

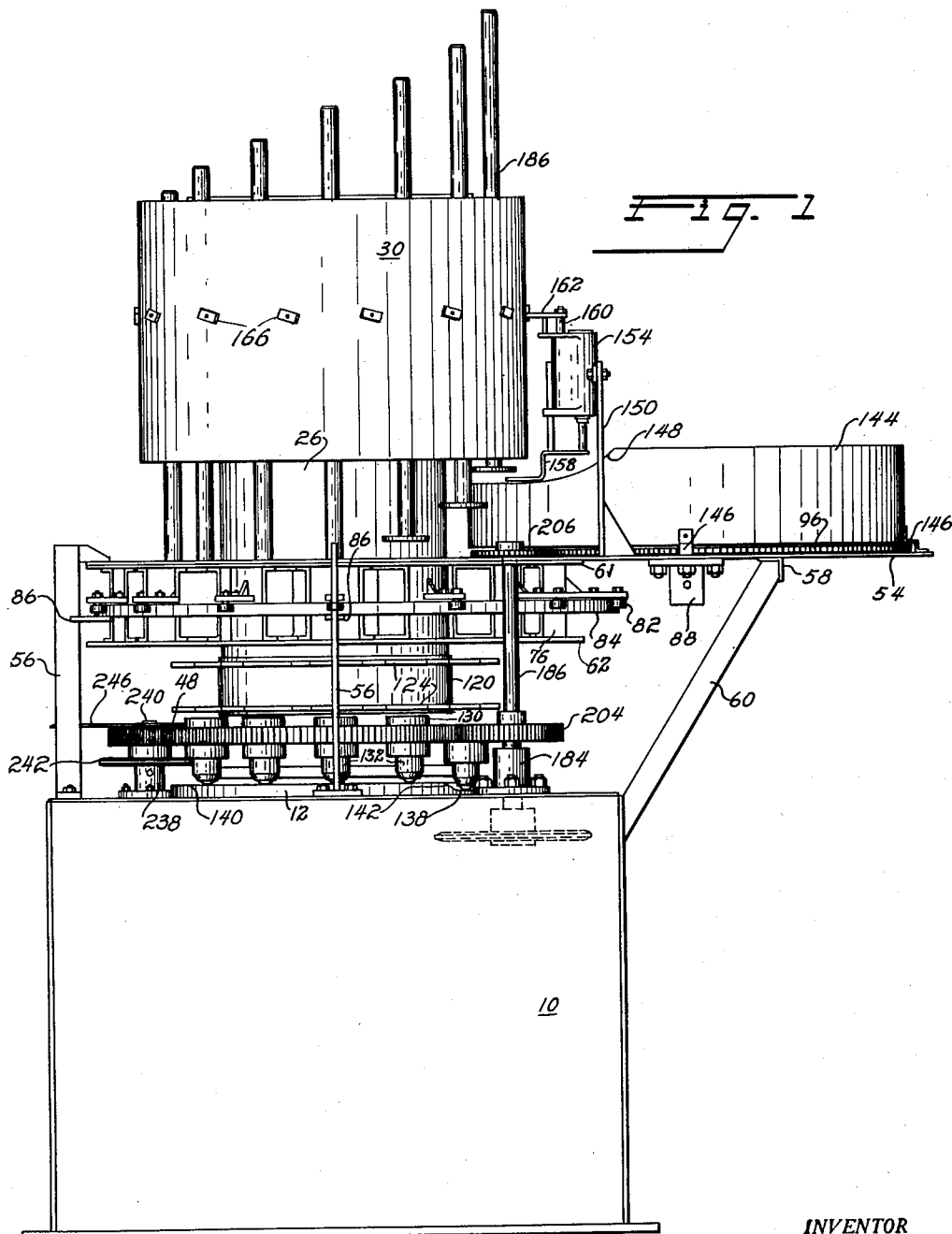
July 7, 1953

O. D. VELIE
CAN FILLING MACHINE

2,644,629

Filed May 8, 1946

4 Sheets-Sheet 1



INVENTOR
ORVILLE D. VELIE

BY

Strauch & Hoffman
ATTORNEYS

July 7, 1953

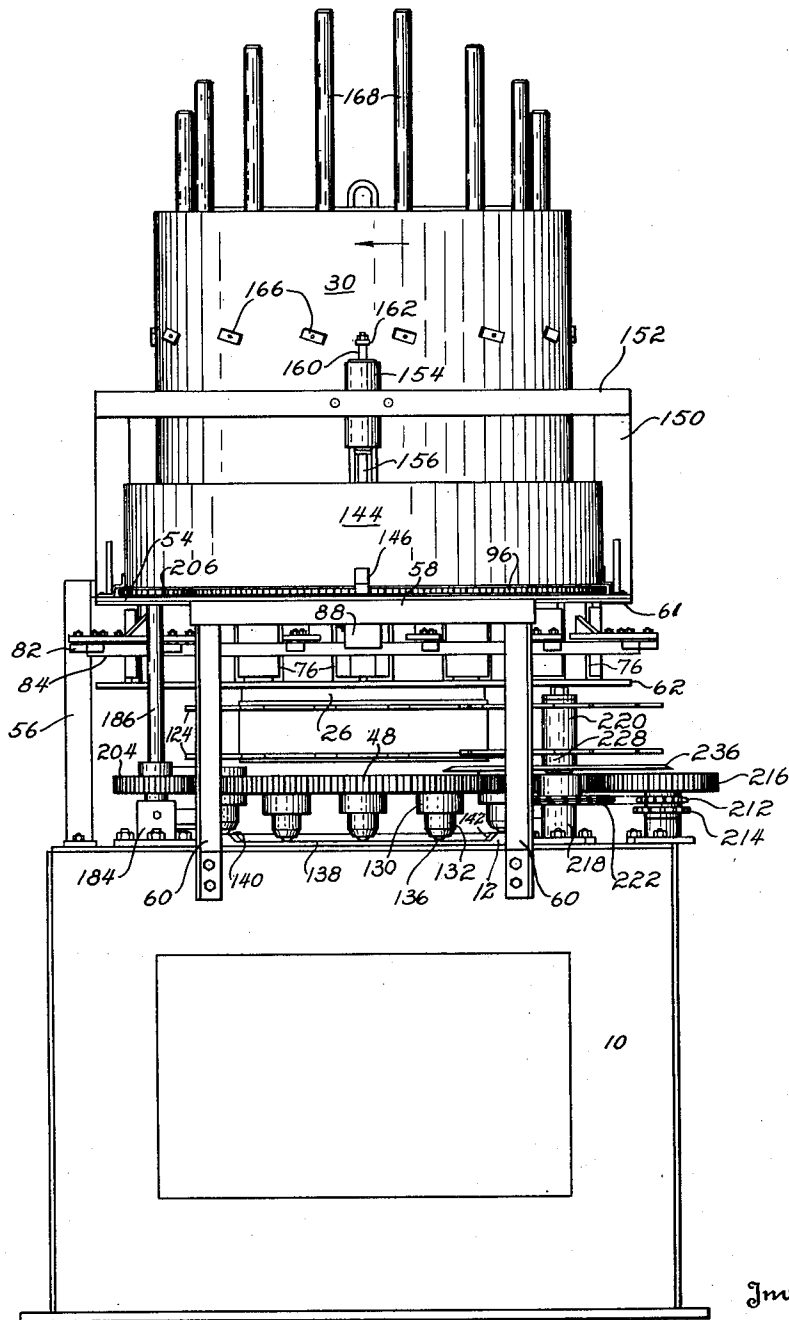
O. D. VELIE

2,644,629

CAN FILLING MACHINE

Filed May 8, 1946

4 Sheets-Sheet 2



Inventor

Fig. 2

ORVILLE D. VELIE

By

Strauch & Hoffman
Attorneys

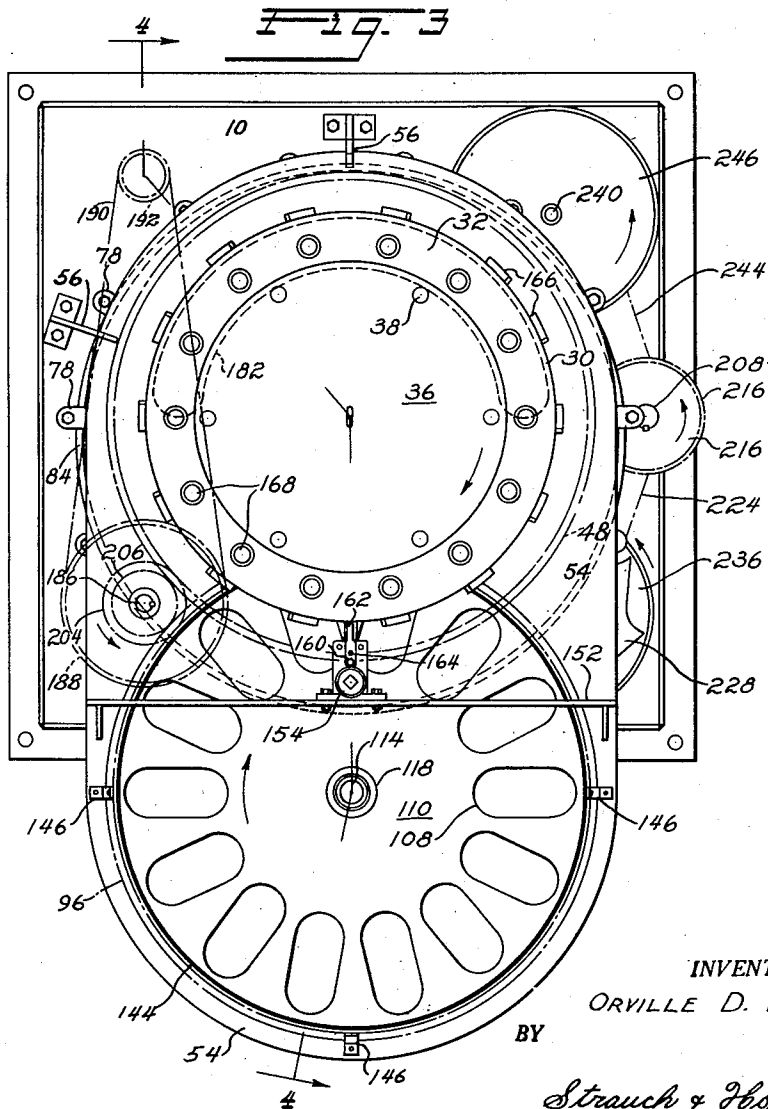
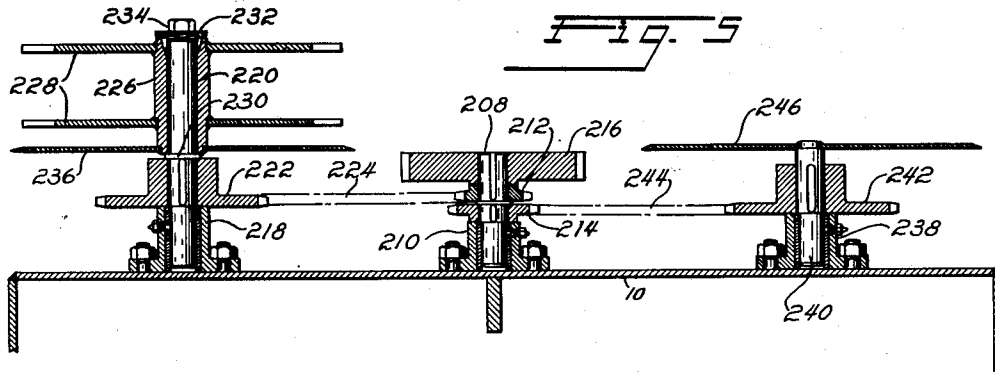
July 7, 1953

O. D. VELIE
CAN FILLING MACHINE

2,644,629

Filed May 8, 1946

4 Sheets-Sheet 3



INVENTORS
ORVILLE D. VELIE

BY
Strauch & Hoffman
ATTORNEYS

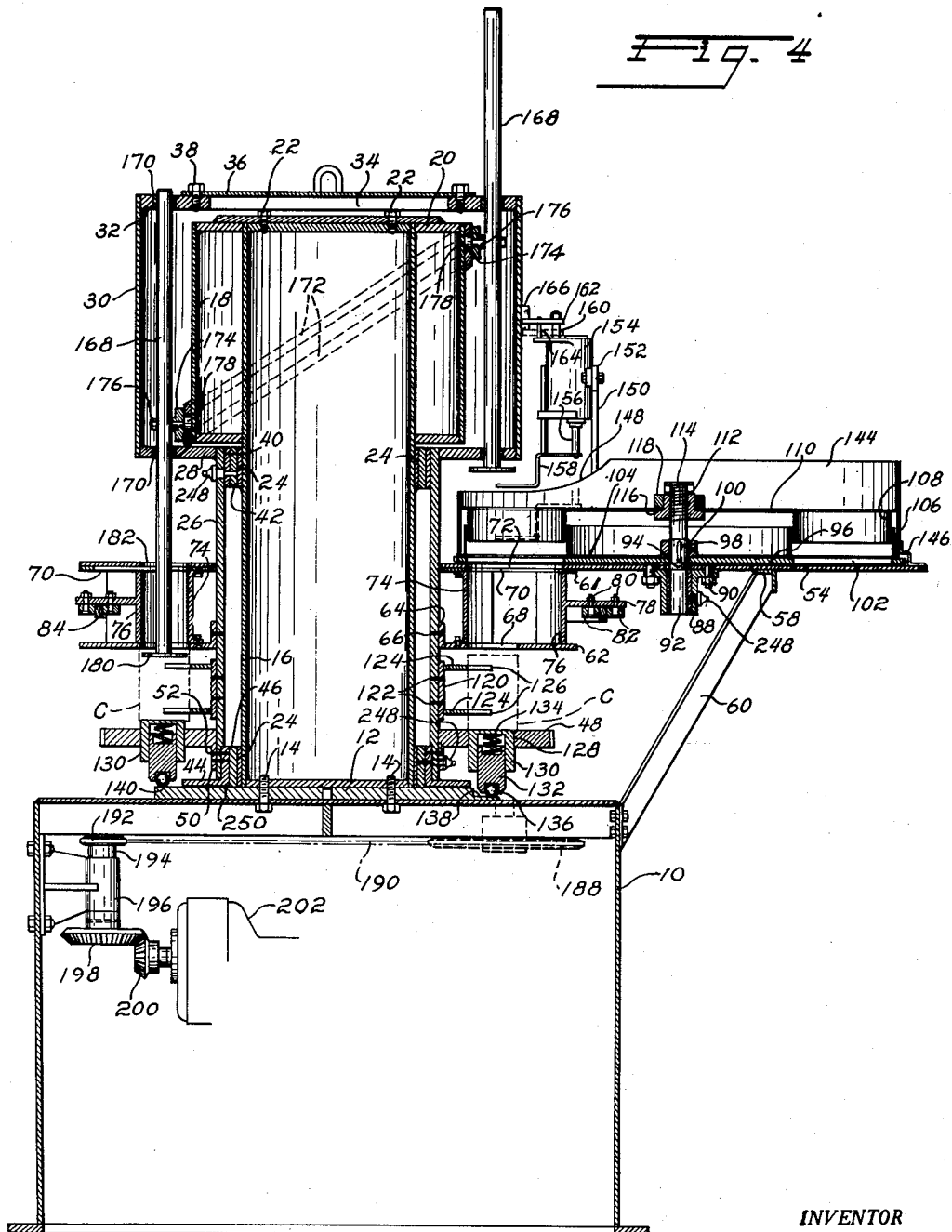
July 7, 1953

O. D. VELIE
CAN FILLING MACHINE

2,644,629

Filed May 8, 1946

4 Sheets-Sheet 4



INVENTOR
ORVILLE D. VELIE
BY
Strauch & Hoffmann
ATTORNEYS

UNITED STATES PATENT OFFICE

2,644,629

CAN FILLING MACHINE

Orville D. Velie, Bellingham, Wash.; Orrie W. Norton, executor of said Orville D. Velie, deceased, assignor, by mesne assignments, to James Q. Leavitt Company, a corporation of Washington

Application May 8, 1946, Serial No. 668,238

8 Claims. (Cl. 226—96)

1

This invention relates to filling machines for automatically filling cans or other commodity vending receptacles with measured quantities of vegetables, fruits or other edible products.

One of the primary objects of the invention, as herein disclosed, is to provide an automatic filling machine for compactly filling measured quantities of uncut string beans or other elongated vegetables or fruits into cans or receptacles of predetermined capacity and without subjecting the same to excessive crushing pressures.

Another object of the invention resides in the provision of a rotating turret carrying a plurality of circumferentially spaced charge-receiving chambers together with a plurality of measuring chambers mounted to rotate in timed relation with the charge-receiving chambers, and means carried by the turret operatively controlling plunger means for expelling the beans or other material from the measuring chambers into the charge-receiving chambers.

A further object of the invention is to provide charge-receiving chambers each consisting of relatively movable sections, and means automatically operating in the rotation of said chambers, to actuate the movable chamber sections and compress the material therein to the required bulk for reception in the vending receptacles.

A further object of the invention is to provide measuring chambers of novel sectional construction with means for adjusting one of the chamber sections relative to the other to vary the capacity or for the reception therein of vegetable or fruit particles of predetermined length.

A still further object of the invention is to provide a novel arrangement of vertically reciprocating plungers carried by the rotating turret together with operating means therefor, whereby upon the arrival of each compressed charge at the filling station it is ejected therefrom into the can or container.

An additional object of the invention is to provide a simple means for effectively clamping or holding the can or container in position at the filling station and subsequently releasing the filled can and discharging the same to a take-off conveyor.

In general, it is the object and purpose of my present invention to provide an automatic filling machine as above characterized which is distinguished by simplicity of construction, efficient and reliable functional operation with low maintenance expense, and maximum output of the canned product.

With the above, and other objects in view, the invention comprises the improved automatic fill-

2

ing machine or apparatus and the construction and relative arrangement of its several parts, as will hereinafter be more fully described, illustrated in the accompanying drawings, and subsequently incorporated in the subjoined claims.

In the drawings, wherein I have disclosed one simple and practical embodiment of my invention and in which similar reference characters indicate corresponding parts throughout the several views:

Figure 1 is a side elevation, illustrating a filling machine as constructed in accordance with the present invention.

Figure 2 is a front elevation thereof.

Figure 3 is a top plan view.

Figure 4 is a vertical sectional view taken substantially on the line 4—4 of Figure 3; and

Figure 5 is a detail vertical sectional view illustrating the drive mechanism for the can feeding and discharging disks.

Referring in further detail to the drawings, in the selected embodiment of my invention the superstructure of the machine is mounted upon a suitable base 10 which, in the present instance, is in the form of a housing enclosing parts of the drive mechanism for the machine. Upon the top of this housing a base plate 12 is secured by means of suitable bolts 14 which may also secure the lower end wall of a hollow cylindrical standard or column 16 upon the upper surface of the plate 12. A hollow drum 18 surrounds the upper end of this standard, the top wall 20 of said drum having an upwardly offset part extending over the upper end of the standard 16 and being rigidly fixed thereto by the bolts or screws 22. Immediately below the drum 18 and at its lower end, the wall of the standard 16 is formed with relatively thick portions or has welded to the external surface thereof the bearing rings indicated at 24, the purpose of which will be presently explained.

A rotating turret encloses the standard 16 and drum 18, said turret including a lower cylindrical section 26 spaced from the standard 16 and having a flange 28 on its upper end to which the lower end of the cylindrical shell 30 of the upper turret section is secured. The upper end of the shell is closed by the top plate 32, having an opening 34, and a detachable cover 35 is secured to plate 32 by the screws 38. At its upper end the turret section 26 has an internally thickened annular portion 40 to which a bearing ring 42 is welded or otherwise secured and has rotatable bearing contact with the peripheral surface of the upper bearing ring 24 on standard 16.

Within the lower end of the turret section 26,

the vertical flange of an L-shaped ring 44 is fitted and has a bearing ring 46 welded to its inner surface and in rotative bearing contact with the peripheral face of the lower bearing ring 24 on standard 16.

A large diameter spur gear 48 surrounds the lower end of turret section 26 and has a depending flange 50, which, together with the vertical flange of ring 44, is rigidly secured to the lower end of turret section 26 by suitable rivets, indicated at 52.

Below the upper section of the turret, a stationary elongated platform 54 is suitably fixed to the upper ends of vertical standards 56, secured to the top wall of housing 10. This platform is provided with an opening of suitable diameter in its rear end portion to receive the turret section 26 and the forwardly extending end of said platform is supported upon the intermediate portion 58 of a U-shaped frame member, the parallel legs 60 of which form inclined struts extending upwardly and forwardly from the front wall of the housing 10, to which they are bolted or otherwise rigidly fixed.

Immediately beneath the platform 54, a plurality of circumferentially spaced charge-receiving chambers are mounted upon the turret section 26 to rotate therewith. As herein shown, these chambers are located between the top and bottom annular plates 61 and 62 respectively, the latter plate at its inner edge having an annular flange 64 riveted or otherwise securely fixed to the wall of turret section 26 as shown at 66. This plate is formed with an annular series of spaced openings 68 of approximately the same diameter as the internal diameter of the can to be filled. The upper plate 61 is provided with an annular series of spaced, radially elongated openings 70 which are adapted to successively register with an opening 72 of similar form in the platform 54 at the forward side of the rotating turret.

Between the plates 61 and 62, at the inner side of the openings 68 and 70, the upper and lower ends respectively of charge-receiving chamber sections 74 are securely fixed. The opposed outer chamber sections 76 are radially movable between plates 61 and 62 with respect to the chamber sections 74 and are each provided with a horizontal outwardly projecting arm 78 in which the spaced pins 80 are mounted to provide supporting journals for rollers 82 on the under side of arm 78. These rollers are engaged, respectively, with the inner and outer faces of a ring 84 eccentrically mounted and supported with relation to the rotating turret and standard 16 by suitable bracket members 86 projecting inwardly from the standards 56 (see Figure 1). It will be evident that, in the rotation of the turret, the outer charge-receiving chamber sections 76 are moved inwardly and outwardly with respect to the fixed sections 74.

In forwardly spaced relation from the charge-receiving chambers, a suitable bearing 88 is rigidly bolted to the under side of the platform 54, as shown at 90, and in this bearing the lower end of the vertically disposed shaft 92 is journaled. Immediately above the platform 54, shaft 92 is provided with a shoulder 94, upon which a large-diameter gear 96 is secured for rotation with said shaft by means of the key 98 and collar 100. This gear is also provided with an annular series of radially elongated openings 102, corresponding in number to the number of charge-receiving chambers. This gear carries

the adjustable measuring chambers. As herein shown, the metal sheet 104, suitably secured to the upper surface of gear 96, is formed with a series of bottomless upstanding chamber sections 106, in accurate register with each of the openings 102 in the gear. Complementary relatively adjustable chamber-sections 108 are formed upon the metal plate 110, which is centrally provided with an opening receiving the nut 112 engaged upon the threaded upper-end portion 114 of the shaft 92. At its lower end, the nut 112 is formed with flange 116, underlying the plate 110, and is rotatively connected with the plate by means of a collar 118 secured to the set 112 by a suitable nut-screw. Thus the nut may be rotated upon the upper end of shaft 92 to move axially on said shaft with the plate 110, and thereby raise or lower said plate and chamber sections 108, with respect to the chamber sections 106, to vary the capacity or the vertical dimension of the measuring chambers in accordance with the length of the vegetable or other commodity to be received therein.

Below the plate 62, a ring 120 is secured to the periphery of turret-section 23 by rivets 122 and is provided with vertically spaced parallel flanges 124 having can end receiving notches or recesses 126 in alignment with the respective openings 68 in the plate 62.

The gear 48 is also provided with a series of openings 128 in alignment with notches 126 and openings 68, in each of which a hollow cylindrical can clamping member 130 is slidably engaged. The upper end of this member is closed and between the same and a pin 132 telescoped therein a spring 134 is interposed. The lower end of the pin 132 is recessed to receive a freely rolling ball 136 bearing upon the marginal edge portion of the base plate 12. As will be seen from reference to Figures 1, 2 and 4, the upper surface of this marginal portion of the base plate has portions thereof disposed at two different levels, the lower level portion, indicated at 138, extending around the front side of the turret while the higher level portion 140 extends around the rear side thereof. The adjoining ends of these two portions of the surface of the base plate are connected by the sloping or inclined cam surfaces, indicated at 142, over which the balls 136 ride from one surface portion to the other.

The rotatable measuring chambers are preferably enclosed by the wall 144 which is supported with its lower edge in clearance relation to the gear 96 by means of a plurality of bracket members 146 fixed to the platform 54. The rear portion of this enclosing wall where it extends beneath the upper section 30 of the rotating turret, is cut away as indicated at 148.

A bracket member, having vertical legs 150 and a horizontal connecting portion 152 extending transversely above the wall 144, is securely anchored to the platform 54. Upon the bracket part 152, at its approximate center, an ejector unit comprising a cylinder 154 is mounted and supplied with a suitable fluid pressure medium from a convenient source (not shown) for the operation of plunger 156, to the lower end of which a suitable form of pressure applying head or ejector 158 is secured. The operation of plunger 156 is controlled by a suitable valve mechanism within cylinder 154, the valve rod or stem 160 at its upper end having one end of an arm 162 rigidly connected therewith, said arm being fixed intermediate of its ends to the vertically movable guide pin 164 mounted in an aper-

tured lug on cylinder 154. When the plunger head 158 is at the limit of its upward movement, the arm 162 is disposed in a substantially horizontal position, and the other end of said arm is adapted to be engaged by circumferentially spaced obliquely inclined cam-lugs 166, secured to the periphery of the upper turret section 30. These cam-lugs correspond in number to the number of measuring and charge-receiving chambers, and are so positioned with respect to the charge-receiving chambers that after a charge-receiving chamber comes into substantial alignment with one of the measuring chambers, arm 162 is then actuated by one of the cam-lugs 166 to operate the valve mechanism whereby plunger head 158 is forced downwardly to displace the measured quantity of material from the measuring chamber into the charge-receiving chamber, with the section 76 thereof at the limit of its outward movement, as shown at the right in Figure 4 of the drawings.

Between the fixed cylindrical wall 18 and the wall 30 of the rotating turret, a plurality of plunger rods 168 are vertically reciprocable through guide bushings 170 in the top and bottom walls 32 and 28 of the upper end section of the turret. To the outer periphery of the wall 18, parallel cam-track bars 172, disposed at an angle of substantially 45 degrees to the axis of rotation of the turret, are suitably secured. Between these bars and each piston rod 168, a spacing bracket 174 is secured to the rod by a bolt 176 having a head at one end upon which a roller 178 is mounted between and in contact with the spaced cam-track bars 172.

Each piston rod 168 is provided at its lower end with a pressure-applying head 180, which is of such diameter that when chamber section 76 is at the limit of its inward movement, and the charge compressed, as seen at the left in Figure 4, said plunger head moves downwardly through the chamber in substantially concentric relation therewith.

As shown most clearly in Figure 3 of the drawings, as the plungers move downwardly from their elevated positions at the front side of the turret (shown at the right in Figure 4), after the charge has been compressed, they pass downwardly through a slot 182 in platform 54 extending through approximately 180 degrees around the rear side of the turret.

While any suitable means may be provided for rotating the turret, and the measuring chambers and for feeding the cans to charge-receiving position between the gear 48 and plate 62 and for discharging the filled cans from the machine, we preferably provide the mechanism best shown in Figures 2, 3 and 5 of the drawings. The housing 10 is of substantially rectangular form and adjacent one of the front corners thereof a bearing 184 is secured to the top wall of the housing in which the lower end of a vertical shaft 186 is journaled. This shaft extends downwardly within the housing and has a sprocket 188 fixed to the lower end thereof and connected by drive chain 190 with a smaller sprocket 192 on the upper end of a shaft 194 journaled in the bearing 196 mounted on one side wall of the housing. A bevel gear 198 on the lower end of this shaft is in constant mesh with bevel pinion 200 on the shaft of a motor mounted within housing 10 and partially indicated at 202 in Figure 4 of the drawings.

Above the bearing 184, gear 204 is secured to shaft 186 and is in constant mesh with the turret

drive gear 48. The upper end of shaft 186 is suitably journaled in platform 54 and to the same gear 206 is secured and is in constant mesh with the drive gear 96 for the measuring chambers.

At the opposite side of the housing 10 and substantially in transverse alignment with the axis of the turret, a stub-shaft 208 is journaled in bearing 210 fixed to the top wall of the housing (see Figure 5). Two sprocket members 212 and 214 respectively and the gear 216 are keyed to shaft 208. This gear is in constant mesh with the turret driving gear 48.

At the other front corner of housing 10, opposite to the shaft 186, a bearing 218 is fixed to the top wall thereof in which the lower end of vertical shaft 220 is journaled. A sprocket 222 keyed to this shaft is connected by drive chain 224 with the sprocket 212 on shaft 208. To the upper end portion of shaft 220, the connecting hub 226 between vertically spaced can feeding disks 228 is keyed or otherwise fixed to rotate therewith and is held against axial movement on said shaft by means of shoulder 230 on the shaft and plate 232 secured against the upper end of the hub by means of nuts 234 threaded upon a reduced upper end extension of the shaft. The edges of the disks 228 are suitably notched or recessed to receive the individual cans supplied thereto from a suitable conveyor mounted at one side of the machine (not shown). Below the lower disk 228 a can-supporting plate or disk 236 is fixed to the lower end of hub 226.

At the same side of the machine and rearwardly of the turret, a bearing member 238 is fixed to the top wall of housing 10, and in this bearing the lower end of stub-shaft 240 is journaled. To this shaft sprocket member 242 is keyed and is connected by drive-chain 244 with the sprocket 214 on shaft 208. To the upper end of shaft 240 a disk 246 is secured to receive the filled cans and discharge the same to a carry-off conveyor extending rearwardly from the machine.

Having now disclosed the several novel structural features of my improved automatic filling machine, a complete operating cycle thereof may be described as follows:

Having first vertically adjusted the measuring chamber sections 108 in the manner heretofore described, in accordance with the known average length of the string beans or other commodities to be filled into the cans or containers, upon energization of motor 202, the several cooperating units are relatively rotated in the directions indicated by the arrows in Figure 3 of the drawings. In the rotation of the gear 96, as the measuring chambers successively approach the central front edge of platform 54, the attendant places a sufficient quantity of the string beans or other product, in each of said chambers to completely fill the same in a loosely coherent mass, the lower ends of the beans extending through opening 102 in the gear and resting on platform 54.

The empty cans are successively fed by the disks 228 into the notches of flanges 124 on the turret between drive-gear 48 and plate 62. These cans, indicated at C in Figure 4 of the drawings, are positioned at the front side of the machine in alignment with the respective openings 68 in the plate 62 and with their open upper ends spaced below said plate, since the members 130 are in their normal positions substantially flush with the top face of gear 48 and the balls 136 are moving upon the lower level 138 of the marginal surface of plate 12.

As each charge-receiving chamber carried by

7

the turret arrives at a position in substantial vertical alignment with one of the measuring chambers which has been supplied with the beans, said chambers are also in substantial vertical alignment with the plunger 158. At this time, one of the cam-lugs 166 on the turret wall 30 contacts the arm 162 to actuate the plunger valve mechanism whereby the plunger is forced downwardly so that the plunger head 158 will apply sufficient force to the upper ends of the beans to urge the same downwardly through opening 72 in platform 54 and into the charge-receiving chamber below said opening. Only a comparatively light pressure is required since by reason of the lubricating effect of the natural fruit or vegetable juices, the entire mass will readily slide vertically from the measuring chamber into the charge-receiving chamber. Since the section 76 of the latter chamber is in its outer position, the charge is received in said chamber in substantially the same loosely coherent mass condition as initially prevailed in the measuring chamber. The distance between the bottom plate 62 of the measuring chamber and the plunger operating cylinder 154 and the stroke of the plunger is accurately calculated so that all danger of crushing the beans or other commodities is avoided. Of course at this time, the plunger rod 168 associated with the particular chamber which has received the charge is at the extreme limit of its upward movement.

As shown in Figure 2 of the drawings, as the turret with the charged chamber and the can continues to rotate in the clockwise direction, the ball 136 moves upwardly over one of the inclines 142 upon the high level surface portion 140 of the base plate 12. The pin 132 and member 130 are thus urged upwardly and the spring 134 placed under compression to tightly clamp the upper open end of the can C against the under side of plate 62 around the opening 68 therein. Simultaneously, the plunger 168 is forced downwardly by the can track bars 172 and the plunger head 180 passes through slot 182 in platform 54 after the eccentric ring 84 has forced the chamber section 76 inwardly and compressed the charge in said chamber. In the continued rotation of the turret and the downward movement of plunger rod 168, the compressed charge is forced downwardly and into the can C, as shown at the left in Figure 4 of the drawings. Movement of the compressed charge is greatly aided by the natural juices thereof and the plunger stroke is accurately calculated to avoid all danger of crushing the beans or other product.

In the further clockwise movement of the turret, the ball 136 moves downwardly upon the other of the inclines 142 to the lower level 138 of the marginal surface of the plate 12, thus releasing the clamping pressure on the filled can. Flanges 124 on the turret, then direct the filled can upon the rotating disk 246 by which it is discharged to the carry-off conveyor for delivery to the briner and seaming mechanism.

From the foregoing, it will be seen that I have provided an automatic filling machine of this type capable of delivering in rapid succession, cans or other containers of predetermined dimensions packed to full capacity with uncut and uncrushed string beans or other edible commodities. It will be seen that the machine comprises comparatively few parts which are of simple and rugged structural form and will operate in a positive and reliable manner at high speed for maximum quantity production of the canned product.

8

It will of course be understood that the form and number of the measuring chambers and the charge-receiving chambers shown in the accompanying drawings is merely suggestive, and that any desired number of these chambers may be provided, of any selected form or shape as may be dictated by the particular form or shape of the can or container to be filled. Of course, it will also be understood that wherever required suitable means may be provided for supplying lubricant to relatively moving parts, such as the fittings 248 shown in Figure 1 through which lubricant is supplied to the contacting surfaces of the bearing rings 24 and 42. Also the lower face of the horizontal flange of ring 44 may be provided with a self-lubricating bearing metal indicated at 250.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. In apparatus for filling containers, a charging station and a filling station; a revolubly mounted turret; a plurality of circumferentially spaced charge-receiving chambers mounted on said turret for movement therewith between said charging and filling stations; means at the charging station, including a plurality of measuring chambers mounted to rotate about a common axis spaced from and parallel to the turret axis to successively position said measuring chambers above and in coaxial relation with said charge receiving chambers; charge delivering means, including a movable member common to all measuring chambers to eject the charges therefrom into said charge receiving chambers; means for actuating said member in timed relation to the rotation of the turret; and means operatively controlled by the turret for ejecting the material from said charge-receiving chambers into the containers at the filling station.

2. Container filling apparatus as defined in claim 1 wherein said charge-delivering means comprises a fluid pressure operated ejecting plunger mounted above the measuring chambers and operating means for a fluid pressure control valve, together with means carried by the turret for actuating said valve operating means.

3. Container filling apparatus as defined in claim 1, wherein the mounting means for said measuring chambers comprises a stationary platform having an opening therein to register with said charge-receiving chambers, together with a shaft journaled in the platform and a driving gear mounted on said platform in fixed relation to the shaft and measuring chambers having openings therein registering with the respective measuring chambers and the opening in said platform.

4. In apparatus for filling containers, a charging station and a filling station, a revolubly mounted turret, said stations being located at relatively opposite sides of the turret axis, a plurality of circumferentially spaced charge-receiving chambers mounted on said turret for move-

ment therewith between said charging and filling stations, means for successively delivering measured charges of material to said chambers in the continuous movement of said turret and chambers, each of said chambers comprising a fixed section and a radially slidable section in constant parallel relation to each other and to the turret axis, stationary means common to all of said chambers and directly coacting with means on said slidable sections thereof to radially move said chamber sections in one direction and dispose the same in maximum spaced relation to the fixed chamber sections at the charging station, and to thereafter radially move said slidable sections in the opposite direction progressively during movement of said chambers between said stations and hold the material under compression at the filling station, and means for ejecting the compressed material from said chambers into the containers.

5. The container filling apparatus as defined in claim 4 wherein said common means comprises a continuous annular member eccentrically mounted in fixed position relative to the turret.

6. Container filling apparatus as defined in claim 1 wherein said charge-delivering means comprises an ejector unit mounted in fixed position at one side of the turret and above the measuring chambers and control means therefore, together with means carried by the turret for actuating the control means.

7. In container filling apparatus, an annular series of charge receiving chambers, an annular series of charge-delivery chambers, means for

mounting said two series of chambers for relative rotation about laterally spaced parallel axes with individual charge-delivery chambers movable in succession into closely superposed registering relation with individual charge-receiving chambers at a position between said axes, power driven means operatively connected with said two series of chambers, an ejector, means mounting said ejector at said position for movement in a fixed path relative to the registered chambers, and means rotatable with one of said two series of chambers operatively controlling effective operation of said ejector upon registration of said chambers to eject measured charges into said charge-receiving chambers.

8. The container filling apparatus as defined in claim 7 in which said last-named means comprises a movable control member for said ejecting device and a series of spaced cam elements; co-acting with said member in successive order.

ORVILLE D. VELJE.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
897,420	Small	Sept. 1, 1908
1,072,428	Colbert	Sept. 9, 1913
1,719,580	Ayars	July 2, 1929
1,891,830	Nicholson	Dec. 20, 1932
1,995,918	De Markus	Mar. 26, 1935
2,176,449	Ayars	Oct. 17, 1939
2,196,403	Thompson	Apr. 9, 1940