Jan. 31, 1950 P. WOLLNER 2,496,113

HEATER FOR MELTING BITUMINOUS MATERIAL AND FOR PREVENTING FLASHING OF VAPORS GIVEN OFF THEREBY

Filed June 25, 1947 3 Sheets-Sheet 1

Fig. 1.

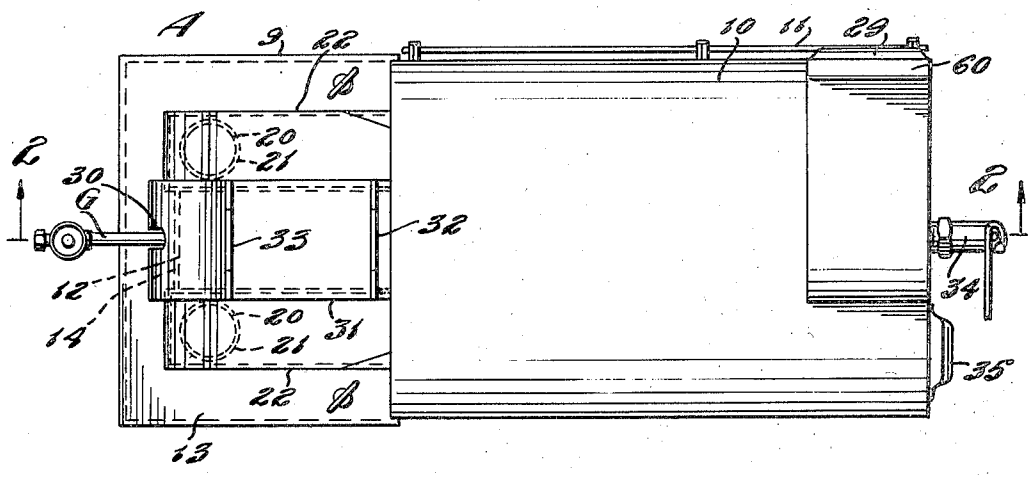
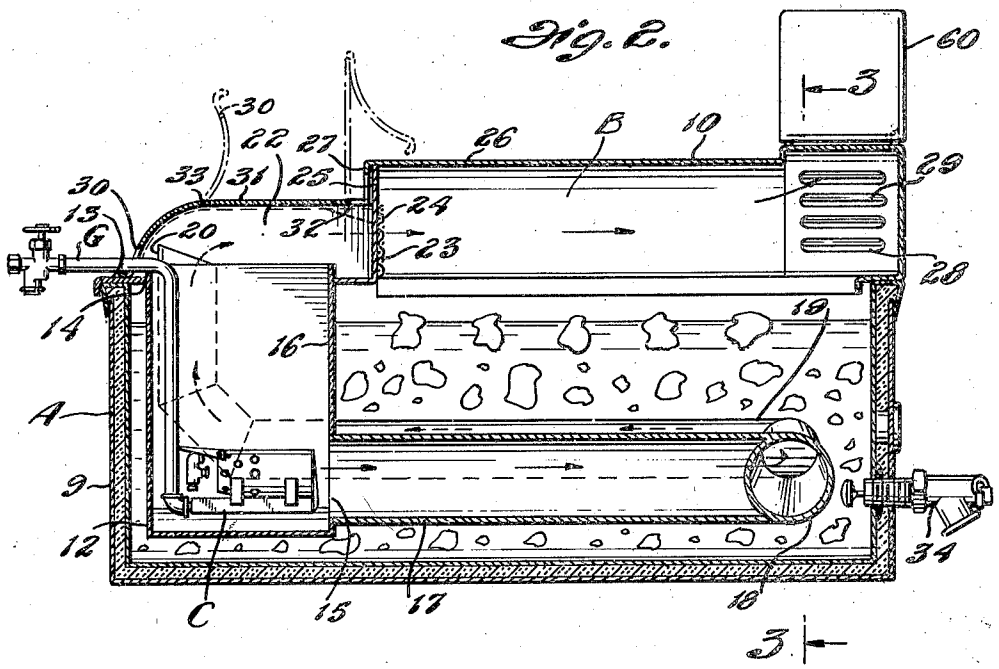


Fig. 2.



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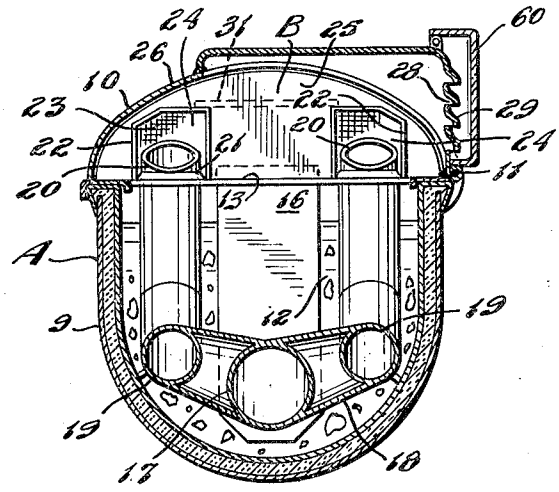
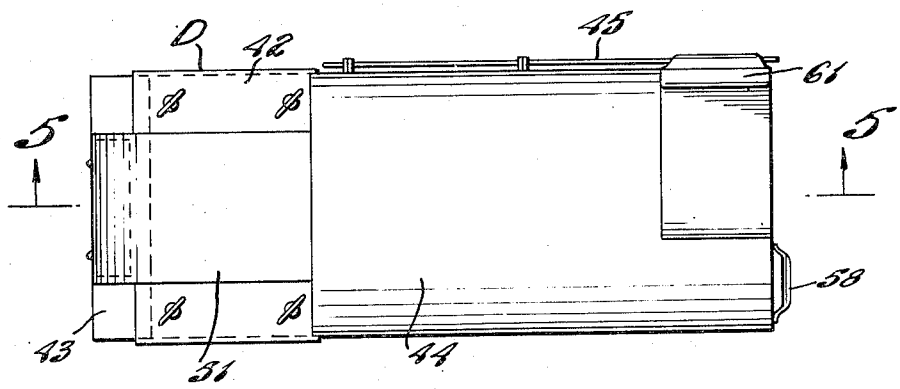


Fig. 3.

Fig. 4.



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Fig. 5.

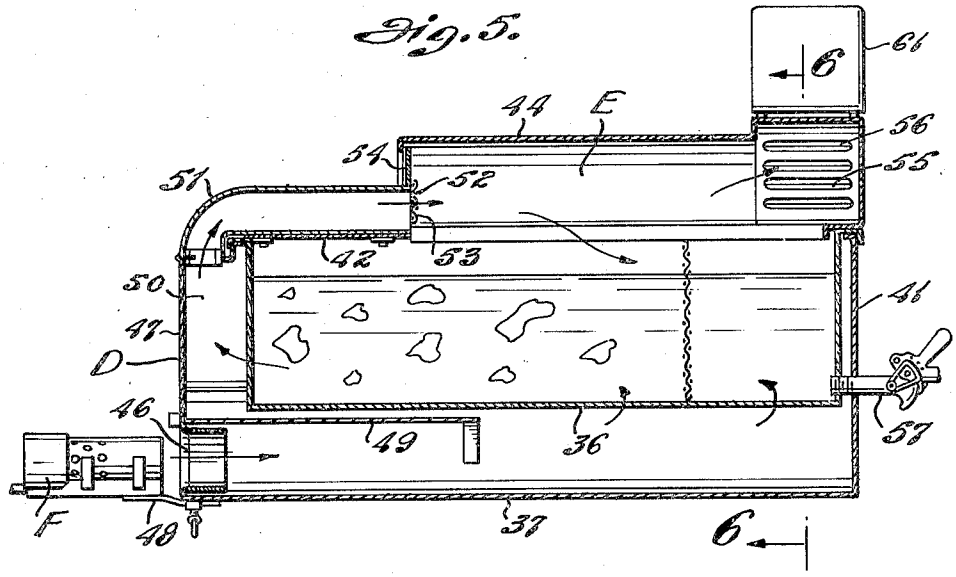
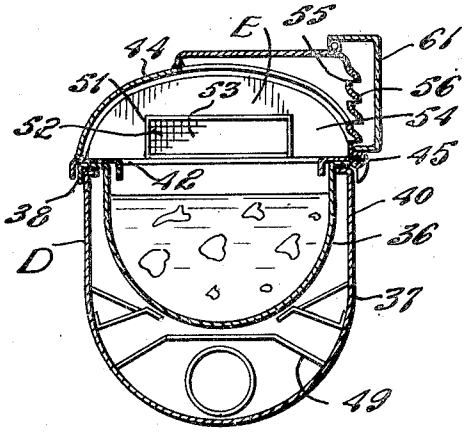


Fig. 6.



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UNITED STATES PATENT OFFICE

2,496,113

HEATER FOR MELTING BITUMINOUS MATERIAL AND FOR PREVENTING FLASHING OF VAPORS GIVEN OFF THEREBY

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Application June 25, 1947, Serial No. 756,858

4 Claims. (Cl. 126—343.5)

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This invention relates to a construction for preventing flashing or igniting of the vapors given off by bituminous material during melting thereof in a melting heater.

Bituminous materials of the type used for road surfacing, paving, roofing and waterproofing give off vapors during melting thereof which collect in the chamber above the upper surface of the material and which frequently become ignited or flash into flame when the cover of the heater is removed for dipping out the molten material or for recharging the heater with additional material. The flashing of the vapors into flame produces an explosion which splashes the molten material from the heater as well as causing tongues of flame to shoot outwardly so as to endanger the workmen and constitute a fire hazard to the work being done and the buildings adjacent thereto. Sometimes the vapors condense and escape under the cover of the heater so as to run down the sides thereof. This condition also constitutes a menace and a fire hazard. In order to prevent flashing of the escaping vapors from the material when the same is being reduced to a molten condition so as to overcome the aforesaid dangers, the present invention comprehends a method of continually passing through the chamber above the material and over the upper surface thereof, heated non-combustible gases which take up and carry off the explosive vapors and provide a blanketing gaseous layer over the upper surface of the molten material so as to exclude air from the chamber which when present provides oxygen to support combustion.

The invention also comprehends a melting heater having means for directing heated non-combustible gases over the upper surface of the material being melted therein in order to take up and remove the explosive vapors given off by the material and to continually discharge the non-combustible gases and the vapors carried therewith.

Another object of the invention is to provide a heater of the indicated character in which the gases of combustion resulting from the burning of the fuel for liquefying the material in the heater are conducted over the upper surface of the material and between the upper surface thereof and the cover of the heater whereby the said gases of combustion serve to heat and assist in liquefying the material in the heater as well as carrying off the vapors given off by the material.

The invention also has for an object the provision of a screen through which the gases of combustion pass on entering the chamber above the material in the heater, together with downwardly directed louvered openings through which the gases of combustion are discharged from the heater and which prevent rain or moisture

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from entering the chamber above the material being melted in the heater.

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

In the drawings:

Fig. 1 is a top plan view of a melting heater constructed in accordance with the invention.

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

Fig. 3 is a vertical transverse sectional view taken approximately on line 3—3 of Fig. 2.

Fig. 4 is a top plan view of a modified form of melting heater constructed in accordance with the invention.

Fig. 5 is a longitudinal sectional view taken approximately on line 5—5 of Fig. 4 and shown with a burner for heating the same.

Fig. 6 is a transverse vertical sectional view taken approximately on line 6—6 of Fig. 5.

Referring to the drawings by characters of reference, the melting heater A illustrated in Figures 1 to 3 thereof, consists of a container 9 having an open top through which it is charged with the material to be heated and melted and which is closed by a cover 10 hingedly connected therewith by a hinge pintle 11. The cover 10 is of arcuate formation in cross-sectional configuration so as to provide a chamber B above the top of the material being heated therein.

Located within the container is a rectangular shaped receptacle 12 depending from a cover panel 13 supported upon the upper edge of the container at one end thereof with the walls of the receptacle disposed in spaced relation to the side and bottom walls of the container. The cover panel 13 is formed with a rectangular central opening 14 through which the upper open top of the receptacle protrudes. Secured in an opening 15 in the end wall 16 of the receptacle 12 is a tubular flue 17 which extends horizontally therefrom and is connected with a manifold 18 located adjacent the discharge end of the container. The manifold 18 extends transversely of the container and is connected at each end thereof with a return flue 19 which extends longitudinally of the flue 17 toward the receptacle 12 and terminates in upwardly directed ends 20. The said upwardly extending ends are located one on each side of the receptacle 12 and protrude upwardly through openings 21 in the cover panel 13 with the open upper ends thereof projecting into return ducts 22 formed on the cover panel 13. The return ducts 22 extend longitudinally of the cover panel and have their outlets 24 opening into the chamber B above the material in the receptacle. The ducts 22 are provided with screens 23 in covering rela-

tion with the outlet 24 for preventing particles or lumps of the material fed into the container from entering the ducts. Secured to the return ducts 22 is a transversely extending panel 25 against which the top wall 26 of the cover engages when in closed relation with the inwardly directed peripheral flange 27 of the cover located outwardly thereof. Adjacent the opposite end of the cover the top wall 26 thereof is formed with a plurality of openings 28 having downwardly directed louvers 29.

The receptacle 12 forms an open well for receiving a burner C disposed in longitudinal alignment with the flue 17 and which burner is of the type adapted to project a flame longitudinally of the flue for heating and melting the material in the container 9. The burner C is connected with a fuel pipe G which extends upwardly through the receptacle 12 and laterally through a notch 30 in a cover 31 hinged at 32 to the top of the return ducts 22 to provide a closure for the receptacle 12. The cover 31 is also hinged at 33 intermediate its ends for swinging the same into open relation as shown in Fig. 2 for inserting the burner C in position in the receptacle 12 or removing the same therefrom and for permitting the entrance of air for suporting combustion by the burner.

The heated gases of combustion produced by the burner C in heating and melting the material in the container are directed by the manifold 18 into the return flues 19. From the return flues 19 the heated gases of combustion are directed into the return ducts 22 and then into the chamber B beneath the hinged cover 10 so that the same pass over the upper surface of the material in the container and form a blanket thereover which takes up the explosive vapors given off by the material being melted and discharges the same to the atmosphere through the openings 28 in the cover while at the same time the blanket of heated non-combustible gases passing over the material excludes the entrance of air to support combustion. This blanket of gases prevents the dangerous flashing of the vapors given off by the material and eliminates the explosion which usually accompanies such flashing when the cover is opened for charging the container or removing the liquefied material therefrom. In addition thereto, the heated gases passing through the chamber B heat the upper surface of the material in the container to thereby assist in melting the same. This greatly reduces the time required for melting the material in the container so as to reduce the fuel consumption of the burner and increase the efficiency of the heater.

The container 9 is provided with a spigot 34 through which the molten material may be discharged and the hinged cover 10 is provided with a handle 35 for facilitating opening and closing thereof.

In the form of the melting heater D illustrated in Figs 4 to 6 of the drawings, the material is heated and melted in a receptacle 36 arranged within an outer casing 37 in spaced relation to the bottom and side walls thereof. The receptacle 36 is open at the top and is formed with an outwardly directed flanged rim 38 which extends continuously along the upper edges of the side and end walls thereof. The rim 38 engages over and is secured to the upper flanged edges of the side walls 40 and end wall 41 of the casing for supporting the receptacle in depending relation within the casing.

The casing is provided with a top cover plate 42 which engages over the upper edges of the opposite side walls 40 thereof and over the edge of a top panel 43 located at the end of the casing so as to overlie and close the top of the receptacle at one end thereof. A hinged cover 44 extends from the cover plate 42 to the end wall 41 of the casing and is hingedly connected therewith by a hinge pintle 45. The hinged cover 44 is of arcuate formation in cross-sectional configuration so as to provide a chamer E above the top of the material in the receptacle.

The casing is formed with an opening 46 in the end wall 47 thereof through which a flame is projected longitudinally of and beneath the receptacle 36 by a burner F secured to the casing by a bracket 48. A baffle 49 secured to the end wall 47 of the casing and to the opposite side walls 40 thereof below the receptacle 36, directs the flame toward the end wall 41 of the casing. The heated gases of combustion produced by the flame circulate toward the end wall 47 of the casing between the side walls 40 thereof and the receptacle 36. The spacing of the receptacle from the end wall 47 of the casing provides an upwardly directed flue 50. The flue 50 opens through the top panel 43 and into a return duct 51 secured to the top panel 43 which duct extends longitudinally over the cover plate 42 with the outlet end 52 thereof opening into the chamber E.

The return duct 51 is provided with a screen 53 in covering relation with the open end 52 thereof for preventing particles or lumps of the material fed into the receptacle from entering the duct. A panel 54 secured to the return duct 51 forms an end wall of the chamber E and is engaged by the hinged cover 44 when in closed position. Adjacent the opposite end the hinged cover 44 is provided with a plurality of openings 55 having downwardly directed louvers 56.

The heated gases of combustion produced by the burner F are directed by the return duct 51 into the chamber E and over the upper surface of the material in the receptacle 36 so as to form a blanket thereover which takes up the explosive vapors given off by the material and which is discharged therewith through the openings 55. The heated gases of combustion do not contain sufficient air or oxygen to support combustion and function to exclude the entrance of air from the chamber F so as to prevent flashing or igniting of the vapors given off by the material being melted. The gases of combustion also serve to heat the top layer of the material in the receptacle to thereby increase the efficiency of the heater.

A spigot 57 extends through the casing 37 and into the receptacle 36 for drawing off the molten material and the hinged cover 44 is provided with a handle 58 for facilitating opening and closing thereof.

In both of the forms of the melting heaters A and D the burners C and F vaporize a liquid fuel and mix the same with air to provide a combustible mixture which when burned in the projected flame produces the heated gases of combustion which are non-combustible and readily take up the explosive vapors covering the upper surface of the material and given off during melting thereof.

The melting heater A illustrated in Figs. 1 to 3 inclusive of the drawings may also be provided with a closure 60 which is pivoted to the top wall 26 of the cover 10 above the openings 28 and which closure is adapted to be swung into super-

imposed relation on the top wall 26 when the burner C is in operation and when the burner is shut off the closure 60 is adapted to be swung downwardly on its pivotal connection into covering or closing relation with the openings 28 to thereby close the same and prevent the escape of the heated non-combustible gases in the chamber B and the entrance of air into the chamber.

Similarly the melting heater D in the form of the invention illustrated in Figs. 4 to 6 inclusive of the drawings is provided with a closure 61 similar to the closure 60 in the previous form of the invention and which is adapted to close the openings 55 in the cover 44 when the burner F is shut off so as to retain the non-combustible gases in the chamber E and to prevent the entrance of air therein.

The melting heaters A and D thus described provide constructions for preventing flashing of the vapors given off by the bituminous material during melting thereof and by means of which the method of preventing flashing thereof is carried out. Hinged covers and discharge ducts like that disclosed in the drawings may be provided on existing melting heaters in order to convert the same into a construction adapted for carrying out the method.

The reduced heating time required in the foregoing method and the blanket of heated gases of combustion which has a specific gravity generally lower than the specific gravity of the fumes and vapors contained in the oils in the bituminous material functions to preserve the oils and other essential substances required for a durable bituminous coating.

What is claimed is:

1. In a heater for melting bituminous material, a container for receiving the material to be melted, a cover hinged to said container adapted to be opened for charging the container with the bituminous material and providing a chamber above the material in the container, a burner for producing a flame for heating and melting the material in the container, a flue having an outlet opening into the chamber and through which the heated gases of combustion produced by said flame are conveyed into said chamber and pass over the upper surface of the material therein for heating the same and for removing the vapors given off by said material, and said hinged cover having an opening through which the said gases of combustion together with the vapors taken up thereby are discharged and a closure hinged to said cover adapted to be swung into overlying relation with said opening for preventing the discharge of the vapors and gases of combustion.

2. In a heater for melting bituminous material, a container for receiving the material to be melted, a cover hinged to the top of said container adapted to be opened for charging the container with the bituminous material, a burner for producing a flame, means for confining said flame and the heated gases of combustion produced thereby for heating the material in said container, a flue for carrying off said heated gases of combustion, said flue opening into said container above the top of the material therein adjacent one end of said cover for directing a stream of said heated gases of combustion over the upper surface of the material therein for heating the same and for taking up the vapors given off by said material during heating and melting thereof, a screen secured over the open end of said flue for preventing particles of material entering said flue during charging of the container, a vertical panel secured to said flue adjacent the open end thereof adapted to be engaged by the cover when in closed relation and forming with said cover a chamber above the material being heated in the container, and said cover having an opening through which the said gases of combustion together with the vapors taken up thereby are discharged from the container.

3. In a heater for melting bituminous material, a container for receiving the material to be melted, a cover hinged to said container adapted to be opened for charging the container with the bituminous material and providing a chamber above the material in the container, a burner for producing a flame for heating and melting the material in the container, a flue having an outlet opening into the chamber and through which the heated gases of combustion produced by said flame are conveyed into said chamber and pass over the upper surface of the material therein for heating the same and for removing the vapors given off by said material, said hinged cover having an opening located below the top thereof through which said gases of combustion together with the vapors taken up thereby are discharged and permitting of a layer of the gases of combustion accumulating at the top of the chamber, and a closure hinged to said cover adapted to be swung into overlying relation with said opening for preventing the discharge of the vapors and gases of combustion.

4. In a heater for melting bituminous material, a container for receiving the material to be melted and having an opening in the top for charging the same with the material, a cover for closing said charging opening, a burner for producing a flame, means for confining said flame and the heated gases of combustion produced thereby for heating the material in said container, a flue for carrying off said heated gases of combustion, said flue opening into said container above the top of the material therein and adjacent one end of said charging opening for directing a stream of said heated gases of combustion over the upper surface of the material therein for heating the same and for taking up the vapors given off by said material during heating and melting thereof, a shield secured over the open end of said flue for preventing particles of material entering said flue during charging of the cover, and said cover having an opening through which the said gases of combustion together with the vapors taken up thereby are discharged from the container.

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