April 24, 1934. O. H. HANSEN 1,956,024

CAN FILLING MACHINE

Filed March 3, 1930 5 Sheets-Sheet 1

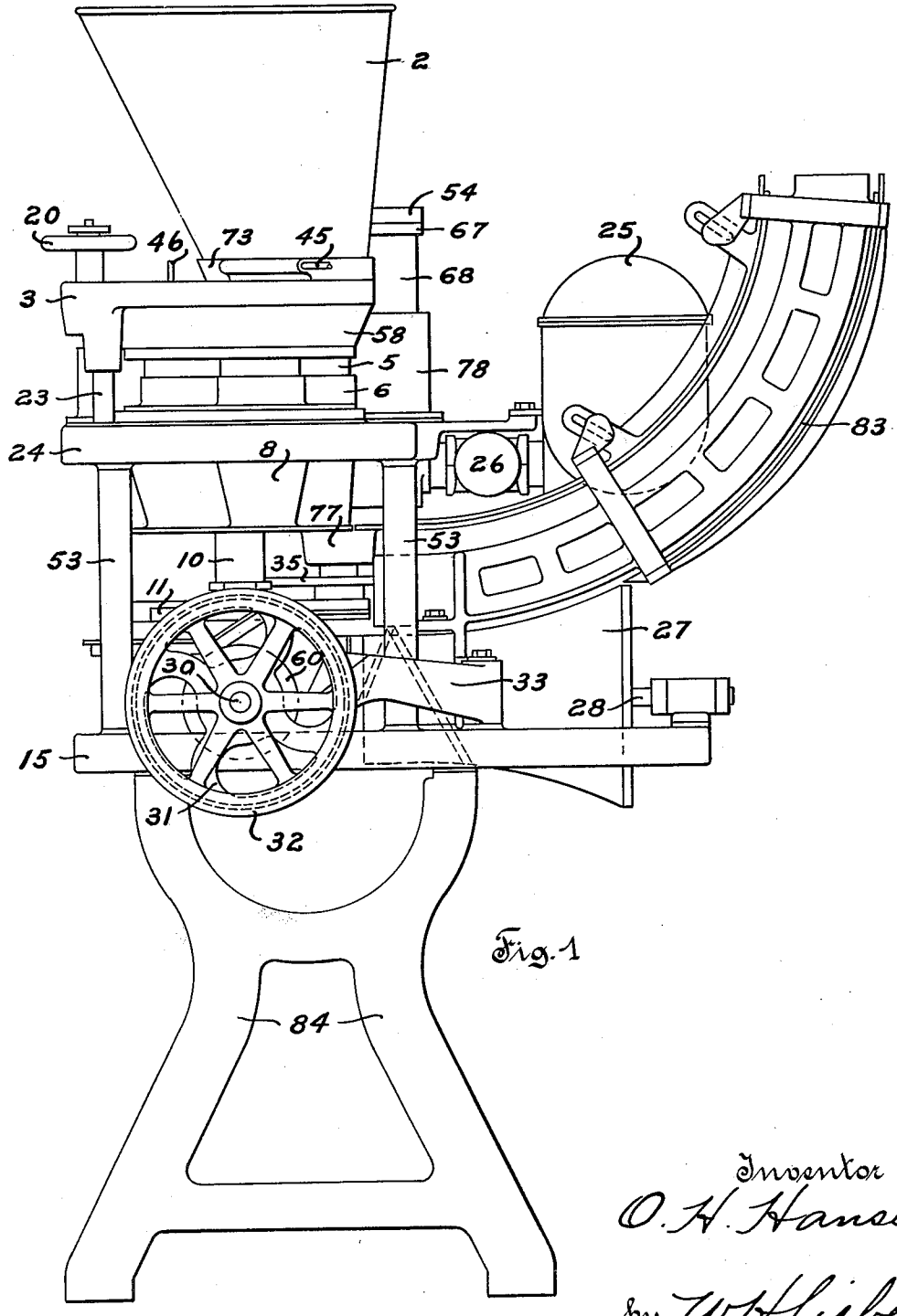


Fig. 1

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CAN FILLING MACHINE

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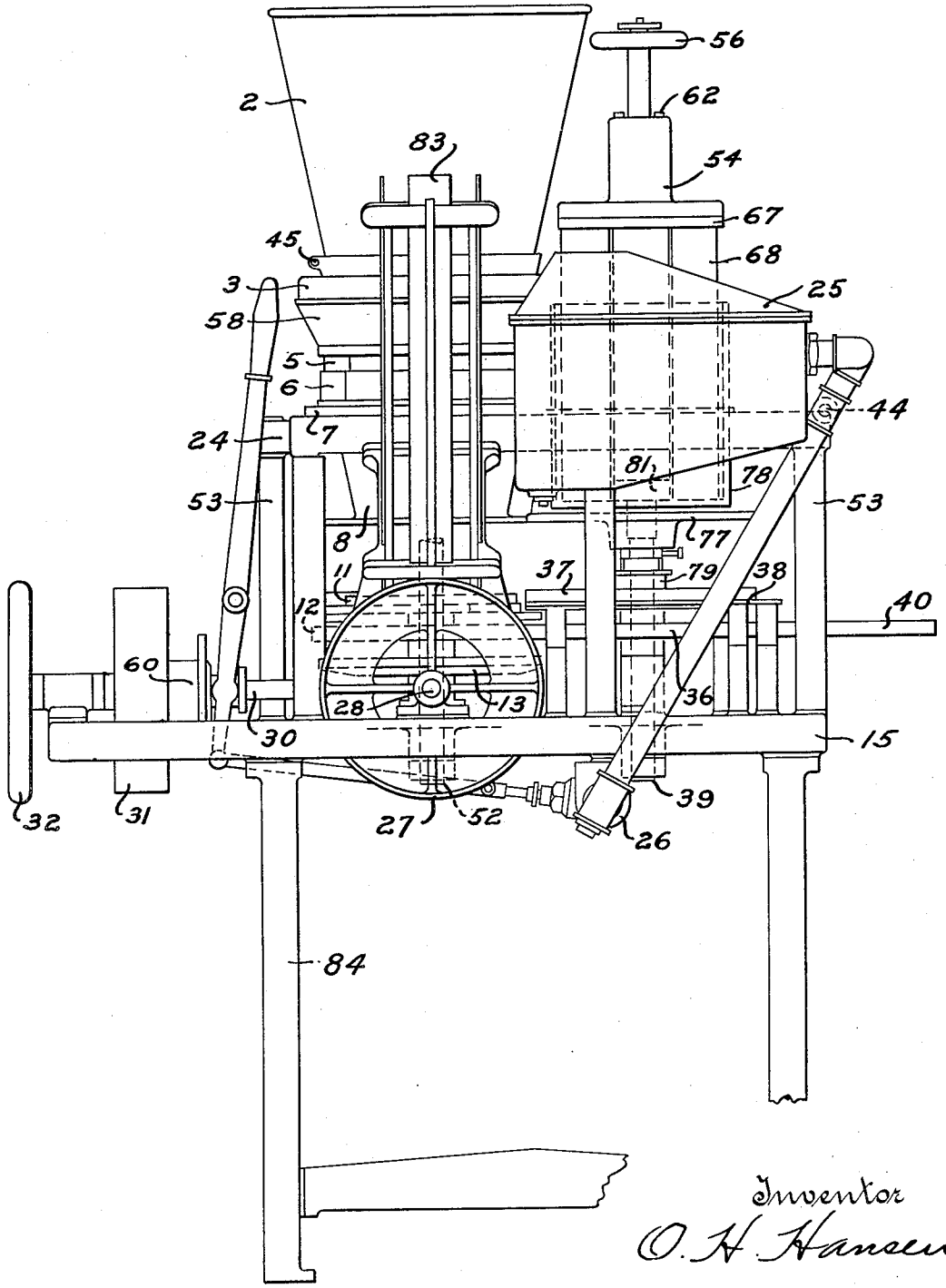


Fig. 2

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CAN FILLING MACHINE

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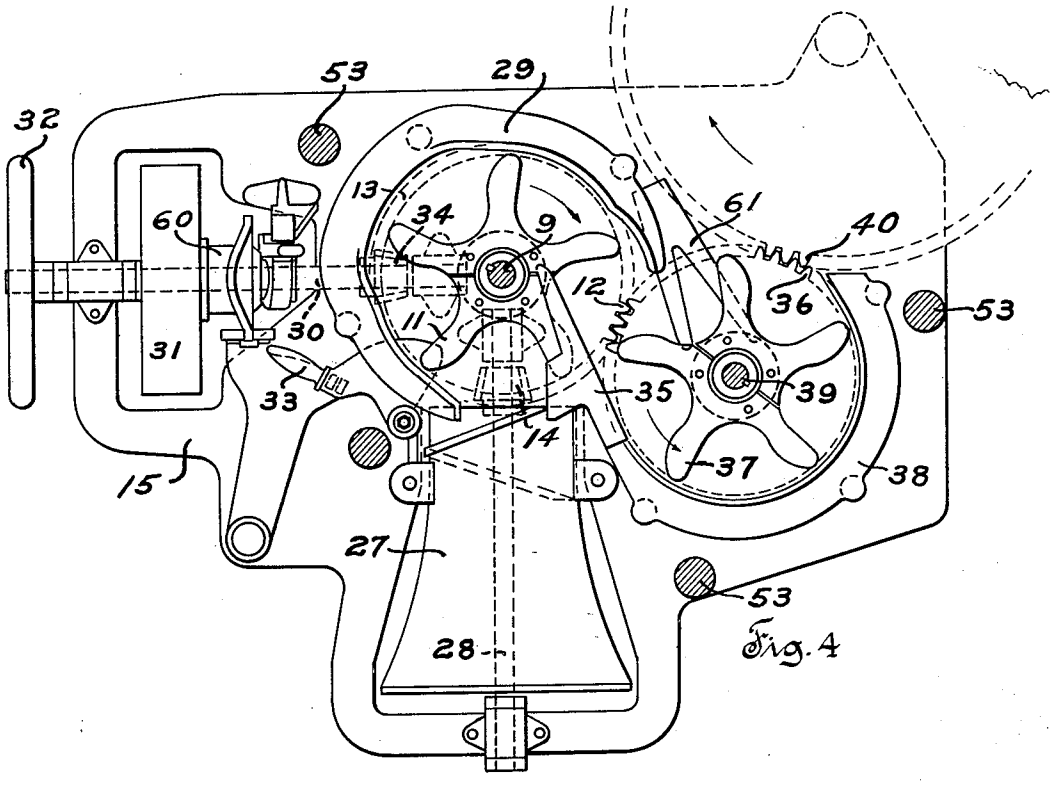


Fig. 4

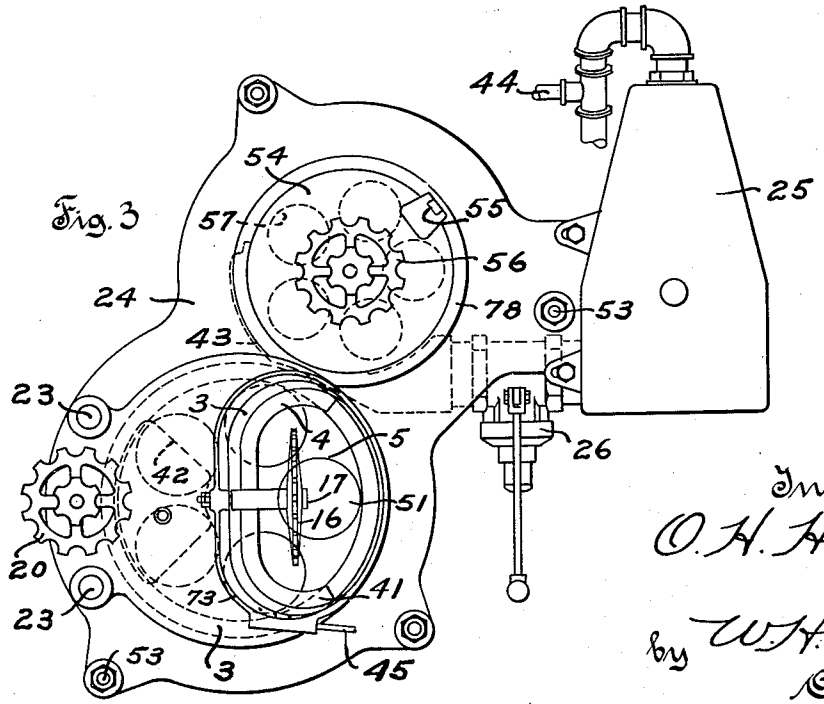


Fig. 3

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CAN FILLING MACHINE

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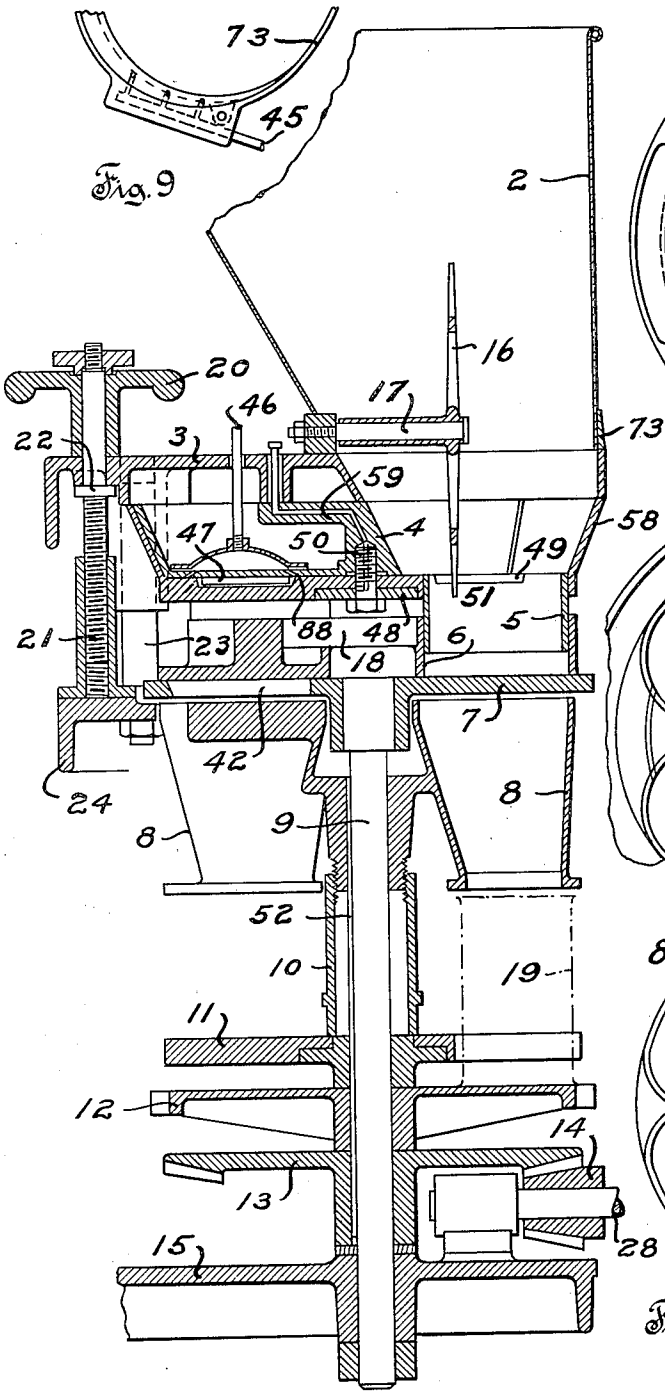


Fig. 9

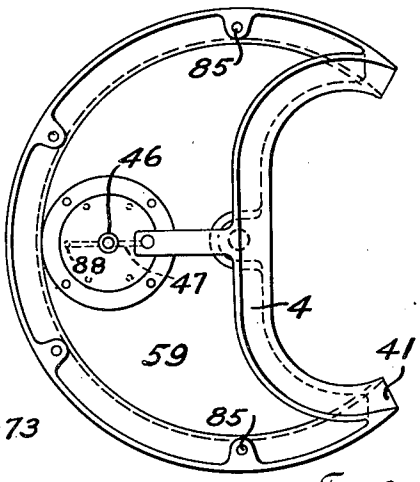


Fig. 8

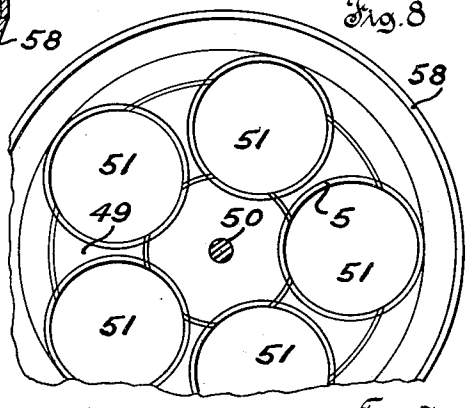


Fig. 7

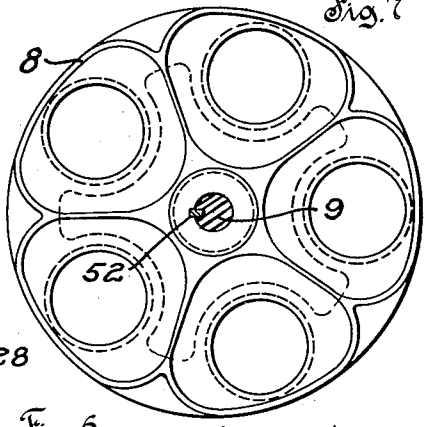


Fig. 6

Fig. 5

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CAN FILLING MACHINE

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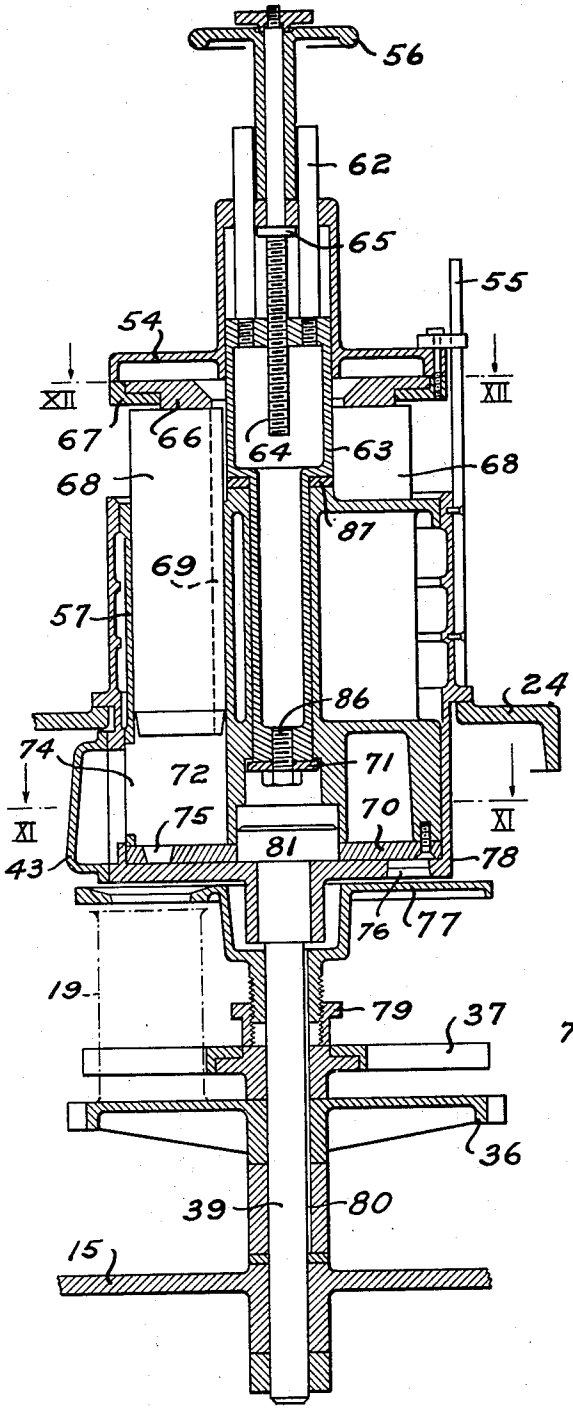


Fig. 10

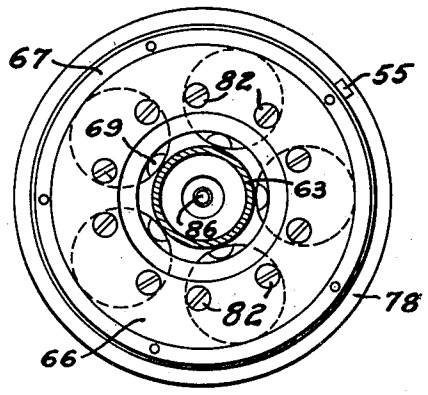


Fig. 12

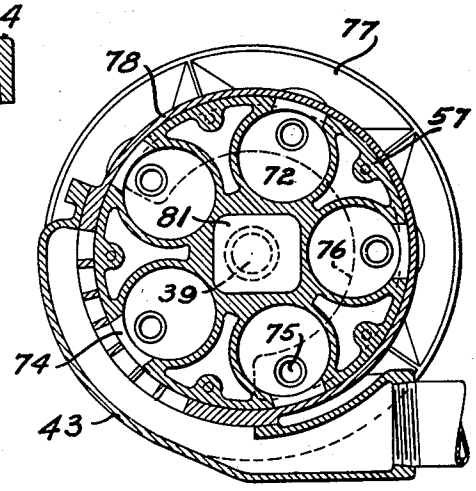


Fig. 11

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Patented Apr. 24, 1934 1,956,024

UNITED STATES PATENT OFFICE

1,956,024

CAN FILLING MACHINE

Oswald H. Hansen, Cedarburg, Wis., assignor to Hansen Canning Machinery Corporation, Cedarburg, Wis., a corporation of Wisconsin

Application March 3, 1930, Serial No. 432,608

7 Claims. (Cl. 226—72)

The present invention relates in general to improvements in the art of packing edible commodities in order to preserve the same and to permit convenient handling thereof, and relates more specifically to improvements in the construction and operation of machines for automatically measuring and delivering homogeneous equal batches of vegetables, fruit, or the like to a succession of receptacles.

A general object of the invention is to provide an improved can filling machine which is simple and compact in construction, and efficient in operation.

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

To provide mechanism for automatically and effectively feeding and measuring relatively sticky substances such as tender green peas, cut string beans, green lima beans, berries and the like.

To provide an improved filler for delivering accurately measured homogeneous batches of mixture, each comprisng equal proportions of granular material and liquid, to a succession of receptacles.

To provide an extremely sanitary can filling machine all parts of which are readily accessible for cleaning and inspection, and which may be quickly dismantled and subsequently reassembled.

To provide improved material measuring structure which may be conveniently adjusted to vary the quantities of material measured, either while the machine is in operation or at rest.

To provide a durable filling machine, the various elements of which may be accurately machined at relatively low cost, and which may be operated at high speed with resultant great capacity.

To provide mechanism for measuring and conveying relatively delicate granular substances, without undesirably mutilating the particles of material.

To provide various other improved features of construction applicable to machinery of this general class, whereby the manufacture and operation thereof is facilitated.

These and other objects of the present invention, will be apparent from the following detailed description.

Some of the novel features specifically applicable to liquid fillers, disclosed but not claimed herein, form the subject of divisional application Serial No. 575,318, filed November 16, 1931.

A clear conception of embodiments of the various novel features of the invention and of the mode of constructing and operating machines built in accordance therewith, 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 several views.

Fig. 1 is a side elevation of the improved can filling machine, looking toward the driving mechanism thereof.

Fig. 2 is a front view of the improved can filling machine, looking toward the can supply.

Fig. 3 is a top view of the supply and measuring mechanisms for the materials.

Fig. 4 is a top view of the driving and can conveying mechanisms.

Fig. 5 is a fragmentary vertical section through the granular material measuring and feeding mechanism.

Fig. 6 is a top view of the discharge hopper element.

Fig. 7 is a fragmentary top view of the upper pocket forming element.

Fig. 8 is a top view of the improved fixed hopper discharge element.

Fig. 9 is a fragmentary top view of the lower hopper retaining member.

Fig. 10 is a fragmentary vertical section through the liquid measuring and feeding mechanism.

Fig. 11 is a horizontal section through the lower portion of the liquid measuring and feeding mechanism, the section being taken on the line XI—XI of Fig. 10.

Fig. 12 is a horizontal section through the upper portion of the liquid measuring and feeding mechanism, the section being taken on the line XII—XII of Fig. 10.

The improved can filling machine specifically shown in the drawings, comprises in general a stationary frame assemblage consisting of an upper frame 24 and a lower frame 15 disposed in substantially parallel vertically spaced relation to each other; granular material measuring and feeding mechanism associated with one portion of the frame assemblage; liquid measuring and feeding mechanism associated with another portion of the frame assemblage; mechanism associated with the lower frame 15 for transporting cans 19 to, through and from the machine; and means for actuating the several mechanisms in properly timed relation to each other. The upper frame 24 is rigidly but detachably supported upon the lower frame 15, by means of a series of upright struts 53, and the lower frame 15 is sup-

ported at a suitable height from the floor level, by means of supporting frame structure 84, as shown in Figs. 1 and 2.

The granular material measuring and feeding mechanism is shown in detail in Figs. 3, 5, 6, 7 and 8, and comprises a stationary hopper 2, an annular movable series of five measuring pockets 51 successively communicable with the discharge opening of the hopper 2, a fixed plate 7 beneath the pockets 51 and having a discharge opening 42 for permitting free delivery of the contents of the successive measuring pockets 51, and an element 8 forming an annular movable series of five chutes located below the plate 7, the chutes of the element 8 being disposed in vertical alinement with the pockets 51. The upper portion of the hopper 2 is secured to a base 73 which is attached to a vertically adjustable non-rotary top plate 3 having an upper element 59 secured to the bottom thereof by cap screws coacting with openings 85. The plate 3 and element 59 are simultaneously vertically adjustable along parallel upright fixed guides 23 by means of a hand wheel 20 attached to an adjusting screw 21 having a lower threaded portion coacting with a threaded socket secured to the upper frame 24, and a vertically movable lifting collar 22 engaging the bottom of the plate 3. The element 59 of the hopper, has a side recess bounded by a fixed downwardly and outwardly inclined material conducting surface 4, and is provided with a stationary scraper 41 as shown in Fig. 8. The lower plane surface of the element 59 coacts with a rotary upper pocket forming member 5 having recesses 49 at the top thereof cooperating with the plane surface of the element 59 to provide an annular conduit as shown in Figs. 5 and 7. The element 59 is provided with a depending projection 47 disposed within the conduit formed by the recesses 49, directly above the material discharge opening 42. The member 5 is vertically adjustable with the element 59, and is provided with an integral annular upwardly flaring wall 58 with the interior of which the scraper 41 is closely cooperable, and which provides a movable material conducting surface on the side of the hopper discharge, opposite to the fixed surface 4. The member 5 is rotatably suspended from the element 59 by means of a central thrust plate 48 detachably secured to the element 59 by means of a cap screw 50, and the element 59 is provided with a peripheral surface snugly fitting the inner surface of the wall 58. A star wheel agitator 16 is rotatably supported within the discharge portion of the hopper 2 by means of a fixed bearing shaft 17, and is rotatable directly by the advancing pocket separating walls of the upper member 5.

The hopper base 73 may be provided with a brine supply connection 45 and has a series of orifices communicating with the connection 45 to deliver a film of liquid over the surface 4 adjacent to the scraper 41. The element 59 may also be provided with a brine supply connection 46 communicable with orifices 88 adjacent to the projection 47 so as to deliver a film of liquid along the surfaces of the moving pockets 51.

The upper member 5 is provided with integral pocket forming liners which project downwardly within and snugly fit alined openings in the lower pocket forming member 6. The lower member 6 is rotatably supported directly upon the fixed plate 7, and the upper member 5 is vertically adjustable relative to the lower member 6 as previously described, in order to vary the volumes of the pockets 51. The members 5, 6 are simultaneously revolvable about a vertical axis by means of a drive shaft 9 having a driving head 18 at its upper end coacting with an eccentric polygonal recess, as shown in Fig. 5. The discharge chute element 8 is revolvable directly beneath the plate 7 by means of a spline 52 carried by the shaft 9, and is vertically adjustable along the shaft 9 and spline 52 by means of an adjusting sleeve 10 the upper end of which has screw thread coaction with the hub of the element 8, and the lower end of which rests upon a set of can hooks 11. The can hooks 11 are also rotatable by the shaft 9 through the spline 52, and rest upon a rotary can support 12 having a toothed periphery, see Figs. 4 and 5. The support 12 rests upon a bevel gear 13 which is adapted to impart rotary motion to the shaft 9 through the spline 52, and the bevel gear 13 coacts directly with a thrust plate carried by the lower frame 15. The can hooks 11 are so positioned relative to the discharge openings of the chutes of the element 8, that the cans 19 will be conveyed with their upper ends directly below these openings, and the vertical adjustability of the element 8 accommodates cans of various heights.

The liquid measuring and feeding mechanism is shown in detail in Figs. 3, 10, 11 and 12, and comprises a brine supply tank 25 adapted to deliver the liquid past a control valve 26 to a manifold 43, and an annular series of five brine measuring pockets 72 successively communicable with the manifold 43 through lateral lower inlet openings 74 and having bottom discharge openings 75, and a cup shaped casing having an arcuate delivery opening 76 for permitting free discharge of the contents of the successive measuring pockets 72 through the openings 75. The brine supply line may be provided with a take-off connection 44 for conducting liquid to the connections 45, 46 of Figs. 5 and 9. The pockets 72 are formed in an element 57 having a bottom plate 70 in which the openings 75 are formed, these parts snugly fitting and being rotatable within the stationary cup shaped casing 78 which is supported upon the upper frame 24. Vertically adjustable within each of the pockets 72, is a displacement plunger 68; the upper extremities of all of the plungers 68 being rigidly attached to a rotary adjusting plate 66 by means of screws 82, thereby making all of the plungers simultaneously adjustable. The top plate 66 is rotatably supported upon an annular bearing 67 detachably associated with an upper adjusting element 54 which is freely vertically movable, but fixed against rotation by means of a guide 55. The element 54 is adjustable upon a stationary central member 63 having parallel guide rods 62 projecting upwardly therefrom through openings in the upper extremity of the element 54, by means of a hand wheel 56 secured to a rod 64 having screw threads cooperable with a threaded opening in the member 63 and carrying a lifting collar 65 coacting with a bottom surface of the element 54. The medial portion of the central member 63 rests upon a thrust plate 87, and the lower end of the member 63 is provided with a retaining plate 71 held in place by a cap screw 86 and serving to facilitate removal of the pocket forming element 57 from within the casing 78. Each of the plungers 68 is also provided with an air vent 69 extending along the side thereof adjoining the central member 63, and the lower extremity of the plungers may be formed as

shown, in order to permit entry of brine to the pockets 72 when the plungers 68 are in contact with the plate 70, or nearly so.

The pocket forming element 57, the lower plate 70 and the plungers 68 are simultaneously revolvable about a vertical axis by means of a drive shaft 39 having a driving head 81 at its upper end coacting with an eccentric polygonal recess, as shown in Figs. 10 and 11. A splash prevention plate 77 is revolvable directly beneath the casing 78 by means of a spline 80 carried by the shaft 39, and is vertically adjustable along the shaft 39 and spline 80 by means of an adjusting sleeve 79 the upper end of which has screw thread coaction with the hub of the plate 77, and the lower end of which rests upon a set of can hooks 37. The can hooks 37 are likewise rotatable by the shaft 39 through the spline 80, and rest upon a rotary can support 36 having peripheral teeth meshing with the teeth at the periphery of the can support 12. The can support 36 is supported upon the lower frame 15 through an intervening bushing as shown in Fig. 10. The can hooks 37 are so positioned that the cans 19 will be conveyed with their upper ends directly in line with and beneath the openings in the splash plate 77, and this plate may be adjusted to cooperate with cans of various heights.

The mechanism associated with the lower frame 15 for transporting the successive cans to, through and from the machine, is shown in detail in Figs. 1, 2 and 4, and comprises a stationary can chute 83 formed to deliver the successive empty cans 19 upon a rotary tapered feed drum 27 mounted upon a horizontal shaft 28. The shaft 28 is continuously rotatable by means of a bevel pinion 14, secured to an end thereof, and is adapted to feed the cans upon the support 12 between successive arms of the can hooks 11. The can hooks 11 and the support 12 cooperate with a fixed can guide 29 to convey the cans 19 in succession around the axis of the shaft 9 until they engage a fixed delivery guide 35 formed to feed the cans upon the support 36 between the arms of the can hooks 37. The can hooks 37 and the support 36 cooperate with a fixed can guide 38 to convey the cans 19 in succession around the axis of the shaft 39 until they engage a fixed discharge guide 61 formed to deliver the cans upon a discharge plate 40 driven by the peripheral teeth of the support 36. The drum 27, supports 12, 36, hooks 11, 37, and plate 40, are operated at proper speeds so as to convey the cans 19 in succession in properly timed relation to the measuring and feeding mechanisms.

The driving mechanism for actuating the several mechanisms in properly timed relation to each other, is shown in detail in Figs. 1, 2 and 4, and comprises a main horizontal drive shaft 30 adapted to be rotated by means of a pulley 31 through a clutch 60. The drive shaft 30 may also be manually operated by a hand wheel 32, and the clutch 60 is operable by means of an automatic stop 33 in order to throw off the power when the feed drum 27 fails to deliver a can 19 to the machine while in operation. A bevel pinion 34 carried by the inner end of the power shaft 30 meshes with the bevel gear secured to the upright shaft 9, thereby imparting motion to this shaft.

During normal operation of the improved can filling machine, the driving mechanism just described is functioning to rotate the vertical shaft 9 through the bevel gearing 34, 13, and the can support 12 is imparting rotary motion to the vertical shaft 39 through the can support 36. The rotary shafts 9, 39 impart rotary motion to the measuring pockets 51, 72 respectively through the driving heads 18, 81, and the can feed drum 27 is being rotated to deliver the cans 19 in succession to the revolving support 12. The hopper 2 is supplied with granular material, and the brine supply tank 25 is delivering liquid to the manifold 43 past the control valve 26.

As the successive pockets 51 pass beneath the hopper 2, they are filled with granular material whereupon they advance beneath the lower plane surface of the fixed upper element 59. When the filled pockets reach the discharge opening 42, they are entirely cut off from the hopper 2, and the measured batches of granular material are delivered by gravity through the opening 42 and through the funnels of the element 8 to the successive cans 19 positioned directly beneath these funnels. The partially filled cans are then transferred from the support 12 to the support 36 by means of the guide 35, preparatory to being supplied with measured batches of liquid. As the successive pockets 72 pass the supply openings of the manifold 43, they are filled with liquid entering through the lateral inlet openings 74. The liquid filled pockets 72 advance about the axis of the shaft 39 until the openings 74 are cut off from the brine supply, whereupon the lower discharge orifices 75 of the pockets are brought into communication with the arcuate discharge opening 76 of the casing 78 and the measured batches of liquid are delivered by gravity into the successive partially filled cans 19 through the openings in the splash plate 77. The cans are thus properly filled with batches of mixture each comprising like proportions of granular material and liquid, and are subsequently delivered from the machine by means of the rotating discharge plate 40.

If it is desired to vary the volumes of the batches of granular material measured, it is only necessary to manipulate the hand wheel 20. This may be done either while the machine is in operation, or at rest. Rotation of the wheel 20, simultaneously raises or lowers the hopper 2, the fixed elements 3, 59 and the revolving pocket forming member 5, thereby varying the volumes of the pockets 51. If it is desired to vary the volumes of the batches of liquid measured, it is only necessary to manipulate the hand wheel 56 either while the machine is in operation or at rest. Rotation of the wheel 56, simultaneously raises or lowers the fixed element 54, the bearing 67, the revolving plate 66 and the revolving plungers 68, relative to the stationary central element 63, thereby varying the volumes of the pockets 72. The volumes of the measured batches of mixture and the relative proportions of solids and liquid in each batch, may thus be quickly and accurately varied.

By providing the discharge portion of the hopper 2 with relatively fixed and movable opposite surfaces 4, 58, bridging of granular material across the hopper discharge, is effectively eliminated. The rotary agitator 16 also serves to prevent bridging of the material, and the flushing liquid admitted through the connection 45 provides a liquid film along the hopper discharge surface which prevents sticky granules from accumulating upon this surface. The scraper 41 functions to maintain the inner surface of the wall 58 clean, and the recesses 49 permit the successive pockets 51 to clear the outlet from the hopper 2 without damaging the granules of ma-

terial. The projection 47 located above the discharge opening 42, removes granular material from the advancing recesses 49 and also serves to urge the granular material from within the pockets 51 downwardly through the opening 42. The liquid film produced upon the walls of the successive pockets 51 by delivery of brine from the pipe 46 through the orifices 88, also prevents sticky substances from lodging upon the pocket bounding surfaces. It will thus be apparent that the granular material measuring mechanism is especially constructed and adapted to handle relatively sticky material without danger of clogging.

The entire mechanism is moreover conveniently accessible for inspection and cleaning. When the hand wheel 20 is removed from the adjusting screw 21, the hopper 2, and the upper element 3 are freely removable, whereupon the fixed element and the upper pocket forming member 5 may be freely vertically removed from the lower pocket forming member 6. The element 59 and the member 5 may then be disconnected by removing the cap screw 50. The lower pocket forming member 6 may be removed with the shaft 9, or the shaft may be withdrawn without disturbing the member 6. After the member 6 has been removed, the fixed plate 7 may be freely withdrawn.

The entire movable portion of the liquid measuring mechanism may be freely vertically removed from within the casing 78 by merely lifting upwardly upon the hand wheel 56. When the hand wheel 56 is removed from the adjusting screw 64, the top element 54, the bearing 67, the revolving plate 66 and the plungers 68 may be simultaneously removed from the pockets 72 and the fixed element 63. The central element 63, the pocket forming member 57 and the bottom plate 70 may be subsequently simultaneously removed from the casing 78 and the driving head 81, whereupon the element 63 and the member 57 may be separated by releasing the cap screw 86. Removal of the shafts 9, 39, simultaneously releases the elements associated with these shafts between the frames 24, 15.

The measuring pockets 51, 72 are located closely adjacent to their axes of revolution, as are also the recesses between the can hooks 11, 37, thereby permitting operation of the machine at high speed. The discharge openings 75 are located eccentric relative to the cylindrical pockets 72 thereby permitting disposition of these pockets close to the axis of revolution, and the vents 69 permit rapid and complete filling of the successive pockets 72 with liquid. The adjustable splash plate 77 may be positioned closely adjacent to the tops of the cans 19 in order to prevent liquid from splashing out of the filled cans, and is formed to drain drippings into the cans.

All elements of the structure may obviously be accurately machined at minimum cost, and the machine is entirely automatic and continuous in operation, having enormous capacity.

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

It is claimed and desired to secure by Letters Patent:

1. In a filling machine, an annular series of measuring pockets movable about an axis, an annular wall movable with said pockets and having an inclined guiding surface for conducting material into said pockets, and a hopper having a fixed oppositely inclined guiding surface cooperable with said movable wall surface to deliver material into the successive pockets of said series.

2. In a filling machine, an annular series of measuring pockets revolvable about an axis, a wall formed integral with said pockets and having a continuous annular inclined surface for conducting material into said pockets toward said axis, a hopper having a guiding surface within said continuous surface and cooperable therewith to deliver material into the successive pockets of said series, and a scraper formed integral with said hopper and coacting with said continuous surface.

3. In a filling machine, a series of movable measuring pockets, a hopper having guiding surfaces for delivering material to the successive pockets of said series, one of said surfaces being fixed and another being movable with said pockets, and a rotary agitator disposed within said hopper between said surfaces.

4. In a filling machine, a series of movable measuring pockets, a hopper having oppositely disposed guiding surfaces for delivering material to the successive pockets of said series, one of said surfaces being fixed and the other being movable with said pockets, and an agitator disposed within said hopper between said surfaces, said agitator being rotatable by direct coaction with said pockets while in motion.

5. In a filling machine, a fixed element having a plane lower surface and a side recess, a member forming a series of pockets, said member being movable in contact with said surface and having recesses therein coacting with said surface to provide a continuous annular conduit connecting said pockets, and a hopper for delivering material to said pockets through said side recess.

6. In a filling machine, a member forming an annular series of measuring pockets movable about an axis, said member having a series of recesses connecting the upper portions of said pockets and forming an annular depression, a hopper for feeding material into said pockets adjacent to said depression, means providing a discharge opening beneath said pockets, and a fixed projection extending into said depression above said opening.

7. In a filling machine, an annular series of movable measuring pockets, a hopper for delivering granular material downwardly into the successive pockets of said series, means for delivering a film of liquid along the surfaces at the discharge portion of said hopper, a member providing a discharge opening beneath said pockets, and means for delivering a film of liquid along the surfaces of said pockets as they pass said opening.

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