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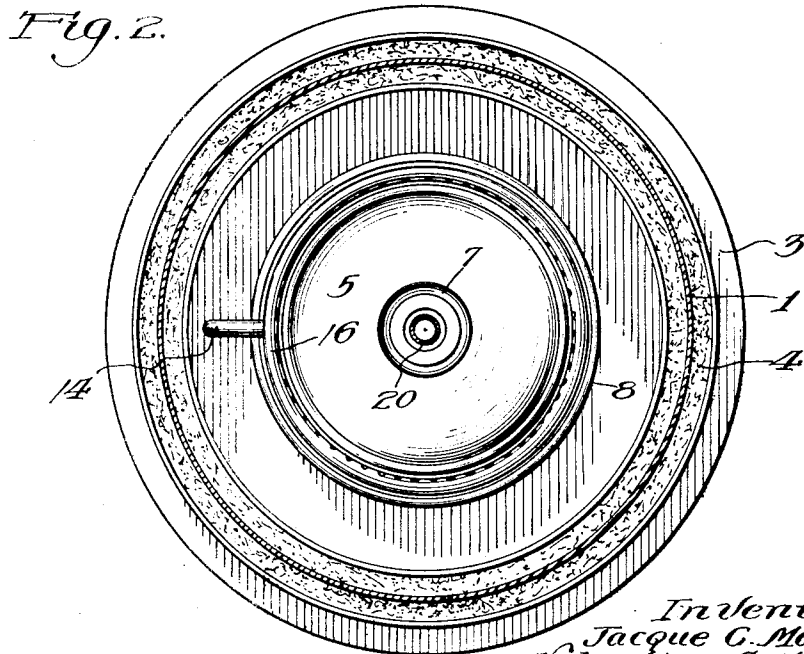
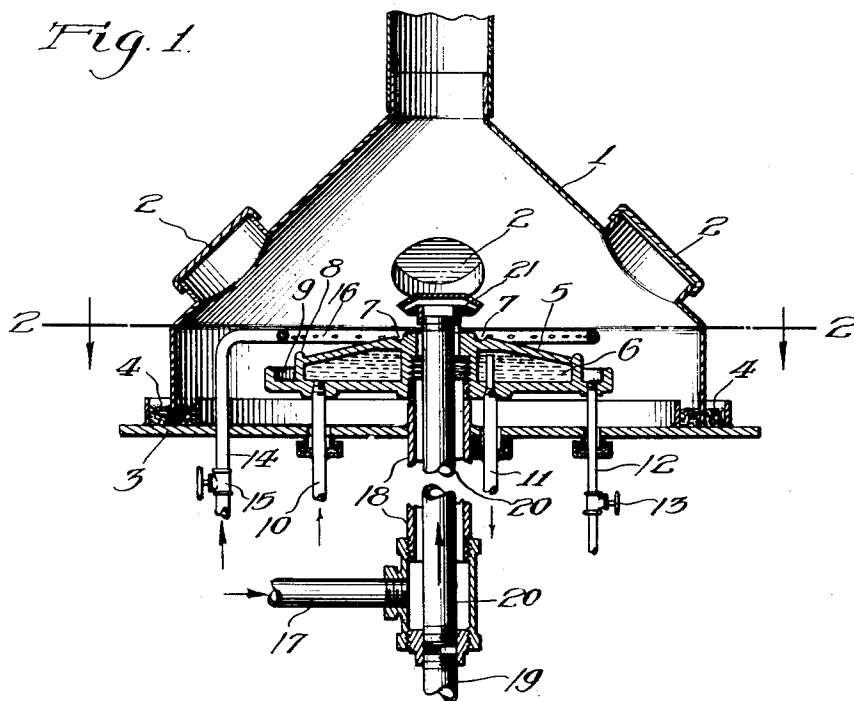
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METHOD AND APPARATUS FOR PRODUCING LAMPBLACK

Filed April 2, 1928

2 Sheets-Sheet 1



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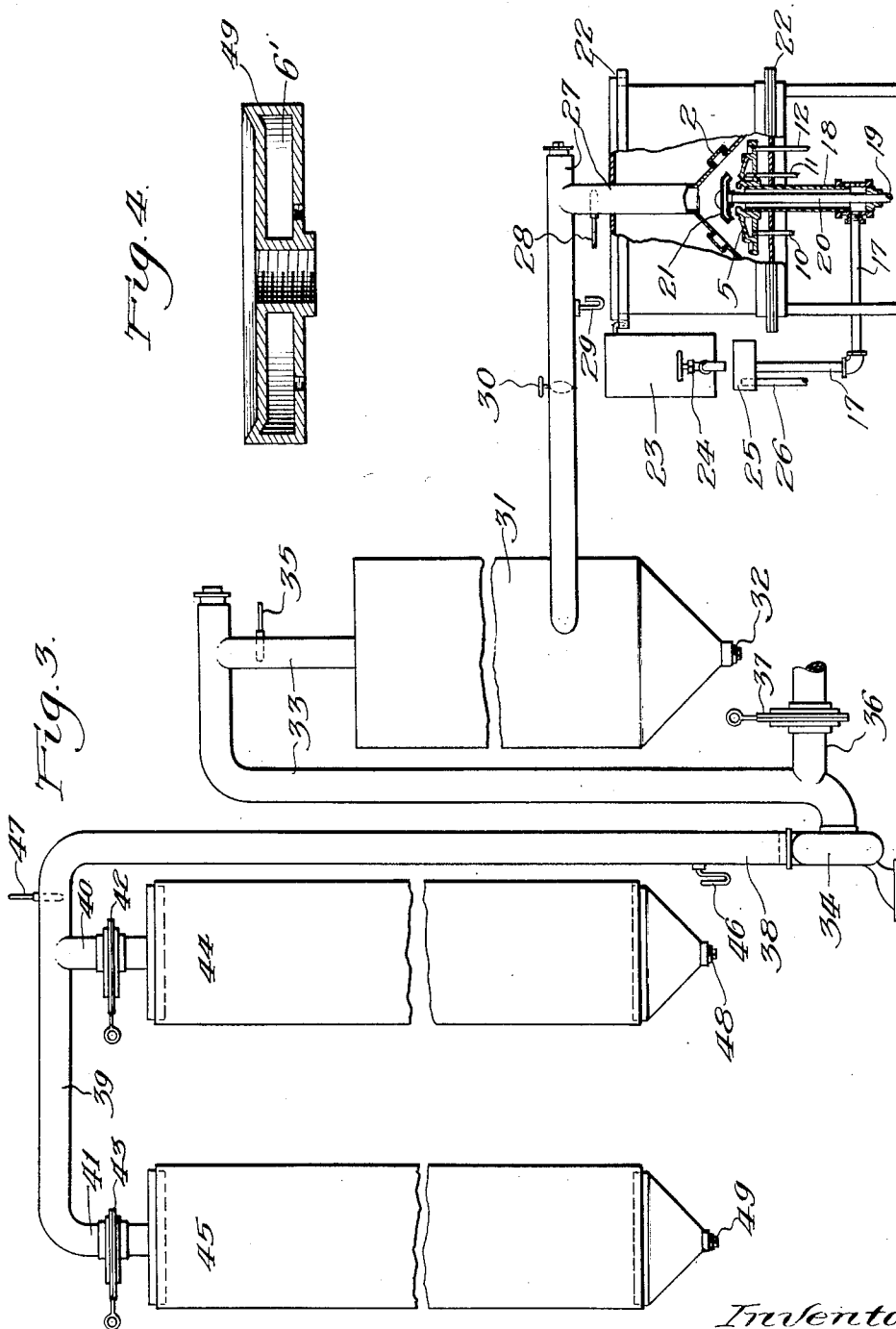
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UNITED STATES PATENT OFFICE

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METHOD AND APPARATUS FOR PRODUCING LAMPBLACK

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The present invention relates to improvements in the production of lampblack or carbonblack by the incomplete combustion of suitable carbonaceous material.

5 It is an object of the present invention to provide a method and apparatus especially adapted to positively control the production of lampblack products, or the like, from liquid hydrocarbons such as hydrocarbon
10 oils, residuum, packing house greases, fats, and the like.

Heretofore, it has been the practice to subject carbonaceous material in liquid and solid form to conditions of incomplete combustion
15 to produce lampblack and the like, and subsequently subject the products of such incomplete combustion to steps whereby the lampblack is separated and collected, while the freed combustion gases are removed. In
20 such practice, no attempt has been made to control the temperature of combustion, nor has any attempt been made to positively control either the supply of combustion supporting media, or the supply of the carbonaceous material itself. It has been found
25 that these factors are important in determining the quality and type of lampblack produced.

30 It is a further object of the present invention to provide a method and apparatus for the production of lampblack in which the temperature of the carbonaceous material is maintained at a predetermined point during combustion.

35 It is another object of the present invention to provide a method and apparatus for the production of lampblack wherein a positive control is maintained over the supply of combustion supporting media required to support the incomplete combustion.

40 It is another object of the present invention to provide a method and apparatus for the production of lampblack wherein the liquid hydrocarbon material is subjected to incomplete combustion while in the form of
45 a film.

50 The apparatus of the present invention comprises a housing enclosing a burner provided with a cooling means. Suitable conduits are provided for the introduction of

controlled amounts of the hydrocarbons and combustion supporting media.

As a feature of the present invention by exerting at the same time an exact control
55 over the quantity of hydrocarbons, the quantity of combustion supporting media, and the temperature of combustion, the quality of the lampblack produced will be uniform and unvarying. Also, by varying any or all of the
60 above, different grades and types of lampblack may be produced to meet given specifications. As another feature, by subjecting a film of the carbonaceous material to combustion, the combustion of the same will be
65 substantially uniform, the oil burning as fast as it flows over the burner. In the use of hydrocarbon oils as fuel, especially the heavier grades such as residuum from cracking processes and the like, the film effect is
70 quite important because of certain heavy ends in such oils. If a comparatively deep pool or body of such oil is subjected to combustion, the heat of the combustion of the surface of the oil tends to distill off the lighter ends,
75 leaving the heavier ends to burn later, thus causing variable conditions of combustion. By the use of a film of oil, all the oil burns as fast as it flows over the burner, the heavier and lighter ends burning substantially simultaneously. Also, by use of the film of oil,
80 a very sensitive control may be exerted over the oil surface during combustion.

Other objects, features and advantages will be more particularly apparent from the following detailed description.

85 In the drawings, Fig. 1 is a cross sectional view of the burner assembly of the present invention.

Fig. 2 is a view taken on line 2—2 of Fig. 1.

Fig. 3 is a diagrammatic elevational view
90 illustrating one form of apparatus, for practicing the invention.

Fig. 4 is a cross-sectional view of a modified type of burner.

Referring more in detail to the drawings, 95 and more particularly to Figs. 1 and 2, 1 designates a suitable housing provided with inspection and cleaning ports 2, the housing being mounted on base member 3. A packing
100 4 may be employed to seal the housing 1 to the

base 3. A burner 5 having a sloping cone-shaped surface, a jacket 6, an annular groove 7, an annular flange or lip 8, and an annular channel 9, may be disposed within the housing 1. An inlet pipe 10 and an outlet pipe 11 controlled by suitable valves (not shown) may communicate with the jacket 6. A pipe 12 controlled by a valve 13 may communicate with the channel 9, and a pipe 14, controlled by a valve 15, may communicate with a perforated annular conduit 16, the latter being mounted within the housing 1 in a position adjacent to or beyond the outer edge of the burner 5. An inlet pipe 17 may communicate with a conduit 18, the latter being connected with the core of the burner 5 in the manner shown. Inlet pipe 19 may communicate with a separate conduit 20, the latter in turn communicating with a deflecting cap member 21 mounted above the burner 5.

The above described burner assembly and housing, may be mounted on a suitable framework 22. An oil reservoir 23 having a spigot valve 24 may also be mounted on the frame 22. The inlet pipe 17 may communicate with a small tank 25 provided with an overflow pipe 26. The housing 1 may be connected to a flue 27, the latter having a pyrometer 28, manometer 29, and a damper 30. The flue 27 may communicate with a settling chamber 31, the latter being provided with a removable plug 32 and connected to a flue 33, the latter flue communicating with a blower 34. The flue 33 may have a pyrometer 35 and a branch pipe 36 controlled by a damper 37 communicating with the atmosphere. The discharge of the blower 34 may communicate with a flue 38, which in turn may communicate with a header 39, the latter having branches 40 and 41, controlled respectively by dampers 42 and 43, communicating with collecting bags 44 and 45 respectively. A manometer 46 may be mounted on the pipe 38 and a pyrometer 47 may be positioned in the header 39. The bags 44 and 45 may each be provided with removable plugs 48 and 49 whereby the lampblack may be removed from the same.

In the operation of the device, the reservoir 23 may be filled with a suitable hydrocarbon liquid, such as hydrocarbon oil, residuum or the like. The spigot valve 24 may be opened permitting a quantity of the oil to flow into the tank 25 from which it flows into the pipe 17, through the conduit 18, from which it flows over the surface of the burner 5, the tank 25 being so positioned as to provide a sufficient head of oil. The pipe 19 is connected with a suitable source for supplying air, or other combustion supporting media, whereby a continuous flow of the latter issues from the cap 21, flowing over the surface of the burner. As the oil flows over the edge of the core of the burner, it flows into the annular groove 7 which serves

to evenly distribute the oil causing it to flow over the sloping surface of the burner in a comparatively thin film. The oil is then ignited and the blower 34 started in operation. The products of combustion pass from the housing 1 through the flue 27 by reason of the draft created by the blower 34. By manipulating the valve 24, the quantity of oil passing over the burner 5 may be closely controlled, at the same time the quantity of air flowing through the pipe 19 may be controlled by a suitable means such as a valve (not shown). Thus the combustion of the oil may be closely controlled, as may be desired.

In starting the burner into operation, should some of the oil flow over the surface of the burner 5 without burning it will collect in the channel 9, from which it may be drained through the pipe 12. After the burner has been ignited, and the proper or desired temperature is obtained, the flow of the oil and combustion supporting media may be so regulated as to cause all the oil flowing over the burner to be burned, thus substantially no oil will collect in the channel 9 during the normal operation of the burner.

As a further feature of the invention, regulated quantities of a suitable cooling medium, such as water, steam, oil, air or the like, may be passed through the jacket 6 by means of the pipes 10 and 11, whereby a close control of the temperature of the surface of the burner 5 is effected. Thus the temperature of the film of oil may in turn be closely controlled during its combustion.

All or a portion of the desired quantity of combustion supporting media may be introduced through the perforated annular conduit 16, the pipe 14 being connected to a suitable supply. By regulating the quantity of air passing from the conduit 16 and the cap 21, the shape of the flame may be determined, which is still another factor in determining the yield and quality of the lampblack.

The draft on the burner may be controlled by manipulating the damper 30 and/or the damper 37. By observing the manometer 29, the draft may be readily maintained at the point desired. The gases, lampblack and other products of combustion pass through the flue 27 into the settling chamber 31 wherein the heavier products of the combustion may be separated. The remaining products of combustion pass out of the settling chamber 31 through the flue 33 to the blower 34, which forces them through pipe 38, header 47 and branches 40 and 41 into the bags 44 and 45, wherein the solid products of combustion, i. e. lampblack, etc., are deposited, the gaseous and vaporous products of combustion passing through the interstices of the fabric of the bags 44 and 45. By manipulating the dampers 42 and 43, the bags may be alternately re-

moved and emptied, without shutting down the apparatus. To prevent damage to the bags 44 and 45 from the hot products of combustion, sufficient air may be introduced through the branch flue 36 by manipulating the damper 37 to cool the products of combustion to such a point that the bags will not be damaged.

The burner 49 illustrated in Fig. 4 is of the trough type whereupon the oil to be burned is maintained in a pool or body as contrasted with the film heretofore mentioned. This burner has a similar jacket 6' to accommodate a suitable cooling medium whereby the temperature of the oil prior to its combustion may be closely controlled. The burner 49 may be mounted in the same manner as the burner 5, being supplied with air and oil by means of the same elements, i. e. the perforated annular conduit 16, the conduits 18 and 20, and the cap member 21.

Suitable apertures (not shown) may be provided in the housing 1 through which air may be introduced to control the shape of the flame. The cap 21 may be vertically adjustable above the burner 5. Also, its orifice through which the air is discharged over the burner may be widened or narrowed, as desired. A suitable cleaning means, such as a mechanical scraper, may be provided to clean the surface of the burner. While I have shown the burner assembly mounted in an enclosed framework 22, such construction is not necessary to the proper functioning of the burner assembly.

We claim as our invention:

1. In an apparatus for the manufacture of lampblack, a burner having an inclined surface, means for supplying liquid hydrocarbon thereto, and means for filming the liquid over said surface.

2. In an apparatus for the manufacture of lampblack, a burner, means for supplying liquid hydrocarbon thereto, means for filming the liquid over said burner, a jacket for said burner, and means for passing a temperature regulating medium through said jacket.

3. In an apparatus for the manufacture of lampblack, a burner having an inclined surface, means for supplying liquid hydrocarbon to said burner, means for filming the liquid over the top of said inclined surface, and means for passing a temperature regulating medium in contact with the underside of said surface.

4. A method for producing lampblack which comprises incompletely burning liquid hydrocarbon while continuously flowing the same by gravity in a thin film.

5. A method for producing lampblack which comprises incompletely burning liquid hydrocarbon while flowing the same by gravity in a thin film and controlling the temperature of the hydrocarbon being burned by

passing said film in indirect heat exchange relation with a temperature regulating medium.

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