J. M. CORNELL.

Lamp-Black Apparatus.

No. 210,672. Patented Dec. 10, 1878.

FIG. 1.

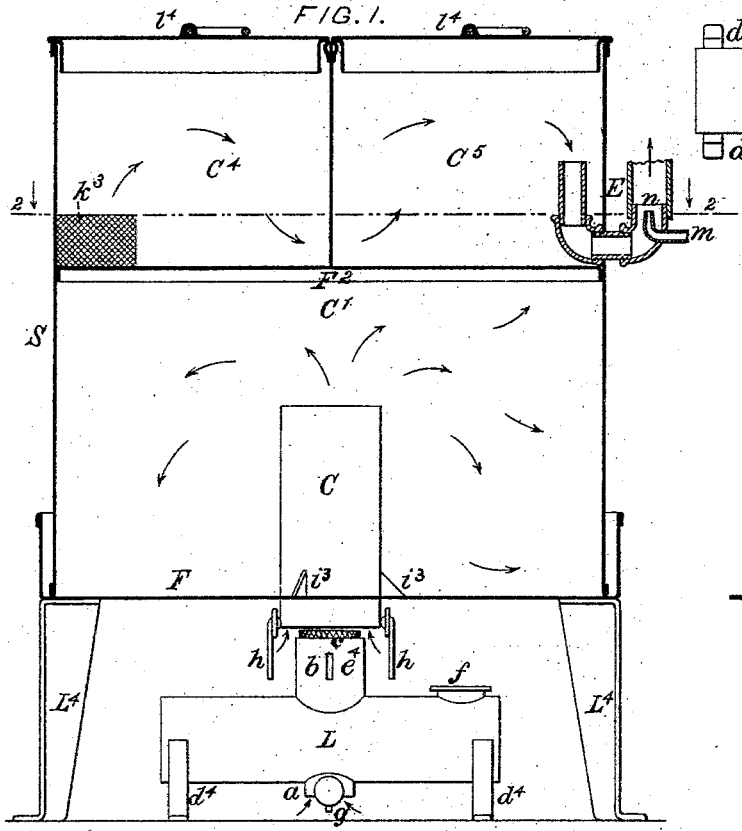


FIG. 2.

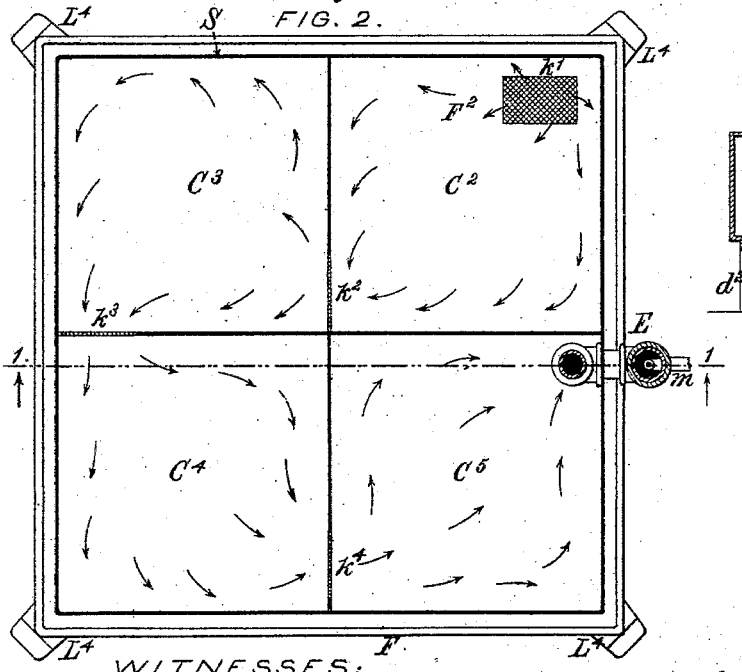


FIG. 3.

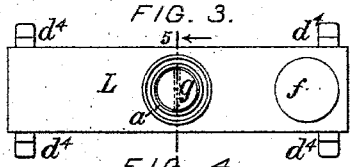


FIG. 4.

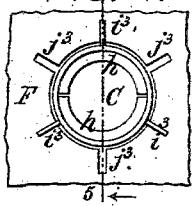


FIG. 5.

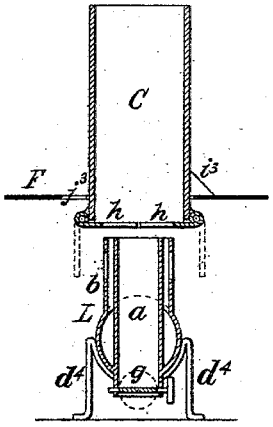


FIG. 6.

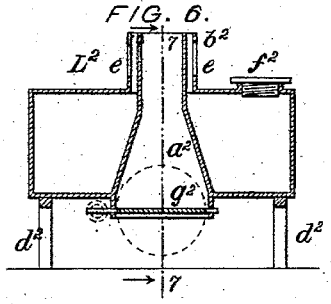
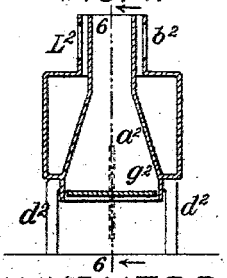


FIG. 7.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN LAMP-BLACK APPARATUS.

Specification forming part of Letters Patent No. **210,672**, dated December 10, 1878; application filed September 12, 1878.

To all whom it may concern:

Be it known that I, JOHN MILTON CORNELL, of the city and county of New York, and State of New York, have invented a new and useful Improvement in Lamp-Black Apparatus, of which the following is a full, clear, and exact specification.

My present invention relates to the manufacture of the finer qualities of lamp-black or carbon-black for printer's ink, &c.

My said invention consists, first, in the combination, in a lamp-black apparatus, of a smoke-producing burner adapted to form a thin annular flame, and having a central air-tube for the admission of air to the interior of said flame, and a concentric chimney supported above said burner, and in which the impurities of the carbon are consumed by the flame of said burner, said chimney being provided with semi-annular dampers at its lower end to close the space between the chimney and the flame more or less completely, at will, to regulate the access of air to the exterior of the flame within said chimney for determining the quality and quantity of the product. The air has constant access externally to the base of the flame for supporting ignition.

My said invention consists, secondly, in the combination, in a lamp-black apparatus, of a smoke-producing burner adapted to form a thin annular flame, and having a central air-tube for the admission of air to the interior of said flame, a concentric chimney supported above said burner, and in which the impurities of the carbon are consumed by the flame of said burner, and a free smoke-black-collecting chamber, which receives the purified carbon particles directly from said chimney. The finest qualities of black are thus produced without danger of reburning, and consequently with the highest luster and blackness. Said purifying-chimney forms a retort, in which the flame, with its more or less abundant supply of oxygen, applies the requisite heat to the carbon particles for their purification before they are liberated, and said chimney in this combination insures the desired effect, however rapidly the operation proceeds.

My said invention consists, thirdly, in a peculiar combination of parts for producing purified lamp-black from hydrocarbon oil or gas by consuming the impurities of the carbon in the smoke-producing flame, and collecting the purified carbon particles without danger of reburning the same, a series of free smoke-collecting chambers being employed, together with one or more connecting-screens.

My said invention consists, fourthly, in a peculiar combination of parts for producing purified lamp-black by said process with superior rapidity and efficiency, a draft-jet being employed for drawing the requisite air into contact with the flame and for drawing the smoke through said screens.

My said invention consists, fifthly, in a peculiar combination of parts for producing different grades of purified lamp-black by said process at one and the same speed, &c., one or more dampers being employed to regulate the admission of air to the flame, as hereinafter more fully set forth.

Fig. 1 of the accompanying drawing represents a vertical section of a lamp-black apparatus illustrating this invention, the lamp and its chimney being shown in elevation. Fig. 2 is a horizontal section of the same, showing a plan of its upper part. Figs. 3 and 4 are plan views, and Fig. 5 a vertical section, of the lamp and its chimney. Fig. 6 is a longitudinal section, and Fig. 7 a transverse section, of another lamp, illustrating a modification.

The planes of the respective sections are indicated by correspondingly-numbered lines across other figures.

Like letters of reference indicate corresponding parts in the several figures.

An apparatus for making lamp-black according to this invention may be of any desired capacity, as determined by the size and number of its lamps.

In the illustration a single lamp, L, is employed, being located while in use beneath the center of a horizontal elevated platform or floor, F, which is supported by corner posts or legs L^4, and serves to support a metallic chimney, C, above the lamp, and also to support an open-bottomed rectangular smoke box or collector, S, the edges of said floor F having vertical flanges to prevent any displacement of the smoke-box.

The lamp L is of peculiar construction, as illustrated by Figs. 3 and 5, having a vertical

tube, *a*, extending upward from below the bottom of the oil-reservoir to a point at or about the top of a concentric outer wick tube or neck, *b*, which projects upward from the top of the reservoir. An ample Argand wick, *c*, is thus accommodated, and air is admitted to the interior of the flame, the reservoir being elevated by legs d^4. Longitudinal slots e^4 in the neck *b* provide for elevating the wick in the most simple manner, and a screw-cap, *f*, provides for filling the reservoir.

Any approved wick-elevator may be substituted, and the oil may be supplied to the reservoir automatically, if preferred.

A cylindrical, or nearly cylindrical, air-tube, *a*, is represented in Figs. 3 and 5. The lamp L^2, (shown in Figs. 6 and 7,) illustrates the employment of an air-tube, a^2, in the form of an inverted funnel, to insure an ample supply of air by the concentration of a larger current. Otherwise said lamp L^2 is substantially the same as the lamp L.

To regulate the supply of air to the interior of the flame, a damper, *g*, is pivoted within the air-tube *a;* and to regulate the supply of air to the exterior of the flame, a pair of semi-annular dampers, *h*, are pivoted within the lower end of the chimney C, so as to close more or less of the space around the flame, the latter being located concentrically within the chimney.

When the dampers *g h* are fully open, as shown in Fig. 1 and in dotted lines in Fig. 5, a full supply of air is admitted to the flame both internally and externally.

The length of the chimney C will be made sufficient to confine the flame, so as to burn out all impurities in the carbon, as nearly as may be, when a full supply of air is admitted.

In the illustration the chimney is supported loosely in the floor F by lugs i^3, adapted to pass through notches j^3. This provides for dropping the chimney, so as to facilitate scraping said floor.

The smoke-box S is divided horizontally by a second floor, F^2, below which a collecting-chamber, C^1, is formed. The upper end of the chimney C is located sufficiently far below this second floor to preclude reburning the carbon thereon, a free escape of the smoke into the surrounding space being provided. A considerable quantity of good black will consequently collect on the surfaces of the chamber C^1, and access is had thereto for periodically removing the accumulations by lifting and inverting the smoke-box.

The space above the floor F^2 is divided by vertical partitions into a series of compartments, C^2 C^3 C^4 C^5, communicating with the chamber C^1 and with each other by means of screens k^1 k^2 k^3 k^4, of fine wire-gauze, which fill orifices in said floor F^2, and in said partitions near said floor, and tend to arrest the carbon particles. Removable covers l^4 provide for readily scraping out the upper compartments.

An escape-pipe, E, extends from near the top of the last of said series of upper compartments and through an outer wall of the smoke-box, beyond which a small steam or air pipe, *m*, enters said escape-pipe and terminates in a nozzle, *n*, by which a draft-jet is formed.

A convenient valve or stop-cock will be employed to regulate the force of the jet, and one escape-pipe and jet may serve for several series of collecting-chambers.

In operation, the said jet draws the smoke from the chambers C^1 through the screens k^1 k^2 k^3 k^4, the same becoming more and more attenuated, and the gaseous portion alone, mingled with steam or air, passes out through the escape-pipe E. Extending its effect to the lamp-chimney C and air-tube *a*, said jet operates to increase the draft of the same more or less, and thus to vary the supply of air to the flame under control of the damper *g h*.

When the dampers are opened to their fullest extent and the draft-jet is in operation the finest quality of black is produced; and when the dampers are closed the greatest quantity is produced for a given combustion of oil; but the more abundant product is necessarily less pure.

By partially opening the dampers more or less, any intermediate grade of black can be as readily produced, and the utmost uniformity in the production of any desired grade is secured.

The apparatus will be constructed of suitble metal, the mechanical details of construction to be determined by the material and size of each apparatus, and by the taste and skill of the builder.

I propose in some cases to use an Argand gas-burner in lieu of a lamp in connection with the purifying-chimney and collecting-chambers above described; but I do not claim an Argand gas-burner *per se* as a part of the present invention.

I am aware that Argand lamps for illuminating purposes have been constructed with air-tubes extending through their oil-reservoirs; but no one has ever before constructed a smoke-producing lamp for carbon-black apparatus with such an air-tube, so far as I am aware; and, as thus applied, said tube operates as a provision for burning out the impurities of the carbon, and not to insure the combustion of the carbon particles.

The draft-jet, gauze-screens, and other individual parts of my apparatus are also disclaimed, except as combined or arranged to operate in the manner and for the purposes herein specified.

The following is what I claim as new and of my own invention, and desire to secure by Letters Patent, namely:

1. The combination, in a lamp-black apparatus, of a smoke-producing burner having a central air-tube, a concentric chimney supported above said burner, and in which the impurities of the carbon are consumed by the flame of said burner, and a pair of semi-annular dampers at the bottom of said chimney for

regulating the access of air to the exterior of said flame, substantially as herein shown and described.

2. The combination, in a lamp-black apparatus, of a smoke-producing burner, having a central air-tube, a concentric chimney supported above said burner, and in which the impurities of the carbon are consumed by the flame of said burner, and a free smoke-black-collecting chamber communicating directly with the top of said chimney, substantially as herein shown and described, for the purpose specified.

3. The combination, in a lamp-black apparatus, of a smoke-producing burner having a central air-tube, a concentric chimney supported above said burner, and in which the impurities of the carbon are consumed by the flame of said burner, and a series of free smoke-black-collecting chambers and connecting-screens of fine gauze to arrest the liberated and purified carbon particles, as herein specified.

4. The combination, in a lamp-black apparatus, of a smoke-producing burner having a central air-tube, a concentric chimney supported above said burner, and in which the impurities of the carbon are consumed by the flame of said burner, a series of free smoke-black-collecting chambers and connecting-screens of fine gauze to arrest the liberated and purified carbon particles, and an escape-pipe containing a draft-jet for drawing air into said air-tube and chimney and the smoke through said screens, as herein set forth.

5. The combination, in a lamp-black apparatus, of a smoke-producing burner having a central air-tube, a concentric chimney supported above said burner, and in which the impurities of the carbon are consumed by the flame of said burner, a series of free smoke-black-collecting chambers and connecting-screens of fine gauze to arrest the liberated and purified carbon particles, an escape-pipe containing a draft-jet for drawing air into said air-tube and chimney and the smoke through said screens, and dampers for regulating the admission of air into said air-tube and chimney, and thereby regulating the quality and quantity of the product, as herein specified.

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Witnesses:
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