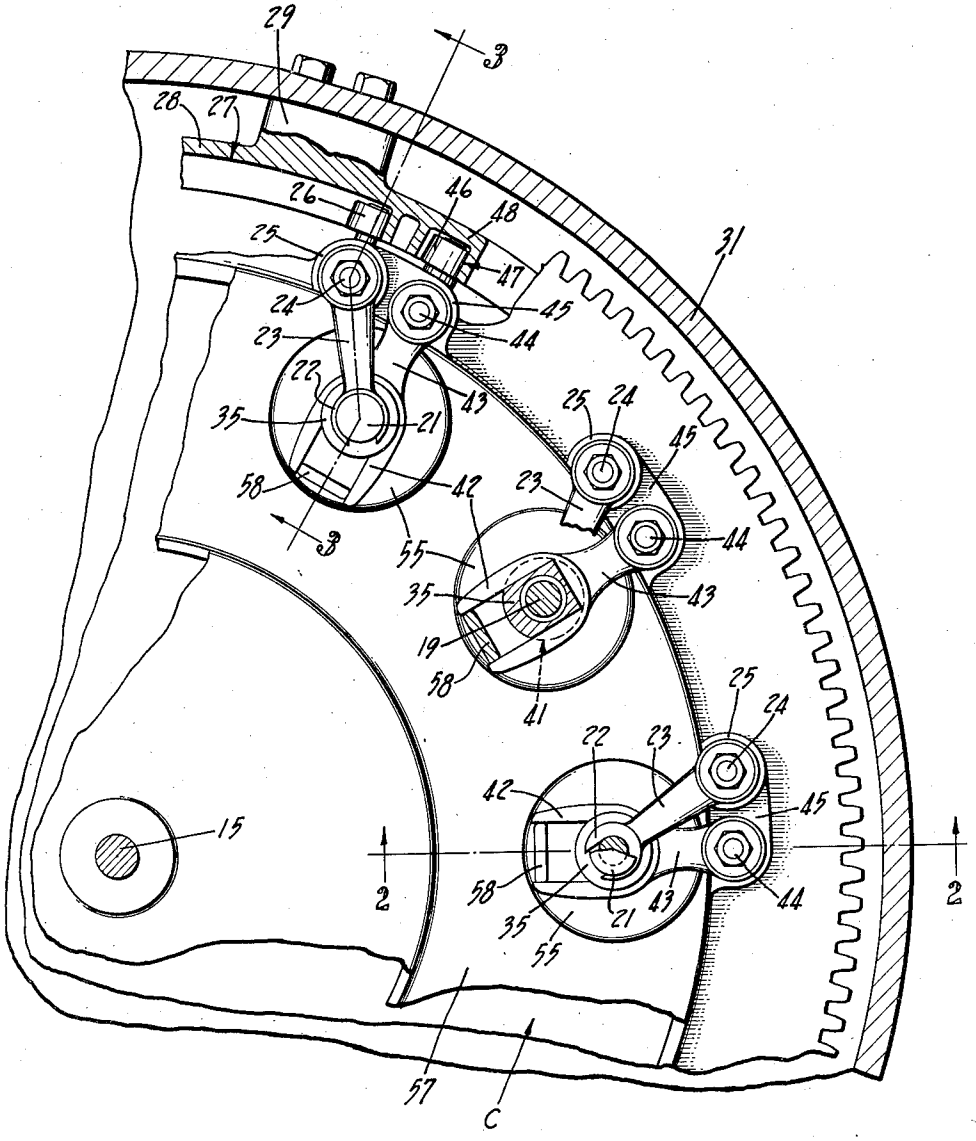
Aug. 22, 1944. W. PECHY 2,356,176

FILLING MACHINE

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Fig 1



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Fig 2

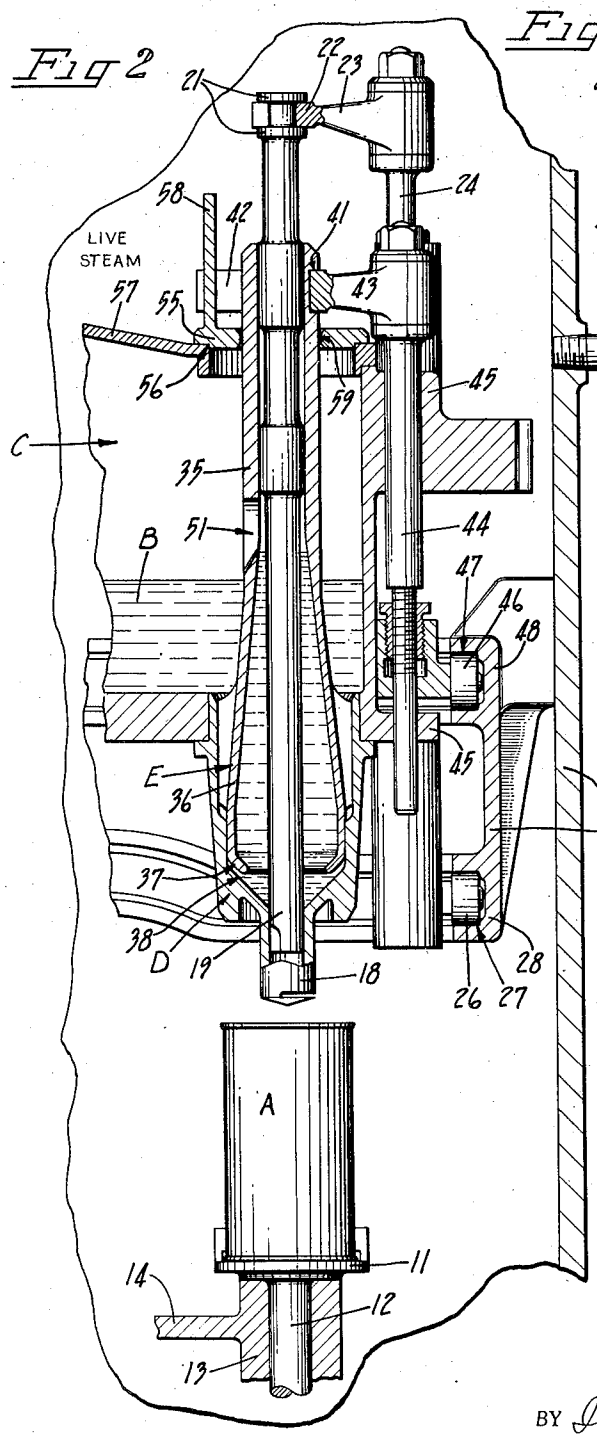
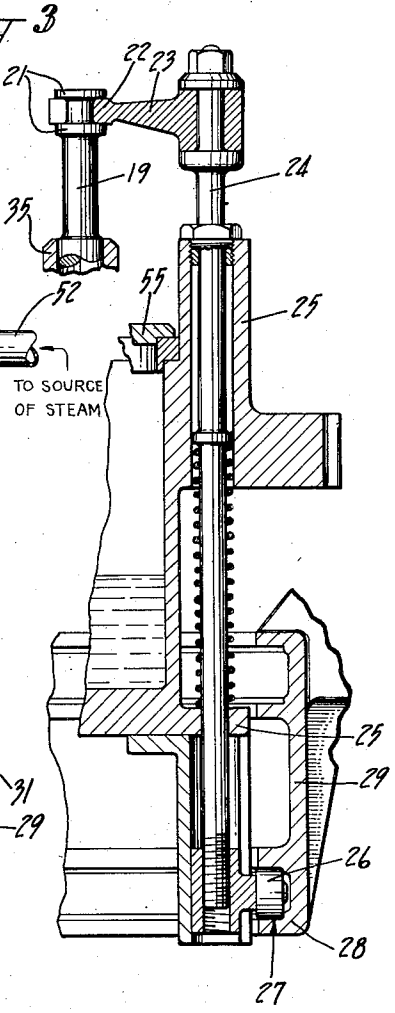


Fig 3



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2,356,176

FILLING MACHINE

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Application December 10, 1941, Serial No. 422,432

2 Claims. (Cl. 226—102)

The present invention relates to machines for filling measured charges of liquids into containers or cans and has particular reference to a special floating mounting for a measuring element which is designed for easy operation under heat conditions as where cans are subjected to a heat sterilizing treatment incident to such filling.

In can filling machines, the liquid product to be filled into the cans is usually held in a tank or reservoir surrounded by a housing which constitutes a part of the machine. In some such machines the measuring elements are located in the tank and are partially in the liquid and partially out. When cans to be filled with the liquid product in such a tank are subjected to a heat sterilizing treatment, portions of the measuring elements which extend above the liquid are affected differently than portions that are in the liquid, due to differences in temperature. It has been found that such a difference in temperature in the same measuring element causes it to warp out of shape and bind in its mounting as such an element, of necessity, must have accurately fitting conditions.

The instant invention contemplates overcoming this difficulty by providing a floating mounting for the measuring element so that warping or uneven expansion of the element will not prevent its normal operation.

An object therefore of the invention is the provision in a can filling machine of a mounting for the measuring elements wherein the element floats in the mounting so that the element will be maintained in proper operating conditions under warping or uneven expansion due to uneven temperatures obtaining in the element.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a fragmentary top plan view of a portion of a can filling machine embodying the instant invention, with parts broken away and parts shown in section;

Fig. 2 is a sectional view taken substantially along the line 2—2 in Fig. 1, with parts broken away, the view also showing a can ready to be shifted into filling position; and

Fig. 3 is a sectional view taken substantially along the broken line 3—3 in Fig. 1.

As a preferred embodiment of the instant invention the drawings illustrate principal parts of a liquid measuring and can filling unit of a filling machine of the character disclosed in United States Patent 2,222,617, issued November 26, 1940, to J. M. Hothersall, et al. Such a machine is a multiple head filling machine which is adapted to fill cans A with a liquid product B as they move along in a continuous procession. The liquid product is retained in a rotatable tank or reservoir C which is provided with a plurality of depending filling heads D. Each filling head contains a measuring element E which segregates, from the liquid in the tank, a predetermined charge of the liquid and holds it confined within the filling head for delivery into a can A.

The cans A to be filled are carried on lifter pads 11 (Fig. 2) formed on lifter stems 12 carried in bearings 13 of a rotating disc 14 mounted on a vertical shaft 15 (Fig. 1) journaled in bearings formed in the main frame of the machine. The tank C is also mounted on the shaft 15 so that the tank and the disc rotate in unison as a unit. The shaft is rotated in any suitable manner and during this rotation the lifter stem 12 is actuated by cam action as disclosed in the above identified Hothersall patent, to bring the can into engagement with the filling head for the filling operation.

Each filling head D is formed with a depending nozzle 18 which enters the can when the latter comes into filling engagement with the head. It is through this nozzle that the liquid product is delivered into the can. The nozzle normally is closed by a vertical valve rod 19, the lower end of which fits into the inside of the nozzle. The upper end of the valve rod is formed with a pair of spaced shoulders 21 which fit over a yoke 22 on an arm 23 mounted on a vertical actuating rod 24.

The actuating rod 24 is disposed outside of the tank C and is carried in a pair of spaced bearings 25 formed on the tank. The lower end of the actuating rod carries a cam roller 26 which operates in a cam groove 27 of a stationary cam 28 formed in a cam bracket 29 bolted to a housing 31 which surrounds the tank C and which constitutes a part of the main frame of the machine. This frame encloses a steam chamber.

Hence as the tank C rotates inside the housing 31, the cam roller 26 traverses the stationary cam 28. This action raises and lowers the actuating rod 24 and the valve rod 19 fastened thereto at the proper time in the filling cycle to fill the charge of liquid B into the can A.

The measuring element E that segregates the charge of liquid B prior to filling into the can

A is of tubular form and has the shape of a bottle having a narrow upper or neck section 35 and an enlarged lower section 36. The bottom and top of the bottle are open. The valve rod 19 extends up through this bottle to engage the actuating yoke 22, hereinbefore mentioned. The lower end of the bottle fits within the filling head D and adjacent its bottom end it is formed with a beveled valve surface 37 which is adapted to fit tightly against a cooperating beveled valve surface 38 inside the filling head. This lower end of the bottle is submerged in the liquid B in the tank C.

The neck section 35 of the measuring element E extends above the surface level of the liquid B in the tank C and projects up out of the tank. The upper end of the element is formed with a groove 41 having three flat sides which loosely engage over a square yoke 42 on an actuating arm 43. The actuating arm is secured to the upper end of an actuating rod 44 which is disposed outside of the tank and which is carried in a pair of spaced bearings 45 formed on the tank The lower end of the actuating rod carries a cam roller 46 which operates in a cam groove 47 of a stationary cam 48 formed in the cam bracket 29.

Hence as the tank C rotates within the housing 31, the cam roller 46 traverses the stationary cam groove 47 and thus raises and lowers the actuating rod 44 and the measuring element E loosely connected thereto, at the proper time in accordance with the filling cycle to segregate a charge of the liquid B. When the measuring element rises, the liquid in the tank flows into the filling head D and up into the element filling it to the level of the liquid in the tank. When the measuring element descends into segregating position the valve surface 37 engages against the valve surface 38 in the head and thereby cuts off communication between the bottle and the tank, thus segregating the liquid within the bottle from that in the tank.

During this descent of the bottle a portion of the liquid trapped therein rises up into the bottle neck and spills out of an opening 51 in the neck. This opening is located at a predetermined level so that when the excess liquid from the bottle stops flowing out of the opening, the liquid that remains in the bottle is the desired amount to be filled into the can A. It is this liquid that constitutes the measured charge hereinbefore mentioned.

In the instant invention, the can A is maintained in a sterilized condition within the machine by steam which is introduced into the chamber by way of a steam pipe 52. Therefore, steam is circulated through the housing 31. This steam at approximately 215° F. surrounds the neck section 35 of the measuring element E while the lower section 36 which is submerged in the liquid B is protected from the steam. The liquid B, on the other hand, is maintained at approximately 70° F. by a continual flow into and out of the tank C as the cans are filled.

Thus the upper and the lower sections of the measuring element are subjected to different temperatures and it is this difference in temperature that causes the warping of the conventional element with its binding action in its mounting. It should be understood that this warping of the measuring element is only slight but is sufficient to bend the neck section of the element so that it binds in its bearings and becomes inoperative when mounted in the usual way.

According to the present disclosure, provision is made for maintaining free movement of the measuring element E in its mountings. For this purpose there is a narrow hardened guide plate 55 which surrounds the neck section 35 of the element. This plate is disposed in a seat 56 formed in a cover 57 on the top of the tank C. A lug 58 on the plate extends up between the prongs of the yoke 42 and holds the plate against rotation in its seat. The inner guiding edge of the plate is rounded as at 59 so that there will be substantially a line contact between the plate and the outside of the neck section of the measuring element.

Hence any bending of the measuring element E due to warpage is compensated for by the automatic adjustment of the neck in the guide plate 55 and by the loose connection between the neck and the actuating yoke 42. This constitutes a floating mounting for the upper end of the measuring element that is very efficient. This upper end may have relatively lateral movement if necessary while the element is shifting vertically to accurately segregate a measured charge of liquid to be filled into the cans.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a machine for filling liquid into containers, the combination of a housing having steam circulated therethrough for sterilizing the containers to be filled, a tank within said housing for holding the liquid to be filled into said containers at a relatively low temperature, a cover for said tank, a filling head on said tank for delivering a measured charge of liquid into a container, a movable measuring element partially submerged in said low temperature liquid and having its lower end movably mounted in said filling head, the upper end of said element being of reduced width and projecting through said cover so as to be exposed to the relatively high steam temperature in said housing, a guide plate in said cover having a rounded aperture constituting a bearing through which the upper reduced end of said element projects in substantially line to line contact, and an actuating yoke loosely engaging a grooved portion of the upper end of said element above said bearing for moving said element relative to said filling head, said yoke loosely engaging said element on three sides only to permit the upper end of said element to move and bend laterally toward the open end of the yoke, said open loose engagement of the yoke cooperating with said line contact bearing to insure free movement of said element relative to said filling head and to permit warping and bending of the upper reduced end of said element due to the described material steam and liquid temperature differences to which the opposite ends of said element are subjected.

2. In a machine for filling liquid into containers, the combination of a housing having steam circulated therethrough for sterilizing the containers to be filled, a tank within said housing for holding at a relatively low temperature the liquid to be filled into said containers, a cover for said tank, a filling head on said tank for delivering

a measured charge of liquid into a container, a vertically reciprocable measuring element partially submerged in said low temperature liquid and having its lower end slidably mounted in said filling head, the upper end of said element being of reduced diameter and projecting through said cover so as to be exposed to the relatively high steam temperature in said housing, a circular guide plate in said cover having a rounded aperture constituting a bearing through which the upper reduced end of said element projects in substantially line to line contact, an actuating yoke loosely engaging a straight edged grooved portion of the upper end of said element above said bearing for vertically reciprocating said element relative to said filling head, said yoke loosely engaging said element along straight lines on three sides only to permit the upper end of said element to move and bend laterally toward the open end of the yoke, said open loose engagement of the yoke cooperating with said line contact bearing to insure free vertical reciprocation of said element relative to said filling head and to permit warping and bending of the upper reduced end of said element as a result of the described material steam and liquid temperature differential to which the opposite ends of said element are subjected to insure against binding of the element in its mountings, and means carried by said guide plate engaging the open end of said yoke to hold said guide plate against rotation relative to said cover.

WILLIAM PECHY.