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METHOD AND APPARATUS FOR THE MANUFACTURE OF CARBON BLACK OR LAMPBLACK

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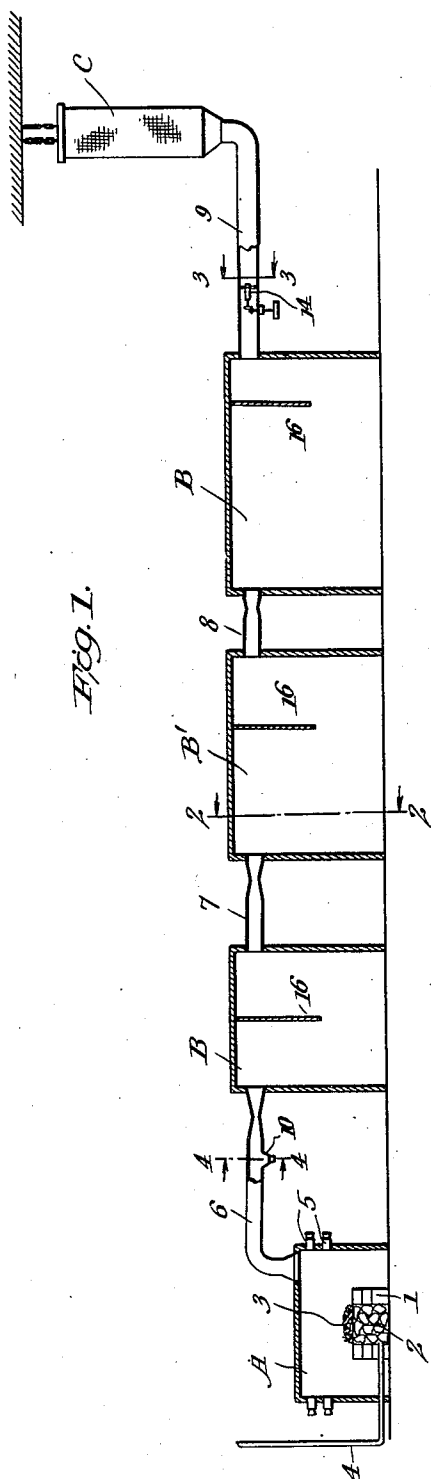


Fig. 1.

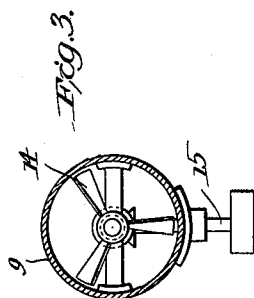


Fig. 3.

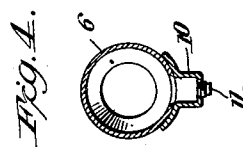


Fig. 4.

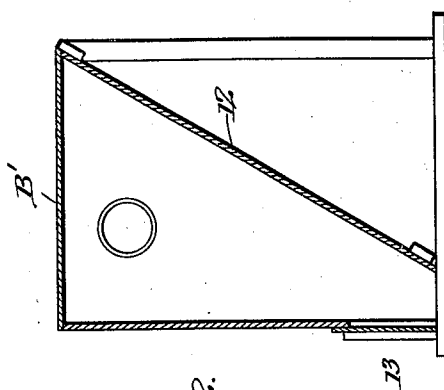


Fig. 2.

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METHOD AND APPARATUS FOR THE MANUFACTURE OF CARBON BLACK OR LAMP-BLACK.

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My invention relates to improvements in lampblack manufacturing systems, and has for its particular purpose to insure the entire recovery of the product and to classify the product during its recovery.

It has long been the practice in the art to conduct the combustion products of the oil or other carbonaceous matter through chambers known as settling chambers, the lampblack being deposited on the walls of such chambers and being recovered subsequently, for the most part by scraping the walls. This procedure is disadvantageous from the standpoint of economy, and particularly so when the walls are of masonry since in such case foreign matters are removed with the lampblack. My invention consists, in one important phase, in so impelling the smoke by mechanical means, that the settling chambers become to a high degree, expansion chambers for the gases, and the suspended particles are mostly precipitated to the floor for easy removal, rather than being deposited on the walls as described above.

Hitherto, the gases from the last settling chamber have been discharged directly into the air, whereby a considerable amount of the finest and most valuable product is lost. This loss would be particularly large were the gases mechanically impelled in such a system. To obviate this loss I propose to provide a bag house at the end of the system.

When the bag house system is used alone, the bags must be shaken frequently, since they collect the entire output, and, moreover, the recovered product is unclassified. According to my system the bags recover only the finest particles and consequently do not require constant attention. In the preferred embodiment of my invention the impelling means above referred to will be interposed between the last expansion chamber and the bag house so that it will also serve the purpose of feeding the gases to the latter at suitable velocity to keep the bags inflated. Due to the velocity of the gases through the various flues, these latter are kept clean.

In addition to the advantages enumerated, I am enabled by use of my improved system to materially speed up production.

In order that my invention may be readily

understood, I shall describe in connection with the accompanying drawings, its preferred embodiment, and while I shall describe what is strictly termed a lampblack apparatus, it is to be understood that my invention may also be applied to the manufacture of carbon black from gas.

The drawings show in Fig. 1 a side elevation of a system according to my invention, the side walls of various of the elements being omitted for the sake of clearness,

Fig. 2 is an enlarged vertical transverse section through one of the expansion chambers.

Fig. 3 is a section on the line 3—3 of Fig. 1, and,

Fig. 4 is a section on the line 4—4 of Fig. 1.

Referring to Fig. 1 of the drawings, A indicates a burner chamber in which is located the burner 1, consisting of an annular masonry structure filled loosely with rock, fire brick or the like, 2, at the top of which is asbestos wicking 3 used in starting the flame.

A pipe 4 conducts the oil to the lower part of mass 2. As is understood, combustion should take place under exclusion of as much air as possible and in order to regulate this factor, I provide pipes 5, set through the walls of chamber A, and these pipes may be plugged as desired. I prefer to dispose these pipes on all sides of the chamber A in order that the combustion may be regulated accurately under all wind conditions.

Leading from the top of chamber A is a flue 6 forming the first section of a flue line comprising the sections 6, 7, 8 and 9. The horizontal portion of flue 6 is slightly inclined down to the tar trap 10. As seen from Fig. 4, in particular, this trap consists merely of a downward expansion having a screw stopper 11, permitting the trap to be drained. At the end of section 6 is arranged the first expansion chamber B which is of any convenient form and preferably constructed of sheet metal. As seen from Fig. 2 the rear wall 12 of chamber B as well as B' and B'' is inclined so as to deliver the precipitated particles to the lower front of the chamber whence they may be withdrawn by opening door 13. Flue 7 connects cham-

ber B with chamber B' and flue 8 connects the latter with chamber B''. It will be noted that these expansion chambers increase progressively in length from the burner chamber. In operation the coarser particles will be precipitated in chamber B, lighter particles in chamber B', and still lighter particles in chamber B''. The lighter particles are precipitated more slowly than the heavier, and hence, I dimension the chambers as stated. By gauging the length of these chambers, classification of the particles into the exact grades desired is obtained, and while I have illustrated three expansion chambers, it is obvious that a greater or lesser number may be used. It will also be noted that the chambers are interconnected near their tops. Heretofore, it has been the custom to dispose the flue orifices alternately at the top and bottom of the settling chambers. However, in my system wherein the particles are precipitated to the floor, it is necessary to dispose the flue orifices near the tops of the chambers throughout, in order to prevent precipitated particles being carried through the system.

Chamber B'' is connected to bag C by means of flue 9, and disposed in the latter is a fan 14, which acts to draw the smoke from the burner chamber A and to impel the gas residue into the bag. The fan 14 may be driven in any convenient manner. As shown a pulley shaft 15 is journaled in the flue 9, and connects through bevel gears with the fan shaft.

In order to induce rapid expansion of the gases upon their entrance into the expansion chambers, each of the flues 6, 7 and 8, is provided with a constricted throat portion just in advance of each of the chambers B' and B''. To prevent any possibility of the current passing directly from one flue section to another, I suspend baffles 16 in each of the expansion chambers transversely to the flue orifices. To take care of air leakage into the system, the flue sections increase progressively in diameter, that is, section 7 is of greater diameter than section 6, etc.

From the above description it will be obvious that upon starting fan 14, a current will be induced throughout the system. It is the purpose of the described arrangement to impart a considerable velocity of the smoke in the flue sections, then to slow it up suddenly in the expansion chambers so that suspended particles will be precipitated. This is an essential difference from the old systems in which the smoke was merely allowed to stream slowly throughout the system so that the greater part of the suspended particles was deposited upon the walls of the settling chambers indiscriminately. A considerable quantity of valuable particles still remains in the gases after

their passage through the expansion chambers and these will be recovered by bag C which is of usual construction.

It will be noted that the flue line is fully exposed to the atmosphere, the smoke is cooled in its passage therethrough, and the precipitations of the suspended particles is thus aided.

While I have described and illustrated one embodiment of my invention, it is to be understood that I do not intend to be limited to the structure disclosed, and that my invention is to be construed from the following claims.

I claim:

1. The method of manufacturing lamp black consisting of burning carbonaceous material, passing the resultant smoke along a prescribed course comprising alternate contracted and expanded sections, and maintaining a sufficient velocity of the smoke in the contracted sections to cause its rapid expansion in the expanded sections, whereby substantially all of the suspended particles in the smoke are precipitated to the bottom of the expanded sections.

2. The method of manufacturing lamp black consisting in burning carbonaceous material, passing the resultant smoke along a prescribed course comprising alternate contracted and expanded sections, and applying an auxiliary impelling force to the smoke in its passage to increase its velocity in the contracted sections and cause its rapid expansion in the expanded sections, whereby substantially all of the suspended particles in the smoke are precipitated to the bottom of the expanded sections.

3. The method of manufacturing lamp black consisting of burning carbonaceous material, passing the resultant smoke along a prescribed course comprising alternate contracted and expanded sections, maintaining a sufficient velocity of the smoke in the contracted sections to cause its rapid expansion in the expanded sections, whereby substantially all of the suspended particles in the smoke are precipitated to the bottom of the expanded sections, and straining the gases escaping at the termination of said sections.

4. The method of manufacturing lamp black consisting in burning carbonaceous material, passing the resultant smoke along a prescribed course comprising alternate contracted and expanded sections, the latter sections increasing progressively in extent, and maintaining a sufficient velocity of the smoke in the contracted sections to cause its rapid expansion in the expanded sections whereby substantially all the suspended particles in the smoke are precipitated to the bottom of the expanded sections in progressive order of fineness.

5. The method of manufacturing lamp black consisting in burning carbonaceous

material, passing the resultant smoke along a prescribed course comprising alternate contracted and expanded sections, the latter sections increasing progressively in extent, applying an auxiliary force to the smoke in its passage to increase its velocity in the contracted sections and cause its rapid expansion in the expanded sections, whereby substantially all of the suspended particles in the smoke are precipitated to the bottom of the expanded sections in progressive order of fineness, and straining the gases escaping at the termination of said sections.

6. Apparatus for the manufacture of lampblack comprising a burner chamber, a collector bag, a flue line between said burner chamber and collector bag, expansion chambers interposed at intervals in said flue line the sections of said flue line being constricted immediately in advance of the expansion chambers and the latter increasing

progressively in length from the burner chamber to the collector bag, and a fan arranged to create a draft in the flue line and to inflate the collector bag.

7. Apparatus for the manufacture of lampblack, comprising a burner chamber, a collector bag, a flue line between the two, expansion chambers interposed at intervals in said flue line, the sections of said flue line progressively increasing in cross section and said expansion chambers progressively increasing in length from the burner chamber to the collector bag, said flue sections being constricted immediately in advance of said expansion chambers, and a fan arranged to create a draft in the flue line and to inflate the collector bag.

In testimony whereof I have hereunto set my hand.

ELMER B. BIRD.