



METAL-QUARRY
EDITION

EDITOR'S PAGE

THE MINING CATALOG

(METAL AND QUARRY EDITION)

Third Issue (1923)

A Consolidation of Condensed Catalog Information Relating to the Metallic
and Non-Metallic Mining Industries, Quarries and Cement Mills

TOGETHER WITH

ENGINEERING DATA COVERING THE VARIOUS
OPERATIONS PERTAINING THERETO

DEvised, COMPILED, EDITED AND PUBLISHED BY

Keystone Consolidated Publishing Co., Inc.

711 PENN AVENUE

PITTSBURGH, PA.

SECTION XI

Mine Lighting



FOR INDEX TO ALL ENGINEERING DATA SEE PAGES 7 TO 16.

**THE FOLLOWING MANUFACTURERS AND DEALERS
ARE REPRESENTED IN THIS SECTION**

Edison Storage Battery Co.
Grier Bros. Co., The
Justrite Manufacturing Co.
Polhemus, L. E.
Shanklin Manufacturing Co.
Union Carbide Sales Co.
Wolf Safety Lamp Company of America, Inc.

FOR LIST OF EQUIPMENT USED IN MINING AND QUARRYING
SEE PRODUCTS INDEX (Blue Sheets)

THE DEVELOPMENT OF MINE LIGHTS

Electric Lights

Electric lamps were placed on the market in 1902, but, on account of the objections common to all the earlier types, they were not favorably received.

In 1909 the Tungsten miniature lamps were first placed on the market in America for limited or special commercial uses. The efficiency or watts per candle, was about three to four times better than the carbon lamp.

In March, 1911, Thomas Edison became interested in the development of a practical miner's lamp and in May, 1912, the first lamps made by the Edison Storage Battery Company appeared, and concurrently the Wico lamp was introduced.

During the latter part of 1913 the Bureau of Mines, through H. H. Clark, became interested in the electric cap lamp, and after a personal tour of inspection and investigation took up the work with a view of standardizing its various features. Their chief concern was safety, thus making the lamp acceptable for general mine use. All available makes were studied and tested, and as a result a schedule of official tests was prepared, which was used in establishing a list of permissible safety lamps for use in mining. This step was the means of bringing home to the manufacturer the realization that the electric cap lamp was here to stay and created not a little competition to produce the best lamp possible.

Today we find the cap lamp comprising a non-spillable battery mechanically protected by an aluminum or steel case having the cover locked and arranged to be carried on a belt, a special twin flexible conductor conveying the current from the battery to the lamp on the cap, encased for a short distance at both ends by flexible steel armor, serving as an anchor and preventing sharp bending. The lamp consists of a parabolic reflector equipped with safety features, in which is mounted a tungsten lamp, the opening supporting a glass lens cushioned on gaskets held in place by a cap or spring, and provided with a hook to fit into the miner's cap.

When wearing the outfit a man can put himself in any position without restraint. It does not interfere with free motion of the body in any direction. He can use all tools and perform any desired work with as much freedom as when wearing the oil cap lamp.

Special combination charging stations are provided with facilities for charging, cleaning and filling both the electric lamps and the oil safety lamps.

The electric cap lamp has fully passed the development stage though improvements will doubtless continue, thus bringing it to a higher degree of perfection as the requirements are better understood and appreciated by the users.*

The electric hand lamp differs from the cap lamp only in detail. The battery and bulb are

brought together into one unit and thus the cord is eliminated. As with the oil safety lamp it is carried by means of a bale and when at the working face can be hung on a post conveniently close to the workings. While the weight of the hand lamp is frequently cited as an objection it must be borne in mind that this weight is not continually carried as the case with the cap lamp.

The Acetylene Lamp

Acetylene gas was accidentally discovered in 1836 by Professor E. Davy, of Dublin; but not until 1892 was it produced at a commercially cheap rate. It was likewise accidentally discovered by H. Moissay, who, while conducting experiments with an electric furnace, noticed that the wall of the furnace, consisting of lime, fused into a liquid state at 3,000 degrees, Centigrade, and that a combination between it and the carbon of an electrode produced calcium carbide. T. L. Wilson, by accident also, while experimenting with an electric furnace, discovered a method which resulted in the manufacture of calcium carbide on a large scale.

Carbide lamps are too well known to require description. The following advantages over oil or candle light are claimed for them:

1. Produce no carbon monoxide.
2. Produce 1/10 the amount of carbon dioxide, and 1/13 the amount of water vapor that an equal light of candles would produce.
3. Consume only 1/5 as much oxygen.
4. Give a 4 to 6-candlepower light.
5. Cost less, being about eight cents for a 10-hour shift.

Their use has extended into nearly all the States. Some of the early objections to the use of carbide lamps are as here stated, but improvements made and a better understanding of the lamps have done much to weaken these.

First—The offensive odors from unconsumed carbide when the bottom is emptied in the mine.

Second—Gas escaping at the screw top.

Third—The scattering of fresh carbide on the damp floor, with the danger that the fumes from it may be ignited and cause injury to life and property.

Fourth—The possibility of fumes being given in the burning that are injurious to the sight and health.

Carbide Safety Lamp

In intelligent hands this lamp can be used successfully and an excellent light is afforded, which amply compensates the disadvantages

*For a very interesting account of the development of the electric cap lamp in America, see paper by J. T. Jennings, "Historical Development of the Miners' Electric Safety Cap Lamp," Proceedings Coal Mining Institute of America, 1916, and which has been drawn upon in this article.

THE GRIER BROTHERS COMPANY

1411-1417 Brighton Road, PITTSBURGH, PA.

Factory: PITTSBURGH, PA.

Western Branch: HANCOCK, MICH.

Manufacturers of

Grier J. & T. Carbide Lamps

The Lamp You Have Waited For

Products

Carbide Lamps for Miners; Carbide Flasks—
Tips and other repair parts; Miner's Dinner Pails,
Powder Cans and other miner's equipment.

J. & T. Tip Cleaner

The J. & T. Tip cleaner with which Grier Lamps are now equipped is a recent invention, and thoroughly covered by patents. The cleaner is always with the lamp ready for instant use. The tip can be cleaned as often as necessary without extinguishing the light. It will save the miner both time and money. The cost added to the price of the lamp is very little compared to the advantages to be derived.

Construction—The device is so simple that there is nothing to get out of order from corrosion or otherwise.

Recent improvements made in our lamps—lower push button on tip cleaner; heavier cleaning wire, will not bend or break; stronger carbide bottoms; improved new felt holder; general construction throughout improved to make our lamps stronger and better than ever before. Lamps furnished with round or flat hooks.

A small wire of special composition works inside of the lamp, being housed in a brass tube and attached to a push button. A slight pressure on the button on outside of lamp injects the wire into the gas orifice in the burner and forces out any dirt or other matter lodged in the burner.

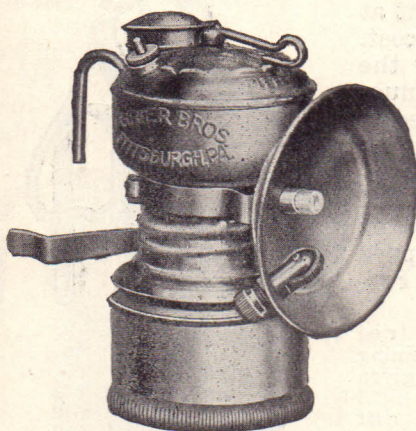


Cut Showing How J. & T. Cleaners Are Installed in Grier Lamps

The diameter of the cleaning wire is slightly less than the diameter of the gas opening in the burner, so that when the wire is projected into the opening the light will not be extinguished.

It is not necessary to remove the lamp from the cap.

All lamps tested before leaving our factory. Lamp equipped with Grier "Loc-on" reflectors and brass, lava insulated tips. All parts are easily replaced. Lamps made with lamp on the market.



Round Hook Coal Miner's Lamp



Flat Hook Metal Miner's Lamp



Inspector's Lamp—Large Carbide Bottom

WRITE FOR CATALOG

JUSTRITE MANUFACTURING CO.

2061-2081 Southport Ave., CHICAGO, U.S.A.



Manufacturers of
Carbide Miner's Lamps

For All Mining Purposes

Products

Miner's Lamps—all types—in brass, steel and aluminum.

Miner's Caps—Carbide Flasks—Burner Tips—and all necessary supply parts.

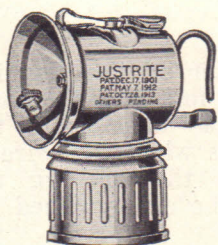
Sanitary Pails, Safety and Oily Waste Cans.

The models illustrated on this page are the most desirable for metal miners, and are known as "Metal Mine Lamps."

All lamps except "Little Giant" and "Uncle Sam" are equipped with self-lighter attachment. "Justrite" Lamps are constructed on scientific principles—only the very best material and workmanship being used. Every lamp is guaranteed.

If interested in other models, consult our general catalog.

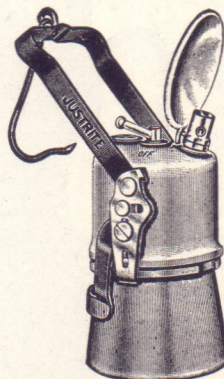
LARGE TYPE LAMPS



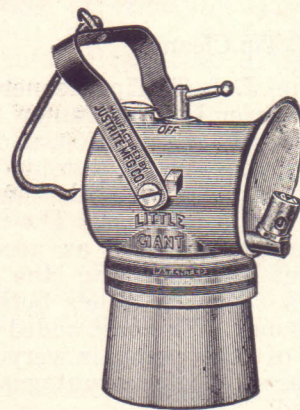
Cap Lamp
No. 407—Wire Feed
No. 707—Polygon Feed
Burns 2½ hrs.
Brass or Nickel



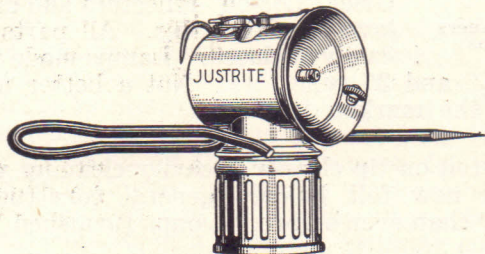
Superintendent's Lamp
No. 95—Burns 4 hrs.
Brass Nickelplated



"Uncle Sam"
No. 306—Burns 6 hrs.
No. 308—Burns 8 hrs.
Aluminum



"Little Giant"
No. 110—Burns 6 hrs.
Aluminum



Candle Stick Lamp
No. 103—Brass. Burns 4 Hours.

**The New "Acme" Steel Lamps
Rustproof Finish—Half Shift Size
Wind and Water-proof**

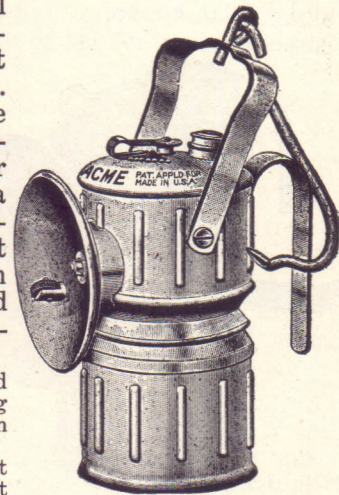
"A Strong and Rugged Steel Lamp."

The "Acme" Lamp is so constructed that it will give the miner a dependable and efficient light at the most economical cost.

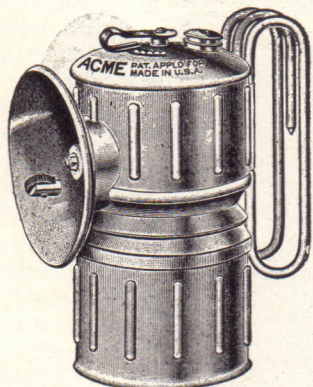
Note particularly the reflector, which fits snugly into the reflector brace, and is held in a permanent and rigid position by the knurled nut—not easily bent, broken or lost. Also equipped with No. 171 Flame Protector.

This lamp has been tried by many of the large mining companies, and has given most excellent service.

Consistent with the cost of this lamp, it is the best value of any steel lamp on the market.

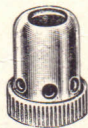


No. 50—With Bail and Hook
Steel



No. 56—With Folding Handle
Steel.
No. 80—Nickelplated—For
Superintendents.

SPECIFICATIONS
Burning Capacity—5 to 6 hrs.
Candle Power—18 C. P.
Weight—15¼ ounces.
Charge (¼" Carbide) 5 ozs.
Height of Lamp—5½ inches.
Height to top of bail—7¼ in.
Diameter Bottom—2⅞ inches.
Diameter Reflector—3 inches.



No. 171—Flame Protector

WRITE FOR CATALOG

WORLD'S LARGEST MANUFACTURERS OF CARBIDE MINER'S LAMPS

SHANKLIN MANUFACTURING CO.

2725-27-29 S. Eleventh St., SPRINGFIELD, ILL.

Miners' Carbide Lamps and Supplies

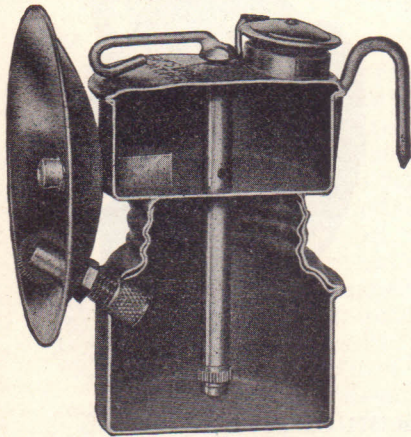
Products

Miners' Carbide Lamps; Carbide Lamp Supplies.

Shanklin's Carbide Lamps

These lamps are made in a wide variety of styles, as described below.

The outstanding feature of all lamps is the Guy Patented Water Dropper, which was perfected several years ago by Mr. Frank Guy, a practical miner, and we have used it for ten years in our lamps, during which time it has proved to be a most accurate and thorough device for feeding water to our Carbide Lamps.



Guy's Patented Water Dropper

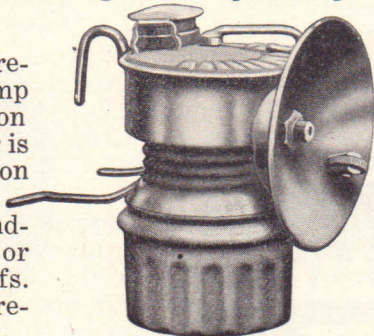
A feature of the Guy Water Dropper is the Valve Cleaner, which is a knurled thimble put on the dropper between the button and the end of the dropper tube. If dirty water is used and the dropper becomes clogged, a few turns of the valve cleaner with the fingers will open it up.

No. 22 S. L. Lamp

Has 2 $\frac{3}{4}$ " polished reflector, fastened to lamp with lock-nut screwed on burner tube. Reflector is strongly reinforced on back to protect it from accidents. Intended for use in rooms or entries with high roofs.

Brass lamp only, retail price \$1.00.

No. 22 Lamp, same as No. 22 S. L., without self-lighter added to reflector. Retail price \$1.00.



No. 22 S. L. Corrugated or Hex. Bottom; Flat Hook or Round Hook and Brace.

No. 220 S. L. Lamp, same as No. 22 S. L., but nickel plated. Retail price \$1.25.

No. 23 S.L. Lamp

Has large, deep, highly polished 3-inch reflector, fastened to lamp by lock-nut screwed to burner tube. Reflector strongly reinforced on back to protect it from injury.

Intended for inspectors and workmen needing an extra large light.



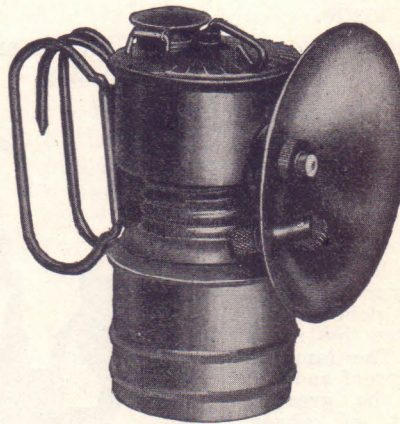
No. 23 S. L. Corrugated or Hex. Bottom; Flat Hook or Round Hook and Brace.

Throws a bright spot of light 50 feet.

Brass Lamp only. Retail price \$1.15.

No. 23 Lamp same as No. 23 S. L., except without lighter. Retail price \$1.00.

No. 230 S. L. Lamp is same as No. 23 S. L., but nickelplated. Retail price \$1.40.



No. 10 S. L. Superintendent's Lamp.

No. 10 S.L. Lamps

Superintendent's hand lamp. Can be furnished with any of our reflectors, but is usually equipped with the No. 23 S. L. reflector.

Has 50 per cent. more capacity than our regular lamp and will burn 4 hours. Has large hook and large folding handles.

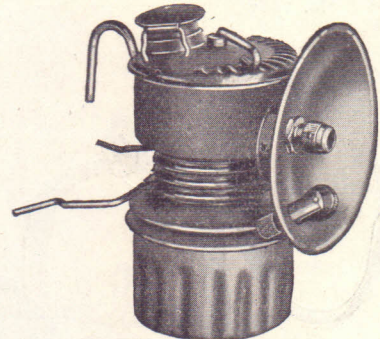
Can be worn on the cap.

Brass lamp only; retail price \$1.50.

No. 100 S. L. Lamp. Same as No. 10 S. L., but nickelplated. Retail price \$1.75.

No. 225 S. L. Lamp

Has 2 $\frac{3}{4}$ inch nickel plated reflector with self lighter. Equipped with our new metal, Non-blow-out tip. Wire brace and corrugated bottom only. Especially intended for drivers, motormen and shotfirers who need a light that will withstand a strong draught of wind or concussion of a shot. Retail price \$1.10.



No. 225 S. L. Lamp

No. 4 Candlestick

Slips on over bottom of lamp. Much stronger and better than a stick that clamps around the screw cap. Does away with the screw cap spreading and making a gas leak around the rubber gasket. Fits our cap lamps and four-hour lamps.



Candlestick

Retail price 30 cents each.

No. 6 Candlestick

Same as No. 4, but made to fit our half-shift lamps. Retail price 35 cents each.

Supply Kit

Contains an assortment of lamp supplies most frequently called for by the miner; also, the repair parts most likely to become lost or worn out, and which require replacement.

Conveniently arranged in a strong, durable cardboard box with hinged cover.



Supply Kit

No. 1—\$8.00; No. 2—\$4.50.

Wolf Safety Lamp Company of America, Inc.

220-224 Taaffe Place, BROOKLYN, N. Y.

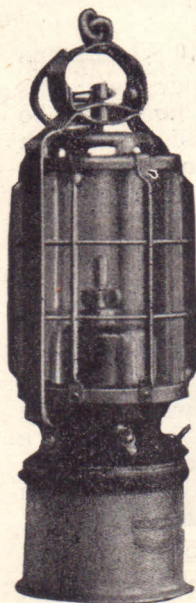
Miners' Carbide Lamps

Products Made in U. S. A.

Miners' Carbide Lamps for hand, cap, trip and general utility purposes. Miners' Safety Lamps burning naphtha, vegetable oil and carbide. Tools and Accessories for all types of lamps. Newton Oiling Device for mine car wheels.

ALL WOLF LAMPS ARE GUARANTEED TO GIVE SATISFACTION and are the strongest and best mining lamps made.

Lamps are made in all metals and different sizes.

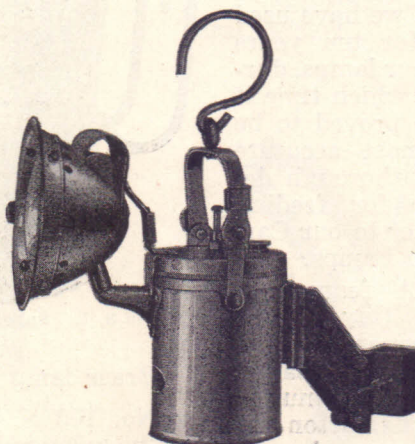


Carbide Lantern
No. 752c

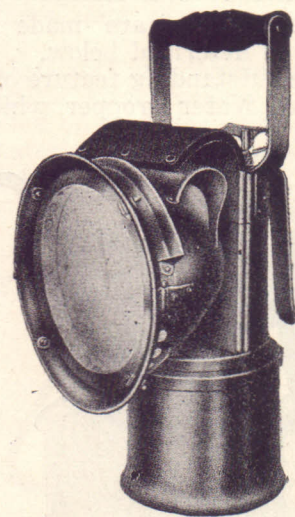
This Lamp will appeal to the man who is looking for a small strong lantern. Glass globe amply protected by metal ribs. The lamp is storm proof and will stand the greatest amount of abuse.

Weight 3¼ lbs.
Height 13 inches.
Burns 10 hours.

Carbide Lantern
No. 752c



Triplight No. 856



No. 871

No. 871 Carbide Lamp

An ideal lamp where an enclosed flame is required. Lamp steel tinned. Reflector hood with aluminum insert. Weight 3¼ lbs. Height 11 inches. Made also in smaller size.

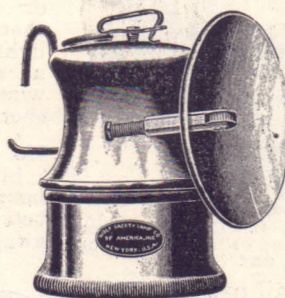


No. 905a

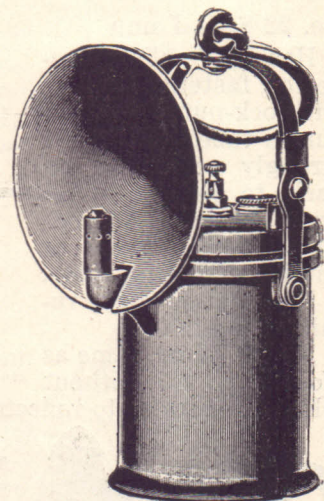
No. 905a Carbide Hand Lamp

This lamp is finished in steel tinned, with a sharp or plain hook and very similar to the No. 856, except it is equipped with a parabolic reflector protecting flame against dripping water. The burning time is 5 to 6 hours. Weight 1¼ lbs. Height 8½ inches.

Wolf's Carbide Cap Lamp,
Model 1923



The Wolf Cap Lamp has not been brought on the market until samples have been tested by practical mining men for quite sometime. All their experiences have been embodied in the model 1923 Cap Lamp. This Lamp is today undoubtedly the strongest Cap Lamp on the market, at the same time light in weight. The lamp is brass, nickel plated and has a good many features which will appeal to the miners. WHY NOT SEND US A TRIAL ORDER TO CONVINCING YOU OF ITS SUPERIOR MERITS. Like all Wolf Products it is made to give satisfaction and we have staked our thirty years' reputation behind this latest type.



No. 856

Carbide Lamp No. 856

This lamp is made in two sizes: smaller one has a burning time of 5 to 6 hrs.; larger size burns 7 to 8 hrs. Either of these lamps may be equipped with a reflector hood (as shown above) and both have the automatic non-adjustable water-feed.

Made in brass and steel, heavily tinned. Can also be equipped with a reflector hood same as on No. 871 Lamp.

L. E. Polhemus Manufacturing Company

Dept. K, MIAMI, ARIZONA, U. S. A.



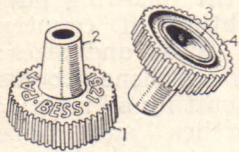
Miner's Lamps and Supplies

Products

All Standard Makes of Miner's Lamps; Lamp Supply Parts; "Bess" Burners; "Polly" Burners; Miner's Caps; Tape Lines.

The "Bess" Burner

The "Bess" Burner is designed to replace the lava burner in all cap lamps and in nearly every make of small hand lamps using carbide. It is made of a soft but resistant metal composition which will not carbonize nor break. The milled edge, marked 1 on the illustration, makes it easy to twist with the fingers when inserting or removing the burner; the tapered shank, 2, insures a perfect fit and no leaks. Neither cement nor pliers are required. The "Bess" is the only burner on the market that comes with a guarantee to the miner.



Enlarged reverse views of the "Bess" Burner. Length overall, $\frac{3}{8}$ " Greatest diameter $\frac{3}{8}$ " 1 is the milled edge; 2, the tapered shank; 3 and 4, water grooves provided to lead water around the gas flame.

In the pursuit of greater efficiency, mining companies should be interested in having all the carbide lamps in use at their mine fitted with the "Bess" Burner. They save money for the miner, because, unlike the lava tips, they can not be broken. They save money for the company because there is less time wasted by the employe. Thousands of these tips are in use and giving entire satisfaction. If you are interested in a demonstration of its merits, here is our offer:

We will send you samples upon receipt of your company's official order form. Try the burners for 15 days in your lamp. If you like them, you can order sufficient to equip your employes' lamps at the following quantity prices:

In	100 Lots	3c Each
500	"	2½c "
1000	"	2¼c "
5000	"	2c "
10000	"	1¾c "
25000	"	1½c "

TERMS: 2% 10 Days. Net 30 Days.

The prices here quoted on the "Bess" Burner are as of May 1, 1923. We maintain at all times a high grade product and sell at the cheapest possible prices, but for reasons of changes in the labor and metal markets, the prices mentioned are subject to change. Current prices will gladly be sent upon request.

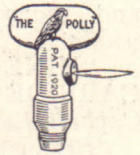
IMPORTANT—To enable the use of the "Bess" Burner in such lamps as employ a wire in the inside of the lamp for keeping the nozzle clear of obstructions, we provide a special burner in which both the inside and outside parts of the shank are made tapering. The end of the shank is therefore of

knife edge thickness and thus permits the ready passage of the cleaning wire through the nozzle.

WINDGUARDS—We have them, of such size that they fit neatly and securely over the burner.

The "Polly" Burner

Many users of carbide lamps object to the vertical flame owing to the danger of burning their hands or face or of igniting their clothing. To all such we offer the "Polly" Burner which throws out a horizontal flame as shown in the illustration herewith.



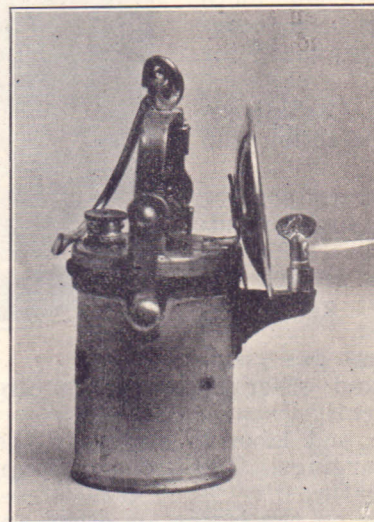
"Polly" Burner

The "Polly" Burner is easily and quickly inserted by screwing into the bracket, as shown in illustration. Furnished at the following quantity prices.

In	100 Lots	3c Each
500	"	2½c "
1000	"	2¼c "
5000	"	2c "
10000	"	1¾c "
25000	"	1½c "

TERMS: 2% 10 Days. Net 30 Days.

In order to use the "Bess" Burner on this style of lamp we provide a special bracket, known as the



"Polly" Burner in Use on This Style Lamp

"Polly" Bracket, at \$2.40 per dozen, which replaces the old bracket originally attached to the lamp. The change is easily made, all that is necessary being the removal of a few rivets from the old bracket and the fastening of the "Polly" Bracket in its place by means of solder. Along with the bracket we can furnish reflectors having igniters attached at \$24.00 per gross.

Carbide Lamps

We handle all makes of carbide lamps and can give you prompt shipments at attractive prices. We are in touch with many markets and are often able to buy to advantage in large quantities. Our savings are reflected in the reasonable prices we are thus able to quote you.

Write for prices if time permits—but if hard put for lamps, send us your order and let us demonstrate that our service, prices and quality are all correct.

UNION CARBIDE SALES COMPANY

NEW YORK
Carbide and Carbon Bldg.
30 East 42nd St.

CHICAGO
Peoples Gas Bldg.

SAN FRANCISCO
Balfour Bldg.

WAREHOUSES IN 150 CITIES

"Miners Lamp" Union Carbide

Union Carbide For Mine Lamps

"MINERS' LAMP" UNION CARBIDE—Packed in 100-pound drums; 25-pound drums; 2-pound cans—24 cans to the case; 10-pound cans—6 cans to the case.

Manufactured by Union Carbide Company, the Original Producers of Commercial Calcium Carbide and today the world's largest makers of this product.

"MINERS' LAMP" is a size of UNION CARBIDE specially adapted for use in Miners' Carbide Lamps.

Because of its special selection, uniform high gas yield, special sizing and screening, and freedom from dust, "Miners' Lamp" Union Carbide is the most economical and satisfactory Carbide for use in Miners' Lamps.

"Miners' Lamp" Union Carbide will keep indefinitely if protected from air and moisture.

UNION CARBIDE—WORLD'S BEST QUALITY—HIGHEST GAS YIELD.

Union Carbide has for more than twenty-five years been recognized as the World's Standard for Quality in Carbide.

The use of Union Carbide results in greatest satisfaction and lowest cost, because:

It has the greatest gas content and is always uniform and dependable in quality.

Union Carbide is always the same—always highest grade and most carefully selected.

When using highest gas yielding Carbide, lamps and other apparatus require recharging less frequently.

Considerable time and labor is saved by the smaller number of chargings. The time saved can be applied to other duties.

The wear and tear on the lamps, or other apparatus, is lessened by reducing the number of rechargings.

There is a smaller quantity of residue to handle per unit of gas consumed, when highest gas yielding Carbide is used—another worth-while saving in time and labor.

When Carbide having the highest gas value is used, a saving is effected in the cost of transportation and handling charges in proportion to the amount of gas actually generated.

The correct uniform sizing and careful screen-

ing of UNION CARBIDE assists greatly in the economical, efficient and uninterrupted operation of lamps and generators.

Because of the faithfully sustained, always dependable quality of Union Carbide, it is easy for the Carbide user to estimate his Carbide requirements from time to time.

What Union Carbide Is Used For

In addition to being used by more than a million miners in cap lamps, hand lamps and other portable and stationary mine lighting equipment, Union Carbide, crushed to the several regular commercial sizes, is extensively used for the following purposes: The lighting of country buildings of all types and sizes; cooking; the oxy-acetylene process for welding and cutting all metals; contractors' torches and flare lights; lighthouses and buoys; train, locomotive, railroad signal and station lighting; motor vehicle lighting; life saving equipment; fire departments; physicians' lamps; scientific and laboratory purposes; searchlights; moving pictures; stereopticons; hunting and trapping, fishing, camping and boat lighting; gathering cotton and small fruits at night; night operation of tractors and other farm implements; steam boiler and other inspection work; and scores of other uses.

Our Blue and Gray Package

Union Carbide is always packed in distinctive Blue and Gray containers. The excellence of our package is in keeping with our aim

to diligently protect the interests of users of our product in the matter of Carbide quality from the time it is packed at the Works until it is consumed by the user.

Union Carbide will keep for years in the original package without deterioration.

The Blue and Gray package is, therefore, a symbol denoting: best grade Carbide; highest gas value; uniform dependable quality, and purest gas.

Our Nation-wide Distributing System

For the convenience and economy of Carbide users we carry large stocks of Union Carbide in our own warehouses, at 150 convenient shipping points throughout the country.

Shipments are made the same day that orders are received.



Directory of Union Carbide Sales Company's Warehouses Appears on Opposite Page

Union Carbide Sales Company's Remarkable Service and Distributing System

Shipments are made same day orders are received at our Warehouses located in the following cities. Orders can be addressed to Union Carbide Sales Company, at any one of the addresses given below.

ALABAMA
 Birmingham.....12 So. 20th St.
 Mobile.....16 So. Commerce St.
 Montgomery.....15 Washington Ave.

ARIZONA
 Phoenix.....42 So. Central Ave.

ARKANSAS
 Ft. Smith.....123 So. 9th St.
 Little Rock.....1400 E. 6th St.

CALIFORNIA
 Fresno.....932 H. St.
 Los Angeles.....639 Gibbon St.
 Oakland.....(See San Francisco)
 Sacramento.....217 O. St.
 San Diego.....7th & J. Sts.
 San Francisco, California & Sansome St.

COLORADO
 Denver.....19th & Wazee St.

CONNECTICUT
 Hartford.....412 Trumbull St.

DISTRICT OF COLUMBIA
 Washington
Maryland Ave. & 9th St., S. W.

FLORIDA
 Jacksonville, 13 Cedar St., P. O. Box 124
 Tampa.....1702 Grand Central Ave.

GEORGIA
 Atlanta.....Haynes & Rhodes Sts.
 Savannah, Ogeechee Canal and Broughton St., P. O. Box 78.

ILLINOIS
 Chicago.....122 So. Michigan Boulevard
 Danville.....511 Oak St.
 Decatur.....133 W. William St.
 E. St. Louis.....700 Broadway
 Marion.....315 Granite St., P. O. Box 747
 Monmouth.....61½ Public Sq.
 Peoria.....100-110 Edmund St.
 Quincy.....313 Delaware St.
 Springfield.....1801 Washington St.
 Streator.....501 E. Hickory St.

INDIANA
 Evansville.....1601 Illinois St.
 Ft. Wayne.....2206 Broadway
 Indianapolis.....601-637 Kentucky Ave.
 Terre Haute.....714 N. Fifth St.

IOWA
 Davenport.....118 Harrison St.
 Des Moines.....3rd & Elm Sts.
 Dubuque.....8th & Washington Sts.
 Ft. Dodge.....Central Ave. & 16th St.
 Ottumwa.....207-9-11 So. Washington St.
 Sioux City, 925 Fourth St., P. O. Box 398
 Waterloo.....1209 E. 4th St.

KANSAS
 Pittsburgh.....824 N. Broadway
 Salina.....154 No. 5th St.
 Wichita.....Douglas and Sycamore Aves.
 P. O. Box 951

KENTUCKY
 Allen.....Beaver Creek
 Central City.....306 Broad St.
 Louisville.....126 E. Main St.
 Middlesboro.....1701 Cumberland Ave.

LOUISIANA
 New Orleans.....4124 Toulouse St.
 Shreveport.....615 Market St.

MAINE
 Portland.....11 Exchange St.

MARYLAND
 Baltimore.....19 E. Lombard St.
 Cumberland.....18 N. George St.
 P. O. Box 172

MASSACHUSETTS
 Indian Orchard.....406 Main St.

MICHIGAN
 Detroit.....5785 Hamilton Ave.
 Grand Rapids.....500 Shawmut Ave., N. W.
 Hancock.....First Natl. Bank Bldg.
 Iron Mountain.....513 Stephenson Ave.
 Ironwood.....

Jackson.....518 So. Water St.
 Muskegon.....301 W. Western Ave.
 Saginaw.....1830-40 No. Michigan Ave.
 Saulte Ste Marie.....

MINNESOTA
 Minneapolis.....334 N. 1st St.
 Virginia.....413 Chestnut St.

MISSISSIPPI
 Vicksburg.....1701-3 Levee St.

MISSOURI
 Kansas City.....1422 St. Louis Ave.
 St. Joseph.....920 So. 6th St.
 St. Louis.....(See E. St. Louis, Ill.)

NEBRASKA
 Omaha.....1007-9-11 Jones St.

NEW JERSEY
 Camden.....Front & Division Sts.
 Newark.....251 Ridgewood Ave.

OHIO
 Athens.....Factory and Moore Sts.
 Canton.....618 Mulberry Road S. E.
 Cincinnati.....67 Plum St.
 Cleveland.....631 Hanna Bldg. Annex
 Columbus.....330 Dublin Ave.
 Dayton.....104-114 S. Wayne Ave.
 Lima.....338 E. High St.
 Mansfield.....40 W. 3rd St.
 Steubenville.....324-343 No. 7th St.
 Toledo.....414 S. Erie St.
 Youngstown.....Jones & Brittain Sts.
 Zanesville.....Main & 2nd Sts.

OKLAHOMA
 McAlester.....8 No. Main St.
 Oklahoma City.....4 W. Park Place
 Tulsa.....1-11 Boulder St., North

OREGON
 Portland.....15th & Hoyt Sts.

PENNSYLVANIA
 Beaver.....262 East End Ave.
 DuBois.....Weber Ave. & Franklin St.
 E. Queensburg.....Clark & George St.
 Erie.....1426 Chestnut St.
 Harrisburg.....25 S. 10th St.
 Johnstown
Messenger St. & B. & O. R. R.
 Philadelphia.....2nd & Fishers Ave.
 Pittsburgh
1202 Chamber of Commerce Bldg.
 Pottsville.....Railroad and Sanderson Sts.
 Scranton.....Penn Ave. & Vine St.
 Shamokin.....5th & Walnut Sts.
 Williamsport.....Canal & Court Sts.
 Wilkes-Barre.....150 E. Northampton St.

SO. CAROLINA
 Charleston.....3 Liberty St.

TENNESSEE
 Chattanooga.....312 Pound Bldg.
 Knoxville.....426 W. Depot Ave.
 Memphis.....671 So. Main St.
 Nashville.....105-7-9 Broadway

TEXAS
 Dallas.....1008 Canton St.
 El Paso.....First and Kansas Sts.
 Houston
Baker & Cedar Sts., P. O. Box 1214
 San Antonio.....115 So. Medina St.
 Waco.....13th & Mary Sts.

UTAH
 Salt Lake City.....108 W. Second South St.

VIRGINIA
 Lynchburg.....1324 Commerce St.
 Norfolk.....P. O. Box 556
 Richmond.....1709 E. Cary St.

WEST VIRGINIA
 Bluefield.....195 Roanoke St.
 Charleston.....Broad St. & K. & M. R. R.
 Elkins.....Railroad Ave. & 1st St.
 Fairmont.....Auburn St.
 Mount Hope.....P. O. Box 536
 Huntington.....7th Ave. & 8th St.
 Morgantown.....178 Clay St.
 Mullens.....P. O. Box 55
 Wheeling.....43rd & McColloch Sts.
 Williamson.....P. O. Drawer L.

WASHINGTON
 Seattle.....304 Railroad Ave. So.
 Spokane.....162 So. Post St.

WISCONSIN
 La Crosse.....Front & King Sts.
 Madison.....513-19 Williamson St.
 Milwaukee.....120 Jefferson St.



The 25 Pound Drum with Large Screw Top is an Economical, Convenient and Very Popular Package

NEW YORK
 Albany.....108 3rd Ave.
 Binghamton.....83 Prospect Ave.
 Brooklyn.....382 Metropolitan Ave.
 Buffalo.....1336 Genesee St.
 Geneva.....Exchange St. & R. R. Place
 Hurleyville
 Jamaica.....11 New York Ave.
 Kingston.....O'Neil St. near Broadway
 Niagara Falls
 Poughkeepsie
 Smith St. & N. Y., N. H. & H. Tracks
 Utica.....135 Hotel St.
 Watertown.....438 Court St.
 Whitehall.....22-23 Main St.

NO. CAROLINA
 Charlotte.....Palmer St. & P. & N. R. R.
 P. O. Box 777

Raleigh
204 W. Hargett St., P. O. Box 149

Wilmington
Surrey St., Bet. Castle & Queen Sts.

Wilson
700 South Goldsboro St.

NO. DAKOTA
 Fargo.....5th St. & 2nd Ave., N.

UNION CARBIDE IS EASILY OBTAINABLE EVERYWHERE

Requests for Information and Special Correspondence Should be Addressed to our New York, Chicago or San Francisco Offices

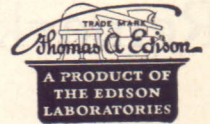
Edison Storage Battery Company

Factory and Main Office

316 LAKESIDE AVENUE, ORANGE, N. J.

Manufacturers of the

Edison Electric Safety Mine Lamp



NEW YORK
ATLANTA
NEW ORLEANS

BOSTON
CLEVELAND
DETROIT

Distributors in
PHILADELPHIA
PITTSBURGH
WASHINGTON

CHICAGO
ST. LOUIS
MONTREAL

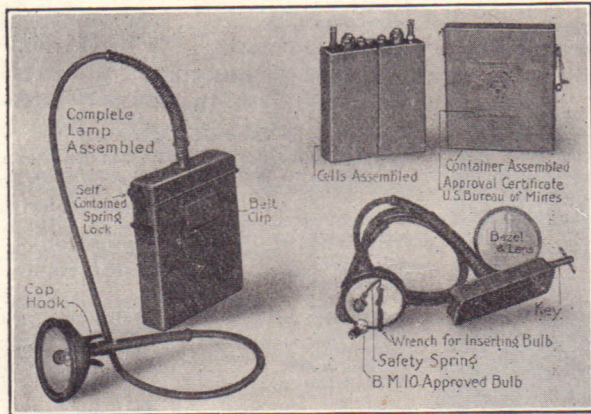
SAN FRANCISCO
SEATTLE
LOS ANGELES

General Distributors

Mine Safety Appliances Co., Pittsburgh, Pa.

The Edison Electric Safety Mine Lamp

The Edison Mine Lamp is a permissible portable Electric Mine Lamp. It is the first to be approved by the Bureau of Mines for Safety, Practicability, Efficiency and General Durability in Mine Service.



Unassembled View Edison Mine Lamp

Standard in over 1,000 mines, over 175,000 in use in Metal and Coal Mines of the United States.

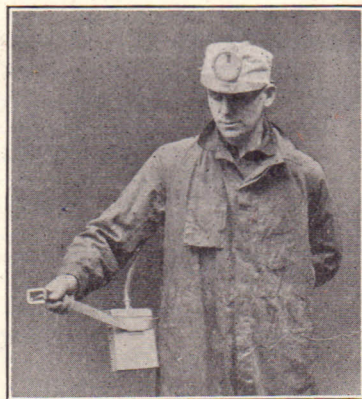
Older installations show uninterrupted service over five years.

Burns 12 hours without recharge.

Fire Protection for your valuable operation.

Method of Attaching

The miner straps the battery case to his back by an ordinary belt. The lamp is attached to the



Method of Attaching

leather support in his cap, leaving his arms entirely free of lamp, cord and battery case.

Described in Bulletin No. 300.

See Page 378 for details of the Edison Battery.



Edison Shot-Firing Battery. Showing how special cover for shot-firing is attached to regular Edison Mine Lamp.

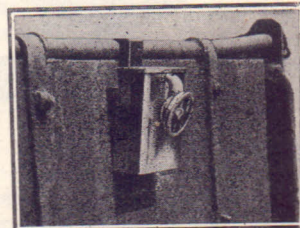
The Edison Electric Shot-Firing Battery

Showing cover for M-8 Mine Lamp Battery arranged for shot-firing. Shot-firing cable is attached to a key furnished with cover. Key is then inserted in receptacle on cover, and detonation accomplished by pressing key into contact. Cover is furnished with or without fittings for lamp attachment.

It is simple, light-weight, strong and durable. One charge of the battery is capable of firing a great many shots.

Edison Electric Safety Trip Lamp

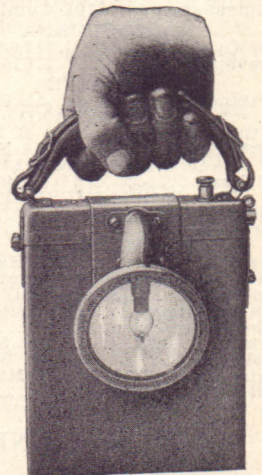
Consists of M-8 (Mine Lamp) Battery in steel case with special cover and lens. The case is provided with hook for attaching to mine car as "head" or "tail" light. This device is approved by the Workmen's Compensation Insurance Inspectors.



Edison Trip Lamp—Hooks Over Either End of the Car

Edison Electric Safety Hand Lamp

Illustration shows arrangement of Edison Safety Mine Lamp as a hand lamp. This consists of a standard M-8 Battery in steel case with special cover. The lamp is attached directly to cover and the cover provided with bails for attaching leather handle. Largely used as Inspector's, Official's and Visitor's lamp.



Electric Safety Hand Lamp