Dec. 20, 1938. W. C. POOLE 2,140,811

APPARATUS FOR FILLING OILS IN CONTAINERS

Filed Aug. 1, 1935 2 Sheets-Sheet 1

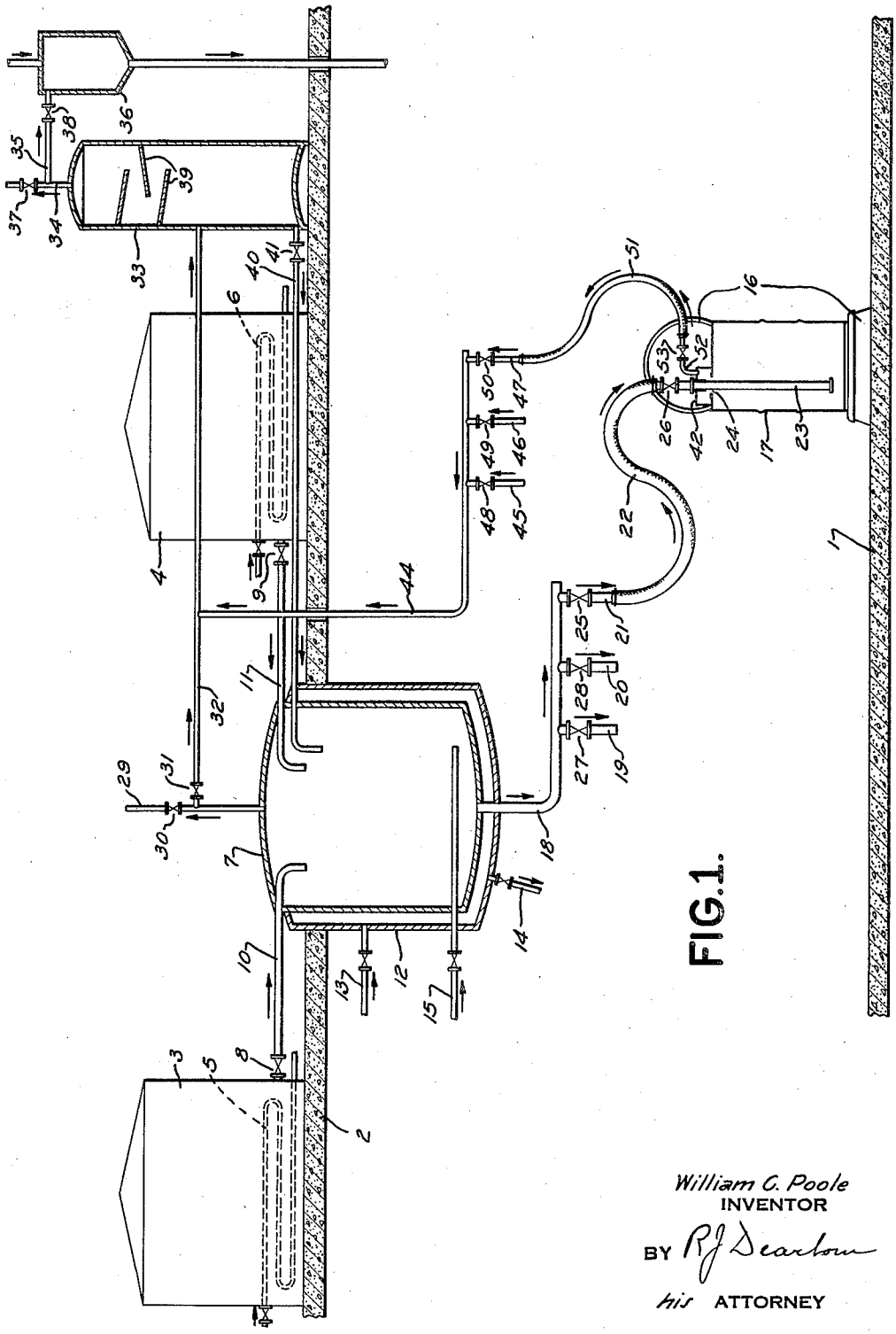


FIG. 1.

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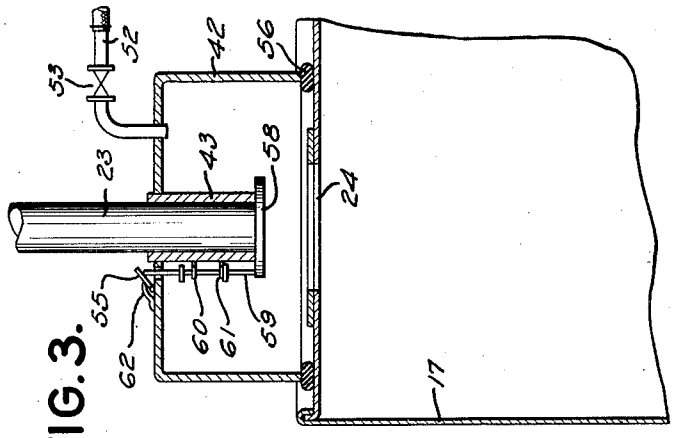


FIG. 3.

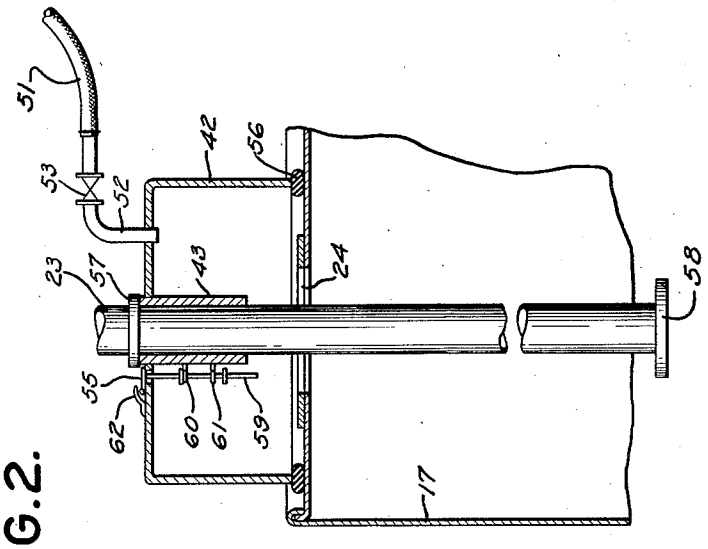


FIG. 2.

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Patented Dec. 20, 1938

2,140,811

UNITED STATES PATENT OFFICE

2,140,811

APPARATUS FOR FILLING OILS IN CONTAINERS

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Application August 1, 1935, Serial No. 34,184

4 Claims. (Cl. 226—116)

This invention relates to apparatus for filling oils in containers, refined oils of the viscous type such as lubricating oils and contemplates rapidly removing or destroying such foam as is formed during the blending and filling steps thus avoiding the necessity of allowing the oil to stand for a considerable period of time in attempting to dispose of the foam and bubbles formed.

The presence of foam does not occur to any great extent in light oils such as gasoline and kerosene, but in lubricating oils, particularly the heavier and the soapy compounded oils, there is a tendency for foam of a rather stubborn permanance to form when the oil is agitated or stirred in the presence of air. A layer of foam on the surface of the oil does not affect the quality of the oil, but it does spoil the appearance of the oil.

The principal objection to the presence of foam in an oil package, in addition to the fact that it spoils the appearance of the oil, is that foam takes up valuable space in the container. The presence of a layer of foam in the top of a container as the oil level rises makes it necessary to discontinue filling before the capacity of the container has been reached, in order to avoid running over. Thus it is an object of the present invention to destroy the foam formed to permit the filling of containers to maximum capacity.

In blending and filling viscous oils it is customary to heat the heavier or more viscous type oils so as to reduce the viscosity. If the oil after blending and/or filling is left standing for a period of time, while hot, the foam may eventually disappear, but in such cases considerable valuable time and space for temporary storage is required. Thus it is a further object of the present invention to provide a method and apparatus for blending and filling oils in which the foam generated during the blending and filling steps is quickly removed from the oil.

The invention broadly contemplates performing the blending or compounding, as the case may be, under vacuum in suitable closed vessels; and thereafter filling the ultimate containers to nearly maximum capacity, then releasing the vacuum to thereby destroy the foam on the surface and trimming the container to its maximum allowable capacity.

The invention will be readily understood by referring to the accompanying drawings, together with the following description:

Fig. 1 of the drawings is a diagrammatic view in elevation showing apparatus suitable for carrying out the invention.

Fig. 2 is a view in sectional elevation showing in enlarged detail the container filling portion of the apparatus illustrated in Fig. 1.

Fig. 3 is a view of the same portion as shown in Fig. 2, with the filling nozzle shown withdrawn from the container.

Referring to the drawings, a building suitable for conducting blending and filling operations, is indicated, such building preferably having superposed floors or levels 1 and 2 to permit gravity flow of the oil from storage to the ultimate containers. On the upper level 2 storage tanks 3 and 4 are provided and are adapted to contain such refined oils as are to be blended and filled in containers. The tanks 3 and 4 are provided with steam coils 5 and 6, respectively, for heating the oils in the tanks, for the purpose of lowering their viscosity and making them more fluent.

Suspended below the floor 2 and above the floor 1 a blending or mixing tank 7 is so positioned that oil from the storage tanks 3 and 4 may be transferred into it by gravity, by opening valves 8 and 9 in lines 10 and 11 which connect with tanks 3 and 4, respectively. The mixing tank 7 is provided with a steam jacket 12 for heating the mixture of oils delivered thereinto. Steam inlet and outlet connections 13 and 14 are provided for the steam jacket 12. An air connection 15 which communicates with the mixing tank 7 is provided for introducing air from any convenient source to agitate and mix the oils, although a mechanical stirring device may be preferable in some instances.

On the floor 1 and below the mixing tank 7 a weighing scale 16 is provided. A drum, barrel or other kind of container 17 is positioned thereon and is adapted to be filled with a predetermined amount by weight of oil. A pipe 18 is provided for withdrawing oil from the mixing tank 7 and delivering it into the drum 17. The pipe 18 is provided with one or more manifold connections such as 19, 20, 21, by means of which more than one drum may be filled at a time. In the present embodiment of my invention a flexible hose 22 is shown connecting the manifold connection 21 with a filling nozzle 23 which is adapted to be inserted in the drum 17 through a bung opening 24. As shown the filling nozzle 23 is somewhat elongated and is adapted to extend to a point near the bottom of the drum 17 so as to avoid agitation or splashing, and consequent foaming, in the drum as much as possible.

The mixing tank 7 is positioned above the floor 1 so that the drum 17 may be filled by opening a

valve 25 in the manifold connection 21 and a valve 26 in the filling nozzle 23 and allowing the oil to move by gravity from the mixing tank 7 as soon as the pressure in the drum 17 has been reduced to about the same or slightly below that existent in the tank 7. Valves 27 and 28 are provided for closing the manifold connections 19 and 20 when these are not in use.

A vent pipe 29 is provided by means of which the air injected into the tank 7 through the connection 15, and that displaced by the oil delivered through the lines 10 and 11, may be discharged. The pipe 29 may discharge such air to the atmosphere, by opening a valve 30 in said pipe and closing a valve 31 in a connecting line 32. The line 32 connects the tank 7 with a tank 33 which is maintained under a partial vacuum. A pipe 34 communicates with tank 33 and may discharge through a connecting pipe 35 into a steam jet 36. Pressure may be regulated in the tank 33 by manipulating a valve 37 in the pipe 34 and valve 38 in the connecting pipe 35.

It will be seen that by means of the steam jet 36 air and foam formed in the mixing tank 7 may be withdrawn therefrom through the connecting pipe 32, and delivered into the tank 33. Baffles 39 are provided in the tank 33 for knocking back any oil carried over with the air and foam, so that air only is withdrawn through the pipe 34, the connecting pipe 35 and steam jet 36. A return line 40 provided with a valve 41 connects the tank 33 and the mixing tank 7. The arrangement is such that by opening valve 41 in the return line 40, any oil collecting in the bottom of the tank 33 may be moved, by gravity, back to the mixing tank 7 from which it was withdrawn.

In addition to the above described means for withdrawing air and foam from the mixing tank 7, means are also provided for withdrawing air and foam from the drum 17. A hood assembly which may include a cup or bell-like member 42 is adapted to surround the bung opening 24 and to rest upon the end of the drum 17. The hood is provided with a centrally disposed opening in which a depending sleeve 43 is secured and through which the filling nozzle can slide.

A branch pipe 44 connecting with the pipe 32 which leads to the tank 33, is provided with manifold connections 45, 46, 47, the manifold connections, respectively, having valves 48, 49, 50. In the present instance the manifold connection 47 is connected by means of a flexible hose 51 to a pipe 52 which communicates with the interior of the bell-like member 42, the pipe 52 being provided with a valve 53. The arrangement is such that by opening valve 53 in the pipe 52 and valve 50 in the manifold connection 47 air and foam may be withdrawn from the drum 17, through the hose 51 and the pipes 44 and 32, and discharged into the tank 33.

The hood member 42 is shown provided with a base portion 56, which may be made of soft oil-insoluble rubber-like material so that substantially no air may pass between the member and the contiguous end of the drum.

The nozzle 23 is adapted to slide in the sleeve 43 of the bell-shaped member 42. The arrangement is such that when the nozzle 23 is withdrawn from the drum 17, any oil remaining on the nozzle is wiped off by the sleeve 43 and dropped into the drum. The sleeve portion may fit the nozzle very closely or may be appropriately packed, so that substantially no air may pass around the nozzle and through the sleeve into the drum.

A flange 57 is secured around the upper end of the nozzle 23 and is adapted to rest against the sleeve 43 for supporting the nozzle in the drum 17 and regulating the distance the nozzle extends into the drum.

Another flange 58 is secured around the lower end of the nozzle 23 and is adapted to bear against the lower end of the sleeve 43 when the nozzle is lifted from the drum for lifting the bell-shaped member 42 from the drum preparatory to inserting the nozzle in another drum.

A small opening is provided in the top of the bell-like member 42. The opening is covered by a clapper type valve 55 which is opened to admit atmospheric air to the bell-like member 42 and the drum 17. The valve 55 is opened by a small rod 59 which is slidably positioned in hooks 60 and 61 which are secured in the outer wall of sleeve 43. A stop 62 is provided for limiting the movement of the valve 55 when it is opened. The rod 59 is moved upward to open the valve when the nozzle 23 is withdrawn from the drum 17, and by so opening the valve air is permitted to quickly enter the bell-like member, thus facilitating its removal from the head of the drum. The withdrawal of the nozzle brings the flange 58 into engagement with the end of the rod 59 and causes the latter to be moved upwardly against valve 55, thereby opening the latter. The flange 58 as it is withdrawn from a container also lifts the bell-shaped member 42 from the drum.

In practicing the invention it may be preferable to heat the oils to be blended in the tanks 3 and 4 to make them fluent enough for mixing. Heating of the oils is accomplished by means of the steam coils 5 and 6. The heated oils, in suitable proportions, may then be delivered from the tanks 3 and 4 into the mixing tank 7. The mixing tank 7 also is heated by means of the steam jacket 12. Mixing of the oils may be accomplished in the tank 7 by blowing with air introduced through the connection 15. When mixing is started the valves 30 and 37 in the pipes 29 and 34 respectively are closed and the valves 31 and 38 in the connecting lines 32 and 35 respectively are opened. Thus it will be seen that a partial vacuum may be maintained in the tank 33 and the mixing tank 7 during mixing by aid of the operation of the jet 36. When the withdrawal of air and foam is discontinued, the valves 30 and 37 may be reopened and the valves 31 and 38 may be closed to admit air so that atmospheric pressure will obtain in the tanks 7 and 33. The valve 41 may also be opened and any oil collected in the tank 33 may be returned to the mixing tank through the line 40.

In practicing the invention I prefer to continue to withdraw air and foam from the mixing tank 7 throughout the mixing step, and also to hold a vacuum therein for a time after the injection of air for mixing has been discontinued.

In withdrawing air and foam from the drum 17 during filling, the valve 55 on the top of the bell-member 42 will be closed and the valves 50 and 53 in the manifold line 47 and flexible hose 51 respectively will be open. During the filling of the drum the valves 25 and 26 in the manifold line and flexible line 22 respectively will be open. When the drum is filled, as indicated by the weighing scale 16, the valve 26 which regulates the delivery of oil to the drum 17 from the mixing tank 7 is first closed. Then, without closing

the valve **53** which regulates the withdrawal of air and foam from the drum, the nozzle **23** is withdrawn and simultaneously therewith the valve **55** is opened by such withdrawal and air is admitted to the drum. By the withdrawal of the nozzle **23** the bell assembly **42** is also removed from its seat on the drum end.

In alternative modes of mixing in the tank **7** it may be found preferable to mix at atmospheric pressure and thereafter reduce the pressure in the tank **7** in the manner described above by use of the jet **36** and hold it for a while before starting to fill containers. Further it may also be found preferable to partially or nearly completely fill containers at atmospheric pressure and near the last of the filling step reduce the pressure therein momentarily to destroy the foam. Moreover the filling step may be accomplished either at atmospheric or reduced pressure within the container while the pressure in the tank **7** is at atmospheric or reduced therebelow.

Obviously many modifications and variations of the invention, as hereinbefore set forth, may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. Apparatus for filling oils in containers comprising a nozzle adapted to be inserted in the bung opening of a container, a hood slidably attached to and surrounding the nozzle and adapted to be placed over the bung opening, a flange secured to the lower end of the nozzle adapted to lift the hood from the container when the nozzle is withdrawn from the container, means for withdrawing air and foam from the hood and from the container, a valved opening in the hood for admitting air to the hood and to the container, and a valve actuating arrangement operated by the flange on the lower end of the nozzle when the latter is lowered into or lifted out of a container adapted to close or open the valve.

2. Apparatus for filling oils in containers having bung openings, comprising a hood adapted to be placed over the bung opening of a container and having an opening therein, a nozzle slidably mounted in said opening and adapted to be inserted through the bung opening, means for withdrawing air and foam from the hood and container during the filling operation to produce a partial vacuum therein, said hood being provided with a second opening and an outwardly opening check valve positioned in and adapted to close said opening, and means actuated by said nozzle for opening the check valve to break the vacuum in the hood and container upon withdrawal of the nozzle from the bung.

3. Apparatus for filling oils in containers having bung openings, comprising a hood adapted to be placed in air-tight engagement over the bung opening of a container and having an opening therein, a nozzle having an annular flange thereon and being slidably mounted in said hood opening and adapted to be inserted through the bung opening, means for withdrawing air and foam from the hood and container during the filling operation to produce a partial vacuum therein, said hood being provided with a second opening and an outwardly opening check valve positioned in and adapted to close said second opening, and means actuated by contact with said flange for raising the check valve to break the vacuum in the hood and container upon withdrawal of the nozzle.

4. Apparatus for filling oils in containers having bung openings, comprising a hood adapted to be placed over the bung opening of a container and having a centrally disposed opening therein, a sleeve mounted in said hood opening, a nozzle having an annular flange thereon and being slidably mounted in said sleeve and adapted to be inserted through the bung opening, means for withdrawing air and foam from the hood and container during the filling operation to produce a partial vacuum therein, said hood being provided with a second opening and an outwardly opening check valve positioned in and adapted to close said second opening, and a plunger slidably mounted on said sleeve and adapted to be actuated by contact with said flange for engaging and raising the check valve to break the vacuum in the hood and container upon withdrawal of the nozzle from the bung.

WILLIAM C. POOLE.

CERTIFICATE OF CORRECTION.

Patent No. 2,140,811. December 20, 1938.

WILLIAM C. POOLE.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 2, for the word and comma "containers," read containers. It has particular reference to the handling of; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 7th day of March, A. D. 1939.

Henry Van Arsdale.

(Seal) Acting Commissioner of Patents.