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J. S. TIDWELL

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LIQUID HEIGHT DETERMINING DEVICE

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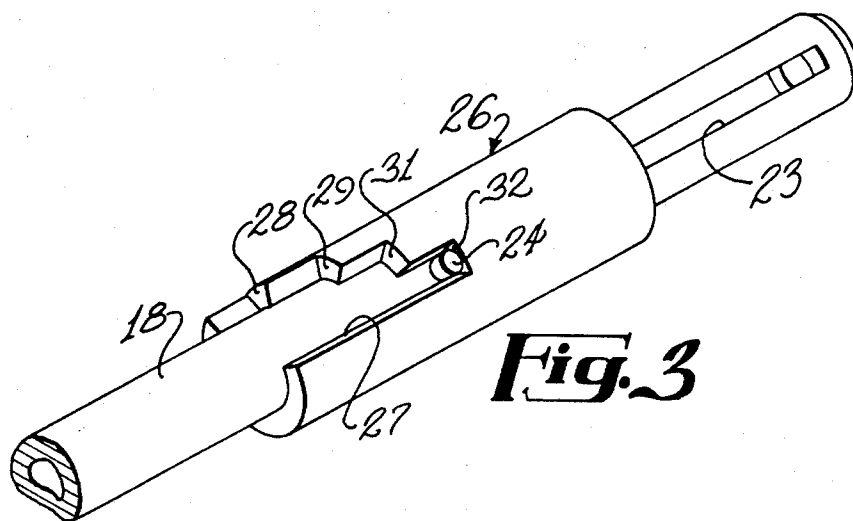
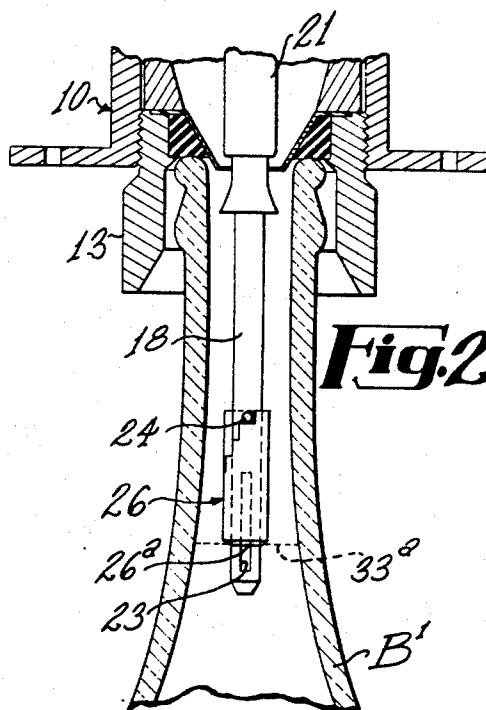
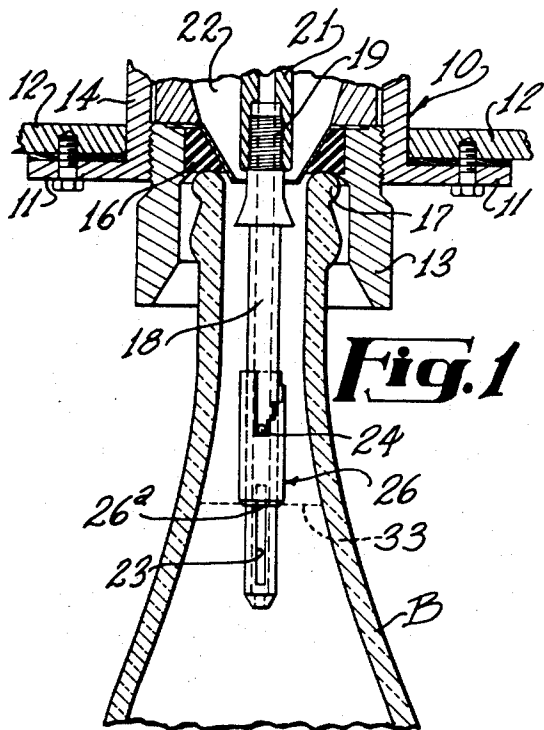


Fig. 3

INVENTOR.
Joseph S. Tidwell
BY
James Carter & Thompson
Attorneys

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3,420,281

LIQUID HEIGHT DETERMINING DEVICE

Joseph S. Tidwell, P.O. Box 2613,
Birmingham, Ala. 35202

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1 Claim

ABSTRACT OF THE DISCLOSURE

Apparatus for filling bottles to a given liquid height comprising a hollow vent tube together with a slot in the same, in combination with a separate sleeve surrounding the tube, there being a slot in the sleeve and a plurality of stepped notches in one side wall of the sleeve, whereby the height of the opening in the vent tube may be adjusted by engaging the notches of the sleeve on a pin projecting outwardly from the sides of the tube.

This invention relates to apparatus for filling bottles and other containers, and is especially useful for filling bottles with carbonated beverages.

A general object of my invention is to provide a device which may be associated with the usual vent tube forming a part of such mechanisms whereby the height of the liquid may be varied for each particular size or height of bottle, whereby the height of liquid in bottles of different overall heights may be varied to suit the particular needs.

Another general object is to provide a device of the character indicated which may consist essentially of a sleeve fitted snugly but slideably about the lower end of the vent tube, together with means cooperating between the sleeve and the vent tube to permit the sleeve to blank off all except a predetermined length or extent of the vent slot in the vent tube, whereby the device may be easily and quickly adjusted for filling bottles of different heights to predetermined liquid levels.

In the art to which this invention relates it is customary in filling bottles with carbonated beverages and the like to bring the bottles into position beneath a filler head. The head either moves down onto the bottle or the bottle moves up into contact with a sealing gasket on the head, there being a vent tube which in the filling position lies inside the bottle. By certain valve arrangements the head of gas on the container in which the liquid is placed is admitted through the vent tube, whereby the pressure inside the bottle is equalized with the pressure on top of the liquid in the tank. Immediately upon opening the liquid flow valve, liquid runs down into the bottle and up to the level as determined by the top of the vent slot or the vent hole in the vent tube. As soon as the liquid level reaches this height the flow of liquid ceases. With bottles of different size it is desired to fill them to a different liquid level. Such even filling is desirable both from the package appearance standpoint and from the standpoint of filling the bottles with precise amounts of liquid. Prior devices effective to accomplish the foregoing are known. However, they have generally been of a type which require the replacement of the entire vent tube, this being a time consuming proposition inasmuch as the modern bottling machine may have as many as seventy-two filling heads. Thus, in prior apparatus the operator is required to unscrew each of the vent tubes and to replace them with others having vent holes located at the liquid height for the different bottles.

In view of the foregoing a more specific object of my invention is to associate with a slotted vent tube a sleeve which fits snugly and slideably about the lower end of the tube whereby specific extents of the slot may be uncovered, and to provide means associated with the tube

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and with the sleeve to predetermine the position of the sleeve on the tube relative to the slot.

More specifically, I propose a sleeve made of a suitable plastic material such as "Teflon" and which has a slot in the top portion thereof, one of the walls of the slot being stepped, thereby to provide a plurality of shoulders and a pin or other form of stop on the side of the tube, whereby by simple rotation and axial movement of the sleeve on the tube the precise effective length of the vent slot may be predetermined, thereby making it extremely easy to adapt the machine to different height bottles, assuring positive, controlled filling of each size bottle up to the predetermined level.

Apparatus illustrating features of my invention is shown in the accompanying drawing forming part of this application in which:

FIG. 1 is a vertical sectional view, somewhat diagrammatic and fragmental, showing a bottle of one size in position to be filled by apparatus on which my improved device is placed;

FIG. 2 is a view corresponding to FIG. 1 and showing my invention in use in filling a bottle of a different height; and

FIG. 3 is a detailed fragmental isometric view of the vent tube with my invention applied thereto.

Referring now to the drawings for a better understanding of my invention I show the same in association with a somewhat standard filling head indicated generally by the numeral 10. As is understood, the filling head is equipped with extensions 11 which may be bolted fluid tight to the bottom of a tank, fragmentally indicated at 12. The tank 12 contains the liquid to be supplied to the bottles and a head of CO₂ gas under pressure is maintained on top of the liquid in the vessel or tank 12.

The head may comprise the usual guide bell 13 which may be screwed into the outer shell portion 14 of the head 10. A rubber sealing gasket 16 is provided to make a gas and fluid tight seal with the top of the bottle 17.

Disposed centrally of the head is a vent tube 18 which at its upper end 19 is threaded into a tube 21 the upper end of which projects above the liquid level in the tank 12 and into the zone of gas under pressure in the manner well understood in the art.

The fluid is adapted to be conveyed down into the bottle through the space indicated at 22, that is, the space surrounding the tube 21. It will be understood, also, that the flow of liquid into the bottles through the opening 22 as well as the admission of gas through the tube 21 into the vent type 18 are under control of suitable valve mechanisms not shown. Thus, whenever the bottle is brought into sealing position relative to gasket 16, the first operation is to admit the gas into the bottle whereby the pressure therein is equalized with the pressure on top of the liquid within the tank 12. The next operation is to permit the liquid to flow through the opening 22 into the bottle.

The apparatus so far described is well known to the art. My invention consists in providing the vent tube 18, adjacent its lower end, either with a plurality of separate holes or with an axially elongated slot 23 which communicates with the interior of the tube and thence with the interior of the tube 21. As stated, tube 21 rises to a level above the liquid in the tank 12 and into the head of gas under pressure therein.

Projecting from a side of the tube 18 is a stop pin 24. Snuggly fitting about the tube 18 is a sleeve indicated generally by the numeral 26. The sleeve may be made of any suitable material such as plastic of the "Teflon" variety. At its upper end the sleeve 26 is provided with a vertically extending slot 27. In one wall of the slot 27 I provide a plurality of stepped shoulders 28, 29, 31, and 32.

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It will be noted that the pin 24 is positioned on the vent tube 18 in such position that the lower end 26^a of the sleeve 26, when the sleeve is placed in selected position relative to the slot 23, covers up or exposes more or less of the length of the slot.

From the foregoing the method of making and employing my invention will now be readily understood. When it is desired to fill a bottle B of a given height, for instance up to the liquid level indicated by the dotted line 33, sleeve 26 is positioned relative to the pin 24 as illustrated in FIG. 1. If it is desired to fill a bottle B¹ up to the line 33^a, which bottle B¹ may be of greater height than bottle B, the pin is positioned relative to the shoulder 28 on the sleeve 26. In the position of FIG. 1 it will be seen that a greater length of the vent slot 23 is exposed as compared to the position shown in FIG. 2. Therefore, when the liquid is delivered into the bottle in either case, it stops precisely at the bottom 26^a of the sleeve 26, namely, at the effective upper end of the slot 23.

When it is desired to change the setup from that shown in FIG. 1 to that shown in FIG. 2, or vice versa, it is a simple matter to rotate the sleeve 26 on the tube 18 and position it with the pin 24 in engagement with any of the shoulders 28 to 32, inclusive.

In actual practice my invention has proven to be extremely practical, simple to manufacture and fully effective for its intended purposes. Instead of having to provide a plurality of vent tubes 18, I can use a single vent tube and make the adjustment by the simple arrangement of the sleeve as shown. Also, if desired, a plurality of spaced holes can be used instead of the continuous slot 23. In such case the sleeve may be adjusted to cover all the holes except those below the desired liquid level. Therefore the term "axially enlarged vent opening" is intended to cover such series of spaced openings.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and

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I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claim.

I claim:

1. In apparatus for filling bottles with liquid wherein the bottles are to be filled to a predetermined level and including a vent tube which projects into the bottles below the desired level of liquid therein, the improvement comprising:

- (a) an axially elongated vent opening adjacent the lower end of the vent tube,
- (b) a sleeve fitting snugly but slideably about the tube,
- (c) an axially extending slot in the upper end of the sleeve,
- (d) a plurality of stepped shoulders provided in a side of the wall of the sleeve which defines the slot therein and each of which corresponds to the desired height of liquid in a selected bottle to be filled, and
- (e) a projection on the tube which said shoulders are disposed selectively to contact, whereby the effective vertical height of the vent opening corresponding to the desired liquid height in a given bottle may be determined by sliding the sleeve axially on the tube and engaging a selected shoulder with said projection.

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HOUSTON S. BELL, JR., *Primary Examiner.*

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