Nov. 6, 1951 A. REICHERT 2,574,157

SELF-CENTERING HOLDER FOR CONTAINER FILLING MACHINES

Filed Feb. 7, 1949

FIG. 1.

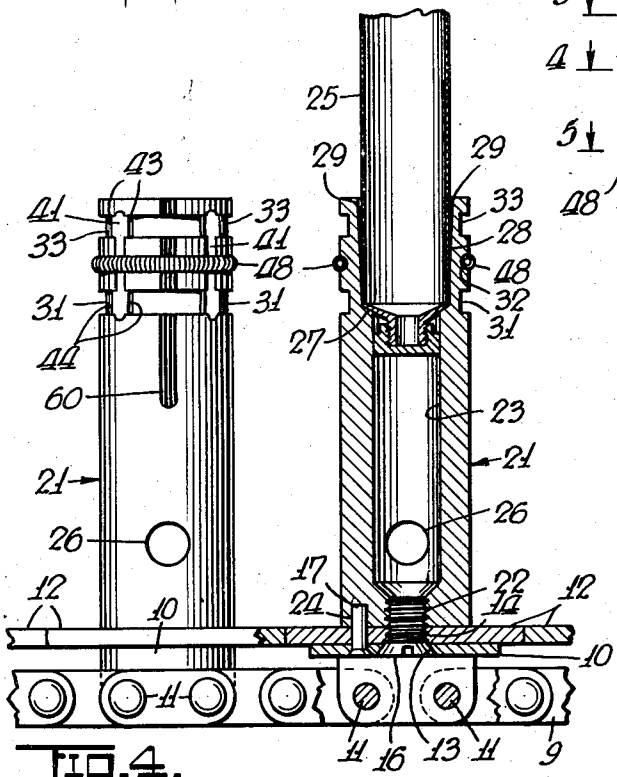


FIG. 2.

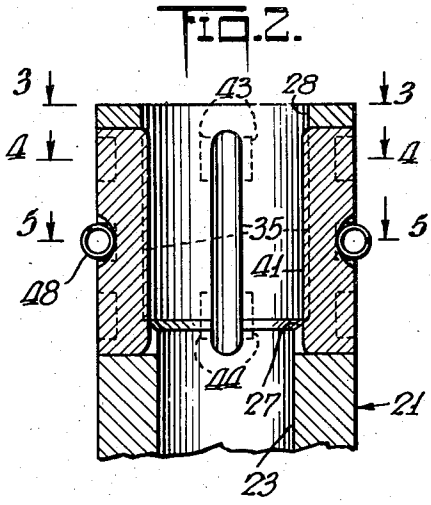


FIG. 3.

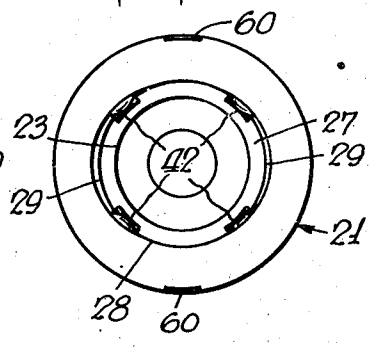


FIG. 4.

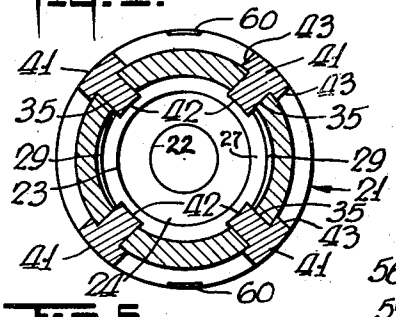


FIG. 5.

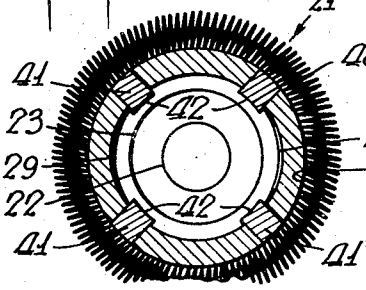


FIG. 7.

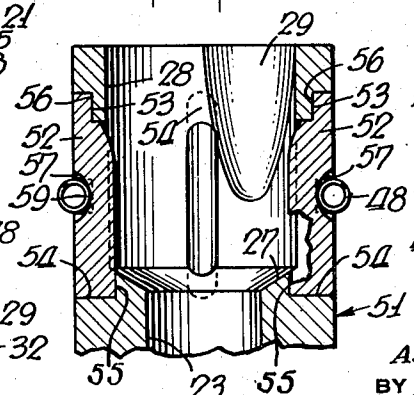
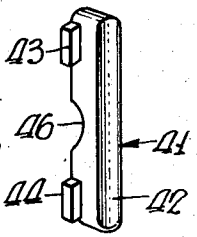


FIG. 6.



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SELF-CENTERING HOLDER FOR CONTAINER FILLING MACHINES

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5 Claims. (Cl. 279—54)

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The present invention relates generally to a machine for filling dry powdered or granular material, liquid or paste, into containers of various types and sizes, and it has particular relation to a self-centering holder in which the containers to be filled may be held during their filling and sealing operations.

In machines of this character the containers to be filled are deposited manually in an inverted position in a holder adapted to maintain them in an exact vertical position so that the spout of the filling mechanism may be moved into and out of its open-top end for filling the same. Obviously, if the container is not centered perfectly the spout of the filling mechanism is likely to strike the end or sides of the container and damage the same, especially if it is a soft, flexible, metal tube such as is used for tooth paste, shaving creams and the like. In such instances, the filling charge of material may be discharged onto the machine or floor. It is readily apparent that not only are the containers destroyed in such instances, but also that the charge of material intended therefor is lost. In many instances, the machine must be stopped, the damaged container, which might be jammed into its holder, removed and the mess cleaned up with a delay resulting in a loss in production.

Several types of machines in which this invention may be readily employed are shown in United States Letters Patent Nos. 1,647,232; 1,872,686 and 2,310,413, and reference is hereby made to such Letters Patent for details of operation of such machines insofar as the filling, closing, crimping or sealing operations are concerned, since such operations form no part of this invention.

Some of these machines utilize a holder having a single spring-clip, but such holders are not capable of maintaining in all instances small, soft, flexible, metal containers, such as tooth paste and shaving cream tubes and the like, in perfect axial alignment. The loss of tubes in the average large container filling plants due to improper alignment of the empty containers in their respective holders amounts to upwards of a million tubes a year. If the single spring-clip such as these holders use is too strong, it has a tendency to cut into and mar the sides of the tubes. When the spring-clip of this type of holder becomes too weak, as it will quickly when in constant use, it is easily possible, at the speed in which such containers are inserted manually in these holders, to position them therein off-center, whereby they are not perfectly aligned

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with the filling spout and will become damaged as the filling spout moves into its filling position.

The present invention consists of a filling container holder that obviates all of these inherent disadvantages, and facilitates the insertion and removal of the containers manually at greater speeds while assuring perfect vertical alignment at all times regardless of how they were inserted initially by the operator.

An object of the invention is to provide a simple, efficient and inexpensive self-centering container holder that may be easily and quickly mounted on existing conventional filling machines.

Another object of the invention is the provision of a holder having an open-top socket that has a series of spring-urging means capable of positively self-centering containers of varying diameters within greater manufacturing tolerances or regardless of how such containers are positioned initially thereinto.

A further object of the invention is to provide a holder of the type described with removable spring-urging members which are provided with means for limiting their inward movement whereby they cannot mar the outer surfaces of the container regardless of the amount of spring-urging pressure applied to them.

Another object of the invention is the provision of a plurality of circumferentially spaced spring-centering jaws or members that not only have stops for limiting their inward movement, but which are also mounted therein in such a manner that they are also capable of pivotal movement axially which facilitates insertion and withdrawal of the containers therefrom.

Various other and further objects and advantages of the invention, which result in simplicity, efficiency and economy, will be readily apparent from the following detailed description, wherein several forms of embodiment of the invention are shown, reference being had to the accompanying drawings, forming a part hereof, wherein like numerals indicate like parts, in which:

Figure 1 is a fragmentary side elevational view of a conveyor used for conveying the holders with their respective containers through the filling, crimping and sealing operations of a conventional filling machine, showing one holder in elevation and another in vertical section with a conventional empty, flexible, metal, paste tube container mounted therein in its normal filling position;

Figure 2 is an enlarged fragmentary vertical sectional view of one of the holders shown in

Figure 1, illustrating in greater detail the structural features of the spring-pressed axial aligning members or jaws;

Figure 3 is a top plan view of the holder shown in Figure 2, the same having been taken substantially along the line 3—3 thereof, looking in the direction of the arrows;

Figure 4 is a cross-sectional view of the holder shown in Figure 2, the same having been taken substantially along the line 4—4 thereof, looking in the direction of the arrows;

Figure 5 is another cross-sectional view of the holder shown in Figure 2, the same having been taken substantially along the line 5—5 thereof, looking in the direction of the arrows;

Figure 6 is an enlarged perspective view of one of the removable spring-pressed keys or jaw members shown in Figures 1 to 5; and

Figure 7 is an enlarged fragmentary vertical sectional view of a modified form of holder, showing a modified form of spring-pressed member wherein the inwardly limiting stop is formed integrally with the holder instead of in the spring-pressed member, per se.

Referring now to the drawings, and particularly to Figure 1 thereof, there is shown a conventional horizontal conveyor chain 9, having a series of inverted U-shaped mounting blocks 10 that may be secured thereto by means of the chain pins 11 or in any other suitable manner. On the top side of each of the blocks 10 is mounted by welding or other suitable means an enlarged horizontal platform or plate 12. The blocks 10 and platforms 12 are apertured axially, as indicated at 13 and 14, respectively, to receive a conventional machine screw 16. The aperture 13 in the block 10 is larger than the aperture 14 in the platform 12, and has inwardly and upwardly tapering shoulders for receiving the correspondingly tapered head of the machine screw 16. Each plate or platform 12 has an upstanding stud 17 spaced radially from its axial aperture 14, which is adapted to engage a recess in the holder to be mounted thereon and prevent its rotation about the axial fastening screw 16.

The holder 21 shown is substantially of cylindrical shape, but, of course, its outside surface may be of any other desired shape. It is of a substantial length as compared to its diameter, and has an open-top socket for receiving a container. The socket is formed from the upper part of an axial passageway extending entirely through it. The several sections of the passageway are of different diameters throughout its length. Its extreme lower end section, which is indicated by the numeral 22, has the smallest diameter and is of a size adapted to receive the threaded shank of the fastening screw 16. It is, therefore, threaded internally. An upwardly extending recess 24, which is open from the bottom, is provided in the holder 21 for engaging and receiving the stud 17 extending upwardly through the plate 12. The lower end section 22 extends upwardly a distance sufficient to pass slightly beyond the shank end of the fastening screw 16, and then connects openly with an intermediate section 23, which is of slightly larger diameter that is determined by the diameter of the cap of the container 25 to be held therein, as best shown in cross-section in Figure 1. A laterally extending opening 26 extends through the sidewall of the holder 21 and connects with the intermediate section 23 adjacent the lower end thereof. The opening 26 provides suitable means for facilitating cleaning the inside of the holder 21 with a jet of live steam or other cleaning medium. The opening 26 also permits the escape of entrapped air from the holder 21 when a container is positioned therein, and prevents the formation of a vacuum when the container is withdrawn suddenly therefrom.

The intermediate section 23 extends upwardly for a substantial distance where it connects openly with a top or container receiving socket section 28. An upwardly and outwardly flaring radial shoulder 27 is formed at the junction of the sections 23 and 28, which acts as a supporting stop for the container 25 when positioned therein, as best shown in Figure 1. The shoulder 27 is spaced a sufficient distance from the top of the holder 21 to assure substantial vertical alignment of the container 25. The diameter of the top socket section 28 is determined by the actual diameter of the tube or container 25 to be held thereby. It must be of a diameter to receive the container 25 snugly and slidably. The extreme upper end of the top socket section 28 is made slightly elliptical along its diametrically opposite sides, as indicated at 29, and which is best shown in greater detail in Figure 7. The slight enlargement of the top socket section 28 is necessary when the holder is to be used for holding soft, flexible, metal containers, such as tooth paste and shaving cream tubes, which have their open ends closed finally by folding or crimping along their transverse axes. This transverse sealing or crimping of the cylindrically shaped tubes causes them to become slightly elliptical in shape for a substantial distance upwardly from their crimped lower bottom ends. If the extreme upper ends of the socket section 28 were not made elliptical to allow for such a change in shape in the container 25, a circumferential indentation would be formed adjacent the end of the holder on the opposite sides of the containers during the crimping or sealing operation, which would mar or disfigure the same and render them unsuitable for commercial sale.

The upper and outer sides of the holder 21, which is that portion corresponding to the upper and larger socket section 28, are provided with a series of vertically spaced circumferentially extending grooves 31, 32 and 33. The outside grooves 31 and 33 are substantially rectangular in cross-section, as best shown in Figure 1, and also are slightly larger than the intermediate groove 32, which is substantially arcuate or concave in cross-section. The grooves 31, 32 and 33 are of substantially the same depth, and are spaced equally from one another. A series of circumferentially spaced vertical slots or apertures 35 are cut through the sidewall of the holder 21. These quadrantly spaced slots 35 are relatively narrow as compared to their lengths, and extend vertically slightly beyond the outer grooves 31 and 33. On the inside of the holder 21, it will be noted that the slots or apertures 35 extend from a point substantially adjacent the open-top thereof down and through the tapering shoulder 27, which acts as the limiting and supporting stop for the container 25 positioned therein.

A key or jaw member 41, which is best shown in Figure 6, is adapted to be mounted externally of the holder 21 and slidably and radially within each of said slots 35. The key or jaw member 41 is slightly rounded or arcuate on its inwardly extending bottom sides, as indicated at 42, to facilitate engagement with the sides of the container 25 when the same is positioned therein. The ends of each key or jaw 41 are also rounded.

Each key or jaw member 41 is provided adjacent opposite ends with a pair of oppositely extending lateral flanges or stops 43 and 44, which serve to limit the inward movement of the key 41 in the sides of the holder 21. The flanges or stops 43 and 44 have a thickness substantially equal to the depths of the grooves 31 and 33 into which they are adapted to be fitted. The pairs of oppositely extending flanges 43 and 44 are so spaced on the keys or jaws 41 that when the flanges 43 are mounted in the top groove 33, the flanges 44 will be mounted in the lower groove 31. Each key 41 has a concave indentation 46 on its outer side along its transverse axis, which aligns with the middle groove 32 of the holder 21 when the keys 41 are fitted thereinto. It will be noted that the keys or jaws 41 have a depth which permits its bottom arcuate side to project only slightly within the socket 28 before the flanges 43 and 44 engage the bottoms of their respective grooves 33 and 31. Thus, the radial distance of movement of the jaws 41 into the socket 28 is limited so that under no conditions can they be forced thereinto a distance sufficient to prevent ready insertion of the container 25 in the holder 21 or to cause any marring or disfiguration of the sides thereof.

A coiled endless circular garter spring 48 is adapted to be mounted circumferentially over the outside of the holder 21 in the intermediate groove 32 thereof. This spring 48 also engages the concave indentures 46 along the transverse axis of each key or jaw 41, which, when aligned with the groove 32, forms an encircling or circumferentially extending indenture in the holder 21. The annular garter spring 48 may be made strong without danger of its spring-urging pressure forcing the keys or jaws 41 too far into the socket 28 to cause their inwardly projecting bottoms 42 to mar or disfigure the sidewalls of the containers 25 since the limiting stops 43 and 44 will prevent the inward movement of the jaws 41 beyond a given distance regardless of the amount of spring-urging pressure that may be applied thereto. It will be obvious that the individual jaws 41 are not only separately removable, but are under spring-urging pressure only at one point intermediate their ends whereby said ends are free to pivot or rock about said pressure point.

There is shown in Figure 7 a modified form of holder 51, which is constructed exactly like the holder 21 except for the shape of its vertical jaw slots, its spring-pressed jaws and its outer arcuate groove. The holder 51 has an intermediate section 23 and an enlarged top socket section 28 connected by an upwardly and outwardly flaring shoulder 27, which serves as a supporting stop for the container to be positioned therein. In this modification, the stops for limiting the inward movement of the keys or jaws 52 are built integrally with the holder 21 and consist of a top flange 53 extending longitudinally into the slot 54, and a bottom shoulder 55. The keys or jaws 52 are shaped to fit snugly but slidably into the slots 54, and each is provided with a top recess or indentation 56, which is adapted to engage the flange 53 of the slot 54. The bottom end of the key 52 merely engages the shoulder 55. The holder 51 has an outside arcuately shaped groove 57 extending circumferentially thereof intermediate the ends of the socket section 28 thereof, and each key 52 has a similar groove 59 formed therein, which becomes aligned with the groove 57 when the keys 52 are assembled in the slots 54. A coiled endless circular spring 48 is adapted to be mounted in the outer groove 57 and the grooves 59 of the keys or jaws 52, and serves to hold them under spring-urging pressure in the holder 51, whereby said jaws are free to pivot or rock at their opposite ends about said spring.

Each of the holders 21 and 51 must be provided with an aligning indicium along diametrically opposite sides in order that the operators may insert the containers 25 in a proper position therein. Each container has some marking known to the operators, such as a line of advertising, slogan, etc. that extends lengthwise along the sides thereof, which may be utilized for indicating the proper position of the containers in the holders. This alignment is particularly important in connection with containers of the paste tube type, which are eventually crimped or sealed transversely. The crimping and sealing must be transversely of the containers, otherwise their face and back sides, which usually carry attractive identification labels, trade-marks, etc. would be distorted if the crimping and sealing ran from the front to the back thereof. There is shown on the holder 21 at the left in Figure 1 a groove 60 extending vertically along its median axis on opposite sides thereof, which serves as an alignment mark for the operator to use in positioning the empty containers properly in these holders. This indicium need not be a groove formed in the holder, but, if desired, can be merely a painted line or other type of visible indicia.

It will be readily recognized that the holders 21 and 51 must be made especially for use for a specific size and type of container, and that each and every different size and type of container may require a holder having a different size and type of receiving socket. This is primarily why the holders are mounted removably on their respective conveyor chains. In this way, a single filling and sealing machine may be used conveniently for filling and crimping different sizes and types of tubes. The aligning jaws are also made removable since they are subject to excessive wear due to their frictional contact with the containers. By making these jaws readily removable upon removal of the spring-urging means, an entirely new set of jaws may be easily and quickly substituted for worn jaws without discarding the entire holder.

The containers 25 must be aligned vertically in this type of holder because the jaws exert an even pressure from all opposite sides thereof, and, even if the operator should improperly position a container in the holder, it cannot remain in such an improper position due to the strong tendency of the spring-urging means to develop an equalization of pressure on all sides thereof, causing eventual alignment of the container.

In actual practice on high speed filling and crimping machines, this invention has not only reduced greatly the number of damaged containers, but has also greatly increased production by facilitating the manual positioning and removing of containers. Holders made in accordance with the present invention permit greater tolerances between the containers and their receiving sockets while assuring an accurate vertical alignment at all times.

Although I have only described in detail several modifications of the invention, it will be readily apparent to those skilled in the art that the same need not be so limited, but that various other modifications may be made therein without departing from the spirit thereof.

What I claim is:

1. A self-centering holder having an open-top socket adapted to receive a container, means within said socket for limiting the distance to which a container may be positioned therein, a plurality of circumferentially spaced jaws adapted to project through the walls of said holder and into the socket thereof for axially centering a container therein, means for limiting the distance to which said jaws may be projected into said socket, and spring means engaging said jaws intermediate the ends thereof for urging them inwardly of the holder whereby their opposite ends are free to rock about said spring engaging means.

2. A self-centering holder having an open top socket adapted to receive a container, means within said socket for limiting the distance to which a container may be positioned therein, a plurality of circumferentially spaced jaws adapted to project into the socket of said holder for axially centering a container therein, means spaced on opposite sides of said spring urging means for limiting the distance to which said jaws may be projected into said socket, and spring urging means engaging said jaws intermediate the ends thereof for urging them inwardly of said socket whereby their opposite ends are free to rock about said spring urging means.

3. A self-centering holder having an open-top socket adapted to receive a container, means within said socket for limiting the distance to which a container may be positioned therein, a plurality of circumferentially spaced removable jaws adapted to project through the walls of said holder and into the socket thereof for axially centering a container therein, means for limiting the distance to which said jaws may be projected into said socket, and spring means encircling said jaws intermediate the ends thereof for urging the same inwardly of said socket whereby the opposite ends of said jaws are free to rock about said spring means.

4. A self-centering holder having an open-top socket adapted to receive a container, means within said socket for limiting the distance to which a container may be positioned therein, a plurality of circumferentially spaced removable jaws adapted to project through the walls of said holder and into said socket for axially centering a container therein, spaced means carried by said jaws for limiting the distance to which said jaws may be projected into said socket, and a garter spring encircling said jaws at their mid-points for urging the same inwardly of said holder whereby the opposite ends of said jaws are free to rock about said spring means.

5. A self-centering holder having an open-top socket adapted to receive a container, means within said socket for limiting the distance to which a container may be positioned therein, a plurality of circumferentially spaced removable jaws adapted to project through the walls of said holder and into said socket for axially centering a container therein, spaced means carried by said holder for limiting the distance to which said jaws may be projected into said socket, and a spring encircling said jaws at their mid-points for urging the same inwardly of said holder whereby the opposite ends of said jaws are free to rock about said spring means.

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