May 9, 1944. J. E. WEAVER 2,348,582

FILLING MACHINE FOR CONTAINERS

Filed Aug. 18, 1941

Fig. 1

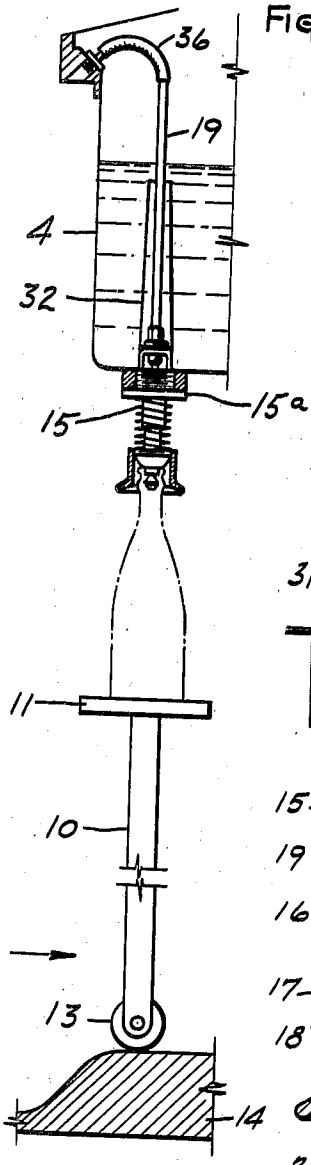


Fig. 2

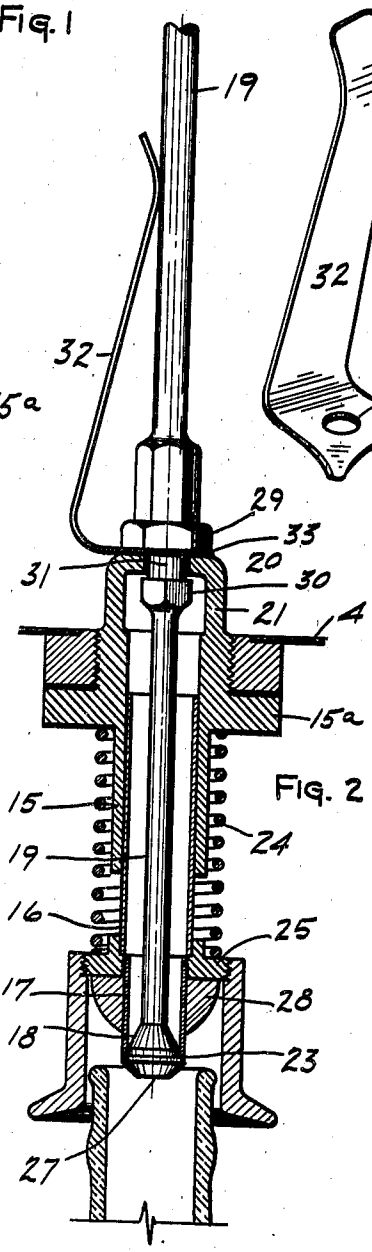


Fig. 4

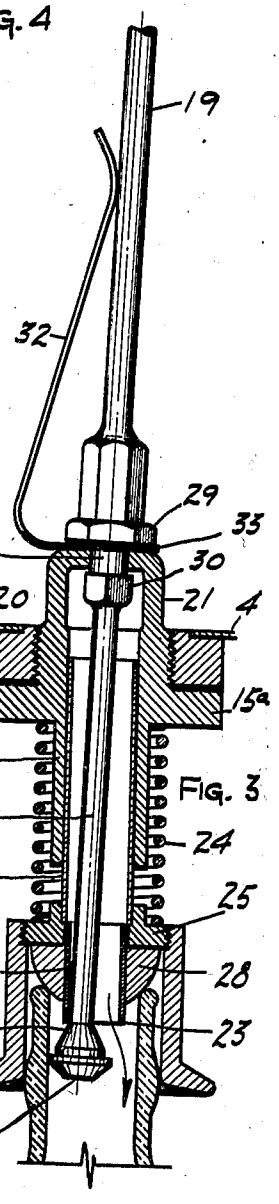


Fig. 3

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FILLING MACHINE FOR CONTAINERS

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2 Claims. (Cl. 226—124)

This invention relates to improvements in filling machines for containers, and particularly to valve controlled supply means for directing the filling substance laterally of the normal center of the container. In my prior Patent No. 2,261,706, of which this application is a continuation in part, I show and describe a normal construction utilizing generally similar mechanism having filling valves or heads operable to vent the container and fill it from a supply source.

As therein stated, it is usually necessary in the filling of certain heavy liquids or semi-liquids, as catsup, to exert considerable pressure upon the clogged vent, to avoid splashing and soiling the container, as well as to avoid waste, when venting air is applied after filling. Such conditions persist and are largely overcome by said means, effecting displacement of lodged material prior to filling.

In the filling of containers, such as narrow neck bottles, with a relatively thick viscous substance such as catsup, passing through the annular clearance between the conduit and its valve, when open, the substance tends to spread coniformly around the valve tip, partially or wholly choking the flow of air into the vent orifice at the bottom of the tip.

In my present invention such undesired result is avoided by deflecting the valve tip or cone with relation to the supply conduit, thus providing a lateral enlarged clearance for free positive directed flow of the substance.

The construction and its operation are illustrated in the accompanying drawing, in which:

Fig. 1 is a diagrammatic view in elevation, partly in section, showing a container in position at the start of the filling cycle;

Fig. 2 is an enlarged vertical sectional view through a filling valve in closed venting position;

Fig. 3 is a similar view showing the valve in deflected open position;

Fig. 4 is an isometric detail view of the valve stem deflecting spring.

It will be understood that in the practice of my invention, it is usually utilized in connection with a rotary filling machine, wherein a liquid reservoir or tank, together with a series of container supports, rotate about a common vertical axis. The container supports travel over a stationary cam track whereby the supports are successively and progressively raised for venting and filling, and then lowered, to engage and disengage the containers with and from the filling valves or heads. It will be understood also that the invention is not limited to a rotary type filling machine, but may also be utilized with a non-rotatable machine with means for raising and lowering the containers, as in a straight line type.

In the drawing, 4 designates an elevated rotatable tank or supply reservoir for the liquid or the like being dispensed in the filling machine, which machine generally provides a rotatable annular series of filling stations beneath said reservoir.

At each filling station is provided a vertically movable rod 10 having a container support or table 11 at the upper end thereof. The lower end of each rod 10 is provided with a roller 13 cooperating with a stationary annular cam track 14 for automatically raising and lowering the container supports in their annular travel, as is customary in machines of the character stated.

At each filling station, the bottom of the reservoir 4 is provided with an outlet opening in which is mounted a depending filling valve or head including fixed sleeve 15 secured in said opening, and having an inner telescoping sleeve 16.

Connected with and depending from said inner sleeve 16 is a reduced diameter filling tube 17, the lower end of which cooperates with a tapered enlargement or valve proper 18 formed on the lower end of a central vent tube 19. Said vent tube extends longitudinally within the sleeves 15 and 16 and filling tube 17, and is loosely fixed at 20 to a supporting open side yoke structure 21 at the upper end of sleeve 15, permitting slight deflection, as in Fig. 3.

An expansion spring 24 extends between a collar abutment 15a of sleeve 15 and a provided collar abutment 25, the latter also serving to connect the lower end of telescoping sleeve 16 to the filling tube 17. The action of the spring 24 normally seats and closes the lower end of the filling tube 17 on its seat 23 on the flange of terminal valve 18, as in Fig. 2, preventing a flow of liquid from the reservoir around the filling valve or head until final opening of the filling tube at its maximum elevation, Fig. 3.

The lower end of the vent tube 19 is open at 27 for continuous venting communication with a bottle or other container.

An annular sealing abutment 28 of rubber or the like is carried by the filling tube 17 for engagement by a container being filled, such as the bottle illustrated, the seal 28 being spaced from and movable upwardly with the terminal end of the filling tube in accordance with the height of the desired fill in the container.

The upward pressure exerted by the container on the seal 28 is transmitted to the telescoping sleeve 16 for raising and opening the filling tube 17, as in Figs. 2 and 3.

For the purpose of deflecting the vent tube 19 with its valve 18, it is loosely mounted on yoke 21 by upper and lower holding nut 29 and shoulder 30, such nut being sufficiently less than tight to allow for slight movement of the tube 19, that portion 31 thereof which extends through the open side yoke, acting as a pivotal connecting neck.

Such deflection of tube 19 and its valve 18 is effected simultaneously with the final elevation of the container and of the lower end of filling tube 17 by action of a leaf spring 32 somewhat loosely secured by its base flange 33 between nut 29 and the yoke. In such position or any rotated the spring is always under sufficient tension to constantly press against the upper portion of tube 19 so that when filling tube 17 is raised as in Fig. 3, the lower end of the tube and valve 18 will be thrust in the opposite direction, providing the desired lateral flow clearance, as indicated by the arrow. In such operation the tube is in a somewhat pendulum-like position, pivoting at its intermediate loose supported portion 31, and in constant communication with the air circulation by flexible hose 36.

It will be understood of course that cam track 14 is so designed as to its active portions as to elevate the container into receiving position of Fig. 3, in connection with other elevating and lowering movements not necessarily herein disclosed, as in my prior patent, supra. Also that any other suitable means may be utilized for deflecting the tube 19, or that other modifications are contemplated within the scope of the following claims.

What I claim is:

1. In combination with the reservoir and delivery conduit of a filling machine and a telescoping extension of said conduit having a terminal valve seat, and resilient means for extending same subject to reversing pressure of a receptive container; an upwardly extending supporting yoke having a central opening, an air vent tube having a neck loosely engaging said opening, a lower extension thereof having a shoulder below the neck and a valve-seat-engaging terminal valve, an upper extension thereof communicating with air circulating means and having a variable pressure clamping nut above the neck, and a leaf spring having a base flange surrounding the neck between the yoke and said clamping nut for loose mounting of the spring and provided with an upwardly extending portion engaging the upper extension of the air vent tube whereby when the conduit and its terminal valve seat are elevated by a container the air vent tube and its valve are tilted.

2. In a filling machine as described, the combination with the telescoping delivery conduit and its terminal valve seat, an open side yoke having a centrally open supporting top, an air vent tube having an upper extension and a neck loosely extending through the yoke provided with a valve-seat-engaging terminal valve, a variable pressure clamping nut on the stem above the yoke, and a leaf spring having a base flange surrounding the neck between the yoke and said clamping nut for loose mounting of the spring and provided with an upwardly extending terminal portion engaging the upper extension of the air vent tube whereby when the conduit and its terminal valve seat are elevated by a container the air vent tube and its valve are tilted.

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