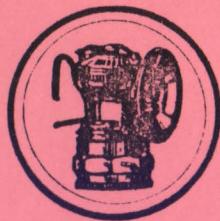


HOW  
THE AUTO-LITE  
IS MADE





*"They're Finer  
Says the Miner"*

**AUTO-LITE**  
TRADE MARK REG U.S. PAT. OFFICE

The Dependable Carbide Lamp

UNIVERSAL LAMP CO.  
CHICAGO, ILLINOIS and WATERBURY, CONN.

## Foreword

Nothing would please us more than to have the opportunity of personally conducting through our manufacturing plant everyone interested in the Auto-lite Lamp.

You would see one of the most modern factories of its kind in the world, where complete facilities are available for casting and rolling brass, drawing wire and rods, and fabricating into finished goods ready for the market. So complete is the equipment that even the cardboard boxes for packing are made here and a complete printing plant is available.

Some of the fabricating machines are so efficient as to seem almost human in their ability to perform a multiplicity of operations with an almost unbelievable rapidity and yet with the most remarkable accuracy. Such machines run endlessly with little attention beyond feeding materials and checking the finished product. The operatives in the plant, too, are skilled and capable and excite admiration in the deftness with which they perform their tasks.

Such a trip through the plant would be a most convincing proof of the precision with which the Auto-lite Lamp is manufactured. The inspections and tests, by their number and exacting detail, would demonstrate conclusively that our product is made so well that we can be proud of it.

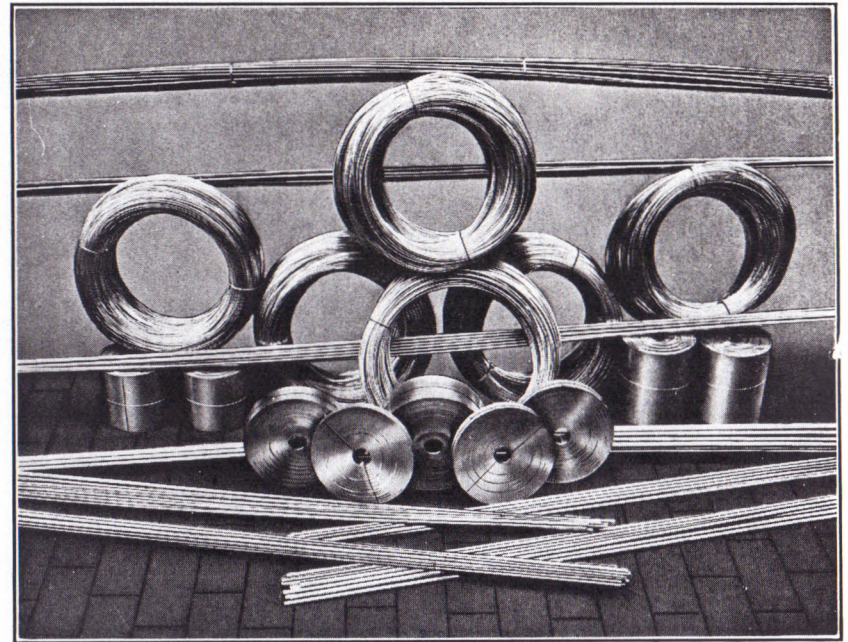
However, because it is impossible to take you through the factory, we feel that we are doing the next best thing in that we are bringing the factory to you in this booklet.



*Weighing out the correct amount of copper and zinc for a certain brass alloy.*

“**A**UTO-LITE”, the dependable carbide mine lamp, is made entirely of the well-known and nationally advertised Chase brass. Each separate part of the mine lamp is made of that mixture of brass best adapted for its purpose. All brass is inspected before manufacture.

In following the steps necessary to make a mine lamp we will trace the production of brass, from the casting shop where it is made from a mixture of copper and zinc, through the different stages in the brass mill, then on into the manufacturing plant where it is cut, shaped and pressed into the different parts necessary to make the lamp.

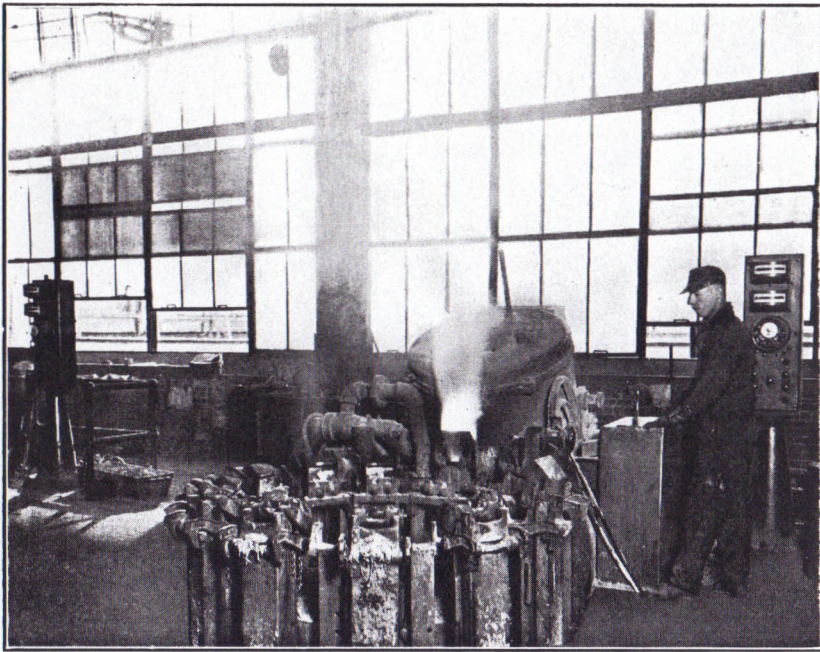


*The number of different sizes, alloys and kinds of brass needed to make a complete Auto-Lite carbide lamp.*

#### MANY BRASS MIXTURES

Brass is made by melting and mixing copper and zinc together. Different mixtures of brass are produced by varying the proportions of copper and zinc, and each special brass alloy is made for a special use. There is a special brass mixture for stamping, spinning, screw machine work and other methods of manufacturing.

In the brass parts used in the Auto-lite six different brass alloys are used, comprising nine different sizes and four different thicknesses of sheet brass, also five mixtures and sizes of brass

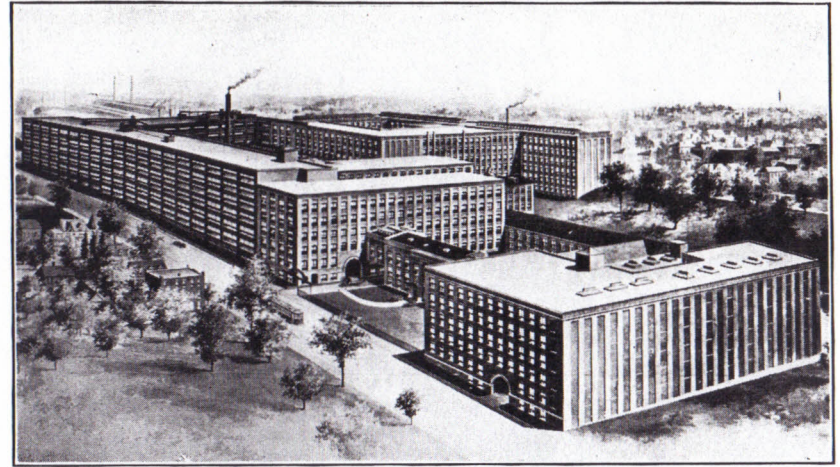


*Pouring brass from a Chase electric furnace. All brass in Auto-Lite carbide lamps is electrically mixed and cast.*

rod, five different sizes of wire and one size of tubing. A grouped illustration of this metal appears on page 5. Although the different sizes and alloys are not apparent from the picture, it does give a very good idea of the variance in forms of metal needed.

#### MAKING BRASS

Chase brass is made from the finest quality of copper and zinc. These metals are mixed together in specially designed electric furnaces, the most accurate and modern development of casting. They are melted into a liquid, thoroughly stirred

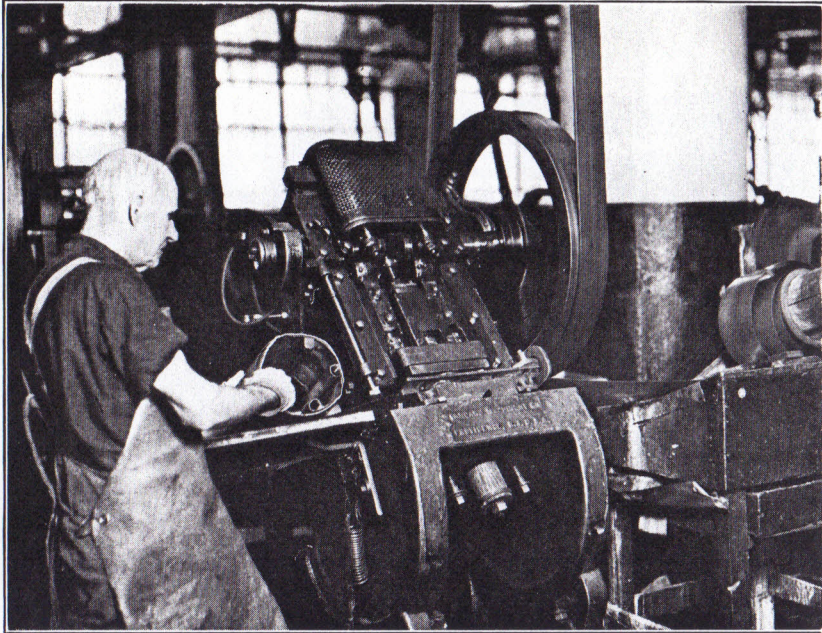


*The large manufacturing plant where Auto-Lite carbide lamps are made.*

and blended, and then poured into large molds. The brass is then taken to the sheet mill where it is rolled down into various thicknesses and widths of sheet brass. Brass is also cast in the form of rods which are drawn down into wire and in the form of rough shells which are later drawn into tubing. It is from all these sources that the mine lamp gets its materials.

The sheet brass, rod, wire and tubing are then sent to the manufacturing plant where the sheet brass goes to one department, the rod to another, the tubing to another, and wire to another, and separately all the various parts are started which will some day be assembled together to make the completed mine lamp.

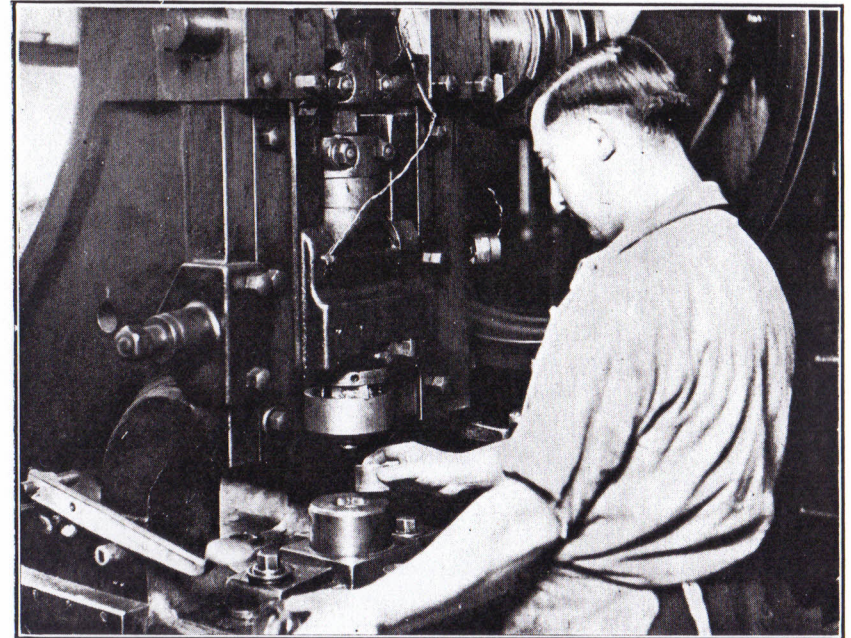
The first mechanical operation in making an Auto-lite lamp is to run the coiled sheet brass as it is received from the mill, through a cut-and-form press that stamps out the carbide bottom. In this operation the bottom is made entirely of one



*Rolls of brass are fed through this "cut and form" press which stamps out the carbide container.*

piece. There are no seams, no soldering, and not a possible chance for leakage, and the containers, because they are of one piece, are absolutely air tight. This first operation is typical of many other parts of the mine lamp.

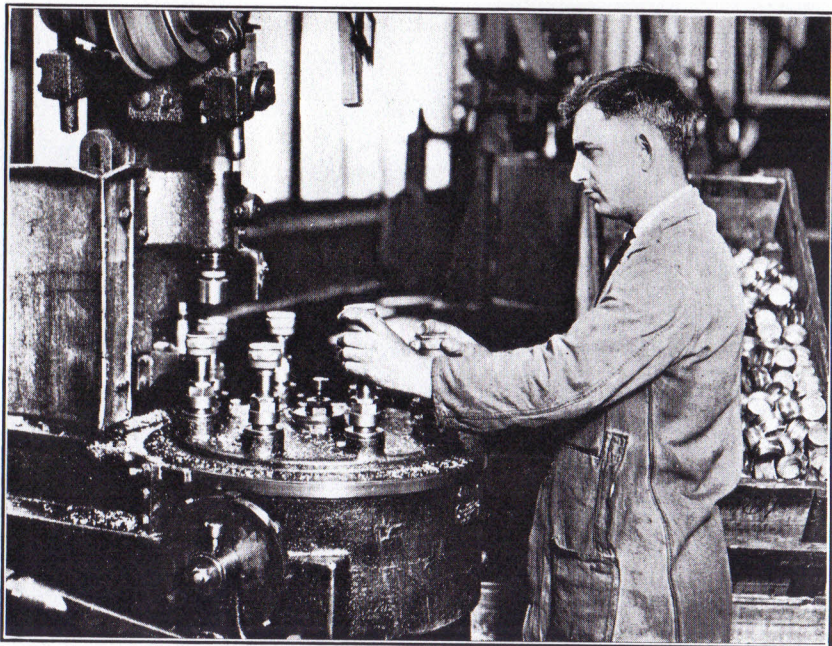
The carbide containers are forwarded to a second machine that presses them into an octagonal shape. This octagonal shape not only improves the appearance of the lamp, but strengthens the walls to withstand hard usage. It also serves as a gripping surface for unscrewing the container from the top half of the lamp, and as these two sections must be screwed together



*Stamping the octagon shape onto the sides of the carbide container.*

tightly, it is essential to have a good gripping surface. The octagonal shape on an Auto-lite is known to miners as the Bull-dog grip, and is an example of one of the many additional features of the Auto-lite which are not found in other mine lamps.

The containers are now rehandled for the third time, and placed on a revolving machine where the edges are cut smoothly and evenly leaving an absolutely perfect edge. This smooth and even edge forms the seat for the screw shell, which is the part directly above it, and upon which is screwed the upper body of the lamp.



*Smoothing the edges of the carbide container to form a seat for the screw shell that is later joined to it.*

On page 12 we see the carbide container and the screw shell being joined together on a special machine designed for this purpose. After joining the two pieces together, however, there still remain two other mechanical operations before the carbide container is completed, although, of course, it is still unfinished.

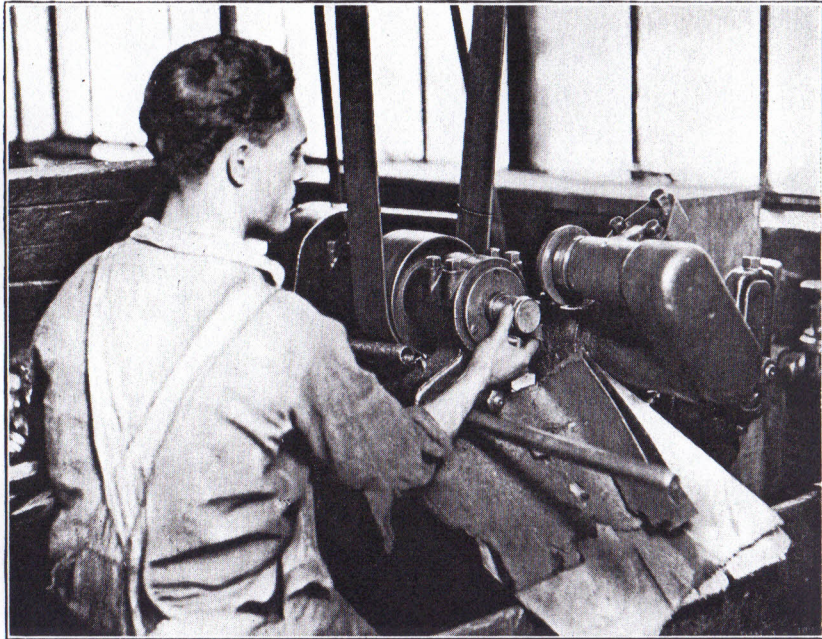
A corrugated knurling is now put around the bottom edge of the container. This knurling, or heavy edging, strengthens the bottom of the container so that it will stand up under the general practice of knocking the bottom on some hard object to loosen any carbide that might be stuck in the container



*Putting a corrugated knurl around the edge of the carbide container.*

when cleaning it. Without a reinforced edge of this kind a mine lamp is damaged and useless within a short time. Auto-lite carbide lamps are purposely made very strong in this way to stand the hard wear that mine lamps actually get during usage. It is remarkable that although the Auto-lite lamps are exceptionally strong and reinforced in such ways, they are also light in weight, very compact, and have maximum water and carbide capacity.

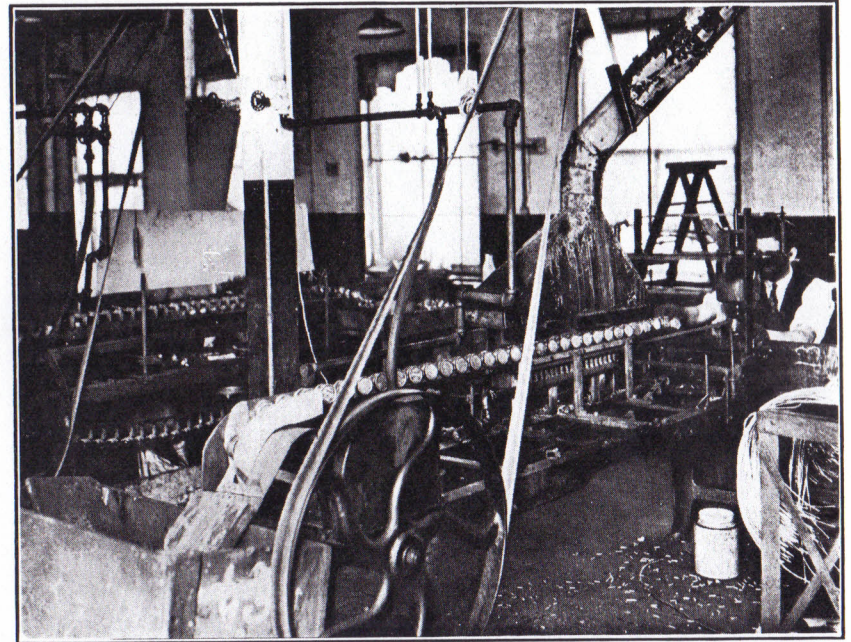
After the knurling operation the screw shell, and carbide container bottom are soldered together on the inside by an automatic machine. (See page 13.) This additional operation



*Closing together the one piece bottom and screw shell which forms the complete carbide container.*

strengthens the connection and forms a tight union which cannot be seen from the outside of the lamp. With these two parts connected, the carbide container of the mine lamp is completed. All of the operations that we have shown are typical of other parts which are made in much the same way for the upper half of the mine lamp. Different tools and slightly different operations are required, of course, but in general the principle is the same.

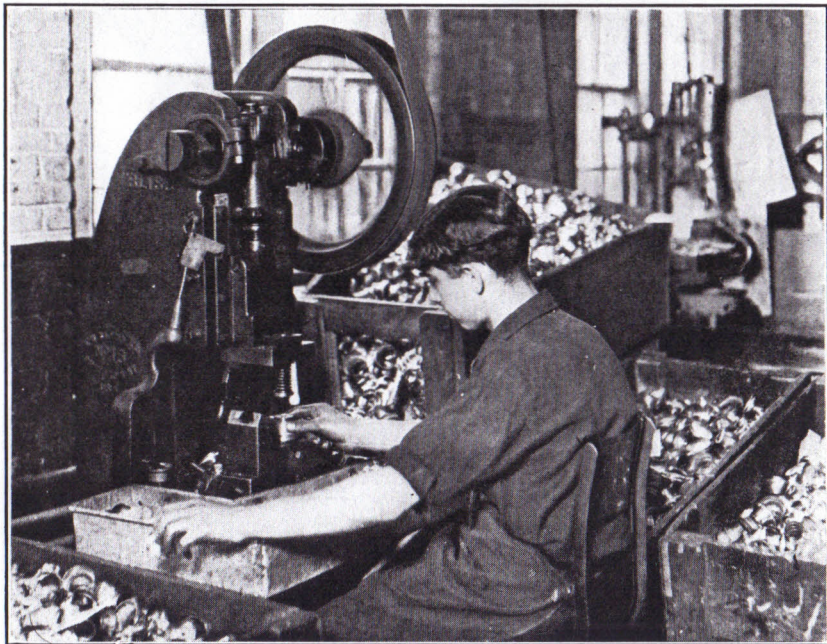
A special machine pierces the rivet holes in the center shell of the mine lamp for holding the hook and burner tubes, which are later to be added. Although the holes are punched



*An automatic soldering machine for joining together the top and bottom section of the carbide container.*

on opposite sides of the shell, they are completed in one operation, and the hook is later riveted and soldered firmly to the shell. While the main parts of the Auto-lite are stamped and formed out of sheet brass, many of the smaller parts such as small nuts, screws, adjusting lever, water tube, burner tube, ball dropper, and other special parts, are all made on automatic screw machines, which forms, machines, and shapes these parts automatically. One of the most important articles made on this useful machine is the special Auto-lite wing lock nut that holds the reflector firmly and securely to the lamp. No tools are





*Piercing the rivet holes for holding the hook and burner tube.*

required either to loosen or to fasten this nut. The automatic screw machine is almost human in its work. Once the dies are set, the machine will automatically complete a product that requires from one to four different operations. It is only necessary for the operator to keep the machine fed with brass and check the finished article for accuracy.

The different parts of the Auto-lite being completed, it is now necessary to assemble them all together into one completed article. When you consider that thirty-four separate pieces have to be formed together to make one lamp, you get some idea of the fine mechanism required in the Auto-lite. In the illus-



*Soldering the water tube by gas torch to the inside of the top cover.*

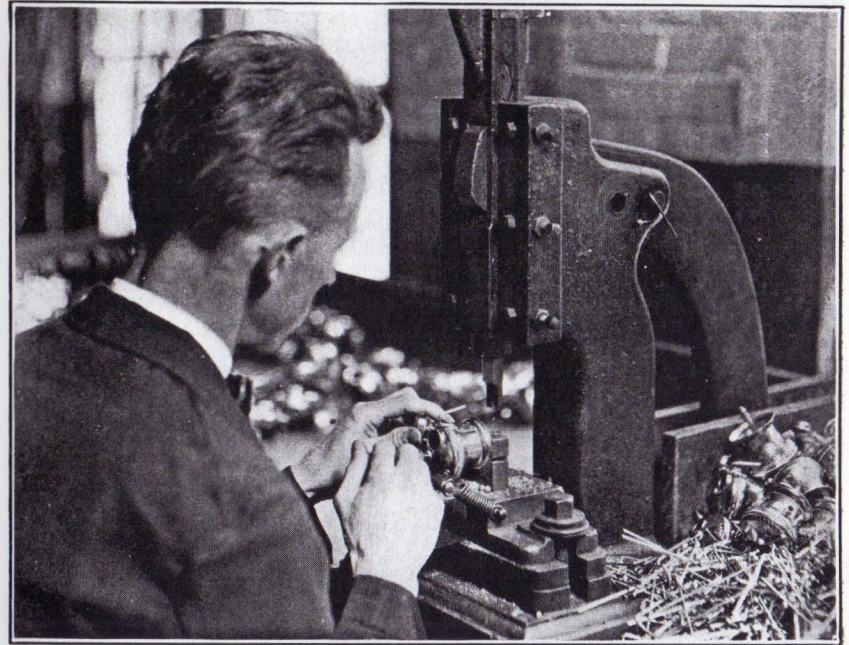
tration just above we see the water tube being soldered to the top cover of the lamp. This soldering connection is very carefully done on the inside of the cover with a gas torch, and with our own special solder mixture.

The cover with the water tube securely soldered to it must next be joined to the center shell. This is a very delicate soldering operation, and the pieces are placed on revolving tables where two skilled solderers join the parts together. (See page 16.) The upper half of the Auto-lite is now practically completed, and the yoke, ball dropper and other small accessories necessary for its operation are now added.



*A delicate soldering operation of joining the top cover to the center shell.*

The special Auto-lite ball dropper feed is very unique in principle. It is self-cleaning and will not clog as the rounded surface of the ball dropper fits perfectly into the beveled edges of the water feed tube. When the water is shut off, this ball dropper automatically forces out of the way whatever sludge formation has collected so there can be no obstructions to the flow when the water is again released. In addition to this the nipple at the end of the ball dropper guides the water in a single flow (like water from a faucet) to the center of the carbide container, which guarantees a steady, uniform flame at all times.

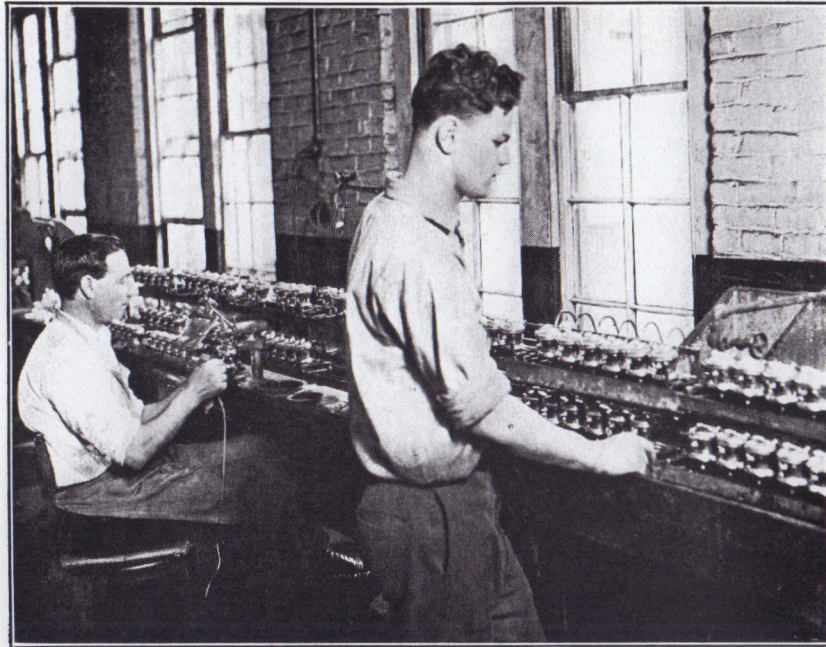


*Flanging the end of the rake wire to hold the ball dropper securely in place.*

The ball dropper itself is then flanged and soldered to the rake wire. This rake wire controls the flow and shut-off of the water, and in the completed lamp appears as a regulator lever on the top of the lamp.

Immediately after the rake wire and ball dropper are soldered together, the lamp is filled with water and inspected for leaks, the rake wire being turned on and off to make sure that the ball dropper functions properly.

But this water test, while it checks the operation of the rake wire, is not considered severe enough for the Auto-lite



Soldering on the rake wire handle and water testing the dropper ball.

itself. The lamps also must pass through the high pressure test. Air is forced through the lamps at a high pressure, while the lamp is submerged in water. This test is severe enough to locate any flaws that the hand or eye inspection could not detect, and insures all Auto-lites being in perfect condition. Any Auto-lite that passes through this test is positively checked against possible manufacturing defects.

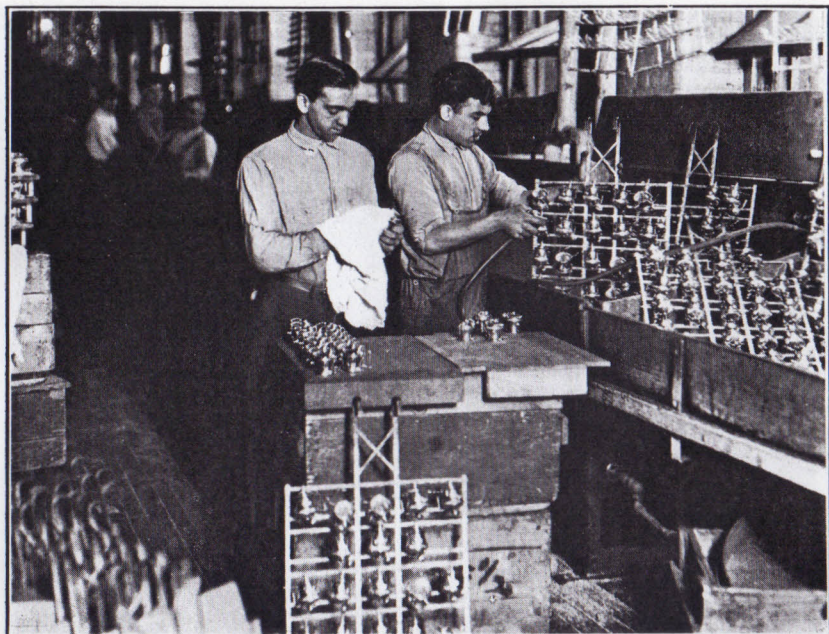
The Auto-lite lamp is now mechanically perfect, but it has yet to be finished either in its highly polished nickel finish, or that of polished brass. After the nickel plating, or polishing process, the lamps are dried in hot granulated sawdust. All of



High pressure water testing given to all Auto-Lite carbide lamps.

this sawdust is carefully removed after drying by an air pressure gun, and the lamps are passed on to be individually polished by hand. This extra repolishing is, of course, in addition to the thorough polishing of the automatic polishing and buffing machines.

In the final assembly of the lamps the felt washer, the felt holder, the reflector and a few other small parts are added. The lamps pass in a continuous line along the assembly benches, the parts being added by experienced operators until the lamp is completed, again inspected and carefully packed for shipment in individual cartons. Twelve of these cartons are put inside



*Cleaning the lamps after the nickel dipping process.*

a larger carton. The lamps are shipped to the jobber in three dozen units, which are very convenient packages for handling.

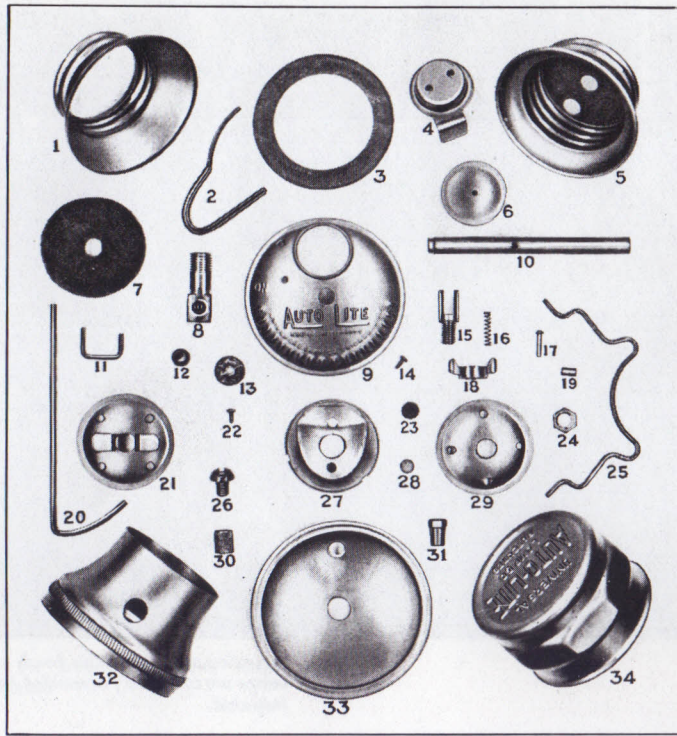
#### FACTS ABOUT THE AUTO-LITE LAMP

1. Made of 34 different parts
2. Requiring 168 mechanical and assembly operations
3. Furnished in six different styles
4. Has 12 advantages of construction not commonly found in other mine lamps:
  - (a) Easy to operate
  - (b) Lightest in weight
  - (c) Maximum water and carbide capacity



*A section of the assemble bench where the lamps are completely assembled and finally inspected.*

- (d) Super-tested
- (e) Strongest and most durable
- (f) Non-leakable water lid
- (g) Self-cleaning ball dropper
- (h) Reinforced inner thread
- (i) Seamless bottom carbide container
- (j) Bull-dog grip bottom
- (k) One piece unbreakable burner tube
- (l) "Sturdibilt" reflector



COMPONENT PARTS OF AN AUTO-LITE

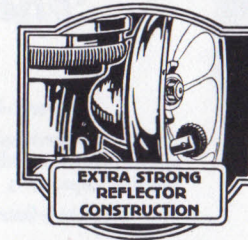
- |                        |                    |                          |
|------------------------|--------------------|--------------------------|
| 1. CONTAINER TOP       | 13. SPARKING WHEEL | 24. HEXAGON NUT          |
| 2. HANDLE              | 14. RIVET          | 25. SPREADER WIRE        |
| 3. RUBBER GASKET       | 15. YOKE           | 26. SCREW FOR RAKE WIRE  |
| 4. BOTTOM OF WATER CAP | 16. SPRING         | 27. BACKING SHELL        |
| 5. INSIDE SCREW SHELL  | 17. YOKE RIVET     | 28. LAVA TIP             |
| 6. TOP OF WATER CAP    | 18. WING NUT       | 29. FELT PROTECTOR PLATE |
| 7. FELT WASHER         | 19. SPARKING METAL | 30. SCREW CAP            |
| 8. BURNER TUBE         | 20. RAKE WIRE      | 31. METAL TIP            |
| 9. TOP SHELL           | 21. STRAINER       | 32. CENTER SHELL         |
| 10. WATER TUBE         | 22. RIVET          | 33. REFLECTOR            |
| 11. HINGE WIRE         | 23. BALL VALVE     | 34. CONTAINER            |
| 12. TOP BALL           |                    |                          |

## AUTO-LITE

Advantages not found in other lamps



Auto-Lite Self Cleaning Ball Dropper get the most exacting try-out for uniformity of Water flow and Sludge resistance. Super Testing insures its perfect operation. Gives a steady even flame at all times.



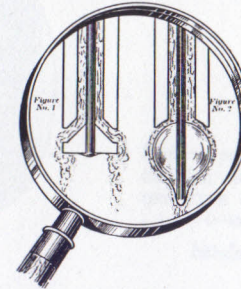
Auto-Lite reflectors are constructed in a way that only the strongest and most unyielding can resist our Super-Test treatment. Reinforced Shell back holds it firm and secure.



Accumulation of Water in the Lid Chamber is prevented by the two eyelid drains, permitting the water to drop back into the Tank below. This prevents spouting.

### The Ball Dropper

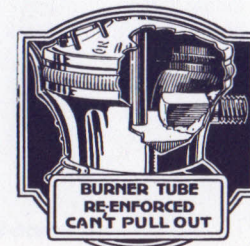
The illustration to the right shows Cross Section of Water Feeds of Auto-Lite and other Carbide Lamps. Figure 2 illustrates the Construction of Auto-Lite Ball Dropper. Note the Auto-Lite Ball Dropper principle



as indicated in Figure 2. Compare it with the operation of other feeds as shown in Figure 1. The uniformity of the water flow in No. 2 immediately is apparent but not so in No. 1. As an additional aid, the nipple lead at the bottom end of the ball acts as a perfect guide in conducting the water to the carbide chamber in an even steady flow.



Auto-Lite has no soldered bottom Carbide chamber. It is of one piece and seamless. No solder to break loose causing receptacle to leak. Bull-dog Grip.



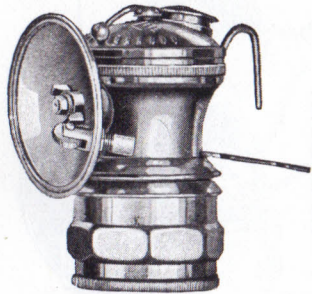
The Auto-Lite Burner Tube Test prevents any possibility of danger from breaking off or pulling out. Its principle of construction is RIGHT and Super-Testing proves it. Can't break loose. Not even with a hammer blow.



No tools are required to remove Reflector. Winged Nut holds Reflector firm and secure. Only finest imported Lava Tips used. Sparking Wheel always works and gives an unflinching spark.

# AUTOLITE

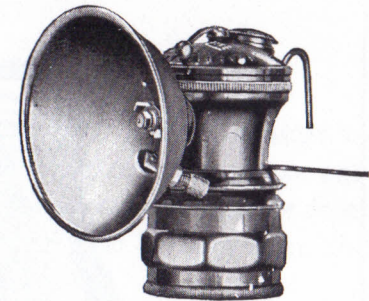
*The most popular of all Miner's Lamps*



AUTO-LITE No. 106

Highly polished solid brass lamp—2½ inch silver nickered reflector with self-lighter—burning capacity 3 to 4 hours.

No. 306—Same lamp—nickel plated



AUTO-LITE No. 105

Highly polished solid brass lamp—3 inch extra deep reflector—with self-lighter—burning capacity 3 to 4 hours.

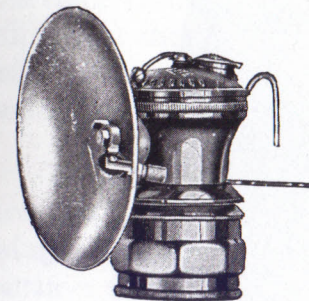
No. 305—Same lamp—nickel plated



AUTO-LITE No. 110

Highly polished solid brass lamp—3 inch reflector with self-lighter—either in polished brass or silver nickered finish. Flat metal cap hook. Burning capacity 3 to 4 hours.

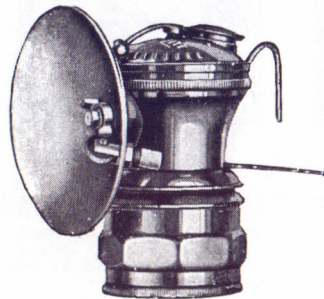
No. 310—Same lamp—nickel plated



AUTO-LITE No. 104

Highly polished solid brass lamp—4 inch reflector with self-lighter—in the polished brass or silver nickered finish. Burning capacity 3 to 4 hours.

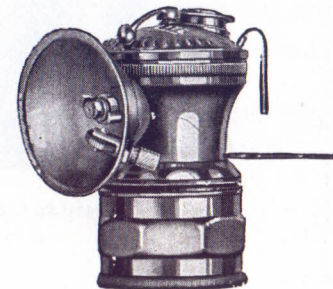
No. 304—Same lamp—nickel plated



AUTO-LITE No. 103

Highly polished solid brass lamp—3 inch silver nickered reflector with self-lighter—burning capacity 3 to 4 hours.

No. 303—Same lamp—nickel plated



AUTO-LITE No. 100

Highly polished solid brass lamp—small deep silver nickered reflector with self-lighter—burning capacity 3 to 4 hours.

No. 300—Same lamp—nickel plated



*Auto-Lite Carbide Containers are made entirely  
of brass—the everlasting metal.*

### AUTO-LITE BRASS FLASKS

Miners are always on the alert for a better container to keep carbide dry. As carbide is very absorbent to moisture and useless when wet, it is not only necessary to keep carbide from actual contact with water, but it must also be kept from the moist air generally hovering in mines.

The Auto-lite Brass Flask was especially constructed to keep carbide dry; it is guaranteed air-tight and water-tight. It is made entirely of Chase brass and will not rust, therefore, will outlast the cheaper tin flasks many times over. Auto-lite flasks are also much stronger and will stand up better under hard usage.

The carbide container is made all in one piece from Chase sheet brass. There are no seams, therefore, no possibility of leakage. The bottom is also of brass double seamed to the container forming a water-tight connection.

In addition to the perfectly matched threads on the brass cap and container, the cap is also lined with a cork gasket that fits snugly against the opening when the cap is screwed on. This prevents any possible chance of leakage at this connection.

An air-tight, water-tight, rustproof container for preserving carbide is a true and terse description of the Auto-lite Brass Flask.

**UNIVERSAL LAMP CO.**  
CHICAGO, ILLINOIS *and* WATERBURY, CONN.

*Selling Agents for the British Isles and the Continent*

**PAUL WINN *and* CO., Ltd.**  
JOHN ST. *and* AMERICA SQUARE  
LONDON *✓* ENGLAND