J. K. HALLOCK & E. R. BLOOD.

Machines for Making Lamp-Black.

No. 205,955. Patented July 16, 1878.

Fig 1

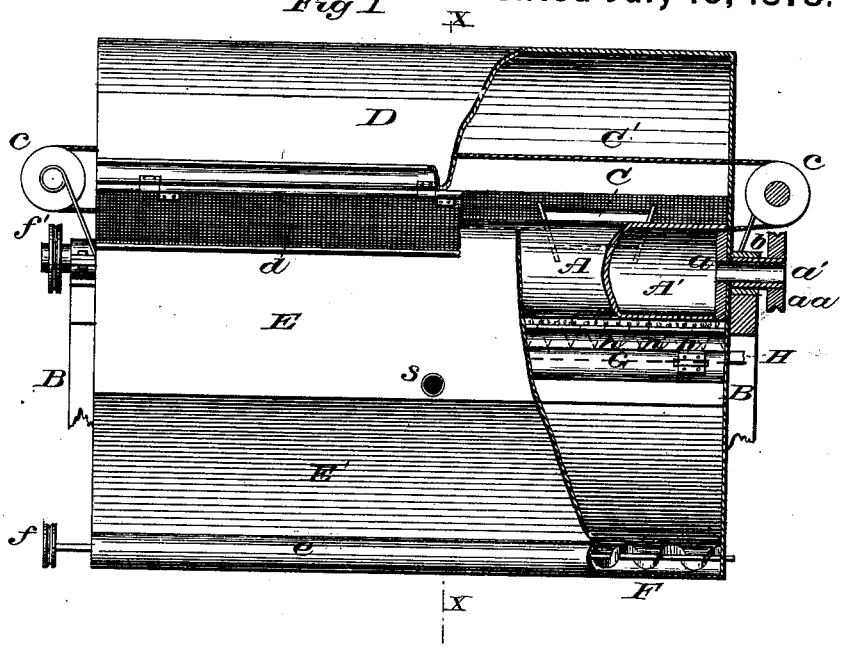


Fig 2

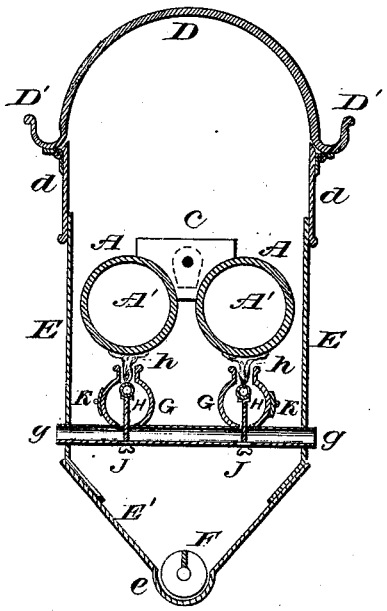
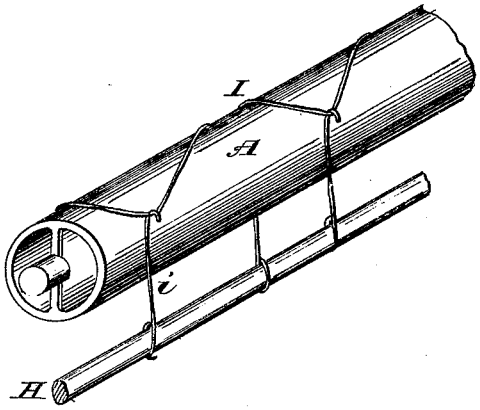


Fig 3



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UNITED STATES PATENT OFFICE.

JOHN K. HALLOCK AND ERASTUS R. BLOOD, OF ERIE, PA., ASSIGNORS, BY MESNE ASSIGNMENTS, TO FRANK GUNNISON, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR MAKING LAMP-BLACK.

Specification forming part of Letters Patent No. **205,955**, dated July 16, 1878; application filed January 26, 1878.

To all whom it may concern:

Be it known that we, JOHN K. HALLOCK and ERASTUS R. BLOOD, of Erie, in the county of Erie and State of Pennsylvania, have invented a new and useful Improved Machine for making Lamp-Black; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to the construction of a device for manufacturing lamp-black from a burning flame of vapor, such as hydrocarbon gas or hydrocarbon oil, benzine, gasoline, or like substances.

Our device is shown in the accompanying drawing, which forms a part of this specification, as follows:

Figure 1 is a side elevation, with parts broken away to show construction of parts within. Fig. 2 is a cross-section, vertical, on the line *x x*, Fig. 1. Fig. 3 is a view of an alternate form of construction of a scraping device, which will be fully explained hereinafter.

The construction and operation of our device will fully appear in the following general description:

A A are hollow cylinders, mounted on journals *a'* in journal-boxes *b* on a frame-work, B. In the drawing we show two of these cylinders. There may be as many as desired. Beneath each of the cylinders is a gas-pipe, H, which is provided with as many jet-openings as desired. The gas jets or flames *h* impinge against the outer surface of the cylinder. The cylinders are made to revolve by some convenient mechanical appliance—as, for instance, by a belt running on the pulley *a a*. By means of this revolution of the cylinders the particles of lamp-black or free carbon which are deposited upon the face of the cylinder are at once removed from the flame. During the revolution of the cylinder the black may be removed by some kind of scraping device. These cylinders we show as hollow; but, if desired, they may be solid. If solid, they would be very heavy and costly. If hollow, as we show them, they may be kept cool by a current of water passing through them, or they may be left open at their ends, and the natural circulation of air therein would keep them at a low temperature. When water is used the hollow cylinder A' is provided with a head, *a*, and the journal *a'* is hollow. Thus the water can pass in at one end and out at the other.

In Fig. 3 the cylinder is shown open for a circulation of air. If desired, a circulation of air may be effected by some convenient blast apparatus.

This application of the flame to the exterior surface of a revolving cylinder constitutes an essential part of our invention. The flames which deposit the particles of carbon need not necessarily come in contact with the cylinder; but it is undoubtedly preferable that they should. These cylinders may be of any size desired. We expect to make them of tubing of about six inches in diameter, and of from ten to twenty feet in length.

For removing the black from these cylinders any form of scraper may be used. We have, however, shown two forms of scraper. One of these is shown at C, Figs. 1 and 2. This consists of a sheet of metal or other substance, set edgewise against the face of the cylinder, and by means of the belt C' and pulleys *c*, which are propelled by any convenient mechanism, it is made to reciprocate from one end of the cylinder to the other, or over any portion of the length of the cylinder desirable. When this form of scraper is used it will be found convenient to let it rest upon the face of two of cylinders, as shown in Fig. 2, in which case the cylinders should revolve toward each other. The other form of scraper is shown in Fig. 3. It consists of a wire, I, arranged in a zigzag manner upon the face of the cylinder, and held taut by weights or other appliances applied alternately at opposite sides of the cylinder. In place of the above arrangement the wire may coil around the cylinder. In place of wire a band of metal may be used. When the black is removed from the rollers A it will fall into a trough, E', beneath. In the drawings we show this trough as forming the bottom of the case E, but it may be placed at any point below the scraper. As a convenient means of removing the black from this trough we show a worm, F, which, when revolved, will draw the black to one end of the trough and then expel it. We do not intend to limit ourselves to the

use of the worm F for this purpose, for any convenient means may be used for that purpose.

The depositing-cylinders are inclosed in a case composed of the top or dome D and sides E. The sides are provided with gauze doors or flaps *d*. The products of combustion first impinge against the cylinders, where probably most of the free carbon will be lodged. The products of combustion not thus retained will rise to the top of the dome, where most of the remaining free carbon will be deposited. The gases and vapors resulting from combustion will then find their way through the gauze *d*, where any still floating particles of carbon will be retained. This gauze is made in the form of a door, so as to admit of access to the inside of the case, and also so that they can be propped open at any point to allow of a freer exit of the products of combustion, if desired. If found necessary in actual practice other ventilators may be constructed at such points as desirable.

This surrounding case is intended simply as a means of augmenting the efficiency of the machine by retaining the products of combustion so as to secure the particles of carbon not collected by the cylinders, and also by preventing the escape of any of the black which may be set in motion by the operation of scraping; but the machine would be perfectly operative if no casing was employed.

As another means for increasing the efficiency of the machine, we have provided for the application of devices for regulating the combustion. This is accomplished by regulating the supply of air to the flame, not only regulating the quantity but the point at which the air impinges against the flame. The means which we herewith present for this purpose are the tubes G and *g*. The tube G extends the entire length of the tube or gas-pipe H, and surrounds it in such a manner that the air which flows in from the ends of this tube G and from the tubes *g*, which are merely supply-tubes, is brought in contact with the flame at a point a little above its base. In fact, the upper arch of these tubes G has the office somewhat of a cone or deflector in a lamp; but in this case the cone is provided with a neck, which surrounds the flame most of its way to the cylinder. This neck prevents any air coming in contact with the flame other than that which is supplied at its base. The result of this construction is an imperfect combustion. The depositing-surface being in close proximity to the top of the neck of the cone or tube or deflector G, the action is not unlike that produced by holding an object over and near to the top of a lamp-chimney.

This device for regulating the combustion may be used in any lamp-black machine.

The lower part of the tube G may be of any form desirable. It may be left entirely off if desired, the chief or essential part being a deflector or cone and a neck or their equivalents, the final result being accomplished by a proper supplying of air to the flame, a confining of the flame in at least part of its passage to the depositing-surface, in connection with the overhanging surface itself.

In order to obtain easy access to the gas-pipe or jet, we hinge one wall of the neck, as at K. In order to regulate the contact of the flame with the cylinder, we provide for the adjustment, toward and from the cylinder, of the gas-pipe, by the thumb-screws J.

We are aware that it is old to collect lamp-black by causing a flame to impinge against a cool surface. We are also aware that the inner surface of a hollow cylinder has been used as a depositing-surface. We do not, therefore, lay claim to the use of a revolving cylinder as a depositing-plate. By using the exterior surface as a depositing-surface much smaller cylinders can be used, and in this form it will be practical, if desired, to use cylinders of soap-stone, which is an excellent depositing-surface. And, furthermore, when the outer surface is used the remaining products of combustion can be more easily dealt with in order to collect the particles of carbon which have not been deposited; and where water is used for keeping the depositing-surface cool, it is more conveniently applied by running it through the cylinder than upon it; and where a blast of air is to be used, our device furnishes a practical means for its employment.

By the use of the surrounding case D E we are able substantially to exclude currents of air which might carry off floating particles of carbon, and we also have better control of the air used for the purposes of combustion.

When the surrounding case D E is used our machine operates both by impingement and as a smudging-machine—that is to say, we collect the black by both the impinging and the smudging processes.

We are aware that revolving cylinders have been used over flames in machines of various kinds other than lamp-black machines—such, for example, as is shown in patent to Gale, August 18, 1868, reissued January 2, 1872, No. 4,689, for a pea-nut roaster.

We do not desire to claim, broadly, as new a cylinder revolving above a flame; but in the manufacture of lamp-black we believe the use of such a device is new.

What we claim is as follows:

1. In a lamp-black machine, the combination, with one or more burners, of a cylinder adapted to be revolved, and arranged above said burners, as described, whereby the flame from said burner shall impinge upon the exterior surface of the cylinder, for the purposes mentioned.

2. In a lamp-black machine, the combination, with one or more burners, of a hollow cylinder adapted to be revolved, arranged above said burners, as and for the purposes described, and adapted for the application to the interior thereof of means for keeping its exterior surface cool, for the purposes set forth.

3. A lamp-black machine which has a cyl-

inder provided with devices whereby it can be revolved, and a series of burners whereby lamp-black may be deposited upon its exterior surface, and a device for removing the lamp-black thus deposited from said cylinder while the same is revolving, substantially as set forth.

4. A lamp-black machine which has a depositing-surface, below which is arranged a burner, so that the flame thereof shall impinge against it, and a surrounding case for inclosing said depositing-surface and burner, and adapted to retain the undeposited lamp-black and allow the products of combustion to gradually escape, substantially as set forth.

5. A lamp-black machine which has a depositing-surface, with burners located with relation thereto, as and for the purposes described, and a surrounding case for retaining the undeposited lamp-black, and air ducts or conduits G *g* formed within said case, by which the atmospheric air can pass from the exterior of said case directly to the burners within without disturbing the inclosed products of combustion, as set forth.

6. In a lamp-black machine, the surrounding case, as described, provided with the openings or exits through which the products of combustion can escape, as set forth.

7. In a lamp-black machine which has a burner or burners and a superimposed depositing-surface, the air-guides, constructed and adapted to operate with relation to the said burner and surface, substantially as and for the purposes described.

In testimony whereof we, the said JOHN K. HALLOCK and ERASTUS R. BLOOD, have hereunto set our hands.

JOHN K. HALLOCK.
ERASTUS R. BLOOD.

Witnesses:
CHAS. H. STRONG,
JNO. D. MCFARLAND.