

July 11, 1944.

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DISPENSING NOZZLE SIGNAL

2,353,181

Filed Oct. 3, 1941

Fig. 1

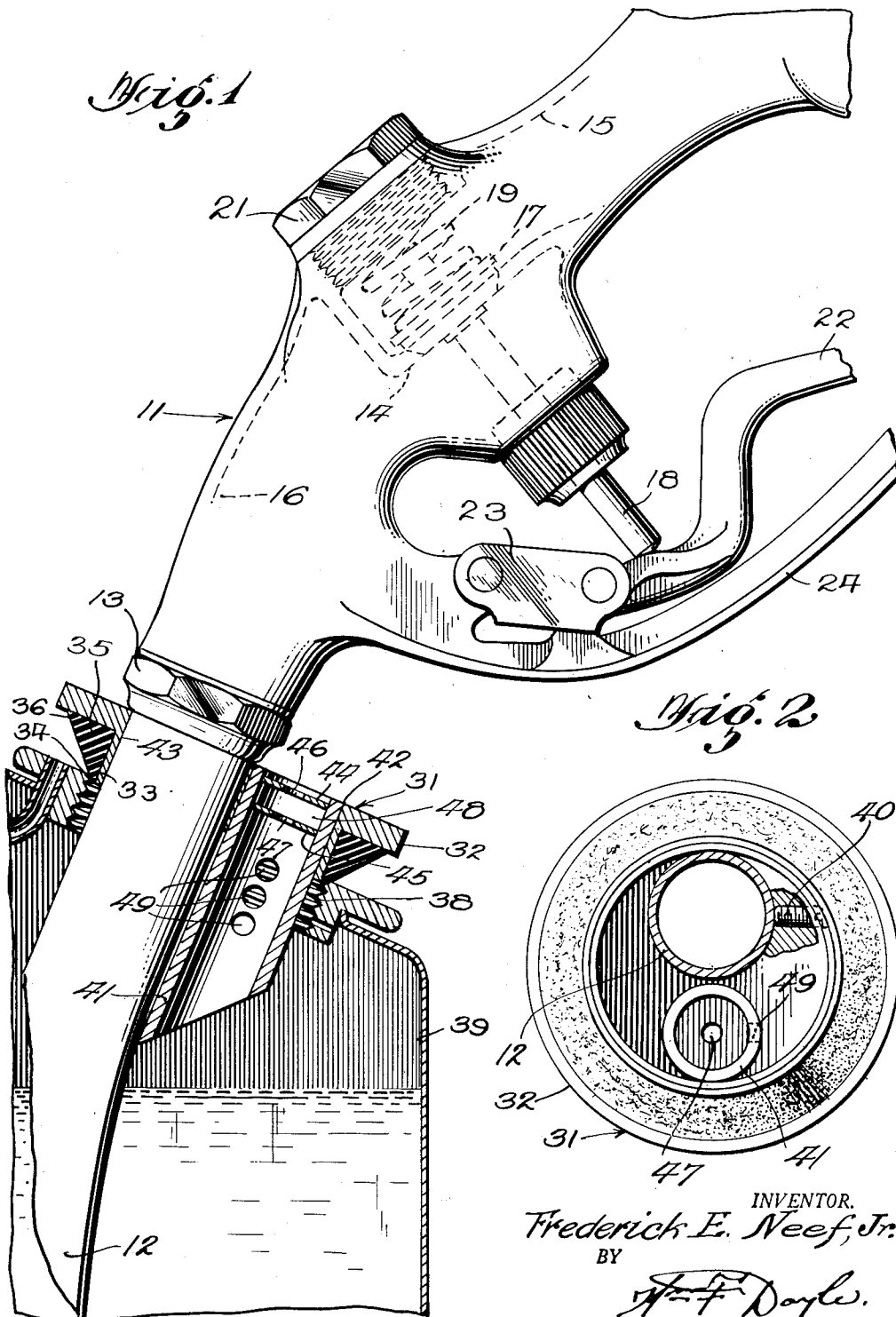
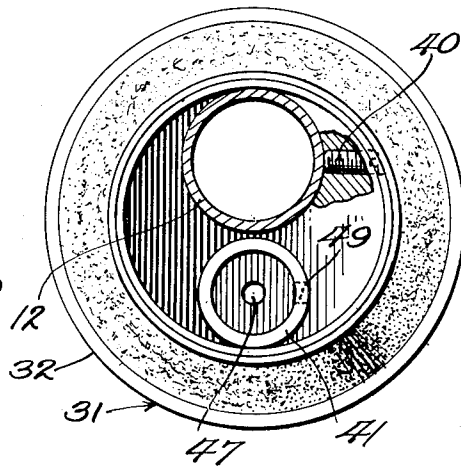


Fig. 2



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2,353,181

DISPENSING NOZZLE SIGNAL

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Application October 3, 1941, Serial No. 413,455

5 Claims. (Cl. 116—109)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein, if patented may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

The present invention relates to dispensing equipment and more specifically relates to a gasoline dispensing nozzle arranged to include an audible signal responsive to changes in the fluid level of any container being filled.

The particular structure illustrated in the following disclosure has been specifically designed to enable troops to easily and safely fill great numbers of small, portable fuel containers, from which Army vehicles are customarily refueled in the field. These containers are transported from place to place by truckloads and are filled in the field from mobile tanks or from railway tank cars, so that it will be unnecessary to keep the large mobile tanks or tank cars near the scene of battle, since these provide an obvious target for hostile aerial attack or artillery bombardment. In filling such containers, it will be readily appreciated that it is of utmost importance that they be filled in rapid succession, and for obvious reasons it is undesirable to have any overflow or spilled fuel in the vicinity of the filling stations. However, inasmuch as field operations of this character are preferably carried out in absolute darkness, ordinary types of indicator or level determining methods are impracticable.

The device disclosed in the following specification has been developed in the United States Army to meet the special requirements incident to such operations, and to conform with the present military requirements. It is, however, not limited to military use and its utility is believed to extend into commercial lines as well.

Before discussing the detailed form of the invention disclosed in the following specification, it is believed pertinent to point out the fact that engineers of the United States Army recently sought to purchase nozzles of the audible indicator type, and it immediately became apparent that no satisfactory structures were available, either in the commercial market or in the patent art. Numerous devices were considered, these devices being taken both from the patent art and from commercial developments, and although some diligence was used in attempting to locate a satisfactory mechanism, each of the prior art devices considered was found to be deficient in certain of the military characteristics regarded as essential by the War Department, and insisted upon by the Army Engineers.

Certain of the prior art devices were objectionable in that they required complete mechanical redesign of the gasoline dispensing equipment in use. These were immediately eliminated from consideration since experience indicates that any complete redesign of mechanical equipment invariably brings forth new faults and errors of design and in the case of gasoline dispensing equipment any such errors are of extreme gravity by reason of the inflammable and explosive characteristics of the fuel. Other devices of the prior art were rejected, either by reason of the fact that they were unnecessarily complicated and undependable in operation, unjustifiably expensive, or that they were operable only under certain specific conditions of use; for example, under a narrow limit of pressures. Certain other prior art structures were objectionable on the grounds that they included restricted fuel passageways which tended to reduce the flow of the fuel unnecessarily.

It is, therefore, the principal object of this invention to provide an improved gasoline dispensing nozzle including an audible signal arranged to notify the operator when the container is filled to a predetermined level.

A further object of the invention is to provide a conversion unit whereby a standard type of gasoline dispensing nozzle may be reconverted into a nozzle including an audible signal without the necessity of mechanical redesign of the essential nozzle structures.

Another object of the invention is to provide a nozzle attachment including an audible signal indicator, wherein the principal structure of the nozzle is unaltered so that the known merits of nozzle structures of proven value may be utilized in connection with the new features constituting the essence of the present invention.

A further object of the invention is to provide a signaling nozzle of such design and construction as to be operable within wide limits of rate of flow and pressure in order to be equally well adapted for use with fuel under pump pressure or gravity feed.

A further object of the invention is to provide a signaling nozzle wherein the signal devices are simple and of extremely rugged nature, having no moving parts or structures requiring delicate adjustment.

A further object of the invention is to provide a nozzle signaling device including a sealing stopper for the container whereby the signal is positively operated by the egress of air from the con-

tainer being filled, as contrasted with suction devices or Venturi or float arrangements.

A further object of the invention is to provide a nozzle signaling device including an unobstructed fuel passageway, so that the operation of the signal will not decrease the normal rate of flow of fuel through the dispensing apparatus.

Referring now more particularly to the drawing,

Fig. 1 is a central sectional view of a gasoline dispensing nozzle and signal indicator device constructed in accordance with the teachings of the present disclosure.

Fig. 2 is a bottom plan view of the nozzle and attached indicator and stopper device removed from the container, the nozzle only being in section, and part of stopper body 31 being broken away to show set screw 40.

In order that the signal indicator device may be utilized in connection with standard gasoline dispensing equipment of conventional design and proven merit, and to avoid any necessity of special tooling or the construction of any complicated type of apparatus, it is contemplated that the most satisfactory form of signal indicator device should be of such a design and construction that it may be applied to a conventional dispensing nozzle either permanently or temporarily and without requiring any substantial changes in design of the nozzle structure. To accomplish this result, the present invention contemplates the provision of a nozzle conversion unit so arranged and constructed that it may be instantly applied to any of the standard forms of nozzles now adapted for use in the Army, and when so attached will convert the standard type of dispensing nozzle into a nozzle including an audible signal indicator whereby the operator will be warned that the vessels being filled are almost full in time so that he may manually shut off the fuel flow.

In the drawings, the numeral 11 indicates a gasoline dispensing valve body, which is provided with a spout 12 secured to the body 11 by the threaded nut 13. The valve body 11 also includes a valve seat 14 arranged to separate the inlet passageway 15 from the discharge passageway 16. The valve seat 14 is normally closed by a valve 17 at the upper end of the valve stem 18 and normally urged downwardly into engagement with the valve seat 14 by a compression spring 19 carried by the closure cap 21 in the conventional manner.

An operating handle 22 and link 23 are pivotally mounted at the forward end of the handle guard 24 so that the operator may grasp the handle 22 to force the valve stem 18 inwardly and lift the valve 17 from the seat 14 against the action of the compression spring 19 to open the valve and permit the liquid to flow from the inlet passageway 15 through the discharge passageway 16 and outwardly through the lower end of the spout 12.

The structures thus far described are entirely conventional and well-known in the art, and since they do not form a pertinent part of this invention except in connection with the structure to be hereinafter described, they will not be mentioned in greater detail in this application.

The audible signal conversion unit consists of a stopper body 31 which is preferably formed of metal and is arranged to include an annular flange 32 and a neck portion 33 terminating in a small lip 34 arranged to maintain a resilient

gasket 35 in position on the neck. The resilient gasket 35 is preferably provided with an angularly inclined sealing surface 36 of size and shape to firmly engage the inner walls of the mouth 38 of a sheet metal fuel container 39. As illustrated, the container 39 constitutes a standardized type of five-gallon fuel container from which Army vehicles are customarily refueled in the field.

The stopper body 31 is provided with a cylindrical bore 43 of proper size to fit closely over the nozzle spout 12, and may be locked in position by any suitable means, as by the set screw 40. This support is ordinarily sufficient for any contingency since upward shifting of the stopper may be prevented by placing its upper surface in contact with the nut 13, but in some instances it may be desirable to weld the stopper body to the spout.

A relatively large diameter whistle tube 41 is pressed into a cylindrical opening 42 formed in the stopper body 31 in parallel relationship and closely adjacent to the mounting opening 43. The whistle tube 41 is arranged to support a whistle structure at its upper end and to extend downwardly in order to provide a connection between the whistle and the inside of the container being filled so that as the liquid enters the container the air emitted therefrom will be forced upwardly and through the whistle structure, thus emitting an audible signal during the entire filling operation. The tube 41 is preferably formed of relatively heavy metal in order that it may act as a guard for the whistle structure and prevent accidental damage due to rough handling or careless treatment of the equipment, and it is preferably beveled at an angle of about 45 degrees at its lower end so that it may be readily inserted into the mouth 38 of the fuel container 39. The upper end of the whistle tube 41 is provided with a pair of spaced disks 44 and 45, each of which are soldered or otherwise secured to the inner walls of the tube 41 and each of which are provided with central passageways or ports 46 and 47, respectively. The disks 44 and 45 are spaced in predetermined relationship to each other in order to define an annular whistling chamber 48. The whistle tube 41 is also provided with a plurality of side ports 49 on one side of the tube and at a position somewhat above the lower open end of the tube.

The operation of the device is as follows:

The operator will insert the spout 12 in the container and position the sealing surface 36 of the gasket 35 firmly against the upper edge of the mouth 38, and open the valve 17 by the operation of the hand lever 22 in the customary manner.

As liquid enters the container, the air contained in the container will be forced out through the tube 41 and in passing through the whistle chamber 48 will emit a shrill and distinct audible signal during the entire time that the liquid is flowing into the container. There will be no appreciable flow of air through the side ports 48 at this time, since the pressure on the outside and the inside of the tube will be substantially equal. As the liquid level rises, it will cover the lower beveled portion of the tube and close the air inlet thereto immediately before the container is completely filled, since the turbulence tube is of such length as to extend downwardly into the container the desired predetermined

distance. When the lower end of the tube 41 is thus closed by the liquid, the air which formerly flowed through the whistle chamber 48 in a direct blast along the axis of the tube 41 will now be introduced through the inlet ports 49 on the side of the tube 41. When the air enters the tube in this manner, it will set up a turbulence within the tube of such nature that although the air will pass upwardly through the apertures 47 and 46 and through the whistle chamber 48, the flow of air through the whistle will be so disturbed that the whistle will be inoperative.

Thus, in filling the container, the operator need only hold the nozzle valve wide open as long as the indicator continues to whistle, and when the sound of the whistle is interrupted by the contact of the liquid with the lower end of the turbulence tube he may release the nozzle valve and thus shut off the flow of liquid before the container overflows.

From the foregoing, it will be apparent that by practicing the teachings of the present invention it is possible to provide a highly satisfactory signal indicating nozzle of extremely simple construction capable of entirely satisfactory operation even under the most adverse circumstances of use. It will be noted, of course, that the entire nozzle structure may be of conventional design and construction and the indicating features included by the simple addition of a few comparatively inexpensive parts. In military operations the indicator here disclosed is of particularly desirable construction since it has no moving parts whatsoever and can be subjected to great abuse without damage. In this connection, it will be noted that the entire stopper body and particularly the whistle structure is quite well protected against accidental damage, since it lies closely adjacent the threaded nut 13 of the nozzle and is close to the nozzle handle guard 24 so that a line drawn between the lower extremity of the nozzle 12 and the guard 24 will not intercept any portion of the stopper body construction. This, of course, means that the stopper is not apt to be damaged by being dropped on the ground or even against steel or concrete surfaces, since the force of any accidental impact will be more apt to be delivered to the nozzle 12 or the guard 24.

Further, the conventional type of nozzle may be altered to provide a warning signal without making any changes in its inherent design. It will also be appreciated that the signal is entirely positive in operation, since the medium by which it is operated is the air entrapped within a closed container and this flow may be depended upon since it is utterly impossible to fill the container with liquid without causing the corresponding discharge of air, so that the operation of the signal device is entirely independent of the pressure at which the fuel is admitted to the nozzle. The rate of flow of the fuel may also vary within wide limits without affecting the efficiency of the device, since with the whistle constructed as illustrated in the drawing a comparatively small rate of flow will emit a distinctly audible signal and the flow may be greatly increased without materially affecting the operation of the device except to intensify the whistling sound.

I have shown and described the present invention in the preferred form as developed for military purposes and adopted by the United States Army. I am, however, aware that it is subject to numerous alterations and modifications without departing from the spirit of the invention and

I therefore do not wish to be limited except as by the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to secure by Letters Patent is:

1. In combination, a liquid discharge spout, a circular stopper body mounted on said spout in eccentric relation thereto to provide a signal-mounting space on the body, and a signal comprising a sound-producing device mounted in and protected by the stopper body and occupying said mounting space and a tube extending below the stopper body and having a plurality of air inlet ports in communication with the interior of a container being filled, one of said ports being adapted to be closed first by the rising liquid level in the container, to interrupt the signal sound, and a single air discharge port in communication with the atmosphere, said tube directing all the air displaced from the container through the sound-producing device.

2. In combination, a liquid discharge spout, a circular stopper body mounted on said spout in eccentric relation thereto, a signal device comprising a tube extending below the stopper having an open lower end and a side-wall opening below the stopper body, the open lower end being adapted to be closed by the rising level of the liquid in a container being filled, and a sound-producing device located within and protected by the stopper body and receiving the air vented from the container through the tube, the air producing sound only when passing through the open lower end of the tube, and a guard angularly positioned with respect to the nozzle to protect the signal device.

3. An audible indicator device and liquid discharge device comprising a stopper for the inlet of the receptacle to be filled, said stopper having parallel bores, and a discharge spout and a vent tube positioned in the bores, the vent tube being shorter than the spout and beveled at its lower end to form a tapered assembly for easy insertion into the receptacle inlet, said vent tube being provided with a whistle in its upper end, and with an open lower end and a perforation on its side-wall below the stopper, whereby the whistle will be operated by the vented air while the liquid level in the receptacle is below said end, but air may continue to be vented through the side-wall perforation without sounding the whistle.

4. A combined nozzle and audible signal for indicating when a desired level in a container has been reached, the nozzle having a guard device and a tubular discharge member joined to form an angle, a stopper body adapted to close the inlet of the container mounted on the discharge member in off-center relation to provide space for a whistle receiving bore on the inside angle of the assembly, and a whistle extending through said bore and lying entirely within the angle formed by said member and said guard, and comprising a sound-producing device within and protected by the stopper body, and a vent tube for conducting air displaced from the container to said device, said tube being parallel to and shorter than the tubular discharge member and beveled for easy insertion in the container and to lie within the protecting angle of the member and guard.

5. A combined nozzle and audible signal for indicating when a desired liquid level in a container has been reached, the nozzle having a guard device and a tubular discharge member joined to form a protecting angle, a stopper body adapted

to close the inlet of the container mounted on the discharge member in off-center relation and providing space in the angle having a whistle receiving bore, and a whistle extending through said bore comprising a sound-producing device adjacent to and protected by the stopper body and a vent tube for conducting air displaced from

the container to said device, said tube being parallel to and shorter than the tubular discharge member so as to lie within the protecting angle of the guard and member, one element of the assembly being beveled for easy insertion into the container.

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