

[54] APPARATUS FOR FILLING BEER CANS OR THE LIKE

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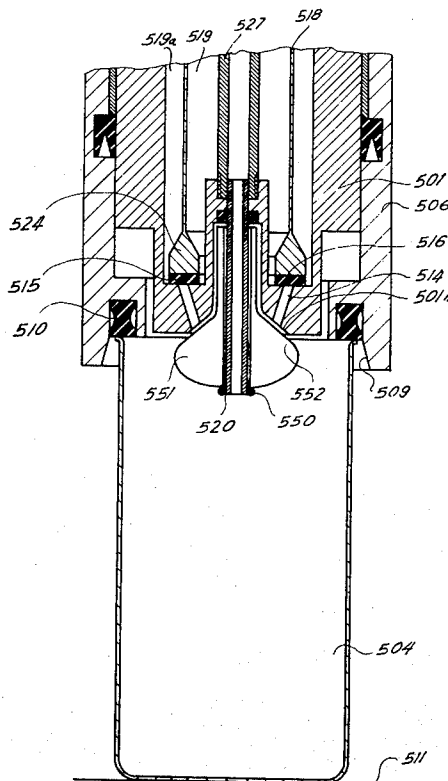
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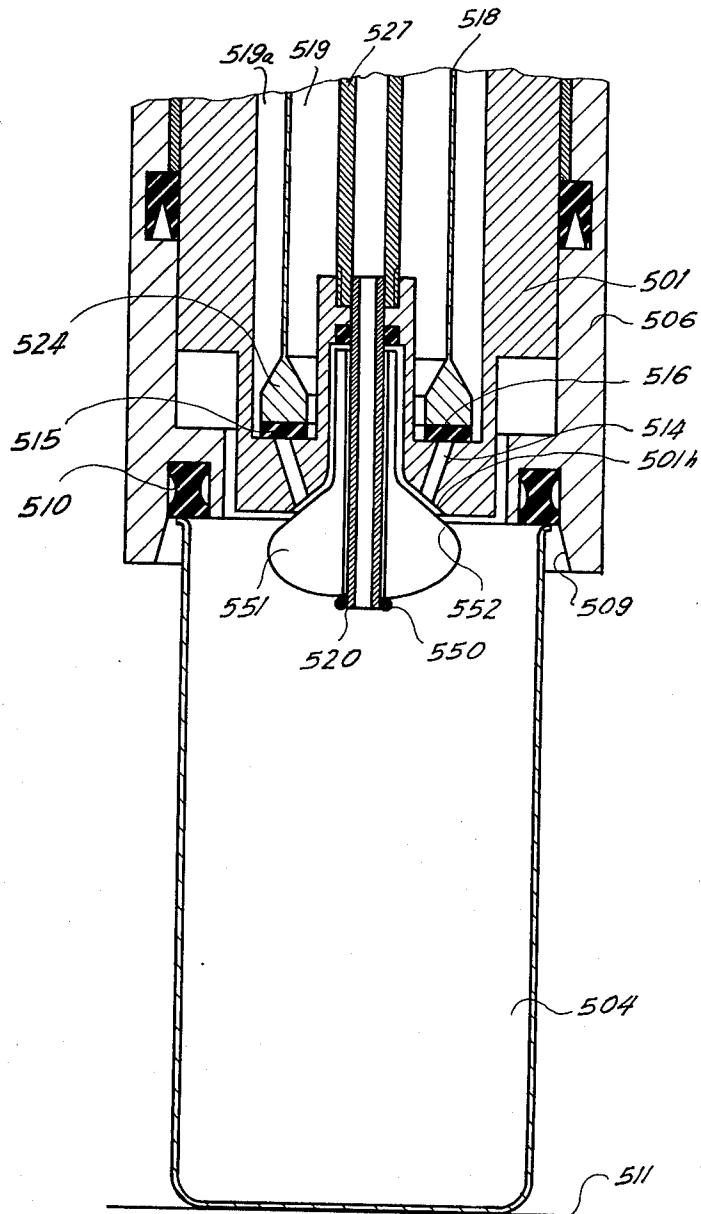
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[57] ABSTRACT

The filling devices in an apparatus which fills beer cans orbit about a vertical axis and have upright housings supporting cylindrical centering members which carry deformable gaskets for the mouths of cans. Such cans are supported by a conveyor which orbits with the filling devices and is movable up and down or is held against vertical movement during rotation with the filling devices. The introduction of liquid into the cans takes place subsequent to introduction of a compressed gas, and such gas can be used to bias the gaskets against the mouths of cans during filling. When the filling of a can is completed, the pressure in its interior is increased to facilitate separation from the respective gasket. That supply of beer which remains in a channel of the housing on closing of the beer-admitting valve can be expelled in response to expansion of gas in a chamber which receives such gas by way of the container and is sealed from the container by beer in the channel. The expansion of gas in the chamber takes place in response to opening of a valve which reduces the pressure of gas above the body of liquid in the container.

4 Claims, 1 Drawing Figure





APPARATUS FOR FILLING BEER CANS OR THE LIKE

CROSS REFERENCE TO RELATED APPLICATION

This is a division of our copending application Ser. No. 175,673, filed Aug. 27, 1971, now Pat. No. 3,807,463 granted Apr. 30, 1974.

BACKGROUND OF THE INVENTION

The present invention relates to apparatus for filling cans or analogous containers with beer, juice, milk and/or other types of carbonated or non-carbonated liquids. More particularly, the invention relates to improvements in container filling apparatus of the type wherein a supply of liquid to be introduced into metallic cans or like containers is preferably stored in an annular vessel below a cushion of compressed gas and wherein the vessel rotates during the filling of containers.

Presently known apparatus of the just outlined character are normally provided with an entire battery of equidistant filling devices which extend downwardly from the annular vessel and are provided with means for sealing the mouths of containers (such as beer cans and hereinafter referred to as cans for short) during introduction of metered quantities of a liquid, such as beer. It is customary to place empty cans onto a conveyor which is provided with means for lifting the cans into sealing engagement with ring-shaped gaskets of the respective filling devices. Since the cans orbit about the axis of rotation of the vessel during introduction of such metered quantities of a liquid, the upper surfaces of the bodies of liquid in the cans are strongly inclined under the action of centrifugal force which acts on decanted liquid, and such inclination presents serious problems during removal of filled cans from the filling apparatus as well as if it is desired to fill each of a series of cans with identical quantities of a liquid. The problems which arise in connection with the inclination of the upper surface of the body of liquid in a filled can are especially serious during downward movement of the can in order to disengage its mouth from the gasket of the respective filling device.

SUMMARY OF THE INVENTION

An object of the invention is to provide a novel and improved apparatus for filling metallic cans or analogous containers with beer, juice or other carbonated or uncarbonated beverages in such a way that a relatively weak container is not likely to undergo deformation in the course of the filling operation and that each of a series of successive containers receives the same quantity of liquid.

Another object of the invention is to provide novel and improved means for preventing contamination of a filling apparatus for beer cans or the like by droplets of liquid, and for reducing the waste in liquid to a minimum.

A further object of the invention is to provide a novel and improved means for introducing metered quantities of a liquid into beer cans or analogous containers by gravity flow.

An additional object of the invention is to provide novel means for sealing the mouths of cans or analogous containers preparatory to and during filling with beer or other types of liquids.

A further object of the invention is to provide novel and improved means for disengaging the mouths of liquid-filled containers from gaskets in apparatus for the filling of beer cans or the like.

Still another object of the invention is to provide an apparatus for introduction of a liquid into cans or other types of containers with novel and improved filling devices which reduce the likelihood of contamination of the apparatus with liquid, which can fill each of a series of containers with the same quantity of liquid, and which can be rapidly disengaged from filled containers without resorting to mechanical deflectors and without deformation of containers and/or spillage of their contents.

Another object of the invention is to provide the improved filling devices with novel means for expelling such quantities of a liquid which remain in the filling devices upon completed filling of containers to a predetermined level and which would go to waste in the absence of expulsion into partially filled containers.

A further object of the invention is to provide a filling device for beer cans or like containers with novel means for sealing the mouths of containers without the danger of deformation of containers and in such a way that the sealing means can be rapidly and conveniently separated from the mouth of a filled container.

An ancillary object of the invention is to provide the filling devices with novel gas- and liquid-admitting valve means as well as with novel means for reducing the pressure in filled or partially filled containers and for expelling remnants of decanted liquid from a filling device into the registering partially filled container.

A further object of the invention is to provide an apparatus wherein the containers to be filled need not be moved up and down preparatory to and/or subsequent to filling with metered quantities of a liquid.

Another object of the invention is to provide a filling apparatus for cans or analogous containers whose energy requirements are less than those of presently known apparatus.

Still another object of the invention is to provide an apparatus which can be utilized for satisfactory filling of different types of containers and which can be readily adjusted to introduce into each container a desired quantity of liquid.

A further object of the invention is to provide an apparatus which can be used for proper filling of relatively weak containers or for the filling of containers which are capable of withstanding substantial stresses for the purpose of sealing their interior from the surrounding atmosphere.

A feature of the present invention resides in the provision of an apparatus for of filling cans or analogous containers with liquids. In accordance with the invention, the apparatus comprises a filling device having a housing, an annular sealing member which is movable up and down along the housing and carries at its lower end a gasket movable into sealing engagement with the mouth of a container therebelow, a channel provided in the housing and terminating in a preferably conical surface at the underside of the housing, an upright holder which is supported by and extends downwardly from the housing, and a float which is movable lengthwise of the holder and has an external surface engaging with the surface of the housing to seal the channel from the interior of the container when the channel has admitted into the container such quantities of liquid that

the float rises by buoyancy into sealing engagement with the housing.

BRIEF DESCRIPTION OF THE DRAWING

The single FIGURE is a fragmentary axial sectional view of a filling device which embodies the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The filling device of which is shown in the drawing comprises a housing 501 for a valve member 516 mounted in the enlarged lower end portion 524 of a vertically reciprocable tubular carrier 518. A seat of the housing 501 is shown at 515. A channel 514 which is provided in housing 501 and is normally sealed from two compartments 519 and 519a by the valve member 516 flares conically upwardly and outwardly and serves to admit a stream of beer into a can 504 supported by a conveyor 511. The lower end of the channel 514 terminates in a conically outwardly and downwardly flaring conical surface 501h at the underside of the housing 501.

A conduit or pipe 520 is secured to and is coaxial the housing 501. The lower end portion of the pipe 520 is provided with a circumferential groove for a split ring 550 serving to retain a substantially conical vertically movable float 551. Thus, the pipe 520 constitutes a holder for the float 551. When the beer can 504 on the conveyor 511 is empty or when the space below the housing 501 does not accommodate a can, the float 551 rests on the split ring 550 by gravity. The upper portion of the float 551 is bounded by a surface 552 whose conicity corresponds to that of the surface 501h. Thus, when the float 551 is lifted, it seals the lower end of the channel 514. The conveyor 511 constitutes a lifting device which can move the can 504 up and down, and the housing 501 is surrounded by a vertically movable sealing and centering member 506 which carries an annular gasket 510 for the mouth of the can 504 on the conveyor 511. A conical surface 509 of the sealing member 506 serves to center the can 504 so as to move its mouth into requisite registry with the gasket 510. The operation of the filling device is as follows

If the conveyor 511 does not support a can 504 below the housing 501 or when an empty beer can 504 on the conveyor 511 is merely filled with air, the float 551 dwells in the illustrated lower end position and rests on the ring 550. If a can 504 is thereupon placed onto the conveyor 511 and the sealing member 506 is lowered by a shifter (not shown) to move the gasket 510 into sealing engagement with the mouth of the can on the conveyor 511, the thus engaged engaged is ready to be filled with beer which is decanted from a vessel, not shown, in the same way as described in connection with FIGS. 1-2 or 3-5 of our Pat. No. 3,807,463 to which reference may be had if necessary. Thus, the valve member (not shown) in a valve body 527 is moved axially to connect the interior of the can 504 with a cushion of compressed gas above the supply of liquid in a vessel so that the pressure in the can equals that in the vessel. The valve member 516 is thereupon moved upwardly to admit beer into the channel 514 and thence into the can 504 by way of the conical clearance between the surfaces 501h and 552. Such conical gap corresponds to the lower end portion 14a of the channel 14 shown in FIG. 1 of our Pat. No. 3,807,463 to insure laminar inflow of beer along the internal surface of the

can 504. The upper surface of beer which accumulates in the can 504 rises and ultimately reaches the float 551. The buoyancy of the float 551 causes it to move upwardly along the conduit or pipe 520 and to seal the lower end of the channel 514 when the can 504 contains a predetermined quantity of beer. The valve member 516 is then moved into engagement with the seat 515 to seal the channel 514 from the compartments 519 and 519a. The upper end portion of the filled can 504 is thereupon connected with the atmosphere, for example, by way of the conduit or pipe 520, and the can 504 is removed from the conveyor 511 or is lowered with the conveyor prior to transfer into a sealing machine. The float 551 descends with the can 504 (while the latter is being lowered by the conveyor 511) whereby the surface 552 moves away from sealing engagement with the surface 501h and the beer which fills the channel 514 is free to descend into the can 504 before the latter is moved away from registry with the filling device. The latter is then ready for the next filling operation which can be started as soon as the conveyor 511 receives and lifts an empty can 504 to a position in which the mouth of such can may be properly sealed in response to downward movement of the sealing and centering member 506.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features which fairly constitute essential characteristics of the generic and specific aspects of our contribution to the art and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the claims.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims:

1. In an apparatus for filling cans or analogous containers with a liquid, a filling device comprising an upright housing; an annular sealing member mounted for up-and-down movement along said housing and having in the region of its lower end annular gasket means movable into sealing engagement with the mouth of a container therebelow, said housing having a surface at the underside thereof and liquid-admitting channel means having a discharge end in said surface; an upright holder supported by and extending downwardly from said housing; and a float mounted for lengthwise movement along said holder and having an external surface which engages said surface of said housing to seal said channel means from the interior of a sealingly engaged can when said channel means has admitted such quantities of liquid that the float rises by buoyancy and moves said external surface into engagement with the surface of said housing.

2. A filling device as defined in claim 1, wherein said surfaces are of conical shape.

3. A filling device as defined in claim 1, wherein said holder is hollow and is arranged to convey a gas into and from the interior of a container which is engaged by said gasket means.

4. A filling device as defined in claim 1, wherein said external surface of said float is arranged to direct the liquid issuing from said channel means against the internal surface of the container which is engaged by said gasket means.

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