June 26, 1923.

1,460,198

O. H. HANSEN

CAN FILLING MACHINE

Filed Oct. 22, 1917

3 Sheets-Sheet 1

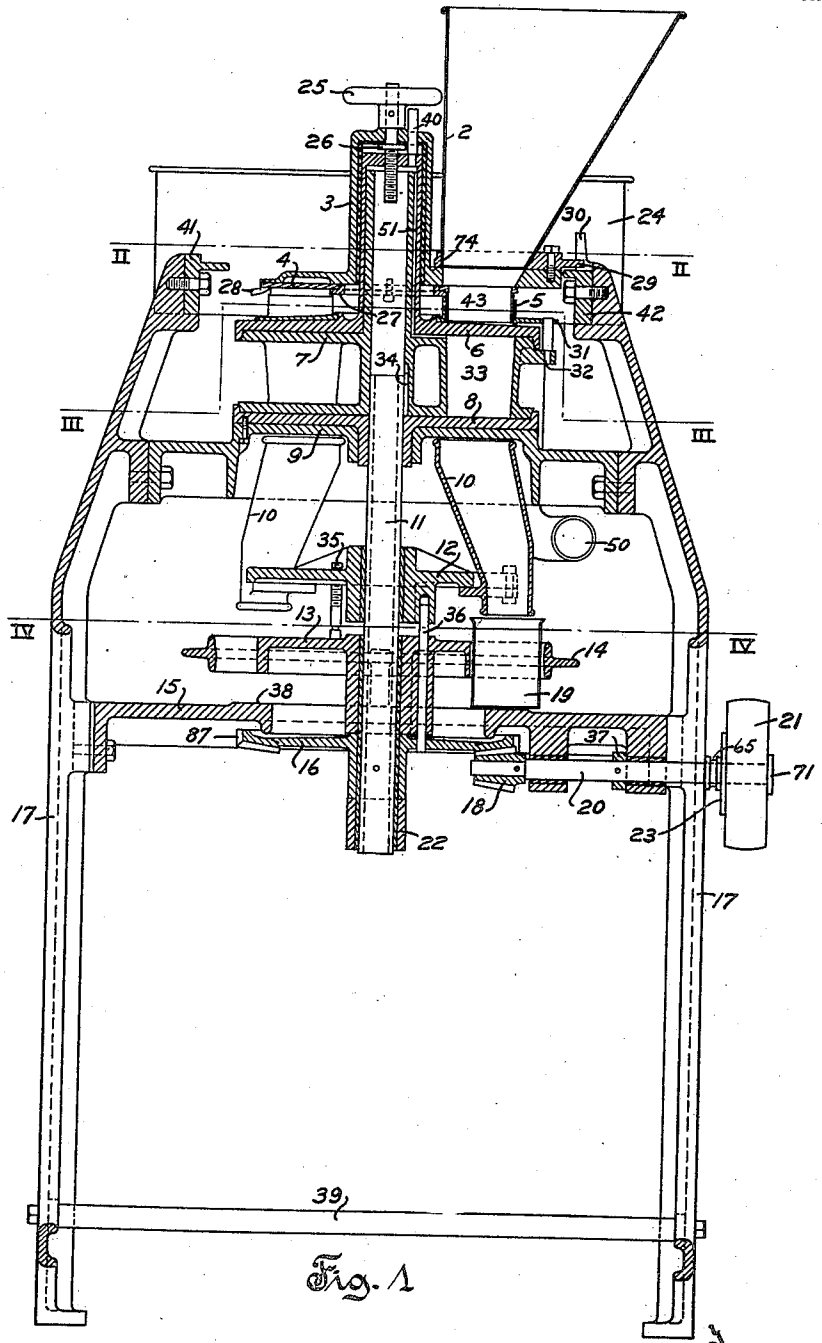


Fig. 1

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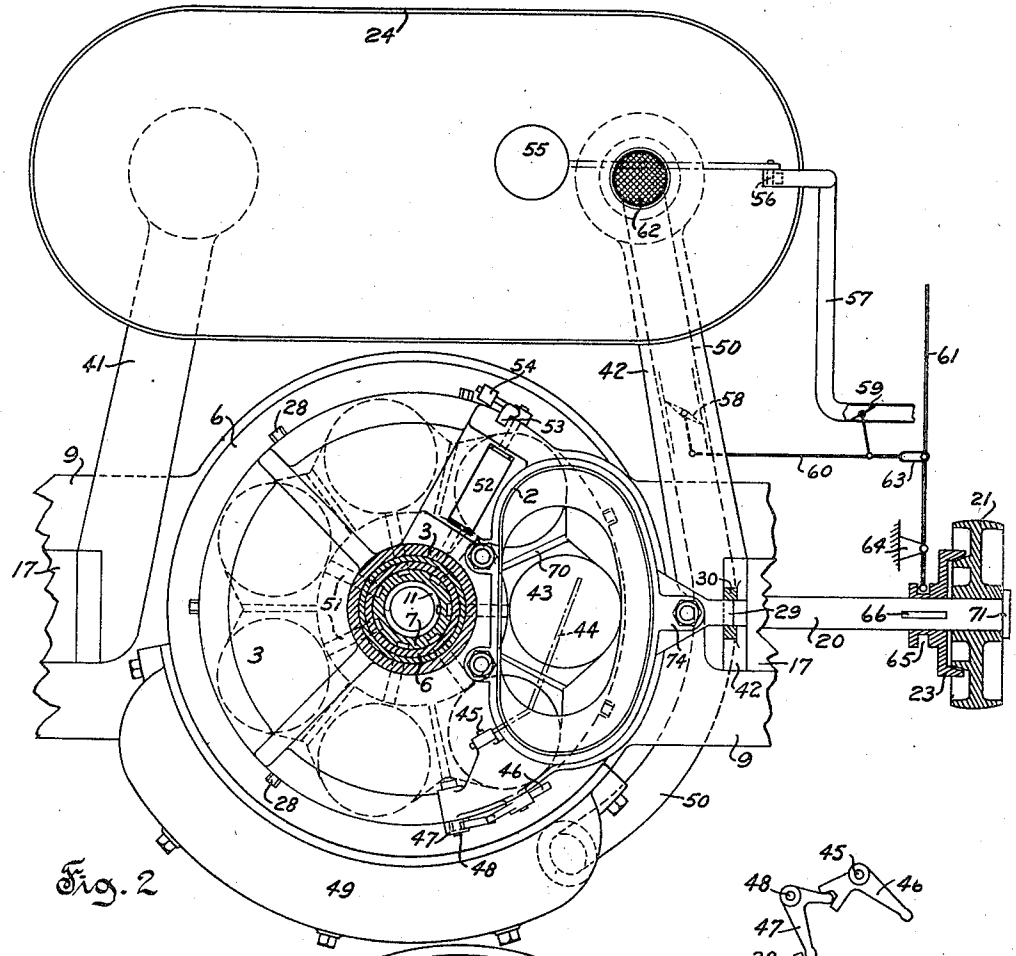


Fig. 2

Fig. 7

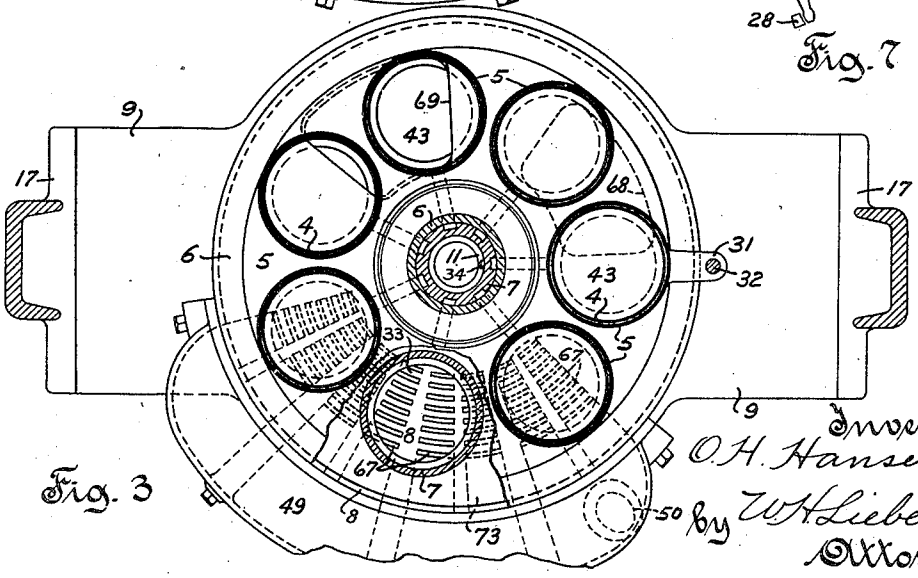


Fig. 3

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CAN FILLING MACHINE

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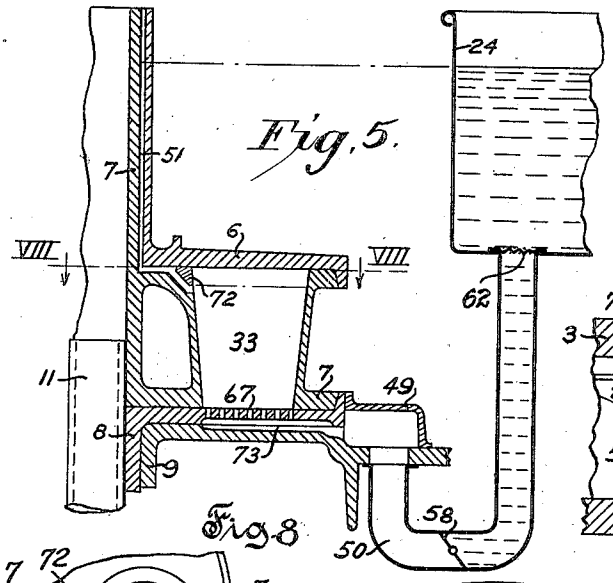


Fig. 5.

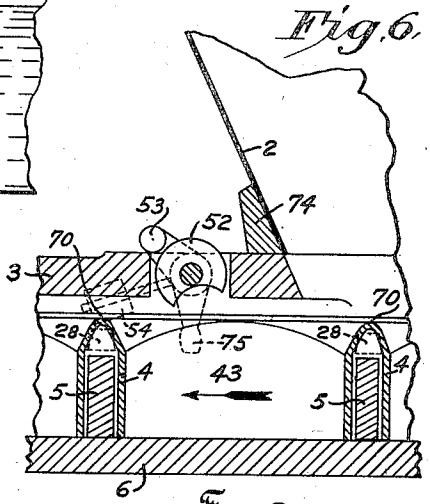


Fig. 6.

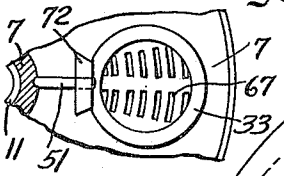


Fig. 8

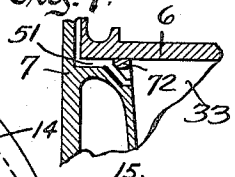


Fig. 9.

Fig. 4

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Patented June 26, 1923. 1,460,198

UNITED STATES PATENT OFFICE.

OSWALD H. HANSEN, OF PORT WASHINGTON, WISCONSIN, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO HANSEN CANNING MACHINERY CORPORATION, A CORPORATION OF WISCONSIN.

CAN-FILLING MACHINE.

Application filed October 22, 1917. Serial No. 197,809.

To all whom it may concern:

Be it known that OSWALD H. HANSEN, a citizen of the United States, residing at Port Washington, in the county of Ozaukee and State of Wisconsin, has invented a certain new and useful Improvement in Can-Filling Machines, of which the following is a specification.

This invention relates to improvements in the construction and operation of can filling machines, and has particular relation to improvements in machines for automatically fillling cans with a mixture of liquid and solids such as peas, beans, berries, and the like.

An object of the invention is to provide a can filling machine which is simple and compact in construction and efficient in operation. Another object is to simplify and improve the construction and operation of the can filling machine disclosed in Patent No. 1,188,764, granted June 27, 1916.

Some of the more specific objects of the present invention are as follows:—

To produce a sanitary, compact, simple can filling machine of maximum capacity and minimum power consumption, which may be readily and safely manipulated by a single attendant.

To provide a device which will entirely eliminate injury and waste of the substance being handled.

To provide means for automatically, accurately and rapidly proportioning and effectively mixing the materials, and for eliminating air from the mixture.

To provide mechanism for quickly and accurately adjusting the proportions of the materials in the mixture, without interrupting the operation of the machine.

To provide a machine of simplified structure which may be readily assembled and disassembled, and in which all parts are readily accessible.

To provide a filler in which danger of injury to the cans is eliminated, and in which the cans are gradually and gently delivered to, through and from the machine

To provide various other details of construction and operation which will reduce to a minimum the cost, and enhance to a maximum the efficiency of the machine.

A clear conception of an embodiment and of modifications of some of the features of the invention may be had by referring to the drawings accompanying and forming a part of this specification, in which like reference characters designate the same or similar parts in the various views.

Fig. 1, is a central vertical section through a can filling machine, showing the general construction thereof.

Fig. 2, is an enlarged transverse horizontal section through the can filling machine, taken along the line II—II of Fig. 1, the power and brine controlling mechanism being shown diagrammatically in order to simplify the disclosure.

Fig. 3, is a fragmentary enlarged transverse horizontal section through the can filling machine, taken along the irregular line III—III of Fig. 1.

Fig. 4, is a fragmentary enlarged transverse horizontal section through the can filling machine, taken along the line IV—IV of Fig. 1.

Fig. 5, is a diagrammatic fragmentary enlarged sectional view of one of the mixture measuring pockets and associated elements, showing a special device for varying the volume of the measured quantities of mixture.

Fig. 6, is an enlarged fragmentary transverse sectional view through several of the pea measuring pockets and the feed cut-off valve.

Fig. 7, is an enlarged elevation of the pea agitator actuating mechanism.

Fig. 8 is a fragmentary enlarged part-sectional top view of one of the mixture measuring pockets and associated elements, the section being taken along the line VIII—VIII of Fig. 5, looking in the direction of the arrow.

Fig. 9 is a fragmentary enlarged sectional view of one of the mixture measuring pockets and associated elements, showing a device similar to that shown in Fig. 5 for varying the volume of the measured quantity of mixture.

The term "peas" as employed in the present specification and claims, refers to any material or substance having characteristics similar to those of peas. The term "edge" as applied to the division portion between the successive pea measuring pockets, should not be limited to meaning a corner, as this

edge may be either the line of intersection of two surfaces, or one of the straight line elements of a curved surface, or even an elongated narrow strip of plane surface. While the machine herein disclosed is especially adapted to fill tin cans with a mixture of peas and brine, it should be understood that the invention is also applicable to machines for filling other types of receptacles with mixtures of other materials.

The stationary main frame of the can filling machine comprises a pair of spaced main vertical side frames 17 interconnected at their lower ends by tie rods 39, at their mid-portions by means of a horizontal frame element 15, and at their upper portions by means of a horizontal frame element 9, see Figs. 1 to 4 inclusive. A circular plate 8 is fixed to the upper central portion of the frame element 9 and forms a support for the rotary mixture measuring element 7. The element 7 comprises spaced upper and lower discs having an annular series of seven cylindrical walls between them which form the mixture measuring pockets 33. The rotary element 7 is provided with a central hub extending upwardly from the lower disc to a point some distance above the pockets 33, this hub being provided with a central through bore the lower extremity of which engages the upper end of the hollow main drive shaft 11. The main shaft 11 is drivingly connected to the element 7 by means of a key 34 or the like. Upon the upper disc of the element 7, is mounted a stationary disc element 6. The stationary elements 6, 8 are provided with recesses having circular tapered surfaces which engage the peripheries of the upper and lower discs respectively, of the element 7, thereby centering this element. The element 6 is provided with an upwardly extending bored cylindrical hub or projection which engages the outer cylindrical surface of the upper end of the hub of the element 7. A rotary pocket element 5 is mounted upon the element 6, and has a side projection 31 which engages a drive pin 32 secured to a lug on the element 7. An element 4 having seven downwardly depending cylindrical pocket walls cooperating with the element 5 and forming the walls of the pea measuring pockets 43, is rotatably mounted upon a flange of the ring 27 which is secured to the stationary top frame 3. The top frame 3 has a bore which engages the outer cylindrical surface of the upwardly extending projection of the element 6, and has secured thereto a hopper frame 74. The hopper frame 74 is provided with a lateral projection 29 which engages vertical guides 30 formed on the brine tank supporting arm 42, thereby positively preventing rotation of the frame 74 and the element 3. The pea supply hopper 2 is supported by the frame 74 and has a discharge opening communicating with the pockets 43 through an opening formed in the disc element 3. The brine tank 24 is mounted upon the supporting brackets or arms 41, 42 which are fixed to the upper extremities of the side frames 17. The pin 40 secured to the upper end of the element 6 fits an opening in the element 3 thereby preventing rotation of the element 6. The element 3, frame 74, hopper 2, pocket element 4 and ring 27 are simultaneously vertically adjustable relatively to the element 5, by means of a hand wheel 25 and a threaded rod 26 having a collar engaging the element 3 and a screw threaded portion engaging a threaded opening in the upper end of the element 6. By means of this adjusting device, the volume of the pea measuring pockets 43 may be readily altered without interrupting the normal operation of the machine.

The lower extremity of the hollow main shaft 11 is mounted in a central bearing 22 secured to the horizontal frame element 15. The upper end of the shaft 11 engages a bore providing a bearing in the stationary plate 8. The bevel gear 16 is secured to the shaft 11 and rests upon the bearing 22. A can conveying element 13 having can hooks 76, has a central bore which engages the shaft 11, and is drivingly connected to the gear 16 by means of a rod 36. An annular series of funnels 10 secured to a funnel support 12 having a central bore engaging the shaft 11, is also rotatably connected to the bevel gear 16 by means of the rod 36. The funnels 10 and funnel support 12 are vertically adjustable relatively to the rotating element 13, by means of one or more set screws 35 which engage screw threaded openings in the support 12 and have heads which abut the element 13. The cans 19 are transported or urged along an upper plane surface 38 of the frame element 15, by the can hooks 76, see Figs. 1 and 4, and are guided in a circular path by means of a curved can guide 14. The can guide 14 has three downwardly depending supporting lugs which engage an upper surface of the frame element 15, and two or more of which are bored to fit parallel upwardly extending guiding pins 77 secured to the element 15. The can guide 14 is freely vertically removable from the pins 77 in order to laterally liberate the cans 19, such liberation being desirable when an abnormal can becomes jammed between the element 13 and the guide 14.

A power cross shaft 20 mounted in bearings formed integral with the frame element 9, has a bevel pinion 18 secured thereto which meshes with the bevel gear 16. The shaft 20 has a thrust collar 37 thereon which engages an end surface of one of the shaft bearings. The outer extremity of the shaft 20 is provided with an enlargement or collar 71 which is engageable with the hub of a

driving pulley 21, see Figs. 1 and 2. A friction clutch 23 controllable by means of a manually operable lever 61 having a stationary fulcrum 64, serves to connect the pulley 21 with the shaft 20. The end of the lever 61 adjacent the shaft 20 engages a recess 65 in the movable clutch element which is drivingly connected to the shaft 20 by means of a spline 66.

The cans 19 are fed onto the plane surface 38 of the stationary frame element 15 by means of a can feed guide 80 which automatically rights the cans and feeds them to the machine in vertical position, see Fig. 4. The delivery of the cans 19 from the guide 80 to the machine, is controllable by means of a can stop 78 which is manipulable by means of a lever 79. The cans 19 are discharged from the machine by means of a rotary can discharging wheel 82 having a series of radiating can hooks 83 engageable with the successive cans 19. The wheel 82 is secured to the upper end of an upright shaft 88 to the lower extremity of which is fastened a spur gear 86 which meshes with the spur gear teeth 87 formed upon the periphery of the bevel gear 16. The cans 19 are urged over the plate 85 and along the adjustable guide 81 by means of the wheel 82.

The brine is supplied to the tank 24 by means of a pipe 57 communicating with a suitable source of brine supply which is ordinarily located on an upper floor of the canning factory, see Fig. 2. The discharge end of the pipe 57 is controlled by means of a float 55 which rests upon the liquid in the tank 24 and actuates a valve device 56. The tank 24 communicates through a screen 62 and a pipe 50, with a brine supply header or manifold 49. Brine cut-off valves 59, 58, located in the pipes 57, 50 respectively, are operatively connected by means of a connection 60 having a slotted end 63 cooperable with a pin on the control lever 61. The brine manifold 49 communicates with brine passages 73 formed between the element 9 and the plate 8, see Figs. 3 and 5. The passages 73 communicate with supply openings 67 which penetrate the plate 8 and are communicable with the lower extremities of the mixture measuring pockets 33. Communicating with the upper portion of each of the mixture measuring pockets 33, are vertical air vent passages 51 which are formed in the element 7 and extend upwardly above the level of the liquid in the brine tank 24. The vent passages communicate with the atmosphere through the opening in the hollow shaft 11. In the device disclosed in Figs. 5, 8 and 9 the level of the liquid within the pockets 33 is determined by means of insert blocks 72. By inserting insert blocks 72 of different vertical heights as shown in Figs. 5 and 9, the volume of the confined air space at the upper ends of the pockets may be varied, thereby varying the volume of the quantities of mixture measured.

The upper portions of the division walls between the successive cylindrical pea measuring pockets 43, are provided with rectilineal portions or edges 70 which extend substantially radially of the axis of the main shaft 11, see Figs. 2 and 6. These edges 70 are cooperable with a rectilineal longitudinal recess formed in the oscillatory cut-off valve 52. The valve 52 is operable by means of an actuating arm 75 and a weight 54, and is stopped in normal position by means of a valve stop 53 which cooperates with the element 3. The valve actuating arm 75 is successively cooperable with lugs 28 formed on and projecting laterally from the rotary pocket element 4 adjacent the edges 70 thereof.

The material in the hopper 2 is automatically and continuously agitated to prevent clogging of the hopper discharge opening, by means of an agitator 44 operable by bell cranks 46, 47 which are actuable by the lugs 28, see Figs. 2 and 7. The bell crank 46 is mounted upon a shaft 45 to an end of which the agitator 44 is also secured. The bell crank 46 has a recessed arm cooperable with an arm of the bell crank 47. The bell crank 47 is pivotally mounted upon the element 3 by means of a pivot shaft 48.

The stationary plate 6 is provided with an opening 69 forming means of communication between the pockets 43 and the pockets 33, see Fig. 3. The stationary plate 8 is provided with an opening 68 forming means of communication between the pockets 33 and the funnels 10. The funnels 10 are spaced from the plate 9 and also clear the tops of the cans 19.

During the normal operation of the machine, the operating lever 61 is thrown toward the extreme left as viewed in Fig. 2, connecting the power pulley 21 with the cross shaft 20 through the clutch 65, and rotating the main shaft 11 and associated elements through the gears 16, 18. The rotation of the gear 16 is also transmitted to the gear 86 through the gear teeth 87 causing the can discharge wheel 82 to rotate. After the lever 61 has been thrown to the left, the valves 58, 59 may be opened wide by moving the connection 60 to the extreme left, thereby causing brine to flow into the tank 24 through the valve device 56 from the main supply tank. As the brine level in the tank 24 rises, the float 55 gradually cuts off the brine supply admitted through the valve device 56. The tank 24 is preferably constructed of sufficient capacity so that if the main brine supply is interrupted, the supply to the cans 19 will not be immediately affected. The brine flows from the tank 24

through the pipe 50 and past the valve 58, into the manifold 49 and passages 73. The peas are fed into the hopper 2 from any suitable source, and are delivered into the revolving pea measuring pockets 43 as these pockets are successively brought into alinement with the hopper discharge opening. As the pockets 43 are carried past the hopper discharge opening, the cut-off valve 52 is automatically actuated by means of the adjacent lug 28 engaging the valve actuating arm 75, and cooperates with the adjacent pocket edge 70 to cut off the pea supply, without in any way injuring the peas. After the advancing pocket edge 70 adjacent the valve 52, has reached a predetermined position, the arm 75 disengages the adjacent lug 28 and the valve 52 is flipped back to normal position by means of the weight 54.

The advancing filled pea pockets 43 upon reaching the opening 69 in the element 6, deliver their contents into the corresponding mixture measuring pockets 33 directly below. As these pockets 33 assume positions directly above the brine openings 67, the brine enters the pockets from the manifold 49 and passages 73. The entering brine rises within the pockets 33 filling the voids between the peas and forcing the air from the pockets through the vents 51 and shaft 11. The advancing pockets 33 after being filled with the mixture of peas and brine, eventually reach a position of alinement with the opening 68 in the plate 8, whereupon the contents of the pockets 33 are successively delivered into the corresponding funnels 10 directly below. The material passing through the funnels 10 is delivered by gravity into the cans 19 which are successively transported over the surface 38 of the frame element 15 by means of the can hooks 76. The spacing of the can hooks 76 is such and the can guide 14 is so disposed, that the successive cans are placed directly in vertical alinement with the funnels 10. The filled cans 19 are gradually urged along the surface 38 and are eventually delivered to the rotating can discharging wheel 82 the hooks 83 of which take the filled cans 19 away from the hooks 76 sliding them over the plate 85 and along the guide 81, and delivering them to a conveyor which leads to the capper.

It will thus be noted that each can 19 is gradually and automatically filled with an accurately measured charge of accurately proportioned mixture of brine and peas. There are no abrupt changes in the direction of travel of the cans 19, these cans being urged along the plane surface 38 and gradually curved guide 14 and delivered from the machine, without jarring or splashing their contents, thereby eliminating waste of material and permitting operation of the machine at maximum speed with resulting maximum capacity. The cans 19 engage the adjacent transporting and guiding elements, along lines rather than surfaces and do not touch the funnels 10 as in the prior machines of this type, thereby eliminating danger of jamming. The can guide 14 may be quickly vertically removed from the pins 77, thereby laterally liberating the cans 19 if desired, since the guide 14 is held in normal position by gravity alone. The supply of cans 19 may be quickly stopped by manipulation of the lever 79. As the power and can feed controlling levers are located on the same side of the machine, a single attendant may readily manipulate the levers 61, 79 to control the operation of the entire machine. The lever 61 provides means for simultaneously stopping the brine supply and interrupting the power supply, while the slotted end 63 of the connection 60 permits application of the power without opening the brine supply controlling valves 58, 59. With this arrangement of elements, the machine may be run idly.

The entire machine is simple and compact in construction, the various elements being readily removable or accessible for inspection and cleaning. The superposed elements 3, 4, 5, 6 and 7 and the associated parts thereof, are held in normal position by gravity alone, being freely vertically removable even when the machine is in motion. The projection 29 and guides 30 form simple means for preventing rotation of the frames 74, 3 while permitting vertical adjustment thereof. The pin 40 coacting with the stationary element 3, effectively prevents rotation of the element 6. The pocket element 7 is driven by the main shaft 11 through the key 34 and transmits rotary motion to the pocket elements 4, 5 through the pin 32 and projection 31, this structure providing an effective direct drive extending across the periphery of the stationary element 6. The driving pin 36 provides simple and effective means for transmitting rotary motion from the gear 16 to the conveying element 13 and funnel support 12, at the same time permitting vertical adjustment of the funnels 10 by means of the set-screws 35. The driving mechanism for the can discharging device is simplified by forming the gear teeth 87 directly upon the periphery of the main gear 16. The main shaft 11 is preferably formed of brass tubing, the gear 16 being secured thereto by means of a transverse pin or the like.

The pea measuring pockets 43 are preferably formed cylindrical in order to facilitate manufacture thereof, while the cut-off edges 70 are preferably formed rectilineal in order to permit cooperation thereof with a cylrindical valve 52 having a rectilineal recess therein. In order to produce recti-

lineal edges 70, the cylindrical surfaces of the pockets 43 are distorted at their upper portions as shown in Fig. 6. This retilineal formation of the edges 70 and of the co-operating cut-off valve recess, produces a cut-off device which effectively accomplishes its purpose without in any way injuring the peas. The space between the valve 52 and the edges 70 and the phase relation between these elements when in motion, is such that the largest size of pea will not be crushed if lodged between the elements.

By admitting the brine at the bottom of the mixture measuring pockets 33, see Fig. 5, the liquid will readily percolate through the voids between the peas and will force the air out of the pockets through the air vents 51. The pockets 33 after receiving the proper quantity of peas, are maintained in communication with the brine supply through the openings 67, a sufficient length of time to insure admission of sufficient brine. The air vents 51 are formed in the element 7 and are readily completely accessible for cleaning, by removal of the element 6 and the elements coacting therewith. The upper extremities of the vents 51 are open to atmosphere and are located sufficient distance above high liquid level in the tank 24, to prevent overflow of brine.

The volume of the pea measuring pockets 43 may be readily varied during normal operation of the machine, by adjustment of the hand-wheel 25, see Fig. 1. Such adjustment of the hand-wheel raises or lowers the frame 6 and element 4 thereby changing the depth of the pockets 43. The volume of the quantities of mixture may be varied by inserting blocks 72 of different vertical thickness thereby varying the volume of the confined air space at the upper end of each pocket, see Fig. 5.

The provision of alternate openings 69, 67, 68 and sealing spaces in the elements 6, 8 and the utilization of seven mixture measuring pockets 33 cooperating therewith, provides an exceedingly compact construction in which the materials are effectively admitted to and discharged from the successive pockets 33, and in which leakage of liquid is eliminated. The peas are admitted to the upper ends of the pockets 33 as they approach from a sealing space, through the opening 69 in the element 6 after which the advancing pockets are sealed. As the pockets advance further the brine is admitted to the lower ends thereof. The advancing pockets are then again sealed, after which the contents are delivered to the cans 19 through the opening 68. It has been found that an annular series of seven pockets is highly desirable in order to insure proper admission and delivery of material. It is also desirable to have the lengths of the openings 68, 69, of the sealing spaces, and of the pockets 33 substantially equal, and to have the brine admission means about twice the length of each of the other openings in order to insure a full supply of brine when operating at high speed.

The peas in the hopper 2 are prevented from choking the discharge opening thereby facilitating high speed operation, by means of the automatically actuated agitator 44. This agitator is oscillated by means of the bell-cranks 46, 47 one of which engages an advancing lug 28 to swing the agitator 44 in one direction, and the other of which engages the same lug 28 to reverse the agitator motion.

The entire machine is also constructed to maintain a pleasing, symmetrical appearance, and the various elements are constructed of materials best suited to withstand the wear and tear to which they are subjected.

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

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

1. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening, a series of measuring pockets each having an opening at its lower portion normally sealed by said element, said element and said pockets being relatively movable to establish communication through said openings between said source and successive pockets of said series, and means for delivering material to said pockets when their lower openings are sealed.

2. In a filling machine, an element having an opening and a plane surface adjoining said opening, a source of liquid supply communicable with said opening, and a series of measuring pockets each having an opening at its lower portion and a plane surface adjacent thereto, said element and said pockets being relatively slidable along said plane surfaces to establish communication through said openings between said source and successive pockets of said series.

3. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening, a measuring pocket having an opening at its lower portion normally sealed by said element, and a perforated diaphragm for preventing discharge of solids through said element opening, said element and said pocket being relatively movable to establish communication between said source and said pocket through said openings and the perforations of said diaphragm.

4. In a filling machine, an element having an opening and a plane surface adjacent

thereto, a source of liquid supply communicable with said opening, a measuring pocket having an opening at its lower portion and a plane surface adjacent thereto, and a perforated diaphragm for preventing discharge of solids through said element opening, said element and said pocket being relatively slidable along said plane surfaces to establish communication between said source and said pocket through said openings and the perforations of said diaphragm, and said diaphragm having a plane surface coincident with the plane surfaces of said element and said pocket.

5. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening, a source of granular material supply, and a measuring pocket having an opening at its upper portion communicable with said source of granular material supply and having another opening at its lower portion normally sealed by said element, said element and said pocket being relatively movable to establish communication between said source of liquid supply and said pocket through said lower pocket and element openings.

6. In a filling machine, an element having an opening and a plane surface adjacent thereto, a source of liquid supply communicable with said opening, a measuring pocket having a lower opening normally out of communication with said element opening, said pocket being bodily slidable along said element surface to establish communication through said openings between said source and said pocket, and means for admitting solid material to said pocket.

7. In a filling machine, a pair of spaced elements having parallel plane surfaces and each having an opening, and a measuring pocket having surfaces slidably engageable with said plane element surfaces, said pocket having openings communicable with said element openings to admit different materials to said pocket.

8. In a filling machine, a pair of vertically spaced superimposed elements each having an opening, a source of granular material supply communicable with the upper one of said openings, a source of liquid supply communicable with the other of said openings, a measuring pocket having openings communicable with said element openings, and means for automatically relatively moving said pocket and said elements to successively admit granular material downwardly and liquid upwardly to said pocket through said element openings.

9. In a filling machine, a pair of vertically spaced elements each having an opening, said element openings being out of vertical alignment, a source of granular material supply communicating with said opening of the upper element, a source of liquid supply communicating with said opening of the lower element, and a measuring pocket having upper and lower openings successively communicable with said element openings.

10. In a filling machine, a pair of vertically spaced elements each having an opening, said element openings being out of vertical alinement, a source of granular material supply communicating with said opening of the upper element, a source of liquid supply communicating with said opening of the lower element, and a measuring pocket having upper and lower openings normally sealed by said elements and successively communicable with said element openings to admit granular material and liquid to said pocket.

11. In a filling machine, a stationary element having an opening, a source of liquid supply communicable with said opening, a series of movable measuring pockets each having an opening at its lower portion normally sealed by said element and communicable with said element opening to admit liquid from said supply source to successive pockets of said series and means for admitting solid material to said pocket.

12. In a filling machine, a stationary element having an opening and a plane surface adjoining said opening, a source of liquid supply communicable with said opening, and a series of movable measuring pockets each having an opening at its lower portion and a plane surface adjacent thereto, each of said pockets being slidable with its plane surface in contact with said element surface to establish communication through said openings between said source and successive pockets of said series.

13. In a filling machine, a stationary element having an opening, a source of liquid supply communicable with said opening, a movable measuring pocket having an opening at its lower portion normally sealed by said element, said pocket being movable along said element to establish communication between said source and said pocket through said openings, and a perforated diaphragm for preventing discharge of solids from said pocket when said communication is established.

14. In a filling machine, a pair of spaced stationary parallel elements each having an opening, and a measuring pocket laterally movable between said elements, said pocket having openings normally sealed by said elements and communicable with said element openings to admit different materials to said pocket.

15. In a filling machine, a stationary element having an opening and a plane surface adjacent thereto, a source of liquid supply communicable with said opening, a movable measuring pocket having an opening at its

lower portion and a plane surface adjacent thereto, said pocket being laterally slidable with its plane surface in contact with said element surface to establish communication between said source and said pocket through said openings, and a perforated diaphragm for preventing discharge of solids from said pocket when said communication is established, said diaphragm having a plane surface coincident with the plane surfaces of said element and said pocket.

16. In a filling machine, a stationary element having an opening, a source of liquid supply communicable with said opening, a source of granular material supply, and a movable measuring pocket having an opening at its upper portion communicable with said source of granular material supply and having another opening at its lower portion normally sealed by said element, said pocket being movable along said element to establish communication between said source of liquid supply and said pocket through said lower pocket and element openings.

17. In a filling machine, a pair of spaced stationary elements having parallel plane surfaces and each having an opening, and a movable measuring pocket having surfaces slidably engageable with said plane element surfaces, said pocket having openings communicable with said element openings to admit different materials to said pocket.

18. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening, a measuring pocket having a lower opening normally out of communication with said element opening, means for automatically relatively moving said element and said pocket to intermittently effect upward flow of liquid through said openings from said source to said pocket, and means for admitting other material to said pocket.

19. In a filling machine, a pair of vertically spaced stationary elements each having an opening, a source of granular material supply communicating with said opening of the upper element, a source of liquid supply communicating with said opening of the lower element, and a movable measuring pocket having upper and lower openings successively communicable with the openings of said upper and lower elements respectively.

20. In a filling machine, a pair of vertically spaced stationary elements each having an opening, a source of granular material supply communicable with said opening of the upper element, a source of liquid supply communicating with said opening of the lower element, and a movable measuring pocket having upper and lower openings normally sealed by said elements and successively communicable with said openings to first admit granular material and to subsequently admit liquid to said pocket.

21. In a filling machine, a series of measuring pockets, means for admitting liquid to successive pockets of said series through the lowermost portions thereof, and means for admitting granular material to successive pockets of said series.

22. In a filling machine, a series of measuring pockets revoluble about an axis, means for admitting liquid to successive pockets of said series through the lowermost portions thereof, and means for admitting granular material to successive pockets of said series.

23. In a filling machine, a series of measuring pockets having upper and lower openings, means for admitting liquid to successive pockets of said series through the lower openings thereof, and means for admitting granular material to successive pockets of said series through the upper openings thereof.

24. In a filling machine, a series of measuring pockets each having an upper and a lower opening, means for revolving said pockets about an axis, means for admitting liquid to successive pockets of said series through the lower openings thereof, and means for admitting granular material to successive pockets of said series through the upper openings thereof.

25. In a filling machine, an annular series of equal size cylindrical pockets each having an upper and a lower opening, means for revolving said pockets about the axis of annularity of said series, means for admitting liquid to successive pockets of said series through the lower openings thereof, and means for admitting granular material to successive pockets of said series through the upper openings thereof.

26. In a filling machine, a measuring pocket, means forming an elongated vertical conduit communicable with said pocket, and removable means for effecting direct lateral access to all portions of said conduit.

27. In a filling machine, a plurality of measuring pockets, means forming elongated vertical conduits communicating with said pockets, and removable means for simultaneously effecting direct lateral access to all portions of said conduits.

28. In a filling machine, an annular series of measuring pockets, a central shaft having longitudinal recesses communicating with said pockets, and an element having a bore fitting said shaft, said element forming a closure for said recesses.

29. In a filling machine, a series of measuring pockets revoluble about an axis, means for successively admitting granular material to said pockets, means for successively admitting liquid to lower portions of said pockets, and conduit means communicable

with upper portions of said pockets and extending to a point above said liquid supply means.

30. In a filling machine, a pocket, means for admitting granular material to said pocket, means for feeding liquid into the bottom of said pocket, an air vent communicable with said pocket, and means for varying the point of communication of said vent with said pocket.

31. In a filling machine, a pocket, means for feeding granular material into an upper portion of said pocket, means for feeding liquid into a lower portion of said pocket, means for confining air in the upper end of said pocket, and means for varying the volume of the air confining space.

32. In a filling machine, a measuring pocket movable about an axis, power control means for effecting movement of said pocket, cut-off means for controlling the delivery of material to said pocket while in motion, and a common manipulating device interconnecting said power control and said cut-off means whereby control of one of said means effects direct control of the other.

33. In a filling machine, a measuring pocket movable about an axis, power control means for effecting movement of said pocket, cut-off means for controlling the delivery of material to said pocket while in motion, and a common manually operable manipulating device interconnecting said power control and said cut-off means whereby control of one of said means effects direct simultaneous control of the other.

34. In a filling machine, a measuring pocket movable about an axis, power control means for effecting movement of said pocket, cut-off means for controlling the delivery of liquid to said pocket while in motion, and a common manually operable manipulating device interconnecting said power control and said cut-off means whereby disconnection of said power means effects direct simultaneous closure of said cut-off means.

35. In a filling machine, a measuring pocket, means for moving said pocket, means for feeding material to said pocket, and means for simultaneously stopping said pocket moving and said material feeding means and for effecting starting of said pocket moving means alone.

36. In a filling machine, two annular series of pockets, means for rotating one of said series about an axis, and a driving connection between said series located adjacent their outer peripheries, said connection being accessible when the machine is assembled.

37. In a filling machine, two superposed alined annular series of pockets, means for rotating one of said series about an axis, and a driving connection between said series located adjacent their outer peripheries, said connection being accessible when the machine is assembled.

38. In a filling machine, superposed pockets movable about an axis, a stationary circular element between said pockets, and a driving connection between said pockets spanning the periphery of said element, said connection being accessible when the machine is assembled.

39. In a filling machine, two superposed alined series of pockets revoluble about an axis, a stationary circular plate between said series, and a positive direct driving connection between said series, extending across the periphery of said plate remote from said axis.

40. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening, a measuring pocket normally out of communication with said element opening, power control means for effecting relative movement of said element and said pocket to establish communication between said pocket and said source through said opening, valve means for controlling the flow of liquid from said source to said opening, and a single device for directly manipulating both said power control and said valve means.

41. In a filling machine, a series of measuring pockets spaced about an axis, power control means for effecting movement of said pockets about said axis, supply means for delivering liquid to successive pockets of said series, and a single device for directly manipulating said power control and said liquid supply means.

42. In a filling machine, an annular series of measuring pockets, a clutch for effecting movement of said pockets about the axis of annularity of said series, a valve for controlling delivery of liquid to successive pockets of said series, and a single lever for directly operating said clutch and said valve.

43. In a filling machine, an annular series of measuring pockets, means for moving said pockets about the axis of annularity of said series, means for feeding material to successive pockets of said series, and means for simultaneously stopping said pocket moving and said material feeding means and for effecting starting of said pocket moving means alone.

44. In a filling machine, two superimposed annular series of movable measuring pockets, a stationary element located above one of said series, a second stationary element located between said series, and a third stationary element forming a support for said pockets, said pockets and said first and second elements being freely successively vertically removable from said supporting element.

45. In a filling machine, a hopper, an agi-

tator movable within said hopper, a series of pockets successively movable in proximity to said hopper, and means associated with each of said pockets for moving said agitator as said pockets approach said hopper.

46. In a filling machine, a hopper for granular material, an oscillatory agitator within said hopper, an annular series of movable pockets adapted to receive material in succession from said hopper, and means associated with each of said pockets for oscillating said agitator as said pockets approach said hopper.

47. In a filling machine, means providing in succession a supply opening of predetermined length, a sealing space of like length, inlet means of aggregate length substantially twice the length of said supply opening, a second sealing space equal in length to said supply opening, a discharge opening of like length, and a third sealing space of substantially like length, and a pocket equal in length to said supply opening, said means and said pocket being relatively movable to admit and deliver material to and from said pocket.

48. In a filling machine, a stationary means providing in succession a pea supply opening of predetermined length, a sealing space of like length, brine inlet means of length substantially twice the length of said supply opening, a second sealing space equal in length to said supply opening, a mixture discharge opening of like length, and a third sealing space of substantially like length, and a pocket movable along said means to admit and deliver material to and from said pocket, said pocket being of length measured in the direction of said movement equal to the length of said supply opening.

49. In a filling machine, means providing in succession a supply opening of predetermined length, a sealing space of like length, liquid inlet means substantially twice the length of said supply opening, a second sealing space equal in length to said supply opening, a discharge opening of like length, and a third sealing space of substantially like length, and a series of seven measuring pockets movable in proximity to said means to admit and deliver material to and from said pocket, each of said pockets being of length measured in the direction of said movement equal to the length of said supply opening.

50. In a filling machine, a plurality of measuring pockets movable about an axis, means for admitting material to said pockets, and means forming a single central conduit for connecting the interiors of all of said pockets with the atmosphere at all times.

51. In a filling machine, an annular series of measuring pockets, means for admitting liquid to successive pockets of said series through the lowermost portions thereof, and means forming a conduit concentric with the axis of annularity of said series, said conduit providing a vent common to all of said pockets and communicating with upper portions thereof and with the atmosphere at all times.

52. In a filling machine, a pair of elements having a space between them, each of said elements having a material inlet opening and one of said elements having a material discharge opening communicating with said space, and a measuring pocket in said space communicable with said openings.

53. In a filling machine, a pair of elements having a space between them, each of said elements having a material inlet opening and one of said elements having a material discharge opening communicating with said space, and a series of seven measuring pockets movable through said space and successively communicable with said openings.

54. In a filling machine, a pair of stationary parallel elements having a space between them, each of said elements having a material inlet opening and one of said elements having a material discharge opening communicating with said space, and an annular series of seven measuring pockets movable through said space and successively communicable with said openings to receive and measure materials and to deliver same from said space.

55. In a filling machine, means for measuring a predetermined quantity of granular material, means for forcing upwardly into the voids of said granular material just sufficient liquid to produce a predetermined quantity of homogeneous mixture, and means for delivering the mixture to a receptacle.

56. In a filling machine, means for successively measuring equal quantities of granular material, means for forcing upwardly into the voids of each measured quantity of granular material just sufficient liquid to produce equal quantities of homogeneous mixture, and means for successively delivering the quantities of mixture to receptacles.

57. In a filling machine, means for measuring a predetermined quantity of granular material, means for varying the volume of the quantity measured, means for forcing upwardly into the voids of said granular material just sufficient liquid to produce a predetermined quantity of homogeneous mixture irrespective of the volume of the quantity of granular material measured, and means for delivering the mixture to a receptacle.

58. In a filling machine, means for successively measuring quantities of granular material, means for varying the volumes of the quantities measured, means for forcing upwardly into the voids of the successive measured quantities of material just sufficient

liquid to produce equal quantities of homogeneous mixture irrespective of the volumes of the quantities of granular material measured, and means for successively delivering the quantities of mixture to receptacles.

59. In a filling machine, a measuring device, means for delivering variable quantities of granular material to said device, means for admitting upwardly into the voids of said granular material just sufficient liquid to produce predetermined quantities of homogeneous mixture irrespective of the volume of granular material first admitted, and means for delivering the mixture to a receptacle.

60. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening, a plurality of pockets each having a lower opening normally out of communication with said element opening, said element and said pockets being relatively movable to establish communication through said openings between said source and said pockets, and means for admitting solid material to said pockets.

61. In a filling machine, a stationary element having an opening, a source of liquid supply communicable with said opening, a plurality of pockets each having a lower opening normally out of communication with said element opening, said pockets being movable relatively to said element to effect upward flow of liquid through said openings from said source to the successive pockets, and means for admitting other material to said pockets.

62. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening an annular series of measuring pockets each having an opening at its lower portion normally out of communication with said element opening, said element and said pockets being relatively movable to effect upward flow of liquid through said openings from said source to said pockets, and means for admitting other material to said pockets.

63. In a filling machine, a stationary element having an opening, a source of liquid supply communicable with said opening, a revoluble series of pockets each having a lower opening normally out of communication with said element opening, said pockets during their revolution being successively communicable with said source through said openings, and means for admitting solid material to said pockets.

64. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening, a plurality of measuring pockets revoluble about an axis and each having a lower opening normally sealed by said element, said pockets being movable relatively to said element to establish communication through said openings between said source and said pockets, and means for admitting material to said pockets when said lower openings are sealed.

65. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening, an annular series of measuring pockets revoluble about an axis and each having a lower opening normally out of communication with said element opening, said pockets being movable relatively to said element to establish communication through said openings between said source and said pockets, and means for admitting solids to said pockets.

66. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening, a series of measuring pockets each having a lower opening normally out of communication with said element opening and an upper opening communicating with the atmosphere said element and said pockets being relatively movable to establish communication through said lower pocket and element openings between said source and said pockets, and means for admitting solids to said pockets.

67. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening, a series of measuring pockets each having a lower opening normally out of communication with said element opening and an upper opening communicating with the atmosphere at all times, said element and said pockets being relatively movable to establish communication through said lower pocket and element openings between said source and said pockets, and means for varying the liquid capacity of said pockets.

68. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening, a series of measuring pockets each having a lower opening, said element and said pockets being relatively movable to establish communication through said pocket and said element openings between said source and said pockets, means for varying the liquid capacity of said pockets, and means for admitting solids to said pockets.

69. In a filling machine, an element having an opening, a source of liquid supply communicable with said opening, a series of measuring pockets each having a lower opening and an upper opening, said element and said pockets being relatively movable to establish communication through said lower pocket and element openings, between said source and said pockets, and means for varying the distance between the bottoms of said pockets and the uppermost edges of said upper openings whereby the liquid capacity of said pockets is varied.

70. In a filling machine, a plurality of

measuring pockets, common means for admitting liquid to the lower portions of said pockets, conduit means connecting the upper portions of said pockets with the atmosphere, and means for adjusting the vertical distance between said admission, means and the uppermost edges of the openings from said conduit means into said pockets to vary the liquid capacities of said pockets.

71. In a filling machine, a plurality of measuring pockets movable about an axis, means for admitting liquid to the lower portions of said pockets in succession, and means forming a single conduit common to all of said pockets for connecting the interiors thereof with the atmosphere at all times.

72. In a filling machine, an annular series of movable measuring pockets, a central drive shaft for moving said pockets, means forming a vent for each of said pockets, and means forming a common chamber coaxially with said drive shaft with which all of said vents communicate, said chamber communicating with the atmosphere through said central drive shaft.

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

OSWALD H. HANSEN.