March 29, 1949. P. WOLLNER 2,465,953

MELTING APPARATUS FOR BITUMINOUS MATERIALS

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Fig. 1

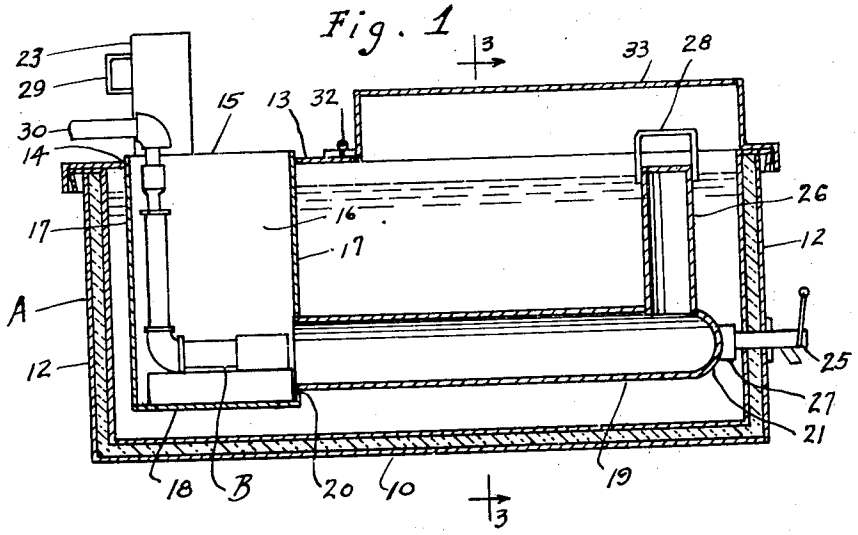
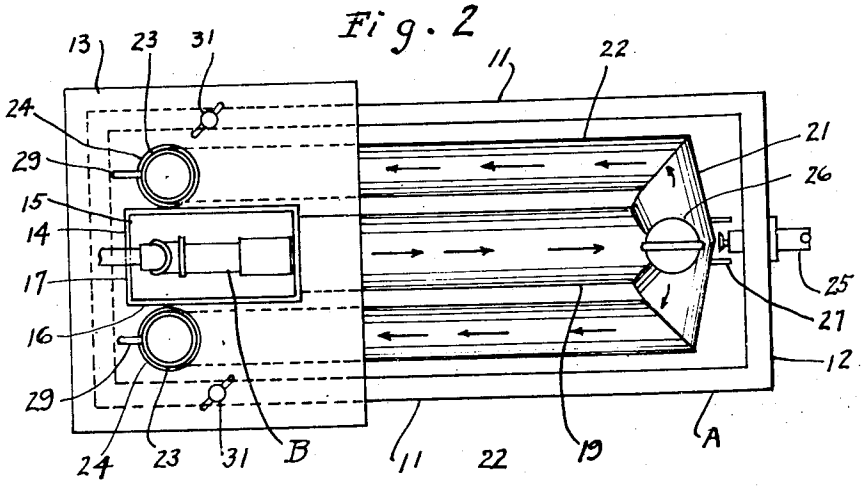


Fig. 2



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Fig. 3

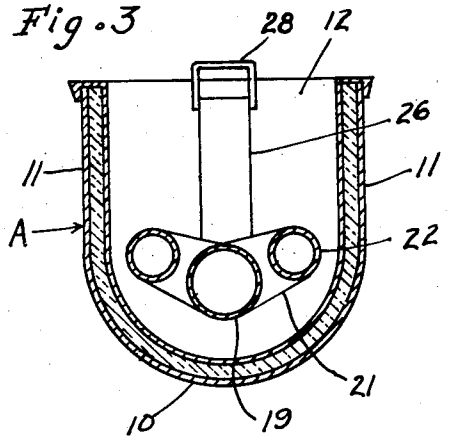
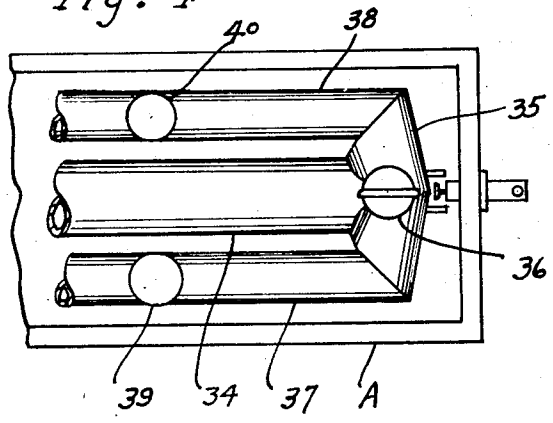


Fig. 4



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MELTING APPARATUS FOR BITUMINOUS MATERIALS

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5 Claims. (Cl. 126—343.5)

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This invention relates to apparatus for melting bituminous materials and the same has particular reference to a melting apparatus of the immersion heater type for melting tar, asphalt and the like.

Such materials are poor heat conductors especially in the unmelted or partly melted condition and therefore require a relatively long time for the heat applied thereto for melting the same to be transmitted throughout the contents of the container. This is especially true of immersion type heater apparatus in which the heat is introduced through a flue extending through the container and surrounded by the material. In this type of heater the material adjacent the flue readily liquefies and frequently becomes overheated before the material adjacent the walls of the container receives sufficient heat to melt the same. Since the melted material is drawn off through a spigot which is generally located at one end of the container where the material remains in a solid state for a long period after heat has been applied to the container, considerable difficulty is encountered in drawing off the liquid through the spigot.

The invention therefore has in view an apparatus of the immersion heater type which is so constructed and arranged as to provide a constant flow of the melted material from the interior of the container to the outlet spigot.

The invention further has for an object the provision of means for heating the material so as to form a liquid stream thereof extending from the interior of the container to the upper surface of the material therein and adjacent the entrance to the spigot by which the melted material may escape from the region surrounding the flue and will flow in a stream towards the spigot and be available for drawing off at all times.

The invention further resides in a heating apparatus of the indicated character which may be operated at high thermal efficiency and which functions to increase the melting capacity of the apparatus without the danger of overheating the material and which effects a rapid melting of the material by which the time elapsing between the initial heating of the material until the same is in a melted condition for drawing off is considerably reduced.

With the foregoing and other objects in view reference is now made to the following specification and accompanying drawings in which the preferred embodiment of the invention is illustrated.

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In the drawings:

Fig. 1 is a longitudinal vertical sectional view of a melting apparatus constructed in accordance with the invention.

Fig. 2 is a top plan view thereof with the lid removed.

Fig. 3 is a transverse sectional view taken approximately on line 3—3 of Fig. 1.

Fig. 4 is a fragmentary plan view of a modified form of the invention.

Referring to the drawings by characters of reference the apparatus includes a container A for receiving the material to be heated and melted and which consists of a bottom wall 10 of arcuate shape in cross-section, side walls 11 and end walls 12 each of which are formed of spaced inner and outer shells between which suitable heat insulation material is interposed such as rock wool, fibre glass and the like so as to retain the heat within the container and prevent dissipation thereof.

Supported upon the upper edge of the container A at one end thereof is a cover panel 13 formed with a substantially central opening 14 therein of rectangular formation from which depends a rectangular shaped receptacle 15 open at the top and provided with continuous side and end walls 16 and 17 and a bottom wall 18 which define a well sealed against the entrance of the material therein from the container A and in which is arranged an immersion heater B for heating the material in the container.

A tubular flue 19 is secured at one end in an opening 20 in the inner end wall 17 of the receptacle B which flue extends forwardly therefrom and is connected with a manifold 21 adjacent the opposite end of the container A. The manifold 21 extends transversely of the said container and connected therewith on each side of the flue 19 is a tubular flue 22 in communication with the flue 19 through the said manifold and which flues extend longitudinally of the flue 19 towards the opposite end of the container and connect with upwardly directed flues or stacks 23 respectively protruding through openings 24 in the cover panel 13.

The heater B may be of any preferred immersion type and is supported on the bottom wall 18 of the receptacle 15 in longitudinal alignment with the flue 19 so as to direct a flame longitudinally of said flue 19 for heating and melting the bituminous material contained in the container A, the gases of combustion being conducted through the return flues 22 and discharged through the open upper ends of the flues or stacks

23. The container A is provided with a valve or spigot 25 opening into the container through the end wall 12 at the opposite end from the heater B for drawing off the melted material.

In order to provide means for forming a column of molten material extending from the region surrounding the flue 19 upwardly to the upper surface of the material in the container and adjacent the valve or spigot 25 so as to cause the molten material to flow toward the said valve or spigot, a cylindrical tube 26 is provided which is secured to and opens at its lower end into the manifold 21 and extends vertically upward therefrom with the upper end thereof closed and protruding above the top of the material in the container. The tube 26 provides a pocket into which the heated gases of combustion rise from the manifold so as to maintain the tube in heated condition at all times during operation of the apparatus. The bituminous material surrounding said tube is maintained in a molten condition extending from the flue 19 to the top of the material in the container A and between the tube 26 and the adjacent end wall 12 of the container and in the region of the valve or spigot 25. In addition to providing means for producing a flow of the molten material from the region surrounding the flue 19 and the formation of an upwardly extending column thereof at the end of the container A adjacent the valve or spigot 25 whereby the molten material will continually flow down said column and be available for drawing off through the spigot at all times, the same also functions to prevent overheating of the material adjacent the tube 19 and a gravitation of the unmelted material to the region surrounding the flue 19 as the molten material is drawn off.

The manifold 21 is provided with spaced solid metallic lugs 27 which are welded or otherwise secured thereto so as to project forwardly on opposite sides of the inlet of the valve or spigot 25. The lugs are heated by the gases of combustion in the manifold and transfer the heat by conduction and radiation to the material between the manifold and the inlet of the valve or spigot to thereby provide a continuous channel of molten material extending from the interior of the container A to the outlet spigot.

The receptacle 15 is disposed in spaced relation to the bottom wall as well as the side and end walls as illustrated and the flue 19 and return flues 22 are similarly spaced from the bottom wall of the container so that the bituminous material may surround the same. A handle 28 is provided on the upper end of the tube 26 and handles 29 are provided on the protruding portions of the flues or stacks 23 forming means by which the immersion unit may be removed from the container A for cleaning purposes. The immersion heater B may also be removed from the receptacle 15 by disconnecting the supply pipe 30 which leads to a source (not shown) of hydrocarbon fuel.

The cover panel 13 is removably secured upon the container A by wing screws 31 projecting upwardly from the flanged upper edge of the container and hinges 32 are provided at the inner edge of the cover panel for hingedly connecting the lid 33 thereto in overlying relation with the material in the container A.

The tube 26 is preferably located centrally of the manifold 21 adjacent the outer end of the flue 19 as illustrated so that the flow of the molten material from the region surrounding the flue 19 will be centrally of the container A and

toward the valve or spigot 25. However, one or more such tubes may be provided as illustrated in the modified form of the invention shown in Fig. 4 of the drawings in which is provided a longitudinally extending flue 34 similar to the flue 19 in a similar container A which flue 34 is connected with a manifold 35 and extending upwardly therefrom is a tube 36 similar to the tube 26. In addition to said tube the return flues 37 and 38 are each provided with an upwardly extending tube 39 and 40 having closed upper ends which are located adjacent the top of the container A. These tubes receive the gases of combustion flowing through the return flues 37 and 38 and serve to liquefy the material surrounding the same so as to provide columns thereof extending upwardly through the material. By this means the molten material more readily flows in streams towards the valve or spigot 41 without the necessity of liquefying the entire contents of the container A so that the molten material is available at all times for discharge through the said valve or spigot.

What is claimed is:

1. In a melting apparatus for bituminous material, a container for receiving the material to be melted, a spigot located at one end of said container for discharging the melted material therethrough, a cover at the other end of said container having an opening therein, a receptacle secured in said opening and depending into said container in spaced relation to the bottom and side walls thereof and adapted to receive a burner therein, a flue connected with and opening into said receptacle in alignment with said burner and longitudinally of which flue said burner is adapted to direct a flame for melting the material in the container, a manifold connected with said flue at one end of the container, a flue connected with said manifold at each side of said first named flue and extending upwardly through said cover for carrying off the gases of combustion, a tubular conduit having a closed upper end and connected at its lower end with said manifold and extending upwardly adjacent the top of said container and in communication with said manifold and said first named flue for receiving therein heated gases of combustion for heating the material in surrounding relation therewith so as to provide a vertical column of molten material extending from said manifold upwardly through the material whereby the molten material flows upwardly when the spigot is closed and flows toward the spigot from about said conduit when the spigot is open.

2. In a melting apparatus for bituminous material, a container for receiving the material to be melted, a spigot located at one end of said container for discharging the melted material therethrough, a cover at the other end of said container having an opening therein, a receptacle secured in said opening and depending into said container in spaced relation to the bottom and side walls thereof and adapted to receive a burner therein, a flue connected with and opening into said receptacle in alignment with said burner and longitudinally of which flue said burner is adapted to direct a flame for melting the material in the container, a manifold connected with said flue at one end of the container, a flue connected with said manifold at each side of said first named flue and extending upwardly through said cover for carrying off the gases of combustion, a tubular conduit having a closed upper end and connected at its lower end with

said manifold and extending upwardly therefrom adjacent to the top of said container and in communication with said manifold and said first named flue for receiving therein heated gases of combustion for heating the material in surrounding relation therewith so as to provide a vertical column of molten material extending from said manifold upwardly through the material whereby the molten material flows upwardly when the spigot is closed and toward the spigot when the same is open and a pair of spaced solid metallic lugs secured to said manifold and extending forwardly therefrom with their free ends located on opposite sides of the inlet of said spigot.

3. In a melting apparatus for bituminous material, a container for receiving the material to be melted, a spigot located at one end of said container for discharging the melted material therethrough, a cover at the other end of said container having an opening therein, a receptacle secured in said opening and depending into said container in spaced relation to the bottom and side walls thereof and adapted to receive a burner therein, a flue connected with and opening into said receptacle in alignment with said burner and longitudinally of which flue said burner is adapted to direct a flame for melting the material in the container, a manifold connected with said flue at one end of the container, a flue connected with said manifold at each side of said first named flue and extending upwardly through said cover for carrying off the gases of combustion, and tubular conduits having closed upper ends and connected at their lower ends with said manifold and said flues on each side of the first named flue and extending upwardly therefrom adjacent to the top of the container and in communication with said manifold and said first named flue for receiving therein heated gases of combustion for heating the material in surrounding relation therewith so as to provide vertical columns of molten material extending upwardly through the material whereby the molten material flows upwardly when the spigot is closed and toward the spigot when the same is open.

4. In a melting apparatus for bituminous material, a container for receiving the material to be melted, a spigot located at one end of said container for discharging the melted material therethrough, a flue having a longitudinally extending portion located adjacent the bottom of said container for directing a flame therethrough for melting the material in the container and an upwardly extending portion opening through the top of the container for carrying off the gases of combustion, a tubular conduit connected at its lower end with the longitudinally extending portion of said flue and having a closed upper end terminating adjacent the top of the container for receiving therein heated gases of combustion for heating the material about said conduit so as to provide a column of molten material extending upwardly therethrough whereby the molten material flows upwardly when the spigot is closed and toward the spigot when the same is open.

5. In a melting apparatus for bituminous material, a container for receiving the material to be melted, a spigot located at one end of said container for discharging the melted material therethrough, a flue having a longitudinally extending portion located adjacent the bottom of the container for directing a flame therethrough for melting the material in the container and an upwardly extending portion opening through the top of the container for discharging the gases of combustion, and a tubular conduit connected at its lower end with the longitudinally extending portion of said flue adjacent said spigot and having a closed upper end terminating adjacent the top of the container for receiving therein heated gases of combustion for heating the material about said conduit so as to provide a column of the molten material extending upwardly therethrough whereby the molten material flows upwardly when the spigot is closed and toward the spigot when the same is open.

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