Aug. 28, 1951 T. J. BRYANT 2,565,589

SNOW MELTER

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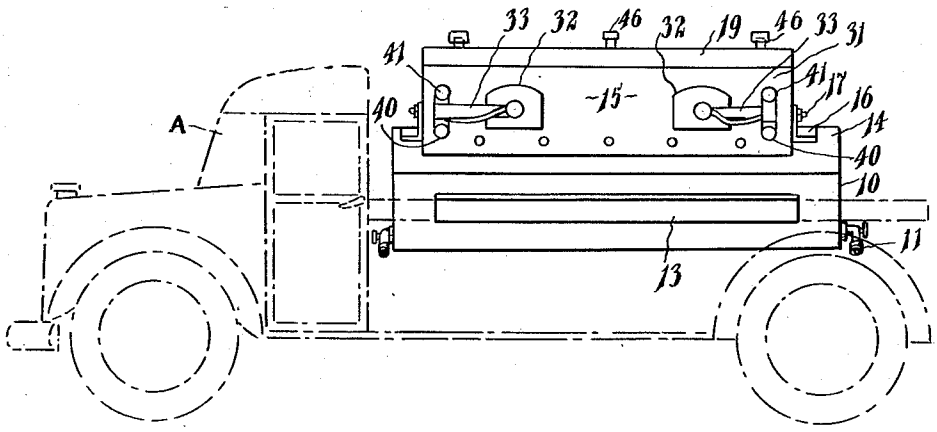


Fig. 1.

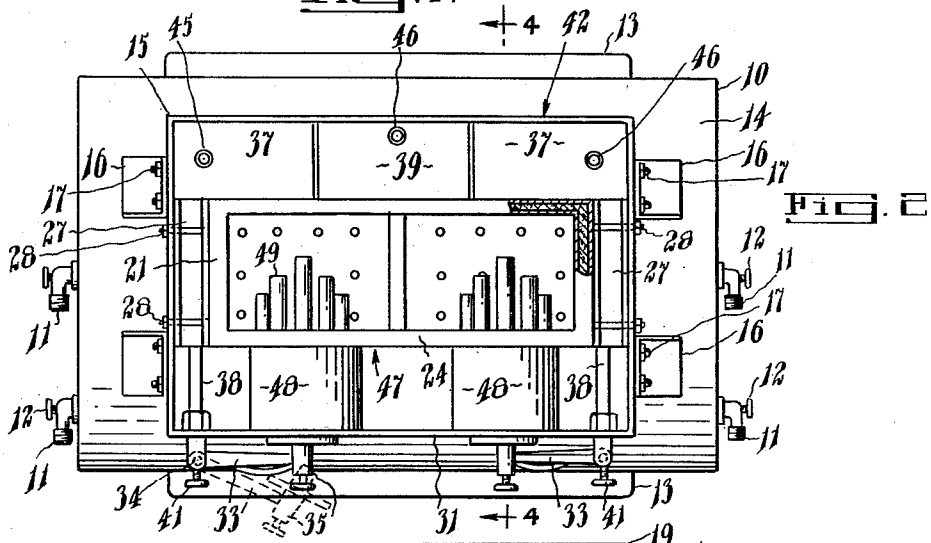


Fig. 2

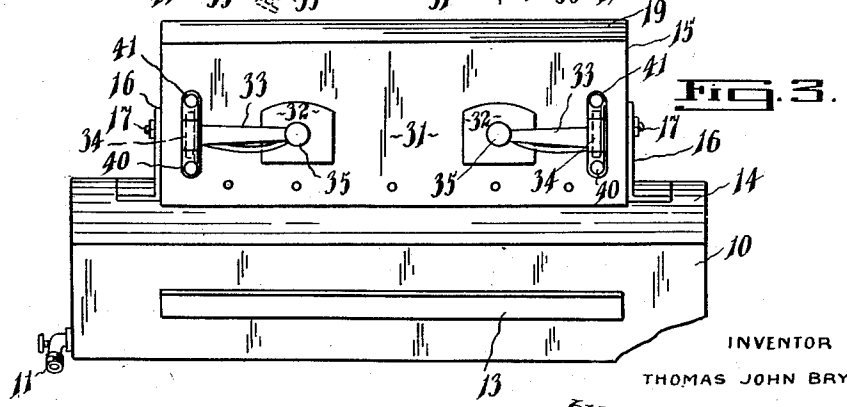


Fig. 3.

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SNOW MELTER

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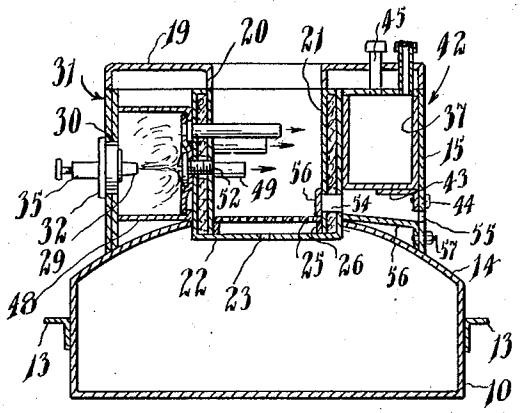


Fig. 4.

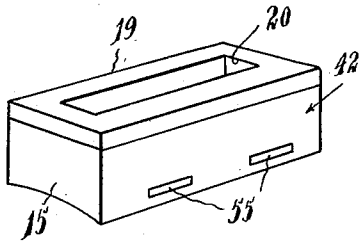


Fig. 8

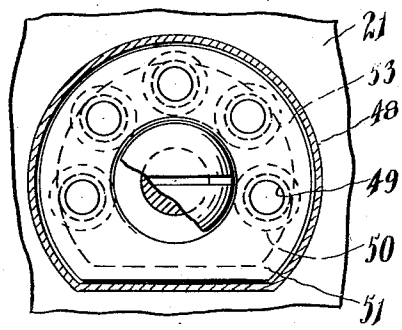


Fig. 6

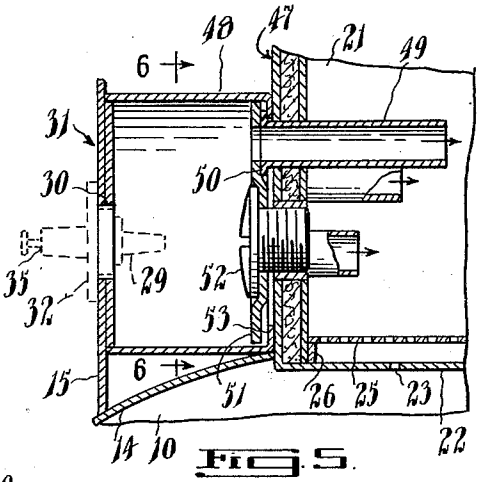


Fig. 5.

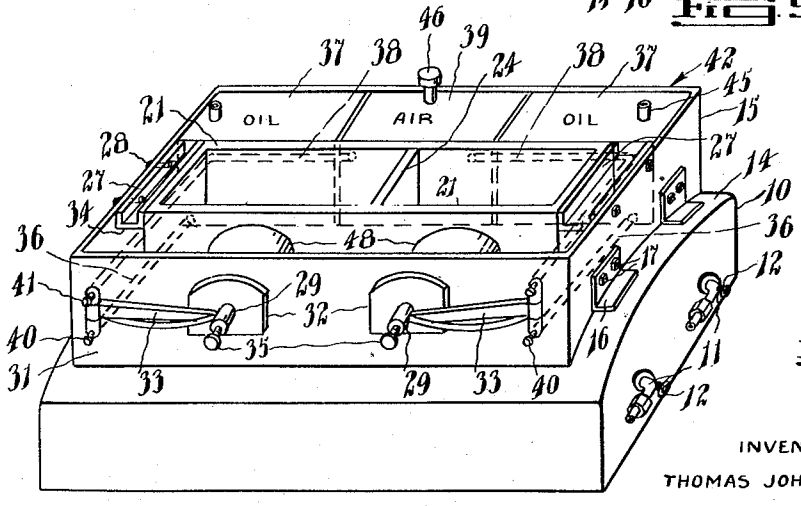


Fig. 7.

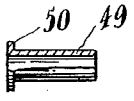


Fig. 9.

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UNITED STATES PATENT OFFICE

2,565,589

SNOW MELTER

Thomas John Bryant, Toronto, Ontario, Canada

Application October 29, 1949, Serial No. 124,445
In Canada October 25, 1949

8 Claims. (Cl. 126—343.5)

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My invention appertains to snow melting apparatus and has for an object to provide a snow melter of the portable kind adapted to be carried by a motor truck for street use in order that snow removed from the pavement can be deposited into the melter and reduced to water.

Another object of the invention is to provide a snow melter unit suited to be mounted on a water tank of a conventional flushing vehicle of the automotive type used for flushing of pavements.

A further object is to produce an economical and serviceable snow melter in which the components can be readily dismantled for inspection and servicing.

With these and other objects in view the invention consists essentially in the novel construction and arrangement of parts as disclosed in the ensuing specification and shown in the accompanying drawings, wherein there is illustrated a preferred embodiment of the invention.

In the drawing, Fig. 1 is a side elevational view of the snow melter mounted on a motor truck.

Fig. 2 is a plan view of the snow melter omitting the cover from the shell-like body.

Fig. 3 is a side view of the snow melter omitting the motor truck shown in Fig. 1.

Fig. 4 is a cross section taken on line 4—4 of Fig. 2.

Fig. 5 is a similar cross section but fragmentary in character and on a larger scale to show the combustion chamber assembly to better advantage.

Fig. 6 is a section on line 6—6 of Fig. 5.

Fig. 7 is a perspective view of the snow melter viewed from the top with the cover omitted.

Fig. 8 is a perspective view of the melting unit showing the slots in the rear wall of the shell-like body which are used for removal of solid matter from the melting tank.

Fig. 9 is a longitudinal view partly in section of one of the fire tubes belonging to the combustion chamber.

My invention is designed preferably to provide a snow melting unit suited to be mounted on a water tank 10 of a conventional flushing vehicle of the motor-truck type commonly employed for flushing pavements. Such a motor truck is represented at A, Fig. 1, in broken lines. The water tank has outlets for discharge of water from its bottom portion. In carrying out the present invention the outlets 11 may be of any approved kind and are valve-controlled as at 12. The water tank is permanently attached to the frame of the motor truck as by supports 13, and in performing the invention the top wall 14 is cut away

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to provide an opening of a substantial size in which a melting tank is inset.

The snow melting unit comprises a body, a melting tank, and a heating unit. Said body is denoted at 15 and consists of a metal shell of box formation having sides, but open at the bottom and top. Said body rests upon the top wall 14 of the water tank 10 and is detachably secured thereto as by the angle plates 16 and bolts 17. Said angle plates are permanently fastened to the water tank as by welding or other approved fastening means. The bolts 17, when removed, enable said body to be detached from the water tank by a lifting motion to clear the angle plates 16. One advantage of providing for detachment of said body is that it can be taken off a flushing tank as a unit with the other components of the snow melting unit and then installed on another flushing tank, according to dictates of usage. A removable cover is provided for the body 15. Said cover is a closure plate 19 fitted on the top of the body and supplied with an opening 20, Fig. 4, in register with the mouth of the snow melting tank.

Said melting tank is indicated at 21 and consists of a receptacle having a bottom wall and side walls. The melting tank is substantially smaller than said body and is disposed therein and loosely inset in the opening which is cut in the top wall 14 of the water tank 10. The side walls of the melting tank are chambered and heat insulated. Snow is deposited in the melting tank. The bottom wall 22 thereof is perforated as at 23 so that as the snow melts the water will drain through the perforations 23 and pass into the water tank 10 which can be emptied at intervals by means of the outlets 11. A divisional wall 24 divides the melting tank into two compartments. At the bottom of each compartment is a perforated strainer plate 25 loosely arranged for removal and spaced above the bottom wall 22 as by depending flanges 26.

The ends of the melting tank are spaced from the respective end walls of the body 15 by means of spacers 27, and are detachably secured to the respective end walls as by means of headed screws 28 which pass through the intervening spacer. By removing these screws the melting tank is detached from the body 15 for removal, or for removal of the body without disturbing the melting tank.

The heater unit comprises a burner unit and a combustion chamber for each compartment of the melting tank. Each burner unit includes a nozzle 29 which projects through an opening 30 in the front wall 31 of the body 15 and carries

a closure plate 32 for closing this opening. Said nozzle is swingable to and away from the opening 30 by means of an arm 33 hinged on an axis 34 and supported on said front wall 31. The nozzle supplies atomized oil to the combustion chamber and is regulated by a valve 35. Said arm is of a known kind in which there is provided a passage for oil and a passage for air. The oil passage is connected to a pipe 36 which leads to an oil tank 37. The air passage is connected to a pipe line 38 which leads to a compressed-air tank 39. Oil flow from the tank 37 is regulated by a valve 40 at the hinged end of the arm 33. Air flow from the tank 39 is regulated by a valve 41 also at the hinged end of the arm 33.

Desirably, as shown, there is a separate oil storage tank 37 for each burner unit. The compressed-air tank 39 is common to the two burner units. The tanks 37 and 39 are disposed between rear wall 42 of the body 15 and the melting tank 21, and the tanks are supported on a ledge 43 in the form of an angle plate held by screw 44, whereby it may be detached. The oil tanks 37 have usual filling tubes 45. The tank 39 has a nipple 46 for making a connection with a source of air under pressure for replenishing compressed air from time to time, as usual.

The combustion chamber for each burner unit is formed in part by the front wall 31 of the body 15 and the adjacent side wall 47 of the melting tank. The remainder is supplied by a tubular shell 48 which loosely extends between said front wall 31 and said side wall 47 and is closed at its ends by these walls to surround the burner nozzle 29. Within the confines of the shell 48 the side wall 47 of the melting tank is supplied with a circular series of holes through each of which a fire tube 49 is loosely inserted. The tubes are of different lengths and the series have their inner ends projecting into the compartment of the melting tank to which the burner unit belongs. The outer ends of the tubes are provided with integral collars 50. A clamp plate 51 is disposed in the shell 48 and placed against the collar portions of said tubes. The clamp plate 51 is fastened to the side wall 47 of the melting tank by a screw 52 by which pressure is applied to cause the clamp plate to secure the tubes in place. The clamp plate is perforated to provide openings in register with the bores of the individual tubes 49. The inner end of the shell 48 is flanged inwardly as at 53 and the flange is engaged by said clamp plate to retain the shell in place.

With this arrangement the shells 48 of the combustion chambers and also the tubes 49 therein are detachable. They can be removed by taking out the screw 52 by which the clamp plate 51 is secured. This provides for replacing and servicing the tubes when worn.

It will be understood that a combustible mixture of oil and air is discharged into the combustion chambers by nozzle 29 of the burners when the valves 35, 40 and 41 are opened. The mixture is ignited in the usual way. The products of combustion flow through the tubes 49 to melt snow deposited in the melting tank. Water from the melted snow gravitates through the holes in the strainers 25 and the bottom wall 22 and is received in the tank 10. The advantage of dividing the melting tank into separate compartments and employing a burner unit for each compartment is that one of the compartments may be kept in use while the other is being cleaned of accumulated solid matter.

To provide for cleaning the melting tank from time to time there is supplied in each compartment thereof a clean-out opening 54 in the rear wall portion at the level of the strainer 25. The clean-out opening communicates with a free space below the tanks 37 and 39, which space is open to the rear side of the body 15 by means of a slot or slots 55 cut in the rear wall 42. A tray 56 is arranged in said free space to extend lengthwise of said body to form a floor at the bottom of the clean-out opening and the slot or slots 55. Accordingly, in a cleaning operation solid matter is removed by forcing it through the clean-out opening of a compartment and across the tray to and through the slot or slots in the rear wall of the body. Normally the clean-out opening will be closed by a gate 56, which may be latched in place in approved manner. The tray is detachably secured as by screws 57.

From the preceding description of the specific form of the invention shown in the drawings it will be understood that the assembly of the snow melter enables the shell-like body to be detached from the water tank 10 independently of the melting tank. Further, the melting tank can be lifted up out of the body along with the combustion chambers and the fire tubes. Obvious other advantages flow from the construction and arrangement of the components of the apparatus.

It is intended such changes and modifications of the invention may be resorted to as fairly come within the scope of the appended claims.

What I claim is:

1. In a snow melter, a shell-like body having a side wall provided with an opening for a nozzle of an oil burner, a melting tank disposed within said body and having a side wall spaced from said body side wall and provided with a hole therethrough, a fire tube loosely disposed in said hole to project into said melting tank, said fire tube having an integral collar by which its outer end is shouldered against the outer face of said side wall of the melting tank, a clamp plate disposed between said side walls and having an aperture in register with the bore of said fire tube, fastening means detachably securing said clamp plate against said collar to hold said fire tube in place, and a tubular shell transversely arranged between said side walls to form a combustion chamber, said shell being disposed to surround said opening in said side wall of the body and said outer end of the fire tube.

2. In a snow melter, a shell-like body having a side wall provided with an opening for a nozzle of an oil burner, a melting tank disposed within said body and having a side wall spaced from said body side wall and provided with holes therethrough, a group of fire tubes freely lodged in said holes to project into said melting tank, said fire tubes having integral collars by which their outer ends are shouldered against the outer face of said side wall of the melting tank, a clamp plate disposed between said side walls and having apertures in register with the bores of said fire tubes, fastening means detachably securing said clamp plate against said collars to retain said fire tubes in place, and a tubular shell transversely arranged between said side walls to form a combustion chamber, said shell being disposed to surround said opening in said side wall of the body and said outer ends of the fire tubes.

3. In a snow melter, a shell-like body having a side wall provided with an opening for a nozzle of an oil burner, a melting tank disposed within said body and having a side wall spaced from said

body side wall and provided with holes therethrough, a group of fire tubes freely lodged in said holes to project into said melting tank, said fire tubes having integral collars by which their outer ends are shouldered against the outer face of said side wall of the melting tank, a clamp plate disposed between said side walls and having apertures in register with the bores of said fire tubes, a screw fastener detachably securing said clamp plate to said side wall of the melting tank to clamp the collar portions of said fire tubes against said side wall of said melting tank, and a tubular shell transversely arranged between said side walls to form a combustion chamber, said shell being disposed to surround said opening in said side wall of the body and said collar ends of the fire tubes.

4. A structure as set forth in claim 3, and in which the tubular shell is provided with an internal flange, and in which the clamp plate has clamping engagement with said flange whereby to secure said shell against said side wall of the melting tank.

5. In a snow melter, a water tank having a top wall cut away to provide an opening, a shell-like body disposed on said top wall, said body having a side wall provided with an opening, means securing said body to said water tank, a melting tank disposed in said body and having a perforated bottom wall at said opening in said top wall of the water tank, said melting tank being of a substantially less size than said body to provide a surrounding space, means securing said melting tank to said body, a combustion chamber surrounding said opening in said side wall of the body and disposed between this side wall and the adjacent side wall of said melting tank, an oil-burner nozzle carried by said side wall of the body and projecting into said opening therein, an oil tank and an air tank disposed in said body at the side of said melting tank which is

opposite to said combustion chamber, and piping connecting said nozzle to said oil and air tanks.

6. A snow melter as defined in claim 5, and in which the shell-like body is detachably secured to the water tank, and in which the melting tank has end walls spaced from adjacent walls of said shell-like body and detachably secured thereto, the space between an end wall of the melting tank and the adjacent wall of the shell-like body accommodating the piping which connects the oil-burner nozzle to the oil tank and the air tank.

7. A snow melter as defined in claim 5, and in which firetubes extend from the combustion chamber and into the melting tank, and in which said fire tubes are detachably mounted on a wall of the melting tank.

8. A snow melter as defined in claim 5, and in which the melting tank is divided into compartments, and in which there is a separate combustion chamber for each compartment.

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