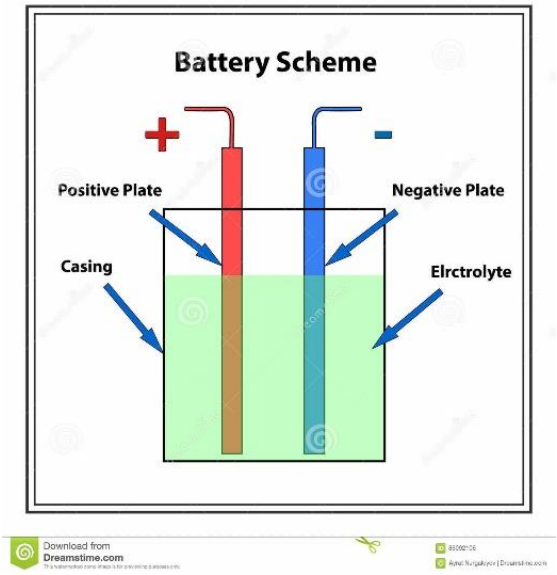
Battery Jars, Battery Trays
& Associated Equipment



A catalog of known battery jars, battery trays,

battery lids, electrodes, etc.

with research on manufacturers, etc.

compiled by

Walter Baumgardt

Tonawanda, NY

Table of Contents

The above list doubles as a list of manufacturers known to have produced battery jars, or whose names have been embossed on jars and associated equipment. A chapter is devoted to each of these companies and or subjects, provided information was available. The index includes names on which no information was available.

At this time, information on some of these companies is rather sketchy. As we develop more data points, I hope to fill in the blanks and have a more comprehensive history of the Battery jar and electrical industry at the time. I attempted to keep the company histories brief in order to highlight the jars and other equipment.

Chapter 1

Introduction

The Battery Jar

Before I begin, I want to thank those whose contributions enhanced this study of battery jars. The first is Debbie Graham who contributed information on her large collection of battery jars. The second is Rick Taylor who shared his extensive collection of battery oil bottles. Bob Berry shared his time and advice on computer matters. There are many others, whom I have not forgotten. I just wanted to give a special mention to those who went above and beyond.

This project is an attempt to document known battery jars, trays, and other battery associated equipment that may exist. In order to better understand the function and use of battery jars and trays, we need to take a minute to understand the basics of electricity. This is by no means a history of electricity. Its sole purpose is to give you a basic understanding of battery jars, and how they worked.

By 1840 – 1850, the concept of producing an electrical current with dissimilar metals in an acidic solution was solidly established. It led to the development of the telegraph, telephone and other equipment which needed a power source. It played a major role in communication during the Civil War and the later westward expansion.

A Battery Jar is simply a container, round, square, or rectangular. Usually they are glass, but they also were made in porcelain and modified hard rubber, whose sole purpose is to hold the components of a battery. The earliest jars were open at the top and fitted with lead electrodes (anode and cathode) in an electrolyte solution of sulphuric acid and water, (based on the Plante battery patented in 1859). The reaction of the acid with the dissimilar metal electrodes produced an electric current.

The open tops resulted in acid leakage, which resulted in damage to surrounding areas. Battery trays, commonly known as sand trays, were used to collect the acid leakage and prevent the damage. Battery trays were shallow flat trays of glass which were filled with sand. The batteries were placed in the sand trays which collected the acid dripping from the batteries. The earliest battery trays were made of wood and lined with lead. Due to the nature of their construction, these trays did not survive, and none are known. Some of the glass trays did survive. What I have identified are in Chapter 4.

It was also found to be necessary to insulate the batteries from their surroundings, in order to prevent shorting the battery. The acidic nature of the early batteries would soon create a fine acidic coating on everything, causing the battery to short. Battery rests helped to solve this problem. The picture below, (**1 – 1**), shows such battery rests in use. Note the battery rests under each of the batteries, as well as the larger rests under the battery supports. The topic of battery rests is discussed, fully, in "Battery Insulators, Oil Insulators, and Chloride Accumulators", by Charles and Sandi Irons (2005). This is reproduced (with permission) in a Chapter 63. In addition, the"Guide for North American Pin Type Insulators" has a well defined and dedicated

section on battery rests . The Price Guide is available from Donald Briel of Providence, UT. Mr. Briel can be reached at www.insulatorpriceguide.com.

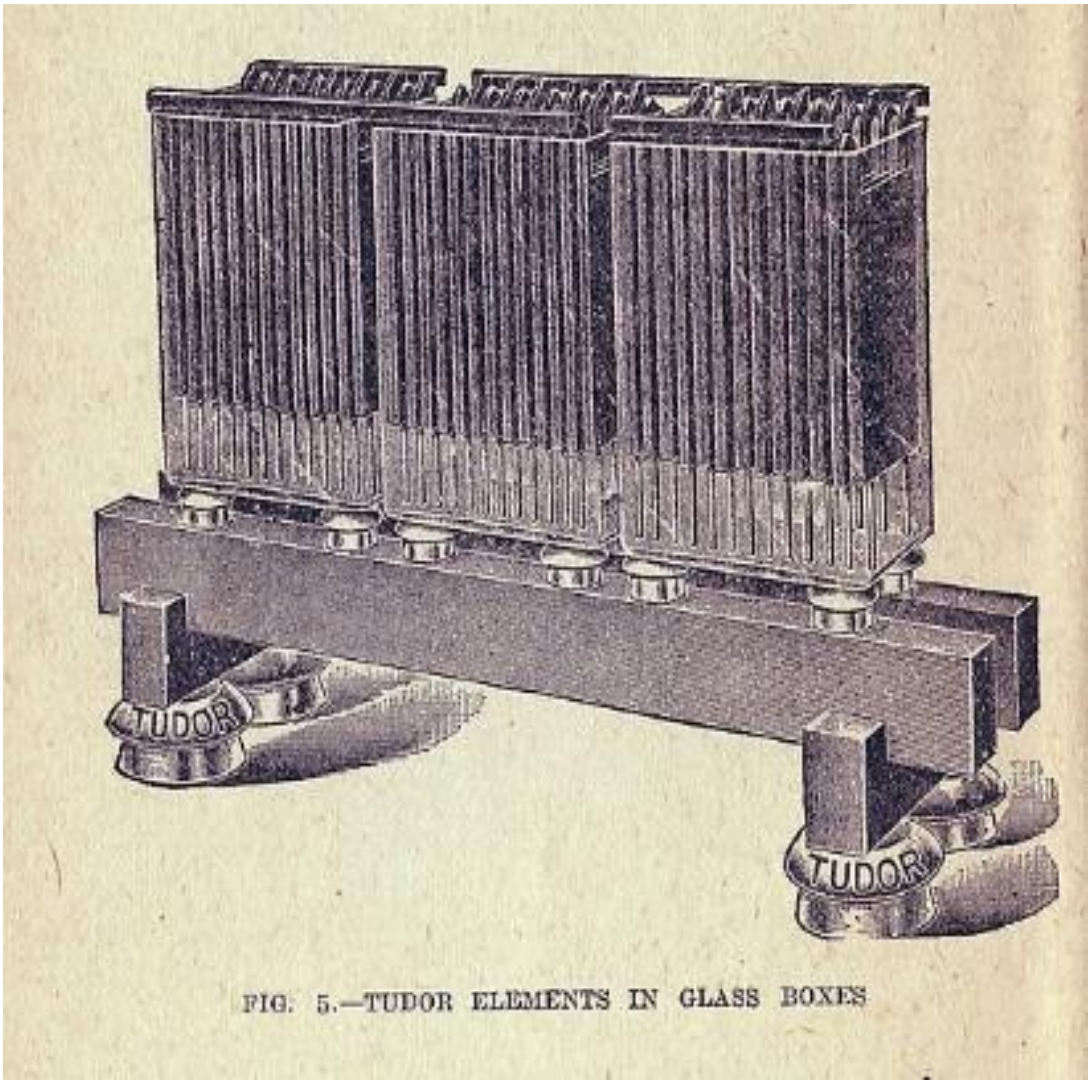


FIG. 5.—TUDOR ELEMENTS IN GLASS BOXES

1 - 1

The first batteries were called Primary Batteries, because they were not rechargeable. When the electrodes were spent you dumped the whole thing out and started over. The advent of the Secondary Batteries, which were rechargeable, enabled batteries to have sealed lids. A perfect example were the Farm batteries, which were sealed and used an internal combustion engine for recharging. The jar lids were either glass, porcelain, or hard rubber. By the latter part of the 1800's and early 1900's batteries were developed with different electrodes that used an electrolyte other than acid; thus, eliminating the dangers of acid usage. The LeCLANCHE battery, patented in 1866, was one of these alternative batteries. It used Zinc and Carbon

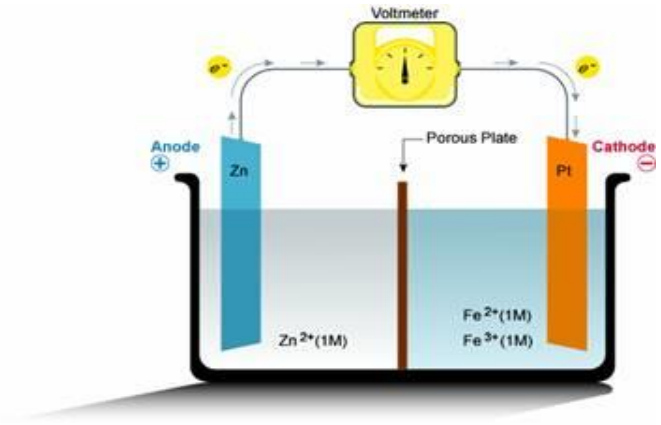
Manganese electrodes with Ammonium Chloride as the electrolyte. The Plante, Lead – Acid battery remained popular as automotive batteries, and farm and home batteries, but the less hazardous, and lighter, LeClanche battery was far friendlier for telegraph and telephone use.

Comparing the differences of Lead-Acid vs. LeClanche batteries, helps to explain how their usage dictated which was used.

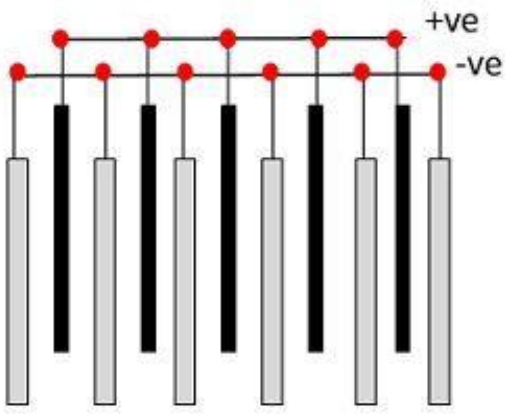
In a LeClanche battery the voltage falls steadily with discharge, whereas in a Lead-Acid Battery the voltage is constant.

- The Energy density of a LeClanche Battery is very low, whereas the Lead-Acid battery can deliver very high currents.
- The LeClanche battery does not perform efficiently at high current drain applications.
- The shelf life of The LeClanche Battery is not very good.

Looking at these differences you can see why the lead-acid battery was the choice for high demand systems such as automotive and the farm and home battery systems. The decreased power demand of telegraph and telephone service favored the LeClanche battery.



1 – 2, left, is a battery jar with a single set of electrodes. It is a single cell and also the simplest battery. It gets confusing because the term cell and battery are used interchangably. Single cells, or batteries, can be linked together to increase the voltage. This can be done by linking individual jars together or by increasing the size of the jar and adding additional sets of electrodes to the same jar. As a spacer is needed between the electrodes, to prevent them from touching, a single cell will always have an odd number of plates. 3 plates being a single cell or the simplest battery.



←**1 – 3:** The plate arrangement in a lead – acid battery , showing the alternating positive and negative plates. (Note: in this simplified format the spacers are not shown).

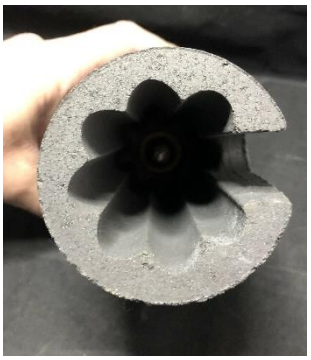
Electrodes varied in size and shape. **1 - 4**, right, is the typical plate assembly. **1 - 4→**

1- 5↓

1 - 6↓

1 - 7↓

1 - 8↓



You will find, however, that most circular jars used circular electrodes, as see in **1 - 5** and **1 - 8**. The anode and cathode were still present, but arranged differently, one around the other. The basis of the Fitch Perefct Battery, it came in different shapes.

Other electrode variants are seen in **1 - 9, 1 - 10** and **1 - 11**. Sizes and shape may vary, but the concept remains the same.

1 - 9↓

1 - 10↓

1 - 11↓

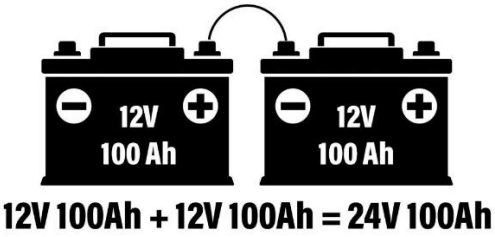
1 - 10 and **1 - 11**, are from the McIntosh Medical Battery.

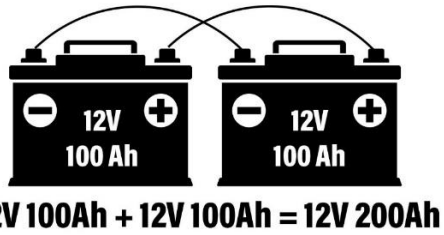
Something needs to be said about battery arrays, where multiple cells (or batteries) are connected together. There are two possibilities: series and parallel connections. The differences are described below.

Series Connections

Series connections involve connecting 2 or more batteries together to increase the voltage of the battery system but keeps the same amp-hour rating. Keep in mind in series connections each battery needs to have the same voltage and capacity rating, or you can end up damaging the battery. To connect batteries in series, you connect the positive terminal of one battery to the negative of another until the desired voltage is achieved.

In the images below, there are two 12V batterie systems, one connected in series which turns this battery bank into a 24V system. You can also see that the bank still has a total capacity rating of 100 Ah. The other is connected in parallel, which maintains the 12 volts but doubles the amperage.



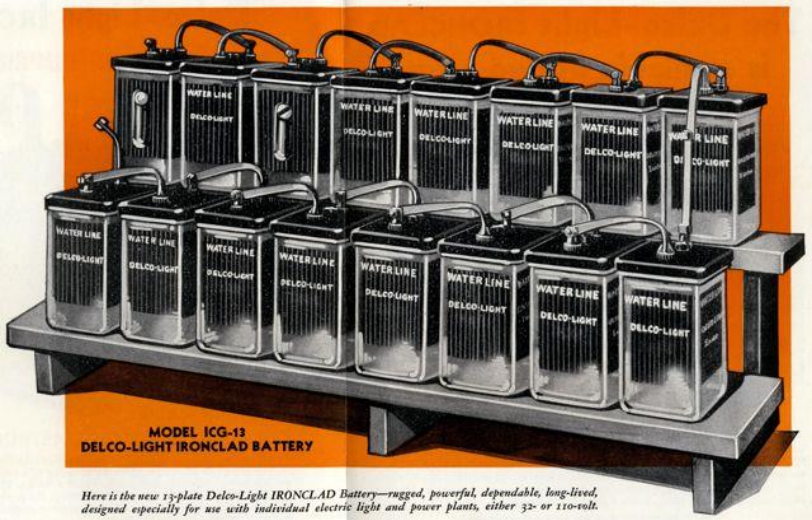


Parallel Connections

Parallel connections involve connecting 2 or more batteries together to increase the amp-hour of the battery bank, but your voltage stays the same. To connect batteries in parallel, the positive terminals are connected together, via a cable, and the negative terminals are connected together with another cable, until you reach your desired capacity**.**

A parallel connection is not meant to allow your batteries to power anything above its standard voltage output, but rather increase the duration for which it could power equipment.

The battery rack shown below, **1 - 12**, is a system for electrifying a whole house and/or farm. It dates from circa 1915. Note each battery contains 13 plates, and there are 16 batteries connected together. The entire system is also called a battery, causing the nomenclature to get confusing at times. Based on data from ESB Co. an array like this could weigh as much as 4500 pounds.



1 - 12

In this catalog you will find what is known about existing Battery Jars and Trays. All pictures and other information is used with permission. If a jar was found with a lid, the lid is reported with the jar. The same applies to electrodes . Please keep in mind that there is no way to know if the lid and/or electrodes reported with a jar actually go with that jar. If they fit they may have been interchanged. In some cases it is obvious that they go together and that is so stated. Tracking the source of many battery jars gets a bit murky, as most of the jars were produced by independent glass houses and fitted with lids produced by yet another independent supplier. The embossing on the jars is usually not the jar manufactuer but rather is advertising for the company that used the jar to make the battery. Porcelain lids usuallycontain the lid manufacturer.

You will notice, as you study the information, that many battery jars fit standard sizes. The most common size is what I'll call a "quart". They are either squared or round, and with or without a pour spout. Generally they will have a ground lip. They have a diameter 4 - 5" and a height of 6 - 8". You will find a few outside of these ranges but not many. Then you have the Farm size batteries. These are the large square and or rectangular jars, generally with a formed lip. These will not have an Electric Co name embossing, but rather the name of the major brand that manufactured them, such as: Delco, Universal, Exide, Gould, Grant, Willard, etc..

And then there are what I call "specialty batteries", manufactured for a specific company for a specific purpose. You will recognize these as you read through the chapters, as they don't conform to the "quart" size of 4–5" diameter x 6–7" tall; nor do they conform to the large size and shape of the Farm battery. Specialty batteries are generally small, sized by oz., or unusually shaped. Many were medical batteries.

We have to remember that a lot was happening at this time. As we learned to make and harness electricity, batteries were called upon to power many things eg. home radio, door bells, radios, phonographs and other home related used.

The development of the battery also spawned the growth of electricity in the medical industry. Chapter 2 is a more detailed discussion of medical batteries.

Many of the larger square and/or rectangular jars have ribs in the bottom. These are designed to hold the electrodes off the bottom of jar, as sediment would short out the plates. Examining such batteries closely will show positive and negative plates are supported on alternate ribs to further prevent shorts. Companies also offered Battery Bridge Rests to overcome some things the ribs could not.

Many companies manufactured battery jars. The LeClanche cell was invented and patented in 1866, and the Lead-Acid cell was invented and patented in 1859 by Gaston Plante. Within this time frame, any patent rights would have long expired

Many glass companies that provided battery jars, etc, published sales catalogs. Where possible I have had these catalogs placed on the NIA web-site (Members Only). To date The ESB Co and Northern Electric Co. offered complete lines of not only battery jars , but also associated equipment. The jars had been manufactured by some glass house To highlight the extent of this industry I extracted parts of the Electric Storage Battery Co . (ESB) catalog and placed it in its own chapter (17).

It is important to kep in mind that advancements in electricity were not slow moving. This was a very dynamic time. The companies at the fore front of this industry were generally incorporated in the last quarter of the 1800s. By the turn of the century we had the first dry cells. The Chloride of Silver Battery Co., of Baltimore Maryland is just one of the companies offering Dry Cells (See Chapter 9). Surprisingly, the Chloride of Silver Dry Cells have a history traced back to the Civil War. National Carbon's, Eveready brand was also introduced about this time. Electroplating equipment was offered in catalogs as early as 1890.

For ease of use, I have grouped everything under the companies, based on the embossing on the jars, lids, etc. Each company is a different chapter, organized as follows: first is a brief history of the company, followed by pictures and the details of known products offered by the company.

Towards the end, is a separate chapter on unknown manufacturers. These are jars, etc. with no embossing, or embossing that doesn't help to identify the manufacturer. Just because we may not know the manufacturer, these pieces are as much a part of the history as any others.

If you have any battery jars and/or lids or other battery accessories, please gather what information you can, including pictures, and advise me of the details. I can be reached at Glassman_43@hotmail.com or 716-860-2524.

Follow the lead from the information on the jars already listed in this endeavor, and will see the information we're looking for. Shape, size, color, dimensions, exact embossing and the location of such. Pictures should include an eye level shot of the jar, preferably showing embossing. If a lid is present, a shot of the lid, with any embossing would be nice. If we all work together we can expand the size of this catalog, and attempt to better understand the size of scope of this important part of our history. For the convenience of the reader, chapters are in alphabetical order by embossing. All pictures are embossed sequentially within a Chapter; e.g. 12 – 2, 15 – 1, etc.

From my research, we know that the following Glass Houses manufactured battery jars:

Gayner Glass Works
Hemingray Glass Co.
Whitall Tatum
Corning Glass Works
Whitney Glass Co.
Cumberland Glass Mfg. Co.
Illinois Glass Co.

Any of the glass houses of the time could have, and may have, manufactured battery jars. The ones listed above, have been verified as having manufactured battery jars. To date, it appears that they manufactured the smaller jars 4-6" in diameter or square x 7-10" tall, what I call the "quart" size.. Of these, very few are marked by the glass house. You will find some jars with a Whitall Taum, Hemingray or Corning marking, but the overwhelming majotity are unmarked by the glass house.

It has not been documented who manufactured the larger battery jars, used for the Farm batteries, and automotive batteries of the time. Certainly the major battery companies of the time, such as:

Edison	ESB	Exide
Gould	Delco	Willard

had the capability. My research shows that the larger battery jars are not manufactured in one piece, like the smaller jars. Rather, they are made in sections and then welded or fused together to make a jar. Although it has not been verified, it is very likely that each companny manufactured their own battery jars.

You may be as surprised as I was at the apparent lack of any kind of consistency of size of the battery jars. There was no apparent attempt to have consistency or standardization of size within a manufacturer, much less between manufacturers. For example, consider the following sizes of battery jars fro just three manufacturers.

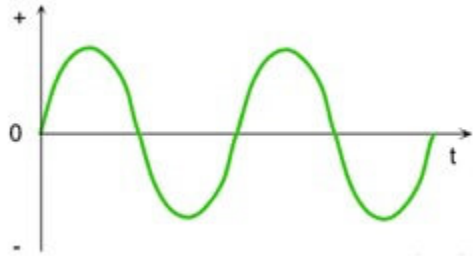
Gould	**ESB EXIDE**	**DELCO EXIDE**
5 x 7 x 11	5 x 7 x 12	6.5 x 7.5 x 10
4 x 7.5 x 10	6 x 11 x 15	6 x 7.25 x 10.75
6 x 9 x 13	7.25 x 7.5 x 10.25	4 x 7.5 x 10.5
3.75 x 8 x 13	4 x 10 x 14.75	6 x 7.5 x 10.5
4 x 7 x 10		
5.75 x 9 x 13.25		

References: 2-8, 63, 68, 78, 96, 97, 98, 110, 111, 118, 129, 140

Chapter 2

Direct vs. Alternating Current

There are two types of electrical current, Direct and Alternating. Battery Jars produce only Direct current. An alternator is required to convert DC to AC.



2 – 1

2 - 2

8 – 1 and **8 – 2** picture Alternating and Direct current. Alternating current (**8 - 1**) changes direction (both positive and negative). The waveform of pure AC is a sine wave. Other forms of AC waves are square, triangle, sawtooth waves. Direct current (**8 – 2**) always flows in the same direction. It's either positive or negative. Pure DC is a flat line.

There are pros and cons of each.

Direct Current:

- DC electricity is easier to store.
- DC motors are more efficient than AC by 15% -20%.
- The major problem with DC is that it cannot be transmitted over long distances.

Alternating Current:

- The main advantage of AC is its ability to be transmitted over long distances with minimal energy loss. This makes it ideal for electrfying towns, cities, and even the whole country.
- Most equipment, however, runs on Direct current. The conversion from AC back to DC results in approximately a 20% loss in power.
- Although both AC and DC are dangerous, AC is most likely to cause heart fibrillation and death.

The history would not be complete without mentioning the "**War of the Currents**". This was the battle that took place between Westinghouse and Edison to determine which electrical system would be the one to electrify America. Both men knew that there was only room for one system,

and Edison set out to ruin Westinghouse in a 'great political, legal and marketing game' that saw Edison stage publicity events where dogs, horses and even an elephant was killed using Westinghouse's alternating current.

Edison realized the Alternating current was the better system, because of the transmission issue, but refused to relent. He hired Nikola Tesla to solve the problem and/or design a new system. When Tesla told Edison that the future of electrical transmission was Alternating current, Edison reportedly fired him, and, according to Tesla, refused to pay him for the work he had done.

In order to sway public opinion about the dangers of alternating current, Edison reportedly electrocuted dogs, cats, calves, horses and even an elephant in order to show that alternating current was dangerous. Westinghouse, in the meantime had purchased all rights to Tesla's patents. The beginning of the end of direct current was in 1896 when Westinghouse and Tesla harnessed the power of Niagara Falls and sent electricity all the way to Buffalo, NY.

Edison attempted to borrow money from J.C. Morgan to buy The Thomson-Houston Electric Co., which in a period of only ten years had grown to the third largest energy producer. Westinghouse and Edison were the other major suppliers. Instead, Morgan, himself, purchased Edison and Thomson-Houston to create The General Electric Co. The Board of Directors, enraged with Edison's shenanigans to promote direct current, left him as a member of the Board of Directors, but, with no authority or power in the company. The final straw was when Westinghouse was awarded the contract to provide electricity for the 1900 World's Fair in Buffalo. In the end alternating current won because it was simply the best system. Westinghouse and Thomson Houston went on to power America.

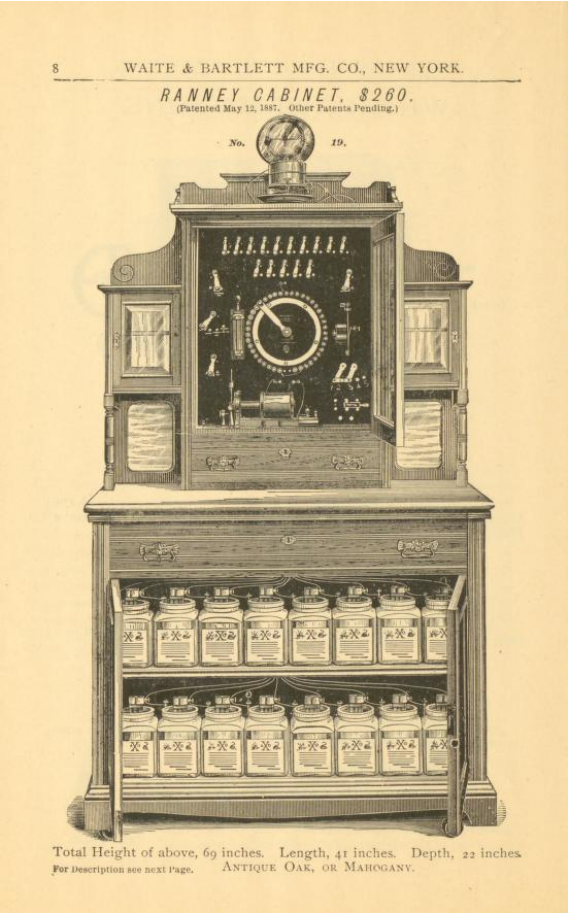
Throughout this document you will find references to the "**War of the Currents**".

References: 61,62

Chapter 3

Medical Betteries.

"Medical Batteries" is a broad term used used to describe a self contained apparatus, including a battery, etc., used for medical treatment, including electro therapy, shock therapy etc.. There are many references in the literature of reputable physicians using electro therapy with good results. All such use was closely monitored long term, and all results documented. Beard and Rockwell (32) discuss the benefits of such therapy. Waite and Bartlett was one such manufacturer of electrotherapy devices used in physicians offices. The Ranney Cabinet,below, is one of several sold by Waite and Bartlett, for this purpose (33).



The Ranney Cabinet, **3 - 1**, is an electrotherapy device sold by Waite and Bartlett for use in physicians offices. Note the array of battery jars in the base.

←3 - 1

On the other end of the spectrum, medical batteries were sold in small self contained units.

They were usually contained in, well constructed, wooden boxes and were 1/3 to ½ a cubic foot in size. As you will see in the manufacturer's catalogs, many companies sold these self contained electro therapy units: F.G. Otto & Sons, Waite & Bartlett, Pilling, Voltamp, Charles T. Green & Co and and Paul Seiler's Electrical Works just to name a few. I have included pictures of several medical batteries to give you an idea of the size of this niche of the industry.

Unfortunately not all physicians were as ethical as Beard and Rockwell. In addition, the way the FDA rules on medical ethics were written at the time, electro therapy devices did not fall under

their jurisdiction. The rules stated that everything in a medical device, etc., had to be stated and that instructions had to be fully described. Since this was done, the electro therapy devices were able to be sold directly to the consumer with no supervision or control. Manufacturers were able to downsize these divices to a single wet cell battery and fit it all in nice wooden box about 8 inches on a side. A multitude of suppliers manufactured and sold them through newspaper and magazine ads. Montgomery Ward and Serars Robuck catalogs in the late 1800's sold them.

References: 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 102, 103, 104, 134, 135

An example of one of these smaller units is pictured, left, (**3 – 2**); "The Florence" by Whitall Tatum and F.G. Otto & Sons The Florence, is typical of the many medical batteries manufactured for home use. It does have a certain air of mystery about it; as I tried to determine who manufactured it. The mahogany case , **3 - 3**, is embossed "WHITALL TATUM & CO.", along with the Patent date of "Aug. 18, 1885", while the battery jar is embossed "F.G. OTTO & SONS / NEW YORK".

←3 - 2

We were leaning toward Whitall Tatum as the battery jar manufacturer, as their catalogs of 1879 and 1880 showed battery jars in their product line. The problem was: where did F.G.Otto fit into the picture. They were known as a major supplier of Medical and Surgical kits during and after the Civil War. It was not until the advertisement for "The MYSTIC " (**3 - 7**, below), was found that we realized, that at some point F.G. Otto & SONS had expanded their role in the medical field to include medical batteries. The Battery jar on the right (**3 - 5**, below) is from The Florence, while the one on the left (**3- 4**, below) is an identical battery jar, embossed F.G. Otto & Sons / NEW YORK. We now knew that Whitall Tatum had likely manufactured the Battery jars for F.G. OTTO & Sons, who manufactured and sold the Florence and The MYSTIC.

The "Florence" is courtesy of Walt Baumgardt.

3 - 3↓

3 - 4 **3 - 5**

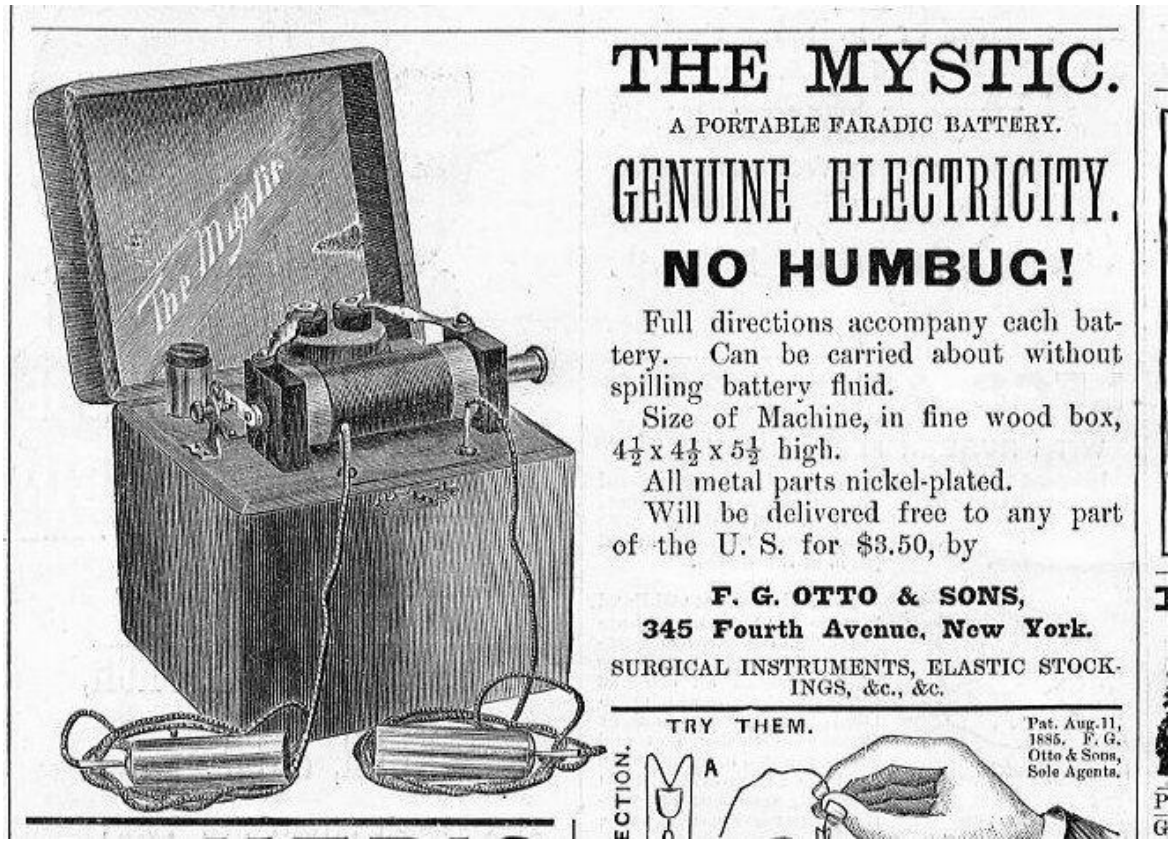
Courtesy of **Walt Baumgardt**

WE still don't know why Whitall Tatum is embossed on the box, **3 – 3**, **3 – 4** and **3- 5** show actual wet cells found in the Florence. Who would have manufactured the mahogany boxes?

Note: the picture of "The MYSTIC" (**3 – 7**) appears to show a battery jar with a round top. This fits well with the Battery jar found by Don Briel, **3 – 6**, which is embossed F.G. OTTO & SONS / JERSEY CITY. It has a 3" square bottom with a 2" diameter round top It is 4 ¼" tall. This slightly smaller batterty jar, likely manufactured by Whitall Tatum, was likely used in the Mystic . Courtesy of **Don Briel**.


JERSEY CITY

3 - 6

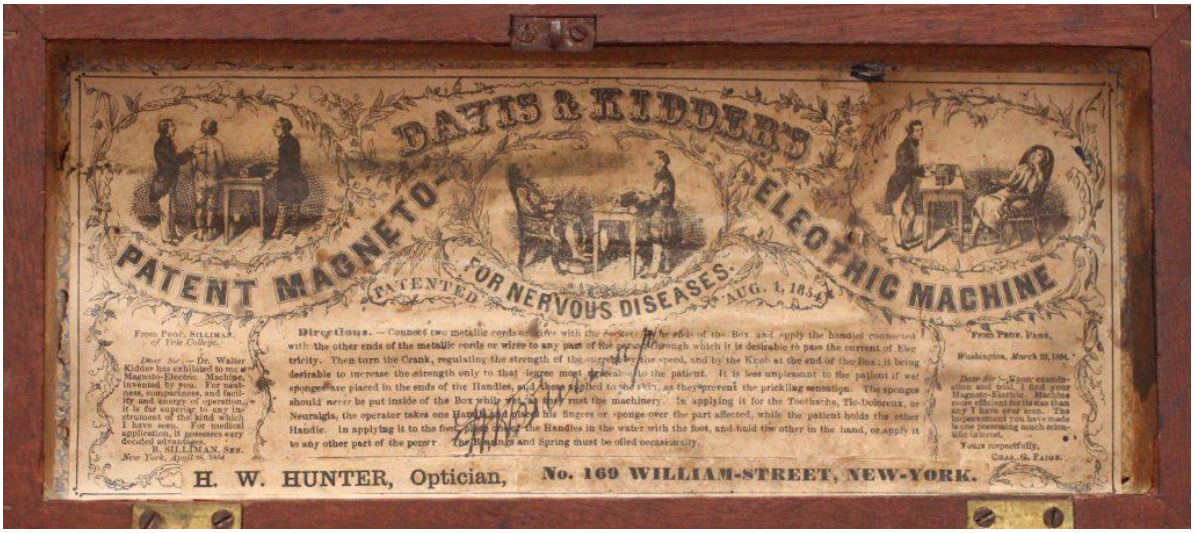

THE MYSTIC.
A PORTABLE FARADIC BATTERY.
GENUINE ELECTRICITY.
NO HUMBUG!
Full directions accompany each battery. Can be carried about without spilling battery fluid.
Size of Machine, in fine wood box, 4½ x 4½ x 5½ high.
All metal parts nickel-plated.
Will be delivered free to any part of the U. S. for $3.50, by
F. G. OTTO & SONS,
345 Fourth Avenue, New York.
SURGICAL INSTRUMENTS, ELASTIC STOCKINGS, &c., &c.
TRY THEM.
Pat. Aug. 11, 1885. F. G. Otto & Sons, Sole Agents.

3 - 7↑


DAVIS & KIDDER'S
PATENT MAGNETO-
ELECTRIC MACHINE
FOR NERVOUS DISEASES

3 – 8 ↑

3 – 9 ↓


DAVIS & KIDDER'S
PATENT MAGNETO-
ELECTRIC MACHINE
PATENTED AUG. 1, 1854
FOR NERVOUS DISEASES.
From Prof. SILLIMAN, of Yale College.
From Prov. FAHS,
Directions.
H. W. HUNTER, Optician, No. 169 WILLIAM-STREET, NEW-YORK.

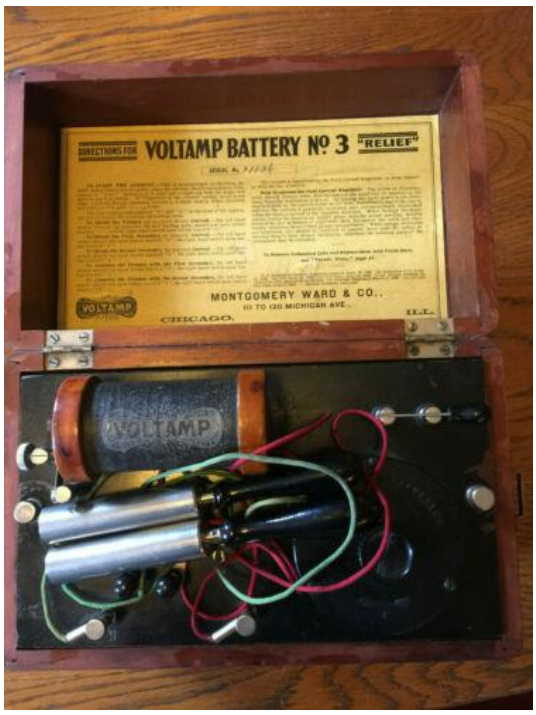
The Davis & Kidder Magneto – Electric Machine **3 – 8 and 3 – 9,** above**,** was patented in 1854 and there is documentation (136) of its successful use to manage pain during the Civil War.

Ari Davis, was a skilled craftsman who received two patents in 1854. #10,788 a machine for producing wooden boxes with metal-reinforced corners and # 11415 described a magneto-electric machine. He sold the rights for both, to a physician, Walter Kidder, in Lowell, MA. In a very short time advertisements for DAVIS' (and later DAVIS & KIDDER'S) PATENT MAGNETO-ELECTRIC MACHINE , for NERVOUS DISEASES, were seen. They were manufactured by W. Kidder, whose signature is on all genuine machines. By 1857 the business was in the hands of William Burnap, also from Lowell. By 1865, Burnap was in New York advertising as "Manufacturer of Davis & Kidder's Electric Machine".

Voltamp produced a whole line of medical batteries, for electroshock therapy. They all use dry cell technology, where many earlier models used wet cells.

3 - 10↓

3 - 11↓



←3 - 12↑

3 - 10 through **3- 13** show the line of medical batteries offered by Voltamp in the early 1900s. They were all powered by dry cells and meant for home use.

←**3 - 13**

McIntosh Galvanic and Faradic Battery Co. of Chicago Illinois was another manufacturer of medical batteries. Pictures **3 – 14** through **3 – 18** (below) show the details of one of their medical batteries. The plaque in **3 – 15** shows the patent date of 1881. **3 – 17** and **3 - 18** show the electrolyte containers and the electrodes for this wet – cell battery.

3 - 15↓

←**3 - 14**

←3 - 16

3 - 17↑

← 3 – 18

Keeping in mind the dynamic growth of the industry, by circa 1913 medical batteries had become an arcade attraction. Below we see two such popular attractions. Just insert a coin and hold the handles to improve your health. The first is the Mills electric shock machine, **3 - 19**. The Acme machine is shown in **3 – 20.**

←3 - 19

3 - 20→

3 - 21↑

3 - 22↑

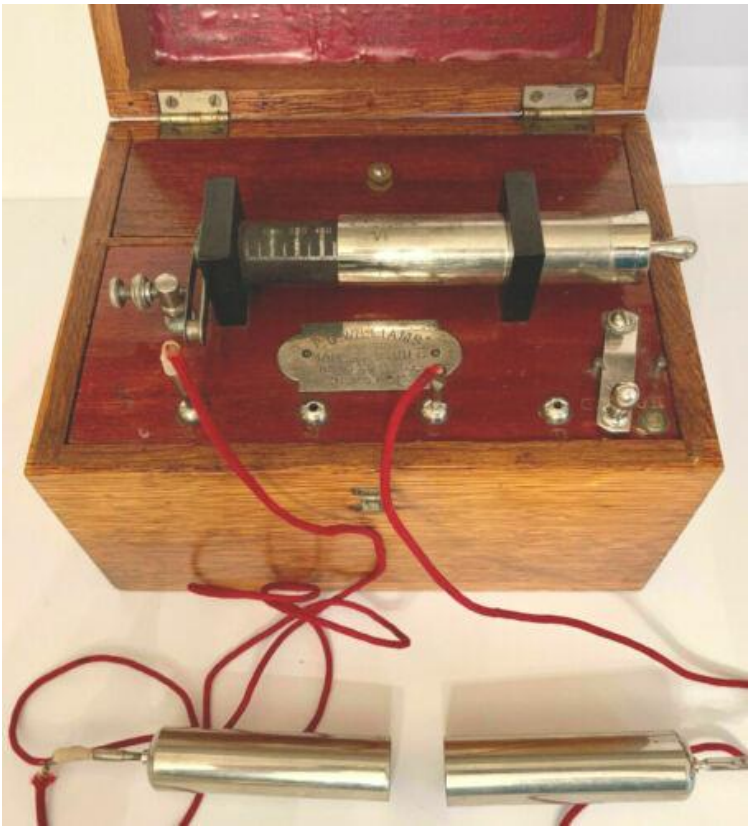
3 - 21 and **3 -22** show a medical battery made in England. The name plate says: manufactured in England by / Garrett Osborne Co. Ltd / London. It appears to be a Violet Ray (Ultra Violet) machine. It appears this machine was a later model, as it looks like it had a power cord that plugged into a household electrical system.

3- 23, is another medical battery. The plate in the top reads: "THE DOW" / Portable Electric Assistant / Patent Applied For / G.N.CLAPP & Co. Sole Ag'ts. / BOSTON, MASS.

←3 - 23

←3 - 24, is a medical battery. The instructions in the lid include the manufacturer; "The MURRAY-BAUMGARTEN Surgical Instrument Co. / 216 West Franklin St / Baltimore , MD.

←3 - 24



3 - 25 left shows yet another medical battery, The name plate is engraved: See **29 - 30**, below.

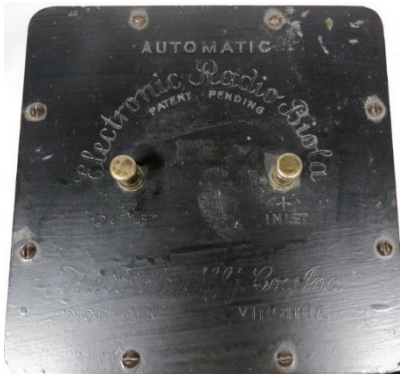
←3 - 25

3 - 26↓

On the other end of the spectrum were items that were questionable at best. One of these is the Electronic Radio Biola , pictured below, manufactured by The Biola Mfg. Co of Trenton, N.J

3 - 27↑

3 - 28↑



3 - 29↑

3 - 30↓

Pictures, **3 – 27** through **3 – 30** , show the Electronic Radio Biola. The battery jar is 4 ½" diameter x 5 ¼" tall, in a mahogany case. The only embossing is on the top : AUTOMATIC / (arc) ELECTRONIC RADIO BIOLA (arc) PATENT PENDING / THE BIOLA MFG. CO. INC. / NORFOLK, VIRGINIA. There are two electrical terminals on the top, labeled OUTLET (-) and INLET (+). Directions called for attaching one elctrode to A Radiator, filling the jar with water and attaching the other electrode to yourself; to rid your body of all manner of diseases.

Biola courtesy of Walt Baumgardt.

It is items such as this that helped to give electro therapy a bad name.


GOMERY WARD & CO.'S CATALOGUE No. 57.

Portable Electro-Medical Batteries.

Magnetic Electro Battery.

Medical Battery Parts.

Order No. 24185 and be sure to specify what Battery the parts are for.

Medical Induction Coil, Without Battery.

Electric Motors.

WE CARRY IN STOCK a full line of DRUGS, CHEMICALS, PHARMACEUTICAL PREPARATIONS, Etc., Etc., and can fill orders promptly and correctly. An experienced druggist is in charge, and he will compound prescriptions when so ordered. Send for our Drug List. Mailed free.

←**3 - 31**, shows a page from a Montgomery Ward catalog showing several medical batteries.

Electro Therapy was popular at the time, as attested to by Beard and Rockwell., and I believe that many were truly interested in helping people. But the carnival atmosphere led to Quacks and Charletans entering the field. It seems as if every electrical company had to participate in this craze. While some were legitimate the miraculous claims by some stretched the imagination to its limits.

I'm not saying that the medical batteries would have ever found a place in medicine, but the charlatans didn't help their cause. Was it a case of the baby being thrown out with the bath water?

It is rumored that the dollars of the Pharmaceutical companies helped to get the FDA to rule against electro-therapy, because there was more money to be made in pharmaceuticals.

It is food for thought, as, Canada and Europe allow electro-therapy with few restrictions.

References: 10-14, 15, 16, 19, 21, 27, 28, 36-39, 86-88, 106, 122-126, 136

Chapter 4

Farm / Large Building Battery Systems

Batterys were assembled in arrays similar to the ones shown below, in order to power farms and or large buildings. Large arrays, like this, were necessary in order to produce the power necessary to power a farm or home.

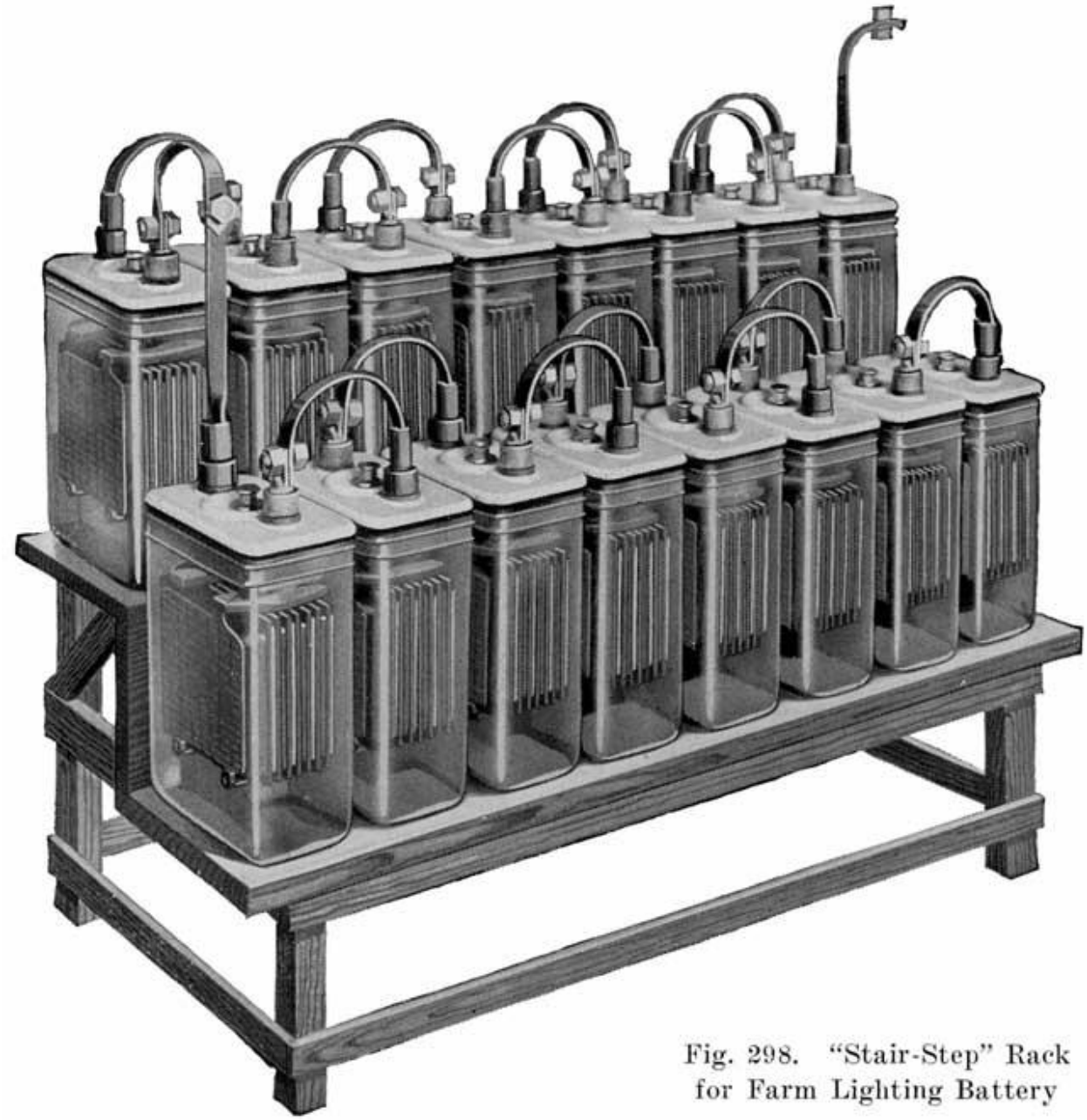


Fig. 298. "Stair-Step" Rack for Farm Lighting Battery

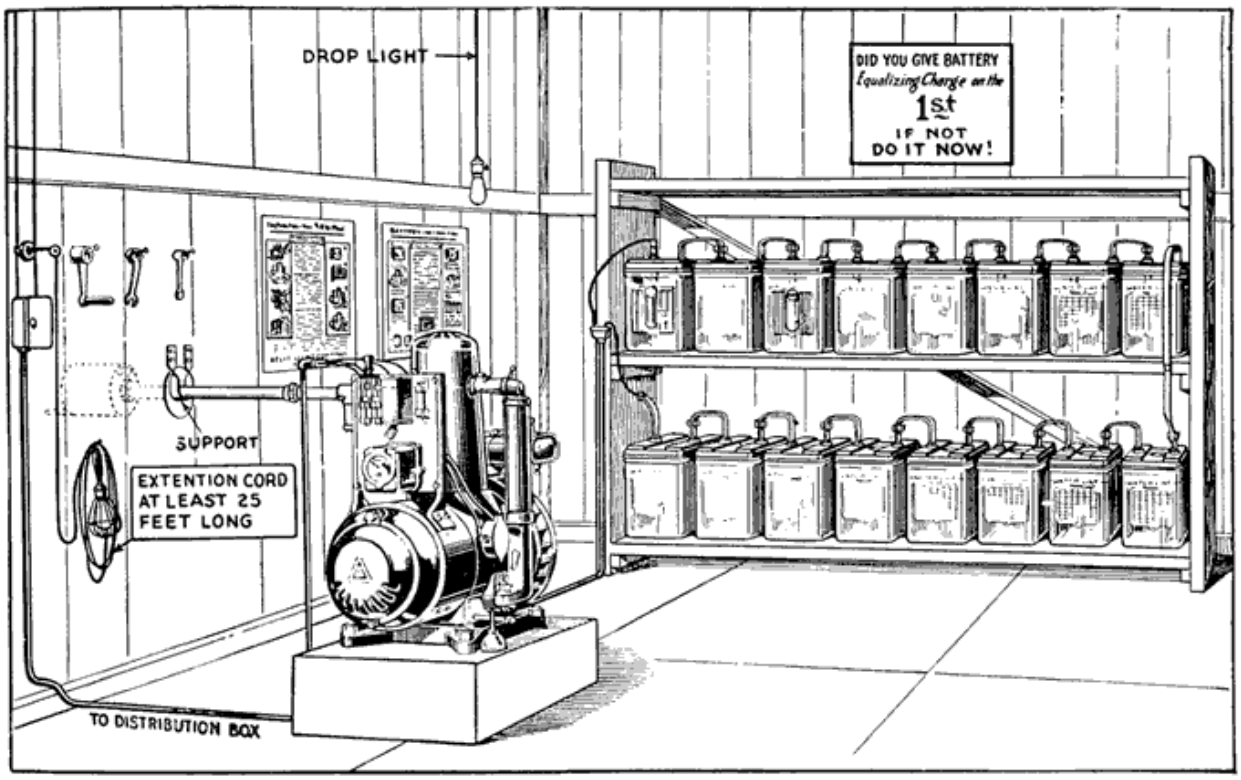


Fig. 299. Installation of a Delco-Light Plant, Showing Two-Tier Shelf Rack for Battery

There were two systems for setting up the batteries, with the preferred method being the "Stair Step " shown in **Fig. 298**. If space was at a premium, the other method was the 2-tier shown in **Fig. 299**. The "stair step" was preferred as the batteries were not directly over one another, and therefore more accessible. Although these systems were all sealed units, leaks could and did develop from time to time. The "stair step", in the event of a leak prevented the acid from dripping onto the batteries blow.

Many companies provided such farm battery systems. Pictures of the various batteries are shown below. Regardless of the batteries used, the set-up would be the same as shown in Fig. 298 or 299. Notice: all are multiple electrodes in sealed battery jars.

As I started my research, I was surprised to find battery jars and battery systems were still being manufactured in the 1940s. Further research revealed that the first farm battery was manufactured by DELCO in 1916; and, by 1920, Delco Light reigned supreme. After the Great Depression, one of the New Deal programs was the Rural Electric Administration (REA), in 1935. Its purpose was to bring electricity to the rural areas of the country. In 1930 only 10% of the rural population in the United States had electrical service. At the beginning of WWII only 50% of the rural population had electrical service. I was born on a farm in 1943, and was fortunate that we had electricity.

Batteries used in such systems included:

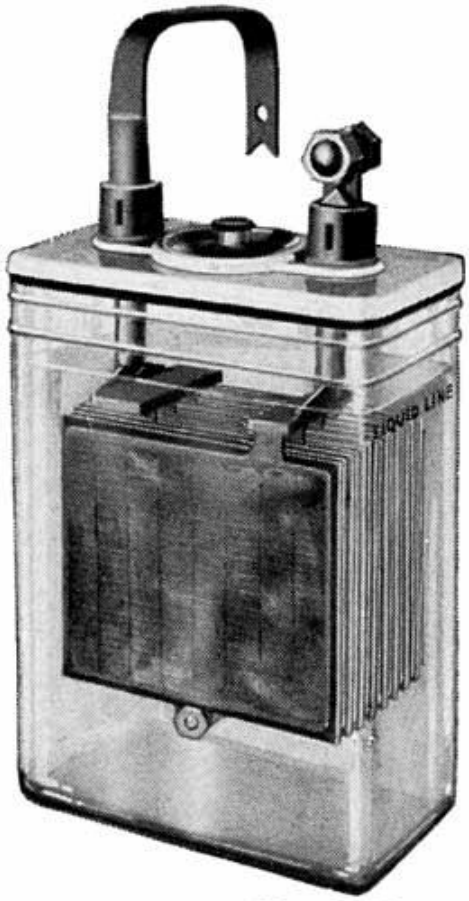


Fig 328. Willard Farm Lighting Cell

Fig. 327. Westinghouse Farm Lighting Cell

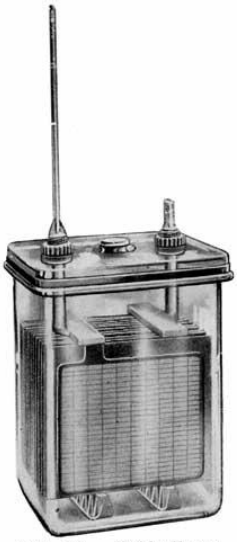


Fig. 296. Exide Farm Lighting Cell with Sealed Glass Jar

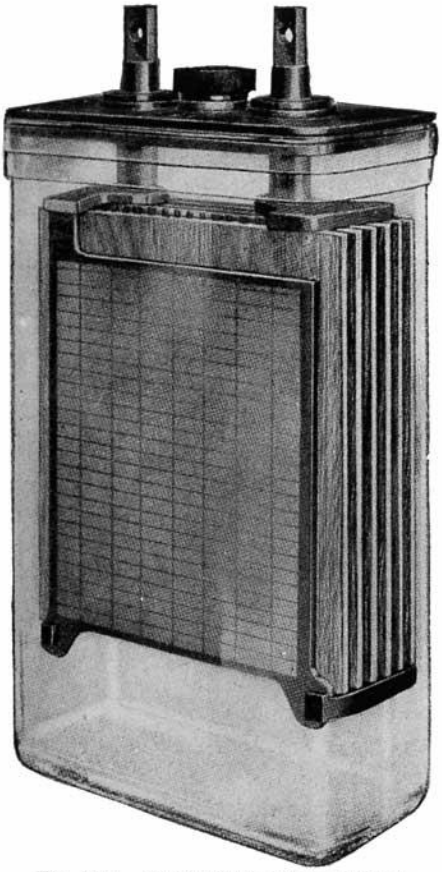


Fig. 295. Prest-O-Lite Farm Lighting Cell, with Lead-Antimony Cover

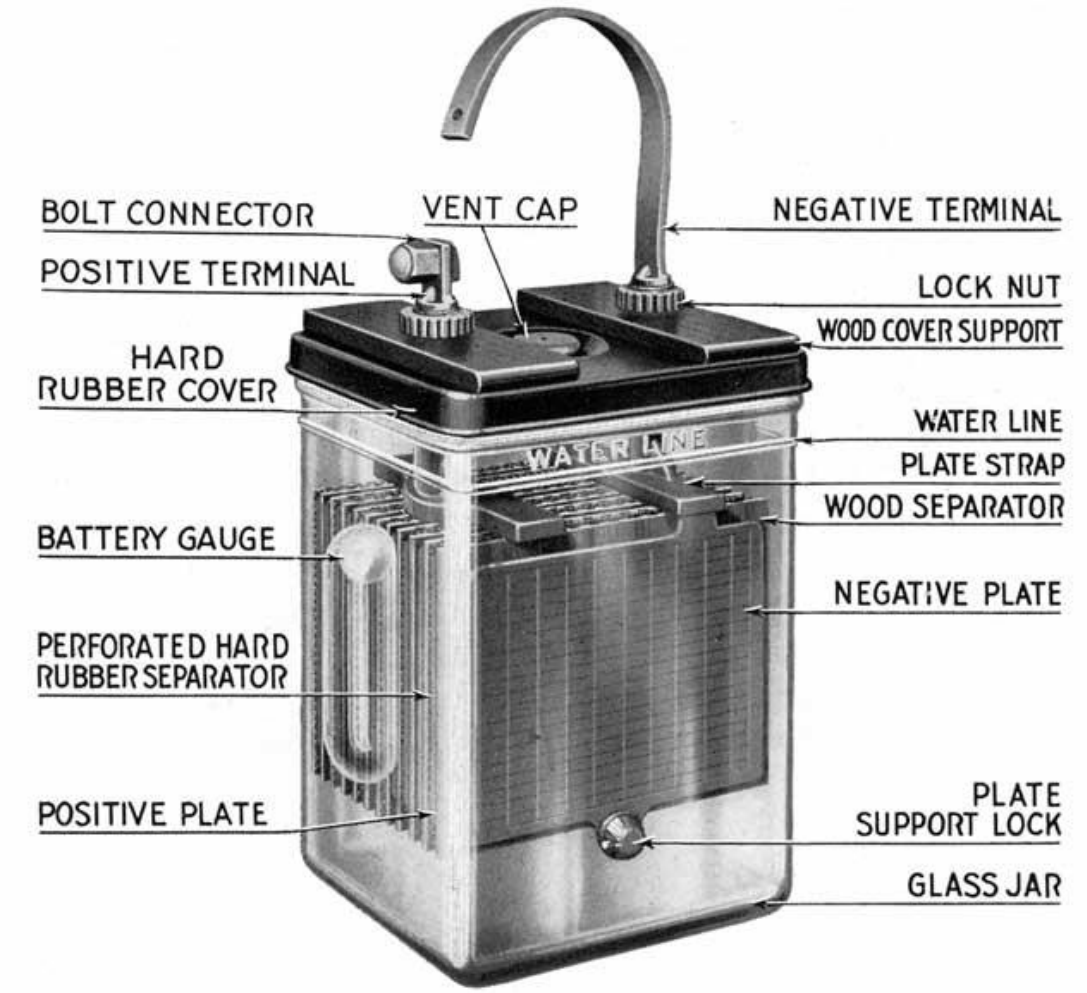


Fig. 294. Exide "Delco Light" Farm Lighting Cell with Hard Rubber Cover

Each battery in a farm array could have anywhere between 7 and 15 plates, and there were usually 16 of these batteries connected together in the array to form the larger battery. The power requirements ultimately determined the number of plates per battery and the total numbers of individual batteries. The rule of thumb was that the entire system would require recharging no more than twice a week. Recharging was accomplished with an internal combustion engine wired into the system. Picture **299, page 30**, shows the entire system, including the internal combustion engine.

Farm systems could be wired in parallel or in series, or even both. Parallel connections could be used to achieve the amperage needed, and the rest of the system could be series. Systems like this were more common than we might like to think. Remember, at the start of WWII, only 50% of rural America was electrified. This is why advertising campaigns such as Reddy Kilowatt were so necessary to push for electrical service in rural areas.

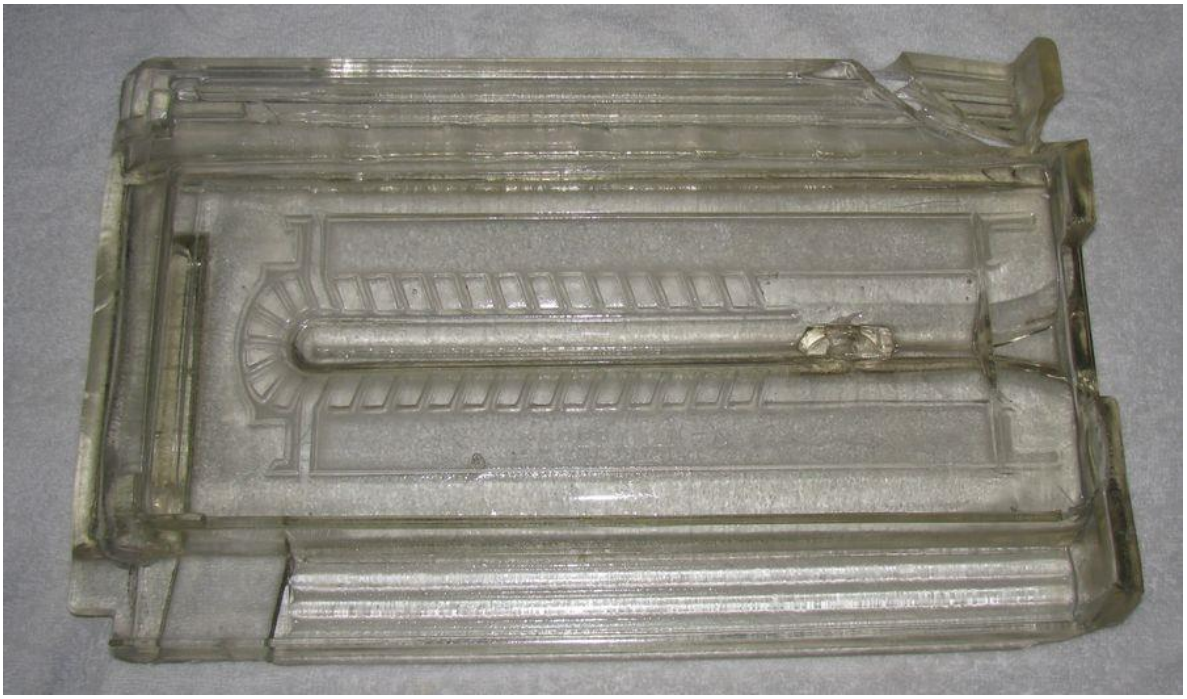
References: 89, 90, 112-12

Chapter 5

Battery (Sand) Trays

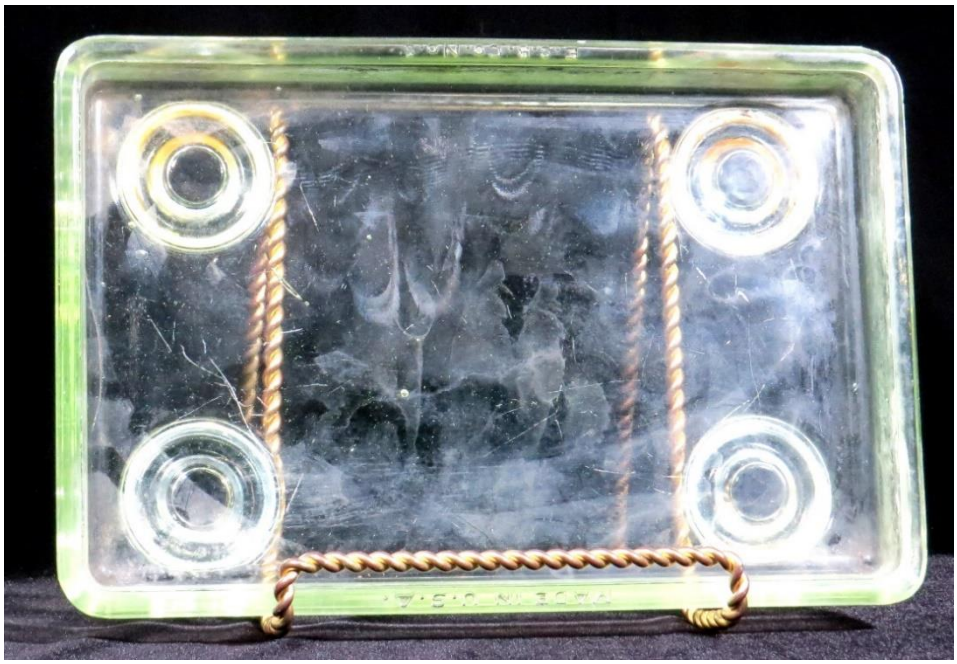
Note: A more detailed explanation of battery trays is found in the Introduction (page 4). Basically they were flat trays which were filled with sand and placed under battery jars without sealed lids. The sand absorbed any acid spills, etc, protecting the surrounding area.

5 – 1, below, is marked ESPERANZA , S. A., from Spain. Its dimensions are 16.5" x 10". Courtesy of **Caleb Thimell**. I spoke with Caleb and he sincerely believes it is a sand tray. It should be noted that I have a similar piece that is an ESPERANZA glass roof tile.



5 - 1↑

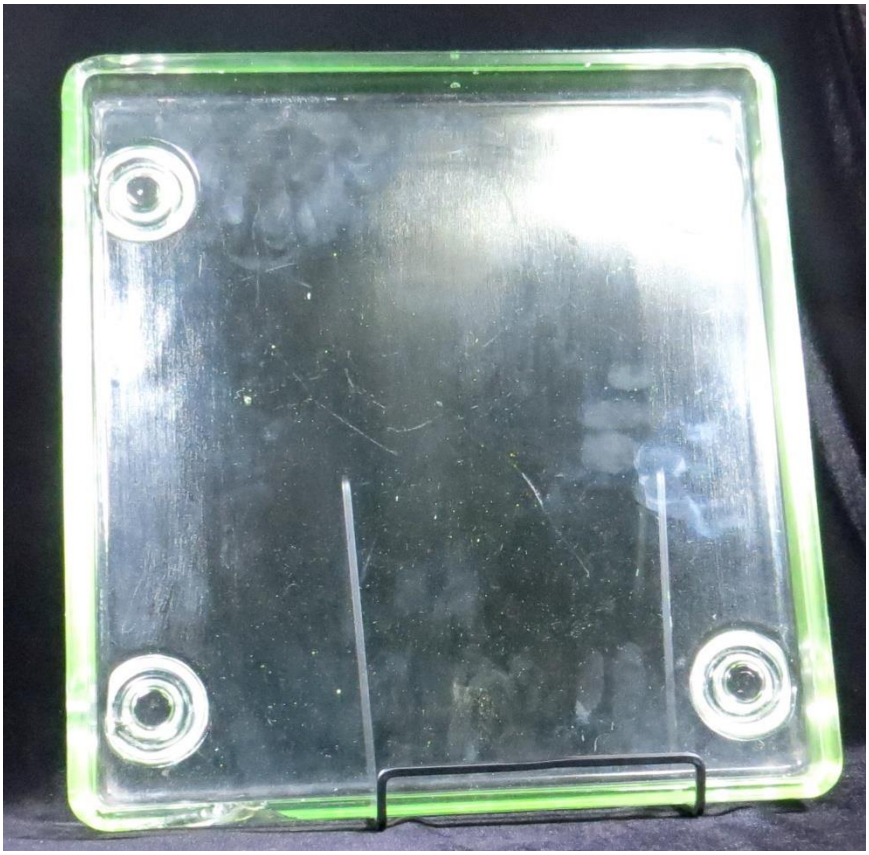
In the United States, ESB . offered battery trays in their catalogs. Examples of some of these have been found. (See below). See page 228 for more informatio on Uranium (Vaseline) Glass.



←**5 – 2** is embossed E.S.B. Co. No. 5 // Made in U.S.A. Its dimensions are 6.75” x 10”. It is Uranium Glass. Courtesy of **Walt Baumgardt.**

←**5 – 3**, is embossed E.S.B. Co. No. 6 // Made in U.S.A. Its dimensions are 9.25” x 10”. It is Uranium Glass. Courtesy of **Walt Baumgardt.**

←**5 – 4**, is embossed E.S.B. Co. No. 7-5 // Made in U.S.A. Its dimensions are 10.25” x 13.5”. It is Uranium Glass. Courtesy of **Walt Baumgardt.**



←**5 – 5**, is embossed E.S.B. Co. No. 9 // Made in U.S.A. Its dimensions are 12.5” x 13.5”. Courtesy of **Walt Baumgardt.**

5 - 6, left is embossed E.S.B. Co. No. 2 / Made in U.S.A. Its dimensions are 7.5" x 9" and is light SCA. Courtesy of **Nick Bergkessel.**

The following notes apply to the battery (sand) trays pictured above:

Model #	**Size (in.)**	**Top**	**Bottom**	**Color**
E.S.B. 5	6.75 x 10	E.S.B. И0. 5	MADE И U.S.A.	Uranium
E.S.B. 6	9.25 x 10	E.S.B. Ио. 6	MADE И U.S.A	Uranium
E.S.B. 7-1	10.25 x 13.5	E.S.B. Ио. 7-1	MADE IN U.S.A.	Uranium
E.S.B. 9	12.5 x 13.5	E.S.B. И0. 9	MADE И U.S.A.	Uranium
E.S.B. 2	9 x 7.5	E.S.B. No 2	MADE IN U.S.A.	SCA

Notes:

- All the Ns are backward on the Vaseline (Uranium) trays.
- The Ns are normal on the SCA Tray No. 2.
- The heights of the trays vary from 1.5 – 1.75".
- Each tray has four short legs (0.375").
- The Vaseline trays (also known as Uranium glass), glow under black light.
- Embossing is on the top of the front and rear lips.

You will notice that none of the sizes match any trays from the E.S.B Co. catalog. It is unknown why this is so.

References: 3, 4, 62

Chapter 6

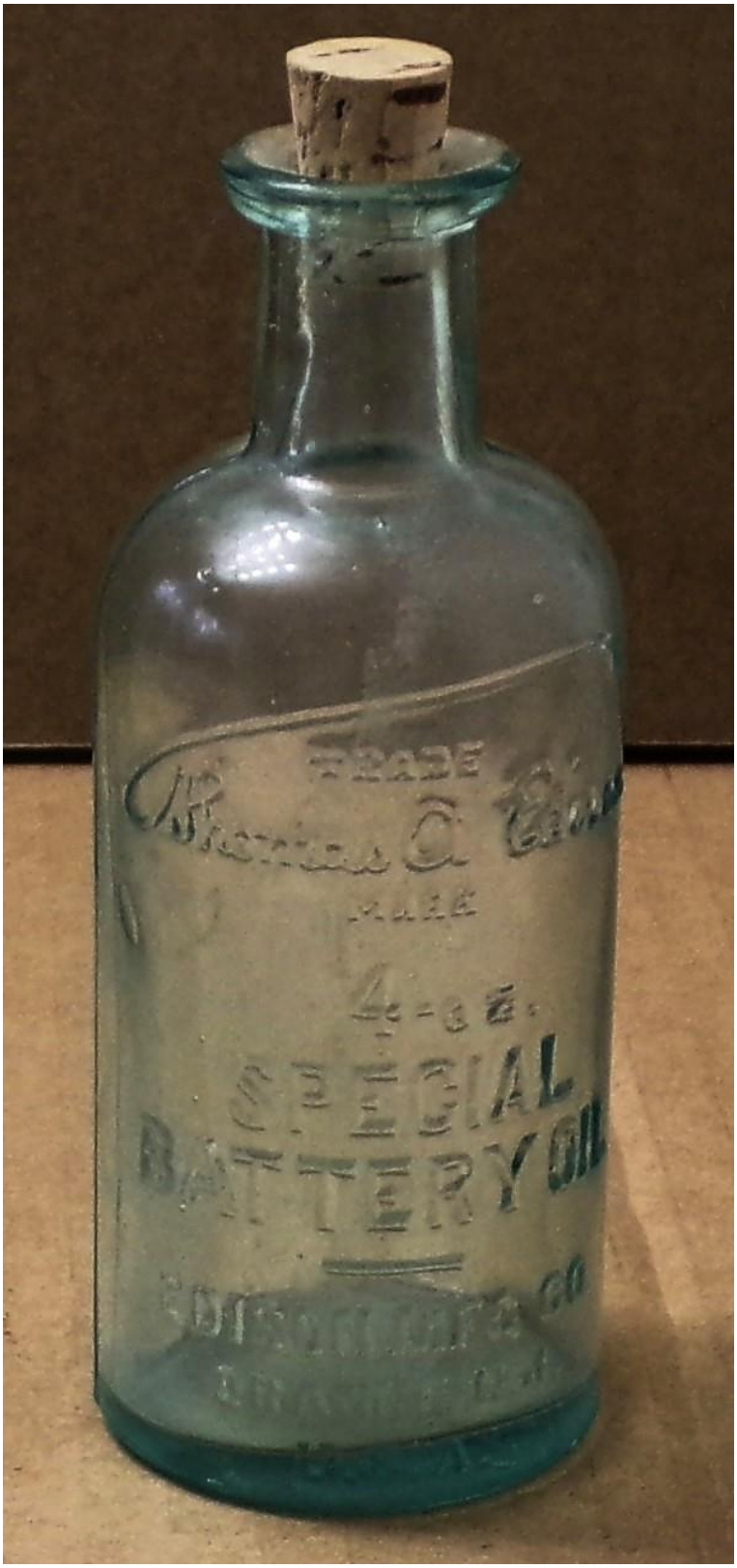
Battery Oil Bottles

No discussion of battery jars would be complete without some mention of battery oil. The battery oil and the bottles it came in could be called associated equipment, as it was essential for a successful battery. Immediately, when oil is mentioned, we tend to think of lubrication. Battery oil is different. The "battery oil" was poured on top of the fresh electrolyte in each cell to prevent evaporation and gassing while charging on these utility poles. The oil would float on top of the electrolyte to give a thick protective oil film. This would help the battery gases to re-combine instead of gassing-off while sitting long term, or re-charging. It also prevented evaporation. You often find empty Edison Battery Oil bottles of 3-4 oz. size, near old railroad iron signal & switch boxes in the woods near the switch & signal boxes today.
The railroad workers would use the oil and then just toss the empty bottles in the woods alongside the tracks.
I am extremely grateful to Rick Turner for sharing his Battery Oil bottle collection: I had no idea that there was so much to Battery Oil bottles until I received the information from Rick. This entire chapter is courtesy of **Rick Turner**.

←**6 – 1**: Is a 6 oz. Edison bottle. It is light green aqua; 2.25" diameter x 5.675" tall. It is a blown in mold bottle with a hand tooled lip. Embossing appears to be hand script. Actual embossing is: (Front) Trade / THOMAS A. EDISON (script) / Reg. U.S. Mark Pat. Off./ 6 OZ. / Special / Battery Oil / Thomas A. Edison Inc. / Orange, N.J. U.S.A. (Base) C-6 Courtesy of **Rick Turner**.

We know that a 2oz. and a 5oz. bottle with the exact same embossing as **6 – 1** and **6 – 2**, exist. Both are Aqua and blown in mold.

6 – 2↑ Shows three – 4 oz. Edison bottles. The two on the left are aqua, while the one on the right is SCA. They are all 2" diameter x 4.875" tall. Like **6 - 1**, they are blown in mold with hand tooled lips, and with what appears to be hand script. Actual embossing is as follows: (Front) TRADE / Thomas A. Edison (script) / Reg. U.S. TRADE Pat. Off./ 4 oz. / Special / Battery Oil / Thomas A. Edison Inc. / Orange, N.J. U.S.A. (Base) C-4. Courtesy of **Rick Turner.**



←**6 – 3**, is a 4 oz Edison bottle with embossing variation. It is aqua; 2" diameter x 4.875" tall. Like the others it is blown in mold with a hand tooled lip. Embossing does not appear to be hand script as in **6 – 1** and **6 – 2**.

Actual embossing is as follows: Trade / Thomas A. Edison (script) / Mark / 4 – oz. SPECIAL / BATTERY Oil / Thomas A. Edison Mfg. Co. / Orange, N.J. U.S.A. Courtesy of **Rick Turner**.

Note: Differences from other 4- oz. bottles:

1. No Reg. U.S. Pat Off.
2. It is EDISON Mfg. Co. rather than THOMAS A. EDISON, Inc.

\

←**6 – 4**, is a rare paper label Edison bottle. It is a 4 oz., aqua bottle, sealed with tar. It is 2" diameter x 4.875" tall; blown in mold with a hand tooled lip. The Label reads: TRADE MARK / Thomas A. Edison (script) / SPECIAL BATTERY OIL / to be used only in / EDISON PRIMARY BATTERY / charge for one cell types Q, S, SS or V. Pour Oil on Solution after / Soda is thoroughly dissolved. / Manufactured By / EDISON MANUFACTURING CO. / Orange, N.J., U.S.A. (Base) either 6 or 9. Courtesy of **Rick Turner**.

The bottle is rare for two reasons:

1. It is full and sealed.
2. It has an in tact paper label.

6 – 5↑ shows four 3 oz. Edison bottles. The colors are aqua, clear and a light cornflower blue. They are all machine made, 1.25" diameter x 4.375" tall. The bottles are embossed: Trade / Thomas A. Edison (script) / REG. U.S. Mark Pat. Off. / 3 – oz. / Special / BATTERY OIL / Thomas A. Edison Inc., Orange, N.J. U.S.A. Courtesy of **Rick Turner**.

←**6 – 6** IS A RARE AUSTRALIAN, MACHINE MADE, EDISON OIL BOTTLE. THE COLOR IS CLEAR AND ITS DIMENSIONA ARE: 1.675" DIAMETER X 4.675" TALL. ITS EMBOSSING APPEARS TO BE HAND SCRIPT, AND READS: 3 OZ. / SPECIAL BATTERY / OIL / THOMAS A. EDISON LTD. / SYDNEY / N.S.W. COURTESY OF **RICK TURNER**.

A 4 oz. aqua bottle, with the exact same embossing exists.

←**6 – 7** are the front views of Edison flask style bottles, of which there are three variations. All are from after the Edisan plant burned and it was moved to Bloomfield, N.J. This is the oldest style, in aqua and clear. Exact embossing is: (front) SPECIAL / BATTERY OIL / Edison / Primary Battery / Division / Thomas A. Edison Inc. / Bloomfield, N.J. Courtesy of **Rick Turner**.

← **6 - 8** is the rear views of **6 - 7** The embossing is vertical; as follows: Trade / Thomas A. Edison / Reg. U.S. Mark Pat. Off.

The bottles are 1.125 x 1.06 x 4.75” tall. Note the seam band midway in the neck.

6 – 9 is the front view of the second style of Edison Flask bottles. Embossing is as follows: (Front) SPECIAL / BATTERY OIL / THOMAS A. EDISON / INCORPORATED / PRIMARY BATTERY /6DIVISION / BLOOMFIELD, N.J. U.S.A.

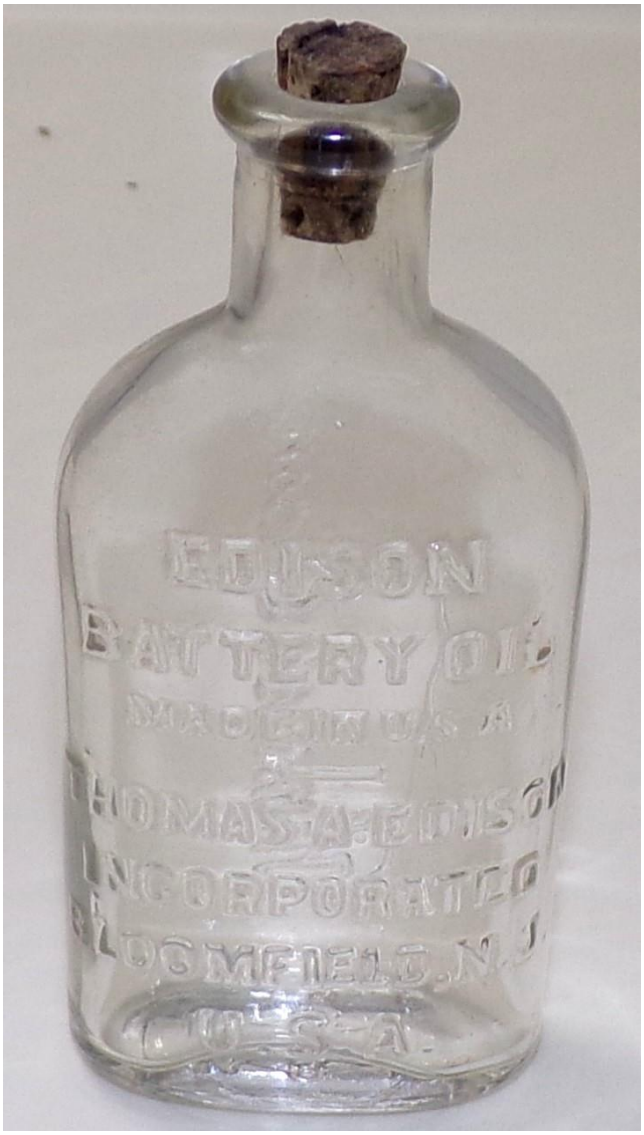
6 – 10 is the rear view of 5 - 9: Embossed as follows: TRADE / THOMAS A. EDISON / Reg. U.S. MARK Pat. Off. / Made in U.S.A. Courtesy of **Rick Turner**.

The bottle is 1.125 x 2.25 x 4.5" tall. The base is embossed 380 W<>T 4

Note: I have this exact bottle in clear galss. On the base is 836 / T (in inverted Triangle) / 10. The logo is for Turner Bros. of Terre Haute, IN. (1910-1929).

←6 - 9

6 - 10↑



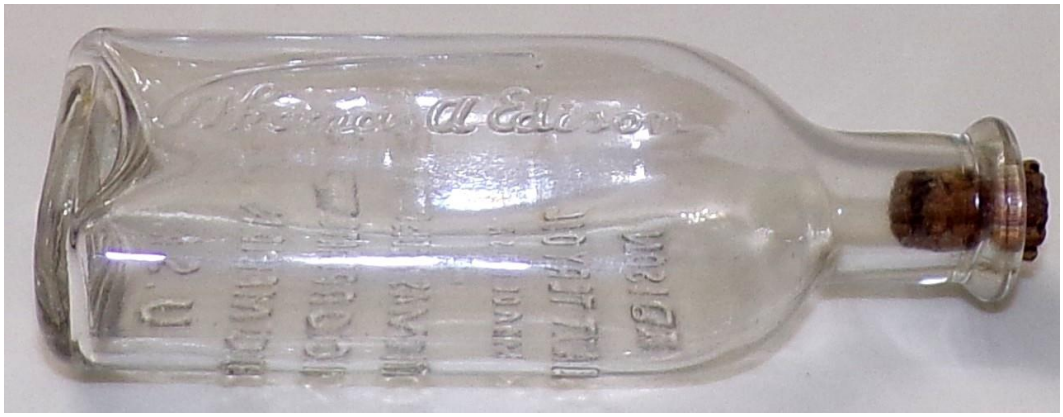
6 – 11 and **6 – 12** are the front and rear views of the third and final style of the Edison flask style battery oil bottle; Courtesy of **Rick Turner**.

It is clear glass with embossing as follows: (Front) EDISON / BATTERY OIL / Made in U.S.A. / Thomas A. Edison / Incorporated / Bloomfield, N.J. / U.S.A.

The reverse is simply Thomas A. Edison (script)

The bottle is 1.125 x 2.25 x 4.5" tall. The base is embossed 14 <O> 1.

←6 - 11



←6 - 12

6 - 13↑ shows three Edison crown top battery oil bottles. They have the Coke bottle style closure and come in clear and light green. Courtesy of **Rick Turner**.

The embosing is as follows: EDISON / BATTERY OIL / Made in U.S.A. / Thomas A. Edison / Incorporated / Bloomfield, N.J. / U.S.A. (Reverse) Thomas A Edison. The dimensions are 1" diameter x 4.125" tall.

The middle bottle is an unembossed Edison Bottle.

←**6 – 14** is a clear bottle with the Crown closure.

It is embossed as follows:

BATTERY OIL / National Carbon / Company / A Division of / Union Carbide / and Carbon Corp. / 30 East 42ND ST / New York 17, N.Y. / MADE in U.S.A. NOTE: the early 2 digit Zip Code. Courtesy of **Rick Turner**.
The dimensions are 1.5" diameter x 4.125" tall.

The base is embossed with an oil derrick. Others have been found with a eystone.

Note: The 2 digit zip code was introduced during WWII and discontinued in 1963 in favor of the 5 digit code.

6 - 15↑ shows two variations of a Waterbury embossing. Both are clear glass with crown closures. The bottle on the left is embossed: WATERBURY / BATTERY OIL / The Waterbury Battery Co. / Waterbury, CONN / U.S.A..The dimensions are 1.5" diameter x 4.125"tall. Courtesy of **Rick Turner**.

The bottle on the right has the same embossing except the location is Plainview, CONN.

←**6 - 16** is simply embossed BATTERY / OIL. The base has the number 15 and an oil derrick. It is clear glass with the crown closure. Its dimensions are 1.5" diameter x 3.625" tall. Courtesy of **Rick Turner**.

6 - 17↑ shows two clear battery oil bottles, with no idea of where they came from. The one on the left is simply embossed 2 ½ FL. OZ.. the base is embossed O-I in a diamond with numbers. The one on the right is embossed on the lower lip "Prior Patented Registered 2 ½ FL. OZ.. It base, too, has O-I in a diamond with numbers. They both have the crown cap closure and were obviously manufactured bb Owens-Illinois. Both bottles are 1.625" diameter x 4.375" tall. Courtesy of **Rick Turner**.

←**6 – 18** is unembossed except for "609" on the base. A paper label reads "EDISON / OIL / T.E. EDISON, MC. / ORANGE / N.J. The bottle is tall & narrow, measuring 1: diameter at the base and 1.25" diameter at the top. It stands 5 125" tall. Courtesy of Bob Berry

Chapter 7

The Ansonia Electrical Co.

The only Ansonia Electrical Co. I could find was an electric company located in Ansonia, CT. I have no way of knowing if it's the right company. I am assuming it is, because of their proximity to New York City, and the fact that they were in business prior to 1900. Ansonia is a small city in New Haven County, about 12 miles northwest of New Haven. Not much could be found about the company, other than that they manufactured electrical equipment. There is currently a parking lot at their former location. There was an investigation in 2018 because of radiation discovered at the site, reportedly from the Radium used in luminous dials and push buttons for doorbells. The investigation showed that the radiation was consistent with background radiation, and no action was recommended.

7 - 1

7 - 2

We have two battery jars designated Ansonia. **7 – 1,** above, left**,** is an aqua, squared jar, with a ground lip. It is 5.875" tall x 4.375" square with a 4" mouth. It is embossed: The / (arc) ANSONIA / ELECTRICAL / Co. Courtesy of **Debbi Graham.**

7 – 2, above right, is a round, aqua jar with a ground lip and pour spout. It is about 5" diameter with a 4" mouth and is 6" tall It is embossed in a circular slug plate: (arc) THE ANSONIA / (arc) ELECTRICAL CO. Courtesy of **Debbi Graham.**

Chapter 8

BRACH, L.S., MANUFACTURING CO ., Newark, N.J.

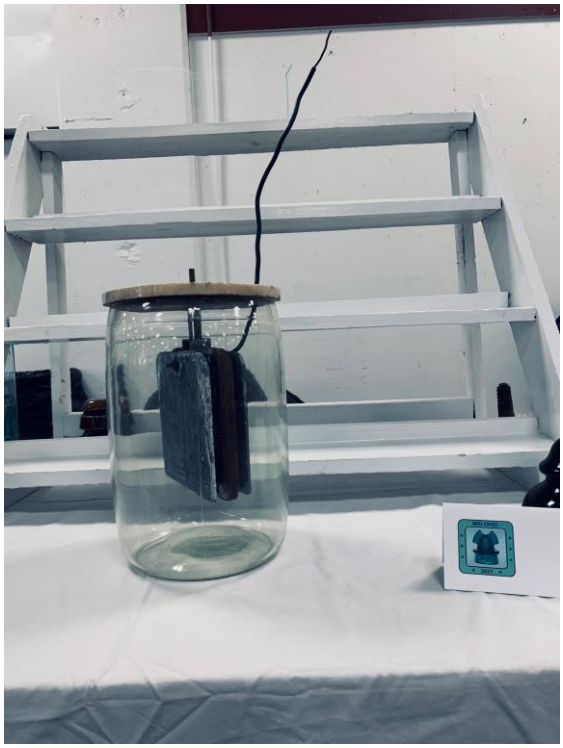
L.S. Brach was founded in 1921 in Newark, NJ. They are primarily known for their radio strains and lightning arrestors. We know that they also manufactured porcelain battery jar lids. There is no record of their ever having made battery jars. It is believed their sole contribution was porcelain lids for use on battery jars manufactured by someone else. References: 119

8 – 1: is a white, porcelain battery jar lid; embossed: (arc) A.R.A. SIGNAL CELL / L.S. BRACH MFG. CO. / NEWARK, N.J. Courtesy of **Walt Baumgardt**.

←8 - 1

The jar pictured below **8 – 2** is a mystery. The jar itself is embossed, as best we could tell: (Front) L.S. BRACH CO. / <COBRA CO.> / NEWARK N.J. (Embossing on jar was very faint, but black paint helped to bring it out). This is a bit confusing, as it is not believed that L.S. Brach manufactured glass battery jars. The jar could have been manufactured by an unknown glass house and embossed L.S. Brach. The dimensions of the jar are 7" diameter x 10.5" tall. It is clear with a ground top. The dimensions of the lid are 7" x 0.5" and is white. It is courtesy of **Jeff Hogan**

It is believed that the lid **8 – 3**, below, right, is original to the jar **8 – 2.** The lid is embossed: (arc) GORDON PRIMARY CELL / PATENTED7 / OCT. 27, 1896 / APR. 13, 1897 / FEB. 13, 1906 / GORDON PRIMARY BATTERY CO. / WATERBURY, / CONN. / U.S.A.



8 – 2↑

8 – 3↑

I later found a similar battery jar **8 – 4** with more legible embossing. This embossing , **8 – 5** appears the same as on this jar, except it is more legible. The embossing on the jar is: L.S. BRACH MFG. Co / <<GCBRAC >> / Newark N.J. The significance of GCBRAC is not exactly known, although it is obviously some identity code for L.S. BRACH. Does this mean that L.S. Brach did in fact manufacture battery jars? I don't believe so. I still believe jars were manufactured for L.S. Brach by an as yet, unknown manufacturer. Perhaps the key is in the word FRY, found under the diamond, and visible in **8 – 5**. What FRY refers to and its

connection is unknown at this time. There is no record of H.G. Fry, if that is the reference, having made anything other than insulators, cut and pressed glass and a line of tableware.

We now have two jars, with similar embossing; one appears to be <<COBRA>> and the other is <<GBRAC>>. Are they two distinct jars or did we interpret the embossing on **8 – 2,** incorrectly? With more data points we may be able to answer that question.

8 – 4

8 – 5

This jar is the courtesy of **Shayne Potter.**

8 - 6↑

The lid to **8 - 4** is shown in **8 - 6**. It is from Edison 's Battery Supplies Co; embossed as follows: EDISON / ,>BSCO< / PRIMARY BATTERY / PATENTED / July 28, '08 Sept. 6. April 4, '11 / Other Patents Pending/ TRADE /(in script) Thomas A. Edison / Reg. U.S._ MARK Pat. Off. / (arc) THOMAS A. EDISON, Inc. ORANGE, N.J. ***Note:*** We have two jars, made by the same manufacturer, with different lids. This shows that in many cases the jars and the lids were manufactured by different companies. Courtesy of Debbi Graham.

Chapter 9

BROOKFIELD GLASS CO.

Following the flash flood which destroyed his plant in Honesdale, PA in 1861, James Madison Brookfield moved to Brooklyn. He worked for Martin Kalbfleisch, as plant manager of a glass plant he had built in 1864 to provide demijohns and carboys for his chemical business, Bushwick Chemical Works, which was across the street. In 1869, J.M. Brookfield, purchased the glass works from Kalbfleisch.

In addition to insulators, for which they are well known, They produced a multitude of bottles and jars. It is known that they provided almost all the bottles for Radway's Ready Relief, as well as Walker's Vinegar Bitters and the Minck Brothers Bottling Works.

Unfortunately, most of their items were unmarked, except for the product name or name of the company ordering the bottles. There are bottles and jars around with the "BGW" embossing, but very few. Much of what we know about their products, other than insulators, is from the literature.

We know they manufactured battery jars, but not specifically which ones. We know, however, they manufactured glass products for G.E, Thomson Houston Electric Co, Pettingell-Andrews and others. It is not too much of a stretch to believe that they may also have manufactured battery jars for them.

Chapter: 10

J.H. BUNNELL & Co., BUNNELL Telegraphic and Electrical Co. , New York

In 1878, Jesse Bunnel created the J.H. BUNNELL & Co. supplying equipment to the telegraph and telephone industries. Jesse was involved with the telegraph his entire life, starting by delivering them at age 13 in Massillion, OH in 1854. In 1856 he was a full-fledged telegraph operator, setting a speed record in 1861 of 32 words per minute, average, over a two-hour period. An 1884 article in Electrical World shows the Bunnell Co. providing Disque LeClanche batteries to telephone companies, claiming they would provide power for 18 – 30 months without replacement. (35) . On the NIA.org site you will find several catalogs for the J.H. BUNNELL Co., and a single catalog for the BUNNELL Telegraphic & Electrical Co. I would be remiss if I didn't explain the history of these companies.

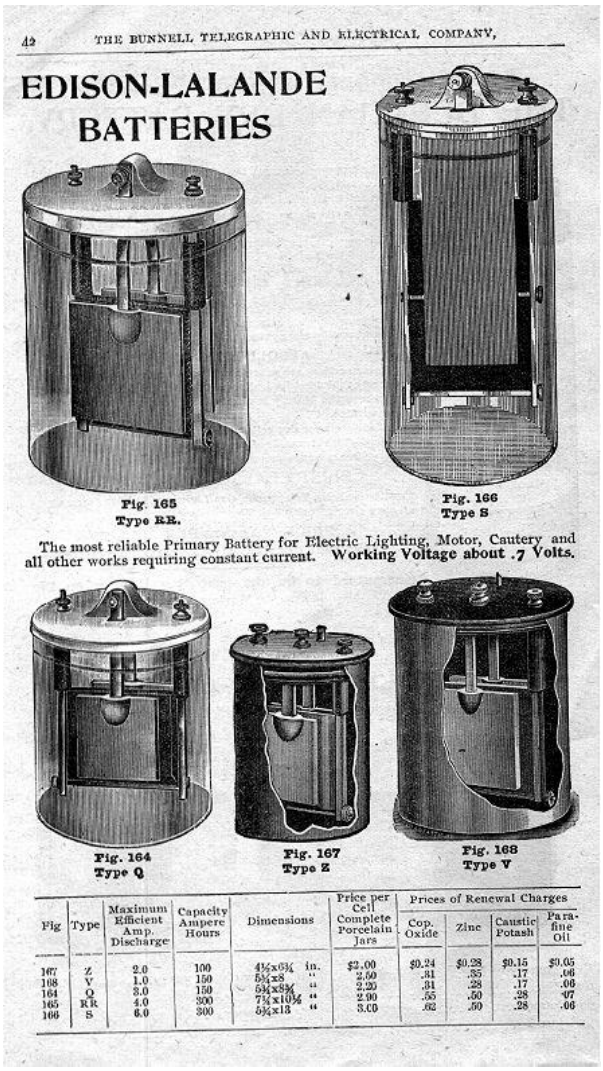
Jesse Bunnell had a partner in The J.H. Bunnell Co., Charles McLaughlin. When Jesse passed away in 1899, Mr. McLaughlin was the sole surviving partner. Wanting to reassure customers that there was not a supply problem because of the death, McLaughlin and four others filed to re-incorporate as the J.H. BUNNELL Co.

McLaughlin's re-incorporating the J.H. BUNNELL co. did not set well with the BUNNELL family. Although the Bunnell family owned the patents, they could not stop the re-incorporation. The family countered by forming their own company using monies from the settlement of Jesse's estate. On January 27, 1900, the BUNNELL TELEGRAPHIC & ELECTRICAL Co. was formed. Three of the five incorporators were: Mary Bunnell (Jesse's widow), Dewitt Bunnell (Jesse's eldest son) and Albert Wise (Jesse's son-in-law).

The two companies were in major competition with each other in a massive game of one-upmanship until September of 1902, when Albert Wise approached Charles McLaughlin to buy his majority share of the J.H. BUNNELL Co. McLaughlin accepted and by the summer of 1903 Albert Wise was the president of J.H. BUNNELL Co. When it was over the BUNNELL TELEGRAPHIC & ELECTRICAL Co. was only in existence for three years.

In contrast to the J.H. BUNNELL Co. offering Disque LeClanche batteries, the BUNNELL Telegraphic and Electrical Co. Offered Edison LeLande batteries.

References: 10-14



42 THE BUNNELL TELEGRAPHIC AND ELECTRICAL COMPANY,

EDISON-LALANDE BATTERIES

Fig. 165
Type RR.

Fig. 166
Type S

The most reliable Primary Battery for Electric Lighting, Motor, Cautery and all other works requiring constant current. **Working Voltage about .7 Volts.**

Fig. 164
Type Q

Fig. 167
Type Z

Fig. 168
Type V

Fig	Type	Maximum Efficient Amp. Discharge	Capacity Ampere Hours	Dimensions	Price per Cell Complete Porcelain Jars	Prices of Renewal Charges			
						Cop. Oxide	Zinc	Caustic Potash	Paraffine Oil
167	Z	2.0	100	4½x6¾ in.	$2.00	$0.24	$0.28	$0.15	$0.05
168	V	1.0	150	5¼x8 "	2.60	.31	.35	.17	.06
164	Q	3.0	150	5¾x8¾ "	2.20	.31	.28	.17	.06
165	RR	4.0	300	7⅞x10⅝ "	2.90	.55	.50	.28	.07
166	S	6.0	300	5¾x13 "	3.00	.62	.50	.28	.06

.

A Page from the Bunnell Telegraphic and Electrical Co. catalog of 1903, above, shows them offering EDISON-LaLANDE batteries, whereas the BUNNELL Co, offered Disque LeClanche batteries.

The Microphone Carbon Battery.

Longer and stronger life than any Sal-Ammoniac Battery made.

For open Circuit work, and especially Gas Lighting purposes, it has no equal.

Fig. 184.

An Association of the "Microphone" with any other cell in any given piece of work and subject to similar conditions will show the superior merits of this battery, and justify the claims we make for it.

It has no equal.

No. 2 Carbon.

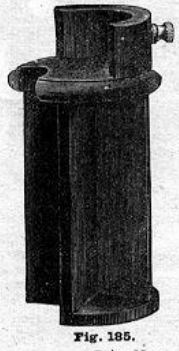


Fig. 185.

TRADE
MICROPHONE
MARK

In the Microphone No. 1. the Carbon element contains the depolarizing substance, Internal Resistance as its minimum, and current at its maximum.

The Microphone No. 2, with its great carbon surface, renders more effective service during a longer period of time than any other carbon battery.

No. 1 Carbon.

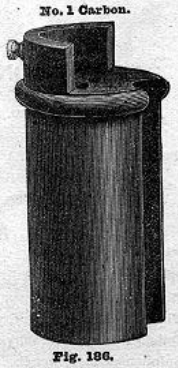


Fig. 186.

Price No. 1, cell complete..... $0.75
" No. 2 " " ..... .65

THE BEEKMAN DRY BATTERY.

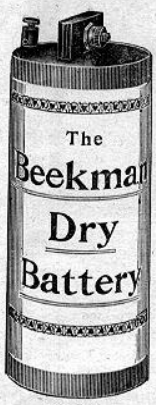


Fig. 162.

The improved form of Dry Battery having been thoroughly tested in comparison with all others, is presented to the Electrical Trade, and to all users of Open Circuit Battery, as the

VERY BEST YET PRODUCED.

It is very compact in form, being smaller than any other of equal capacity, and its

Great Strength, Durability and Recuperative Power

are its chief merits.

Being without liquids, it is not subject to freezing in winter or to evaporation at any time, and is

ABSOLUTELY CLEAN.

Its connections are so arranged that no creeping salts whatever are at any time developed. For portable purposes, Railway Signals etc., where the battery is often placed outdoors, it is especially recommended.

Of all forms or dry cells yet attempted, ours is the only one produced which is capable of successfully competing with Leclanche Battery; hence we are presenting it to the public as a

FIRST CLASS DRY BATTERY

for Electric Bells, Telephones, Gas Lighting, Burglar Alarms, and all open circuit work.

PRICE, 20 CENTS PER CELL.

Special Prices to the Trade.

Guaranteed to be the best Dry Battery on the Market.

"CROW FOOT" GRAVITY BATTERY.

For Telegraph and Closed Circuit Work.

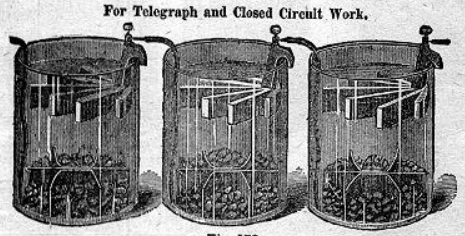
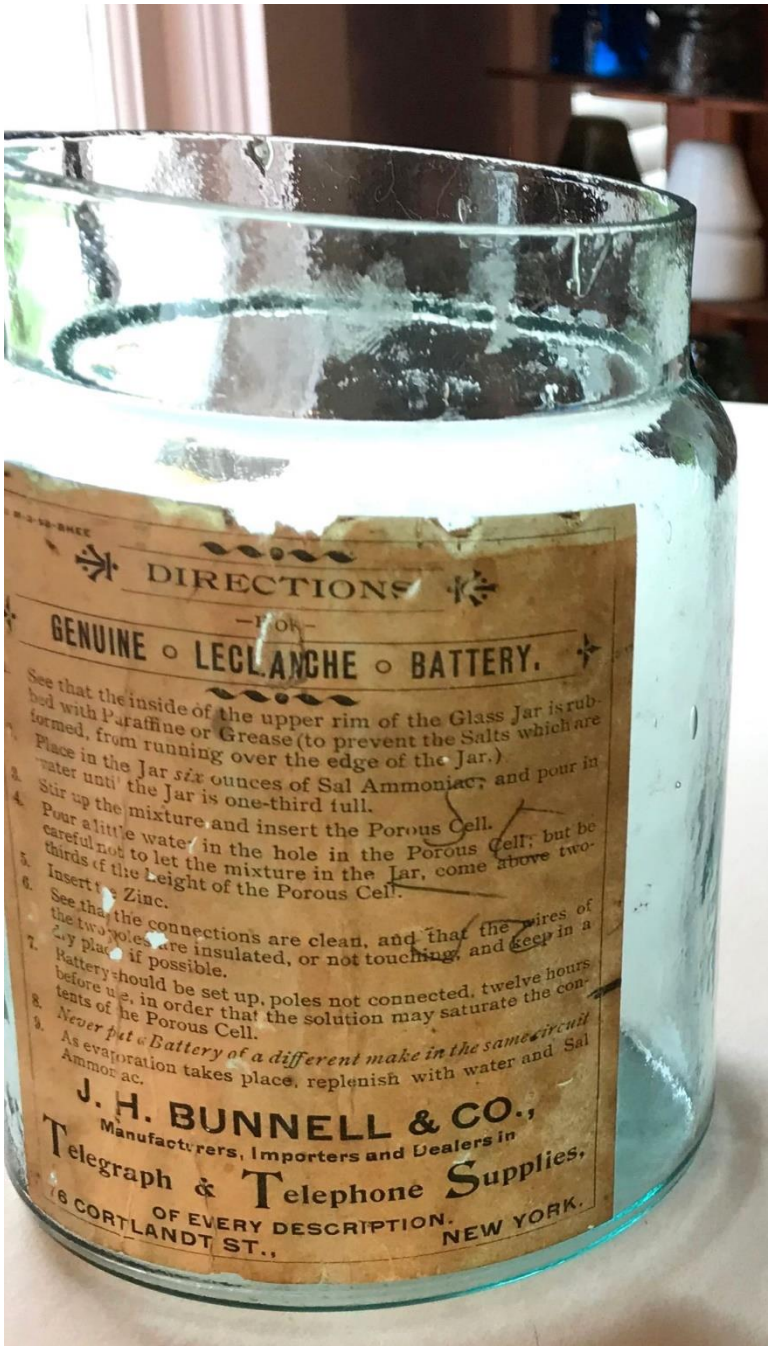


Fig. 179.

Cell complete, less vitriol, 6x8	$1.20	Cell complete, 5x7	$1.10
6x8 Zinc	.60	5x7 Zinc	.46
6x8 Copper	.20	5x7 Copper	.18
6x8 Jars	.50	5x7 Jars	.48

The pages, above, from the same catalog, show more batteries offered by Bunnell Telegraphic & Electrical Co. Note the microphone battery.

The pages, above, from the same catalog show a few medical batteries offered bu Bunnell Telegraphic and Electrical Co.

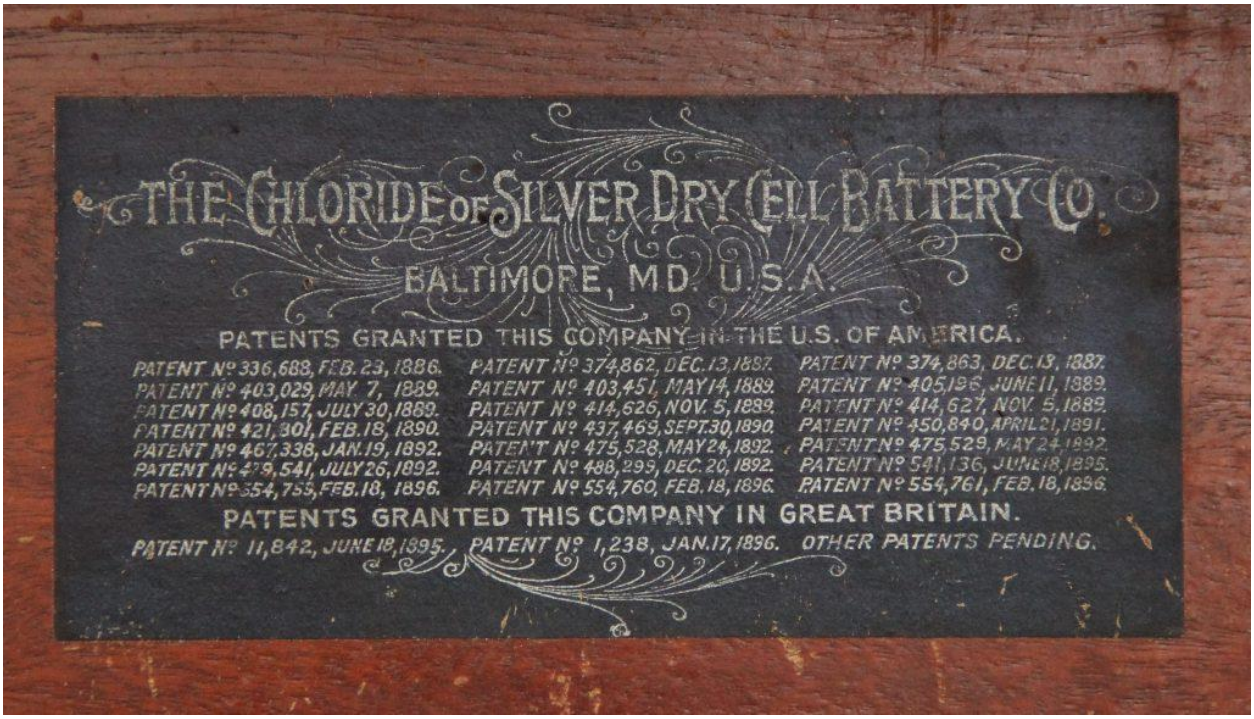


←**10 – 1** is a LeClanche Battery distributed by J.H. Bunnell & Co. / Telegraph & Telephone Supplies / of every description / 78 Cortland St., New York. Courtesy of **Debbi Graham.**

Chapter 11

Chloride of Silver Battery Co.

There is not much written about the history of the Chloride of Silver Dry Cell Battery Co., of Baltimore, MD. I decided to devote a chapter to them because their battery was different (Chloride of Silver), and it was a dry cell. From the dates it was likely the first dry cell, and also one of the first Medical Batteries. There is documented history that The Chloride of Silver Medical Batteries were being used for electro therapy during the Civil War. We may not know much about them, but they sure had an impact on the electrical history of the United States
References: 130



11 - 1↑ is the cover panel from **11 – 2**, below.

←**11 – 3** is a dry cell. It would have been used in the medical device, below. Its major embossing is: The CHLORIDE of SILVER/. DRY CELL BATTERY Co. / Baltimore, MD. U.S.A. / CHLORIDE of SILVER DRY / CELL/ FARADIC CELL CASE. Courtesy of **Walt Baumgardt.**

The device pictured below is circa 1900, but the literature records Chloride of Silver Medical Batteries being used during the Civil War to control pain.

←**11 – 2** is an electro therapy device from the Chloride of Silver Dry Cell Battery Co.

References: 27

Chapter 12

CORNING GLASS WORKS , CORNING, N.Y.

In 1851, Amory Houghton, Sr. founded what would become Corning Glass in Cambridge, MA, as Bay State Glass Company. By 1864 he had sold his interest in the company and purchased the Brooklyn Flint Glass Company in Brooklyn, N.Y. A few years later, in 1868, Labor problems forced him to re-locate to Corning, N.Y., where he set up shop as Corning Flint Glass Company. In 1870 it was renamed to Corning Glass Works of Corning, N.Y. Since then, they have been a driving force in so many areas:

- 1880's: Production of first light bulbs for Thomas Edison.
- 1900's: Creation of weather-proof glass for railroad lenses, which became the basis for clear "Pyrex".
- 1930" s: Fabrication of telescope mirrors for California Institute of Technology.
- 1940's: Manufacture of durable dinner ware for the U.S. military, which evolved into opal "Pyrex".
- 1960's: Created safer Automobile windshields which fracture into small granules if broken.
- 1970's: Development of fiber optics for networking and telecommunications.

From the 1920's through the 1940's they produced a line of power insulators and, also a line of battery jars.

It appears that Corning had a mark that they used on some battery jars, which is not mentioned in any of the literature. It is an elongated 'C" (see **10 - 5**, below), with what appear to be the letters "XX" inside of the C. This mark appears on several corning manufactured battery jars.

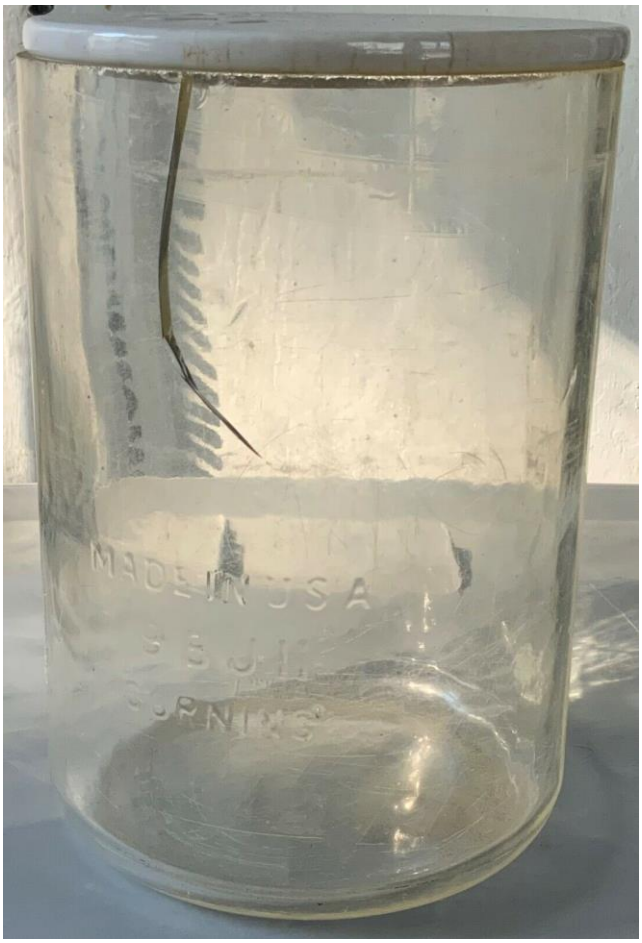
References: 31

Their Battery Jars include:

12 – 1 is a rectangular, clear glass jar with a ground top. The dimensions are: 6.5 x 8 x 13.25" tall. The jar is embossed: (Front) PYREX / T.M. REG. U.S. PAT. OFF. / MADE IN U.S.A. / 50006. The porcelain lid, **12 – 2**, is 8 x 6.5" x 0.75" thick. It is embossed: EDISON / MADE IN U.S.A. The lid is likely original to the jar. It is the courtesy of Don Briel

12 - 1↑

↑12 - 2



←12 – 3

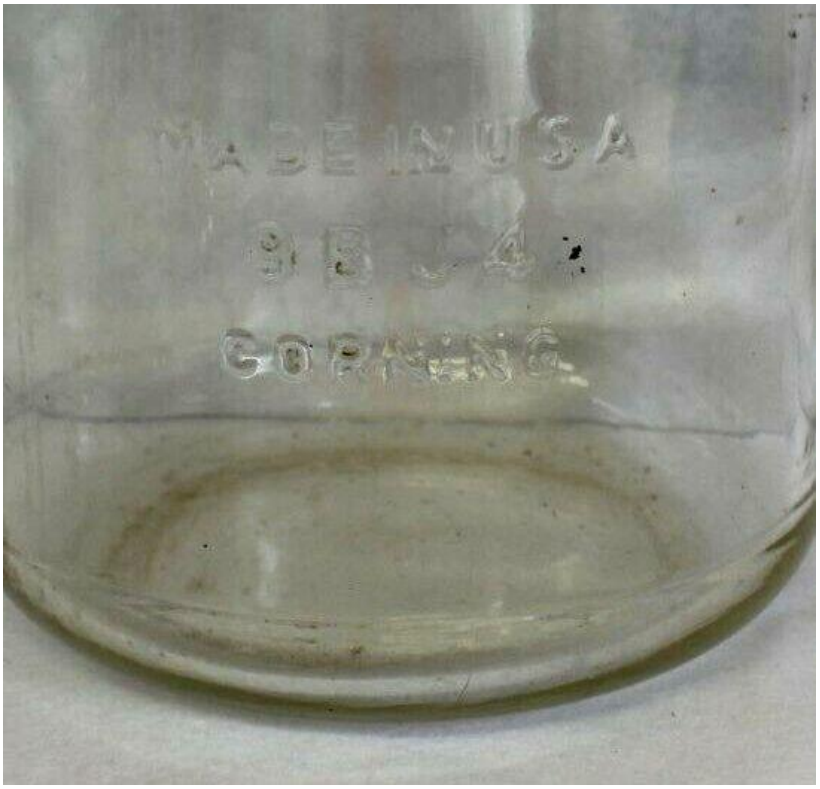
12 - 4↑

12 – 3, is a clear, round glass jar with a ground lip; 7.5” diameter x 10” tall. It is embossed: MADE IN U.S.A. / 9BJ11 / CORNING. This jar also has embossing on the rear **12 - 5**: Cxx / Tm Reg U.S. Pat. Off. The white porcelain lid, **12 – 4**, is 7.5” diameter x 0.75” high. It, too, is embossed: (arc) EDISON /(arc) MADE IN U.S.A. It is the courtesy of Don Briel.

12 - 5↑

12 – 7↑

12 - 6↑



←12 -8

12 -6, is another Corning battery jar. The embossing, shown in **12 – 8,** reads MADE IN U.S.A. / 9BJ4 / CORNING. It is 6.5" diam eter x 10" tall with a ground lip. It, too, has an Edison lid, **12 – 7** embossed (arc) EDISON / <BSCO> / Primary Battery / Patented / July 28, 08 Sept. 6, 10 April 4, 11 / Other Patents Pending / Trade / Thomas A. Edison (script) / Reg. U.S. Mark Pat. Off. / (arc) THOMAS A> EDISON, Inc. Orange, NM.J. Courtesy of **Shayne Potter**.

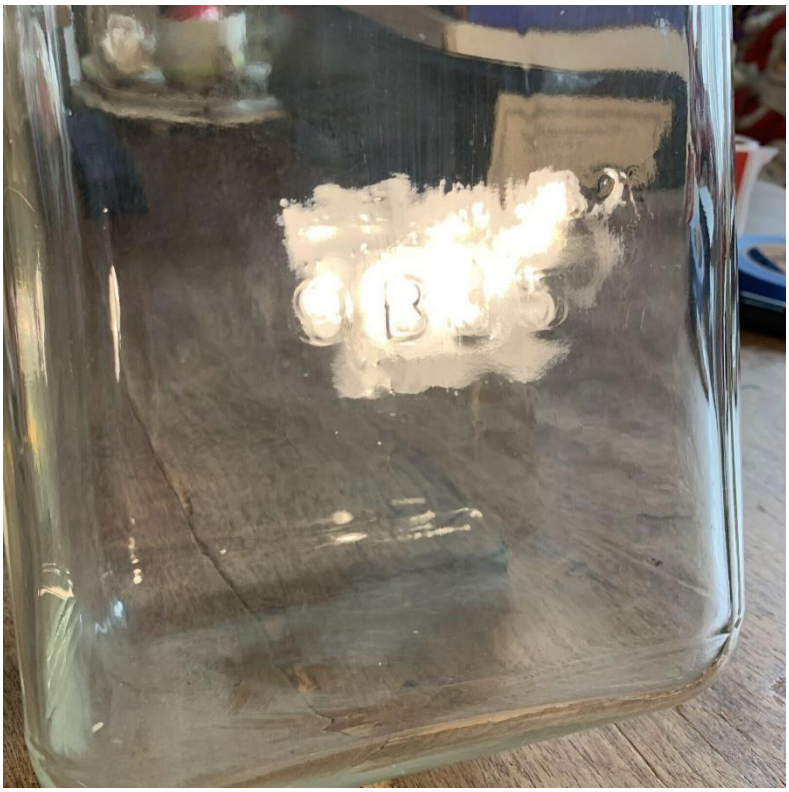
←12 - 9

12 - 10↑

←12 – 11

Pictures **12 – 9 and 12 – 10,** show, yet another Corning jar. It is embossed**: Made in U.S.A. / 9BJ2 / CORNING.** The jar dimensions are 5" diameter x 11"tall. It's original lid**, 12 – 11,** is the same as the lid for **12 – 5; 12 – 6.** Courtesy of **Walt Baumgardt**

←12 – 12

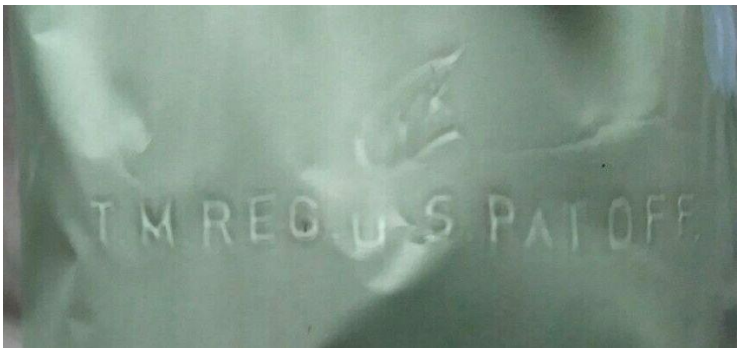


This corning jar, **12 – 12** and **12 – 13**, is square with round corners and a ground lip. It is embossed MADE IN U.S.A. / 9BJ5 / CORNING. Its dimensions are 6.5” x 5.5” x 10.5” tall. Courtesy of **joeamyc8iez**

←12 - 13

12 - 14↓

12 - 15↓



12 – 14 through **12 – 15** show one more of what appears to be a series of Battery jars manufactured by Corning. To date we have 9BJ2, 9BJ4, 9BJ5, and 9BJ11; and now 9BJ1. This jar is cylindrical in shape, with a diameter of 6.5" amd 10.5" tall. The lid, which appears original to the jar is embossed (arc) EDISIN / (arc) MADE IN U.S.A. The clear glass jar is embossed: Cxx / T.M. REG. U.S. Pat Off. // MADE IN U.S.A. / 9BJ1 / CORNING

← **12 - 14,** although appearing to be a battery jar is actually an ESB Charge Controller. The jar was manufactured by Corning for The Electric Storage Battery Co. (E.S.B.)

I have attempted to correlate the numbering of the Corning jars to their dimensions.

Number	Width (in)	Length (in)	Diameter (in)	Height (in)
9BJ5	5.5	6.5		10.5
9BJ1			6.5	10
9BJ2			5	11
9BJ 4			6.5	10
9BJ 5	5.5	6.5		10.5
9BJ 11			7.5	10

There are abviously not enough data points to make a meaningful correlation. It is complicated by the fact that round and square/rectangular jars have the same numbering system. Perhaos with more data points we will determine a correlation.

Chapter: 13

The CUMBERLAND GLASS MFG. Co ., Bridgeton, N.J.

The Cumberland Glass Mfg. Co. started small, but quickly grew to be one of the largest glass houses in N.J. Unfortunately they rarely used any kind of markings to identify their products. “Columbia ” and “D&O” appear to be two markings that were used exclusovely by the company. It was started as the Joseph A. Clark Co. in 1880. Mr. Clark also started the Clark Window Glass Co. in 1882. In 1885 they were re-organized as the Cumberland Glass Mfg. Co., maunfacturing a large variety of bottles and jars. It is known from a 1915 catalog that they manufactured battery jars. In 1920 they were purchased by the expanding Illinois Glass Co .

To date, there are no known battery jars that can be attributed to the Cumberland Glass Mfg. Co, likely because the bulk of their product line was unmarked.

It is also known that they manufactured Fruit Jars, including,” Leotric”.

They deserve mentioning, however, as a major supplier of glass for 35 years.

References: 33

Chapter 14
DELCO

The name DELCO comes from the DAYTON ENGINEERING LABORATORIES Co. founded by Charles Kettering and Edward Deeds in 1906. In 1911 Kettering approached E.S.B. for a suitable automotive battery to complement his new electric starter. This produced the first automotive battery of the modern era and gave Delco the Exide technology. In 1918 General Motors (GM) acquired the UNITED MOTORS COMPANY which included Delco, Dayton-Wright, and Dayton Metal Products Company; all of which were associated with Kettering and Deeds. Charles Kettering became president of General Motors Research Corporation in 1920, a position he held for 27 years. They were responsible for the Delco and Delco-Light batteries.

References: 40-47

←**14 – 1**:
The jar, **14 – 1** and lid, **14 – 2** is a DELCO LIGHT Battery Jar. The jar is embossed WATER LINE / DELCO LIGHT on 4 sides. One side near bottom is MADE IN U.S.A. The dimensions are 6.5” x 7.5” x 10” tall.

The lid is embossed DELCO LIGHT towards the front and rear. Its dimensions are.

Courtesy of **Walt Baumgardt**.

14 – 2→

←**14 – 3** is aqua with a formed top, Its dimensions are 6”x 7.25” x 10.75” tall. The embossing is WATER LINE / DELCO LIGHT on 4 sides. The botton is embossed KXG 13. Courtesy of **mnmama**

←**14 – 4** is the lid for It is clear and embossed DELCO Light on opposing sides and PATENTED on a third side.

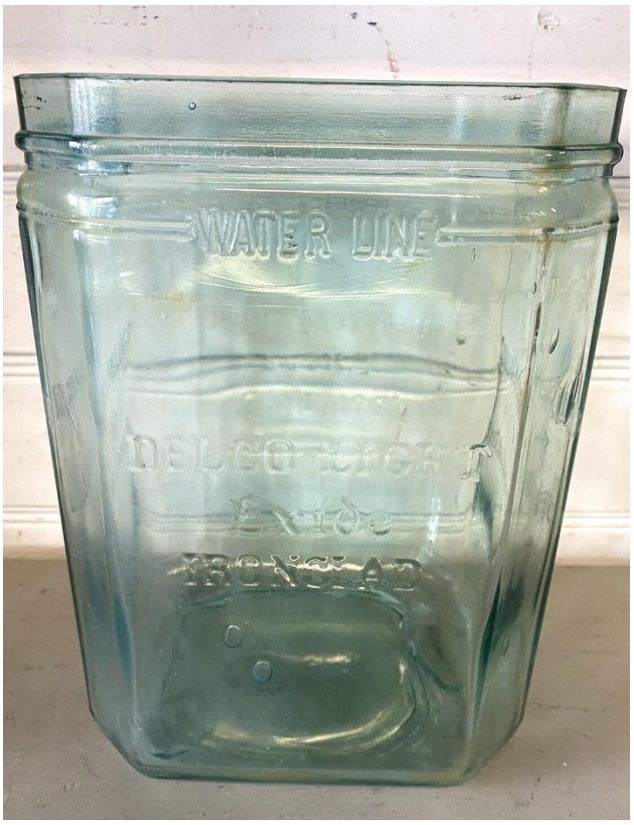
14 – 5↑

14- 6↑

14 – 5 and **14 - 6** are pictures of yet another Delco battery jar, It is aqua with a formed lip. It is embossed WATER LINE on four sides, with DELCO / LIGHT / EXIDE on only one side. The bottom is embossed KXG 5. The dimensions are 4" x 7.5" x 10.5" tall. Delco Light Exide is a bit of a strange embossing. We know that ESB CO. manufactured EXIDE batteries. We also know that DELCO manufactured Delco and Delco Light. The combination obviously came from the 1911 agreement between ESB and DELCO. Why the combined embossing is not on all Delco jars is unknown. We don't have enough information, at this point, to know if we can use it for dating battery jars. The Delco Light Exide embossing will be included under Delco, as the "KXG" numbering system seems to be a Delco numbering system.

←14- 7 **14 - 8↑**

14 - 7 and **14 - 8** show a lid for a Delco-Light EXIDE battery. It is further embossed: PATENTED / AUG, 8, 1911 Jun. 6, 1916 / MAR. 6, 1917 Oct. 30, 1917. Courtesy of **perichbrothers.**



←**14 – 9** is another Exide battery jar. The embossing is: WATER LINE (four sides), DELCO - LIGHT / EXIDE / IRONCLAD / Made in U.S.A. (on front and two sides). The dimensions are 6” x 7.5” x 10.5” tall. Courtesy of **kennycoke99**

14 – 10↑

14 – 11↑

14 – 10 through **14 – 12** show a DELCO LIGHT battery jar lid. Its dimensions are 8” x 7”, indicating it fit a jar with top dimensions of 7” x 6”. It is embossed DELCO – LIGHT / MADE IN U.S.A., with numbers 46 – 1 and 21959.

←14 - 12

14 - 13↑is a Delco Light Exide battery jar with dimensions of 3.5” x 7.25” x 10’25” tall. It is embossed KXG – 7 on the bottom. It is embossed on 4 sides: WATER LINE / DELCO LIGHT / EXIDE. On 2 sides it is embossed MADE IN U.S.A. near the bottom.

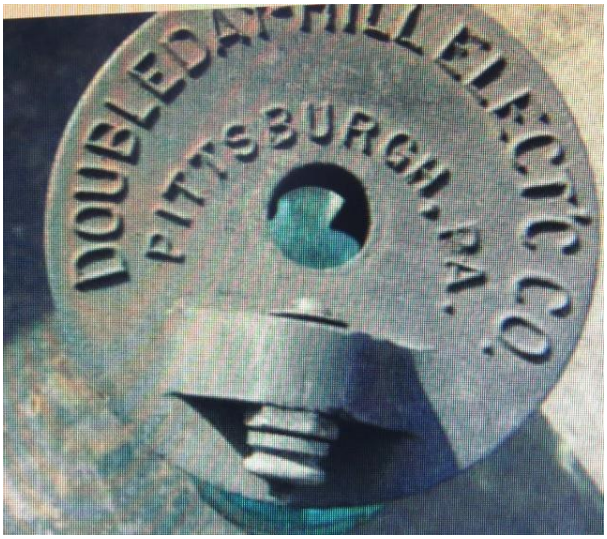
Chapter: 15

Double Day Hill Electric CO., Pittsburg, PA

Double Day Hill Electric Co. was a supplier of radio equipment and other electrical supplies in the early1900's. Not much couild be found on them, other than that they had offices in Pittsburg, PA and Washington DC. Their product line must have been extensive as their 1916 General Catalog #7 was a book of 1475 pages.

References: 34

We know of at least one carbon graphite electrode, **15 – 1**, with the Double Day Hill Electric Co. / Pittsburg, PA embossing. The jar it was found with is totally un-embossed with dimensions of 5.5" diameter x 6'5" tall. Picture **15 – 2** shows the usual cylindrical shape of the electrode



15 - 1↑ **15 - 2↑**

←**15 – 3** is the jar that was found with the Double Day Hill lid, **15 – 1**. It is aqua with dimensions of 5.5" diameter x 6.5" tall. There is no embossing. It is unknown if the jar and lid are original. Courtesy of **Debbi Graham**

Chapter 16

The Edison Companies

Rather than attempting to devote chapters to the individual Edison Companies, I will lump them all together with a brief biography of Thomas A. Edison, himself.

T.A. Edison was born in 1847 in Milan, MI and grew up in Port Huron, MI. He attended formal school for only a few months. His mother, a teacher by profession, taught him reading, writing and arithmetic. A chemistry class at the Cooper Union for the advancement of science and art is his only known enrollment of any kind at an institution of higher learning. He was a curious child and learned most things by reading on his own. An early bout with Scarlet Fever caused the loss of hearing in one ear and most of the hearing in the other. Edison believed that his hearing loss allowed him to avoid distraction and to concentrate more easily. If anyone is interested in learning more about his career, I refer you to:
https://edison.rutgers.edu/company.htm

Throughout his career he received 1,093 patents in his name and formed many companies. A partial list is:

Battery Supplies Company
Edison Manufacturing Company Edison Storage Battery Company
Edison Storage Battery Garage, Inc.
Edison Storage Battery Supply Co.
Edison Crushing Roll Co.
Edison Portland Cement Co.
Edison Company for Isolated Lighting
Edison Electric Light Co.
Edison General Electric Co.
Edison Lamp Co.
Edison Machine Works
Edison United Manufacturing Co.
Edison Wiring Co.
United Edison Manufacturing Co.
Mining Exploration Co. of N.J.
Edison Industrial Works
Edison Manufacturing Co.
Edison Manufacturing Co. Ltd.
Edison Phonograph Co.
Edison Phonograph Works.
Electric Railway Co. of the U.S. ,

I didn't attempt to sort them all out. Some of them are Holding Companies, and most are inter-connected in some way or another. In all Edison started almost 200 companies, so the list above is truly partial. If we break the companies down by category we find:

Battery:	7	Motion picture:	13
Cement & Cement Products:	7	Office Machinery & Supplies:	6
Electric Light, Domestic:	15	Phonograph, Domestic:	14
Electric Light, Foreign:	24	Phonograph, Foreign:	16
Mining:	11	Railway:	6
Miscellaneous:	11	Telegraph & Telephone,	

Domestic:	28
Telegraph & Telephone,	7
Foreign:	14

For a total of 172 companies

Some information about the various battery companies:

Thomas A. Edison, Inc, originally the National Phonograph Co., was the main holding company for the various manufacturing companies established by Edison. It was the successor to the Edison Mfg. Co. and operated between 1911 and 1957 when it merged with McGraw Electric to form McGraw Edison.

The ***Edison Mfg, Co.*** was incorporated in 1900, as Edison's personal business. It manufactured and marketed the Edison-LaLande primary battery, as well as batteries for telegraph, telephone, phonograph. It also sold X-Ray equipment, medical instruments and electric fans as well as having a motion picture branch.

The ***Battery Supplies Co***. was formed in 1903 by former Edison Employees to manufacture primary batteries. Edison sued, alleging patent infringement. A settlement called for the Edison Mfg. Co. to purchase it in 1905. It was officially dissolved in 1908.

The ***Edison Storage Battery Co***. was formed in 1904 to produce Edison's nickel-iron battery. Edison's life-long dream was the electric vehicle, and the Battery Supplies Co. was to make it happen. He refined the nickel-iron battery first patented by Swedish inventor, Ernst Waldemar Jungner in 1899. It was so revolutionary that even Henry Ford wanted it. He struck a deal with Edison in 1914, to release the "Ford Electric", selling for $900.00 with a range of 100 miles. However, the Edison Battery was big, heavy, expensive and required frequent charging. By the time Edison's project was complete, consumers had spoken in favor of the fossil fuel-powered Model T. The nickel-iron battery never became very successful.

As a side note, Edison championed Direct Current for many years, claiming its superiority over alternating current. Westing House and The Thomas Huston Co. championed the alternating current. Edison used what some might consider un-ethical means to combat AC current, which didn't sit well with his Board of Directors In 1892 J.P. Morgan engineered a merger between Edison General Electric and Thomas Huston that put the Board of Thomas Huston in charge of the new company; General Electric. Edison was essentially forced out of controlling his own company. General Electric now controlled 75% of the U.S. Electrical business and would compete with Westinghouse for the AC market. See Chapter 8 for more details.

You will find equipment from the Edison Companies highlighted in ***BOLD*** (above) featured in this chapter. I will try to keep the equipment from the individual companies separated for your convenience.

References: 49-58

←16 - 1

Among other things the Edison Companies manufactured porcelain battery jar lids, which were found on many other jars. The lids came with several different embossings.
16 – 1, above, is simply embossed: (arc) EDISON / (arc) MADE IN U.S.A..

Courtesy of **Walt Baumgardt**

……while **16 – 2,** left**,** is embossed (arc) EDISON / (arc) R S A. Both lids are the courtesy of **Walt Baumgardt.**

← 16 – 2

←**16 - 3** is a set of 5” square electrodes. This set of electrodes is simply marked EDISON.

Courtesy of **Walt Baumgardt**

16 - 4→

16 – 4 is a white, porcelain,battery jar. The jar itself is un-embossed. The original lid, **16 – 5**, below,is embossed: (arc) B S CO / PRIMARY BATTERY / SIGNAL MODEL / (arc) BATTERY SUPPLIES Co. NEWARK, N.J. Courtesy of **Walt Baumgardt**.

←16 - 5

←**16 – 6** is an Edison lid with another embossing variation. It is embossed: (arc) EDISON / <BSCO> / PRIMARY BATTERY / Patented / July 28,'08 Sept. 6,'10 April 4,'11 / Other Patents Pending / Trade / THOMAS A. EDISON / Reg. U.S. Mark Pat. Off. / (arc) THOMAS A. EDISON, INC., ORANGE, N.J. Courtesy of **Walt Baumgardt**

←**16 – 7** is yet another embossing variation. It is embossed (arc) EDISON / (arc) MADE IN U.S.A., with a third hole embossed "OIL", for adding battery oil.

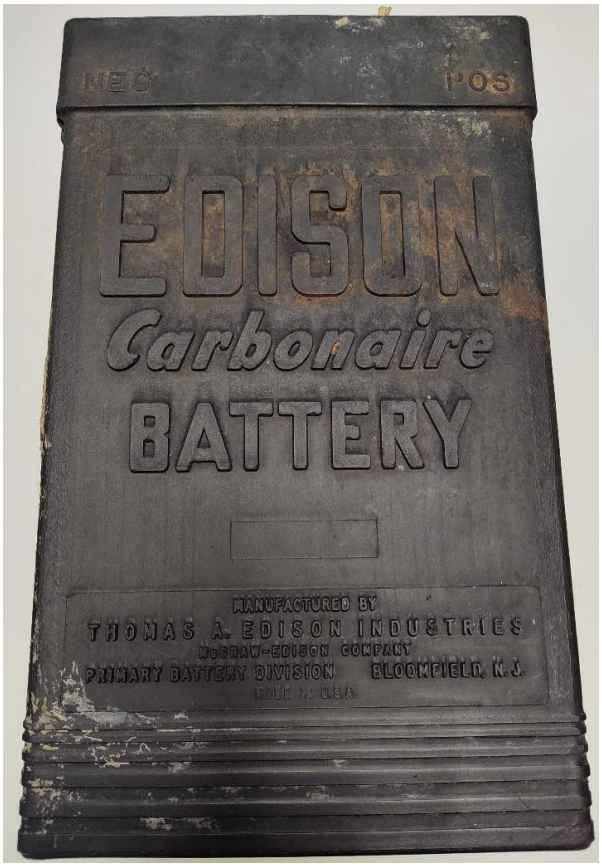
16 - 8, is yet another embossing variation: (arc) BSCO / PRIMARY BATTERY / SIGNAL MODEL / BATTERY SUPPLIES CO., NEWARK, N.J

16 - 9↑ is a totally unembossed porcelain battery jar. The lid, **15 - 10,** is embossed: (arc) EDISON PRIMARY BATTERY / Trade / Thomas A. Edison (script) / Mark / Pat. June 17, 1890 / Other Patents Pending / Manf'd. by / (arc) EDISON MFG.Co., ORANGE , N.J. Courtesy of **Wayne Duczynski.**

←**16 – 10**, below is the original lid to the battery jar **16 – 9**,

←**16 – 11** shows an Edison Alkaline Battery from the early 1900s.

←**16 – 12** shows an early Edison Battery Tube Radio. Note the array of batteries.



16 – 14 ↑

←16 – 13, left is battery jar that was found along the tracks west of Minneapolis, MN, indicating it probably powered a switch or something similar. It appears to be made of hard rubber and is 7.75” square x 12.5” tall. Courtesy of **WayneDuzynski**

It is embossed: NEG …… POS / EDISON CARBONAIRE BATTERY / manufactured by / THOMAS A. EDISON Industries McGraw-Edison Company / Primary Battery Division Bloomfield, N.J. / Made in U.S.A. The top shown in **15- 14** is merely embossed EDISON. The fact that it is listed as a McGraw Edison Company would date this battery to post 1957.

←**16 – 15** shows two Catrbonaire battery jars, in glass, with the original shipping box. The jars are 7” diameter x 10.25” tall, with no embossing.

16 – 16 ↓

16 – 16 shows one of the original lids from the Carbonaire jars in 14 – 15. The lids are white porcelain and embossed: (arc) FOR OVER-SIZE JARS / MADE IN U.S.A. Like we've see on other lids these, too, have separate a separate hole for adding battery oil. It is so marked.

←16 - 17

This is very likely an Edison battery jar with a printing error.

16 – 17 is a round, aqua jar with a pour spout and ground lip. Its dimensions are: 4.5" diameter x 6.25" tall with a 3.75" diameter mouth. Courtesy of **Debbi Graham**.

The embossing is inside of a slug plate on the front: (arc) SOUTHER ELECTRICAL CO [Note: I believe the N is missing from what should be SOUTHERN; which was an EDISON company in California]. / everything electrical / (arc) Los Angeles CAL New York N.Y.

←**16 - 18**

16 - 19↓

16 - 18 and **16 - 19** show a barrel shaped porcelain battery jar.
The lid is embossed: EDISON LALANDE BATTERY / PAT. MAR., 20-1885 / Other Patents Applied For

Edison LaLande Battery, a type of alkaline primary battery developed for Edison from an earlier design by Felix Lalande and Georges Chaperon. It consists of plates of copper oxide and zinc in a solution of potassium hydroxide. The cell voltage was low, about 0.75 volts; but the internal resistance was also low so they were capable of delivering large currents.

←16 - 20

16 - 21↓

16 - 22↑

16 -20, 16 - 21, and 16 - 22 show the Gladstone LaLande battery. It is essentially the same battery as the Edison Lalande, except that the Gladstone jar, rather than being porcelain, is enamalized steel. The lid is still porcelain. The Gladstone Lalande seems to have been offered by Ewing-Merkle Electric Company. It is 5.5" diameter x 8.5" tall.

The lid, which is original, is embossed: (arc) GLADSTONE LALANDE BATTERY / Pat. Aug. 2, 1902 / June 2, 1903 / Nov. 3, 1903

16 - 24↑

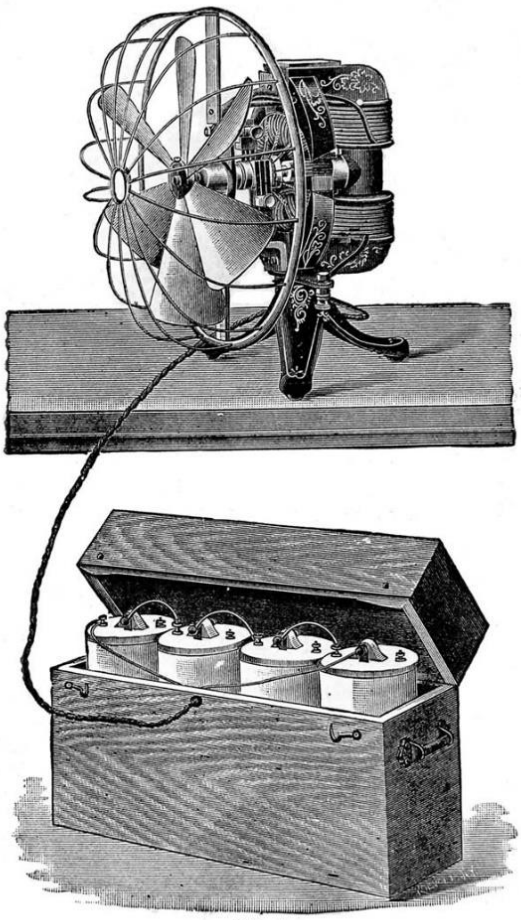
←16 - 23

The Gladstone Lalande Batteries were also made in Cobalt Blue, as seen in **16 - 23** and **16 - 24**. The dimensions and embossing are the same as the white Gladstone Lalande Battery seen in **16 - 20, 16 - 21** and **16 - 22**. 5.5” diameter x 8.5” tall. (arc) GLADSTONE LALANDE BATTERY / Pat. Aug, 2, 1902 / June 2, 1903 / Nov. 8, 1903.

16 - 25↑

15 -25 shows an array of Gladstone-LaLande Batteries which were used to power an electric fan.

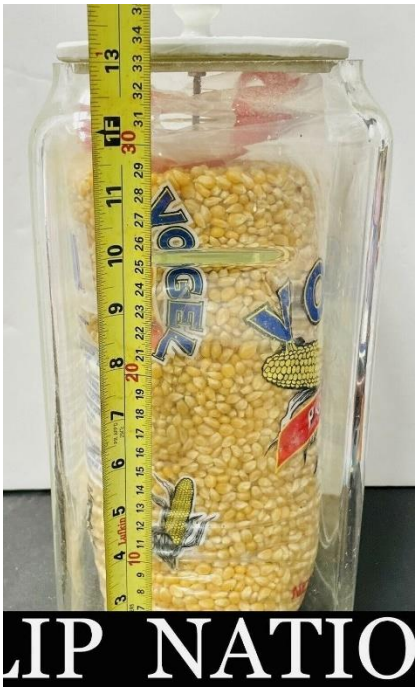
16 - 26 is a sketch of an array of Gladstone LaLande batteries powering an electric fan.



16 - 26↑

16 – 27↑

16 - 28↑



The battery jar shown above (**16-27, 16 – 28, 16 - 29**) is rectangular and unmarked and tapered from top to bottom. Its dimensions are 5” x 8” x 13”, with molded in handles on opposite sides. The only place we’ve see the molded in handles is on a Corning battery jar (11 – 1). It is likely that this is a Corning made battery jar. The porcelain lid appears to be original to the jar. It is embossed EDISON / <BSCO> / PRIMARY BATTERY / PATENTED / July 28, ’08 Sept. ’10 Apr. 4, ’11 ‘ / other patents pending / Trade / Thomas A. Edison (script) / Reg. U.S. Mark Pat. Off. / THOMAS A. EDISON, Inc. / Orange, N.J., U.S.A.

←16 – 29

16 - 30↑

16 - 31↑

The Exide jar shown above (**16 – 30 & 16 – 31**) is manufactured by the Edison Manufacturing CO., as shown on the bottom. It dimensions are 9” x 6” x 13.5” tall. It is embossed EXIDE / MADE IN U.S.A. on the two opposing short sides. It is embossed WATER LINE on 4 sides**.**

Chapter 17

ELECTRICAL ENGINEERING CO. Minneapolis, Minn

Googling this company produced no information. We do know that in 1882 Thomas A. Edison wrote to the president of Columbia University, urging him to introduce courses in Electrical Engineering. That same year, Edison created the first Central Electric Station in Lower Manhattan, creating the need for young engineers with an understanding of electrical sciences. We can only surmise that the ELECTRICAL ENGINEERING CO. of Minneapolis was a new company formed between 1882 and 1895 specializing in the new science of electricity

References: 54

17 - 1↑

17 - 1 is the lid from the jar, below. The jar is totally un-marked. The carbon graphite lid/electrode combination is embossed: (arc) ELECTRICAL ENGINEERING CO . / (arc) MINNEAPOLIS / MINN. Courtesy of **Walt Baumgardt.**

17 -2↑

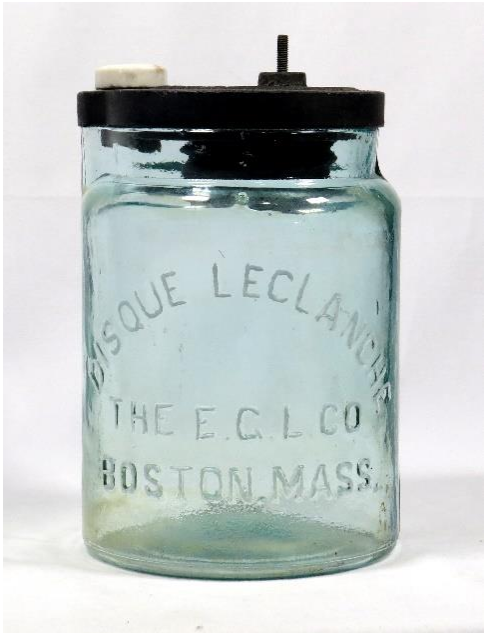
17 - 3↑

17 – 2 and **17 – 3** show the battery jar itself as well as more detail on the cylindrical carbon-graphite electrode**.**

Chapter: 18

The EGL Co – Electric Gas Light Co Boston, MA.

The Electric Gas Lighting Co., usually referred to as E.G.L. Co, was formed in the late 1800's, about the time the city of Boston was switching from gas lights to electric lights. It manufactured electrical switches and batteries for telephone systems and gas lighting. In 1906 it changed its name to Electric Goods Manufacturing Company, usually referred to as E.G.M. Co. E.G.M. Co. was a general electrical supplier: battery cut-outs, open-circuit wet batteries (such as the SAMSON), telephones, etc. In 1911 the company left Boston in favor of Canton, MA. It 1917 the company changed its name again, to the Samson Electric CO.



←18 – 1 is a round aqua jar, 4.5" diameter x 6" tall with a ground lip and pour spout. The embossing on the front of the jar is: (arc) DISQUE LECLANCHE / THE EGL Co. / BOSTON MASS. It has a hard rubber lid, with no embossing. The lid appears original to the jar. From the picture the electrode was threaded and would screw onto the bottom of the lid.
Courtesy of **Walt Baumgardt.**

18 – 2 and **18 – 3** give more detail of the lid.

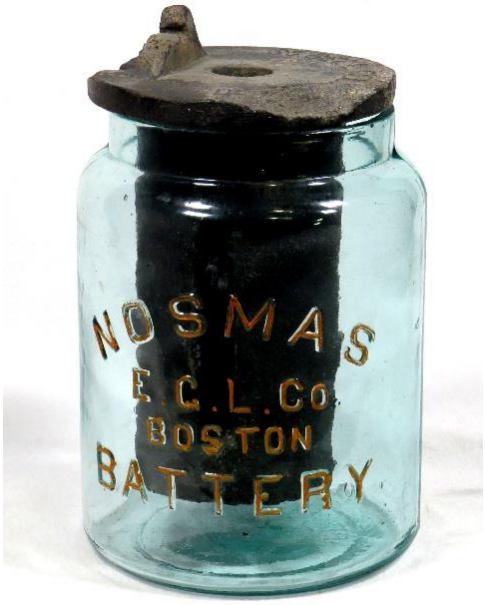
←18 -2

- 18 - 3↓

←**18 - 4** is an aqua, squared jar with a ground lip. It is 4.5" square x 6.5" tall. There is no pour spout. The jar top is round, 4" diameter. The jar is embossed on three sides: (Side 1) THE / SAMSON / BATTERY / N^{O} 2 Side 2) THE / EGL Co. / BOSTON / MASS (Side 3) WATER LINE / WITHOUT ELEMENTS . The lid, **18 – 5**, is hard rubber, 3.875" diameter, with fused cylindrical carbon-graphite, fluted, electrodes. The lid embossing is: (Circle) SAMSON N^{0}. 2 BATTERY / (arc) PAT. JULY 8, 90. / (arc) PAT. SEPT. 22. 96 / (arc) THE / (arc) E.G.L. CO. / (arc) BOSTON, MASS. (Center Connector) (Circle) MADE IN FRANCE / SAMSON. In this instance, the lid and electrodes are original to the jar.

Courtesy of **Walt Baumgardt**.

←**18 - 5**



←**18 – 6** is a round aqua jar, 4.5” diameter x 6” tall with ground top. The top of the jar is round, 3.675” diameter. The jar embossing is: (Front) NOSMAS / E.G.L. CO. / BOSTON / BATTERY (Note: NOSMAS is SAMSON spelled backwards). The lid, **18 – 7**, is 4” diameter x 0.75” thick with cylindrical fused carbon electrodes ; embossed as follows: (Top) (arc) SO. BELL. TEL. & TEL. CO The lid is not original to the jar.

Courtesy of **Walt Baumgardt**

←**18 - 7**

18 - 8↓

18 - 9↓

The two batteries above are labelled BEACON batteries from The E.G.L. Co.

18 - 8 is aqua with ground lip It is 4.75" diameter x 6.25" tall with a 3.75"and pour spout. The paper label reads: The BEACON BATTERY / use & care instructions / The ELECTRICAL GAS LIGHTING Co. / 195 Devonshire St., Boston, MASS. The lid is un-embossed and includes a cylindrical electrode. Courtesy of **Debbi Graham**.

18 – 9 is almost the same size as **18 – 8**, being 0.25" taller. The paper label reads: The BEACON BATTERY / care & use instructions / E.G.L.Co. logos / 115 Purchase St., Boston, MASS. Courtesy Of **Debbi Graham.**

←**18 – 10** is aqua with a ground lip. It is square with rounded corners. It is 4.5" square x 6" tall with a 3.25" mouth. It is embossed: (side 1) THE / SAMSON / BATTERY / No. 1 (side 2) The E.G.L. Co. / Boston Courtesy of **Debbi Graham.**

←**18 - 11** is an aqua, cylindrical jar with a ground lip It is 5" diameter x 6.675" tall. It is embossed: NO 3 / SAMSON / BATTERY / EGL CO / Boston.

Courtesy of **Debbi Graham**.

←**18 – 12** is a square, aqua jar with round corners and a ground lip. Its dimensions are 4.75" square x 6" tall with a 3.875" mouth. It is embossed: (side 1) THE / SAMSON/ BATTERY / No 2 (side 2) The / EGL CO / Boston / Mass (Side 3) water line --- without elements. Courtesy of **Debbi Graham**.

Chapter 19

Electrical Goods Mfg. Co. (E.G.M.)

The Electrical Goods Manufacturing is the successor to the Electric Gas Lighting Co. (E.G.L.). E.G.L. was formed about 1883 and in 1906 changed its name to The Electrical Goods Manufacturing Co, remaining at the same address until 1I11, when they moved to Canton, MA. In 1917 they changed their name to SAMSON ELECTREC Co.

References: 59

19 – 1↑

19 - 2↑

19 - 1 shows a jar from the E.G.M. Co. The jar is aqua with a ground lid. It is 5.125" diameter x 6.875" tall. The intact paper label reads: The / SAMSON / BATTERY / No 3. The rest of the label lists instructions / The E.G.M. logos / 144 Pearl St./ Canton, Mass. U.S.A. Courtesy of **Debbi Graham**.

The lid, **19 -2**, is embossed: (arc) SAMSON No. 3 BATTERY / (arc) The E.G.M. Co. Boston Mass / (arc) UD PAT. July 8 '88. Courtesy of **Debbi Graham**.

←**19 – 3** is an E.G.M. jar. It is a squared, aqua with a formed lip. Its dimensions are 4.75" square x 6.375" tall, with a 4" diameter mouth. It is embossed on 3 sides:

Side 1: THE / SAMSON / BATTERY / No 2

Side 2: THE / E.G.M. Co / BOSTON / MASS

Side 3: Water Line without elements

Courtesy of **Debbi Graham**.

19 – 4 through 19 – 7 (below) show a Samson # 2 battery jar from E.G.M. All Four sides are either embossed or have paper labels. It's dimensions are also 4.75" square x 6.375" tall, with a 4" diameter mouth. It, too, is embossed on 3 sides.

Side 1: Paper Label with The / SAMSON / BATTERY / No. 2

Side 2: Embossed, The /SAMSON / BATTERY / No. 2

Side 3: Embossed, E.G.M. CO. / BOSTON / MASS

Side 4: Paper label with Instructions, etc.

19 - 4↑

19 - 5↑

19 - 6↑

19 - 7

Chapter: 20

The ELECTRIC STORAGE BATTERY CO (E.S.B. CO., Gloucester, N.J.)

Exide Corporation's predecessor was the **Electric Storage Battery Company**, founded by W.W. Gibbs in 1888. Gibbs purchased the ideas and patents of inventor Clement Payen to make the storage battery a commercial product.

In 1893, the Electric Storage Battery Company was producing chloride accumulators for stabilizing electric grids. Nine years later there were 220 lead chloride accumulator installations in service enabling electric street rail.

In December of 1894, W.W. Gibbs, president of ESB CO, stated that the company had completed the purchase of all patents and patent rights concerning the manufacture and use of electric storage batteries of the General Electric Co., The Edison Co., the Thomas-Huston Co., the Brush, the Accumulator company, the Consolidated Electric Storage Co. and the General Electric Launch Co. Mr. Gibbs assured everyone that this gave the Electric Storage Battery Co. exclusive rights to supply the country with electric storage batteries of the various types previously developed, as well as the protection of every decision rendered by the federal courts in the interpretation of patents of this kind.

In 1898, an Exide battery provided the submerged power for the USS Holland, the U.S. Navy's first submarine. Electric Storage remained a significant supplier of the U.S. Navy's submarine through WWII. Isaac Rice, president of Electric Storage in 1899 was instrumental in founding the Electric Boat Company.

In 1900, the Electric Storage Battery Company developed a product of greater capacity and less weight for electric taxicabs. This battery was the first to bear the name, ***Exide***, short for "Excellent Oxide". Exide is a Nickel Cadmium battery:

In 1902, The Electric Storage Battery Co formed Willard Storage Battery Co., when they acquired the battery -making assets of a jewelry manufacturer in Cleveland, OH and incorporated them. By 1950 Willard automotive batteries were outselling Exide automotive batteries although The Electric Storage Battery Co. was larger due to diversification.

It was at this time that Delco approached E.S.B. to develop a battery to complement its new electric starter. This project yielded the first car battery of the modern type and gave Delco the Exide technology.

The members only pages on the NIA web site contains a copy of the 1917 sales catalog of The Electric Storage Battery Co. You are encouraged to look at it, as they offered a complete line of storage batteries and associated equipment. The following page, from that catalog, better describes the extent of their line of batteries and associated equipment. They also had a complete line of Battery (Sand Trays) See Chapter 5 for more details.

References: 61, 62

"Exide" Accumulator "Chloride Accumulator" "Tudor Accumulator"

THE ELECTRIC STORAGE BATTERY CO.

Manufacturer of Storage Batteries for All Classes of Service

Factory, Allegheny Ave. and 19th St., PHILADELPHIA, PA.

BRANCH OFFICES:—PHILADELPHIA, NEW YORK, BOSTON, CHICAGO, ST. LOUIS, CLEVELAND, ATLANTA, DENVER, DETROIT, SAN FRANCISCO, PORTLAND, ORE., LOS ANGELES, SEATTLE, TORONTO

BATTERY DEPOTS:—NEW YORK, BOSTON, CHICAGO, ST. LOUIS, CLEVELAND, ATLANTA, DENVER, SAN FRANCISCO, KANSAS CITY.

PRODUCTS STORAGE BATTERIES AND AUXILIARIES.

PLATE THE PLATE is the vital component of the cell, and the *type* of plate should be determined with reference to the conditions of operation and character of service. The Electric Storage Battery Co. manufactures the following types:

TUDOR POSITIVE, } Plante formation, for heavy regulating
MANCHESTER POSITIVE, } service and peak work.

BOX NEGATIVE for use with Tudor or Manchester positives of large size.

SHELF NEGATIVE for use with Tudor or Manchester positives of smaller size.

EXIDE POSITIVE AND NEGATIVE, "pasted" type for heavy Stand-by service, and portable cells.

IRONCLAD-EXIDE POSITIVE—the most noteworthy advance in the storage battery art in recent years—for Electric Vehicles, Locomotives, Storage Battery Cars, Train Lighting, etc.

PLATE SUPPORTS In glass jars, plates are supported by plate lugs integral with the grid, resting on the edges of the jar. In lead-lined tanks, the plate lugs rest on vertical sheets of glass. In rubber jars, the plates rest on ribs cast on the bottom of the jar.

SEPARATOR THE WOOD DIAPHRAGM SEPARATOR, in the smaller stationary cell in glass jars, is supported by slotted dowels, resting on the bottom of the jar. In larger cells in lead-lined tanks the separator is supported by a hard rubber pin passing through the middle dowel near the top and resting on the tops of the adjacent plates, the dowels extending only to the bottom of the plates, leaving the space below free for removing sediment. In portable cells no dowels are used, the wood separators are grooved vertically, and usually a perforated sheet rubber separator is also inserted betweeen the wood separator and the adjacent positive plate.

GLASS JARS GLASS JARS—Style A for smaller cells, Style B, heavier, for larger cells—high-grade, uniform in quality and dimension, thoroughly annealed, carefully inspected.

WOODEN TANKS LEAD-LINED WOODEN TANKS—Shell manufactured of specially selected resinous yellow pine, dove-tailed and doweled together without metallic fastenings, bottoms drained and ventilated under lining, protected inside and out, before lining, by two coats of acid resisting composition. Linings of sheet lead, with overlapping seams, lead-burned with hydrogen flame, upper and lower corners reinforced, upper edges carried over clear from the shell and finished with drip points. Lead linings are thoroughly tested before placing in the shells.

CELL SUPPORTS CELL SUPPORTS—Cells in Style A glass jars are supported on glass sand trays provided with glass feet. Cells in Style B glass jars are supported on wooden sand trays resting on glass petticoat insulators. Cells in lead-lined tanks rest on glass oil insulators, provided with circular trough half-filled with oil, and covered by a lead cap extending down around, but free from the sides, and provided with an internally beaded edge. The oil-insulator rests on a heavy truncated cone of acid proof earthen ware, set on the battery room floor. Perfect insulation under cells in lead-lined tanks is vital to prevent electrolytic leakage and corrosion of tank linings.

ELECTROLYTE ELECTROLYTE, of dilute sulphuric acid, free from injurious impurities, is all tested at The Electric Storage Battery Company's factory before shipment.

AUXILIARIES AUXILIARIES—This company also manufactures switchboards, end cell switches, carbon regulators, average adjusters, automatic cell fillers and other auxiliary apparatus.

Write for bulletins describing in detail the application of the **"Chloride Accumulator," "Tudor Accumulator"** or **"Exide"** BATTERIES to the service in which you are interested, also suggestions for Battery Room Construction, etc.

See Chapter for known E.S.B. battery (sand) trays.

The information on the next three pages is extracted from the 1917 catalog of ESB CO., which was mentioned earlier. The dimensions were provided by Nick Bergkessel. There are also glass trays for the Exide Accumulator and Hyray-Exide Battery. The same page also includes a complete line of wood sand trays for Chloride and Tudor Accumulators; types BT, CT, PT, ET and H cells.

Glass (Sand) Trays for the

Chloride and Tudor Accumulators

Type	Dimensions (in.)	Catalog #
C-3	3 ½ x 5 1/4	9250
C-5	4 ¼ x 5 ¼	9250
C-7	5 ¼ x 5 ¼	9250
D-3	3 7/8 x 7 3/8	9254
D-5	5 3/8 x 7 3/8	9254
D-9	8 ¼ x 7 3/8	9256
D-11	9 ½ x 7 3/8	9256
D 13	11 x 7 3/8	9258
E-5	5 7/8 x 9 1/8	9259
E-7	6 ¾ x 9 1/8	9260
E-9	8 ¼ x 9 1/8	9260
E-11	9 ½ x 9 1/8	9262
E-13	11 x 9 1/8	9262
E-15	12 ¼ x 9 1/8	9269
F-9	8 ½ x 12 3/8	9265
F-11	9 ¾ x 12 3/8	9265
F-13	11x 12 3/8	9265
F-15	15 ½ x 12 3/8	9268

For information on known ESB battery trays, please see Chapter 4, page 33 - 36.

Electric Storage Batteries from ESB CO.

Glass and Rubber

Type	*# Plates*	*Glass*	*Rubber*	Dimensions *(O.D. in, L,W,H)*	*Cat. #*
B	3	XX		2 ½ x 4 x 4 ½	248
	3	XX		2 ½ x 4 x 5 ½	251
	3	XX		2 ½ x 4 x 6 ½	252
B	3	XX		1 ¾ x 3 11/16 x 5 1/16	249
C	3	XX		3 ¼ x 5 ¼ x 7 1/8	259
	5	XX		4 ¼ x 5 ¼ x 7 1/8	322
	7	XX		5 ¼ x 4 ¼ x 7 1/8	325
C	3	XX		1 ¾ x 4 ½ x 7	260
	5	XX		2 ¾ x 4 7/16 x 7	323
	7	XX		3 ¾ x 4 7/16 x 7	326
D	3	XX		3 7/8 x 7 3/8 x 10 ¾	273
	5	XX		5 3/8 7 3/8 x 10 ¼	275
	7	XX		6 ¾ x 7 3/8 x 10 ¼	277
	9	XX		8 ¼ x 7 3/8 x 10 ¼	279
	11	XX		9 ½ X 7 3/8 X 10 ¼	281
	13	XX		11 X 7 3/8 X 10 ¼	283
D	3	XX		1 ¾ X 6 7/16 X 9	433
	5	XX		2 ¼ X 6 7/16 X 9	436
	7	XX		3 13/16 X 6 7/16 X 9	445
	9	XX		5 X 6 ½ X 9	472
	11	XX		6 3/16 X 6 7/17 X 9	476
	13	XX		7 ¼ X 6 ½ X 9	479
E	5	XX		5 3/8 x 9 1/8 x 12 ¾	345
	7	XX		6 ¾ x 9 1/8 x 12 ¾	347
	9	XX		8 ¼ x 9 1/6 x 12 ¾	349
	11	XX		9 ½ x 9 1/8 x 12 ¾	351
	13	XX		11 x 9 1/8 x 12 ¾	353
	15	XX		12 ¼ x 9 1/8 x 12 ¾	355

Electric Storage Batteries from ESB CO.

Glass and Rubber (cont'd)

Type	*# Plates*	*Glass*	*Rubber*	*Dimensions (O.D. in, L,W,H)*	*Cat. #*
E	5		XX	2 13/16 x 8 ½ x 11	494
	7		XX	3 7/8 x 8 ½ x 11	495
	9		XX	5 x 8 ½ x 11	496
	11		*XX*	*6 1/8 x 8 ½ x 11*	*497*
	13		*XX*	*8 7/16 x 8 ½ x 11*	*498*
	15		*XX*	*8 ½ x 8 ½ x 11*	*499*
F(A)*	9	XX		8 ½ x 12 ¾ x 17	582
F(A)*	11	*XX*		*9 ¾ x 12 ¾ x 17*	*583*
*F(A)**	*13*	*XX*		*11 x 12 3/4 x 17*	*584*
*F(A)**	*15*	*XX*		*12 3/8 x 12 ¾ x 17*	*595*
F(B)*	13	XX		13 5/8 X 12 3/8 X 18	589
F(B)*	17	XX		16 ¾ x 12 5/8 x 18	591
F(B*)	21	XX		20 ¾ x 12 5/8 x 18	593

- The letter in ( ) is the battery style. Eg., Type F, Style A.

LEAD LINED WOOD TANKS

9	*13 7/8 x 15 x 20 1/4*	*690*
11	*15 7/8 x 15 x 20 ¼*	*691*
13	*16 ¾ x 15 x 20 ¼*	*692*
15	*18 3/8 x 15 x 20 ¼*	*693*
17	*20 X 15 x 20 ¼*	*694*
19	*21 ¾ x 15 x 20 ¼*	*695*
21	*23 ¾ x 15 x 20 ¼*	*696* `
23	*25 x 15 x 20 ¼*	*697*
25	*26 5/8 x 15 x 20`1/4*	*698*
27	*8 3/8 x 15 x 20 ¼*	*699*

Following is actual equipment from the ESB Co .:

←**20 - 1** is not a battery jar at all, but rather an automatic water fill unit to maintain the liquid level in the batteries. It is a quart size; 5.5" diameter x 3.5" high. The neck is 1.75" diameter x 1.5" high. Aqua in color it is embossed: (F- Readable UD) PILOT CELL AUTOMATIC / WATER FILLER / STYLE A - ONE QUART / To Refill - Invert bottle and / Unscrew Goose Neck at Sleeve / THE ELECTRIC STORAGE BATTERY CO. This is the courtesy of **W. Baumgardt**, who acquired it from **Phil Mayhew**.

20 - 2 , below, is an Exide battery jar, also courtesy of **Walt Baumgardt.** It is Blue Aqua with dimensions of 2.5" x 8.75" x 11.75" tall. It is Embossed Front and Rear: (near top) WATER LINE / (Middle of jar) EXIDE.

20 – 2 →

←**20 – 3** is an Exide battery jar in clear glass. The front is embossed EXIDE / Exide / Manchex. The rear is embossed EXIDE. The Lid, **20 - 4**, is embossed EXIDE (front and rear) with Patented on the right. The dimensions are 5” x 7” x 12” tall. The name plate identifies at as Type DMGO7, with a 1945 date.

←**20– 4**

←**20 – 5** is another EXIDE battery jar. The lid, **20 - 6** is also embossed EXIDE. The name plate identifies it as Type EOS 9, dated April 29, 1943. Its dimensions are 6” x 11” x 15” tall.

If it seems a little strange that battery jars were still being used in the 1940s, consider the data from the Introduction and from Chapter 4. Just prior to WWII, 50% of rural America did not have electricity, which was up from the 10% of rural America, that had electricity in 1930. In 1935 the Government started the Rural Electric Administration. Significant progress had been made. This explains why during the 1940s and into the 1950s, battery jars were the only source of power for a significant part of the U.S.

←**20 - 6**

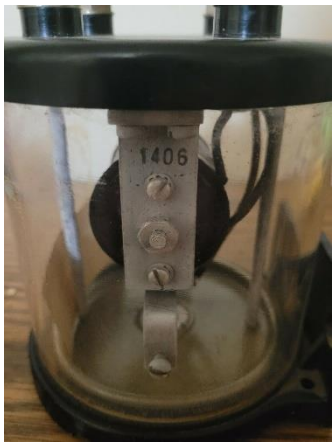
20 - 7↑

20 -7 is a wooden shipping crate for Exide batteries. I'm not sure of the dimensions, but it appears it would hold 3 or 4 batteries, depending on the size. Courtesy of **Wayne Duzinski.**

20 - 8 through **20 - 13**, below, are pictures of a Charge Control Unit offered by the Electric Storage Battery Co. They are also known as charge controllers, charge regulators or battery regulators. They were used on secondary batteries to protect against electrical overload, and or overcharging. This prevented conditions that would reduce battery performance, or lifespan or that may cause a safety issue.

20 - 8↑

20 - 9↑



20 - 10↑

20 - 11↑

20 - 12↑

20 - 13↑

The paper label on the unit reads: EXIDE Two Rate Charge / Control Unit. Electric Storage Battery Co. The jar itself, manufactured by Corning, is embossed (arc) T.M. REG. / PYREX / (arc) U.S. PATENT. This further reinforces the point that battery jars, themselves, were manufactured by glass houses for the various electrical companies. (Also see Chapter 60.)

←**20 - 14** is an Exide battery jar. The dimensions are 7.25” x 7.5” x 10.25”. It has a formed lip, with clear glass. It is embossed with high and low liquid levels on four sides. On opposing sides, it is embossed EXIDE / Made in U.S.A. The base is embossed 12260.

The Exide jar pictured below and right **(20 – 15, 20 – 16 & 20 – 17**) is clear, with dimensions of 4” x 10” x 14.75” tall. It is embossed EXIDE / MADE IN U.S.A. on the two opposing 10” sides. Although a line is there, it has no WATER LINE embossing. The bottom is embossed 25576 / 3.

20 - 15→

20 - 16↑

20 - 17↑

Chapter 21

D.H. FITCH CO .

Very little is known about D.H. (Derrick Hollenbeck) Fitch (1837 – 1922), other than he was a telegrapher for several southern railroads. While in that capacity, he developed a liquid for the Galvano batteries used in telegraphy, obtaining a patent, June 16, 1863. Returning to his hometown of Cazenovia, NY, he founded a company (incorporated Oct. 6, 1885) to make the "Perfect" battery. Manufacturing facilities were at 107 East 34Th Street in NY City. The company became a major manufacturer of medical batteries. Although their name appears on battery jars, they did not manufacture them. Records show that on at least one occasion they ordered the jars from Whitney Glass Co.

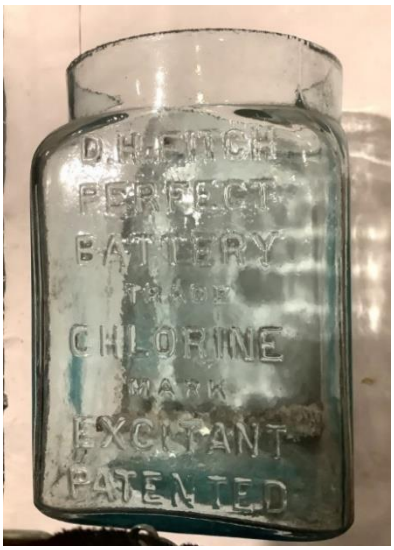
References: 3, 66, 68

21 - 1 is a square jar; 4 x 4 x 5.75" tall. Its round, ground, top is 4" diameter. Embossing is: D.H. FITCH / PERFECT / BATTERY / TRADE / CHLORINE / MARK / EXCITANT / PATENTED Courtesy of **Jeff Hogan**

There is a lid with electrodes for the jar (also pictured below). The lid, **21 - 2** is embossed: (arc) FITCH PERFECT BATTERY / (arc) MANUFACTURED BY / (arc) VAN HUTEN TENBROECK / (arc) NEW YORK

21 – 1→

←21– 2



←**21 – 3** is another variant of the Fitch Battery. It is an aqua, round jar with a ground lip and pour spout. Its dimensions are 4.25" diameter x 6.675" tall with a 3.675" diameter mouth.

It is embossed on the front: CHLORINE BATTERY / FITCH'S PATENT / SEPT. 16, 1879 / PARTRICK and CARTER / PHILA, PA. Courtesy of **Debbi Graham**.

Chapter: 22
GAMEWELL

In the early days of this country, fire was a constant threat, particularly in the densely populated cities. The biggest problem was the lack of a notification system to alert residents and authorities of a fire. The invention of the Morse telegraph helped to solve this problem. The first plan for such a notification was put forth by DR. William F. Channing and Moses G. Farmer in 1847, and the first installation in the city of Boston in 1851.

In 1855 John N. Gamewell of S. Carolina, believing in the possibilities of the Boston system, purchased the rights to use their invention in the south. In1859, he purchased all the patents associated with the system. In 1866, immediately following the Civil War, actual manufacturing began by Kennard & Co. John F. Kennard was a partner of John N. Gamewell. The Gamewell Fire Alarm Telegraph Co. was formed in 1879 and grew rapidly. BY 1886 the system was installed in 250 cities, and in 500 cities by 1890. In 1910 Gamewell held a market Share of 95% of Fire Alarm Systems.

It is not believed that Gamewell actually manufactured the battery jars to power their systems, but that an unknown manufacturer produced the battery jars with the Gamewell Name.

References: 72, 74-77

←**22-1** is the lid from a small Gamewell battery jar. It is white milk glass with dimensions of 2" x 5". Both the lid and the Jar, **22 – 2**, are embossed TRADE / GAME (logo) WELL / MARK. Courtesy of **Walt Baumgardt**.

←**22 – 2** is the clear glass jar with the lid shown in **22 – 2**. It is 2" x 5" x 5.7"tall. The Gamewell logo is a clenched fist holding lightning bolts.

Courtesy of **Walt Baumgardt**.

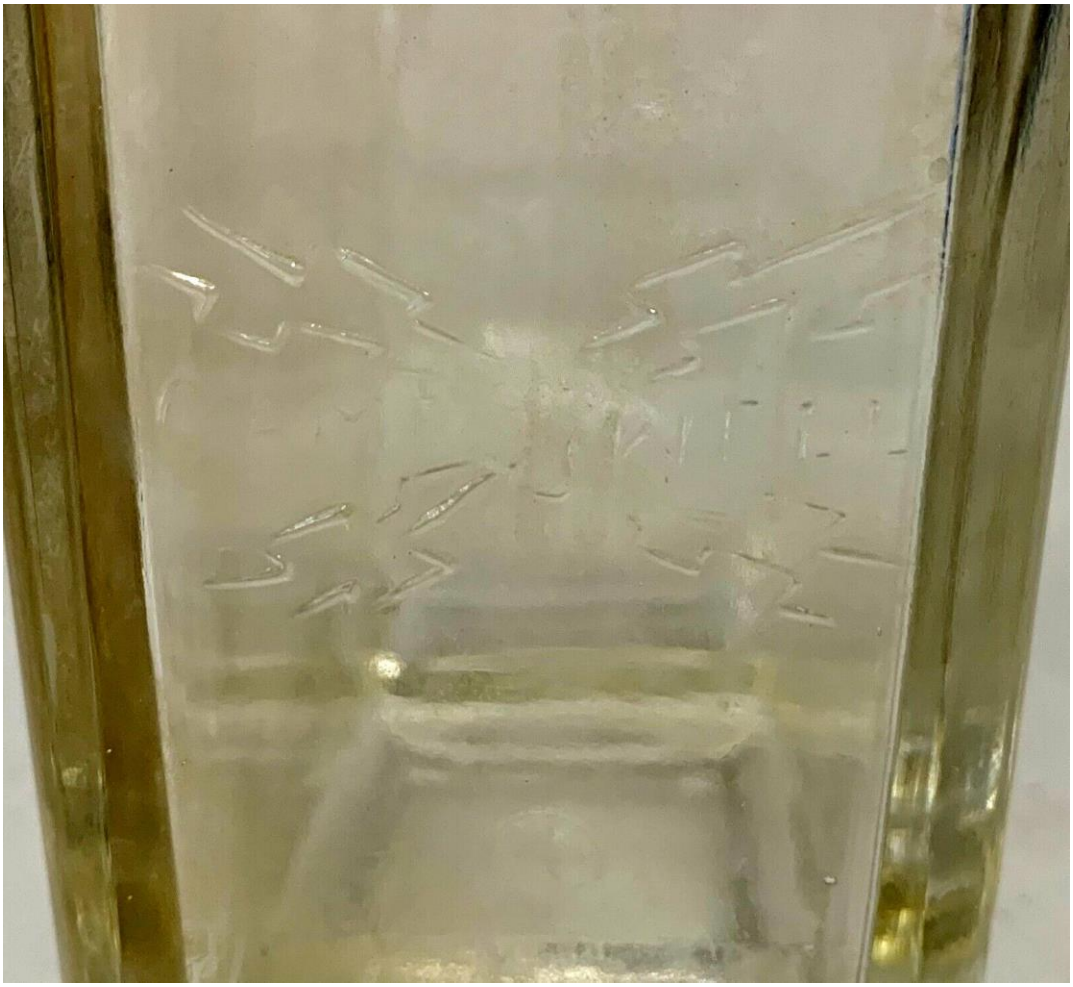
Better pictures are shown in **22 – 3** and **22 – 4**

22 – 3↓

←**22 – 4** is likely a later logo than the one in 20 - 3

←**22- 5** A vintage Gamewell Fire Alarm Call Box.

22 - 6



22 – 7

22 – 6 is a large, straw-colored battery jar It is 7” x 4” at the base and the side flare outward to 6.5” x 9.5” at the top. It stands 12” tall. The GAMEWELL logo is on either end of the jar **21 – 7** is a close up of the Gamewell logo. Note: The embossing around the logo is absent on this jar, making it different than **22 – 3** and **22 – 4**.

Chapter: 23

Gayner Glass Works , Salem, NJ

With S. Pardusses as a partner, John Gayner Sr. established the John Gayner Glass Manufactory in 1874 in Waterford, NJ, manufacturing what is termed “large ware”, consisting of large bottles, carboys, battery jars, etc. In 1879 they moved to Salem, NJ. The plant was destroyed by fire in 1884. In 1885 Pardusses withdrew as partner and Gayner built a new factory. In 1891 Gayner applied for a patent for a “Mold for Battery Jars” and received Patent No. 478,792 in 1892. I was unable to find a copy of the patent. It was in 1898 that, with family members, The Gayner Glass Works was incorporated. S.B. Roberts reports in the American Glass Review of Dec 24, 1927, that the average annual production of battery jars was 500,000.

To date, no battery jars have been attributed to The Gayner Glass Works.

References: 79-82, 154

Chapter 24

General Electric

General Electric had its beginnings in the laboratories of Thomas Edison. In 1878 Edison had formed the Edison Electric Light Company. Edison received half of the company's shares on the agreement that he develop an incandescent lighting system. He succeeded a year later when he found that carbonized thread or carbonized bamboo worked in the laboratory. However, developing a lighting system for an entire community involved much more than developing a light bulb; the devices that generated, transmitted and controlled electric power also had to be invented. In 1879 he had developed the first dynamo, or direct current (DC) generator. The first application of electric lighting was the steamship Columbia in 1880. The first full scale public application of the Edison Lighting System was in London at the Holborn Viaduct. The first public application in the United States was when the Pearl Street Station opened in New York City.

While these things were going on with Edison, the Thomson-Houston Company was formed from the American Electric Company, founded by Elihu Thomson and Edwin Houston. Many of their systems differed from Edison's in that they used alternating current (AC), which can transmit over far longer distances than DC systems. By the early 1890s the spread of electrification was threatened by conflict between the competing technologies.

By 1889, Edison had consolidated all his companies under the name Edison General Electric Company. In 1892 Edison was manipulated into a merger of Edison General Electric Company and the Thomson-Houston Electric Company to form The General Electric Company. As a result of the merger, Edison resigned from the Board of Directors, clearing the way for the development of AC current.

By 1900 GE was manufacturing everything involved in the electrification of the United States; generators to produce electricity, transmission equipment to carry power, industrial electric motors, electric light bulbs and electric locomotives. It should be noted that GE operated in the virtual absence of competition. In 1896 they had entered a patent pool with Westinghouse Electric, their only competitor at the time.

By the early 1900s GE had expanded into the appliance market etc. They continued to grow and expand, and today are diversified into many markets.

References: 83-84

←**24 - 1** is a General Electric Battery Jar. It is aqua with a ground lip. It is straight sided, 3.125" diameter x 6.875" tall. The lip is threaded and the top screws on. It used a zinc band with a white porcelain insert, similar to a fruit jar. The lid has 2 positive and 2 negative electrodes, and is embossed: G.E. Co./ U.S.A./ Type K. The GE logo appears 3 times around the jar. Courtesy of **Debbi Graham**.

←**24 - 2** is another GE battery jar. This one is rectangular in shape, with a formed lip. . It is clear glass, with dimensions of 2" x 4.5" x 7" tall.

Chapter: 25

GORDON BATTERY CO .

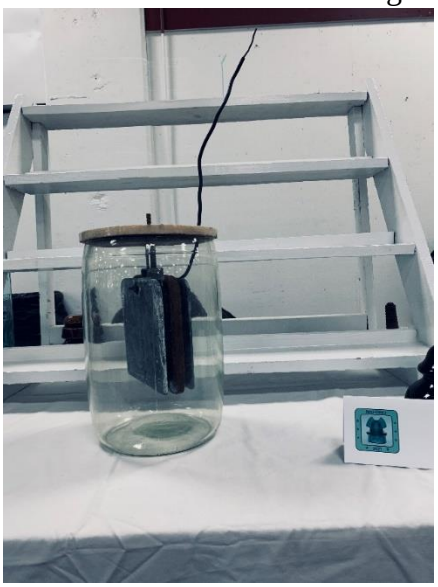
Gordon Battery Co. was formed in the 1880's, in Waterbury, CT. to produce glass and porcelain battery jars. In the same timeframe, Waterbury Battery Co., also in Waterbury, CT., produced glass and porcelain battery jars. Very little is known about the two companies other than what they produced. It seems very likely that there was a relationship between the companies, but there is nothing to indicate what that relationship was. It appears that Gordon had a maker's mark that appeared on some battery jars. It is similar to the Corning mark (an elongated C with two letters inside the C).

References: 117

The jar pictured below, **25 - 1** is a mystery. The jar itself is embossed: (Front) L.S. BRACH CO. / <COBRA CO.> / NEWARK N.J. (Embossing on the Jar was very faint, but black paint helped to bring it out). This is a bit confusing as it is not believed that L.S. Brach manufactured glass battery jars. The jar could have been manufactured by an unknown glass house and embossed L.S. Brach.

The dimensions of the jar are 7" diameter x 10.5" tall. It is clear with a ground top. The dimensions of the lid are 7" x 0.5" and is white. It is the courtesy of **Jeff Hogan**.

It is believed that the lid is original to the jar. The lid is embossed: (arc) GORDON PRIMARY CELL / PATENTED / (arc) / OCT. 27, 1896 / APR. 13, 1897 / FEB. 13, 1906 / PRIMARY BATTERY CO. / WATERBURY, / CONN. / U.S.A. This implies that the lid was manufactured by The Primary Battery Co. of Waterbury , CT, making it a third Battery Co in Waterbury, CT. The Gordon Battery Co. and the Waterbury Battery Co. were also located in Waterbury, CT. I could find no record of a Primary Battery Co. In fact, googling Primary Battery Co. of Waterbury yielded the Waterbury Battery Co. Perhaps when we have more jars in the mix it will become clear.



←25 – 1

The lid, **25 - 2,** below, in white porcelain, is original to the jar and is embossed (arc) GORDON PRIMARY CELL /PATENTED / OCT. 27, 1896 / Apr. 13, 1897 / Feb. 13, 1906/ GORDON PRIMARY BATTERY Co. WATERBURY, / CONN / U.S.A. Courtesy of **Jeff Hogan.**
References:

25 – 1 and **25 – 2** are the sane as **8 – 2** (page 54). The jar is 7" diameter and embossed L.S. BRACH Co. / <<COBRA>> / Newark, N.J.is somewhat of a mystery in that it is not generally believed that L.S. Brach manufactured glass. They are generally known for their porcelain strains and similar products and electric railway signals. It is likely the jar was manufactured by a third party and put Brach's name on the jar. **Courtesy of Jeff Hogan**.

←25 – 2

25 - 3↓

25 - 4↓

←**25 – 5**

25 – 3 through **25 – 5** show a battery jar similar to **25 – 1 and 25 – 2.** The exception is that this one is embossed "GBRAC" , which is more logical for an L.S. BRACH jar. I'm not sure of the significance of "FRY" under the embossing.

The lid is embossed (arc) GORDON BATTERY / (arc) patented / (arc) Oct. 27, 1896 April 13, 1897 FEB. 13, 1906 / GORDON PRIMARY BATTERY CO. / WATERBURY / CONN / U.S.A.

25 – 6, below, shows a jar and lid. The lid is the same as 25 – 5, above. It is 7" diameter and 10" tall. The jar is simply marked Cxx, which we've seen on Corning battery jars, As the Cxx and Corning have appeared together on the same jar, it is likely that the plain Cxx embossing belongs to Corning. The lid, on the other hand is embossed: (arc) GORDON BATTERY / (arc) Patented / (arc) Oct. 27, 1895-Apr. 12, 1897-Feb.13, 1906 / GORDON PRIMARY BATTERY CO. / Waterbury / CONN / U.S.A. Courtesy of **Walt Baumgardt**.

25- 6↑

The Gordon lid, **25 – 7**, (above) further adds to mysteries around the battery Companies of Waterbury, CT. It is embossed: (arc) GORDON PRIMARY CELL / Patent/ Dec – 27 – 1896 / Feb – 12 – 1897/ Feb – 12 – 1906 / The LUTZ LOCKWOOD MFG. CO./ Aldene, Union Co, N.J./ (arc) successor to / (arc) GORDON BATTERY CO. Courtesy of Debbi Graham.

Unfortunately, Lutz-Lockwood is one of those companies about which little is known. We don't know when Lutz Lockwood took over the Gordon Battery Co. As more information becomes available hopefully, we will learn more

25 - 8↑ is a Gordon cell. It is aqua, with a ground lip, 4.75" diameter x 6" tall with a 4" diameter mouth. It has a combination lid and cylindrical, carbon graphite electrode. It is embossed: Water Line / THE / GORDON CELL / M'FD BY / GORDON _ BURNHAM BATTERY CO./ NEW YORK / PATENTED. **Courtesy of Debbi Graham.**

Chapter 26

H.J. GORKE Electric CO . Syracuse, NY

Not much is known about them, but we know a little of their history. In 1893 The Engineering & Supply Co. opened a branch in Syracuse, at 308 – 310 West Jefferson St. H.J. Gorke was the Manager, and a Jesse Lorenzo was superintendent. In 1897 H.J. Gorke established his own company which was to become the H.J. GORKE Electric Co. In the same year, Jesse Lorenzo left to start The Crouse Hinds Electric Co.

There is an un-embossed battery jar with the H.J. GORKE name on the lid.

←**26 - 1** is un-embossed, with a pour spout and a ground lip. The lid **26 - 2** is embossed as follows:

(arc) OAKLEAF / H.J. GORKE / SYRACUSE, N.Y.

There seems to be no significance to the term OAKLEAF. Courtesy of **Debbi Graham**.

26 - 2↓

Chapter: 27

Gould Storage Battery Co.

The origins of Gould Electronics date to the late 1800s. Charles J. Gould started a small foundry to forge couplers for railroad cars. When a fire destroyed a plant in 1895, he rebuilt on a larger scale, and established a town around the factory. The community of Depew was founded on 1,200 acres, just east of Buffalo, NY. The growing market for storage batteries prompted Gould to expand his product line, and to change the name to Gould Storage Battery Co. Gould produced batteries for trains, electric utilities, subways, elevators and farms. Gould was also a major supplier of submarine batteries (see Chapter). By 1930 Gould was one of the largest manufacturers of industrial batteries in the U.S.

Meanwhile in St. Paul, Minnesota, another company was carving a niche in the battery business. The Electric Manufacturing Company, originally a distributor of electrical accessories, realized success was in manufacturing and expanded into batteries. It was renamed to the National Lead Battery Company. The combination of a small customer base, a fire that destroyed the battery plant, and a recession following WWI caused great financial problems. The company went after a single customer with a national presence, Montgomery Ward. When Montgomery Ward visited National Lead Battery, they hired workers for a few hours the day of the meeting. They only had enough materials to run the plant for a few hours. The staged production was convincing, and Montgomery Ward signed a contract with National Lead Battery, allowing it to escape financial ruin. As the company grew through the 1920s, it removed Lead from its name and became simply National Battery.

In the late 1930s, in order to get control of a patent owned by Gould, National Battery acquired Gould. In the late 1930s they changed the name again to become Gould-National Batteries. In the late 1960s as the world was switching to electronics, Gould followed suit and in the 1970s became Gould Electronics.

References: 680

←**27 – 1** is a large Gould battery jar with clear glass and a formed lip. It is embossed WATER LINE / GOULD on all four sides. Its dimensions are 5" x 11" x 17" tall.

←**27 – 2** is another Gould battery jar with dimensions more in line with other Farm battery jars. Its dimensions are 4" x 7.5" x 10" tall. It is aqua, and embossed Water Line / Gould on the front and rear

←**27 – 3**, left, is a blue battery jar also with the Gould name. It is embossed **WATER LINE / GOULD** on all four sides. Its dimensions are 6" x 9" x 13" tall.

←**27 – 4** is a clear glass GOULD battery jar. It has dimensions of 3.75" x 8" x 13" tall. It is embossed WATER LINE / GOULD on two sides.

←**27 - 5**

27 – 5 and 27- 6 show yet another Gould Battery jar. It is Aqua with tapered sides. It is 10" tall with top dimensions of 7" x 4". It is embossed WATER LINE / GOULD on 4 sides. There is a 60 on the bottom.

These Gould jars give us an opportunity to examine the jars in greater detail. Some are straight sided, while others are tapered. Some like 26-5 have a double lip at the top while others have a single lip. Another variation is the height of the 2nd, or lower lip. Some are just a very shallow ring, while others are higher. Whether these differences are by design or are a result of different manufacturers is not known .

27 - 6↑

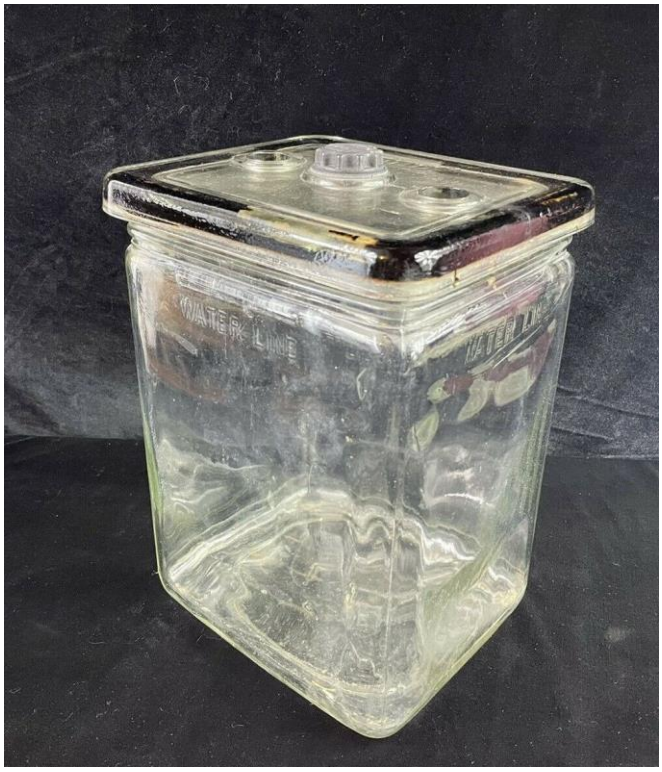
27 - 7↑

27 - 8↑

The Gould battery jar above (**27 – 7 & 27 – 8**) is embossed on 4 sides WATER LINE / GOULD. It is Clear glass with dimensions of 5.75” x 9” x 13.25” tall.

Chapter 28

Grant Storage Battery Co.



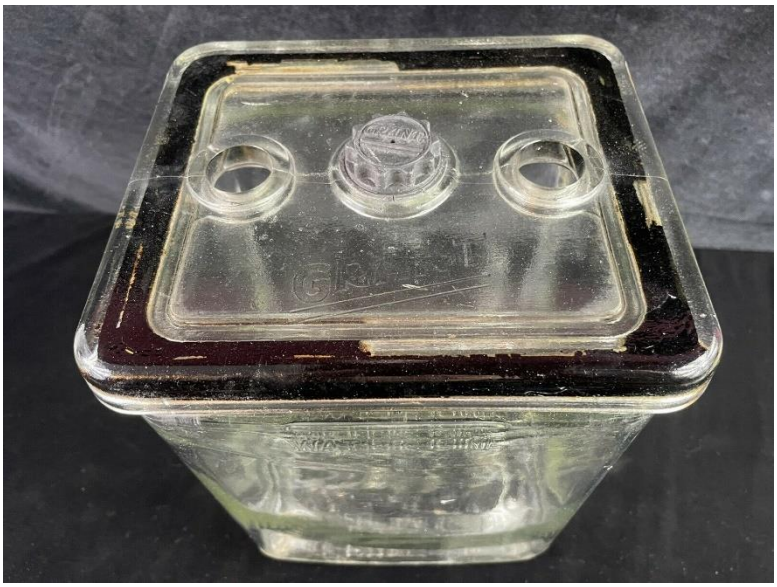
The Grant Storage Battery Company was incorporated in Minnesota on Sept. 24, 1919. That is about all we know about this company.

They did manufacture batteries.

←28 - 1

28 – 1, left**,** is assumed to be a Grant battery jar. It is un-embossed except for WATER LINE on all four sides. The only way we know it is GRANT is from the embossing on the original lid **28 – 2**

The dimensions of the jar are 6.25” x 7.5” x 11” tall, with the lid. Without the lid the jar is about 10” tall. Based on its size it was most likely part of a Farm Battery System. (See Chapter 3).



←28 - 2

Chapter 29

Hemingray Glass Company

You are all familiar with the Hemingray Glass Co., the largest manufacturer of glass pin-type insulators. The company was started in1848 in Cincinnati, OH, by Robert Hemingray and Ralph Gray. It was known as Gray, Hemingray & Bros. and manufactured salt and pepper shakers, dishware, and various knick-knacks, but became famous for insulators. In 1852 it moved across the Ohio River to Covington, KY. Ralph Gray died in 1863, and the company was renamed to Hemingray, Bros. & Co. in 1864. In 1868 it became R. Hemingray & Co., and in 1870 it became The Hemingray Glass Co. In 1888 they built a plant in Muncie, IN, taking advantage of the natural gas boom, which essentially closed the Covington plant. The Covington plant was re-opened for a short time in 1892 when a fire closed the Muncie plant for repairs. The Hemingray Glass Co. remained a separate entity until 1933 when it was purchased by Owens-Illinois Glass CO. It became the Hemingray Division of Owens-Illinois.

Although it was best known for insulators Hemingray also produced many other glass items, including battery jars, kerosene jugs, bottles, fruit jars, oil lamps, etc. Although you won't find Hemingray's name embossed on many battery jars, you will find jars made by them. Bob Stahr's collection of Hemingray items includes battery jars; **26 – 1**, embossed L.B. Co. and <BSCO> (Battery Supplies Co.). The <BSCO> embossing would indicate that they may have made battery jars for Edison Companies. Or it could have supplied jars to <BSCO> for the few years when it was not under Edison control. Their catalog from May 1, 1903, shows battery jars embossed Pile LeClanche and Gonda, as well as un-embossed LeClanche jars. Courtesy of **Bob Stahr.**

References: 93-95

←29 - 1

Christian Willis provided information on two battery jars manufactured by Hemingray. They are shown below: **28 - 2, 28 - 3, 28 - 4, 28 - 5.**

29 - 2↑ 29 - 3↓ 29 -4↑ 29 - 5↓

Bothe jars are 4 .75” diameter with 3,875” diameter mouths. They have ground lips and pour spouts. Both are embossed: (Towards top on front) PILECLANCHE (note no spacing): (Base): H.G. CO. The difference between the jars is that the one on the right in 27 - 1 has a circular slug plate on the from for the addition of a paper label. The other jar is plain.

Chapter: 30

Illinois Glass Co.

The Illinois Glass Co. was started in Alton, IL in 1873, by William Smith and Edward Lewis. It started to expand in 1900 and by the time it merged with Owens Bottle Co. in 1929, it was one of the largest glass companies in the U.S. They produced bottles, fruit jars and battery jars among other glass products.

To date no battery jars have been attributed to the Illinois Glass Co, but the page from one of their catalogs gives us a hint of what they supplied. Their catalog from 1906 has been added to the NIA members only site.

References: 99

Chapter: 31

Law Telegraph Co

This company was started in 1874 by William A. Childs to provide a system for lawyers to quickly and easily communicate with the courts and especially each other. Thus, the Law Telegraph Company was formed. By April of 1875 it was up a running. There was a Central office and a signaling system. Each lawyer was assigned a number and, it used a system of bells for them to reach whomever they wanted.

Although Alexander Graham Bell described ideas for a central exchange system, the Law Telegraph Co applied telephones to the exchange system before Bell did, and preceded Bell in New York City with a functioning telephone exchange. The Law Telegraph Co. received patent 220,874 (Frank Shaw) for the adoption of the call-wire principle to telephones, on Oct. 21, 1879.

For a time there were three telephone companies in New York City; The Gold & Stock Telegraph Co. (Controlled by Western Union), The Bell Telephone Co. of New York and the Law Telegraph Co When the courts caused Western Union to give up the Telephone Business, and the first two companies merged as The Metropolitan Telephone and Telegraph Co., the Law Telegraph Co. became the sole independent company in New York City, though its customers were able to communicate with the Metropolitan Company. Under an agreement with Bell, it was limited to 600 subscribers. It lasted until 1884 when it was bought by Metropolitan. They did not manufacture the jars themselves. Some of their battery ads are in Chapter 57.

References: 107-109

←**31 -1** is a Law battery jar. It is clear glass, with a formed lip. The jar is 4.5" square x 7.125" tall. The mouth of the jar is 4" diameter. Courtesy of **Debbi Graham.**

Chapter: 32

LeClanche Battery Co., New York

LeCLANCHE was a French company, founded by relatives of Georges LeClanche, who invented the LeClanche cell in 1866. Rather than using Lead-Acid, which was invented by Gaston Plante in 1859, the LeClanche cell used Zinc -Ammonium Chloride. This is discussed briefly in the Introduction. There is no record of LeClanche having built plants in this county, so it is likely they licensed the technology to the U.S. GONDA was a trade name associated with LeClanche batteries. "Gonda" batteries were used by Waite & Bartlett in their Medical Batteries. Waite & Bartlett were also distributors for "Gonda" batteries according to early catalogs. We know from Hemingray's catalog of May 1, 1903, that the Hemingray Glass Co. manufactured jars embossed: Pile LeClanche and "Gonda", as well as other un-embossed LeClanche jars. The E.G.L. Co. of Boston sold LeClanche battery jars, as well. The LeClanche Battery Co had a New York, N.Y. address, and we know they were in business prior to 1900. I found a reference that claimed the difference in a LeClanche cell, was that the LeClanche cell had a pour spout. Below, you will see some LeClanche cells without a pour spout. So always check your sources for accuracy.

References: 113-116

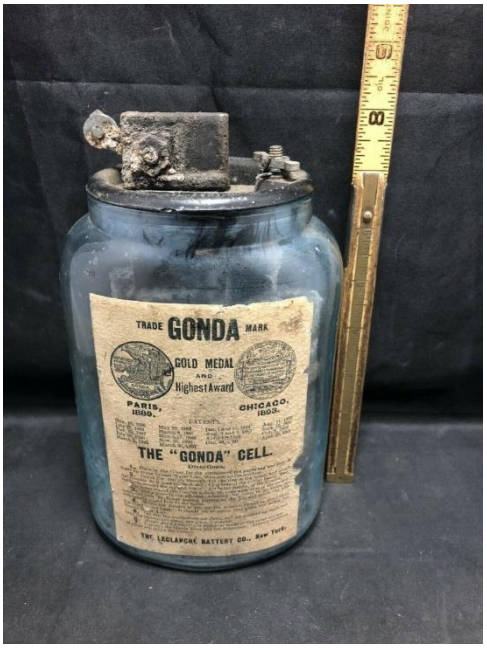
32 - 1↑

← 32 - 2

32 – 1 is a DISQUE LECLANCHE battery jar in a light aqua. It is embossed (arc) DISQUE LECLANCHE / The E.G.L. CO./BOSTON, MASS. Its dimensions are4.375" diameter x 5.875" tall. The jar top 3.675" diameter, with a ground lip. The lid **32 – 2** is un embossed. If you look carefully, you can see that the cylindrical electrode would screw onto the underside of the lid. This is a feature that is not often seen. Courtesy of **Walt Baumgardt**.

←**32 – 3**, is a TM."GONDA" battery jar. manufactured by the LECLANCHE BATTERY CO. It is an aqua, squared jar with a round, ground, top. It is approximately 5" square with a 4" diameter top It is approximately 10" tall.

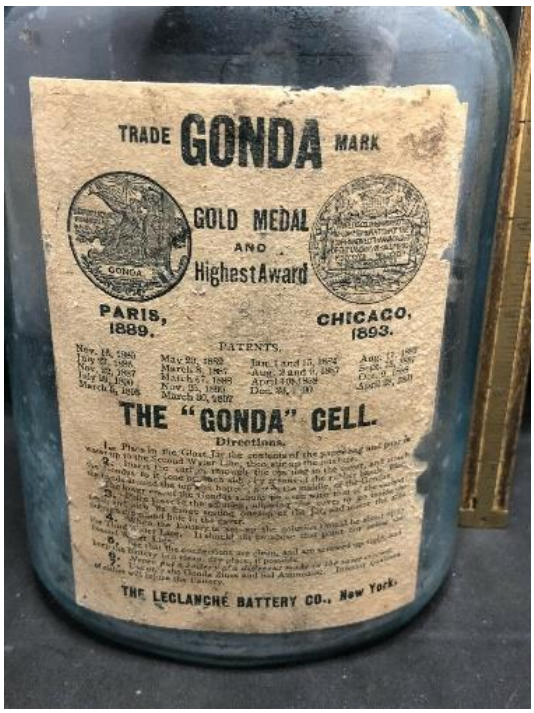
Embossed on the front, only. TRADE / **GONDA** / MARK / THE /**LECLANCHE / BATTERY CO**. / NEW YORK. Courtesy of **Debbi Graham.**



32 – 4, is another LeClanche battery jar with the name LeClanche Battery Co. New York. This one has a paper label Courtesy of **Debbi Graham**.

←**32 - 4**

This jar has a paper label with the GONDA trade name A close-up of the label is shown in **32 – 5**. Courtesy of Debbi **Graham**



Note the Gold Medal awards in Paris in 1889 and Chicago in 1893, as well as the 18 patent dates: Nov. 16, 1880; May 23, 1882; Jan. 1, 1884; Jan 15, 1884; Aug. 11, 1885; July 27, 1896.

March 8, 1887; Aug. 2, 1887; Aug. 9, 1887; Sept. 13, 1887; Nov. 22, 1887; March 27, 1888; April 10, 1888; Oct. 9, 1888; July 29, 1890; Nov. 25, 1890' Dec. 28, 1890; April 28, 1891; March 5, 1895; March 30, 1897

←32 - 5

32 – 6, is the lid to **32 – 4.** It is embossed: (arc) TRADE **GONDA** MARK / (arc) PATENTED MARCH 27, 1888. JULY 29, 1890.

←32 - 6

←**32 – 7**, is embossed PILE/ LECLANCHE. IN French DISQUE means cell, while PILE means battery. Essentially, it means the same thing; LeClanche Cell vs. LeClanche Battery. There are no dimensions for the jar. It is approximately 4.5" diameter x 8" tall with a ground lip and a pour spout. Courtesy of **Debbi Graham.**

←**32 – 8,** is a GONDA trademark battery jar with a ground lip. The jar itself is oval, measuring 4" x 3.25". The mouth is 3" diameter and it is 6.675" tall. It is embossed: Trade / GONDA /Mark / Patents / Nov. 16, 1880. May 23, 1882 / Jan. 1, 84 JAN. 15, 84 / Aug. 11, 85 Aug. 9, 87 / MCH. 27, 88 APL. 10, 88. There are WATER LINEs marking the lower and upper levels for the electrolyte.

The lid, which appears to fit over the top of the jar is embossed: Trade / GONDA / Mark / Patented March 17, 1887. Courtesy of **Debbi Graham**.

←**32 – 9**, is a trademark GONDA battery jar. It is 4.25" square with a round mouth, 3.25" diameter. It has a ground lip and a pour spout. Courtesy of **Debbi Graham**.

Its paper label is the same as the one in **32 – 4**, except for the term "The POUROUS-CUP CELL. A porous cup cell in one in which one of the electrodes has been enclosed in a porous container, called a salt bridge. This arrangement allows one to measure the activity at each electrode, independently from the other. Other than that, the cell works as any other.

←**32 – 10**, is yet another variation of a LeClanche cell. The jar itself is oval shaped, 4.75" x 3.75" x 6.625" tall. It is aqua with a ground lip and lid and electrodes. Courtesy of **Debbi Graham.**

The embossing is GONDA / PRISM BATTERY / Pat'd NOV. 16 - 1880 / & JAN. 15 – 1884 / PILE LECLANCHE

The lid is embossed: PILE LECLANCHE / PATENTED / Nov. 16, 1880 & Jan. 15, '84 / Trade / GONDA / Mark

There are two different types of battery construction, cylindrical and prismatic. The cylindrical is as it sounds, while prismatic batteries are oval or rectangular in shape. The cylindrical batteries are less expensive to manufacture, but the prismatic offers definite advantages. It is more compact, lighter in weight and much better able to resist over-charging and/or dis-charging. They have also proven to be more reliable.

←**32 – 11**, is a trademark GONDA battery jar. It is a round, aqua, jar with a ground lip and pour spout. Its diameter is 4.5” with a 3.75” diameter mouth x 6” tall. Courtesy of **Debbi Graham**.

The embossing is: PILE LECLANCHE / Trade / GONDA / Mark the side has two water level lines, designating the low and high levels of electrolyte.

I wasn’t sure of where to place the next two jars, but, as they have the PILE LECLANCHE embossing, I kept them with LeClanche.

32 – 12 is a greenish aqua jar with a ground lip and pour spout. It is 4" square x 6.25" tall with a 3.375" mouth. It is embossed PILE LECLANCHE / INDIA RUBBER Co / SILVERTOWN / 2. The embossing is inside of a rectangular panel. Courtesy of **Debbi Graham**.

32 – 12 →

←**32-13** is an aqua jar with the same dimensions and embossing as **32 – 12**. The two exceptions are. This jar has a formed lip and is missing the rectangular plate on one side. Courtesy of **Debbi Graham.**

Dimensions: 4" square x 6.25" tall with a 3.375" diameter mouth. It has a pour spout.

EMBOSSING: PILE LECLANCHE / INDIA RUBBER Co / SILVERTOWN / 2

32 – 14, is a square aqua jar, with a pour spout and a ground lip. It is 4" square x 7.25" tall with a 3.675" mouth. Courtesy of **Debbi Graham.**

The embossing is: (Front) PILE / 3 / PRUD HOMME/ B$^{\underline{TE}}$S.G.D.G. / PARIS (Rear) SETH W. FULLER / 63 / DEVONSHIRE ST / BOSTON

31 – 14 →

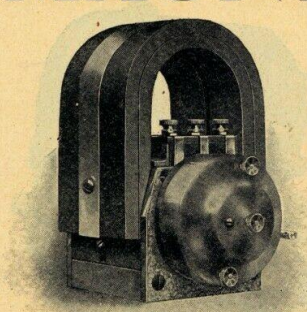
Chapter 33

Lutz Lockwood Mfg Co.

Not much information is available on Lutz Lockwood. All I could find is this ad dating from circa 1910. It verifies that they were indeed located in Aldene, Union County, N.J. The ad does indicate that they were active in the electrical industry. Like so many other companies, we need more information before we can put the pieces together. The lid from GORDON (Chapter 24) **25 - 5** indicates that Lutz Lockwood, at some point acquired the Gordon Battery Co. The full embossing of **33 - 1**, below, is (arc) GORDON PRIMARY CELL / PATENTED / Oct. – 27, - 1896 / Apr. – 13, - 1897 / FEB. – 13 – 1906 / The Lutz – Lockwood Mfg. Co. / Aldene, Union CO. N.J. / (arc) Successor to (arc) GORDON BATTERY CO.

33 - 1↑

SX MAGNETO



Designed Right
Simple
Efficient

Built Right
Reliable
Durable .

Do you want the best ignition system on your car? The "SX" MAGNETO is the peer of all others.

The "SX" MAGNETO when once installed will without any attention outlive your car. We have made records of 30,000 miles and "still running."

Do you want to start your car on MAGNETO.

The "SX" MAGNETO will generate a hot spark at 50 revolutions per minute and run 2500 per minute without overheating.

Do you want two systems in one without double sets of plugs, extra coil, timers, switch, and wiring? You have a double system in the "SX" MAGNETO without these troublesome extras.

Do you want a MAGNETO that moisture won't make "lie down"? We don't claim to make MAGNETOS that will run under water, but we have had on exhibition for the past two weeks at the Palace and Garden Shows in New York an "SX" MAGNETO **running under water.**

If you want to be convinced write us and we will show you.

SX IGNITION DRY CELL

BEST FOR SPARKING

Voltage, 1.6 Volts. Initial Amperage, 28 to 35

Will produce the best and most permanent results under the most trying conditions. Every step in the manufacture, from the selection of raw materials to the last test, subjected to the most minute inspection.

High voltage, longer life, and producing more current than any other battery on the market. Try them and be convinced.

PRINTED MATTER ON REQUEST

THE LUTZ-LOCKWOOD MFG. CO.

ALDENE, UNION CO., N. J. (P. O., ROSELLE, N. J.)

All we really know about the company is from the ad pictured on the left.

←32 - 2

Chapter: 34

National Carbon Co.

The National Carbon Co. was founded in 1886 by W.H. Lawrence, formerly with Brush Electric Co., in association with Myron Herrick, James Parmelee, and Webb Hayes, son of President Rutherford B. Hayes. In 1890 National Carbon merged with Thomas-Houston, Standard Carbon and Faraday Carbon.

In 1894 they began marketing LeClanche wet cells, while at the same time pursuing research into dry cells. In 1896 they marketed the first battery intended for widespread consumer use; a sealed, 6-inch, 1.5-volt dry cell battery. The trademark was Columbia, which served as the basis for all dry cells for the next 60 years

In 1899, 11 companies, including National Carbon Co., incorporated as the National Carbon Co. In 1906 the American Ever Ready Company shortened its name to EVEREADY, and in 1914 the Eveready company became part of National Carbon. In 1917, National Carbon was acquired by Union Carbide. National Carbon eventually evolved in the Energizer Corp.

References: 128-130

34 - 1↑

34 – 1, is the lid is for **34 – 2.** It is embossed as Follows: (arc) A.A.R. SIGNAL CELL / CONTAINS CAUSTIC / NATIONAL CARBON COMPANY / A DIVISION OF U.C. & C. CORPORATION /. NEW YORK, N.Y.

The fact that it is labeled as “Division of U.C. & C. Corp. would date it to post 1917.

34 – 2, is the battery jar associated with the lid, **34 – 1**. The jar, left, has a story. It is embossed Cxx, which indicates it is likely a Corning jar. This jar came with a National Carbon Company lid, pictured above, **34 - 1**.

←34 - 2

34 - 3, left, is a National Carbon Battery Jar, with a partial paper label. It is 4.75" diameter with a 3.875" diameter mouth x 6.75" tall. It is aqua with a ground lip and pour spout. The paper label is embossed NATIONAL CARBON CO. / CLEVELAND / O. Courtesy of **Debbi Graham**.

←34 - 3

34 - 4↑

34 - 4, is an un-embossed jar, with an, embossed, combination lid and electrode. Because of the angle, reading can be difficult, but most of it is able to be deciphered. (arc) NATIONAL CARBON CO. CLEVELAND, O. / (arc) NATIONAL FULLER. **Courtesy of Debbi Graham.**

Chapter 35

Ness, Ness, McLaren & Bate Electrical Supplies, Montreal, N.W. & B.I.T. Co.

Thomas Wood Ness was born in King City, Ontario, the first of his family to be born in Canada. They had emigrated from Scotland the previous year. In 1885 the family moved to Montreal, Quebec, where Thomas started his business: T.W. NESS Co., which manufactured Thymo-cresol, which was used in vaporizers. By 1889 the company had shifted to making pulleys, electrical supplies, typewriters, cash registers and office specialties. Until 1893 the company was known as T.W. Ness. In 1893 the name changed to T.W. Ness & Co. In 1895 it became Ness, McLaren and Bate, which was later modified to N.W. & B.I.T. Co. which, we, as insulator collectors, know. Courtesy of **Chris Minicola**

References: 119

←35 – 2 **35 - 2↑**

The T.W. Ness jar, **35 - 1**, would have been manufactured between 1885 and 1893. It is simply embossed T.W. NESS / MONTREAL. The lid, **35 – 2** although faint, appears to say Pat Appl. For. The jar is 4'5" x 7" tall with a ground lip and pour spout and appears original.

Chapter 36

New York, Westchester and Boston Railway (NYW&B)

The New York, Westchester and Boston Railway was incorporated in 1871 to run from what was then the southern edge of Westchester County, (now the BRONX) New York) to the county seat in White Plains New York. It lost financing during the panic of 1873 and entered foreclosure in 1875 and was liquidated in 1881.

Starting in 1874 parts of Westchester county were made part of New York City. This process was complete by 1898, placing much of the NYW&B franchise under the control of the City of New York, meaning the New York Democratic Association, Tammany Hall. The NYW&B emerged from receivership in 1904 and by 1910 had acquired the Hudson River & Port Chester Railroad (HR&PC). Passenger service started in 1912 and continued until 1935 when it declared bankruptcy.

Strangely, the New York, Westchester & Boston Railway ran from the Southern Bronx to White Plains, N.Y., never getting close to Boston.

The battery jar shown in pictures **36 – 1** through **36 – 4** was used on the NYW&B. It was assumed that JWP Jupiter to the electric company that supplied the battery.

36 - 1↑

36 - 2↑

36 – 1 through **36 – 4** are believed to be from the NYW&B railway. It is cylindrical in shape with a 4.25" diameter. The height is 6.375". The jar has a circular slug plate on the front with a BK 36 on the bottom. The top of the jar is 3.75" diameter with a pour spout.

The lid, with attached carbon electrode, is embossed on the top: (arc) JUPITER J.W.P. JUPITER / (arc) BOSTON, MASS. / N.Y.C.W.

36 - 3↑ **36 - 4↓**

The lid appears to be original to the jar. This entry will be repeated in the Chapter of Unknowns, as it is unknown if the jar was actually used on the NYW&B Railway.

Chapter: 37

Northern Electric Ltd

The Bell Telephone Company (Bell) of Canada was formed in May 1880. The first Bell Telephone factory and repair shop in Canada was opened in Montreal in 1882, and a new company was incorporated for this business in 1895 under the name of Northern Electric and Manufacturing Company Ltd. This company merged with the Imperial Wire and Cable Co., also owned by Bell, in 1914 to form the Northern Electric Company Ltd. (NE), with the majority of NE stock owned by the Bell Telephone Company of Canada.

As part of the Bell system, Northern was a pioneer in the early days of the telephone. In the picture on the left of an early phone, the box on the bottom held the batteries that powered the unit.

The Northern Electric catalog from 1920 (mentioned earlier) contains several pages of battery jars which were sold by the company. Most of these batter jars had the Edison embossing.

It is not believed that Northern Electric actually manufactured the battery jars. It appears that they may have been an outlet for the Edison Battery Co.

At this time no battery jars have been attributed to The Northern Electric Co.

References: 120

Chapter: 38

NOVELTY Electric Co., Philadelphia, PA

38 - 2↑

←38 - 1

Very little could be found on the NOVELTY Electric Co. of Philadelphia. We know they were formed in the latter half of the 1800's, as they had a product catalog published in 1885. We know they manufactured electric motors, fans, and other electrical equipment. Their product catalog shows a line of battery jars.

This round, blue aqua, jar, **38 - 1**, is 4" Diameter x 8" tall. The top of the jar narrows to 3". It has a screw lid which holds the electrodes, which are 1.5" x 6". The lid, **38 - 2**, is un-embossed. The jar is embossed on the front: (In a Keystone) (arc) NOVELTY / ELECTRIC / CO. / (arc) PHILA. (rear) SIZE A / (paper label) From / J. ELLIOTT SHAW & CO. / Dealers in / ELECTRICAL SUPPLIES / 682 ARCH STREET / Philadelphia. It is doubtful that Novelty Electric actually manufactured the jar. Courtesy of **Walt Baumgardt**

Chapter 39
Otto, F. G., & Sons

Ferdinand G. Otto came to the U.S from Germany in the late 1840s. He worked for George Tiemann & Co., then had a partnership with Augustus Koehler (1853 – 1860), and a partnership with John Reynders (1860 – 1875). In 1875 he went into partnership with his sons, Albert and Gustav. The company continued until 1914 when his son, Edmund, died. The company is best known as a supplier of surgical supplies. They have an instrument sales catalog which can be accessed at:
https://collections.nlm.nih.gov/catalog/nlm:nlmuid-101204651-bk
https://collections.nlm.nih.gov/catalog/nlmuid-101204651-bk
What is not generally known is that by 1895 New Jersey had become the music box manufacturing center of the U.S. It is generally acknowledged that the top three manufacturers were The Regina Music Box Company, F.G. Otto & Sons. and The Aeolian Company. F.G. Otto introduced the Capital Cuff Brand of music boxes, followed by the Criterion and the Olympia.
They were a diverse company and through some kind arrangement with Whitall Tatum were a supplier of medical batteries for electro-shock therapy and cures for all types of ailments. It is believed that Whitall Tatum provided the battery jars. I believe there is a deeper connection between the two companies, but, to date, have not determined what it is.

References: 122

It is generally believed that Whitall Tatum made the battery jars used and offered by F. G. Otto.

39 – 1, has a square base, ground lip, and off-set square neck. The base is 5.125" square, with a 2" square mouth. It is embossed: Neck: LD/ PATENTED / July 4TH 1871
Base: (arc) F.G. Otto & Sons / New York
Courtesy of Courtesy of **Debbi Graham.**

This jar has been found in the Florence, Medical Battery.

←39 - 1

39 – 2, is the same size and shape as **39 – 1,** with dimensions of 5.125" square base with a 2" square mouth. It is embossed:
Neck: LD / PATENTED / July 4TH / 1871
Base: (arc) F.G. Otto & Sons / Jersey City

This jar has also been found in the Florence Medical Battery.

←39 - 2

39 – 3, is smaller than **39 – 1** and **39 – 2**. Its dimensions are 4.125" square base with a 1.75" round and centered neck and mouth. It is aqua with a formed lip. It is embossed:
Base: (arc) F.G. OTTO & Sons / Jersey City
The jar is believed to have been used in the MYSTIC, a smaller and earlier version of the Florence.

←39 - 3

39 - 4↑

39 – 4, is a picture of the Florence with either **39 – 1** or **39 – 2.** Note the Patent date of August 18, 1883, and the WHITALL TATUM & CO. embossing. Courtesy of **Debbi Graham**.

Chapter 40
PATENTED

These jars are merely embossed with a patent date of May 22, 1882. As it is embossed, I decided to give it its own chapter, similar to the way we acknowledge "Patent" insulators.

40 – 1, is 4.5" square with a 3.375" diameter. It is approximately 6.5" tall, with a ground lip. In addition to the patent date there are graduations on the front 3 / 2 / 1 PATENTED / MAY 22, 1882, and an "A" on the back. Courtesy of **Debbi Graham**.

←40 - 1

40 – 2, is another patented battery jar. It is aqua, with a ground lip and a pour spout. It is 4" square x 6.25" tall with a 3.675" mouth. Courtesy of **Debbi Graham.**

The embossing is PATENTED / MAY 22, 1882 / B. The rear side 2 lines denoting liquid levels, labeled 2 /1.

←40 - 2

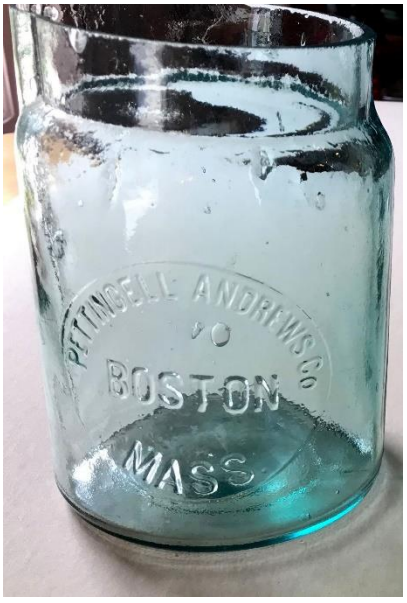
Chapter: 41

Pettingell Andrews, Boston, MASS

There is very little on Pettingell Andrews as a company, other than that they sold electric supplies and lighting equipment in Boston Mass in the last half of the 19th and into the 20th century (1888-1927.) Pettingell and Andrews were both prominent families in The Boston area, having emigrated from England in the early 1800's. They are known for a line of insulators, of the CD 134 type, which were manufactured for them by a still unknown company. Their jars were also manufactured for them by an unknown company. The battery jars were likely used as a source of power for the early electric lighting that they sold. Throughout their existence they were primarily a supplier of all different kinds of General Electric Products.

When General Electric acquired The Thomas Houston Co. in 1892, the T.H.E. CO. glass insulators were manufactured under contract by Brookfield and Hemingray. It is likely, that, for a while after the acquisition, General Electric Glass Insulators were produced by Brookfield and Hemingray. Brookfield manufactured battery jars, so it is likely they manufactured for T.H.E and G.E.

References: 125



41 - 1, is aqua with a ground lip and pour spout. The dimensions are 4.75" diameter x 6.125" tall with a 3.75" diameter mouth. It is embossed inside of a circular slug plate: (arc) PETTINGELL ANDREWS Co. / BOSTON / MASS. Courtesy of **Debbi Graham**.

←41 - 1

Chapter: 42

PHILCO Batteries

What would eventually become PHILCO, started in 1892 as the Helios Electric Co. After a very slow start, it was re-organized in 1906 to the PHILADELPHIA STORAGE BATTEY CO. In 1915 they introduced their new trademark "PHILCO". They continued to produce storage batteries.

References: 126

42 - 2↓

42 -1, is an unmarked, double cell, battery jar in green, possibly uranium glass. It is approximately 4" x 7" x 7" tall.

The lid, **42 - 2**, shows PHILCO on the arm connecting the electrodes. Note the two cells are connected in parallel. Courtesy of

←42 - 1

The jar pictured below, **42 – 3,** is a battery for an early Radio. It is embossed PHILCOTRON B / PART K-483 on the front two lines near the top are the upper and lower liquid levels. It is 1.5" square x 6" tall. ***Note:*** This is seen in the advertisement on page 188. Courtesy of Walt Baumgardt. I have pictured the electrodes, **42 – 4,** separately. Courtesy of **Walt Baumgardt**.

42 - 3

42 - 4

41 – 5 is a larger single cell battery jar. It is clear with a formed lip. Its dimensions are approximately 3” x 10” x 14” tall. It is embossed Water Line / PHILCO on all 4 sides. The bottom is embossed G-617.

←42 - 5

←**42 – 6** and **42 – 7** show a Philco Battery jar embossed G-11 on the base. The top dimensions are 7” x 3.25” x 10” tall. Other embossing is: Upper and Lower water lines on 4 sides, and PHILCO on the Front and Rear.

42 - 7↓

Chapter: 43

RAILWAY STORAGE BATTERY CAR CO.

Railway Storage Battery Car Company was the name adopted for the former Federal Storage Battery Car Company, about 1913. Its purpose was to support the development of battery-operated rail cars. Some authorities maintain that Edison started the company as a means of selling his storage batteries. Although he may have been involved in the establishment of the company, The Railway Storage Battery Car Company was never Edison's company. A study of Edison's papers show that he was intimately involved with the company in technical matters, and management and promotion from before 1912 to as late as 1921.

An annual report of the Railway Storage Battery Car Company shows the company was incorporated to manufacture storage battery cars; and has a contract authorizing the use of the Edison Storage Battery.

Records show a streetcar powered by Edison Storage Batteries began a cross-town run in New York City in 1910. By 1914 the Long Island Railroad had four battery powered cars running.

References: 131

November 22, 1912 RAILWAY AGE GAZETTE. 13

Beach Cars with the Edison Battery

On the Long Island R. R.

The First Battery Car on a Steam Road in the United States

This single-truck car was installed on the Long Island Railroad on April 1, 1911.

To October 1, 1912, it had covered more than 38,000 miles. It makes a schedule speed of 24 miles per hour and because of good tracks and infrequent stops the power consumption is unusually low.

The battery input is 490 watt hours per car mile—battery output, 377 watt hours per car mile and 57.1 watt hours per ton mile.

This branch line formerly operated with a locomotive and combination car.

The Beach car makes 72 miles per day, or four trips more than the steam equipment. It has given no trouble—has remained in service with little attention and saves the company about $21.00 per day over the cost of former equipment—a saving equivalent to more than $11,000 in 18 months.

If you are operating steam equipment on branch line or local service and desire to increase the earnings—look to Beach cars.

Anyway get the records of Beach cars on various roads for comparison with your present costs—we'll gladly mail them on request.

Railway Storage Battery Car Co.

Distributing Agents

30 Broad St. - - - - New York City

FEDERAL STORAGE BATTERY CAR CO., Manufacturers, Silver Lake, N. J.

FIRST STORAGE BATTERY TRAIN IN THE WORLD'S HISTORY

Beach Cars—Edison Batteries

Each car is 38 feet over the platform buffer, 8 feet 3 inches wide over the drip rail and 12 feet 7½ inches from rail to top of ventilators. Each car seats 40 passengers.

They are equipped with 220 cells A/6 Edison nickel-steel alkaline batteries, placed under the transverse seats; 200 of these are for power and 20 are for lighting and operating the multiple control relays.

Each car is equipped with four 10 H. P. 200 volt, 37.5 amperes, 800 R. P. M. series wound motors. Two motors permanently connected in multiple are suspended, one on each axle of each truck, and the wheel is driven by a gear on the inside of the wide hub through single reduction to the motor pinion.

The train is operated by an unique system of magnetic multiple control and can be operated from either end of any car by a master controller placed on each platform. This master control is fitted with a control and reversing lever which are mechanically interlocked. Four speeds can be obtained from the master control. In the first position the motors are started with two pairs in series with the starting resistance. In the second position all the starting resistance is cut out automatically, leaving the motors running in full series. In the third position the two pairs of motors are connected in multiple in series with the starting resistance and the resistance is cut out automatically leaving all motors connected in multiple across the power battery. In the fourth position the series field of each motor is paralleled with resistance which further increases the speed. This sequence of operations takes place simultaneously on each car and is accomplished through the train line consisting of two wires which run through all the cars and is connected to all master controllers, relay panels and polarized relays.

The interior finish is of mahogany and polished bronze, the exterior being of cedar, while the underframing is entirely of steel construction.

These cars are equipped with M. C. B. couplers, draft rigging and buffer plates; platforms are full vestibuled with end doors, allowing intercommunication between the cars. The brake equipment consists of a powerful hand brake as well as the Westinghouse A. M. M. automatic air system, controlled on platform of any car.

An electric whistle is secured to the roof at each of the cars and operated by a foot button connection on each platform.

The trucks are of diamond frame type and while of light construction are exceptionally strong. The wheels are steel tired with a cast steel centre and are free to rotate independently of each other on the stationary axle. This is accomplished by a rigid axle upon which is pressed a nickel-steel hardened sleeve over which two trains of rollers rotate. They in turn are held in a nickel-steel hardened raceway pressed into the wide hub of the wheel. This device, peculiar alone to Beach cars, saves approximately 50% in power consumption.

Chapter 44

Samson Electric Co, Canton MASS

The Samson Electric Co. was the successor to the Electrical Goods Manufacturing Co. (E.G.M. Co), which was the successor to The Electrical Gas Lighting Co. (E.G.L. Co.).

E.G.L. was formed in 1883 in Boston, MA. In 1906 they changed their name to E.G.M., at the same address. In 1911, the company moved to Canton, MA; a part of the greater Boston area, about 15 miles south-west of downtown Boston. In 1917 they changed their name again, to the SAMSON ELECTRIC Co.

44 - 1↑

44 - 2↑

44 – 1, is a squared aqua jar with a ground lip. The dimensions are 4.75" square x 6.5" tall with a 3.75" diameter mouth. The jar is embossed on 3 sides:

Side 1: The SAMSON/ BATTERY / No 2

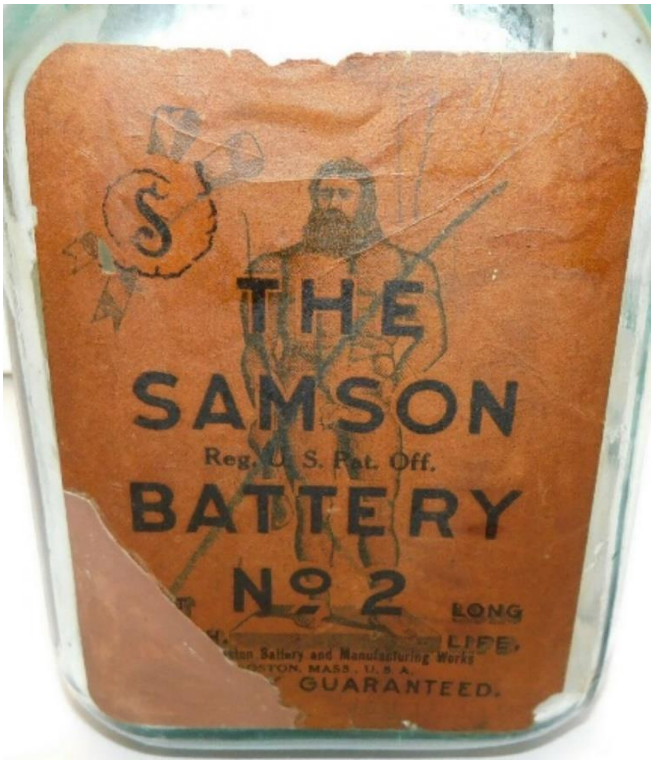
Side 2: SAMSON ELECT Co / CANTON / MASS

Side 3" Water Line without elements

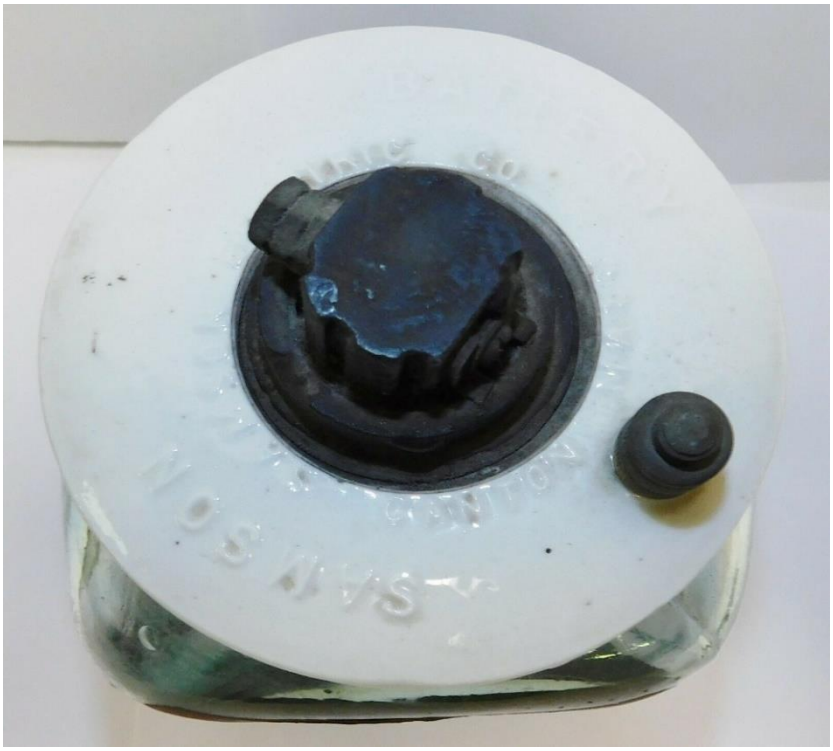
The lid is embossed: (arc) SAMSON / Samson Electric Co / Canton Mass / BATTERY

44- 2 and **44 - 3** show the lid and reverse of the jar. Courtesy of **Debbi Graham**.

←**44 – 3**



44 - 4↑ **44 - 6↓** **44 - 5↑** **44 - 7↓**



← 44 - 8

Pictures **43 - 4** through **43 - 9** show another SAMSON No. 2 battery. All four sides of the jar are shown. Side 1: paper label with SAMSON no. 2 / Burn-Boston Battery and Manufacturing Works. Side 2: SAMSON / ELECTRIC Co. / CANTON / MASS. Side 3: THE / SAMSON / BATTERY / No. 2. Side 4: Water Line / Without Elements / Paper Label with instructions. Also labelled BURN-BOSTON BATTERY & MANUFACTURING Co.

The lid, **44 - 8**, is the same as **43 - 2**. Labelled: (arc) SAMSON / (arc) SAMSON ELECTRIC CO. / (arc) CANTON, MASS / (arc) BATTERY, it is original to the jar.

←44 - 9

44 - 9 shows the electrodes. They are unusual in that the inner electrode seems to be tied up like a sausage. Like 41 - 1, this jar is also 4.74" square with a 3.75" diameter mouth. It is 6.5" tall, with a ground lip.

We have no idea who manufactured the jar, but it was obviously manufactured for The Samson Electric Co and distributed by Burn-Boston Battery and Manufacturing Works.

I could find no information on Burn Boston Battery and Manufacturing CO.

Chapter 45

Self Winding Clock Co

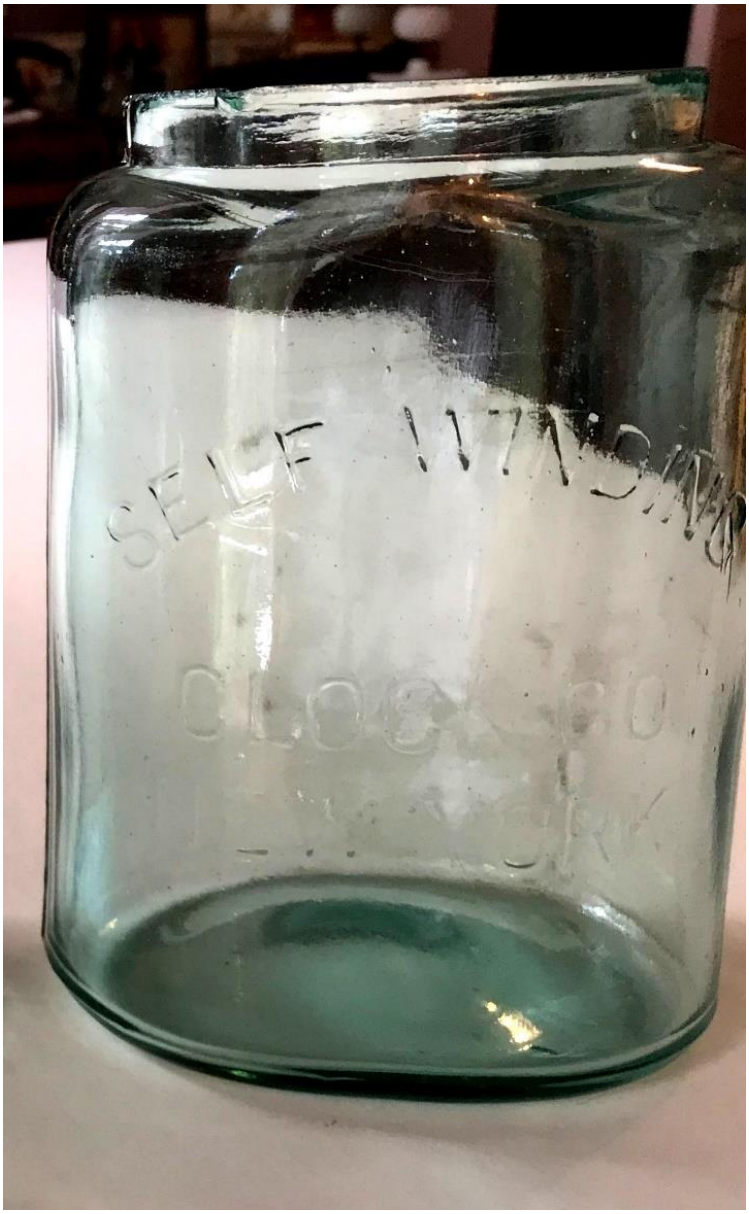
The Self-Winding Clock Co. (SWCC) was started in 1866 by Chester H Pond, who was also a principal in the Gamewell Fire Alarm-Telegraph Company. Pond was an instrument maker as well as a pioneer in the developing field of electricity. It was one of the first companies to power its clocks with an electric motor. The motor rewound the main spring every hour and lasted approximately one year. Most clocks required two batteries, which accounts for the large size of most electric clocks of this period. Two batteries allowed symmetry, with a battery on either side.

The company was situated in New York City, at the site of the current Pratt Institute. Charles Pratt, the founder of the institute, was also one of the original founders of the Self-Winding Clock Company. The SWCC was in business until the early 1960s.

References: 134-136

45 -1↓ **45 -2→**

45 - 1 is 5” square with a 4” diameter mouth, with a pour spout and a ground lip. It is 6” tall. It is embossed on the front: (arc) SELF WINDING / CLOCK / (arc) COMPANY / NEW YORK. The lid, **45 - 2,** which seems may not be original to the jar, is a Carbon graphite composite and is 5” tall. The lid **44 – 3,** below**,** is embossed J.E SHAW CO. PHILA, PA. Courtesy of **Walt Baumgardt.**



45 - 3↑

←**45 - 4,** left, is another variation of the Self-Winding Clock Co jar. The jar is aqua, with a ground lip. It is oval measuring 4.25" x 5.25" x 6.875" tall. The mouth is 3.675" diameter. The front is embossed: (arc) SELF WINDING / CLOCK CO./ NEW YORK. Courtesy of **Debbi Graham.**

Chapter 46
Thaxter, Samuel & Son, Boston

Samuel Thaxter was born in Massachusetts in 1769 and lived until 1842. In 1796 he is listed in The Boston Directory as a mathematical instrument maker. 1n the 1823 edition the business is listed as Samuel Thaxter & Son (Joseph H. 1801 – 1835). Samuel Thaxter's grandson, Samuel Thaxter Cushing (1821 – 1882) took over the business. When Samuel Thaxter Cushing died, his widow, Abby C. Cushing took over management of the business. Nothing is known of the company after 1916. Over the years they manufactured nautical and optical instruments, charts, and nautical books; publishers of Eldridge's charts and coast pilots; agents for U.S. Coast Survey & Hydrographic Office charts & books: engineers' transits, levels, compasses, yacht and ship binnacles, patent logs and liquid compasses. They were located at 125 State St. in Boston.

46 - 1↓

I'm not sure why they would need batteries, but there must have been something in their product line requiring them.

46 - 1, is a round aqua jar; 4.5" diameter x 6.675" tall with a 3.875" diameter mouth. Embossing is inside a circular slug plate: (arc) SAMUEL THAXTER & SON / (arc) BOSTON, MASS. Courtesy of **Debbi Graham**.

Chapter 47
Thomson-Houston Electric Co.

In 1880 Elihu Thomson and Edwin Houston started the American Electric Co. Due to inexperience with running a company, the company struggled. In 1882 Charles Coffin of Shoe factory fame , and a customer of American Electric, purchased the American Electric Co. Coffin led the company, which had been renamed to the Thomson-Houston Electric Co., and organized its finances, marketing and sales operations. Edwin W. Rice, a former student of Thomson, was hired to organize the manufacturing department. Elihu Thomson ran the Model Room, which evolved into a Research Lab. Edwin Houston left all involvement with the company.

In seven years (circa 1890) Thomson-Houston had grown to the third largest competitor in the American electrical equipment market, with 4000 employees and $10 million in annual sales.

The other companies struggling for supremacy in electrical systems were Edison Electric Co. and Westinghouse Electric Co. Edison was a proponent of a direct-current system, while Westinghouse and Thomson Houston favored the alternating current system. In 1890, Edison, realizing that AC was the better system, attempted to borrow money from J.P. Morgan to purchase Thomson-Houston to obtain their AC patents. Instead, in 1892, Morgan acquired both Thomson-Houston and Edison Electric Co. Charles Coffin was president, Thomson was consulting engineer, and Rice was the Technical Director. Edison served on the Board of Directors but had no managerial or executive role. Edison's Schenectady, NY facilities became the General Electric Co.'s headquarters.

Westinghouse and General Electric shared their patents which removed the competitive spirit and greatly helped to electrify America.

Short of 3 Insulators with T.H.E. Co. embossing, manufactured by Brookfield and/or Hemingray, there is no record of battery jars with T.H.E. Co. embossing. I included them because of the role they played in the electrification of America. In just under 10 years, rising from a struggling Electric Co. to a major player in the Electrical Industry.

Chapter 48
L.G. Tillotson & Co.

Luther G. Tillotson was born in Ithaca, NY in 1834. In 1849, he moved west with his father, Daniel, who was superintendent of the Erie and Lake Michigan Telegraph Co. In 1850 he returned east, and worked for the New York and Erie Railroad, which ran across the southern tier of New York state. The New York and Erie Railroad was the first railroad to use the telegraph. In 1853 he was promoted superintendent of telegraph in charge of the eastern half of the route.

Seeing the future demand by railroads for telegraph and railroad supplies, in 1862, Luther started Tillotson & Co. In 1865 he founded the firm of L.G. Tillotson & Co. with General E.S. Greeley and W.H. Hold. He maintained his position with the Erie RR, until 1866, when he resigned to devote full time to the business.

In 1874, L.G. Tillotson & Co. was considered the largest independent manufacturer of telegraphic instruments in the U.S. Only the New York shop of Western Union, and Westinghouse in Chicago, were larger. In 1875 Jesse Bunnell (see Chapter 8) joined L.G. Tillotson & Co. He invented a new sounder, which significantly increased the clarity of the signal. The patent was granted and assigned to The Partrick and Bunnell Co. Partrick was already a partner with the firm of Partrick & Carter of Philadelphia. L.G. Tillotson and Partrick & Carter both claimed exclusive rights to the Bunnell patent. Bunnell stated publicly that L.G. Tillotson & Co. had the rights to his patent.

During this period L.G. Tillotson had three highly regarded telegraph inventors; J.H. Bunnell, Miles W. Goodyear and Henry Splitdorf. L.G. Tillotson invented and manufactured all types of telegraph and railroad equipment, including insulators. The insulators were actually made by other glass houses.

In 1878, Jesse Bunnell left L.G. Tillotson to form J.H. Bunnell.

When Tillotson passed away in 1885 his partner, General E.S. Greeley, took over the business, with plans to retain the Tillotson name. However, this soon changed, and the name was changed to E.S. Greeley & Co. E.S. Greely & Co. became a victim of the depression of the 1890s and ended operations in 1897.

References: 141

48 - 1, left, is Embossed (arc) L.C. TILLOTSON / NEW YORK. It is aqua with a ground lip and pour spout. The dimensions are: It is courtesy of **Debbi Graham.**

← 48 - 2

Tillotson even offered a learner's instrument for battery jars **(48 - 2),** above. An enlarged picture is shown in **48 - 3**, below. Bunnell offered a learner's manual for beginning telegraphers. (see bibliography).

Bunnell's Learners' Instrument Perfected.

Complete and Perfect, full-sized Sounder and Key, with Book of Instruction. Battery, Wire, and all necessary Materials.

[These instruments have been greatly improved in their working qualities and in the style in which they are finished. Those having the latest improvement in their construction are those manufactured *only* by Messrs. L. G. TILLOTSON & CO. JESSE H. BUNNELL.]

They are made in the best manner, and are just exactly the thing wanted for

LEARNERS' USES, FOR TELEGRAPH SCHOOLS, or FOR SHORT LINES, from a few feet to 12 miles long.

PRICE, Complete, with Battery, Book of Instructions, Wire, and all necessary materials to put in operation, singly or on a short line..... $8 50
Learners' Instrument, without Battery, &c..... 6 50
Ornamental Learners' Instrument, Rubber Covered Coils, &c..... 7 50
Same Instruments, wound with finer silk covered Wires, so as to operate satisfactorily lines up to twelve miles in length, $1.00 in addition to above prices.

A COPY OF SMITH'S MANUAL,

new and enlarged edition (see advertisement in another column) sent with each complete outfit of BUNNELL'S PERFECT LEARNERS' INSTRUMENT.

☞ These prices subject to our usual discount of 20 per cent. where money is sent in advance, either by Postal Order or Draft.

L. G. TILLOTSON & CO.

48 - 3 ↑

I'm unsure of the relationship between the various companies. Apparently Bunnell manufactured it and coupled it with a manual from Professor J.E. Smith. It was offered by L.G. Tillotson & Co. If you're interested, the complete manual can be found at: Manual of telegraphy, designed for beginners (archive.org)
https://archive.org/details/manualoftelegrap00smit/page/22/mode/2up
https.//archives.org/details/manual of telegraph00smit/page/22/mode/2up. 1865
Another manual by prof. Smith can be found at https://ia802901/.us.archives.org/17/items/manual of telegraph00yorkgoog/manual of telegraph00yorkgoog.pdf. It was published by L.G. Tillotson. 14Th Edition.

A patent was granted to Emmor Bonsall of Davenport, IA for a Learners Telegraphic Instrument, # 336,284, Feb. 16, 1886.

Chapter 49
Turner Bros. Glass Co.

The Modes Glass Co. opened in 1894 and evolved into the Modes -Turner Glass Co. (operated by the Turner Brothers) and the Southern Indiana Glass Co. (operated by William Modes. The Modes business burned in 1909. William Modes moved on, but the Turner Brothers (L.L. and Jay Lee) renamed their plant the Turner Bros. Co., adding branches in Winchester, IN and Fairmount, WV. During the late 1920s.

It is not known if they became over-extended by the expansions, or if it was the Depression, by the Hocking Glass Co. slowly took over. By 1929 Turner Bros. Co. was closed for good.

The identifying mark of Turner Bros. was a straight-sided, inverted triangle with a T in the center. Travis Glass Co. used the same mark, but they were acquired by Thatcher Glass Manufacturing Co. of Elmira, N.Y. in 1919. The Thatcher mark was MTC.

We can be fairly certain that The Turner Bros. manufactured the bottle mentioned on page 91, because Travis and Thatcher manufactured milk bottles exclusively. We also know that the Turner Bros. manufactured a general line of bottles.

Chapter 50
Union Carbide and Carbon Co.

The Union Carbide and Carbon Company (U.C. & C.) was formed in 1917, as a merger of Union Carbide Co. (incorporated 1898), Linde Air Products Co. (incorporated 1907), National Carbon Co. (incorporated 1899) and Prest-O-Lite Co. (incorporated 1913). The new company was organized as holding company with each of its members acting autonomously and cooperating where their business converged. Cooperation between Prest-O-Lite and National Carbon enabled National Carbon to produce the first commercial dry cell battery, under the Eveready trademark, which would remain a U.C. & C. staple for the next seven decades.

As a holding company, the Union Carbide and Carbon Company would not have manufactured anything. Everything was manufactured by the individual members of the Holding Company. The UCC would be mentioned, as in the picture below "Division of U.C.& C. Company".

References: 150-151

50 – 1, is a porcelain lid from the National Carbon Co. Embossed: (arc) A.A.R. SIGNAL CELL / contains caustic / (arc) NATIONAL CARBON COMPANY / (arc) A Division of U.C. & C. Corporation, New York, N.Y. Made in U.S.A.

50 - 1↑

50 - 2↑

50 - 2, above is the un-embossed jar that accompanies the lid, **50 - 1**

Chapter: 51
UNIVERSAL BATTERY CO. Chicago, IL

Very little is known about the Universal Battery Co. of Chicago. We know that they started by manufacturing batteries for early radios. They produced four different styles of radio batteries, each ranging in weight from 40 – 50 pounds. Each was comprised of three sealed glass jars. If you've ever wondered why the vintage console radios were so large in the nice Mahogany cases; it is because they had to be large enough, and strong enough to hold the batteries. Over time they went on to supply batteries for other purposes, including farm lighting plants.

References: 153

51 - 1, left and **51 - 2** below, show a Universal Battery Jar.

The jar has a formed lip, with dimensions of 7.25 x 6.75 x 10. The only embossing is on the base (arc) UNIVERSAL / (arc) CHICAGO

←51 -1

51 - 2↓

↓51 - 3

51 - 4→

51 - 3, 51 - 4, 51 - 5, show another Universal Battery jar. It has the same dimensions as **51 - 1** and **51 - 2.**
This jar is embossed Water Line / UNIVERSAL (inside a heart)
The lid, left, is embossed: UNIVERSAL / CHICAGO / PAT. MARCH 28,1922

←51 - 5

Chapter 52
Van Houten Tenbroeck

I couldn't find much about this company other than that they supplied medical batteries and x-ray equipment. Some of their largest customers were the Sanitariums of the day. The medical batteries were for Physician's offices, as well as for home use. **50 - 1** is the lid for the Fitch jar, **20 - 1** (page 112). It is embossed: (arc) FITCH PERFECT BATTERY / (arc) MANUFACTURED BY / (arc) VAN HOUTEN TENBROECK / (arc) NEW YORK

←52 - 1

Chapter 53
Viaduct Manufacturing Co., Baltimore

The Viaduct Manufacturing Co. of Baltimore, MD is the successor to the firm of Davis & Watts which was founded circa 1870. Augustus G Davis continued as president of the Viaduct Mfg. Company. They manufactured a full line of electrical appliances: Telephones, Telegraph, Lighting, Fire Alarm Boxes, Messenger Boxes, Lightning Arrestors, Bells, etc.

References 174 - 178.

They had battery jars like **53 – 1 and 53 - 2** (below) with their name embossed to power some of their electrical Equipment.

←53 - 1

The jar is a light aqua and is embossed (arc) VIADUCT MFG. CO. / BALTIMORE. The dimensions are It has a ground lip and a squared spout rather than the usual V-shape. The dimensions are 4.5” diameter x 6” tall.

←**53 - 2**

Chapter 54
Voltamp Electric Mfg. Co., Baltimore

Voltamp was an early American manufacturer of toy trains based in Baltimore, MD. It was founded by Manes A. Fuld, in the 18902. Voltamp is important in the evolution of toy trains. Their 1907 release was the first toy electric train to run on ordinary household alternating current. This was a significant advancement, as up to then toy trains had used battery power.
As an out-growth of the Chloride of Silver Dry Cell Battery Co., also of Baltimore, Voltamp was formed to manufacture electric motors, toys, and novelties. They released their first model toy train in 1903 and it sold out immediately. They continued to manufacture toy trains and then branched out into batteries, including farm batteries, and then into medical batteries. They offered an entire line of medical batteries; even using Montgomery Ward as a distributor.
Voltamp toy trains are very collectible, today, as they were known for their great attention to detail in the manufacture of the cars.

References; 156

←**54 - 1**,is the Falcon Battery No. 1, by Volamp, was one of their early entries into the field of medical batteries.

52 - 2, is Voltamp Battery No. 6 a later version was available through the 1910s.

54 - 2↓

←**54 - 3** is Voltamp Battery No. 11.

Note the increased sophistication of the medical batteries with the later models. Also, they all use dry cells as a power source.

54 - 4→

54 - 4, is a Voltamp Battery No. 12, sold through Montgomery Ward.

Chapter 55
Waite & Bartlett Co.

I could find very little on this company, other than they were a major supplier surgical supplies and equipment. They later manufactured and supplied of Medical Batteries to physicians. As such, it appears they purchased the batteries from the LeClanche Battery Co. and incorporated them into their units. Many of these are found in an illustrated catalog of 1896. (See Chapter 2) The medical batteries were largely arrays which powered wall mounted electro therapy devices in physicians. They also participated in the consumer market with smaller units. It is estimated that in the period from 1880 – 1920 there were 150 different companies supplying medical batteries. Most of these were small and left no real history.

Following is actual battery equipment ascribed to Waite & Bartlett

.

References: 157, 158

←**55 - 1** This small rectangular, aqua, battery jar is typical of the type Waite & Bartlett used in many of their batteries. It is 1.25 x 2 x 3.375" tall. The top edges are beveled. Front side embossing is: (arc) WAITE & /BARTLETT / NY / MFG. Co. / PAT JULY 22 90. It is not believed that Waite & Bartlett actually manufactured the jar; and at this time the actual manufacturer is unknown. Courtesy of Walt Baumgardt.

←**55 - 2** battery jar. It is very similar to ones we've attributed to Whitall Tatum, so it is likely that this is also manufactured by Whitall Tatum. It is embossed; (arc) WAITE & BARTLETT / N.Y. The base is 4" square x 4.75" tall with a 2.25" diameter mouth. It is clear glass with a ground lip and a zinc screw cap. It was likely used in a medical battery.

Chapter 56

WATERBURY BATTERY CO

Waterbury Battery Co. was formed in the 1880's, in Waterbury, CT. to produce glass and porcelain battery jars. In the same timeframe, The Gordon Battery Co., also in Waterbury, CT. produced glass and porcelain battery jars. Very little is known about the two companies other than what they produced. It seems very likely that there was a relationship between the companies, but there is nothing to indicate what that relationship was.

56 - 1↑

56 - 2↑

The battery jar, above, is unmarked. The matching porcelain lid is embossed as follows: WATERBURY PRIMARY CELL / MANUFACTURED BY / THE WATERBURY BATTERY CO. / WATERBURY, CONN. / U.S.A.

56 - 3↑

This round porcelain lid, without a jar is embossed: (arc) WATERBURY PRIMARY CELL / WATERBURY BATTERY CO. / WATERBURY, CONN. / U.S.A.

Chapter: 57

Western Electric Co.

Western Electric was incorporated as the Western Electric Manufacturing Co. in 1872. In 1875 they were acquired by the Bell Telephone Co. In 1925, ITT purchased the Bell Telephone Manufacturing Co., and manufactured rotary system switching equipment under the Western Union brand. They continued to manufacture telephone systems and related equipment.

References: 159, 160

57 - 1↑

57 - 2↑

57– 1, is 4.5" diameter x 6", with a ground lip and pour spout. Embossing; (inside circular slug plate) (arc) WESTERN ELECTRIC / NEW YORK. Courtesy of **Debbi Graham.**

57 – 2, is SCA with a ground lip and pour spout. It had a combination carbon-graphite lid and cylindrical electrode (not shown). Its dimensions are 4.5" diameter x 6.25" tall with a 3.785" diameter mouth. Embossing: WESTERN ELEC. CO. / NEW YORK / and / CHICAGO. Courtesy of **Debbi Graham**

Chapter: 58
Westinghouse

Westinghouse Electric Corporation was founded in 1886 by George Westinghouse, inventor of the air brake and other devices, to construct and market alternating-current electrical systems. It overcame strong opposition from those fearful of alternating-current, branching out into all phases of electrical production and use.

The first, **58 - 1**, is embossed WESTINGHOUSE, logo (B / W / C/O) B / W / C / O, on all four sides of the jar. The Water Line mark is only on two opposing sides. It is approximately 7" x 11" x 17" tall.

The second jar, **58 - 2** , is embossed on only three sides: WESTINGHOUSE / logo (B / W / C / O), with the water line embossed on only two opposing sides. It is approximately the same size as the first jar.

Both jars are large enough to have been part of Farm Lighting Systems.

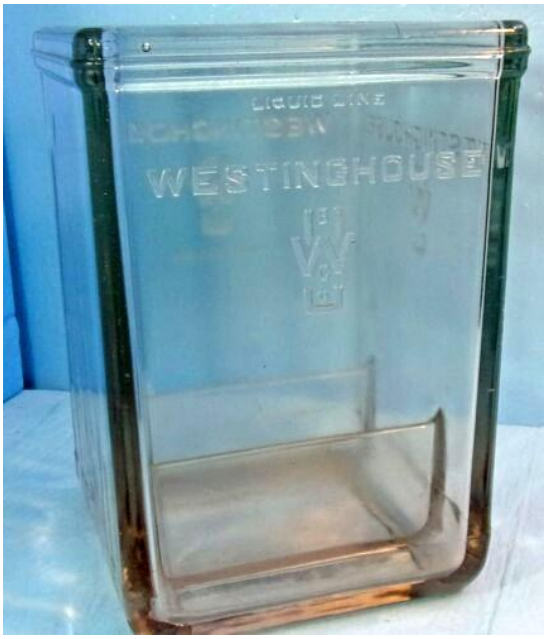
Reference: 161-162

←58 - 1

58 - 2→

58 - 3↑ **58 - 4↑**

The jar, above, **55 - 3** and **55 - 4** is embossed WESTINGHOUSE on two sides, and Water Line on four sides The dimensions are 4” x 2” x 6 ” tall.



←**58 – 5** is another Westinghouse Union battery jar. It is tapered square with a molded to. It is 11” tall. The bottom is 7” x 7”, while the top is 8” x 8”. It is embossed on three sides: Liquid Line / WESTINGHOUSE / Westinghouse Union logo. The middle side has Made In U.S.A. under the logo.

Chapter: 59
WHITALL TATUM CO

What we know as Whitall Tatum was formed in 1806. Originally known as the Phenix Glass Co., its first thirty years were unstable; changing ownership approximately 12 times during those years. Stability arrived when Edward Tatum joined the company in 1848.

That the operation specialized in glassware for druggists, chemists and perfumers probably reflects the fact several of the early owners were Philadelphia pharmacists. This was not true of the Whitalls and Tatums. It did, however, provide them with a business compatible with their religious beliefs. Both families were devout Quakers, who "did not believe in war, nor in litigation, nor in the manufacture or sale of intoxicating liquors." As a result, they refused to manufacture liquor bottles of any kind (although this was to change later).

References:

During the early years they produced window glass, carboys, and bottles. Later on, they were a major insulator manufacturer. They also produced battery Jars. Company catalogs, as early as 1879 show a line of round battery jars ranging from 4 x 4" to 9 x 15" (shown below). It is believed they also produced specialty jars for F.G. OTTO & Sons for use in Electroshock Therapy Devices. The actual relationship between Whitall Tatum and F.G. Otto and Sons is not known. What we do know will be discussed below.

References: 165-166

For examples of their battery jars, see Whitall Tatum Catalogs from 1879 and 1880 at NIA.org. Other examples are shown below:

←**59 – 1**, is not shown in their catalogs. A square, light aqua jar, 3" square x 4" high, with a 2" diameter top. It is embossed, on the front: (arc) F.G. OTTO & SONS / Jersey City. It is believed to have been used in an Electro Therapy device, (medical battery), very likely "The Mystic". This is courtesy of **Don Briel**.

←**59 – 2**, is not shown in their catalog, either. It is 4" square x 5" high, with an off-set glass top, 2" square. It is light aqua and embossed, on the front, (arc) F.G. OTTO & SONS / NEW YORK. This one is known to have been used in an electro therapy device called "The Florence". This jar is also courtesy of Don Briel.

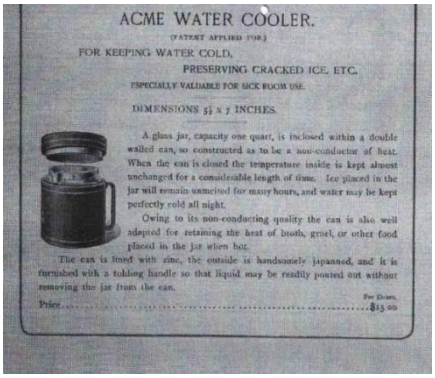
59 – 3, was made by Whitall Tatum Co. It is un-embossed except for (arc) W.T & Co. / U.S.A. It is a very light aqua in color and is 1.25" square x 3.5" tall. This jar does not show either of the Whitall Tatum Catalogs. This may indicate that Whitall Tatum, and perhaps other companies, manufactured specialty items for specific customers. Courtesy of **Debbi Graham**

If you look ahead to Willard Battery Co. you will notice a great deal of similarity between this bottle and the bottles in the 24-bottle array. The jars in the Willard are 1.25" square x 4.5" tall, thus the similarity. Based on this similarity, is it possible that Whitall Tatum made the small Willard battery Jars. We may never know. Courtesy of **Courtesy of Debbi Graham.**

59- 3↑

←**59 – 4**, in spite of its appearance, is not a battery jar. As the embossing says it is a water cooler, manufactured by Whitall Tatum with the brand name Acme. It is described in their supplemental price list from 1894. "A glass jar, capacity, one quart, encased within a double walled can, so constructed as to be a non-conductor of heat. When the can is closed the temperature inside is kept almost unchanged for a considerable length of time. Owing to its non - conducting quality, the can is also well adapted for retaining the heat of broth, gruel or other food placed in the jar when hot." The jar itself is light straw, with ground lip and pour spout. It is 3.75" diameter x 6" tall. Embossed on a slug plate on the front: (arc) ACME / (arc) WATER COOLER around the W/T logo. The base is embossed WT & CO. U.S.A.
Courtesy of **Debbi Graham.**

←**59 – 5**, appears to be a variation of the complete Water Cooler as described in the Whitall Tatum price list of 1894. If you look closely, you can see the Whitall Tatum logo on the jar. The glass jar fit inside the red base and the darker portion fit over the whole thing. Notice the wire carrying handle on the jar. Courtesy of **Debbi Graham.**



ACME WATER COOLER.

(PATENT APPLIED FOR.)

FOR KEEPING WATER COLD,

PRESERVING CRACKED ICE, ETC.

ESPECIALLY VALUABLE FOR SICK ROOM USE.

DIMENSIONS 5½ x 7 INCHES.

A glass jar, capacity one quart, is inclosed within a double walled can, so constructed as to be a non-conductor of heat. When the can is closed the temperature inside is kept almost unchanged for a considerable length of time. Ice placed in the jar will remain unmelted for many hours, and water may be kept perfectly cold all night.

Owing to its non-conducting quality the can is also well adapted for retaining the heat of broth, gruel, or other food placed in the jar when hot.

The can is lined with zinc, the outside is handsomely japanned, and it is furnished with a folding handle so that liquid may be readily poured out without removing the jar from the can.

Per Dozen.

Price.....$15 00

←**59 - 6** is the page from the 1894 catalog showing the Acme Water Cooler made by Whitall Tatum. The one above may be an earlier version. Certainly, there are similarities.

Chapter: 60

Whitney Glass Works, Glassboro, NJ

Although the glass plant had a much older history, Thomas and Samuel Whitney began to operate the Harmony Glass Works as the Whitney Brothers in 1839. In 1885, the firm became the Whitney Glass Works, but the Owens Bottle Mfg. Co. purchased the factories (two by then) in 1918, closing one and absorbing the other into the Owens family of plants. The Whitney's produced a large variety of fruit jars and bottles of many types. Aside from the wide range of fruit jar names, Whitney apparently did not mark most of their products, although the firm managed to use a large variety of logos on the ones, they did mark. Fruit jars they are known to have made, include, Trademark 5, Jersey, Telephone, WB monogram, Leader, Whitney Mason and Whitney. In 1885 Whitney received its largest single order, for 7.5 million Warner's Safe Cure bottles. In 1888 they received an order for 15,000 battery jars from the Law Battery Co. It is not known if they produced battery jars for other companies, but it is likely they did.

References: 167

CHAPTER: 61

WILLARD Storage Battery CO., Cleveland, OH.

The **Willard Storage Battery Co.**, an early leader in the development and manufacture of automobile batteries, was founded by Theodore A. Willard as the Willard Electric & Battery Co. at 33 Sheriff (E. 4th) St. in 1896, relocating to 49 Wood (E. 3rd) St. the following year. Willard reorganized the company as the Willard Storage Battery Co. in 1902. The company produced batteries for use by dentists and physicians, in Edison phonographs, and for lighting railroad cars, and made its first battery for automobile ignition in 1908. Beginning in 1910 Willard produced batteries and electric lighting accessories and sold them directly to individual automobile owners, unable to convince the manufacturers of their viability until 1912. Business then grew quickly; the company built a 15-acre plant at 274 E. 131 St. in 1915 and had contracts to supply batteries to 85% of the automobile factories in the U.S. by 1918.

The company grew with the automobile industry and after several years of experimental broadcasting, Willard bought station WEAR from Goodyear Tire and Rubber Co. and combined it with its own operation to create WTAM, a 1,500-watt, clear-channel radio station in Cleveland in 1923 (see **WTAM**). In Nov. 1930 Willard had more than 2,500 employees, additional plants in Toronto and Los Angeles, and distributors in 89 countries. The company produced batteries for submarines during World War II and was a pioneer in the development of small, hand-sized batteries. In 1952 employment had fallen to 1,500 and the firm was purchased by the Electric Storage Battery Co. of Philadelphia. In Aug. 1959 Electric Storage Battery announced it would close its Cleveland manufacturing operations, and by 1961 the E. 131 St. plant was vacant.

References: 168

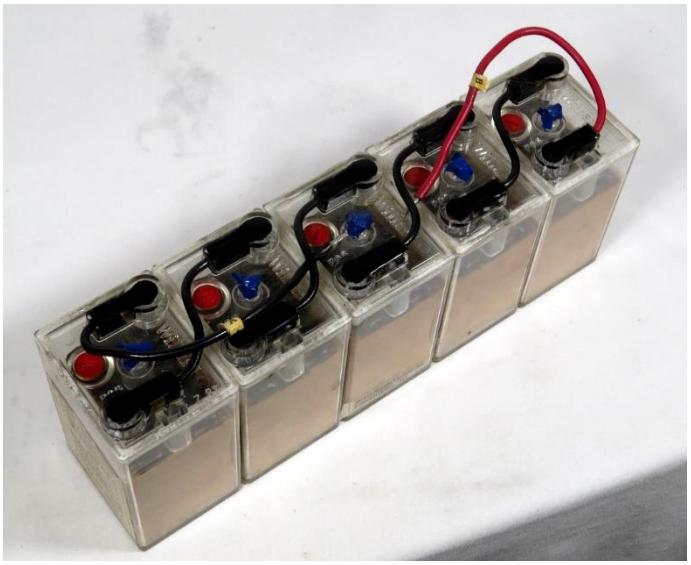
61 -1↑

61 - 1 and **61 - 2**, show a 2.5” x 7” round glass battery jar with a screw top that holds the electrodes, which are 2” x 5”. There is no embossing on the jar and the name WILLARD appears only on the lid. This battery was likely used in a small electrical apparatus, only producing 1.5 to 2 volts of electricity. Courtesy of **Walt Baumgardt**.

61 - 2↑

←**61 - 3,** is a 5-cell array manufactured by WILLARD. Each cell is 2 x 2.5 x 3.5" high. 5 of these individual cells are connected in parallel to produce a higher voltage. They are unmarked except for the top, which is embossed, WILLARD. The labels on the ends of the array are filling, charging, and servicing instructions.

Courtesy of **Walt Baumgardt.**



←**61 - 4**, is a top view of **61 - 3** showing the connection of the cells, (parallel). It looks like it was never used.

Building upon the array concept we have a 24-cell array, also manufactured by WILLARD, below. Courtesy of **Walt Baumgardt**.

←61 – 5

Each squared, glass cell is 1.25 x 1.25” x 4.5” tall. They are arranged in a 4 x 6 cell array, connected in parallel to increase the voltage to approximately 48 volts. The jars are unmarked except for a number on the bottom.

←61 - 6

“WILLARD” is embossed on the connecting rods between the cells. The electrodes are 1” x 3”. The box they are in measures 6 x 8.5 x 3.5” and is embossed (Front) **THREAD RUBBER / WILLARD /** Large W) **/ INSULATION**, (Left Side) **WILLARD / 1126** (Right Side**) WILLARD / 1126** (Rear**) PART NO. 2776 / CHARGE at 1/10 AMP**. Courtesy of **Walt Baumgardt**.

← **61 - 7**, is very similar to the battery jars used in the array, above. It is 1.25” square x 3.5” tall. The top appears slightly narrower than those in the array. The bottom is embossed (arc) W.T.& C0. U.S.A. Courtesy of **Walt Baumgardt**.

Just when you think Willard may have only used small battery jars and arrays, we find this large WILLARD battery jar (below), **61 - 8** and **61 - 9**. It is 7" x8" x 11" tall. It is thick walled, with the walls measuring 1/2" thick. On opposing sides, it is embossed: WATER LINE / WILLARD / TYPE / MH – 13. It is clear glass.

←61 - 8

61 -9→

61 - 10↑

61 – 10 is a Willard battery jar in light straw. It is a multicell offering 3 distinct cells in a single unit. The dimensions are 4” x 8” x 8” tall. It is embossed on front and back: High and Low liquid levels / WILLARD (in an oval). The base has, I but can’t make it all out. What I can see is: ??? / WILLARD ?? / PATENTED / CLEVELAND, OH.

Chapter 62

WINCHARGER

The Wincharger Corporation of Sioux City, IA started life as the Albers Propeller Co, making wind driven power generators for home radios. In the late 1920s and 1930s much of rural America had no eletrical power. Their only connection to the world was radio powered bya battery jar. When th battery was spent they lost contact with the world. These small wind driven units were sold as a way to recharge the batteries that powered the radios. The small 6 Volt systems wer an immediate success. In April of 1935 Zenith purchased 51% of the stock of Albers Propeller Co. and renamed it the Zenith Wincharger Corporation. By the end of 1936 Zenith pyrchased the remaining 49% of Alber's stock and became the sole owners.

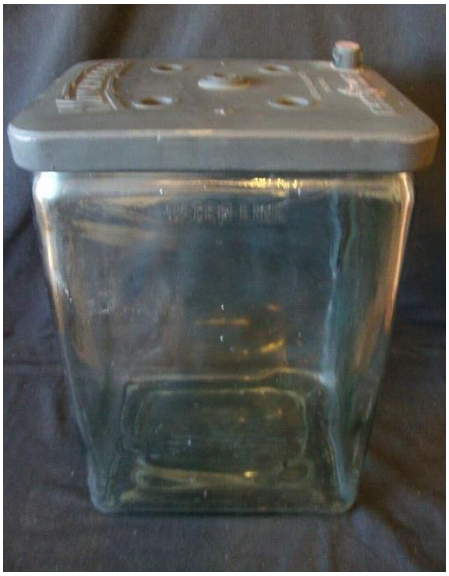
They had an entire line of wind turbines, ranging from small 6 volt units for single radios to much larger 110 volt units. They ranged from 110 – 2500 Watts. It is estimated that Wincharger manufactured 75% of the wind powered generators sold between 1930 and 1950. They used wooden propellar blades made of Douglas Fir.

They also had a line of Wincharger Farm batteries, which were designed to overcome most of the problems associated with other farm batteries:

- Excessive sediment
- Cracked or fallen plates
- Short circuits due to failed separators

Their jars were larger to provide more room for sediment, used reinforced plate support rods, and used Port Oxford Cedar separators. A complete Wincharger farm battery system was 32 Volts, containing 16 glass jar cells of 2 Volts each.

Pictured below (**62 – 1** through **62 – 2**), is such a Wincharger battery jar. It 9.5" 11" by 15.5" tall. It is embossed WATER LINE on 4 sides. The lid is embossed WINCHARGER / Do Not Lift Cell By Posts / Made in U.S.A. / Glass Guard.



62 – 1

62 - 2↓

Chapter: 63

Submarine Batteries

The first U.S. submarine was the USS Holland, commissioned in 1900. She had both an internal combustion engine (specifically, a 4-stroke Otto gasoline engine of 45 bhp (34 kW) for running on the surface and for charging batteries, and an Electro Dynamic electric motor of 50 shp (37 kW) for submerged operation, with one shaft.https://en.wikipedia.org/wiki/USS_Holland_(SS-1)#cite_note-Conways1-8 A 66-cell Exidehttps://en.wikipedia.org/wiki/Electric_battery array powered the electric motor when submerged.https://en.wikipedia.org/wiki/USS_Holland_(SS-1)#cite_note-FriedmanSubs1-specs-5 This allowed speeds of 6 knots (11 km/h; 6.9 mph) surfaced and 5.5 knots (10.2 km/h; 6.3 mph) submerged.

By the time WWII came, submarine batteries had advanced considerably. Each battery was about 54 inches high, 15 inches deep, and 21 inches wide, and weighed about 1,650 pounds. Each battery was composed of 126 lead-acid cells. Each cell in a submarine battery produced from 1.06 volts when fully discharged, to 2.75 volts at the optimum output. The cells could be connected in series to give a usable output of from about 210 to 350 volts, and in parallel for a power output of as much as 15,000 amps.

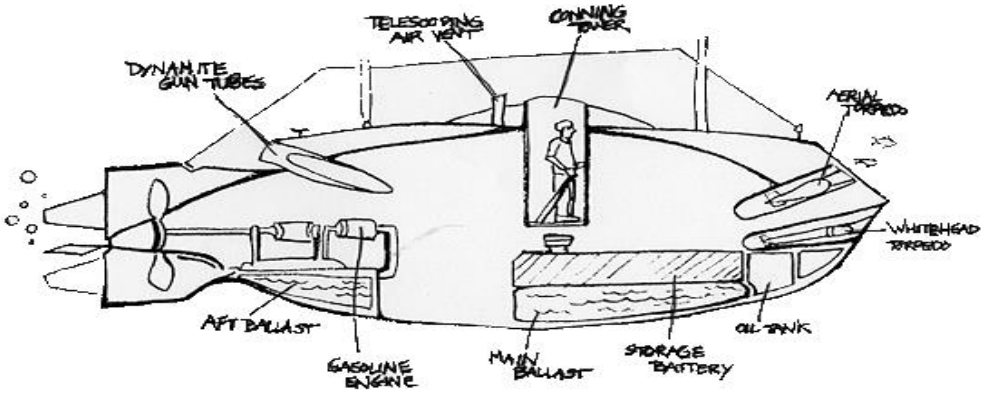
The primary manufacturers of the batteries were the Exide Corporation (now Exide Technologies) and the Gould Storage Battery Company (absorbed by JX Nippon Mining in 1988).

Pictured below, **63 - 1** and **63 - 2** is a typical submarine battery from WWII. They were constructed of a modified hard rubber, impervious to the acid, and also, shock resistant to avoid breakage.

References: 148, 149

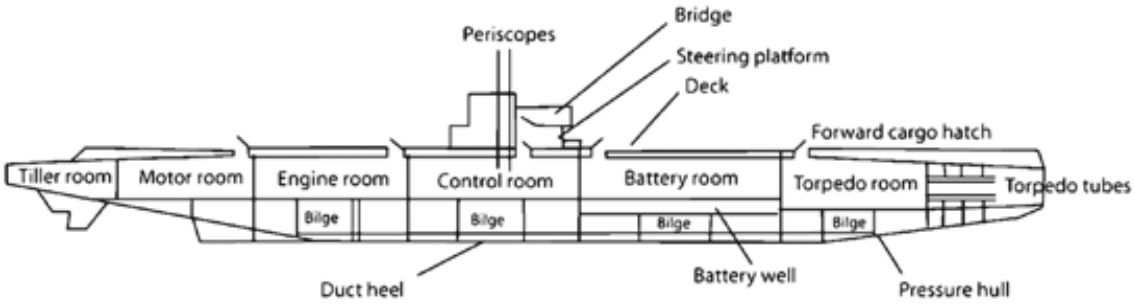
←63 - 1

63 - 2 →



63- 3↑

USS Holland



Schematic diagram of the *S-Five*.

63 - 4↑

WORLD WAR II type Submarine

Pictured, above, and **63 – 3** and **63 - 4** are schematics of the USS Holland and a Typical WWII era submarine (the S-Five) showing the battery compartments.

Chapter: 64

Batteries from Fruit Jars

For the layman and/or the DIYers at the time; conversion kits were available for converting fruit jars to battery jars. WE have two examples of these conversions, Gelfand's and Atlas.

I could find very little on Gelfands. It appears that they were a food products co, among many other things. They offered mayonnaise and other such products in Crocks, manufactured by the Western Stoneware Co. of Monmouth, IL, with Weir closures.

There is at least one Gelfand's fruit jar listed (# 1052) in the Fruit Jar Red Book. It is marked GELFAND's HA on the base. Some records show a GELFAND'S / BALTIMORE embossing.

The other is an Atlas fruit jar. Atlas Mason Jars were manufactured by the Atlas-Hazel Glass Company of Wheeling, WV, from 1902 – 1964.

Both conversions are simply screw fruit jar lids fitted with a single set of electrodes to make a single cell (battery). They were obviously used on small electrical appliances, requiring very little voltage.

References: 92, 132

64 - 1→

←64 - 2

64 - 3→

Gelfand's conversion is pictured above **64 - 1**, **64 - 2** and **64 - 3**. Note the more refined electrode attachments, compared to the Atlas conversion pictured below.

Courtesy of Walt Baumgardt

.

64 - 5

←64 – 4↑

The large wing nuts on the Atlas, **62 - 4** and **62 – 5,** look like a DIY project.
Courtesy of **Walt Baumgardt.**

Chapter: 65

Battery Jars, etc. of Unknown Manufacturers

There were so many manufacturers of Battery jars around the turn of the century (1880-1920) that many were un-embossed. We may never know who manufactured many of them, but they were manufactured and used, thus, deserving mentioning.

This chapter is devoted to battery jars that are either un-embossed; or, if embossed, there is little or nothing to report on the company.

←**65 - 1** is merely embossed THE / (arc) CRESCENT / BATTERY. It is a clear, squared, jar with a ground lip. It is 4.75" square x 6.675" tall, with a 4.375" diameter mouth. Courtesy of **Debbi Graham**.

There was no information to be found. There are several Crescent Electric Companies, but none that would have been in existence in the early 1900s.

65 - 2→

65 - 2, is in a very light SCA, with a ground lip and pour spout. Dimensions: 4.375" diameter x 5.5" tall, with a 3.875" diameter mouth. It is embossed PC&W PHILA on the lid, which appears to be original.

←**65 - 3**

←**65 - 4**

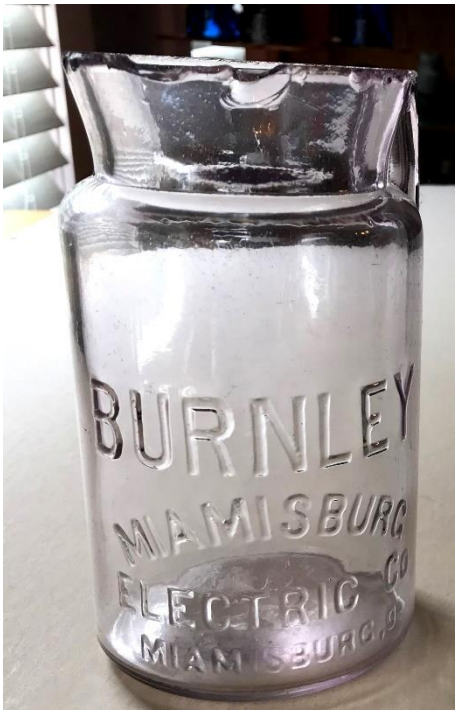
65- 5→

65 - 3, 65 - 4 and **65 -5** show an unmarked aqua jar with a caron graphite electrode. The jar is 4.4” diameter x 6.5” tall, with a ground lip and pour spout. The lid and electrode do not appear original to the jar. The lid is embossed (arc) APEX / E.T.W. Courtesy of **Walt Baumgardt**.

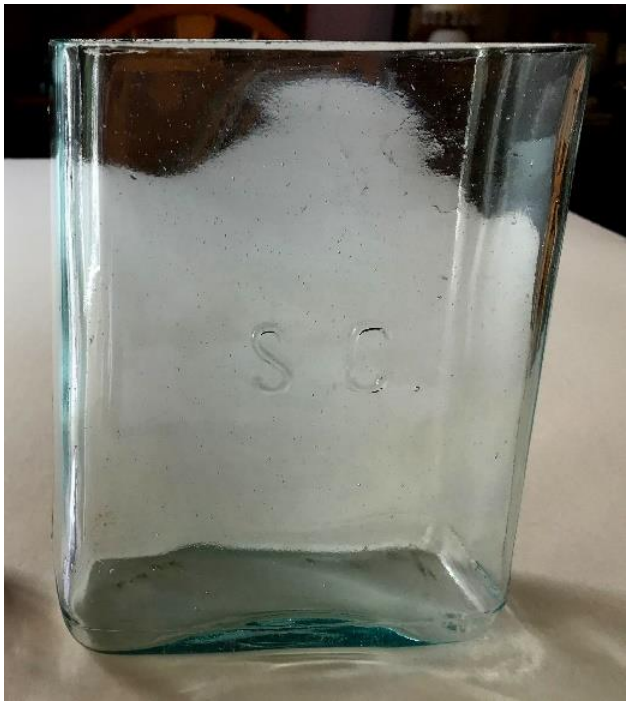
There are several Apex Electric Companies, but none that would match the time period.

65 – 6 is a round jar with a ground lip a pour spout. It is embossed BURNLEY / (arc) MIAMISBURG / ELECTRIC CO. / Miamisburg, OH. The color is SCA. Dimensions are 3.375” diameter x 6.25” tall

65 – 7 is a rectangular jar, simply labeled SC, with a ground lip. Dimensions are 5 “ x 2.675” x 6.25” tall. The color is light aqua.



65 - 6↑



65 - 7↑

65 - 8↑

65 - 9↑

65 - 8, is an un-embossed battery jar. It is aqua with a ground lip and pour spout with a circular slug plate with a small raised circle in the center. Its dimensions are 4.75" diameter x 6.5" tall with 3.75" diameter mouth. Courtesy of **Debbi Graham.**

65 - 9, is an un-embossed battery jar. It is aqua with a ground lip and pour spout with a circular slug plate. Its dimensions are 4.75" diameter x 6.5" tall with 3.75" diameter mouth. Courtesy of **Debbi Graham**.

65 - 10↑

65 - 11↑

65 - 10, is a battery jar for a microphone, apparently. It is aqua with a ground lip and pour spout. It is 4.5" diameter x 6" tall, with 3.675" diameter mouth. It is embossed: MICROPHONE CELL / NEW YORK / PATENTED. Courtesy of **Debbi Graham**.

65 - 11, is an un-embossed aqua jar, with a ground lip and pour spout. It is 4.5" diameter x 6.25" tall, with a 3.75" diameter mouth. There is a circular slug plate on the front with what appears to be a diamond in the center. Courtesy of **Debbi Graham**.

65 - 12↑

65 - 13↑

52 - 12, is a light green jar, identical to **65 - 10**. Courtesy of **Debbi Graham**.

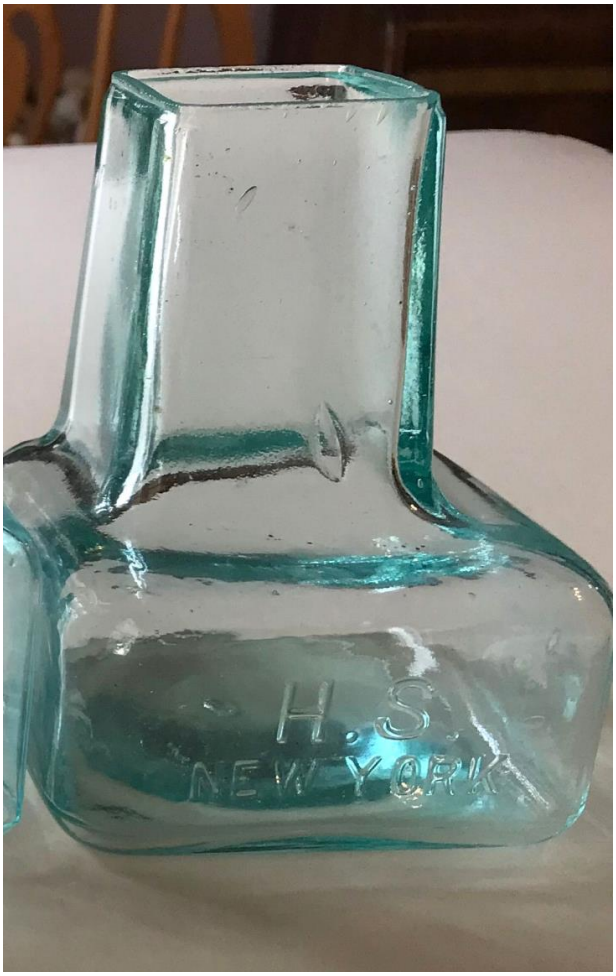
65 - 13, is a square amber jar with a ground lip. It is 1.675" square x 4.5" tall. There is a recessed groove around the jar approximatelty1.5" from the top. It is embossed: (arc) BATTERY / Made By / NATIONAL / COMMERCIAL Co. / CINCINNATI, OHIO Courtesy of **Debbi Graham**.

65 - 15↑

←65 - 14

65 - 14, is a small specialty battery jar in aqua. It is 2.375" diameter x 3.25" tall. It has a formed lip and a screw on lip. The jar is embossed HIGH / LOW on both front and back. On the base is <I>. The lid, **65 - 15**, is embossed: FANSTEEL / BALKITE / RECTIFIER CELL / Type C-5 / Pat in U.S.A. / May 27, 1924 / Made in U.S.A. In an arc around half of lid: FANSTEEL PRODUCTS CO. INC. NORTH CHICAGO, ILL. Courtesy of **Debbi Graham.**

FANSTEEL, not to be confused with Pfansteil, was a supplier of radio power units in N. Chicago, IL.



65 - 16↑

65 - 17↑

65 - 16, is a small specialty battery jar, likely manufactured by Whitall Tatum. It is similar to the jars shown under F.G. Otto & Sons in Chapter 36. It is aqua with a ground lip and offset, square neck. The base is 5.25" square, and the neck is 1.75" square and off-set. The front is embossed H.S. / NEW YORK. It was very likely used in a medical battery. Courtesy of **Debbi Graham**.

65 - 17, is similar to the jars seen in Chapter 36, F.G. OTTO & Sons. Likely made by Whitall Tatum, it is smaller than the ones we've seen before. It has a square base with a small square neck, with a ground lip. The base is 3" square while the neck is 1.75" square. It was likely used in medical batteries. Courtesy of **Debbi Graham.**

←**65 - 18**, shows a squared aqua jar with a paper label formed lip along with the combination lid and electrode. The jar is un-embossed except for a BL 1 near the base. It's dimensions are 4.75" square by 7" tall, with a 4.375" diameter mouth. The label reads: SEROCO / Seroco Carbon Battery / Directions / for use on open circuit service. The lid is un-embossed. Courtesy of **Debbi Graham**.

65 - 19, is a jar in SCA, with a ground lip and pour spout. It is 4.5" diameter x 6" tall with a 3.75" mouth. Embossed inside a circular slug plate: (arc) If Jar Should Be Broken / Purchase Another / From (arc) JOHN WANNAMAKER. Base: W.T. Co. / 4 / U.S.A.

65 - 19→

It is here because I found nothing under John Wannamaker other than Department Stores. Courtesy of **Debbi Graham**.

←**65 – 20,** is a straw-colored jar and is about the largest one I've seen. It is rectangular in shape with rounded corners and a formed top. Its dimensions are 8.675" x 13" x 17 "tall. NOTE: The electrode rests in the bottom.

Courtesy of **Walt Baumgardt.**

65 – 21, is a rectangular (almost square) jar in an aqua color. It has a ground lip, and the dimensions are 6.675" x 7.5" x 10". The number 6 appears on two sides. The bottom has 110 - 6. Courtesy of **Walt Baumgardt**.

65 - 21→

←65 - 22

65 - 22, is unmarked, except for a BK 2 near the base. It is aqua, with a ground lip and pour spout. It is 4.5” diameter x 6.75” tall, with a 3.75” diameter mouth, Courtesy of **Debbi Graham**.

65 - 23, is embossed Water Line on 4 sides, with MADE IN U.S.A. on one side. Its dimensions are 3.75” x 4” x 6” tall. It has a formed lip, and tin lid. The electrode rests in the base are 1.74” tall. Courtesy of **Walt Baumgardt**.

←65 - 23

65 – 24, is in Uranium (Vaseline) glass, measuring 6.75 x 8.75 x 7.75". There are internal dividers molded in, essentially dividing the jar into three separate jars, each measuring 3.25 x 6 x 7.75 "tall. Its electrode supports are 0.75" tall. Courtesy of **Walt Baumgardt.**

←65 - 24

A note about Uranium (Vaseline) Glass. Although they are used interchangeably, purists insist that they are not the same. Research shows that they are both made by the addition Uranium Oxide, to the glass before melting. True Uranium glass fluoresces bright green under ultraviolet light and contains approximately 2% of Uranium Oxide. Lesser amounts of Uranium Oxide, generally in the range of 0.1 - 0.3%, may tend to fluoresce in a yellow green color which is Vaseline glass. Other minerals in the glass will also affect the color. Remember True Uranium glass will glow green or shades of green.

65 – 25, is a light Aqua jar with Ground lip and pour spout. It is 4.375" diameter x 5.875" tall. There is no lid and no embossing. Courtesy of **Walt Baumgardt.**

←65 - 25

←**65 – 26**, is a clear, 4.5” square jar is 4.5” with a 3.75” diameter round top, x 6.25” tall, with a formed lip. The jar has no embossing. The lid, **65 - 27**, is of hard rubber with 3.25” x 4.5” cylindrical electrodes fused to it. The lid is embossed in a circle ELECTRICAL ENGINEERING COMPANY / MINNEAPOLIS, MINN. Not much is known about the Electrical Engineering Co. It is unknown if they manufactured the jar. Courtesy of **Walt Baumgardt.**

←**65 - 27**

65 – 28 and **65 - 29,** show a round aqua jar 4.5” diameter x 6.25” tall. The front has what appears to be a diamond inside of a large circle. A “3” is on the base. The lid is hard rubber with fused cylindrical electrodes, 3” diameter x 4.75” tall. There is an “S” embossed on the lid, below, which is not original to the jar. Courtesy of **Walt Baumgardt**.

65 - 28↑

65 - 29↑

Jar **65 - 30,** is identified merely as KXC 13, on the bottom. Its dimensions are 6” x 7” x 10” tall. It is aqua and has WATER LINE on four sides.

←65 - 30

65- 31, is totally unmarked, with dimensions of 6” x 10” x 7” tall. Note the formed, decorative lip.

62 - 31→

←**65 - 32,** is a totally un-embossed jar with a circular slug plate on the front. It is almost straight sided, 4” diameter x 7” tall with a 3.75” diameter mouth. It has a ground lip.

65 - 33↑

65 - 34↑

65 - 33, 65 - 34, 65 - 35 and **65 - 36** are pictures of what I believe may be a previously un-identified battery rest. As you can see one side has a "Y" shaped slot, as it were to fit over something to hold it in place. The other side is bowl shaped with a center post that is ¼" short of being even with the sides. Overall dimensions are 5 7/8" by 2 7/8". The Y slot is 1 ¼" deep and ¾" wide. It is clear glass and totally unmarked. Courtesy of **Walt Baumgardt**. ↑

65 – 35↓

65 - 36↓

Jar **65 - 37**, is embossed on 2 sides (opposing): ACID LEVEL / TYPE J1/8. The dimensions are 8.5" x 10.5" x 13"tall. It appears to be a light olive green, or perhaps Uranium (vaseline) glass.

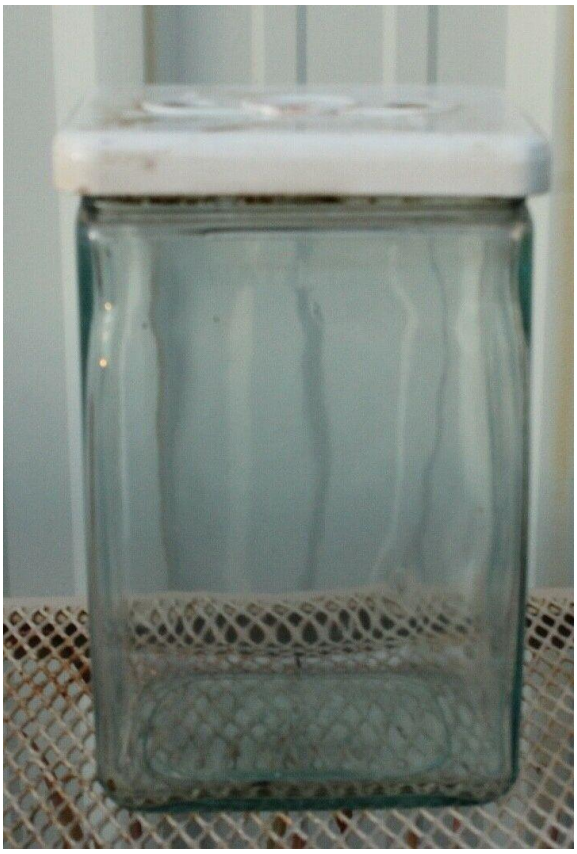
65 - 38 and **65-39**, below, is a light green aqua, with the same dimensions as **65 - 37**. It is embossed ACID LEVEL / TYPE J1/9. It is unknown why jars with different numbers would have the same dimensions.

These jars were reportedly used on the ralroad system in the 1930s.

65 - 37↑

65 - 38↓

65 - 39↓

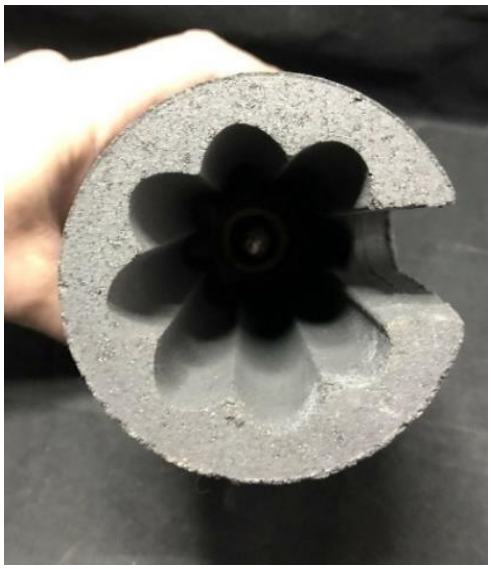


65 - 43, is marked G-13 on the bottom. It is aqua, with dimensions of 6" x 7.5" x 10". The lid, **65 - 44**, below, is only marked POS (+) and NEG (-). The Water Line is marked on 4 sides.

←65 - 43

65 - 44↓

65 - 45↑



65 - 47↑

65 - 45, has a ground lip and is merely embossed **L.B. CO.** The un-embossed lid, **65 - 46**, is original to the jar. The dimensions are 4,75" square x 6.25" tall with a 3.875" diameter mouth. It has a cylindrical carbon graphite electrode, **65 - 47**, above.

65 - 46↑

←**65 - 48**

65 - 48 and **65 - 49**, show a unique battery jar called "**OLD IRONSIDES**". The embossing is OLD IRONSIDES / STORAGE / BATTERIES / M.J. FITZGERALD, CO. / MADISON, WIS. The dimensions are 8.5" x 7.75" x 11.75" tall. Courtesy of **c**

M.J. Fitzgerald CO., was a radio manufacturer in Madison, WI, making large console radios. It is assumed that "Old Ironsides" was used to power such radios.

←**65 - 49**

65 - 52↑

65 - 51→

65 - 50↓

65 - 50, 65 - 51 and **65 - 52** show an un-embossed battery jar. Its only marking is 558 B 1303 on the base. The dimensions are 7.75” square x 10.5” tall with a formed lip. Courtesy of **Wayne Dudzinski.**

This jar has a unique feature. The plate rests are not an integral part of the jar. Instead the rests and separate, and, adhered to the bottom with tar.

This is surprising, as I would imagine the tar would have a negative effect on the electrolyte.

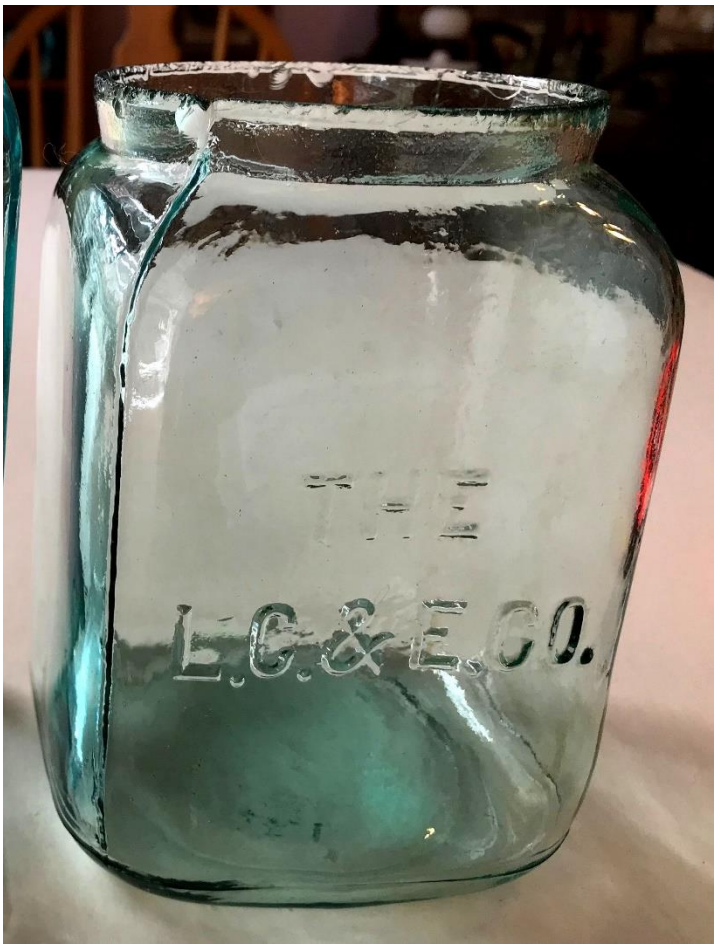
65 - 53↑

65 - 54↑

65 - 53, is an aqua jar with a ground lip and pour spout. It is 4.675: diameter x 6.25" tall with a 3.875: diameter mouth. It is embossed inside a circular slug plate: (arc) SAMUEL THAXTER & SON / (arc) BOSTON, MASS. Courtesy of **Debbi Graham**.

65 - 54 is a squared, light SCA jar with a ground lip. It is 4.375" square with a 3/875" diameter mouth x 6.25" tall. The embossing is: BAZAR / D ELECTRIQUE / 34B HENRIM / PARIS. Courtesy of **Debbi Graham.**

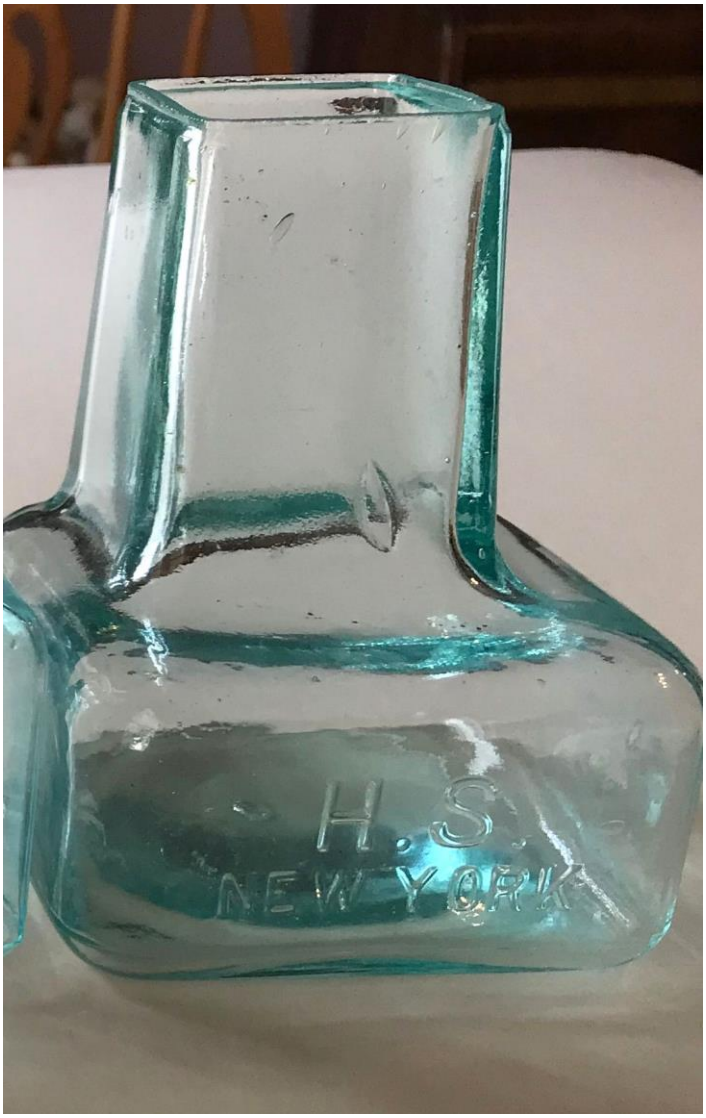
65 - 55↑



65 - 56↑

65 - 55, is a clear, square, jar with a ground lip and pour spout. It is 4.25" square with a 3.675" diameter mouth x 6.375" tall. It is embossed: (arc) THE SOUTHERN GROSS / REGISTERED TRADE MARK / MADE IN GERMANY **Courtesy of Debbi Graham**.

65 - 56, is an aqua, square jar with a ground lip. Its dimensions are 4.25" square x 6.75"tall with a 3675" diameter mouth. It is embossed: THE / L.C.& E. CO.Courtesy of **Debbi Graham.**



←**65 - 57,** is a specialty battery jar, likely made by Whitall Tatum. Note: It is the same size and shape as the battery jars used in the "Florence" medical battery. Courtesy of **Debbi Graham.**

It has a 5.25" square base with a 2" square off set neck x 5" tall. It is embossed H.S. / NEW YORK

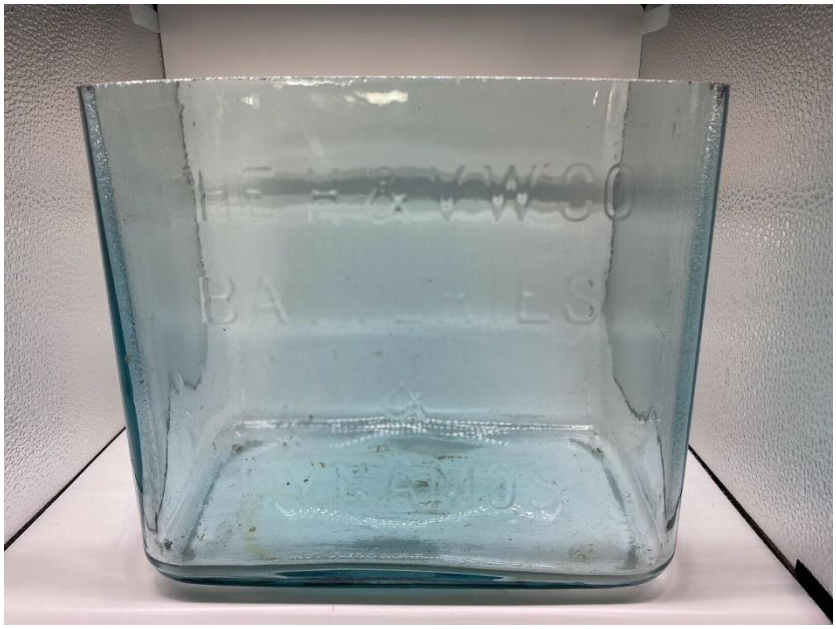
←65 - 58

65 - 59↓

I could find no information on the Empire City Electric Co. An illustrated catalog of the Empire City Electric Co sold on eBay in 2021. The jars **65 - 58** and **65- 59** are all we have of this company Courtesy of **Walt Baumgardt and Debbi Graham.**

They are round with a pour spout and ground lip. Dimensions are 4.25" diameter top x 6.875" tall.. The embossing is (arc) THE EMPIRE CITY / ELECTRIC COMPANY / (arc) NEW YORK, inside a circular plate usually used for a paper label.

65 - 60↓



65 -60 through **65 - 62** show a rectangular battery jar embossed THE H & VW CO / BATTERIES / & / DYNAMOS. Its dimensions are 6” x 9.5” X 8.5” tall. It is aqua with a ground lip.

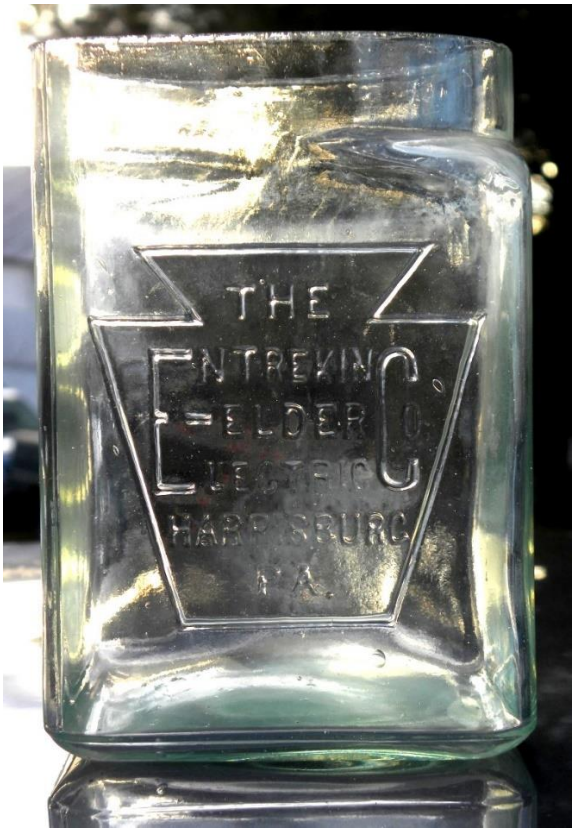
65 - 62↓

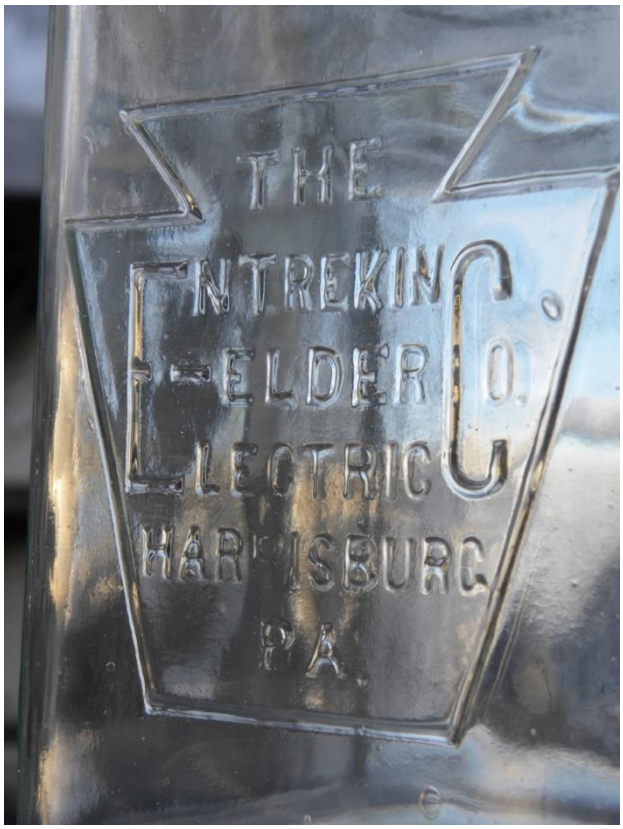
65 - 61↓

65 - 63↑

65 - 64↑

The battery jar shown in **65 -63** and **65 - 64** is at the courtesy of **Jim Fleishman**. It is clear glass with no embossing, except for the numbers 33762 on the bottom. Its dimensions are 7.75" x 10" x 13" tall. It has a formed lip.





65 -65↑ **65 - 66↑**

The jar pictured in **52 - 65** and **65 - 66** is the courtesy of **Dave Fertig**. It is clear glass with a ground lip. The jar is square with a round mouth. Dimensions are 4.75" square x 7" tall. The mouth is 4;375" diameter. The embossing is inside a keystone: THE /[ENTREKIN /ELDER / ELECTRIC.] Co. / HARRISBURG / PA.

There are currently several Entrekins and Elders in Harrisburg, but no Entrekin Elder Electric Co.

65 - 67↑

65 - 68↑

65 - 67 through **65 - 69**, show four battery jars joined together into a multi cell unit by the use of a module. The module is constructed of molded Bakelite, which would date it to the period 1925 - 1935. It is reported to have been used on a tractor. This is perfectly logical, considering what we know about the electrification of America at the time. At this time there is nothing to identify the manufacturer, although the jars bear a remarkable resemblance to a similar Willard jar.

One corner of the module has broken off. I cn't tell from the pictures how it was wired. Series connections would have increased the voltage to approximately 8.4 volts. Parallel connections would have quadrupled the ampere output.

←65 - 69

65 – 70 ↑

65 - 71↓

65 - 72↑

65 - 70 through **65 - 72** are believed to be from the NYW&B railway. It is cylindrical in shape with a 4.25" diameter. The height is 6.375". The jar has a circular slug plate on the front with a BK 36 on the bottom. The top of the jar is 3.75" diameter with a pour spout.

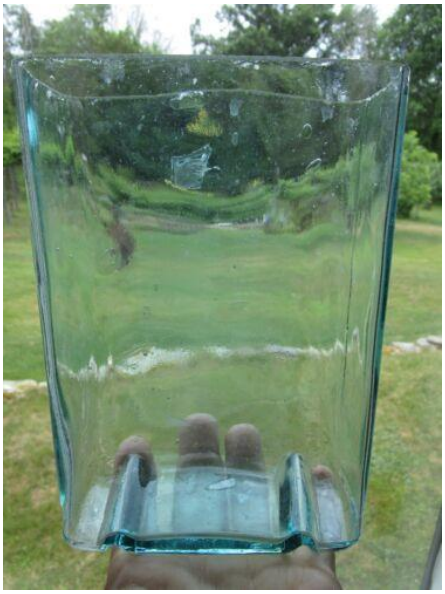
The lid, with attached carbon electrode, is embossed on the top: (arc) JUPITER J.W.P. JUPITER / (arc) BOSTON, MASS. / N.Y.C.W.

This jar is also shown in Chapter 35: New York, Westchester & Boston Railway. See Chapter 35 for more details.

65 - 73↑ is a Uranium glass battery jar. It is totally un-embossed, with dimensions of 4.5” x 10.5” x 6” tall. It is three units in one; sort of a 3 battery array in a singlr battery jar. This is the courtesy of **Cabaret Antiques**, Wakefield, RI.

65 - 74↓

65 – 74 through **65 – 78** show an unembossed battery jar held in a decorative brass base with a vine motif. The jar itself is 7.375” x 5.25” x 2.75”, with a ground lip. Thr brass holder is obviously made to go with the jar. There is difficult to read embossing on the rear of the brass holder. Looks like it could be “ARCHITECTURAL ??”. Very like a decorative piece for a well to do family that just didn’t want a plain battery jor sitting around. Like a single purpose jar such as door bell or something similar.



65 - 75↑

65 - 76↑

65 - 77↓

65 - 78↓

←**65 - 79** is unmarked except for WATER Line on the two ends and G 15 on the bottom. Like G-13 on page 234, the manufacturer is unknown. The dimensions are 6" x 7.5" x 10" tall. The hand crafted wooden lid is not original to the jar.

The battery jar shown below **(65 – 80, 65 – 81, 65 – 82)** is embhossed as follows: The dimensions are 4.25" diameter x 7" tall. It has a ground lipand no spout.

Front:

THE IMPROVED / PATENTED / POUROUS CUP BATTERY / PAT'D OCT 26 1886 / TRADE MARK / CJH (surrounded by 4 5-point stars)

Rear: 2nd Water Line

1st Water Line

The lid is made by another company, as is typical for this type of jar. It is Embossed:

P.& C. CO. / PHILADELPHIA / PAT OCT 6 1885

65 – 80↑

65 – 81↓

65 - 83↑

← 65 - 84

The jar pictured to the left (**65 – 84** and **65 – 85**) is the only one I've seen like it. It is Green, 4.675" in diameter and 5.375" tall with a screw top. It is embossed as follows:

1. Line all around the jar at the top with the words;"FILL ONLY TO THIS LEVEL".
2. About a third of the way from the top, another line all around the jar, with the words; "DO NOT ALLOW LIQUID LEVEL / TO FALL BELOW THIS LINE". Courtesy of Bob Berry.

←65 – 85

Chapter 66

Manufacturer's Catalogs

Sales Catalogs of the following companies; all known to have manufactured and/or supplied battery jars and associated equipment have been placed in the members only portion of the NIA website.

- Cunberland Glass Mfg. Co., Bridgeton, NJ, 1911
- Whitall Tatum Co., New York & Philadelphia, 1879,
- Whitall Tatum Co., New York & Philadelphia, 1880
- Whitall Tatum Co., New York & Philadelphia,
  Supplemental Price List 1894
- Northern Electric Co., Montreal, 1920
- Novelty Electric Co., Philadelphia, 1899
- Waite & Bartlett, New York, NY, 1895 - 1896
- J. Andrae Westinghouse Electric Co., Milwaukee, 1915
- F.G. Otto & Sons , New York, NY, 1875
- F.G. Otto & Sons , New York, NY, Surgical
  - & Orthopedic Instruments 1875
- Electric Storage Battery Co (ESB) 1917
- Chloride of Silver Dry Cell Faradic Batteries. Circa 1900.
- Catalogue of Screw Glass Insulators, Battery Jars, Electric Light Globes, etc.by Hemingray Glass C0. 1903
- Catalogue of Edison-Lalande batteries, battery motors, measuring instruments, medical apparayus, etc., 1910
- Partrick and Carter, 1888
- Illinois Glass Works, 1906
- Frank H. Stewart, (E.G.L.)
- Electric Storage Battery Co.
- J.C. Vetter, (LeClanche)
- Novelty Electric Co.

It is suggested that you visit the site to see what these manufacturers offered, to get a better idea of the scope of wet cell batteries.

Chapter: 67

Associated Equipment

In addition to the battery jars, lids and electrodes, there were other items needed to set up and maintain batteries. I have used the term "associated equipment" to describe these items.

Below, **64 - 1**, is a picture of what Irons calls battery plate spacers, which he describes as a failed attempt to insulate the positive and negative plates from each other in a cell. Others, including the McDougalds, describe them as protective covers for the wires between batteries, to protect them from the corrosive materials dripping from batteries above, such as in a farm battery set up. They have been found in various shades of aqua, blue, and green. Courtesy: **Walt Baumgardt**

67 - 1↓

←67 - 2

67 – 2 You have seen this before in the ESB chapter. It is an automatic water fill unit to maintain the liquid level in the batteries. It is a quart size; 5.5” diameter x 3.5” high. The neck is 1.75” diameter x 1.5” high. Aqua in color it is embossed: (F- Readable UD) PILOT CELL AUTOMATIC / WATER FILLER / STYLE A - ONE QUART / To Refill - Invert bottle and / Unscrew Goose Neck at Sleeve / THE ELECTRIC STORAGE BATTERY CO. This is the courtesy of **W. Baumgardt**, who acquired it from **Phil Mayhew**.

67 - 3↑

The picture of associated equipment, above, is the courtesy of **Debbi Graham**. The hygrometer, laying across the bottom was used to check the specific gravity of the electrolyte solutions, critical to a properly functioning battery. The other three items were various instruments for checking the condition of the cells. In each case the contacts on the instruments were placed across the cell (Battery) electrodes to check whether the battery was charged or spent, how many volts were left, etc. All instruments necessary to maintaining a properly working battery.

←67 - 4

67 - 4 is not about the jar, but rather about the electrode rests in the bottom of the jar. Usually, we find the rests to be an integral part of the jar. In this case the rests are a separate entity and adhered to the bottom of the jar with a tar like substance. This demonstrates that the electrode rests were manufactured and could be added to an existing jar at any time.

67 - 5↑

67 - 5, shows various electrodes, leads etc. to accompany a medical battery. As the embossing is in French it is assumed they came from France.

67 - 6↑

67 - 6 and **67 -7** show an ESB Charge Control Unit, with the jar manufactured by Corning. For more information, see Chapter 18.

←67 - 7

67 - 8↑

67 - 9↑

67 - 10↓

Decorative brass battery jar holders were available to disguise the battery jar for the well – to – do. They appear to have been custom made to fit specific jars. **67 – 8 through 67– 10** show such a holder. **See 65 – 74 through 65 – 78** for more details.

Chapter: 68

Battery Patents

The following is what I could find regarding patents assigned to Thomas A. Edison for batteries, batterry jars and associated equipment. I'm sure there are many more. The list contains147 patents Edison received. It is arranged in chronological order by execution date, which is the date on which Edison signed the application and the date in the patenting process that comes closest to the time of actual inventive activity. The application date is the date on which the Patent Office received and recorded the application; the issue date, the time at which the patent, having passed inspection and any legal challenges, was awarded. Many of these patents are downloadable at https://edison.rutgers.edu/battpats.htm

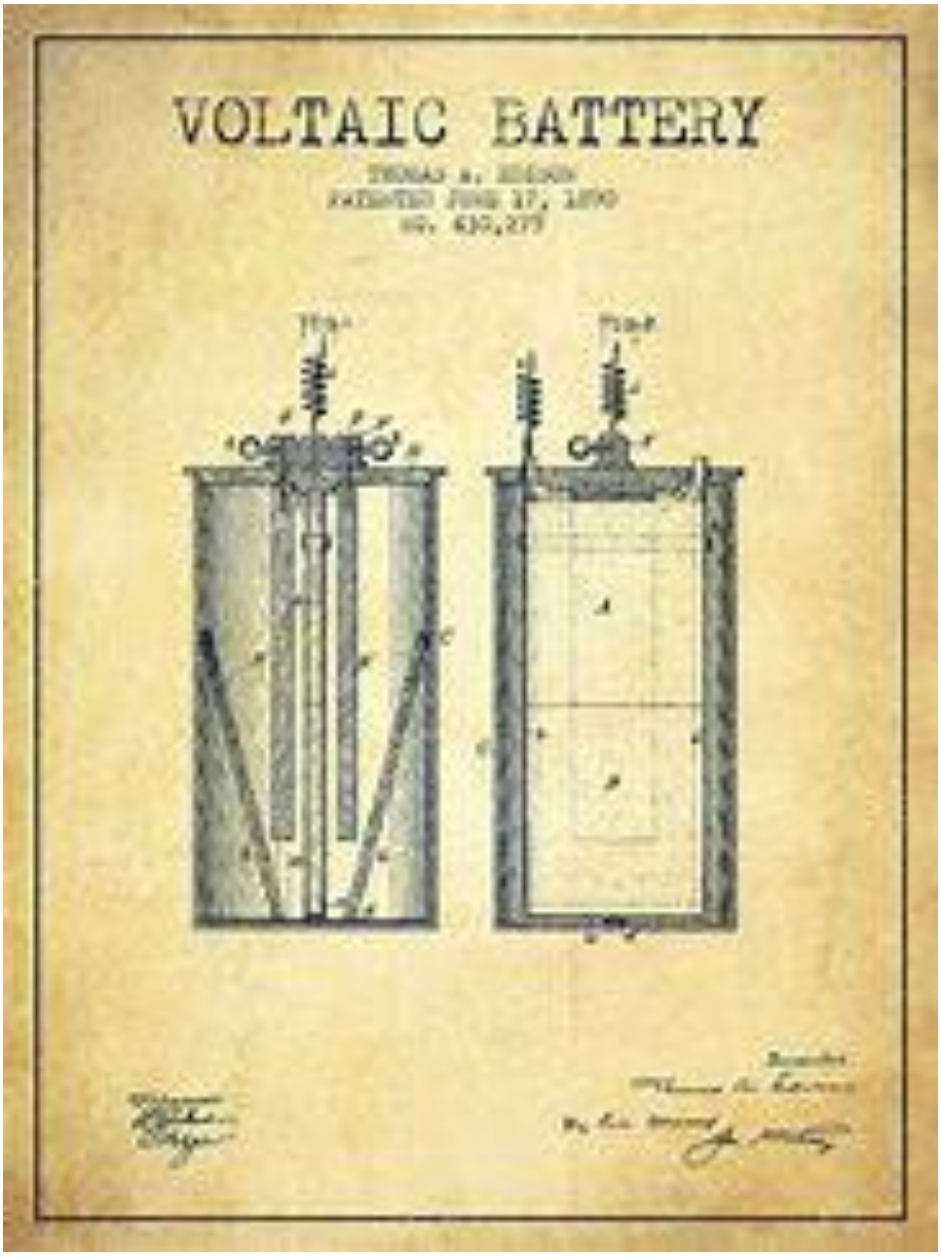
No.	Executed	Applied	Issued	Patent No.	Title
53.	10/31/72	11/05/72	09/23/73	142,999	Galvanic Batteries
274.	06/21/81	09/03/81	09/02/90	435,687	Means for Charging and Using Secondary Batteries
347.	05/19/82	06/26/82	03/06/83	273,492	Secondary Battery
353.	06/03/82	08/07/82	03/20/83	274,292	Secondary Battery
583.	01/21/88	01/30/88	08/19/90	434,587	Thermo-Electric Battery
645.	06/15/89	07/02/89	06/17/90	430,279	Voltaic Battery
785.	10/15/00	10/31/00	10/08/01	684,204	Reversible Galvanic Battery
786.	10/15/00	10/31/00	11/19/07	871,214	Reversible Galvanic Battery
787.	12/22/00	01/08/01	07/08/02	704,303	Reversible Galvanic Battery
788.	02/18/01	03/05/01	05/13/02	700,136	Reversible Galvanic Battery
789.	02/23/01	03/01/01	07/08/02	704,304	Reversible Galvanic Battery
790.	02/23/01	03/05/01	05/13/02	700,137	Reversible Galvanic Battery
791.	05/10/01	05/17/01	07/08/02	704,305	Electrode for Batteries
792.	06/17/01	06/20/01	07/16/01	678,722	Reversible Galvanic Battery
793.	06/17/01	06/20/01	10/08/01	684,205	Reversible Galvanic Battery
794.	06/17/01	06/20/01	02/04/02	692,507	Reversible Galvanic Battery
795.	06/17/01	06/20/01	06/03/02	701,804	Reversible Galvanic Battery
796.	06/17/01	06/20/01	07/08/02	704,306	Reversible Galvanic Battery
800.	02/11/02	02/14/02	07/28/03	734,522	Process of Nickel-Plating
801.	09/29/02	10/03/02	05/05/03	727,117	Reversible Galvanic Battery
802.	10/13/02	10/21/02	05/05/03	727,118	Process of Manufacturing Electrolytically-Active Finely-Divided Iron
803.	11/13/02	11/28/02	03/03/03	721,682	Reversible Galvanic Battery
804.	11/13/02	11/28/02	03/03/03	721,870	Funnel for Filling Storage-Battery Cans or Analogous Purposes
805.	11/13/02	11/28/02	03/24/03	723,449	Electrode for Storage Batteries

806.	11/13/02	11/28/02	03/24/03	723,450 Reversible Galvanic Battery
807.	11/13/02	11/28/02	03/15/04	754,755 Compressing-Dies
808.	11/13/02	11/28/02	03/15/04	754,858 Storage-Battery Tray
809.	11/13/02	11/28/02	03/15/04	754,859 Reversible Galvanic Battery
810.	11/13/02	11/28/02	07/05/04	764,183 Method of Separating Mechanically-Entrained Globules from Gases
811.	11/13/02	11/28/02	05/07/07	852,424 Secondary Battery
815.	12/18/02	01/09/03	01/19/04	750,102 Electrical Automobile
823.	01/30/03	03/05/03	09/18/06	831,269 Storage-Battery Electrode-Plate
830.	10/03/03	10/05/03	04/23/07	850,912 Process of Making Articles by Electroplating
831.	10/03/03	10/05/03	06/18/07	857,041 Can or Receptacle for Storage Batteries
833.	11/16/03	11/18/03	08/09/04	766,815 Primary Battery
835.	11/20/03	11/23/03	12/10/07	873,220 Reversible Galvanic Battery
836.	12/08/03	12/10/03	09/15/08	898,633 Filling Apparatus for Storage-Battery Jars & c.
837.	06/08/04	06/13/04	08/16/04	767,554 Method of Rendering Storage-Battery Gases Non-Explosive
840.	06/24/04	06/29/04	05/29/06	821,622 Process of Cleaning Metallic Surfaces
841.	06/24/04	06/29/04	02/18/08	879,612 Alkaline Storage Battery
842.	06/24/04	06/29/04	02/25/08	880,484 Process of Producing Very Thin Sheet Metal
843.	07/12/04	07/21/04	08/22/05	797,845 Sheet Metal for Perforated Pockets of Storage Batteries
844.	07/12/04	07/21/04	07/31/06	827,297 Alkaline Battery
846.	07/18/04	08/16/04	03/21/05	785,297 Gas-Separator for Storage Batteries
847.	08/10/04	08/16/04	07/23/07	861,242 Can or Receptacle for Storage Batteries
848.	08/10/04	09/28/04	05/22/06	821,032 Storage Battery
850.	09/26/04	09/29/04	04/10/06	817,162 Process of Treating Alkaline Storage Batteries
851.	09/28/04	09/29/04	02/08/10	948,542 Method of Treating Cans of Alkaline Storage Batteries
853.	10/29/04	11/02/04	05/29/06	821,624 Gas-Separator for Storage Batteries
854.	10/29/04	11/05/04	05/29/06	821,625 Process of Treating Alkaline Storage Batteries
855.	11/01/04	11/02/04	05/29/06	821,623 Storage-Battery-Filling Apparatus
856.	02/16/05	03/01/05	02/25/08	879,859 Apparatus for Producing Very Thin Sheet Metal
857.	03/17/05	03/20/05	11/14/05	804,799 Apparatus for Perforating Sheet Metal
858.	03/23/05	03/24/05	11/05/07	870,024 Apparatus for Producing Perforated Strips
859.	03/29/05	03/30/05	05/29/06	821,626 Process of Making Metallic Films or Flakes
860.	03/29/05	03/30/05	05/29/06	821,627 Process of Making Metallic Flakes or Scales
861.	03/29/05	03/30/05	08/07/06	827,717 Process of Making Composite Metals
862.	03/29/05	03/30/05	12/25/06	839,371 Method of Coating Active Material with Flake-Like Conducting Material
863.	03/29/05	03/30/05	05/21/07	854,200 Process of Making Storage-Battery Electrodes
864.	03/29/05	03/30/05	06/25/07	857,929 Storage-Battery Electrode
865.	03/29/05	03/30/05	03/17/08	882,144 Storage-Battery Electrode
866.	04/26/05	04/28/05	07/16/07	860,195 Storage-Battery Electrode
867.	04/26/05	04/28/05	08/06/07	862,145 Process of Making Seamless Tubular Pockets or Receptacles for Storage Battery Electrodes
868.	04/26/05	04/28/05	11/22/10	976,791 Storage-Battery Electrode

870.	05/15/05	05/16/05	02/27/06	813,491 Pocket-Filling Machine
872.	05/20/05	05/24/05	02/22/10	950,226 Phonographic Recording Apparatus
873.	05/20/05	05/24/05	07/05/10	963,362 Apparatus for Recording or Reproducing Sounds
874.	05/20/05	05/26/05	05/29/06	821,628 Process for Making Conducting-Films
877.	10/10/05	10/12/05	02/22/10	950,227 Apparatus for Making Metallic Films or Flakes
878.	10/12/05	10/14/05	10/12/09	936,433 Tube-Filling and Tamping Machine
879.	10/12/05	10/14/05	04/26/10	956,317 Tube-Sealing Machine
880.	10/16/05	10/17/05	08/16/10	967,178 Tube-Forming Machine
881.	10/31/05	11/02/05	03/03/08	880,978 Electrode Element for Storage Batteries
882.	10/31/05	11/02/05	03/03/08	880,979 Method of Making Storage-Battery Electrodes
883.	12/06/05	12/07/05	04/23/07	850,913 Secondary Battery
884.	12/06/05	12/07/05	03/02/09	914,342 Storage Battery
885.	01/09/06	01/10/06	07/02/07	858,862 Primary and Secondary Battery
886.	01/19/06	01/20/06	04/16/07	850,881 Composite Metal
888.	02/24/06	03/19/06	07/12/10	964,096 Process of Electroplating
890.	07/13/06	07/14/06	03/02/09	914,372 Process for Making Thin Metallic Flakes
895.	11/02/06	11/03/06	09/08/08	898,404 Process of Making Articles by Electroplating
899.	11/28/06	12/03/06	02/08/10	948,558 Storage-Battery Electrode
903.	01/11/07	01/19/07	09/10/07	865,688 Process of Making Metallic Films or Flakes
904.	01/17/07	01/18/07	10/12/09	936,525 Process of Making Metallic Films or Flakes
905.	01/18/07	01/19/07	09/10/07	865,687 Process of Making Nickel Films
912.	05/08/07	05/10/07	01/14/08	876,445 Electrolyte for Alkaline Storage Batteries
913.	05/15/07	05/17/07	03/02/09	914,343 Process of Making Storage-Battery Electrodes
921.	02/04/08	02/06/08	08/25/08	896,811 Metallic Film for Use with Storage-Battery Electrodes and Process of Preparing the Same
923.	02/04/08	02/06/08	11/16/09	940,635 Electrode Element for Storage Batteries
925.	03/13/08	03/18/08	08/25/08	896,812 Storage Battery
927.	03/13/08	03/20/08	08/08/11	999,762 Storage Battery and Process of Treating the Same
929.	03/13/08	03/23/08	01/18/10	946,540 Storage Battery
962.	05/13/10	05/24/10	12/05/16	1,207,382 Primary Battery
963.	05/19/10	05/24/10	11/22/10	976,792 Storage Battery
964.	05/19/10	05/24/10	12/26/11	1,012,828 Storage Battery
966.	05/31/10	06/06/10	08/20/12	1,036,471 Storage Battery
969.	06/13/10	06/17/10	10/27/14	1,115,463 Electrode Element
970.	06/30/10	07/01/10	01/14/13	1,050,436 Apparatus for Producing Rubber Strips
971.	06/30/10	07/01/10	01/06/14	1,083,353 Production of Perforated Strips
973.	10/04/10	10/07/10	06/09/14	1,099,241 Rectifier
979.	01/25/11	01/27/11	07/30/12	1,034,002 Storage Battery
980.	01/25/11	01/27/11	07/30/12	1,034,003 Battery-Cell Container
981.	01/25/11	01/27/11	01/06/14	1,083,354 Insulating Compound
986.	04/07/11	04/08/11	01/06/14	1,083,355 Art of Forming Chemical Compounds
987.	04/07/11	04/08/11	01/06/14	1,083,356 Storage Battery
988.	04/07/11	04/08/11	01/11/16	1,167,484 Production of Nickel Hydroxide
989.	05/01/11	05/09/11	01/14/13	1,050,629 Art of Separating Copper from Other Metals
990.	05/12/11	05/18/11	01/14/13	1,050,630 Art of Separating Copper from Other Metals

993.	06/16/11	06/21/11	02/06/12	1,016,874	Means and Method for Preventing Depletion of Electrolyte
995.	07/24/11	07/28/11	02/06/12	1,016,875	Electroplating Apparatus
996.	11/28/11	12/01/11	03/11/13	1,055,524	Dumping Mechanism
999.	12/20/11	12/22/11	08/13/18	1,275,232	Production of Finely-Divided Metals
1000.	12/30/11	01/11/12	09/16/13	1,073,107	Storage Battery
1002.	01/12/12	01/17/12	06/22/15	1,143,818	Charging Storage Batteries
1005.	04/23/12	04/30/12	01/11/16	1,167,485	Storage Battery
1006.	05/20/12	05/23/12	07/25/16	1,192,400	Electrical System for Automobiles
1008.	05/31/12	06/07/12	04/04/16	1,178,063	Receptacle-Filling Machine
1009.	06/10/12	06/13/12	09/07/15	1,152,615	Alternating-Current-Rectifying System
1010.	06/10/12	06/13/12	09/07/15	1,152,616	Contact for Electrical Apparatus
1013.	07/27/12	07/31/12	02/05/18	1,255,517	Starting and Current-Supplying System for Automobiles
1025.	08/06/14	08/10/14	04/08/19	1,299,693	Storage Battery
1027.	08/27/14	08/31/14	09/19/16	1,198,426	Production of Electrode Elements
1031.	12/08/15	12/13/15	01/04/21	1,364,358	Battery-Tray
1036.	03/04/16	03/06/16	08/05/19	1,311,955	Tube Filling and Tamping Machine
1039.	01/16/17	01/20/17	05/21/18	1,266,780	Storage Battery
1046.	06/12/19	06/17/19	03/15/21	1,371,414	Nickel-Plating
1047.	06/18/19	06/21/19	11/23/20	1,359,972	Electroplating
1048.	06/24/19	07/03/19	02/22/21	1,369,271	Cleaning of Metallic Surfaces
1051.	08/28/19	09/05/19	01/10/22	1,402,751	Storage-Battery Electrode and the Production of Same
1052.	09/13/19	09/16/19	05/24/21	1,379,088	Storage Battery
1053.	09/24/19	09/29/19	01/04/21	1,364,359	Protecting-Varnish for Electrodes of Electrolytic Cells
1054.	09/30/19	10/04/19	05/24/21	1,379,089	Production of Thin Metallic Sheets or Foils
1055.	11/03/19	11/06/19	08/02/21	1,386,095	Electrode Element for Galvanic Batteries and Method of Producing same
1059.	06/14/20	06/16/20	05/10/21	1,377,194	Storage Battery
1060.	07/08/20	07/16/20	05/23/22	1,417,464	Production of Thin Metal Sheets or Foils
1061.	08/23/20	08/26/20	08/08/22	1,425,184	Production of Thin Metal Sheets or Foils
1062.	12/31/20	01/05/21	04/08/24	1,489,240	Voltaic Battery and the Production of Electrode Elements Therefor
1063.	09/26/21	09/28/21	04/01/24	1,488,480	Regeneration of Alkaline Storage-Battery Elements
1065.	04/25/22	04/26/22	04/01/24	1,488,481	Regeneration of Storage-Battery Elements
1066.	06/23/22	06/28/22	07/24/28	1,678,246	Production of Alkali-Metal Compounds from Silicates Containing Them
1068.	05/11/23	05/14/23	11/29/27	1,651,196	Storage Battery
1070.	05/23/23	05/25/23	11/03/25	1,559,562	Storage Battery
1073.	02/20/24	02/26/24	09/07/26	1,599,121	Production of Depolarizing Agent for Voltaic Battery
1074.	02/25/24	03/12/24	02/17/25	1,526,326	Storage Battery
1083.	07/17/25	07/24/25	11/15/27	1,649,579	Storage-Battery Electrode Element and Production Thereof

1089.10/11/27 10/12/2708/06/291,723,609 [Apparatus for Producing Storage-Battery Electrode Elements]



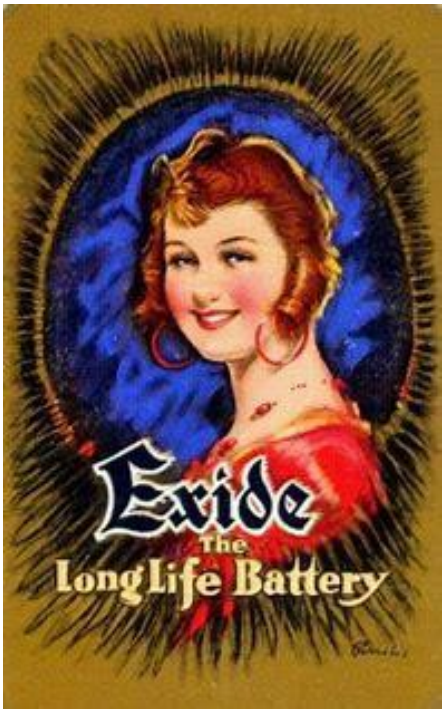
To the left is a print of the cover page for a Voltaic Battery patent , granted to Thomas A.Edison on June 17, 1890. (No. 430,279)

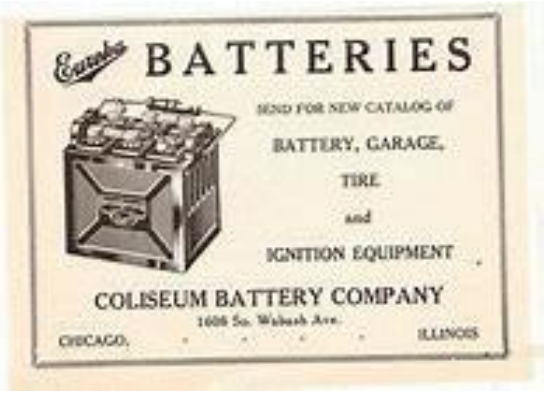
Chapter: 69

Vintage Advertisements

This chapter is devoted to battery ads from the late 1800's to the early 1900's. Some are self-explanatory, while others require a caption.

For example, the ad, left, is from a Sears Roebuck catalog circa 1900




Exide
BATTERIES
SEND FOR NEW CATALOG OF
BATTERY, GARAGE,
TIRE
and
IGNITION EQUIPMENT
COLISEUM BATTERY COMPANY
1606 So. Wabash Ave.
CHICAGO, ILLINOIS


Willard
STORAGE BATTERIES


The LAW Battery
Response
responds dependably at all times and under all conditions. It is the kind of battery that functions when you want it to and does not lay down on you when you need it most. It will stand long and hard usage in Radio or Auto service.
$13.50 up
William Law Co.
COR. ABORN and SABIN STS.
Established 1913


2 YEARS SERVICE
OR FREE REPLACEMENT
Exide
'DOUBLE-LIFE'
CAR BATTERIES


THE
LAW BATTERY
PATENTED.
THE BEST
OPEN CIRCUIT BATTERY
SUPPLANTING ALL OTHERS!
TELEPHONE BATTERY,
Send for Circular and Schedule of Prices.
Manufactured and for sale by the
LAW TELEGRAPH COMPANY
140 Fulton Street, New York.


DOUBLE CYLINDER LAW BATTE

Q

WILLIAMS HARDWARE COMPANY :: STREATOR, ILLINOIS

Supplies For Battery Radios

CRUSADER RADIO BATTERIES

Crusader Radio Batteries are suitable for all battery operated sets. Crusader Batteries will render long and dependable service being designed especially for radio operation.

NO. N-6-AR11 Crusader Battery 6 volt 80 amp. hours.....**$11.75**
NO. N-6-AR13 Crusader Battery 6 volt 100 amp. hours.....**$13.20**

PHILCO GLASS BATTERIES

Prilco glass case "A" batteries are designed for Philco Socket Power units and for trickle charger use. They are well made, spray proof, have a large solution space, and thick rugged plates.

NO. U. D. 44 Philco Battery (4 volts for small sets) .....**$ 7.50**
NO. U. D. 86 Philco Battery (6 volts for sets of six tubes or less).. **12.50**
NO. U. D. 96 Philco Battery (6 volts for sets of six tubes or more) **13.90**

PHILCOTRON REPLACEMENT CELLS

NO. K-463 "AA" Philcotron..**$4.00**

NO. K-458 "A" Philcotron..**$3.00**

NO. K-457 "B" Philcotron..**$1.00**

HAFNER HYDROMETERS

Hafner Hydrometers come in two styles, the regular and the drip-proof. Both are of the best quality.

NO. 75 Hafner Hydrometer, regular.....**$ .75**
NO. 150 Hafner Hydrometer, "Drip-Pruf"..... **1.00**

"Everything for the Radio Dealer"

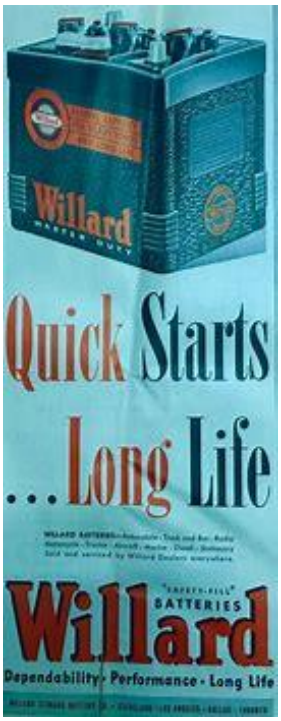
Page Twenty-Eight

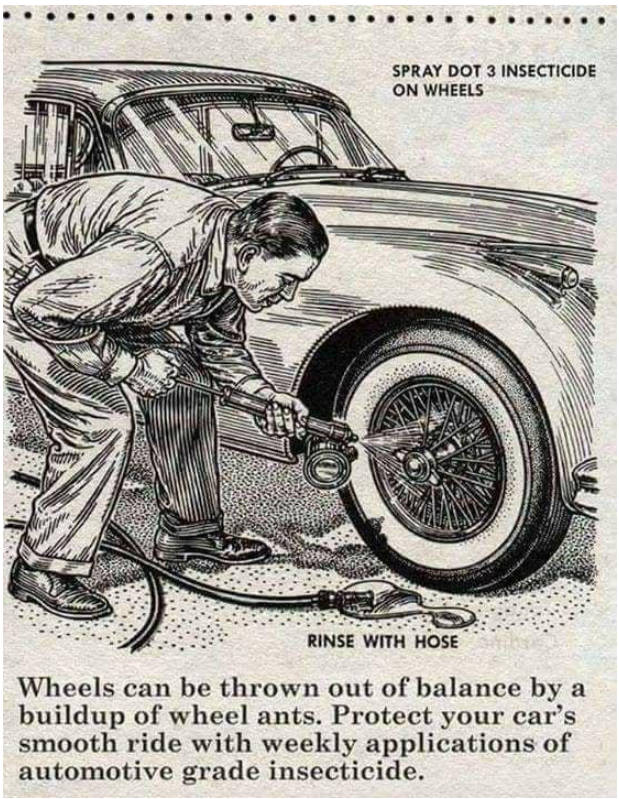
Note: No. K-463 is the Philcotron battery seen in Chapter 41.


"Hey, Dad!
THE CAR WON'T START"
WHEN IT'S AN
Exide
YOU START
WHEN IT'S AN EXIDE YOU START


The New Medical Battery.
The Earth-Magneto.
THE BEST OF ALL ELECTRICAL DISCOVERIES
INDORSED BY PHYSICIANS, ELECTRICIANS AND SCIENTISTS.
THE STATIC—MAGNETIC—GALVANIC.
IT GIVES NO SHOCK OR SENSATION.
Nervous Diseases, Gout, Dyspepsia, Constipation, Rheumatism, Neuralgia, Sciatica, Insomnia or Sleeplessness, Melancholia, Paralysis, Lumbago, Pain in the Back or Limbs, and Kidney, Bladder or Liver Complaints, Headaches, Nervousness, Female Complaints, Wasting Diseases, etc., etc.
The Earth-Magneto Medical Battery Co.,
19 Union Square, West, New York.


S.O.S
TRADE MARK REGISTERED
FARM LIGHT BATTERIES
NEW AND GREATER
S. O. S.
FARM LIGHT BATTERIES
YOU WANT A RELIABLE QUALITY PRODUCT!
Our new S. O. S. "P" type Farm Light Batteries include new white PORCELAIN COVERS—PLATES SUSPENDED FROM THE COVER—LARGE ACID SPACE—NO CHANCE FOR SHORT CIR CUITS FROM ACCUMULATIONS IN THE BOTTOM OF JAR.
S. O. S. Batteries proven best by years of service!
New Distributors' Contract on Auto, Radio and Farm Lighting Batteries ready!
— WRITE TODAY —
S. O. S. are the
ONE QUALITY batteries
BEST — BAR NONE!
Victor Storage Battery Co.
Rock Island, Illinois
ESTABLISHED 1914

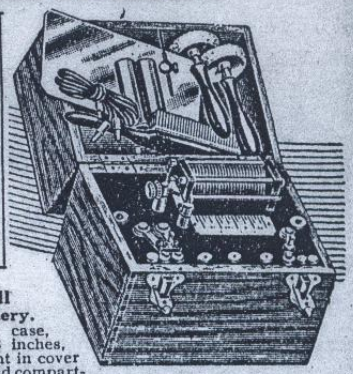




The Wheel Ants insecticide ranks right up there with paying to have your tires de-stoned. The consumer constantly has to be aware of scams.

MEDICAL BATTERIES

Medical Batteries are in extensive use for the relief of certain diseases and disorders. Their advocates are enthusiastic over the possibilities for relief resulting from the proper use of these machines. We advise consultation with a physician before placing an order, so that the purchaser may be sure to order the particular machine best suited to the purpose for which it is to be used. We guarantee these appliances to be high grade in every respect.



Triple Cell Medical Battery.

Polished oak case, about 9¼x7¾x8¼ inches. Three dry cells. Faradic coil, 1¼ inches in diameter. Circular carbon rheostat regulates current. Four-point switch permits one cell, two cells or three cells to be used at a time. Wheel rheotome for interrupted current, adjustable for slow or rapid interruptions. Metal parts all nickel plated. One pair conducting cords with tips, pair insulating wooden handles, pair nickel plated metal handles, pair sponge electrodes, one nickel plated foot plate, hair brush and an instruction pamphlet included. Otherwise same as 6L9105. Shipping wt., 20 lbs.

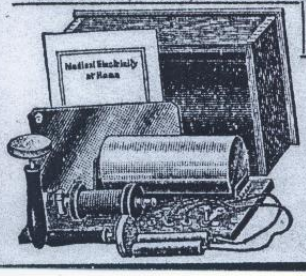
6L9110¼—Complete with accessories and three dry cells, **$13.55**

Double Cell Medical Battery.

Polished oak case, about 8¾x6¼x8 inches, with compartment in cover for accessories and compartment in base for two dry cells. Faradic coil, 1⅛ inches in diameter, with locknut, spring vibrator and adjustable ball attachment for slow vibration. Intensity of current regulated by withdrawing shield. Three-point switch. Pole changer for changing the polarity or direction of the current. Metal parts all nickel plated. One pair conducting cords with tips, pair insulating wooden handles, pair nickel plated metal handles, pair sponge electrodes, nickel plated foot plate, hair brush and instruction pamphlet included. Shipping wt., 13 lbs.

6L9105—Complete with accessories and two dry cells..... **$9.15**

For extra batteries see 6L8635 on page 813.



Single Cell Medical Battery.

Polished oak case, about 10x6¼x5 inches, opening top and bottom. Lower compartment for dry cell and battery mechanism, upper compartment for accessories. Faradic coil, 1⅛ inch in diameter, with locking device and spring vibrator. Intensity of current regulated from mild to strong by withdrawing shield from core of coil. Metal parts nickel plated. One pair conducting cords with tips, one pair insulating wooden handles, pair nickel plated metal handles, pair sponge electrodes, nickel plated foot plate and an instruction pamphlet included. Shipping weight, 7¾ pounds.

6L9100—Complete with accessories and one dry cell.. **$5.80**

Portable Electro-Medical Batteries.

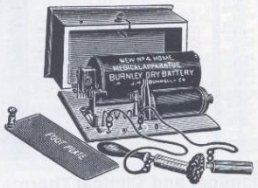
These magnetic instruments are of undoubted value as the instruments through whose agency physicians effected almost miraculous cures. Our most learned doctors and physicians acknowledge their efficiency in even the worst cases of paralysis, rheumatism, neuralgia, and in fact, all nervous diseases. These machines may be used by all invalids with perfect safety. When doctors fail to effect a cure with drugs and medicines, and electricity is resorted to in the last stage of disease, even then, under such immense disadvantages, electricity often cures.

24175 Gaiffe's Battery, three currents, with silk covered conducting cords, two insulated handles, one metallic brush, one olive shaped exciter, one spherical exciter and one vial of bisulphate of mercury. In polished mahogany case, 7½x4x1¼ in. Complete, with full directions. Weight, 1¼ lbs. $7.75

24176 Gaiffe's Battery, with same size coil as in preceding, producing two currents instead of three. Mounted in single cover mahogany case, 6¼x4x1¼ inches, containing two insulated handles and one vial bisulphate of mercury. Weight, 1 pound. Each.....$6.25

24177 The Crown Family Battery. The merits of this battery will be easily appreciated as possessing neatness of design and simplicity of operating. A pleasant and uniform electric current, both mild and powerful. Three different and distinct currents are produced—the primary, secondary, and both combined in intensity. Mounted in polished cherry case with nickel handles. Size, 6x5¼x5¼ inches, with full directions for using. Highly recommended. Weight, 2¼ lbs. Price, complete.....$3.50

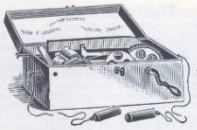
24178 Alpha Faradic Family Medical Battery, constructed upon improved scientific principles and designed for private or professional use. Full description of apparatus, directions for operating and directions for making solution furnished with each instrument. Weight, 3½ lbs. Each.....$5.00



24179 The New Home Electro-Medical Apparatus, with dry battery. This battery is the most convenient and reliable of any hundreds of forms ever introduced. It is reliable, because with its dry battery so much less care is necessary to avoid getting it out of order than is required with any other known form. The entire absence of acids, liquors or salts will be appreciated by any one who has ever had occasion to use a medical battery. The appliance furnished with the apparatus consists of foot-plate, sponge, cords and handles (electrodes). The electrode having a wooden handle is used as a sponge-holder when required. The size of the apparatus is 3¼x5x8¾ inches. Weight, 4 pounds.

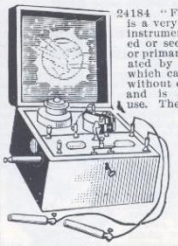
Price, complete.....$7.00 Extra battery, per cell $0.75
Extra Sponge Holder .50 Extra Handles, pair.. .75
Extra Metallic Hair Brush, electrode..... 1.25
Extra Cords, 4 feet, per pair..... .50

24180 The Genuine Smith & Shaw Portable Pocket Battery. Powerful current. The most practicable and thorough pocket battery made. Cells cannot spill contents.
Price, with two cells (weigh. 1 1¼ lb)...$8.50
Price, with three cells (weight, 2 lbs....$10.00



Magnetic Electro Battery.

24182 Davis & Kidder's Genuine Magneto-Electric Machines.
Price, each.$7.25
Weigh, 6¾ lbs.



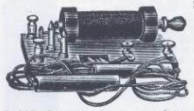
24184 "Family" Battery. This is a very effective and portable instrument, produces the induced or secondary, and the direct or primary current, and is operated by an open battery which can be used for months without changing the solution and is constantly ready for use. The power may be increased by gradually withdrawing the tube from the helix. In polished black walnut case with cords and handles; weight, 8 lbs. Each.....$10.00

Medical Battery Parts.

Order No. 24185 and be sure to specify what Battery the parts are for.

	Each.
Zincs for the Crown Family Battery	$0.20
Carbons for same	.25
Glass Jars for same	.25
Tops complete for same, zinc and carbon attached	.65
Zincs for the Alpha Battery	.25
Carbons for same	.25
Glass Jars for same	.25
Zinc for Family Battery. Per pair	.50
Postage on pair zincs	.18
Platinas for same	1.00
Clamps for same	.25
Cords for same. Per pair	.50
Glass Jars for same	.25
Metal Springs for Magnetic Battery	.10
Cord belt for same	.05
Bisulphate Mercury for use with batteries Nos. 24175, 24176 and 24180 per ounce	.10
Price, per ¼ lb. bottle	.75
Price, per 1 lb. bottle	1.25
Bichromate Potassium for use with batteries, Nos. 24177 and 24178. Per lb.	.35

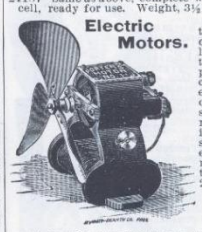
Medical Induction Coil, Without Battery.



24186 Induction Coil, mounted on neat wooden stand with pair of hand electrodes and sponge holder of best quality. Can be operated with any acid battery. Price, without battery.....$3.50

24187 Same as above, complete with dry battery cell, ready for use. Weight, 3½ pounds. 4.00

Electric Motors.



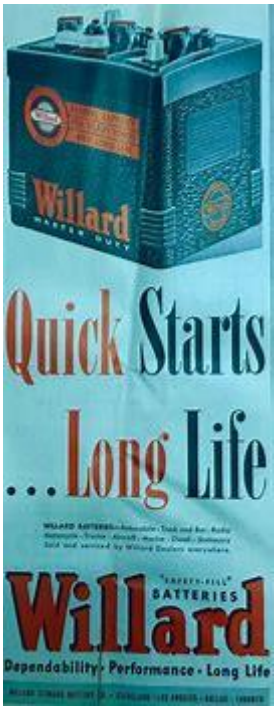
The Porter Electric Motor, a practical machine for a little money. An entirely novel principle underlies the construction both electrically and mechanically, insuring simplicity, low cost, reduced size, diminished weight, higher speed and wonderful economy in power required to operate them.

24190 The No. 1. Motor, although a very small one in size, is highly efficient. With one cell of acid battery it will operate a small dental lathe, a fan, a revolving window stand, an egg beater, a music-box, etc. It is no toy. Its electrical efficiency is about ¼ horse power, or from 35 to 40 watts on a continuous run. No better motor can be furnished to meet the wishes of young students engaged in the study of experimental physics. Its efficiency will surprise the user. Weight, 1¼ pounds. Price, each.....$2.90

24191 The No. 2 Motor, same construction as above, but larger size, weighing 3 pounds and capacity of ¼ horse power. Price..... 4.75

WE CARRY IN STOCK a full line of DRUGS, CHEMICALS, PHARMACEUTICAL PREPARATIONS, Etc., Etc., and can fill orders promptly and correctly. An experienced druggist is in charge, and he will compound prescriptions when so ordered. Send for our Drug List. Mailed free.


100,000 Car Owners Last Year Replaced Their Original Batteries With the Vesta
VESTA BATTERY CORPORATION
CHICAGO
VESTA
STORAGE BATTERY
Costs Less Per Month of Service


Willard
Quick Starts
...Long Life
"SAFETY-FILL" BATTERIES
Willard
Dependability - Performance - Long Life


THE "DOUGHNUT" BATTERY...
the all around battery with a hole

Chapter 70

Battery Insulators, Oil Insulators , and Chloride Accumulators

by Charles & Sandi Iron

(Reproduced here with permission)

Battery Insulators,

From the first time that a cell or battery was used to supply electricity ... a way was needed to prevent or reduce the leakage of electric current. This leakage occurred when over the surface of the cell or battery (and the support that it was placed on) became coated with a fine deposit of acid-laden moisture and dust.

It was found that electric leakage was reduced if each cell or battery (a series of cells) was isolated from the support on which it sat.

Wood framing was used, but it was discovered that, over time, the wood would absorb the acid-laden moisture and created a direct path for electrical leakage, and eventually the acid moisture would cause the wood to rot.

Battery Insulators were used with DC electric systems as low as 1-2 volts and up to 600 volts and greater.

Lower DC voltage was used for a short time with telegraphs, alarms, and railroad signals. Higher voltage was used for lighting, motors, pumps, etc.

Originally, plain glass battery insulators were placed between wooden stringers and the battery tank. This proved to be *insufficient* ... so, glass insulators were added between the wood stringers and the floor. This combination became known as "Double Insulation." However, this did not prevent the decay of the wooden stringers ... so the Electric Storage Battery Company (E.S.B. Co.) designed and developed the combination of an oil insulator and an earthenware pedestal that solved the problem of the wood decaying. This earthenware pedestal / oil insulator became the standard for the industry and made it possible to finally do away with the wooden stringers.

In the display there is a COMPLETE Pedestal/Oil Insulator UNIT ... consisting of the cupped lead washer, alloy cap, Y lead washer, oil insulator, and the insulator pedestal. You can now see how the insulator and the pedestal look together. I believe that this is a one-of-a-kind ... COMPLETE UNIT. Also displayed is a copy of the patent for this invention that was granted to Cornelius Ambruster of Roslywn, Pennsylvania, on July 13, 1915.

The oil insulator / earthenware pedestal was used to support a battery tank that was constructed of wood and lined with lead. The exterior was coated

Oil Insulators, and Chlo

with asphaltum. Four to six CD-35s or CD-36s were used to support this style of Battery Tank (see Patent Sheet).

Please notice the base of the pedestal ... The uneven design at the base of the pedestal allowed water and foreign material to pass under the support when flushing the Battery Room Floor.

* * * * *

BIRDFEEDERS

The nickname "Birdfeeder" was given to the CD-35 and CD-36 around 1969. The collectors at that time thought they resembled a bird feeder. There are five of these displayed. These battery insulators were very unique because they used a nonconductive oil that was put in the circular trough and was then covered by a lead-alloy cap. The purpose of the cap was to exclude, as far as possible, all spray or other foreign matter from getting into the oil space and to protect it from being splashed when flushing the Battery Room Floor.

* * * * *

GLASS TRAY

The tray displayed is a No. 7 and it is embossed with "E.S.B. Co. No. 7 Made in U.S.A."

Jars that *were not sealed* were set on separate glass trays or boxes filled with sand. This was necessary due to the absence of a sealed cover which allowed acid-laden moisture to run down the outside of the jar and attack the wooden support (susceptible to rot) that the battery sat on.

* * * * *

GLASS THREAD SCREW BATTERY INSULATORS

This type of Battery Insulator has a very fragile Male Glass Thread Screw. It is believed that the thread was used to secure the insulator in the wooden stringers that supported the battery so that the insulator and support could be moved as a unit.

* * * * *

WHAT IS A WELL?

The wells (circular trough) that are a part of some of these insulators were used to collect Chlorides that would seep down the sides of the cell (battery jar). This type of battery insulator is known as a "Chloride Accumulator" and some are embossed with that information.

ide Accumulators

UNITED KINGDOM BATTERY INSULATORS

British Battery Insulators are different from Battery Insulators that were made in the United States.

The British Battery Insulators are in two parts ... a Base Unit and a Top. The smaller size bases have a round bump in the center that matches a depression in the top's center to locate and secure the two-pieces together.

Four two-part styles are known (of which two are in this exhibit). Until a year ago, the only colors known to exist in the two-part battery insulators were light green and light aqua.

Displayed is a CLEAR base battery insulator that is believed to be the only one known at this writing.

The only known light green "unipart" in the U.S.-style has a solid center instead of hollow center and has a corrugated base.

The style numbers and letters of the United Kingdom battery insulators were assigned by Ian Mackey. (These are not "officially" recognized numbers by the insulator-collecting community at this time.)

* * * * *

COLORS FOR BATTERY INSULATORS

COLORS of Battery Insulators range from various shades of • Aqua to Green • Clear • Smoke • Lavender • 7-up Green • Emerald Green • Yellow-Green • Cobalt Blue • Blue • Amber.

* * * * *

WHAT ARE GLASS BATTERY PLATE SPACERS?

It is *believed* that the "U" Shaped Glass Bars were part of a failed attempt to insulate the positive and negative plates from each other in a cell. At this writing, no proof has been found to support this theory.

The only reference found was to "Rods" being used in a patent issued to Stanley C.C. Currie of Philadelphia, PA, October 14, 1890, #438,532 ... "Insulated from one another by means of rods."

"Plate Spacers" have been found in various shades of aqua, blue, and green.

MANUFACTURERS

Some of the manufacturers known to have produced Battery (Rests) Insulators are: Brookfield Glass Company, Old Bridge, New Jersey; The Elmer Glass Co., Elmer, New Jersey; Hemingray Glass Co., Muncie, Indiana. Dumps that were used by these companies have been excavated by collectors. Battery Insulators, shards of, and warming pours of battery insulators were found at some of the manufacturer's dumps.

The following is a list of Battery Insulators (or pieces of such) that have been found in some of the Manufacturer's dumps.

Brookfield Dump – Old Bridge, New Jersey	
CD-20 Gould	CD-29 No Embossing
CD-53 U.S.L.	
Hemingray Dump – Muncie, Indiana	
CD-24 U.S. Light & Heating Co.	
CD-24 National Battery Co.	
CD-33 No Embossing	
Elmer Glass Co. Dump – Elmer, New Jersey	
CD-35 No Embossing	CD-36 E.S.B. Co.

* * * * *

EARLIEST PATENT DATE

The earliest known patent date for a Glass Battery Insulator is July 12, 1870. The patent number was 105,252 and was granted to Orris W. Robertson of Milwaukee, Wisconsin.

* * * * *

E.S.B. CO.

The Electric Storage Battery Co. (E.S.B.Co.) of Philadelphia, Pennsylvania, was founded in 1888 by W. W. Gibbs, and by 1908 they were using glass for their battery (rests) insulators.

This information is supported by copies of various patents that accompany this display.

* * * * *

GOULD

Gould Storage Battery Co. was founded in 1898 by Charles Gould of New York, and they applied for their first patent for a Battery Insulator in 1913.

U.S.L.

In 1898 the National Battery Company was formed. Electric Autolite later gained control of National Battery Company and operated it under the name of U.S.L. Battery Company.

* * * * *

NO WRITTEN HISTORY

The collecting of "Battery (Rests) Insulators" is a specialty within the hobby of Insulator Collecting. Although we are learning more about how the Battery Insulators were used and who made them, the history of the Battery Insulators has yet to be written. We need more written documentation.

At this time there are still unlisted colors and styles just waiting to be discovered.

* * * * *

AS COLLECTORS OUR GOAL ... We hope that by viewing this display you will become more aware of the different styles (CD numbers) and the range of colors ... as well as some basic history of the Battery Insulators, Oil Insulators, and Chloride Accumulators.

CHARLES AND SANDI IRONS - 2005

SOURCES:

History & Guide to North American Insulators, ...John and Carol McDougald

Gould Electronics Inc. .....Judy Kokal

EnerSys (Exide).....Deb Burkhart

Patent Information .....Glenn Drummond

American/British Battery Rest Gallery website .....Ian Mackey

Patent Information .....Elton Gish

Storage Batteries.....E. W. Allen

NIA (National Insulator Association).....web site

Research .....Smithsonian Institute, Washington, D.C.

ICON .....Bill Meiers

Hemingray Dump Info.....Darin Cochran

Hemingray Dump Info .....Bob Stahr

Brookfield Dump Info .....David Sztramski

Chapter 71

Bibliography:

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2. Battery Cell Container, Patent, T.A. Edison , July 30, 1912. 1,034,003
3. Battery Insulators , Oil Insulators and Chloride Accumulators , Charles & Sandi Irons, 2005.
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