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R. B. STOVER ET AL

2,328,401

FILLING MACHINE

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2 Sheets-Sheet 1

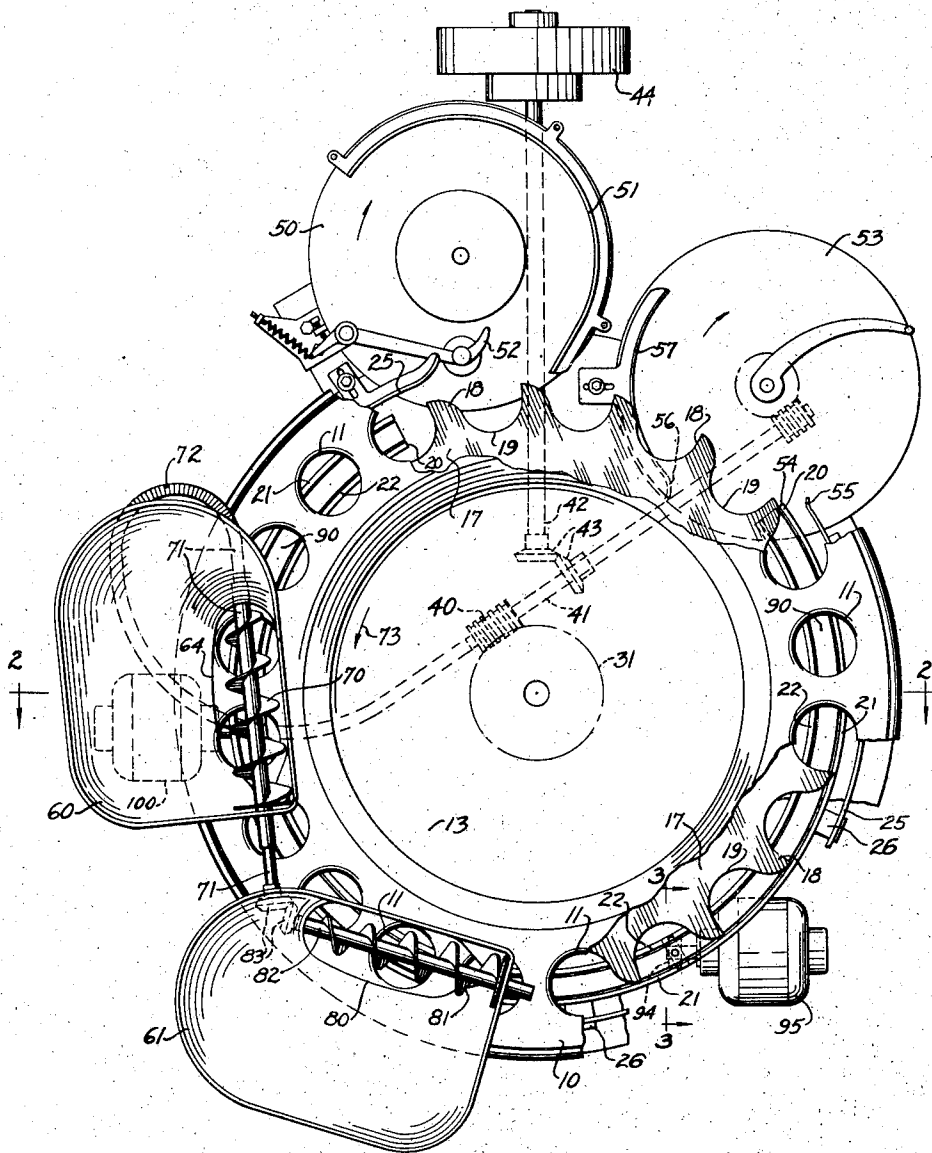


FIG. 1

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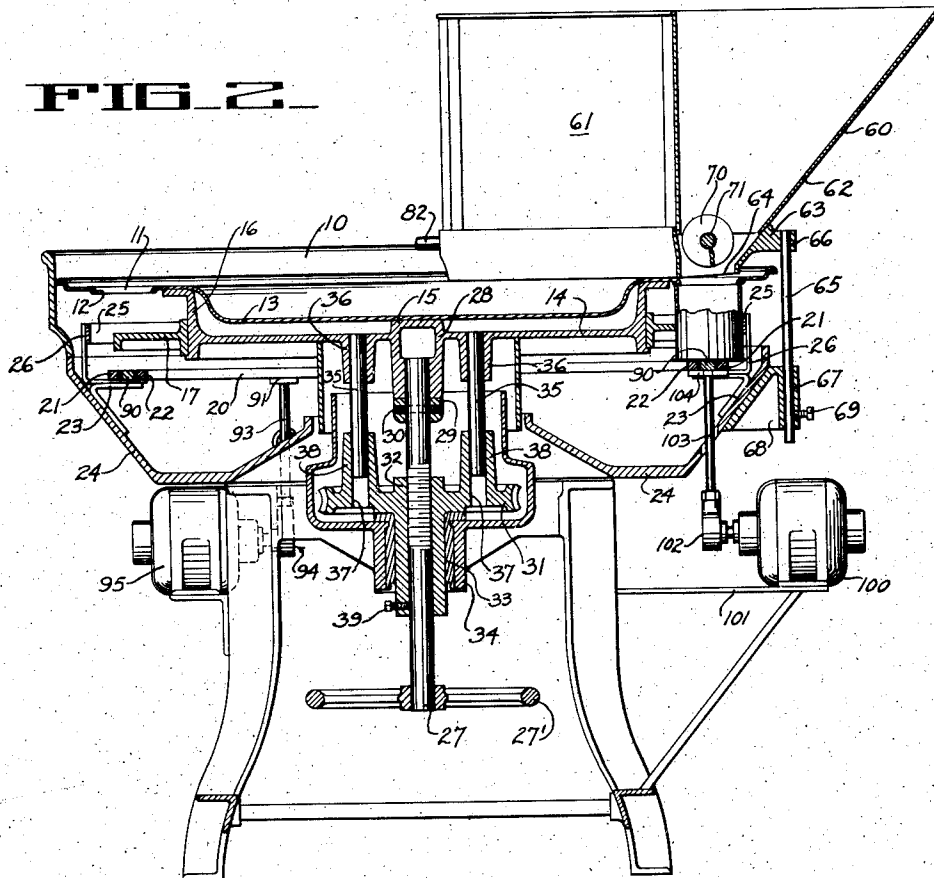
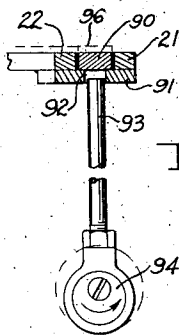
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2 Sheets-Sheet 2



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2,328,401

FILLING MACHINE

Roy B. Stover, Toledo, Ohio, and Clarence A. Hoy, Hoopeston, Ill.; said Hoy assignor to Food Machinery Corporation, San Jose, Calif., a corporation of Delaware, and said Stover assignor to Owens-Illinois Glass Company, a corporation of Ohio

Application July 27, 1940, Serial No. 347,914

10 Claims. (Cl. 226-72)

This invention relates to machines for filling containers, such as cans and jars, with food commodities, particularly cut vegetables, such as: sliced beets, cut string beans, diced beets, diced carrots, diced potatoes, mixed diced vegetables, shoe string beans, shoe string carrots, and shoe string potatoes.

Heretofore, cut vegetables had to be packed, partly or entirely, by hand. The difficulties encountered in filling the containers mechanically from a hopper arose from the fact that the product because of its shape would not readily pack in the container with the result that the container left the hopper only partially filled. It was usually undesirable to use a mechanical packing means, such as a packer wheel, which would exert a downward pressure on the contents of the can, because of the danger of crushing the product. Shoe string potatoes, for example, are quite brittle, and easily break.

The problem was quite pronounced in the case of packing shoe string cut vegetables, like shoe string potatoes, in jars. In the first place, the fact that the opening in the top of the jar is smaller in diameter than the inside of the jar, makes it difficult to fill. In the second place, the lengthy shape of the pieces of shoe string potato makes them awkward to pack because the pieces tend to bridge the opening of the jar and in other ways obstruct the complete filling thereof.

One of the objects of this invention is to provide a machine capable of automatically filling containers, such as cans or jars, with food commodities, which have been cut into pieces. The term "cut food commodities," as employed herein and in the appended claims, is intended to mean any of the many food commodities which are cut into pieces of various shape before being packed into the containers.

Another object of the invention is to provide a machine of the type employing a rotary filling table with two filling hoppers and with means for jarring the containers during the filling operation.

A further object is to provide a means located under the containers which will apply a sudden and repeated shock thereto which will have somewhat the same effect as tamping the commodity down into the container from above. In other words, instead of applying a downward pressure directly on the commodity, the container is given a sudden upward movement, so that the inertia of the commodity causes it to settle down in the container.

Other objects will appear after the disclosure

of a machine in which the invention has been embodied.

In the drawings:

Fig. 1 is a plan view of the machine with part of the table broken away.

Fig. 2 is a vertical section thereof taken as indicated by the arrows 2-2 in Fig. 1.

Fig. 3 is a detail view taken as indicated by the arrows 3-3 in Fig. 1.

The invention is disclosed as embodied in a machine of the general type disclosed in the patent to W. F. Christel, No. 2,150,490, issued March 14, 1939. The machine comprises a revolving table 10 (Figs. 1 and 2) having a series of filling openings 11 arranged around its periphery. Each filling opening 11 has a downwardly projecting lip 12 for fitting into the open end of the can. The central portion 13 of the table 10 is depressed to form a bowl for the reception of excess material. The table 10 is supported upon and rigidly secured to the wheel 14 having a central protuberance 15 for supporting the center of the bowl portion 13 and having an upstanding peripheral flange 16 for supporting the peripheral portion of the table 10. A feed ring 17 is secured to the wheel 14 and is provided with feed fingers 18. Intermediate the fingers 18 are formed arcuate openings or pockets 19 into which the cans fit, and which serve to center the cans in registry with the filling openings 11.

A stationary track 20 comprising two spaced-apart concentric rails 21, 22 is provided for supporting the cans during their travel around with the table, the fingers 18 engaging the walls of the cans to advance the cans along the track 20. As shown in Fig. 2, the rails 21 and 22 are mounted in fixed position by means of brackets 23 attached to the frame 24 of the machine. A circular fixed guide rail 25 is supported on brackets 26 concentric with the table 10 to retain the cans in the arcuate openings 19 of the feed ring 17.

The wheel 14 to which the table 10 and feed ring 17 are secured is supported on a vertical shaft 27 (Fig. 2) having a hand wheel 27' secured to its lower end. The upper end of the shaft 27 is received in the bore of the hub 28 of the wheel 14. The lower end of the hub 28 bears against a collar 29 secured to the shaft 27 by a pin 30. The shaft 27 is supported by a worm wheel 31, into the hub 32 of which the shaft 27 is threaded. The worm wheel 31 is supported in a bearing 33 mounted in the central portion 34 of the machine framework 24.

In order to transmit rotation from the worm wheel 31 to the wheel 14 the latter is provided

with plunger rods 35 secured in bosses 36 formed integrally with the wheel 14. The rods 35 slidably engage bores 37 formed in upstanding bosses 38 on the worm wheel 31. A set screw 39 is threaded through the hub 32 of the worm wheel and bears against the shaft 27 to lock the worm wheel and shaft together in any adjusted position. The threaded shaft 27 is rotated to raise and lower the table 10 with respect to the track 20 in order to enable the machine to accommodate cans of different height. Rotation of the worm wheel 31 is transmitted through the rods 35 to the wheel 14 so that the table 10 rotates in unison with the worm wheel 31.

The means for driving the worm wheel 31 is shown in phantom in Fig. 1. The worm wheel 31 is driven by a worm 40 on a shaft 41 which is driven from a power shaft 42 by bevel gears 43. The outer end of the power shaft 42 has a pulley 44 adapted to be driven from a source of power not shown.

Suitable means of well-known construction are provided for feeding the cans into the machine and for discharging them therefrom. The feeding means comprises a rotary disc 50 on which the empty cans are deposited. A stationary guide 51 is positioned above the disc to direct the cans toward the feed ring 17. A spring-pressed pivoted arm device 52 admits the cans one by one to the pockets 19 and the fingers 18 transfer the cans from the disc to the track 20. The beginning of the guide rail 25 projects over the disc to guide the cans into the pockets 19 and retain them therein. The cans are thus carried around in registry with the filling openings 11.

After the cans are filled, by mechanism presently to be described, they are deposited on a rotary discharge disc 53. The track 20 and the guide rail 25 terminate at 54 and 55, respectively, above the discharge disc 53 and the fingers 18 move the cans off the end of the track onto the disc. A stationary rake 56 projects under the feed ring 17 to intercept the cans and remove them from the pockets 19. An arcuate portion 57 of the rake directs the filled cans around in the direction of rotation of the discharge disc 53.

The means for filling the containers comprises two hoppers 60 and 61 (Fig. 1) disposed above the revolving table 10 and containing a supply of the commodity. The hoppers are duplicates so only one will be described in detail. The hopper 60 comprises a funnel-shaped sheet-metal upper portion 62 (Fig. 2) which is fitted into a cast base 63 having an outlet 64, which is elongated, as shown in Fig. 1, along the path of travel of the filling openings 11. The commodity is discharged from the hopper outlet 64 onto the table 10 and through the filling openings 11 into the containers therebeneath. The hopper is supported by means of two posts, one of which appears at 65 in Fig. 2. The upper end of the post is secured in the hopper base 63 at 66 and the lower end slidably engages in an aperture 67 in a bracket 68 secured to the frame 24. The hopper is lowered until it just clears the surface of the table 10 and is held in adjusted position by the set screw 69 threaded through the bracket 68 and bearing against the post 65.

To facilitate the discharge of the commodity from the hopper 60 a feed screw 70 is rotatably mounted in the base 63 with the shaft 71 thereof parallel to the table 10. The screw shaft 71 is rotated by means of a flexible drive 72 (Fig. 1) from the worm shaft 41 in a direction to feed the material in a direction opposite to that of the

table which is indicated by the arrow 73 placed thereon. The outside diameter of the screw 70 decreases in the direction of feed.

The second hopper 61 is spaced apart from the first hopper 60 and is mounted above the table 10 so that its elongated outlet 80 is along the path of travel of the filling openings 11. The second hopper is likewise provided with a feed screw 81 on a shaft 82 which is driven from the shaft 71 by means of bevel gears 83.

Means are provided for jarring the containers as they are slid around the track 20 by the fingers 18, comprising an arcuate strip of metal 90 disposed between the rails 21, 22 and coextensive therewith. The arcuate strip 90 is independent of the rails of the track and is free to move up and down with respect thereto. The strip 90 is supported on straps, one of which is shown at 91 in Fig. 3. The strap 91 is welded to the under side of the rails 21 and 22. The arcuate strip 90 is of the same thickness as the rails so that when it is resting on the strap 91 its upper surface is in the same plane as the upper surfaces of the rails and is, therefore, in contact with the bottom of the container.

The strap 91 (Fig. 3) has an aperture 92 into which a rod 93 projects. A vertical movement is imparted to the rod 93 by means of an eccentric 94 which is rotated by a motor 95 (Figs. 1 and 2). Every time the eccentric passes through top dead center the rod 93 strikes the strip 90 a sharp blow, elevating it to the broken line position 96 (Fig. 3). As the eccentric 94 is rapidly rotated by the motor 95 a continuous series of rapid hammer-like blows is delivered to the strip 90 which constantly jars the container.

There are two of these jarring mechanisms. The other is the same as the one just described and is located under the first hopper 60 (Figs. 1 and 2). It comprises a motor 100 supported on a bracket 101 with an eccentric 102 mounted on the motor shaft and actuating a striker rod 103, the upper end of which projects through an aperture in the strap 104 secured to the rails 21 and 22.

The operation of the machine is as follows: The table 10 is elevated to the proper distance above the track 20 to accommodate the height of the container which is to be filled. This is accomplished by turning the hand wheel 27 until there is just sufficient clearance between the rim of the container and the lip 12 of the filling opening in the table to permit the container to be moved upwardly by the arcuate strip 90 when the latter is raised by the rods 93 and 103 of the motor-driven eccentrics.

The hoppers 60 and 61 are lowered until their bases just clear the surface of the table and they are held in this position by tightening the set screws on the supporting posts. Power is then applied to the pulley 44 to set the machine in motion.

The empty containers, such as cans or jars, are deposited right-side-up on the rotating disc 50 which feeds them to the feed ring 17, where they are admitted one by one to the pockets 19 by the device 52. The fingers 18 move the containers onto the track 20 and the rail 25 retains them in position in the pockets 19. The containers are jolted by the action of the striker rods 93, 103 on the strip 90. This does not interfere with the advancement of the containers along the track because they are free to move upwardly in the pockets 19 of the feed ring.

As the containers come under the outlet 64

of the first hopper 60 the commodity drops into the container and is shaken into place by the jolting and jarring action, so that any tendency of the pieces to bridge or jam in the opening of the containers is overcome. As the container travels along under the elongated outlet 64 of the first hopper 60 the commodity begins settling and packing down. The container is filled to the brim when it leaves the first hopper but during its travel to the second hopper it is still subjected to the jarring action so that if any further settling or packing occurs, additional commodity is supplied from the second hopper. When the container leaves the second hopper it is completely filled and packed with the commodity.

The jarring action continues until the container is delivered to the discharge disc. During its travel from the second hopper 61 its contents settle slightly, but this is not disadvantageous for it makes unnecessary the provision of any means to remove the excess material from the top of the container. The result is that by the time the container arrives at the discharge disc it is packed with the commodity and is filled to the proper level, which should be a short distance below the top edge to permit sealing or capping. The container is then automatically removed from the table by the rake 56 and the rotating discharge disc 53.

While we have described a particular embodiment of the present invention, it will be obvious that various changes and modifications may be made in the details thereof without departing from the spirit of the present invention and the scope of the appended claims.

Having thus described our invention and in what manner the same may be used, what we claim as new and desire to protect by Letters Patent is:

1. In a machine for filling containers, such as cans and jars, with cut food commodities, a rotary table having filling openings around its periphery, a circular track under said table having spaced-apart concentric rails, means engaging the side walls of the containers to center the containers under said filling openings and to advance the containers along said track, said engaging means permitting vertical movement of the containers, a hopper for containing a supply of the material having an outlet disposed above said table, an arcuate strip disposed between said rails, straps secured to the under side of said rails to support said strip, one of said straps having an aperture therein, a rod having its upper end projecting into said aperture, and means to move said rod vertically to cause the upper end thereof to strike the under side of said strip intermittent blows.

2. In a machine for filling containers, such as cans and jars, with cut food commodities, a rotary table having filling openings around its periphery, a circular track under said table having spaced-apart concentric rails, means engaging the side walls of the containers to center the containers under said filling openings and to advance the containers along said track, said engaging means permitting vertical movement of the containers, a hopper for containing a supply of the material having an outlet disposed above said table, an arcuate strip disposed between said rails, straps secured to the under side of said rails to support said strip, one of said straps having an aperture therein, a rod having its upper end projecting into said aperture, and a motor-driven eccentric to move said rod up and down to cause

the upper end thereof to strike said strip intermittent blows, the upper end of said rod being spaced apart from said strip in the bottom dead center position of said eccentric.

3. In a machine for filling containers, such as cans and jars, with cut food commodities, a rotary table having filling openings around its periphery, a circular track under said table having spaced apart concentric rails, means engaging the side walls of the containers to center the containers under said filling openings and to advance the containers along said track, said engaging means permitting vertical movement of the containers, a plurality of hoppers above said table having outlets spaced apart along the path of said filling openings, an arcuate strip disposed between said rails and adapted to engage the bottoms of the containers, and a plurality of spaced-apart strikers to deliver intermittent blows to said strip.

4. In a machine for filling containers such as cans and jars with solid commodities and wherein the container serves as the measure for filling, a rotary table having filling openings arranged about the axis thereof, said filling openings having lip portions adapted to fit over the open ends of the containers during filling, means for conveying the containers in registry with the filling openings, a support over which the containers move during their travel with said table, a stationary hopper having an elongated outlet in its bottom disposed above and extending in the direction of the path of said filling openings whereby commodity may gravitate from the hopper through said outlet to said table and through said filling openings into the containers beneath, said outlet being of greater length than the width of a filling opening whereby the filling opening travels for a distance in receiving relation to said outlet, an arcuate member associated with said support and engageable with the bottoms of the containers in their travel with said table, and means for substantially continuously vibrating said member whereby the containers are substantially constantly jarred by said member while over the same, said member being disposed under said hopper outlet to constantly jar the containers during the filling operation and extending beyond said outlet to continue said jarring after the filling operation to settle the commodity in the lips of said filling openings whereby all the commodity is within the confines of the container.

5. In a machine for filling containers such as cans and jars with solid commodities and wherein the container serves as the measure for filling, a rotary table having filling openings arranged about the axis thereof, said filling openings having downwardly projecting lips adapted to fit into the open ends of the containers during filling, means for conveying the containers in registry with the filling openings, a support over which the containers move during their travel with said table, a pair of stationary hoppers each having an elongated outlet in its bottom disposed above and extending in the direction of the path of said filling openings whereby commodity may gravitate from the hopper through said outlet to said table and through said filling openings into the containers beneath, each outlet being of greater length than the width of a filling opening whereby the filling opening travels for a distance in receiving relation to said outlet, an arcuate member associated with said support and

engageable with the bottoms of the containers in their travel with said table, and means for substantially continuously vibrating said member whereby the containers are substantially constantly jarred by said member while over the same, said member being disposed under the outlet of one of said hoppers and extending beyond said outlet under the outlet of said second hopper and past said second hopper outlet whereby to substantially constantly jar the containers during filling and after filling by each of said hoppers to settle the commodity during and after filling under the first hopper and to settle it sufficiently in the lips of said filling openings after refilling by the second hopper whereby all the commodity is within the confines of the containers.

6. In a machine for filling containers such as cans and jars with solid commodities and wherein the container serves as the measure for filling, a rotary table having filling openings arranged about the axis thereof, said filling openings having lip portions adapted to fit over the open ends of the containers during filling, means for conveying the containers in registry with said filling openings, a stationary hopper having an elongated outlet in its bottom disposed above and extending in the direction of the path of said filling openings whereby commodity may gravitate from the hopper through said outlet to said table and through said filling openings into the unfilled containers beneath, said outlet being of greater length than the width of a filling opening whereby the filling opening travels for a distance in receiving relation to said outlet, an arcuate member extending along the path of said filling openings under and beyond said hopper outlet, said member engaging the bottoms of the containers and supporting the containers in their travel with said table, means for supporting said arcuate member, means adjacent one end of said arcuate member for feeding unfilled containers thereon and into engagement with said conveying means, means adjacent the other end of said arcuate member for discharging filled containers from said member and conveying means and means for substantially continuously vibrating said member along its length whereby substantially all the containers in engagement with said conveyor are substantially constantly jarred by said member from substantially the time they enter the path of said filling openings to be filled by said hopper until they leave the said path after final filling by said hopper and such that the commodity fills the containers and the filled containers are discharged from the conveyor substantially without spillage.

7. In a machine for filling containers such as cans and jars with solid commodities and wherein the container serves as the measure for filling, a rotary table having filling openings arranged about the axis thereof said filling openings having lip portions adapted to fit over the open ends of the containers during filling, means for conveying the containers in registry with the filling openings, a plurality of stationary hoppers each having an elongated outlet in its bottom disposed above and extending in the direction of the path of said filling openings whereby commodity may gravitate from the hopper through said outlet to said table and through said filling openings into the containers beneath, each outlet being of greater length than the width of a filling opening whereby the filling opening travels for a distance in receiving relation to said outlet,

and arcuate means disposed along the path of said filling openings and extending under each hopper outlet and beyond the last hopper outlet to be encountered by the containers, said means engaging the bottoms of the containers and supporting the containers in their travel with said table, means for supporting said arcuate means, and a plurality of mechanical means associated with said arcuate means for substantially continuously vibrating said arcuate means along its length whereby the containers are substantially constantly jarred by said arcuate means during and after filling by each of said hoppers and are jarred sufficiently after filling by the last of said hoppers to settle the commodity in the lips of said filling openings to confine all the commodity within the confines of the containers, one of said mechanical means being positioned to actuate said arcuate means at the hopper first encountered by the containers in filling and another of said mechanical means being positioned to actuate said arcuate means at a point beyond the last hopper encountered by the containers in filling.

8. In a machine for filling containers such as cans and jars, with solid food commodities, and wherein the container serves as the measure for filling, a rotary table having filling openings around its periphery, a circular track under said table, means engaging the side walls of the containers to center the containers along said track, said engaging means permitting vertical movement of the containers, a stationary hopper for containing a supply of the commodity and having an outlet disposed above and in the path of said filling openings whereby commodity may gravitate from said hopper through said filling openings into the containers beneath, an arcuate strip positioned substantially concentric to said track, straps secured to the under side of said track and extending under said arcuate strip to support the same, a rod for moving said strip vertically to jar the containers, and means engaging said rod for substantially continuously oscillating said rod and strip whereby to substantially constantly jar the containers, said strip being disposed under said hopper outlet to substantially constantly jar the containers during the filling operation and extending beyond said hopper outlet to continue said jarring after the filling operation to settle the commodity in said filling openings within the confines of said containers.

9. In a machine for filling containers such as cans and jars with solid commodities and wherein the container serves as the measure for filling, a rotary table having filling openings arranged about the axis thereof, said filling openings adapted to be positioned over the open ends of the containers during filling, means for conveying the containers in registry with the filling openings, a support over which the containers move during their travel with said table, a stationary hopper having an elongated outlet in its bottom disposed above and extending in a direction of the path of said filling openings whereby commodity may gravitate from the hopper through said outlet and through said filling openings into the containers beneath, said outlet being of greater length than the width of a filling opening whereby the filling opening travels for a distance in receiving relation to said outlet, an arcuate member associated with said support and engageable with the bottoms of the containers in their travel with said table, and means for substantially continuously vibrating said member

whereby the containers are substantially constantly jarred by said member while over the same, said member being disposed under said hopper outlet to jar the containers throughout the filling operation and extending sufficiently beyond said outlet to continue said jarring after the filling operation to settle the commodity in the containers below said filling openings.

10. In a machine for filling containers such as cans and jars with solid commodities and wherein the container serves as the measure for filling, a rotary table having filling openings arranged about the axis thereof, said filling openings adapted to be positioned over the open ends of the containers during filling, means for conveying the containers in registry with the filling openings, a circular track over which the containers move during their travel with said table, a pair of stationary hoppers each having an elongated outlet in its bottom disposed above and extending in the direction of the path of said filling openings whereby commodity may gravitate from the hopper through said outlet and through said filling openings into the containers beneath, each outlet being of greater length

than the width of a filling opening whereby the filling opening travels for a distance in receiving relation to said outlets, arcuate means positioned substantially concentric to said track and engageable with the bottoms of the containers in their travel over said track, and means for substantially continuously vibrating said arcuate means whereby the containers are substantially constantly jarred by said arcuate means while over the same, said arcuate means being disposed under the first of said hoppers to be encountered by the containers during filling and extending beyond said outlet whereby to substantially constantly jar the containers during filling and after filling by said hopper to settle the commodity in said container, and said arcuate means being also disposed under the second of said hoppers and extending beyond said second hopper to substantially constantly jar the containers during any refilling by said second hopper and after said refilling, to settle the commodity in the containers below said filling openings.

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