April 12, 1966 J. M. MILLER 3,245,806

METHOD AND APPARATUS FOR INSERTING FRANKFURTERS INTO CONTAINERS

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Fig. 1.

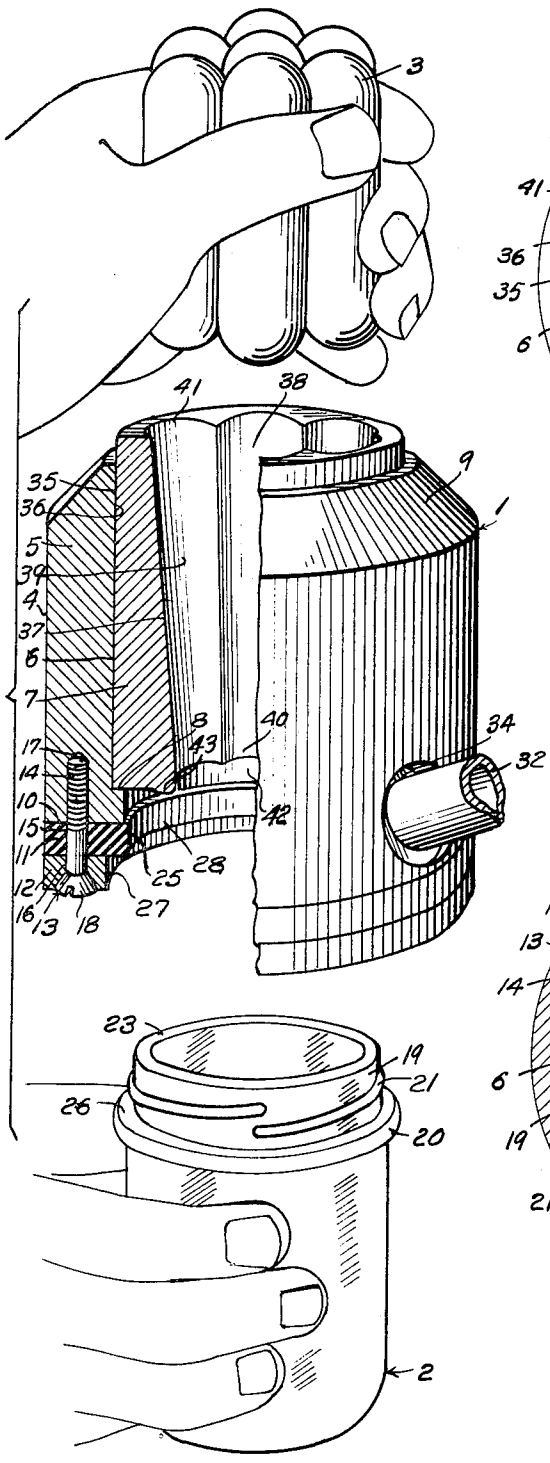


Fig. 4.

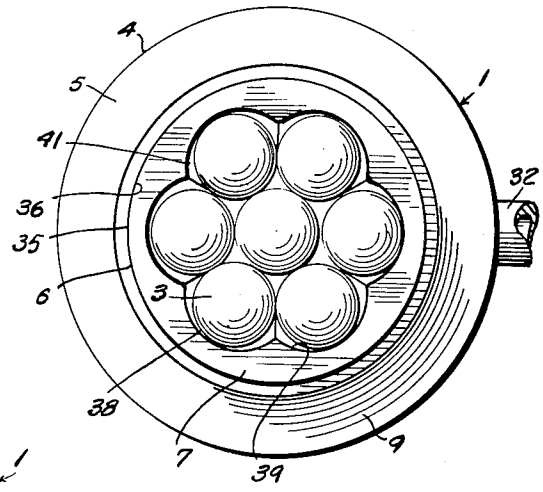
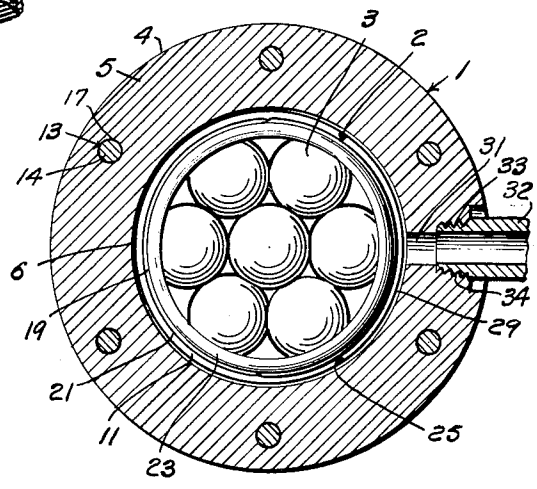


Fig. 5.



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Fig. 6.

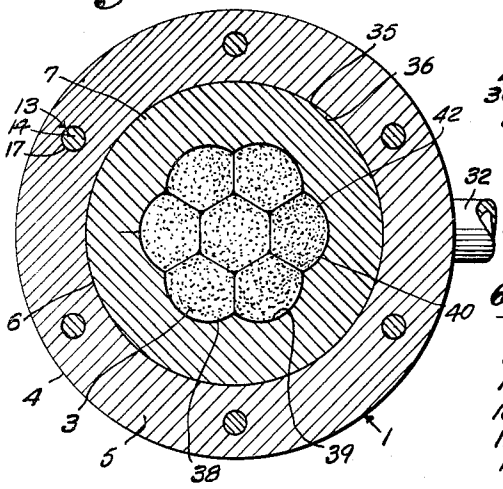


Fig. 2.

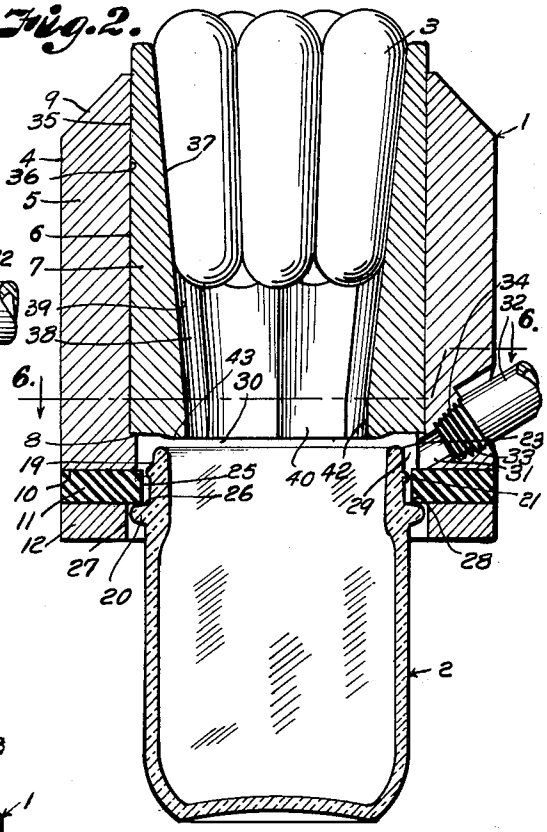


Fig. 3.

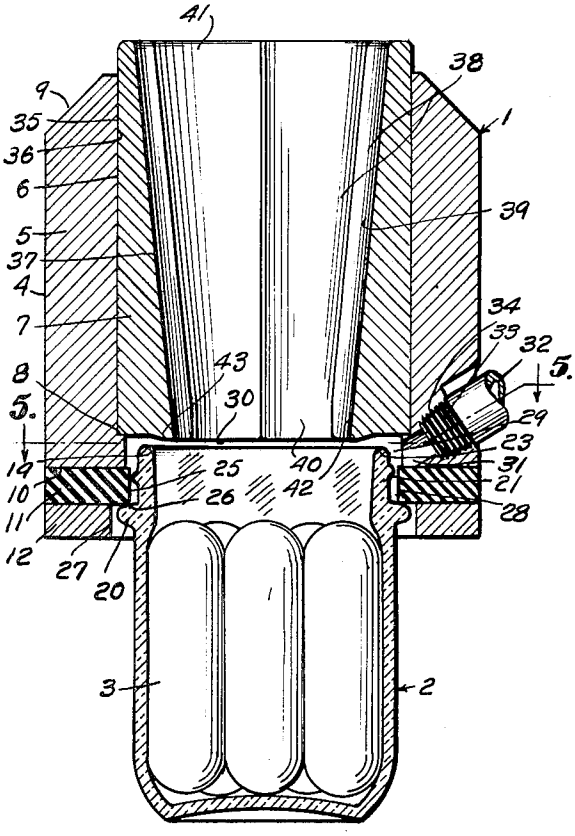
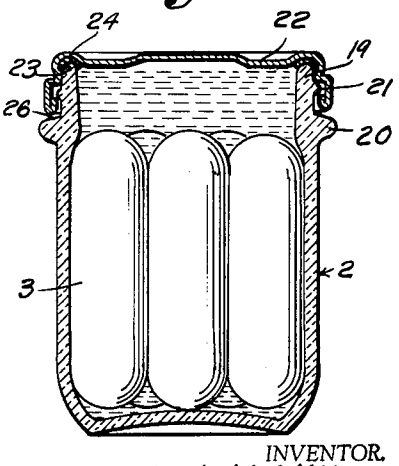


Fig. 7.



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METHOD AND APPARATUS FOR INSERTING FRANKFURTERS INTO CONTAINERS

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This invention relates to canning food products, and more particularly to a method and apparatus for inserting a product into the container in which the product is marketed.

Many products, for example, those of resilient character, are difficult to get into a container, especially without marring the appearance of the product. In fact, when such products are packaged in transparent jars or similar containers, the deformation is such that the marketability is restricted.

Products which are especially difficult to place in containers are types of meat products, such as frankfurters, sausages, and similarly shaped articles, that are to be packed in an orderly, close fitting arrangement within the container. This is because when a proper number of such articles are grouped together preparatory to insertion into the container, the overall outer diameter of the group is too large to enter the mouth of the container without deforming or scraping off the sides of the articles as they are pushed into the container. This is especially true of skinless frankfurters and like products that are fragile enough for the surfaces thereof to burst as they are sufficiently squeezed together to push them through the neck of the container. It is also difficult to get all of the articles to slide into the container at the same time, and the orderly arrangement cannot be restored in the container because the fit is such that the articles will not slide relatively to each other to effect a readjustment. Another difficulty is that packing of such products is slow and not in accordance with modern high speed canning procedure, with the result that the cost of the canned product is increased.

It is, therefore, the principal object of the present invention to provide an improved method and means for causing such products to plop into the container without damaging the product or destroying the appetizing appearance thereof.

In carrying out the invention, the articles to be packed in a single container are grouped together as a unit and inserted into the flared end of a funnel shaped filling member having a discharge throat shaped to control the passage of the articles into the container responsive to a vacuum that is drawn circumferentially between the discharge throat of the funnel shaped filling member and the top of the container, whereby atmospheric pressure is utilized to act equally on all of the articles and force them simultaneously into the container without damage thereto.

It is also an object of the invention to establish a continuous suction and to create the vacuum upon insertion of the articles into the filling member by placing the container in sealing relation with the discharge throat of the filling member, and to automatically break the vacuum when the articles clear the throat of the filling member.

It is a further object of the invention to provide the inner face of the filling member with flutes or guide grooves to maintain the grouping of the articles and to enhance the effectiveness of the suction in quickly forming the necessary vacuum.

Another object of the invention is to provide a simple and effective seal about the neck of the container without breaking or chipping the container when the container is moved into and out of position for receiving the articles.

In accomplishing these and other objects of the invention, as hereinafter described, I have provided an improved method and apparatus, the preferred form of which is illustrated in the accompanying drawings, wherein:

FIG. 1 is a perspective view of the filling member, showing the articles and container being moved into position therewith, a part of the filling member being broken away to better illustrate the construction.

FIG. 2 is a vertical section through the filling member with the articles inserted therein and with the container applied to start the vacuum.

FIG. 3 is a similar section showing the articles after they have entered the container.

FIG. 4 is a plan view of the filling member, showing the articles therein.

FIG. 5 is a horizontal section on the line 5—5 of FIG. 3, showing the suction passageway about the neck of the container and the port and duct through which a suction is drawn.

FIG. 6 is a horizontal section on the line 6—6 of FIG. 2, particularly illustrating passage of the articles through the throat of the filling member.

FIG. 7 is a vertical section through the packed and sealed container.

Referring more in detail to the drawings:

1 designates a filling member constructed in accordance with the present invention and used in my improved method of filling containers 2, the filling member illustrated being of a type for inserting articles such as frankfurters or similar products 3 having resilient characteristics.

The filling member 1 may be of unitary construction and may be composed of a material that is substantially inert to the product, preferably provides a low coefficient of friction, and is resistant to adhesion of the product thereto. Such a material may be a tetrafluorethylene resin obtainable on the market under the trade name Teflon. However, such material is expensive, and to reduce the cost, the preferred construction is to construct the filling member 1 with an outer casing 4 of metal or other less expensive material, and provide a liner 7 composed of the more expensive material.

The casing 4 has an annular wall 5 open at the upper and lower ends to provide a through axial bore 6 having a stop or shoulder 8 at the lower end thereof. The upper end of the casing has an exterior bevel 9, and the lower end has a preferably flat face 10 to which a gasket ring 11 is attached for encircling the neck of the container 2. The gasket ring 11 may be held in place by a ring 12 that is preferably nonmetallic, to avoid chipping the container 2 in case the container is made of glass or other frangible material. The ring 12 and gasket ring 11 may be retained by fastening devices such as machine screws 13 having the threaded shanks 14 thereof extending through registering openings 15 and 16 in the rings 11 and 12 and into threaded sockets 17 in the casing. The heads 18 (FIG. 1) of the screws 13 are preferably countersunk into the ring 12 to avoid contact of the container 2 therewith.

The diameters of the casing 4, liner 7, and gasket ring 11 are dependent upon the size and shape of the container 2, and, therefore, the container illustrated is now described, although it is obvious that other types of containers may be used.

One form of container 2 is illustrated in the accompanying drawings and comprises a jar formed of transparent material such as glass or the like through which the attractiveness and desirability of the product may be

visible. The container illustrated has a neck 19 having an inner diameter closely corresponding to the inner diameter below the neck, so that the offset therebetween is kept at a minimum to facilitate entrance of the articles into the container. Encircling the neck 19 on the outer side thereof is a flange 20 to facilitate seal of the container with the filling member of the present invention. The external portion of the neck above the flange 20 has threads 21 for retaining a cap 22 (FIG. 7) which forms a seal with the lip or rim 23 of the neck 19 by a sealing gasket 24 carried in the cap, as shown in FIG. 7. The inner face 25 of the gasket ring 11 is such as to freely pass the threads 21 on the neck 19, but to engage the upper face 26 of the flange 20 for forming an annular seal with the container, as later described. The inner diametrical face 27 of the retaining ring 12 is of a diameter to pass the flange 20 freely into sealing contact with the inwardly projecting portion 28 of the gasket ring 11. The inner diameter of the casing 4 below the shoulder 8 is slightly less than the inner diameter of the gasket ring, so that an annular passageway 29 is provided about the neck 19 of the container 2, sealed on the lower side thereof through contact of the flange 20 with the gasket ring 11. The shoulder 8 that forms a stop for the liner 7 is also located slightly above the lip 23 of the container, to provide a passageway 30 between the lower end of the liner 7 and the lip or rim 23 of the container 2.

Connected with the passageways 29 and 30 at one diametrical side of the casing 4 is a port 31 which in turn is connected with a source of suction through a duct 32. The duct 32 may be a pipe having a threaded end 33 engaged in an internally threaded socket 34 that is provided in axial alignment with the port 31. The port 31, as well as the end of the duct 32 that is connected thereto, are preferably located on a downwardly inclined angle with respect to the axis of the casing 4, so as to facilitate drawing of a vacuum in the passageways 29 and 30, as later to be described.

The liner 7 has an outer circumferential face 35 closely engaging the cylindrical face 36 of the bore 6 of the casing. The liner 7 is of a length to slightly project from the top of the casing, to prevent contact of the articles with the casing when they are inserted into the liner 7, as later described. The interior of the liner 7 has a tapered bore 37 which at the smaller end is less than the inner diameter of the neck 19 of the container 2, to facilitate passage of the articles across the passageway 30, as later described. The upper or flared end of the tapered bore 37 is of a size to amply contain the group of articles that are to be inserted into the container.

In order to support and retain the arrangement of the articles, the inner face of the tapered bore 37 is preferably provided with flutes 38 that are of arcuate cross section, as best illustrated in FIGS. 4 and 6, to better accommodate generally cylindrical articles 3 having resilient characteristics, such as frankfurters. The arcuate faces 39 at the lower ends 40 of the flutes closely conform to the transverse curvature of the articles, but the flutes 38 taper slightly outwardly toward the upper ends 41 to effect easy start of the articles 3 into the upper end of the liner 7. The flutes 38 thus provide for gradual pinching-in of the articles as they are drawn through the throat 42 of the liner, whereby the articles are caused to form a seal with the throat 42 and with each other, as shown in FIG. 6, to facilitate formation of a pressure differential by which the articles will plop into the container by the external pressure acting on the articles within the upper end of the liner. The lower end of the liner is also preferably shaped as shown at 43, so that the discharge throat 42 is close to the neck of the container without constricting the suction inlet from the container to the passageway 30.

In assembling the filling member or head 1, the liner 7, made of tetrafluoroethylene resin or some equivalent inert material, is pressed into the bore 6 of the casing 4, to bring the lower end into seating contact with the shoulder 8, whereupon the upper end of the liner will project from the upper end of the casing. This projection is to prevent contact of the product with the metal of the casing upon placing the product into the bore of the liner. The gasket ring 11, backed by the retaining ring 12, is secured in position against the lower face 10 of the casing upon insertion of the machine screws 13. The filling member or head is then screwed onto the threaded end of the duct or pipe 32, to form a support therefor whereby the filling member is carried so that the containers 2 are readily moved into and out of engagement with the underneath side of the filling member, and the product is conveniently inserted into the top of the fluted bore of the liner 7.

After the filling member 1 is assembled and mounted on the pipe 32 as described, and with the pipe 32 connected with a source of suction, air is drawn continuously through both the upper and lower ends of the filling member.

Assuming that the filling member is to be used for inserting frankfurters 3 into a container 2, a sufficient number of the frankfurters to fill the container are gathered together and wetted. The frankfurters are prearranged in coinciding parallel relation substantially in the same relation that they assume in the container. For example, as illustrated in FIG. 1, six frankfurters may be grouped about a center frankfurter, and the group gripped together to hold the assembly, so that the prearranged group is in position to be dropped into the flared upper end of the tapered bore 37 of the liner 7, with the lower ends of the outer frankfurters sliding into the flutes or grooves 38 until they are stopped by the taper thereof. A slight pressure is then applied on the upper ends of the frankfurters to push them further into the flutes, as shown in FIG. 2, so that the wedging action constringes the frankfurters and presses them together to hold them in prearranged relation with spaces therebetween substantially closed.

An empty open mouthed container 2 is now brought upwardly under the filling member 1 so that the neck 19 thereof passes freely the inner face 25 of the gasket ring 11 until stopped by engagement of the upper face of the annular flange 20 with the inwardly projecting portion 28 of the gasket ring. Since the upper end of the fluted bore is now substantially stoppered by the prearranged group of frankfurters, the suction becomes effective in drawing a vacuum above the flange 20 and within the container, so that the container is acted upon by the external air pressure to hold the container in sealing contact with the gasket ring. As soon as sufficient air has been evacuated from the container, the frankfurters begin to move downwardly through the constricted throat 42, as shown in FIG. 6, to fully seal off the suction, so that the vacuum increases to establish a differential pressure at the respective ends of the frankfurters sufficient for the external air pressure to plop the frankfurters into the container, as shown in FIG. 3.

During movement of the frankfurters downwardly within the fluted bore of the liner, the suction is fully effective, but when the upper ends of the frankfurters have cleared the throat 42 the vacuum is relieved and the inertia completes movement of the frankfurters into the container. At this time the air flow is again established through the fluted bore of the liner, to break the vacuum and effect release of the container with the frankfurters therein. From the time that the frankfurters are placed in the filling member, the actions all follow in rapid order, so that the actions are substantially instantaneous.

It is obvious that the flutes not only close the spaces around the frankfurters, but they also provide guides to prevent twisting or turning of the frankfurters with respect to each other, so that they are deposited in the container substantially as prearranged within the filling head.

It is also obvious that since the throat **42** is of smaller diameter than the opening in the container **2**, the frankfurters are not scraped by the container as they move across the passageway **30**. This is important, because the frankfurters, being resilient and subject to the suction, tend to expand as they move out of the throat **42** and into the container, but there is sufficient overhang of the shaped lower end **43** of the liner to prevent the expanding frankfurters from scraping on the inner face of the neck. The constricted throat also assures simultaneous movement of the frankfurters into the container.

As previously stated, it is desirable that the filling member, or at least the portions thereof in contact with the product, be constructed of a material that is substantially inert and provides a low coefficient of friction, to assure free sliding of the frankfurters without sticking or bursting of the surfaces thereof. It is also important that the material be resistant to adhesion of the product and be capable of being kept in sanitary condition through the customary sterilizing processes employed in a packing plant.

The method of directing the suction between the lower end of the liner and the lip or rim **23** of the container has an important part in drawing the vacuum in the container and effecting a smooth movement of the frankfurters into the container. The angle of application of suction to the passageways **29** and **30** is also important to assure initial sealing contact of the container with the gasket ring.

After insertion of the frankfurters in a container, the container is filled with liquid, the cap **22** is applied, and the product is ready for sterilization.

While I have particularly illustrated and described my invention for the insertion of frankfurters and similarly shaped products, it is to be understood that the described method and apparatus is adapted to the insertion of other food products of resilient character, such as pickles, asparagus stalks, carrots, whole green beans and sardines that are sufficiently resilient to be grouped together and moved by the suction into a container.

What I claim and desire to secure by Letters Patent is:

1. The method of inserting frankfurters and food products of similar shape into an open mouthed closed bottom container through a funnel shaped filling member having a constricted discharge throat, including the steps of

prearranging the frankfurters in coinciding parallel relation,

inserting the prearranged frankfurters into the filling member while holding said arrangement,

positioning said open mouthed closed bottom container to be filled into sealing contact with the filling member while maintaining space between said throat of the filling member and the open mouth of the container, and

producing suction in said space to evacuate air from the container for holding the container in sealing contact with the filling member and for establishing a pressure differential upon respective ends of the frankfurters sufficient to discharge the frankfurters into the container.

2. An apparatus for inserting frankfurters and food products of similar shape into an open mouthed closed bottom container, including

a filling member having an inwardly tapering bore open at the ends,

with the smaller end of the bore terminating short of the corresponding end of the filling member,

said bore having flutes extending from one end of the bore to the other for guiding the outermost frankfurters placed in the bore into squeezing contact with the innermost frankfurter to close spaces between the frankfurters,

a gasket ring fixed to the filling member in spaced encircling relation with the smaller end of the bore to accommodate the open end of a container in sealing contact therewith, and

means for creating suction in said space between the smaller end of the bore and the container to evacuate air from the container and establish a differential pressure on the frankfurters placed in the larger end of the bore to discharge the squeezed together frankfurthers into the container.

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