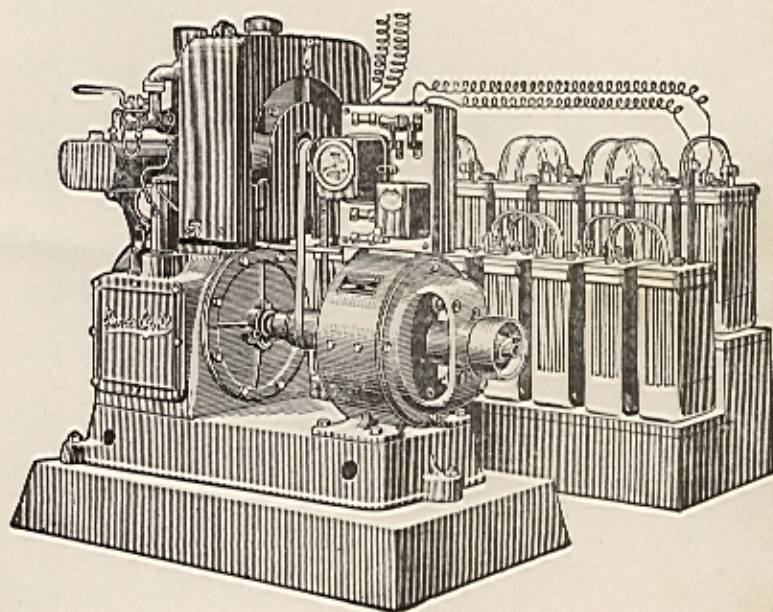
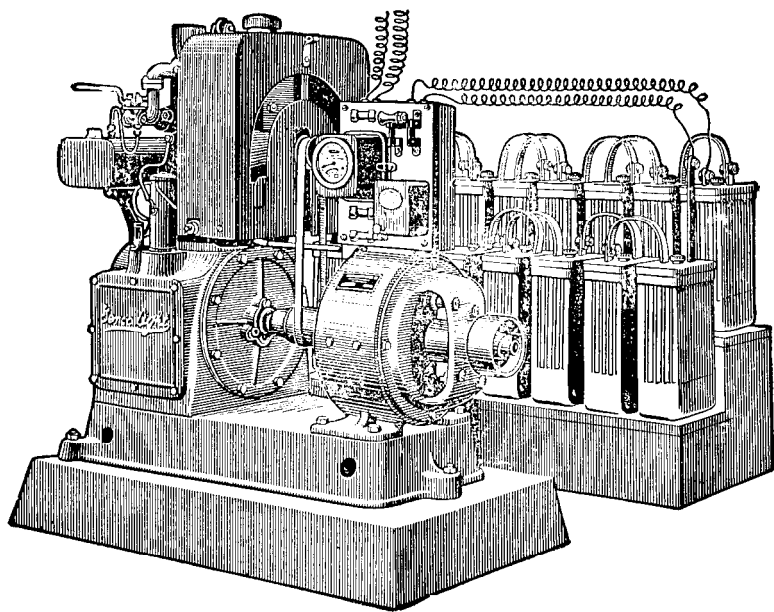


GENCO-LIGHT INSTRUCTION BOOK



GENERAL GAS-ELECTRIC COMPANY
HANOVER, PA., U. S. A.

GENCO-LIGHT INSTRUCTIONBOOK



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HANOVER, PA., U. S. A.

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READ CAREFULLY INSTRUCTIONS ON FOLLOWING
PAGES: YOU WILL KNOW THEN EXACTLY HOW
TO INSTALL AND HOW TO RUN THE
GENCO-LIGHT PLANT.

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Our Guarantee



EVERY GENCO-LIGHT Power Plant is sold with our Guarantee. The Guarantee Certificate has an attached Card, which must be positively filled by customer and returned to us.

We file these returned cards which are numbered correspondingly to the number on your Guarantee Certificate. In case card is not returned, it becomes impossible for us to properly locate the plant and therefore very difficult to give you the service you are entitled to by becoming the owner of a Genco-Light Plant.

You will find Guarantee Certificate in this book. If you don't, please advise us at once.

General Gas-Electric Company

Hanover, Pennsylvania, U. S. A.

Our Method of Shipment.

Genco-Light is shipped to you in two sections, the power plant is packed in a shipping crate having for outside dimensions: Length $38\frac{3}{4}$ in., height $36\frac{1}{2}$ in., width 18 in. This crate contains the power plant complete and the exhaust muffler to which a $1\frac{1}{2}$ in. nipple 4 inches long is attached, to fit in the exhaust manifold of the engine. The base of the power plant is bolted on two heavy sills forming the bottom of the crate.

The Storage Batteries are shipped fully charged, and filled with Electrolyte. These cells have sealed tops, and are carefully packed in boxes with inverted "V" tops. In plant "A" and "B" the batteries are sent in two boxes of eight cells each.

Each battery box completely packed weighs approximately 300 pounds, in plant "A" and measures 41 in. long, 16 in. wide and 24 in. high. In plant "B" each battery box weighs approximately 400 pounds and measures 41 in. long, 19 in. wide and 24 in. high. The total shipping weight of plant "A" is approximately 1100 pounds and for plant "B" is approximately 1400 pounds.

In hauling Genco-Light from the station be sure to keep the battery boxes **RIGHTSIDE UP** and do not turn them on the side. The batteries having glass jars are packed very carefully, yet if subjected to rough handling or dropped breakage is liable to occur.

Unload the plant and batteries as closely as possible to the location of the installation, it will save you additional handling.

Best Location For Genco-Light.

The problem of selecting the proper location for your plant is simple, it is however subject, to the following conditions:

In the average installation most of the electric current will be required in the house and in small outbuildings near the house, therefore it is advisable to install the Genco-Light plant in the house or close to it. (The engine of the Genco-Light plant is the quietest of its kind in the world), you can put it in the cellar of your house where the temperature is more even the year around. If one of the outbuildings has a small cellar this will provide the ideal location. There is no objections however in installing the plant in small out-buildings subject to freezing temperature, the water cooled engine being of the radiator type, a mixture of half alcohol and half water will form a non-freezing solution which can be kept in the cooling system all winter and used from season to season, it is also possible to fill radiator with kerosene when temperature goes below freezing.

Another very important feature in Genco-Light when used in northern climate is that by draining the two gallons of water out of the radiator you have the opportunity of filling it at charging time with hot water and it will help greatly in starting. It is a well known fact that under

extreme cold the oil becomes very sticky and it requires quite a lot of power to start.

The storage battery should be kept near fully charged condition during the cold season, in that state it will not be subject to freezing even at temperature going below zero.

The space taken by the power plant on the floor is 17 in. wide, 38 in. long and 34 in. high.

You stand in front of the plant when you look at the instrument board. All devices of control are situated in front of the plant. It is advisable to have a space of approximately three feet on all sides of the plant in order to give the operator enough room.

To Run a Line Shaft Besides Making Light.

All Genco-Light plants are equipped with a pulley on the end of generator, and as the engine can be operated by a slight pressure of the starting lever, the outfit is ideal in the operation of a line shaft or any machinery direct from that pulley--the proper size of the belt is 2 in. wide. The pulley on the counter-shaft should be from 14 in. to 16 in. diameter. All other pulleys on counter-shaft can operate three inch belts if necessary.

The countershaft can be set directly overhead, or at an angle, or on the side.

It is advisable when running the engine for light alone, to drop the belt from countershaft. Machinery run directly by belt power naturally costs less to operate than run by electric motor, besides as much as two horsepower are available and quite heavy machinery can be run with surprising economy.

The size of the line shaft can be from one inch to 1½ inches. It is not advisable to use a heavier shaft. Be sure to have supporting bearings close to pulleys on line shaft.

Foundation.

The power plant must be bolted on a good foundation. We recommend a concrete foundation. The concrete foundation must be 19 in. wide and 34 in. long. When a concrete foundation is made the top of it should be 14 in. above the ground or floor of building.

The three fastening bolts should be imbedded in concrete as per instructions contained in our foundation instruction sheet which is furnished to every customer.

Be sure to have the top of the base level and flat. The three points of contact of base will make it an easy matter to install.

Be sure to install plant on concrete direct, do not use a wooden board between plant and foundation.

Location of Storage Batteries.

The best location for storage batteries is between the rear of the plant and the wall. (See storage battery instructions). Six feet of wiring extend from the top of panel board for each terminal of battery, positive and negative, the battery should be close enough to the power plant to connect to same without additional wiring.

If you desire to make provision for the storage batteries before the plant arrives, build a heavy shelf supported from the bottom of the floor, this shelf to have the following dimensions: 76 in. long, 12 in. wide and 10 in. high and to be supported to the floor every $1\frac{1}{2}$ feet, this is for battery of plant "A".

For biggest battery or plant "B" the shelf will have to be as follows: 114 in. x 10 in. wide x 10 in. high.

The above dimensions are for the location of storage batteries in one row. If objection is raised as to the length of battery installation, then two shelves can be built half as long but each one as wide as stated above. We recommend in case two row installation is adopted to have the back row four inches higher than the front row, it will facilitate inspection of batteries.

If you wait until you receive batteries to install them you can use the battery boxes as shelves by sawing off the handles and top and turning them upside down placing them side by side or one in front of the other for two or one row location.

Plant "A" or small batteries come to you in two boxes. The bigger batteries of plant "B" are shipped in four boxes.

How to Unpack Genco-Light.

To unpack power plant, open crate with hammer and remove bolts holding base of the plant to bottom of crate. Use these bolts in molds putting them head down in their correct position indicated on our base instruction sheet furnished to each customer. Remove the tops of the battery boxes and then remove carefully packing materials above the batteries, taking care to notice the positive and negative of each cell.

Lift the plant clear from the bottom of the crate and set same on foundation.

Now lift battery cells gently from crates and clean those cells of all packing material.

How to Install Genco-Light.

As the power plant is set on foundation be sure that base bolts are drawn tight. The front of the plant is the side showing the oil gauge, spark plug and all the instruments on panel board

The batteries are ready to be installed. If they are put in one row take one cell and set it on the shelf with the positive terminal toward you, take the next cell and put it next to the first one with the positive terminal in just the opposite direction. You will notice that the positive terminals are longer than the negative terminals. Always connect a positive terminal to a negative terminal, therefore, one end of the battery will be a positive terminal, and the other will be a negative terminal to which the wires from the panel board connect. If the cells are to be put in 2 rows of 8 each each use connection strap, which is furnished with every set. In connecting batteries to panel board take six foot wire marked positive at panel board and connect the positive terminal of battery and do the same thing for the negative side. This will apply both for plant "A" and plant "B".

The battery is now properly connected to power plant.

CAUTION. The first thing to do when you are ready to start connection of wires to battery is to pull open the switch on panel board.

The two wires on top and left of panel board connect to your house circuit, and if you have lamps installed you can close the panel board switch and turn on the lights.

The plant is now ready for its first battery charging run.

Exhaust Piping.

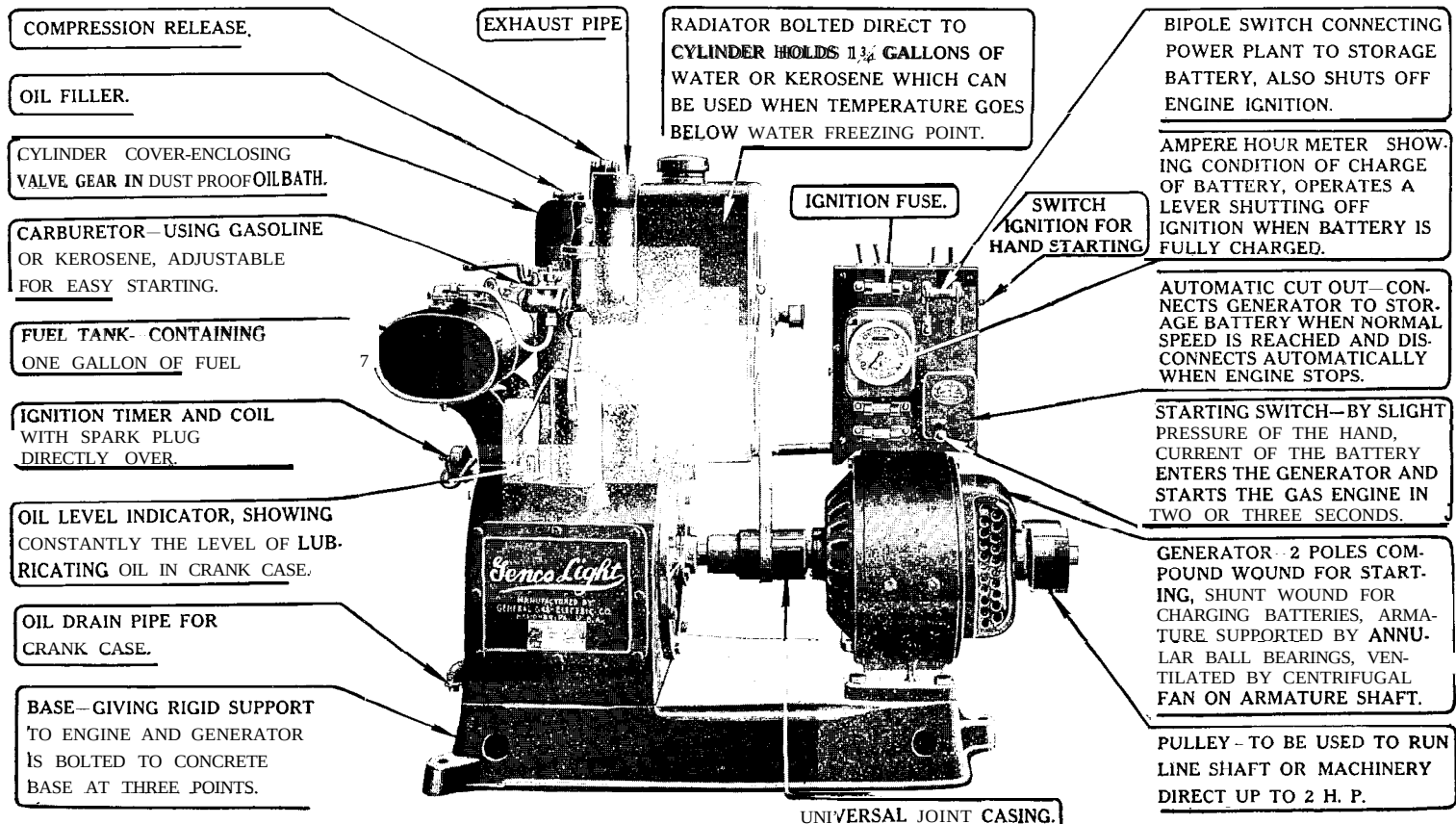
Each plant is furnished with a muffler, and a nipple $1\frac{1}{2}$ size fitted in muffler. This nipple is 4 inches long and goes in exhaust manifold. This installation is the best for small outbuildings not connected in any way with the dwelling house or barn. The top of the muffler has a tapped connection for $1\frac{1}{4}$ piping which you can install yourself if you wish to.

In case plant is to be run in cellar of dwelling house it is of the utmost importance not to have any gas leaking in the cellar and it is better to remove muffler to outside, piping it with exhaust manifold with $1\frac{1}{2}$ piping and suitable elbows.

How to Start Genco-Light.

The storage battery being connected to the Plant. Read carefully illustrated diagram on opposite page and acquaint yourself with the name of every part of the Genco-Light Plant. The first thing you must look at is lubricating oil. The Genco-Light Plant will reach you without oil. Right to the left of the ignition coil you will notice the oil indicating level. Remove plug at cylinder head and pour two quarts of medium automobile oil in. This amount of oil will raise the gauge $\frac{3}{4}$ way up. After the Plant has been in operation one month, gradually allow the oil level to lower until indicator stays half way up.

After this put a gallon of gasoline in fuel tank, removing filler plug, and using a funnel.



Illustrated Diagram of Genco-Light

The radiator is sent empty, fill it up with water. See that drain plug at lower end of radiator is tight. Two gallons of water will fill up the radiator and cylinder jacket. Screw radiator cap on again.

It is to be noticed that the radiator has an overflow pipe which may discharge water at first, due to expansion and overfilling. The water will be seen dripping behind cylinder. If steam is seen escaping there it is a sign that water must be added to the radiator.

The plant having oil, gasoline and water, is now ready to run. Turn on fan grease cup, (a turn or two) and take with your hand the pulley at outside end of generator, the shaft should turn freely.

The shaft should never become tight as we have a universal joint in pulley coupling, but we recommend that the base rest in perfect contact with top of foundation before drawing on the bolts. It will pay to be careful and spend five minutes more in installing the power plant which is to stay there a life time. Note that base is to touch foundation only where bolts go through at the three points.

Now close the switch to the top and right of panel board. This switch connects battery to generator. Put carburetor lever on "start" and press starting button. Keep on pressing starting button until engine starts and as soon as it starts put carburetor lever on about center position or No. 6 on dial. Wait till engine warms up and then set handle on position at which engine runs best, this will be found generally between No. 6 and No. 4 on dial.

After you have found the correct position of lever you will find that, it is not necessary to change it any more except when starting, when the lever should be turned toward, "START" two or three notches from running position.

CAUTION. Always try to find the best position of lever after engine is thoroughly warmed up and when starting cold again give the engine for ten minutes one notch more of fuel, cutting it down when it gets warm. This will save a considerable amount of gasoline or other fuel.

The engine is now running, it will be noticed that the lower needle of the ampere meter is registering to the right about 15 amperes for plant "A" and 18 amperes for plant "B".

The BATTERY is getting CHARGED. When starting the engine by pushing down starting lever after closing main switch, the lower needle of the Ampere Hour meter will swing sharply to the left, and soon as engine starts, it will swing slowly to the right on charging side. It happens sometimes in new instruments that the needle sticks in the left corner, a sharp tap with the hand on the box of the meter after the engine gets going will bring the needle back.

As the engine runs and charges the batteries the upper needle or hand of the meter will turn slowly to the right. It will take approximately seven hours to go from 0 to 100, when it reaches 100 that hand will open a contact and stop the engine by shutting off its ignition. At 100 the battery is fully charged and as the battery is getting used in the house the hand will slowly go back to zero. It is advisable to start

engine and recharge battery when hand shows between 10 and 20 in summer and 40 to 50 in winter.

If power is to be used on cooking instruments the power plant must operate irrespective of the amount of current stored in the battery and shown by all times by upper needle or hand of the Ampere Hour meter.

The engine is liable to run out of fuel before the hand close contact when reaching fully charged condition on ampere hour meter dial. The fact that the engine runs out of fuel is caused by an insufficient amount of fuel in the tank. In that case the engine will simply stop and the automatic cutout will break the connection between generator and storage battery.

The current at all times will be available whether the engine runs or not if switch on panel board is closed.

CAUTION. If working on wiring in house, open panel board switch. If working on engine with wrench, open switch also. This is to prevent short circuits which will blow the fuses.

Fuses on Panel Board.

The current going to the house is protected by two fuses seen right under the meter. The fuses have a capacity of 30 amperes they will blow out in case the current exceeds this amount for a certain length of time. It is advisable to always have spare fuses on hand. The single fuse at the top of the meter protects the current going to the spark coil. It is there only as an extra precaution. If this fuse blows out, the engine will not run.

REMEMBER. When replacing a blown out fuse always trace and remedy the cause of the trouble, otherwise fuse will blow again.

Complete Explanation of Carbureter.

The Genco-Light carbureter is built for reliable service. It has an easy starting arrangement and a self cleaning device. It is adjustable to different fuels, burn gasoline, kerosene or alcohol. Besides, each carbureter is built with a fuel saving device.

Looking at the carbureter one will notice a handle which revolves on a pin, having a locking device which makes it stop in every perforation of the dial plate.

Turning the handle so that the linked end is above the word **START** on dial plate, will provide for the maximum amount of fuel being introduced in the engine. Turning the handle in the extreme opposite direction will stop the fuel entirely and therefore cause the engine to stop. While in that stop position the needle valve controlling the admission of the fuel will come exactly in contact with its seat and will remove whatever dirt which might collect there. Therefore the stop position is not only useful as a means to shut off the fuel when it is found necessary to stop the power plant, but it has the quality of being a

Cold Weather Conditions for Plant and Batteries.

The Genco-Light engine is water cooled. Approximately two gallons of water is used in the cooling system. During the season when temperature is above water freezing no special care is required with the cooling system, **except to keep water** in radiator, as high as over-flow pipe will allow. When temperature comes below freezing, Genco-Light can be run in two ways: First, the water can be withdrawn entirely, and replaced by two gallons of kerosene. Second, the water can be taken off after its charging period, and replaced when the Plant is to be run again. The only advantage of this last system is to allow warm water to be introduced when starting. This warm water being a great help in loosening up the Oil. **It is advisable, however, to install Genco-Light Plants** where they will not be subject to freezing temperature, if possible. Not on account, of plant, but on account of the storage batteries. A fully charged Genco-Light storage battery will start to freeze at 50 degrees below zero, but if it is in a discharged condition it will start to freeze at approximately zero, F. In extreme cold weather we also recommend running on gasoline only. Starting to run on a mixture of half and half gasoline and kerosene in the spring, and on kerosene only in the summer. This condition to apply in the United States for territory between latitude 35 and 40. Below latitude 35 in the United States it is possible to run the year around on kerosene, and the above latitude 40, it is advisable to run always on gasoline, unless the Plant is installed in the cellar where the variation of temperature is not so great.

Care of Batteries.

STUDY OF AMPERE HOUR METER. When the battery cells are connected to each other in such a way that a positive terminal always connects to the negative terminal of the next cell, there will be a free positive and **one negative terminal to be connected as per** previous instructions to the wires at the right and top of panel board.

The battery is shipped in fully charged condition but is naturally expected to lose a little charge in transit, this explains why you will find the ampere hour meter hand set at 30 per cent. charge.

Run the plant at first until the hand shows 100 charge, do not care if the batteries are gassing, when the first charge is completed be sure the liquid of electrolyte covers the top of the plates, if not add clean rain water until the liquid is one-half inch above the plates, if, however, liquid has been spilled in transit, then add electrolyte testing 1.250.

With each Genco-Light plant we send a hydrometer. This instrument is used in testing the specific gravity of the electrolyte. It is not necessary to do it often, some people never do it. We advise that gravity should be taken in each cell every three months. Always take it when the ampere hour meter shows 100 charge. The gravity should be then 1.250. It is not necessary to read the gravity when the batteries are discharged or near complete discharge, or in other words when the ampere hour meter shows 5 or 10. But as a matter of information we will say that should be 1.150 to 1.165.

After having looked all the cells over with a hydrometer it is not necessary to do it again if you want to take a reading any time, but observe only the cell at the end of the battery. The purpose of looking over all the cells at the end of every three months is only to detect a defective cell. For instance if one cell constantly reads less than 1,250 at full charge you should let us know at once.

TO TAKE HYDROMETER READINGS. With the syringe type hydrometer furnished by us, insert the end of the rubber tube in the cell. Squeeze, and then slowly release bulb, drawing up the electrolyte from the cell until the hydrometer floats. The reading on the graduated scale at the surface of the liquid is the specific gravity of the electrolyte.

After testing, the liquid must be returned to the cell. If too much electrolyte is drawn into the tube, the float will strike the stopper in the upper end of the bulb giving a wrong reading.

The gravity is expressed in points. Thus the difference between 1,250 and 1,150 specific gravity is 100 points.

The Ampere Hour Meter.

The Ampere hour meter on the panel board is useful in more than one point.

1st. It shows at all times the amount of current in the battery. (See upper Hand).

2nd. It shows at all times approximately the amount of current going in or out of the battery. (See lower Hand.)

3rd. It automatically stops the engine when the batteries are fully charged.

BESIDES THIS IT ACCOMPLISHES ONE USEFUL AND UNSEEN DUTY. It automatically gives the battery a small amount of overcharge and therefore keeps the storage battery in healthy condition.

This is done inside of the meter and with this feature it is not necessary to give the batteries an overcharge from time to time as most of battery builders advocate.

The glass cover over the meter is removable and furthermore it is possible to slip the upper hand on its shaft. It is sometimes necessary to slip this hand back a little as we explain in the following paragraph:

It may happen sometimes for a reason unforeseen, or due perhaps to an accidental discharge of the batteries, caused by some iron wires coming in contact directly with the poles of the batteries, that the ampere hour meter shows 100 charge and stops the engine, the average specific gravity taken in all the cells with the hydrometer is below 1,250. Say for instance it is 1,200. The electrolyte will be observed to be above the plates and everything seems to be in perfect condition. Remove glass lid and push upper hand back to 80 and start engine.

Take another gravity reading when meter reaches 100 and repeat operation until gravity reads 1,260. Be sure to put glass cover back in place.

Another condition exists sometimes where it is necessary to slip handle back.

Say for instance, the power plant runs a line shaft, that line shaft is belted to a powerful deep well pump requiring one to one and one-half horsepower to run it. The plant has just stopped because the meter reached the **100** charge position. During the night a small fire happens in the house or outbuilding, it is necessary to start the plant at once and pump water fast. Remove glass lid, set handle back and start plant. Whatever power the pump does not take the battery will get in the form of an overcharge and it will not do it any harm.

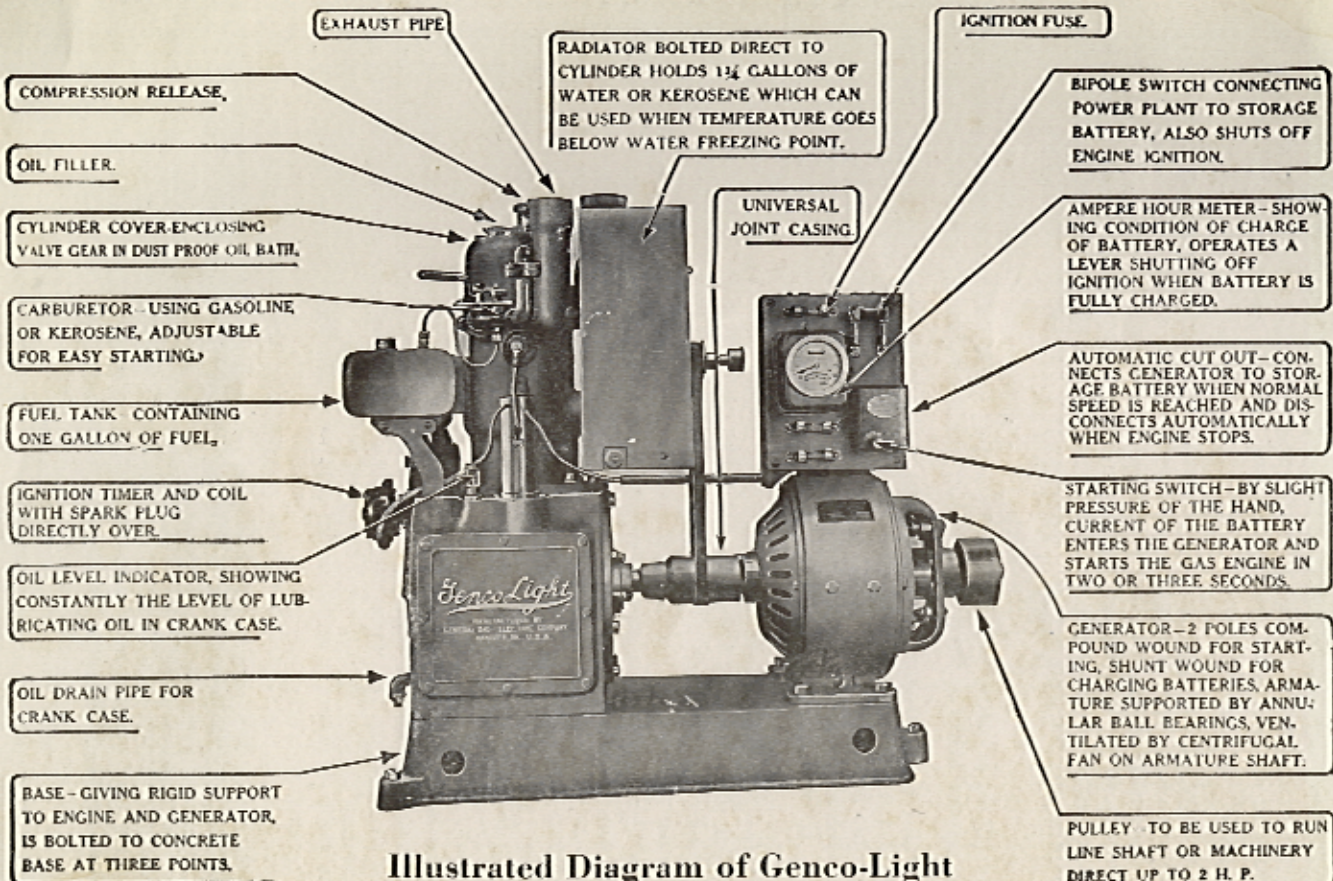
NOTE. We recommend to our customer that they familiarize themselves with the use of the hydrometer. This will give them at **all** times a perfect idea of the condition of the Genco-Light Battery and will help to give them the perfect service that we expect and are getting everywhere.

If one or two of the glass cells are broken by accident or if one cell is found defective, for instance the gravity in one particular cell keeps low all the time, that cell can be removed and the communication re-established with a heavy copper wire not less than No. **10** while the cell is returned to us or repaired. In other words Genco-Light will work with **15** or **14** cells, but of course the lights will not be as bright during time battery cell or cells are removed, as when using 16 cells.

CAUTION. Take all hydrometer readings with a temperature as close as possible to 70 degrees F.

The best indication that the batteries are fully charged is that each and every cell starts to gas freely when the meter reaches 90 to 95 and the electrolyte looks milky.

Any cell not gassing at that time is not in healthy shape. It is then advisable to set upper hand of meter back to ten or twenty points and keep on charging until all cells gas freely.



Illustrated Diagram of Genco-Light

6421-β

Genco Light

Instruction Book.

Read Carefully.