G. ENGELHARD.

CASK FILLING DEVICE.

APPLICATION FILED AUG. 5, 1911.

1,054,912.

Patented Mar. 4, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

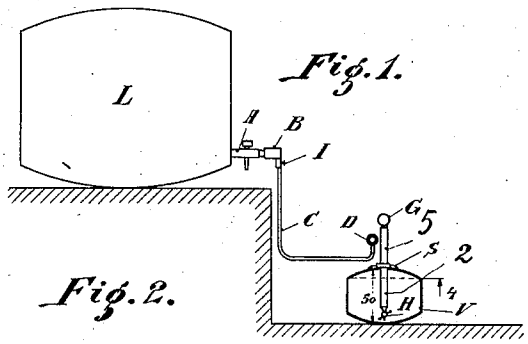


Fig. 2.

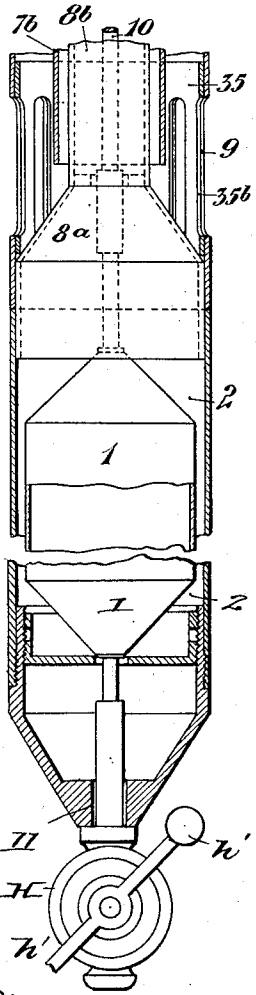


Fig. 4.

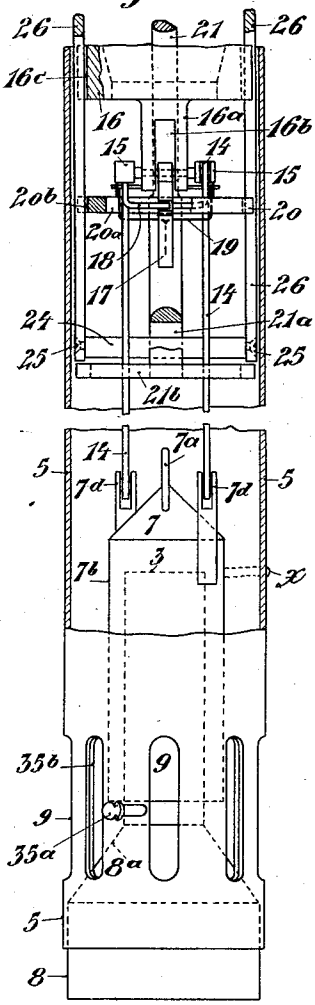
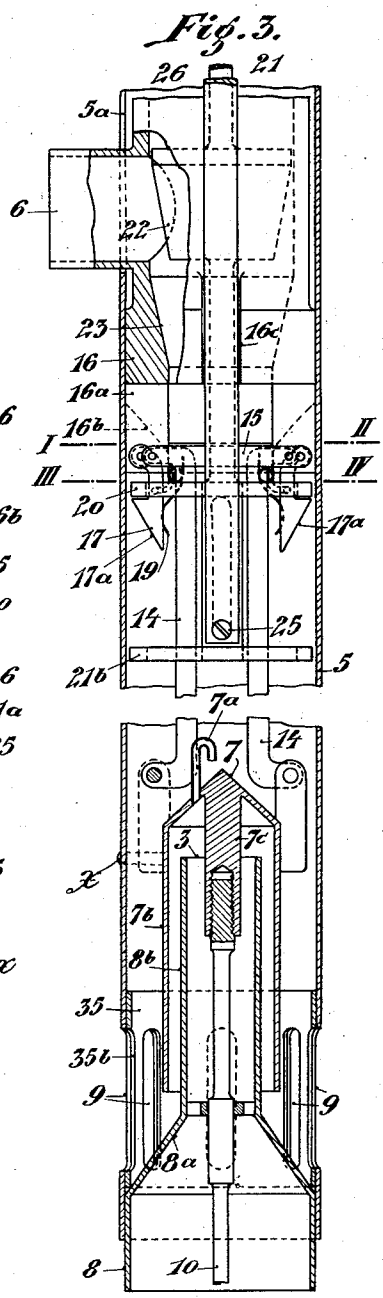


Fig. 3.



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R. Schmidt

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2 SHEETS—SHEET 2.

Fig. 5.

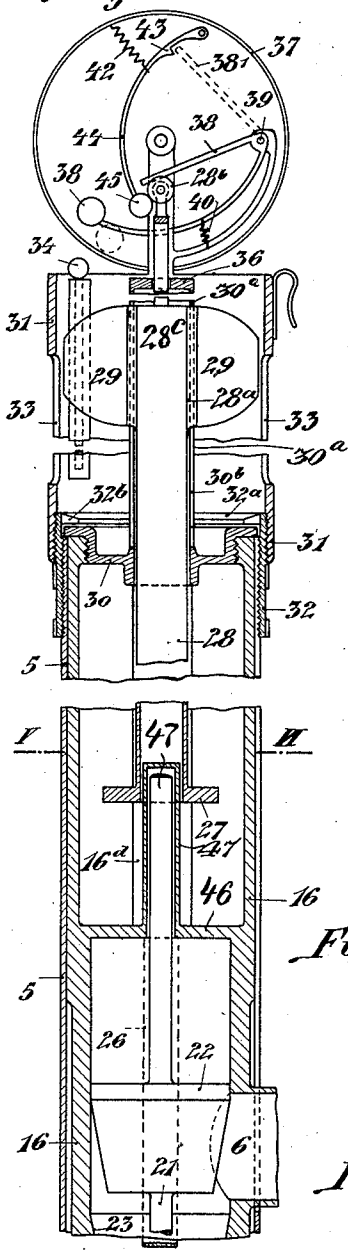

Fig. 6.

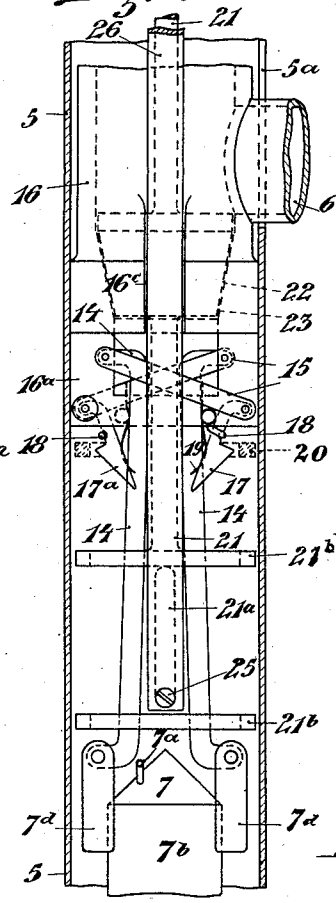

Fig. 3a.

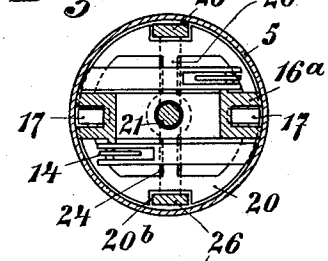

Fig. 3b.

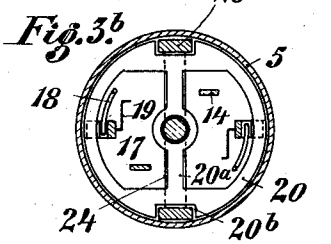

Fig. 9.

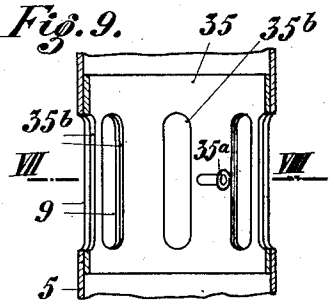

Fig. 9a.

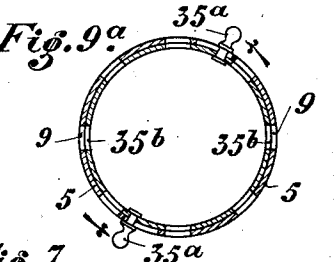

Fig. 5a.

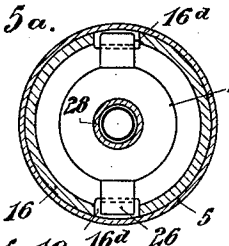

Fig. 7.

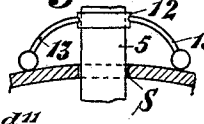

Fig. 7a.

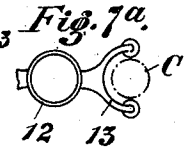

Fig. 10.

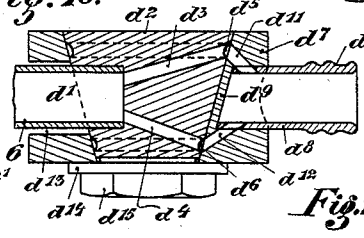

Fig. 8.

Fig. 11.

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GUSTAV ENGELHARD, OF GOTHA, GERMANY.

CASK-FILLING DEVICE.

1,054,912. Specification of Letters Patent. Patented Mar. 4, 1913.

Application filed August 5, 1911. Serial No. 642,466.

To all whom it may concern:

Be it known that I, GUSTAV ENGELHARD, a subject of the Emperor of Germany, and a resident of Gotha, Germany, have invented certain Improvements in Cask-Filling Devices, of which the following is a specification.

The present invention relates to a device of the kind used for transferring liquid from the storage tuns to capacious casks in which it is to be despatched, and of the kind provided with means for preventing an overflow and consequent loss of the liquid. By capacious casks is meant those having a capacity of at least 50 liters. Though there is nothing in the way of using the improved device for the filling of smaller casks, it would hardly be of any advantage to do so. Smaller casks are quickly filled and do not therefore allow of any long absence, during the filling process, on the part of the man who has charge of such process. In the case of larger casks, however, the man has ample time to do other work while the liquid is running, and then the utility of the device is obvious, since it insures the stopping of the flow at the right moment and prevents spilling of the liquid.

Previous devices of this kind have been fitted with a float which, when the liquid surface in the cask has reached a certain level, either actuates an electric signaling device or effects an automatic closing of the tun tap. As for the first alternative it has been found that the signal frequently remains unnoticed by the employees, owing, either to lack of attention on their part, or to the sound being drowned in other noise. Of course it is also feasible that the signaling device, for one or other reason, may refuse to act, the consequence being in either case that the liquid flows over and is wasted. Apart from the diversion of liquid which the possibility of such uncontrollable over-flow involves, there is also, in the case of inflammable, volatile liquids, the danger of incurring an explosion thereby. The provision of a dripping tray underneath the cask for the reception of overflowing liquid, and the emptying of such tray into the next cask to be filled, is at all events not a very clean method.

Devices adapted to automatically close the tun tap when the cask is full, necessitates a hermetic closure of the bung-hole which can only be lastingly effected in metal casks or casks having a metal lining. The bung-holes of ordinary wooden casks soon lose their original roundness and are then difficult to close.

According to the present invention a float of ordinary construction is fitted in a chamber in a casing and is inserted together with the latter into the cask to be filled. The liquid is fed into the cask through the upper part of the casing which is constructed so as to guide such liquid away from the float chamber. When the liquid in the cask has risen to a certain point the float chamber is flooded so as to cause a sudden raising of the float. Such raising of the float causes the release of a drop valve which interrupts the flow of liquid. Means are provided for a manual operation of the valve and for the visual ascertaining of its position. Means are also provided for giving an audible signal simultaneously with the dropping of the valve. In this arrangement no tightening of the bung-hole is needed.

In the accompanying drawings the invention is illustrated, Figure 1 representing a diagrammatic view of the whole arrangement, Fig. 2, a sectional view of the lower part of the device, Fig. 3, a sectional view of the middle portion of the same, Fig. 3^a, a cross-section on the line I—II of Fig. 3, Fig. 3^b, a cross-section on the line III—IV of the same figure, Fig. 4, another view of the middle portion of the device, partly in section and at right angles to Fig. 3, Fig. 5, a sectional view of the upper part of the device, Fig. 5^a, a cross-section on the line V—VI of Fig. 5, Fig. 6, a view similar to Fig. 3 but showing the elements in a different position, Fig. 7, a view of the element for supporting the device on the cask, Fig. 7^a, a partial plan of said supporting element, Fig. 8, a view of a valve for emptying the float chamber, Fig. 9, a sectional view of the part of the device through which the filling liquid is discharged into the cask, Fig. 9^a, a cross-section on the line VII—VIII of the latter figure, Fig. 10, a sectional view of a jointed pipe connection used in the arrangement, and Fig. 11, a diagrammatic view of a strainer used for preventing the entrance of impurities into the apparatus.

In the diagrammatic view of the arrangement shown in Fig. 1, L is the storage tun and V the cask to be filled from the same. 5 is the upper part of the filling device, and

2 the lower part of the same. The device is inserted in the cask through the bung-hole S and is connected to a flexible hose C by means of a jointed union D. A is the tap of the tun, B, the union connecting the hose with said tap, and I, a valve for admitting air into the hose when it is emptied. The part 5 is surmounted by a signaling device G, and the part 2 has a discharge valve H for emptying the float chamber.

The device is principally intended for the filling of wooden casks and these are for that purpose provided with bung-holes of about 4 centimeters diameter. It makes no difference if the bung-hole is larger or if it is of irregular shape, as long as it admits a body having a diameter of 4 centimeters into the cask. An advantage in connection with the improved device is that it does not, like many old filling devices, require a second bung-hole, each additional hole tending naturally to weaken the staves of the cask.

Casks of the above mentioned capacity have, perpendicularly to the bung-hole, an internal diameter of at least 40 centimeters, and the length of the device need not, therefore, be limited to the same extent as the thickness thereof. It is thus possible to provide the device with a capacious float. The float 1 (Fig. 2) has the form of a cylinder about 25 centimeters long and 3.5 centimeters wide. The weight of the water displaced by the float represents the approximate impelling power available for effecting an interruption of the filling. If this float, as is the case in all hitherto known arrangements, would be suspended on the surface of the liquid in the cask, it is evident that it would rise slowly with the liquid and that it would, moreover, be subjected to vibrations caused by the formation of waves on said surface at the inrush of the liquid. It would therefore be hard, if at all possible, to induce the float to act at the desired moment. To avoid this drawback the float is, according to the present invention, fitted in upright position in the lower part 2 of the elongated, cylindrical casing forming the filling device, and the float chamber is protected so as not to admit any liquid to the float until the moment has arrived at which the filling is to be interrupted. For this purpose the float chamber is closed at the top by a cylindrical body 8 which is continued upward by a tapering portion 8^a to which finally a cylindrical intake tube 8^b is attached. The float is slidably guided by means of a spindle 10 in a bridge piece in the tube 8^b. A similar spindle is provided at the lower end of the float to guide it in the lower, tapering end of the casing 2. In this manner the float can move freely without coming into contact with the walls of the casing. At the lower end of the casing a discharge port 11 is provided which is normally closed by a valve H (Figs. 1 and 8). The spindle has a stem 7^c screwed upon its upper end, which stem carries a hood 7. The latter has an upright air-vent 7^a with downturned end, and is continued downward by a cylinder 7^b which surrounds the tube 8^b so as to protect the inlet 3 of the same.

Immediately above the tapering portion 8^a, the casing is provided with longitudinal apertures 9 through which the liquid, fed through the part 5 of the casing and prevented by the hood 7, 7^b from entering the float chamber, is discharged. The total discharge area of the apertures 9 should be such as to cause no accumulation of the liquid in the casing 5. A lateral intake nozzle 6 on the casing 5 is connected to the hose C and admits the liquid into the apparatus.

So far as hitherto described the device operates as follows: The liquid entering through the intake 6 passes through the casing 5 and is discharged by the apertures 9 whence it flows along the outside of the casing 2 into the cask. Since the liquid is constantly guided on the surfaces of the apparatus, no splashing and no formation of froth and waves takes place. As the cask begins to fill the apertures 9 will be inundated whereupon the liquid rises under the hood 7, 7^b until it finally flows over into the tube 8^b and floods the float chamber. The narrow space around the float is quickly filled with liquid which then causes the float to be thrust upward. This movement of the float is utilized for releasing a drop valve and thus interrupting the filling, an arrangement which will be hereinafter fully described.

It is evident that a disturbance which might possibly be caused on the surface of the liquid in the cask, cannot be transmitted to the interior of the hood 7, 7^b and so to affect the movement of the float. An exact adjustment of the device, therefore, to interrupt the filling at a particular stage of the same can easily be effected. A mark x is made on the outside of the casing 5 on a level with the inlet 3 of the tube 8^b to facilitate the adjustment.

For supporting the filling device on the cask in adjusted position, a collar 12 is adjustably fitted on the casing 5 and provided with two diametrically opposed curved legs 13 terminating in points or balls (Fig. 7). The legs 13 are set in the same vertical plane as the axis of the intake nozzle 6, and the leg situated at the same side as the nozzle is forked, as shown in Fig. 7^a, to embrace the hose C when the latter is disengaged from the tun and hangs parallel with the casing 5, 2. This construction and ar-

rangement of the legs 13 serves to maintain the apparatus in a perpendicular position and prevent its being tilted owing to the onesided feed of liquid. Rocking of the apparatus at right angles to the legs 13 is prevented by the forked formation on one of the legs and also by the fact that the center of gravity is disposed below the point of support.

As previously noticed, the upward movement of the float is utilized for releasing a drop valve adapted, by its own weight to be applied to its seating and interrupt the filling. For this purpose the hood 7 is provided, as shown in Figs. 3, 4 and 6, with two forked brackets 7^d each of which is connected by means of a vertical rod 14 to one end of a lever 15. The two levers 15 have normally a horizontal position and are accommodated at opposite sides of downwardly projecting lugs 16^a connected to a valve chamber 16. The latter is integral with the intake nozzle 6 and is inserted into the casing 5 from the upper end thereof, the casing having a longitudinal slot 5^a to admit the nozzle. The levers 15 are pivoted to the lugs 16^a at opposite sides, one to each, and are provided with fingers 18 which take across catches 17 loosely suspended from inside slots 16^b in the lugs 16^a on the pivots of the levers. Each lever carries also a spring 19 which abuts with its free end against the back of the respective catch so as to press it resiliently against the finger. From this arrangement it follows that the finger and the spring coöperate for moving the catch 17 with the lever 15 to which it is connected.

In the normal position of the catches 17 they serve to support a ring 20 which, on a bridge piece 20^a, carries an upward rod 21. To this rod a conical drop valve 22 is connected which, when the ring 20 is supported on the catches, is held away from its seating 23, the latter being formed in the body 16, immediately underneath the intake 6. The rods 14 are bent so as to admit of working in the spaces between the ring 20 and the bridge piece 20^a, as shown in Fig. 3^b.

It is evident that when the float 1 is raised from the position shown in Figs. 2 and 3, the levers 15 and the catches 17 will be turned about their pivots into the position shown in Fig. 6, thus releasing the ring 20 and causing the valve 22 to drop into its seating. The filling is consequently interrupted and cannot be resumed until the valve is re-opened.

A space is inclosed above the valve seating by a partition 46 carrying an upright tube 47 in which the upper end of the rod 21 is guided. The tube 47 is closed at its upper end to prevent the liquid from passing through.

To allow a re-opening of the valve after such automatic closing and also an inspection of the elements to ascertain the position of the valve, the following arrangement is provided: The rod 21 is continued downward some distance beyond the bridge piece 20^a, and the extended part is provided with a longitudinal slot 21^a. A cross bar 24, passing through the slot 21^a, is connected with its ends, by means of screws 25, to the lower ends of draw-rods 26 carried upward through notches 20^b in the ring 20 (Fig. 3^b) and through grooves 16^c made on the outside of the valve chamber 16. Above the partition 46, the grooves 16^c develop into slots 16^d through which the two draw-rods are connected by means of a platform 27, the latter having a central aperture to accommodate the tube 47. On the platform 27 an upright tube 28 is mounted which also accommodates the tube 47 in its lower end and which carries in its upper part a vertical plate 29, the latter being passed through a slot 28^a in the tube and connected thereto so as to project wing-like at both sides. This part of the tube 28 is guided in a tube 30^a carried by a closing element 30 which is screwed into an extension of the valve chamber 16, the tube 30^a having longitudinal slots 30^b to admit the plate 29. A screw-cap 32 is applied to the casing 5 to retain the body 16 in the same, and this screw-cap is adapted to receive a head piece 31 as shown in Fig. 5. The screw-cap 32 has slots 32^b in its flange 32^a to allow the plate 29 to pass, the plate being made as wide as possible. Two diametrically opposed apertures 33 are provided in the head piece 31 through which apertures the plate 29 may be observed and also gripped.

As long as the ring 20 is retained by the catches 17, the cross bar 24 together with the rods 26, the platform 27, the tube 28 and the plate 29, will be supported in the lower end of the slot 21^a in the position shown in Fig. 5. To insure a better support for and a proper balancing of the rods 26, another ring 21^b, similar to the ring 20 with its bridge piece, may be connected to the lower end of the rod 21, the rods 14 being admitted through said ring at opposite sides of the bridge piece. The position of the plate 29 being thus dependent on the position of the valve 22, it is possible to ascertain, by a glance at the plate through the apertures 33, whether the valve is closed or not. After the valve has been closed by the operation of the float, which should be effected before the cask is quite full, for instance when the liquid reaches the level 4 (Fig. 1), it is possible, by gripping the plate 29 through the apertures 33, to raise said plate and lift the valve from its seating so as to complete the filling. The lifting of the valve in this manner is due to the engagement of the cross bar 24 with the upper

end of the slot 21ª. Since the catches 17, however, are continually held by the float 1 in the position shown in Fig. 6, a re-closing of the valve will be effected immediately the plate is released. The possibility of overflow, should the operator be called away while occupied with the completion of the filling, is thus excluded.

When the liquid in the cask has reached the bung-hole, the plate 29 is released to allow the valve to close, whereupon the apparatus is removed from the cask. To fill up the space vacuated by the apparatus, and at the same time to empty the float chamber, the valve H is opened. In order to facilitate the opening and closing of the valve H, it is fitted with a double-armed actuating lever the ends of which terminate in bulbs h^1. The lever is set so as to form, in both end positions, an angle of 45° with the axis of the apparatus. After the removal of the apparatus, therefore, it is possible to open the valve by simply pushing the lower arm of the lever against the edge of the bung-hole. The float chamber having been emptied in this manner, the tap A on the tun is closed and the air inlet I opened so that the contents of the hose C can also be transferred to the cask, for which purpose the valve 22 must be lifted by means of the plate 29. During this operation the apparatus must be held in the bung-hole so that the liquid, which is discharged through the apertures 9, can be guided along the casing 2 into the cask. After the hose has also been emptied into the cask, the latter, which is now quite full, is removed to make room for an empty one, the bung-hole being first properly plugged.

Since, at the lifting of the valve 22 for emptying the hose, the float had already resumed its normal position, it is evident that by this operation the catches 17 would be retracted by the engagement of the ring 20 with their inclined surfaces 17ª and would finally, by the action of the springs 19, snap behind the ring so as to lock the valve in open position. Similarly the plate 29, instead of dropping back into its lowest position, would be retained in its middle position. By a glance at the plate 29, therefore, it can be ascertained whether the valve 22 is actually open or not, an examination which is necessary before the apparatus is employed for the filling of a fresh cask. If the valve should not be open it shows, either that the float has been retained in its elevated position or that the springs which actuate the catches are out of order. In either case the apparatus must be put in order before it is reëmployed.

A further test as to the operativeness of the apparatus can be effected by inserting a suitable pin through the duct of the opened valve H into the float chamber so as to raise the float and cause the valve 22 to drop into its seating. A pin 34 for this purpose is stored in a sheath in the head piece 31 as shown in Fig. 5.

Before the apparatus is placed in position on a fresh cask, the valve 22 should be closed through the medium of the pin 34 in the manner just described. At the insertion of the apparatus into the bung-hole, the valve H is closed by pushing the now downturned arm of its actuating lever against the edge of the hole. The apparatus being in position, the tap A of the storage tun is opened, whereupon the valve 22 may also be opened by lifting the plate 29, the catches 17 being again operated for locking the valve in open position. The apparatus can now be let alone to interrupt the filling process automatically in due time as previously described.

For rinsing the apparatus it is only necessary to connect the intake nozzle 6 to a water pipe and let the water rush through. Since such water would ordinarily be discharged by the apertures 9 without entering the float chamber, and since a rinsing of the latter is just as essential, the following arrangement is provided for closing the apertures 9.

Referring to Figs. 9 and 9ª it will be seen that a sleeve 35 is fitted snugly inside the casing 5 at the portion of the latter in which the apertures 9 are made. This sleeve is rotatable and is provided with apertures 35ᵇ which coincide in shape and position with the apertures 9 on the casing. Normally the sleeve is set so that the apertures of both elements are opposite each other, thus leaving free passage for the liquid. By means of two diametrically opposed studs 35ª, projecting through and guided in transverse slots in the casing 5, the sleeve can be turned for bringing the apertures out of register. This effects naturally a closing of the apertures 9 and causes the rinsing liquid to rise from under the hood 7, 7ᵇ into the tube 8ᵇ whence it passes through the float chamber and through the discharge valve H, the valve 22 being meanwhile prevented from closing.

Two box-shaped strainers K, as shown diagrammatically in Fig. 11, are fitted in the hose C, one at each end, so as to prevent as far as possible the entrance of impurities into the apparatus.

To prevent the apparatus from being taken to pieces by inquisitive employees, all screw and other connections should as far as possible be soldered. The float and all the parts to be actuated by the same are preferably made of aluminium in order to reduce the weight. All the other parts should be made of suitably galvanized steel plate to be as strong and resistive as possible. Although the apparatus is illustrated

in the drawings as being of uniform diameter all through, it is evident that the parts thereof which are not required to pass through the bung-hole, may be made wider if so desired.

Since it is advantageous for the attendant to be notified when the filling has been interrupted and thus to be saved the trouble of frequently examining the plate 29, means are provided for giving an audible signal at the moment the valve 22 drops. For this purpose the tube 28 has its upper end connected to an upright pin 28^c which on the one hand serves to guide said tube in the top cover 36 of the tube 30^a and which, on the other hand serves to operate means for ringing a bell (Fig. 5). A bell 37 is mounted on a horizontal spindle above the head piece 31 and provided with a clapper 38 which moves about a pivot 39 and which has a tail extending from said pivot across a roller 28^b mounted on the upper end of the pin 28^c. A spring 40 tends to maintain the clapper in the position shown in Fig. 5. When the plate 29, at the commencement of the filling, is lifted for opening the valve 22, the roller 28^b acts on the tail of the clapper and turns the latter about its pivot 39. In its highest position the tail snaps behind the nose 43 of a catch 44 and is retained by the latter when the plate 29 is released. The catch 44 is pivoted and is controlled by a spring 42. When the pin 28^c, owing to the release of the valve 22 by the float, drops into its lowest position, the roller 28^b engages an enlargement 45 on the free end of the catch 44, the effect being to depress the catch and to release the clapper so as to sound the bell. This arrangement is more reliable than an electric signaling device which easily gets out of order. Besides, a single powerful impact on the bell is likely to produce a more startling and noticeable signal than the continued ringing of an electric bell.

It is well known that rubber hose is only durable when no bending of the same at sharp angles takes place. Such bending is bound to occur at the union of the hose C with the nozzle 6 in the manipulation of the apparatus, unless the union is jointed. A union allowing the necessary movement and capable of maintaining, lastingly, the desired degree of tightness in an apparatus of this description, is not so far known, and it has therefore been necessary to design a union fulfilling these conditions. Such a union (D) is shown in Fig. 10 and consists of a conical plug d^2 fitted in a casing d^7 and secured thereto in known manner by means of a nut d^{15} and a washer d^{14}. The nozzle 6 has its outer end fitted in and soldered to a laterally disposed socket d^1 in said plug, the casing d^7 having a circumferential slot d^{13} to admit the nozzle and allow it and the plug to be turned about 180° relative to the casing. From the socket d^1 two ducts d^3 and d^4 converge to the opposite side of the plug where they open into circumferential grooves d^5 and d^6 disposed at opposite ends of the plug. Opposite the slot d^{13}, the casing d^7 has a socket which leaves a partition d^9 between it and the plug. To this socket a nipple d^8 is secured which serves to receive the end of the hose and which is provided with beads d^{10} for the retention of the same. Ducts d^{11} and d^{12} lead from the nipple d^8 to the grooves d^5 and d^6 on the plug, communication being thus established between said nipple and the nozzle 6. It is evident that the casing with the nipple can be turned relative to the plug and the nozzle without interrupting such communication. By this arrangement a durable tightening is insured in spite of the comparatively wide movement the union allows of.

I claim:

1. A cask filler comprising an elongated, cylindrical casing adapted to be suspended in the bung-hole, means for feeding the liquid through the casing into the cask, a float guided on spindles in the lower part of the casing so as to allow of longitudinal adjustment, means for closing the lower end of the float chamber, an inlet nozzle surmounting the float chamber, the casing having lateral apertures around said nozzle to discharge the liquid, a hood carried by the upper float spindle so as to protect the nozzle from the liquid streaming down through the casing but so as to allow liquid rising from below the hood when the cask is full to enter and flood the chamber, a drop valve arranged in the upper part of the casing so as to be capable of interrupting the flow of liquid, catches for retaining said valve normally in open position, and connections between said hood and said catches for releasing the drop valve and interrupting the filling when the float chamber is flooded, substantially as set forth.

2. A cask filler comprising an elongated, cylindrical casing adapted to be suspended in the bung-hole, a valve chamber closed at the top and open at the bottom arranged in the casing, an intake nozzle opening laterally into said chamber to admit the liquid through the casing into the cask, a drop valve carried by a vertical rod in said chamber so as to be capable of interrupting the flow of liquid, a supporting ring connected to said rod, catches arranged so as to engage said ring and hold the valve normally in open position, a cross bar guided in a slot in the lower part of said rod, draw rods connected to the ends of said cross bar and carried outside the valve chamber to the upper part of the casing, a platform carried by said draw rods, a vertical plate carried

by the platform, the casing having apertures allowing the plate to be gripped and viewed for lifting the valve and ascertaining its position, a float fitted in a chamber in the lower part of the casing, means for protecting said chamber from the liquid streaming down through the casing, means for admitting liquid into the chamber when the liquid surface in the cask has reached a certain point on the casing, and connections between the float and the catches for releasing the drop valve and interrupt the filling when the float chamber is flooded, substantially as set forth.

3. A cask filler comprising an elongated, cylindrical casing adapted to be suspended in the bung-hole, means for feeding the liquid through the casing into the cask, a float fitted in a chamber in the lower part of the casing, means for protecting said chamber against the liquid streaming down the casing, means for admitting liquid into so as to flood the chamber when the liquid surface in the cask has reached a certain point on the casing, a drop valve arranged above the float chamber so as to be capable of interrupting the flow of liquid, catches retaining said valve normally in open position, and connections between the float and the catches for releasing the valve and interrupt the filling when the float chamber is flooded, substantially as set forth.

4. A cask filler comprising an elongated, cylindrical casing adapted to be suspended in the bung-hole, a float fitted in a chamber in the lower part of the casing, means for feeding the liquid through the casing into the cask, the casing having lateral apertures above the float chamber for the discharge of the liquid, an inlet nozzle surmounting the float chamber, means for protecting said nozzle against the liquid streaming down through the casing, means for admitting liquid into the chamber when the liquid surface in the cask has reached the level of the inlet nozzle, a drop valve arranged above the float chamber so as to be capable of interrupting the flow of liquid, means for retaining said valve normally in open position, connections between the float and the retaining elements of said valve for releasing the latter and interrupting the filling when the float chamber is flooded, and means for discharging the liquid from the float chamber, substantially as set forth.

GUSTAV ENGELHARD.

Witnesses:
PAUL LUBRE,
CHAS. BORNGRAEBER.