April 24, 1928. 1,666,931

O. H. HANSEN

CAN FILLING MACHINE

Filed June 7, 1923 2 Sheets-Sheet 1

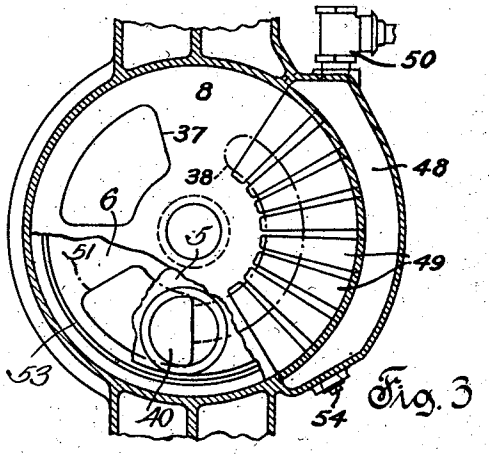


Fig. 3

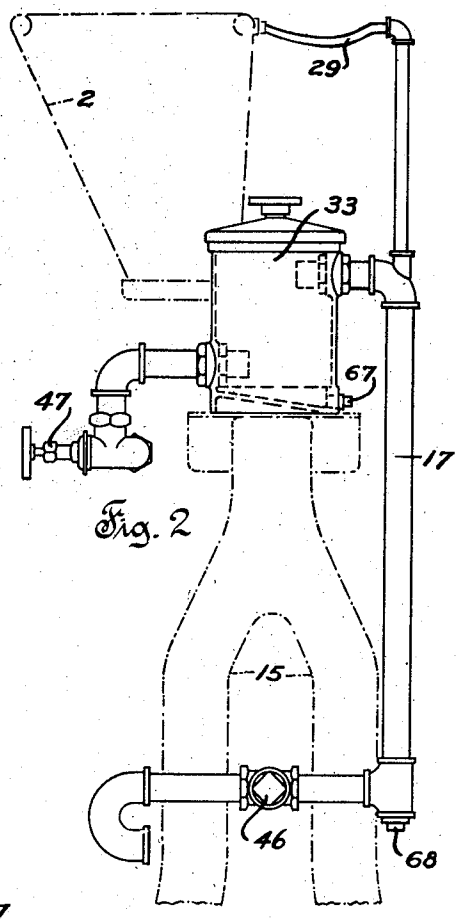


Fig. 2

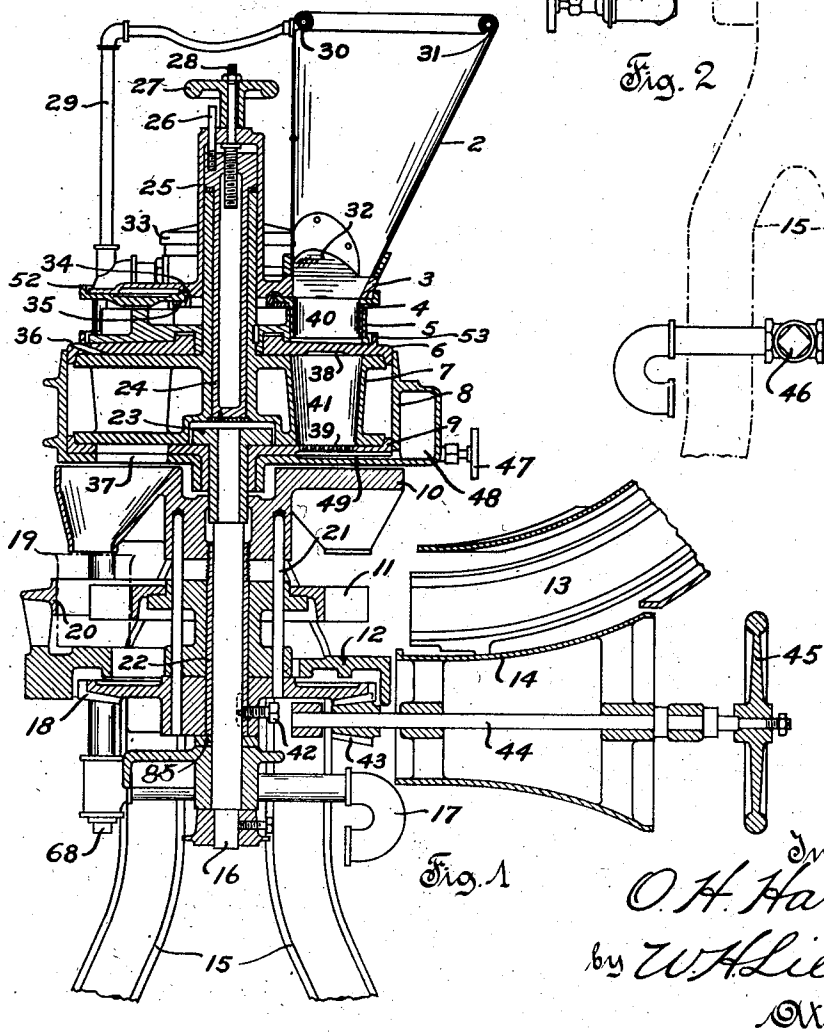


Fig. 1

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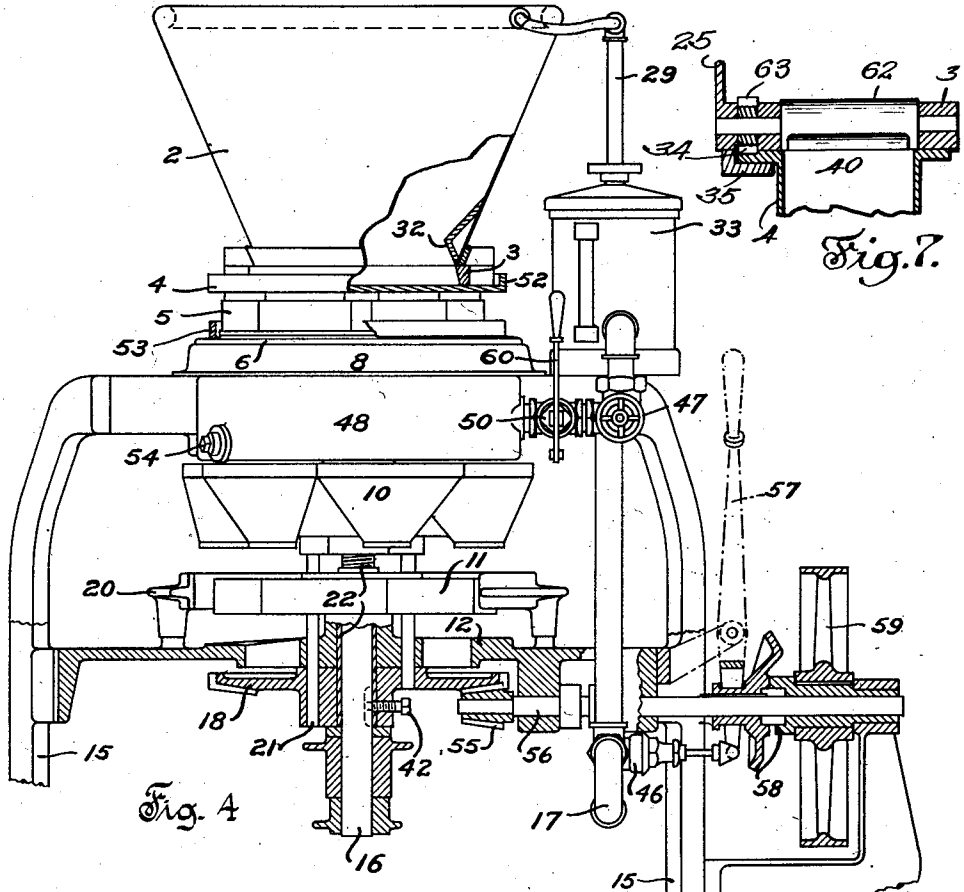


Fig. 7.

Fig. 4

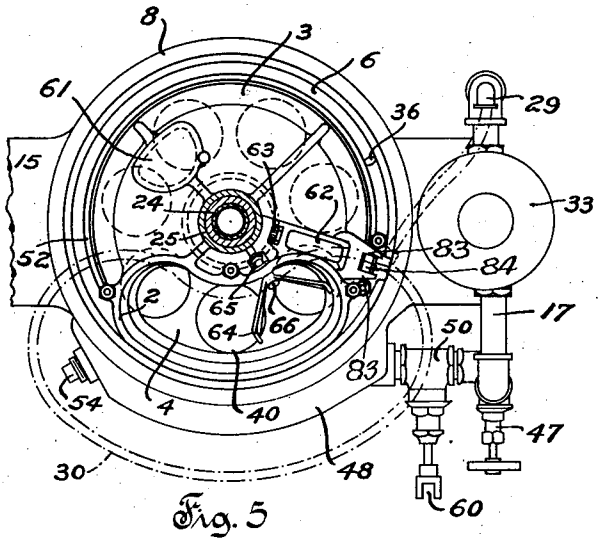


Fig. 5

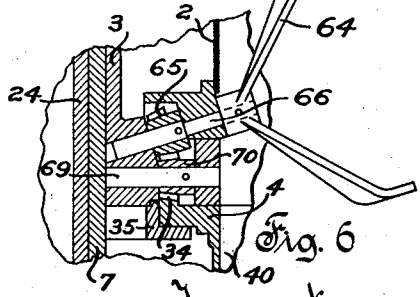


Fig. 6

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UNITED STATES PATENT OFFICE.

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CAN-FILLING MACHINE.

Application filed June 7, 1923. Serial No. 643,850.

This invention relates in general to improvements in the art of packing commodities for preservation, storage and transportation; and relates more specifically to various improvements in the construction and operation of receptacle filling devices for automatically delivering measured batches of mixture of granular material and liquid to successive containers as they are transported in series through the machine.

Generally stated, the object of the present invention is to provide a receptacle or can filling machine which is simple in construction and efficient in operation.

Several of the more important specific objects and advantages of the present invention are as follows:—

First.—To provide simple, compact, sanitary and efficient apparatus for supplying granular material such as peas or berries, in bulk to a can filling machine, and for automatically measuring batches of the substance prior to delivery thereof to the cans, without damaging or wasting the granules.

Second.—To provide improved structure for supplying liquid such as brine or syrup, to a can filling machine, and for automatically measuring batches of the liquid prior to delivery thereof to the cans, without wasting any of the material.

Third.—To provide an improved can filling machine assemblage, the various elements of which may be conveniently manufactured, assembled, dismantled and adjusted, and all parts of which are readily accessible for operation, inspection and cleaning.

Fourth.—To provide a can filling machine which is fool-proof and sanitary in every respect and which is automatic and reliable in operation.

While the improvements are disclosed herein as being applied to a can filling machine which is especially adapted to fill successive cans with measured batches of mixture of brine and peas, it is not intended to limit the scope of the invention by such specific disclosure. Some of the novel features of can filling machine construction which are disclosed but not specifically claimed herein, form no part of the present invention and form the subject of copending applications.

A clear conception of the several novel features comprising the present improvement and of the operation of a machine embodying the same, may be had by referring to the drawings accompanying and forming part of this specification in which like reference characters designate the same or similar parts in the various views.

Fig. 1 is a fragmentary sectional view of the improved can filling machine, the section to the right of the vertical central axis being taken through the liquid supply manifold and passages and the section to the left of said axis being taken through the mixture discharge opening.

Fig. 2 is an elevation of the liquid supply piping and the liquid reserve tank.

Fig. 3 is a horizontal section through the stationary liquid supply member and manifold, having the bottom plate removed from the member, but showing a fragment of the stationary intermediate plate associated therewith.

Fig. 4 is a fragmentary part sectional elevation of the improved can filling machine looking toward the granular material supply hopper side thereof.

Fig. 5 is a fragmentary part sectional top view of the improved can filling machine with part of the hopper removed and showing an agitator of improved construction disposed within the lower portion of the granular material supply hopper.

Fig. 6 is an enlarged fragmentary sectional view showing the details of construction of the improved agitator.

Fig. 7 is an enlarged fragmentary sectional view showing the details of construction of the rotary cut off valve.

The improved can filling machine disclosed in the accompanying drawing comprises in general a granular material supply

hopper 2 having a discharge opening in the lower portion thereof; adjustable and non-adjustable pocket elements 4, 5 respectively forming an annular series of movable granular material measuring pockets 40 which are successively communicable with the hopper 2 through the bottom discharge opening thereof; an element 7 forming an annular series of movable mixture measuring pockets 41 successively communicable with the superposed pockets 40 and with a source of liquid supply; means for transporting cans 19 in series to, through and from the machine; and mechanism for driving the various elements of the structure.

The granular material supply hopper is mounted upon a vertically adjustable non-rotary top plate 3 having a central vertical sleeve 25 formed integral therewith. The top plate 3 is provided with a pair of integral abutments 83 which coact with the upper portion of a stationary stop 84 to prevent rotation of the plate 3 while permitting free vertical removal and adjustment thereof. The upper edge of the hopper 2 is wrapped around a liquid supply pipe 30 which communicates with the liquid supply pipe 17 through a pipe 29. The pipe 30 is provided with a series of liquid discharge orifices 31 which are directed downwardly along the inner inclined surface of the supply hopper 2. As shown in Figs. 1 and 4, the lower portion of the hopper 2 may be provided with a stationary element 32 having an inclined lower surface for urging granular material into the successive pockets 40 as they pass beyond the hopper discharge opening, and for preventing bridging of the material across the hopper 2.

The upper adjustable pocket element 4 is rotatably supported upon an annular bearing plate 35 which is secured to the bottom of the top plate 3, and has a series of seven downwardly projecting tubular portions which fit within corresponding upwardly projecting tubular portions of the lower pocket element 5. The upper element 4 is provided with an annular marginal rim 52 which extends upwardly above the joint between the element 4 and the top plate 3 in order to prevent liquid which may escape through this joint from flowing down the side of the machine. The telescoping tubular portions of the elements 4, 5 form the granular material measuring pockets 40 which are adjustable in volume as will be later described. The lower pocket element 5 is drivingly connected with a rotary central bearing sleeve formed integral with the element 7, by means of a key or the like, and the upper pocket element 4 is rotatable by virtue of its telescopic connection with the lower element 5. The lower pocket element 5 is supported upon a stationary intermediate plate 6 having a granular material discharge opening 51 therein and also having an annular marginal rim 53 extending upwardly above the joint between the plate 6 and the element 5 in order to prevent liquid which may escape through this joint from flowing down the side of the machine. The stationary stop 84 is fastened to the plate 6 and has a lower portion or lug which engages a recess in the stationary member 8 to prevent rotation of the plate 6 while permitting free vertical removal thereof.

The pocket element 7 is formed in one piece and has seven mixture measuring pockets 41 of fixed volume formed therein. The element 7 snugly fits a recess formed in the bottom of the stationary intermediate plate 6 and rests upon a grid plate 9 which is stationarily supported within the liquid supply member 8. The intermediate plate 6 is provided with a sector shape air vent 38 shown in Figs. 1 and 3, which extends from the granular material discharge opening 51 and in the direction of travel of the pockets about the central vertical axis of the machine. The central portion of the pocket element 7 is bored to receive a stationary sleeve 24 having a lower cap the purpose of which will be subsequently explained. The lower central portion of the pocket element 7 is provided with a driving socket adapted to receive a driving head 23 as shown in Fig. 1.

The stationary brine supply member 8 is cup shape and comprises a horizontal bottom supporting the grid plate 9, and a vertical annular wall coacting with the periphery of the intermediate plate 6. The grid plate 9 and the bottom of the member 8 are provided with registering mixture discharge openings 37 and the intermediate plate 6 is provided with one or more air escape ports 36 communicable with the successive pockets 41 as they approach the openings 37. The bottom of the member 8 is also provided with a series of radial liquid supply recesses 49 which communicate with the openings forming the liquid supply grid 39, and the outer extremities of which terminate in the liquid supply manifold 48. The manifold 48 is preferably cast integral with the vertical wall of the member 8 and communicates with the liquid supply pipe 17. The manifold 48 is also preferably provided with a removable plug 54 for effecting flushing of the manifold. The liquid supply pipe 17 is provided with a control valve 50 operable by means of a lever 60 and with a flow regulating valve 47 located closely adjacent to the manifold 48. A reserve tank 33 having a capacity sufficient to supply several pockets 41 with liquid is located in the supply pipe 17 adjacent to the valves 47, 50. The reserve tank 33 besides serving the function of a header, serves as a sand trap and has a cleaning plug 67 at the bottom thereof.

The pipe 17 enters the tank 33 at the top and leaves the same at the bottom. The vertical run of the supply pipe 17 also supplies the pipe 29 with liquid and preferably has a cleaning plug 68 at the lower portion thereof. The main liquid control valve 46 located in the liquid supply pipe 17 is operable by means of the power control lever 57 as shown in Fig. 4.

The can supply mechanism consists of a supply chute 13 and a can feed drum 14 which is mounted upon a rotary horizontal shaft 44. The shaft 44 has a bevel pinion 43 at one end thereof which meshes with the main bevel gear 18, and has its opposite end provided with a hand wheel 45 for manipulating the machine while changing grades. The main bevel gear 18 is secured to the lower portion of the vertical main shaft 16 by means of a set screw 42 and is provided with a plurality of vertical parallel drive rods 21 projecting upwardly therefrom. A series of can hooks 11 are mounted upon a central drive element which is pierced by the rods 21, these can hooks 11 being adapted to engage the successive cans 19 which are delivered to the machine by the feed drum 14 and to transport the cans about the central vertical axis of the machine. An annular series of seven hoppers are formed in the single hopper member 10 which is also engaged by the driving rods 21. The central portion of the hopper member 10 has screw thread engagement with the upper end of the adjusting sleeve 22, the lower portion of which is locked to the shaft 16 by means of the set screw 42. The stationary can support 12 located below the can hooks 11 is adapted to support the successive cans 19 during filling thereof and provides a mounting for the sector shaped can guide 20. The can discharge mechanism is of well known construction and requires no detailed description herein.

The horizontal main power shaft 56 has its inner extremity drivingly connected with the bevel gear 18 by means of a bevel pinion 55, and has a main driving pulley 59 rotatably mounted upon the outer extremity thereof. The pulley 59 is connectible with the shaft 56 to drive the same, by means of a jaw clutch 58 manipulable by the lever 57 which also operates the valve 46.

The mechanism for varying the capacity of the granular material measuring pockets 40 by vertical adjustment of the top plate 3 and upper element 4, comprises an adjusting rod 28 having a lower threaded end engaging the upper extremity of the stationary sleeve 24 and having a thrust collar engageable with a lower inner surface formed at the upper end of the vertically movable non-rotary sleeve 25. The rod 28 may be rotated to vertically adjust the sleeve 25 relatively to the sleeve 24 by means of a hand wheel 27 which may be locked in an adjusted position by means of a clamping nut coacting with the rod 28 and with the hand wheel 27 above the latter. The sleeve 25 is fixed against rotation by virtue of its integral formation with the non-rotary top plate 3, and the locking pin 26 coacting with the two sleeves 25, 24 prevents relative rotation thereof. The top plate 3 is provided with an inspection opening which is normally closed by a pivoted cover 61 as shown in Fig. 5. The top plate 3 also forms a support for the rotary cut-off valve 62 shown in Fig. 5 and located adjacent to the discharge opening of the hopper 2. The valve 62 is positively and continuously rotated at a predetermined speed by means of a gear 63 which meshes with an annular gear 34 formed integral with the rotary upper pocket element 4 as shown in Figs. 1, 5 and 6. The details of construction of the valve 62 are substantially the same as those of the corresponding valve shown in Patent No. 1,460,198 granted June 26, 1923.

When an agitator 64 is desirable, the same may be mounted upon a shaft 66 supported in bearings in the top plate 3 and having a driving connection with the gear 34 of the rotating pocket element 4 as shown in Figs. 5 and 6. The gear 65 secured to the agitator shaft 66 meshes with an idler gear 70 mounted upon a counter shaft 69, the gear 70 in turn meshing with the gear 34. The entire filler and can transporting mechanisms are preferably supported by a simple frame 15 comprising side and cross frames of well known structure.

During normal operation of the filling machine, granular material such as peas, is being delivered in bulk to the supply hopper 2 and liquid such as brine is being admitted to the supply pipe 17 from a source of supply. Power applied to the pulley 59 is being transmitted through the clutch 58 to the power shaft 56 and pinion 55. The rotary motion of the pinion 55 is transmitted through the main bevel gear 18 to the vertical shaft 16, to the can supply and discharge mechanisms and to the can hooks 11 and hopper member 10. The rotating shaft 16 produces rotary motion of the pocket elements 7, 5, 4 by virtue of the driving head 23 thereby causing the pockets 40, 41 to pass in succession beneath the delivery openings of the hopper 2 and of the intermediate plate 6 respectively.

As the successive granular material measuring pockets 40 pass beneath the hopper discharge opening, granular material is delivered by gravity to these pockets filling the same. As the filled pockets 40 pass laterally from beneath the hopper 2, the lower inclined surface of the element 32 positively urges sufficient granular material into each pocket to fill the same and the cut off valve

62 which is being positively rotated by the rotating element 4 through the gearing 34, 63 automatically functions to separate the measured batches of material in the successive pockets 40 from the bulk of material in the hopper 2, without damaging the granules of material. The filled measuring pockets 40 are advanced over the top surface of the stationary intermediate plate 6 until they reach the discharge opening 51 whereupon the measured batches of granular material drop into the successive mixture measuring pockets 41 which are being revolved between the plates 6, 9. The pockets 41 which have thus been partially filled with granular material are subsequently brought into communication with the liquid supply grid 39 whereupon liquid is admitted from the supply pipe 17 through the valves 46, 47, 50, reserve tank 33, header 48 and passages 49, and is forced upwardly into the successive pockets 41. The liquid entering the pockets 41 from below fills the voids of the granular material and eventually completely fills the pockets 41 with mixture of granular material and liquid, the air escaping freely from within the pockets 41 through the vent 38 during such filling. When the successive pockets 41 are filled with mixture, they advance toward the discharge opening 37 through which the measured batches of mixture are automatically precipitated into the successive hoppers of the rotating member 10, the air vent 36 functioning to admit air to the successive pockets 41 during such discharge of mixture. The charges delivered to these hoppers are delivered into the successive cans 19 which have been supplied by the can feed drum 14 and which are being transported along the support 12 and guide 20 by means of the revolving can hooks 11. The successive cans 19 which are thus suitably filled with mixture are subsequently delivered from the filling machine to the closing machines in a well known manner. It will thus be noted that the successive cans 19 are automatically filled with a proper amount of mixture of granular material and liquid and that each measured batch has like proportions of ingredients.

If it is desired to vary the proportion of granular material and liquid in each batch of mixture, it is only necessary to manipulate the hand wheel 27. Rotation of the hand wheel 27 causes the adjusting rod 28 to move the sleeve 25 and top plate 3 along the central axis of the machine and relatively to the fixed sleeve 24. Such vertical movement of the top plate 3 causes similar movement of the upper pocket element 4 relatively to the lower pocket element 5 without interfering with the rotation of the elements 4, 5. The relative movement of the elements 4, 5 produces variation in the volumes of the measuring pockets 40 thereby permitting any desired variation in the proportion of ingredients constituting the final batches of mixture without interrupting the normal operation of the machine. It will be observed that as the top plate 3 and element 4 are adjusted vertically, the hopper 2 is also displaced thus making it necessary to provide a flexible or telescopic portion in the liquid supply pipe 29.

If it is desired to vary the position of the hopper element 10 relatively to the main shaft 16, it is only necessary to release the set screw 42 and to rotate the sleeve 22 by manipulation of the bearing nut 85 formed integral therewith, whereupon the screw thread coaction between the sleeve 22 and the element 10 will cause the element 10 to move along the shaft 16. The driving rods 21 however prevent relative rotation of the element 10 and shaft 16.

When the machine is operating normally, liquid is being delivered from the main supply pipe 17 through the pipe 29 to the continuous pipe 30 at the top of the hopper 2. This liquid is discharged through the lower openings 31 of the pipe 30 along the inner surface of the hopper 2 and serves to lubricate the hopper surface and to prevent sticky granules from lodging upon the hopper surface. The element 32 effectively prevents bridging of most granular materials across the hopper discharge opening, although an agitator 64 operable through gearing such as shown in Fig. 6 may be desirable when handling some kinds of material or when a small supply hopper 2 is utilized. The drip catch rim 52 effectively prevents any liquid which may leak through the joint between the top plate 3 and the pocket element 4 from flowing down the outside surfaces of the machine. Such leakage may be permitted to flow through suitable conduits into the pockets 40 in an obvious manner or may be allowed to drain directly into the pockets 41 through the intermediate plate 6. The drip catch rim 53 likewise effectively prevents liquid which may escape through the joint between the pocket element 5 and the stationary intermediate plate 6 and through the joint between the element 7 and plate 6 adjacent to the sleeve 24, from flowing down the outside surfaces of the machine. Any leakage collected within the rim 53 flows through the opening 51 into the unfilled pockets 41, as shown in Fig. 3. The outer annular wall of the liquid supply member 8 also prevents liquid which may escape from the joint between the element 8 and the grid plate 9 from flowing down the outer surface of the machine, and the integral formation of the member 8 and manifold 48 positively eliminates leaky joints between these elements. The air vents 36, 38 effectively prevent pocketing of air in the structure and enhance the efficiency and speed

of operation by permitting free escape of air during filling and discharge of the mixture measuring pockets 41, and also eliminate splashing.

The admission of liquid to the machine and the delivery of liquid to the pockets 41 is also effectively controllable. The main operating lever 57 controls the operation of the valve 46 simultaneously with the power. The flow of liquid through the pipe 17 to the manifold 48 may be sensitively regulated by adjustment of the valve 47 and this flow may be quickly cut off or established by manipulation of the valve 50. The reserve tank 33 besides establishing a desirable head and insuring a proper and constant supply of liquid, serves as a purifier for the liquid. This reserve tank 33 effectively displaces the usual complicated brine tank with objectionable float control valves therein. The plugs 54, 67, 68 permit convenient cleaning of the liquid supply conduits whenever desirable.

The entire structure may also be rapidly assembled and dismantled, the various elements of the measuring mechanism being held in place by gravity. It will be noted that by removing the hand wheel 27, the hopper 2 and top plate 3 are freely vertically removable together with the upper pocket element 4. The pocket element 5, intermediate plate 6, pocket element 7 and grid plate 9 are then successively vertically removable. The other elements of the structure are likewise readily removable thus facilitating inspection, cleaning and repairing.

The improved filler is extremely simple, compact, sanitary and efficient in every respect and is operable at comparatively high speed without damaging or wasting materials. All of the elements may be readily manufactured and the machine may be maintained in operation with minimum attention. While the device specifically described is especially adapted to fill cans with mixture of peas and brine, its adaptability for other uses is obvious.

It should be understood that it is not desired to limit the present invention to the exact details of construction and operation herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:—

1. In a filling machine, a granular material supply hopper having a lower discharge opening, an agitator within said pocket adjacent to said opening, means for directing liquid downwardly along the surface of said hopper beneath the granular material resting thereon, a series of pockets successively communicable with said opening, and means for positively urging granular material into said pockets as they pass laterally beyond said opening.

2. In a filling machine, a granular material supply hopper having a lower discharge opening, an agitator within said pocket adjacent to said opening, means for directing liquid downwardly along the surface of said hopper beneath the granular material resting thereon, a series of pockets successively communicable with said discharge opening, and a stationary element having a surface adjacent to said opening formed to positively urge material from said hopper into said pockets as they pass laterally beyond said opening.

3. In a filling machine, an annular series of granular material measuring pockets, an annular series of mixture measuring pockets located below said first mentioned series, and an annular wall circumscribing each of said series and extending upwardly above the tops of the adjacent pockets of the respective series.

4. In a filling machine, superposed annular series of measuring pockets, means for delivering material to successive pockets of the upper and lower series, and means for collecting material escaping from filled pockets and for delivering said material to unfilled pockets of the lower series.

5. In a filling machine, an annular series of measuring pockets rotatable about an axis, means for delivering liquid upwardly to successive pockets of said series, and means for collecting liquid escaping from the tops of filled pockets and for delivering said liquid to the tops of unfilled pockets of said series.

6. In a filling machine, a series of measuring pockets rotatable about an axis and having open lower ends, a stationary member having an annular wall extending from the bottom to the top of said pockets and completely surrounding said series, said wall providing means for delivering liquid upwardly into the lower ends of successive pockets, and a liquid manifold formed integral with said wall.

7. In a filling machine, a series of measuring pockets movable about a vertical axis and having open lower ends, and a member forming a cup within which said pockets are located entirely, said member having passages for delivering liquid upwardly into the lower ends of successive pockets of said series.

8. In a filling machine, a series of measuring pockets revoluble about an axis and having open lower ends, a member forming a cup within which said pockets are located entirely, said member having passages for delivering liquid upwardly into the lower ends of successive pockets of said series, and a liquid manifold formed integral

with said cup and communicating with said passages.

9. In a filling machine, a series of measuring pockets movable about an axis, means for delivering liquid upwardly into lower portions of the successive pockets, and a top plate forming a cover for said pockets and having a sector shaped air vent simultaneously communicable with a plurality of said pockets.

10. In a filling machine, superposed series of pockets movable about a common axis, a top plate coacting with the upper extremities of the upper of said series, an intermediate plate coacting with the lower extremity of the upper of said series and with the upper extremity of the lower of said series, a bottom plate coacting with the lower extremity of the lower of said series, and annular rims surrounding the surfaces of coaction between said plates and said pockets.

11. In a filling machine, an annular series of measuring pockets having a gear formed integral therewith, means for feeding granular material to successive pockets of said series, and a rotary cut-off valve for said pockets operable directly by said gear.

12. In a filling machine, an annular series of measuring pockets, means for rotating said pockets about an axis, means for feeding granular material to said pockets, a cut-off valve for intercepting delivery of material to said pockets upon advancement thereof beyond said feeding means, and gearing connecting said pockets and said valve for rotating the latter.

13. In a filling machine, an annular series of measuring pockets rotatable about an axis, a gear rotatable by said series, a hopper for delivering granular material to successive pockets of said series, and means operable directly by said gear for controlling delivery of material from said hopper to said pockets while the latter pass beyond the hopper discharge.

14. In a filling machine, a stationary top plate, an annular bearing ring secured to said plate, and a rotatable measuring pocket element supported by said ring.

15. In a filling machine, a non-rotary top plate, an annular bearing ring secured to said plate, a rotary measuring pocket element supported directly by said ring, and means for effecting vertical adjustment of said plate and of said element.

16. In a filling machine, a non-rotary plate, a measuring pocket element rotatably supported by said plate, means for effecting simultaneous vertical adjustment of said plate and of said element, and a second positively rotatable pocket element having a telescopic union with said adjustable element.

17. In a filling machine, a top plate having an upright central sleeve, a rotary pocket element having a central tubular projection extending within said sleeve, a stationary member located within said projection, and means for relatively moving said top plate and said member along said projection.

18. In a filling machine, a top plate, a rotary pocket element having a central projection penetrating said top plate, a stationary member within said projection, and an adjusting rod coacting with said member to effect adjustment of said plate along said projection.

19. In a filling machine, an annular series of measuring pockets terminating in a plane surface, a closure plate engageable with said pockets at said surface, and an annular wall formed integral with said plate and circumscribing said series of pockets, said wall extending upwardly from said surface and being of greater internal diameter than the external diameter of said series to provide a liquid collecting trough between said pockets and said wall.

20. In a filling machine, an annular series of measuring pockets formed integral with a circular movable plate, a stationary cut off plate having surface coaction with said movable plate to form a closure for said pockets, and an annular wall of greater internal diameter than the external diameter of said movable plate formed integral with said stationary plate, said wall extending beyond the surface of coaction of said plates to form a liquid collecting trough.

21. In a filling machine, superposed series of pockets movable about a common axis, an intermediate plate coacting with a lower surface of the upper of said series and with an upper surface of the lower of said series, a bottom plate coacting with a lower surface of the lower of said series, and annular walls surrounding the joints produced by the surface coaction between said plates.

22. In a filling machine, superposed series of pockets movable about a common axis, a top plate coacting with the upper surface of the upper of said series, a bottom plate coacting with the lower surface of the lower of said series, and annular walls surrounding the joints produced by the surface coaction between said plates and said series.

23. In a filling machine, superposed series of pockets movable about a common axis, a top plate coacting with the upper surface of the upper of said series, an intermediate plate coacting with the lower surface of the upper of said series and with the upper surface of the lower of said series, and annular walls surrounding the joints produced by the surface coaction between said plates and said series.

24. In a filling machine, an annular series

of hoppers movable about an axis, driving means coacting with said hoppers and located remote from said axis, and a single sleeve located between said driving means and said axis for effecting simultaneous vertical adjustment of said hoppers.

25. In a filling machine, an annular series of integrally united hoppers revoluble about an axis, driving rods for said hoppers located remote from said axis, and a single sleeve surrounding said axis and rotatable to effect simultaneous vertical adjustment of said hoppers.

In testimony whereof, the signature of the inventor is affixed hereto.

OSWALD H. HANSEN.