

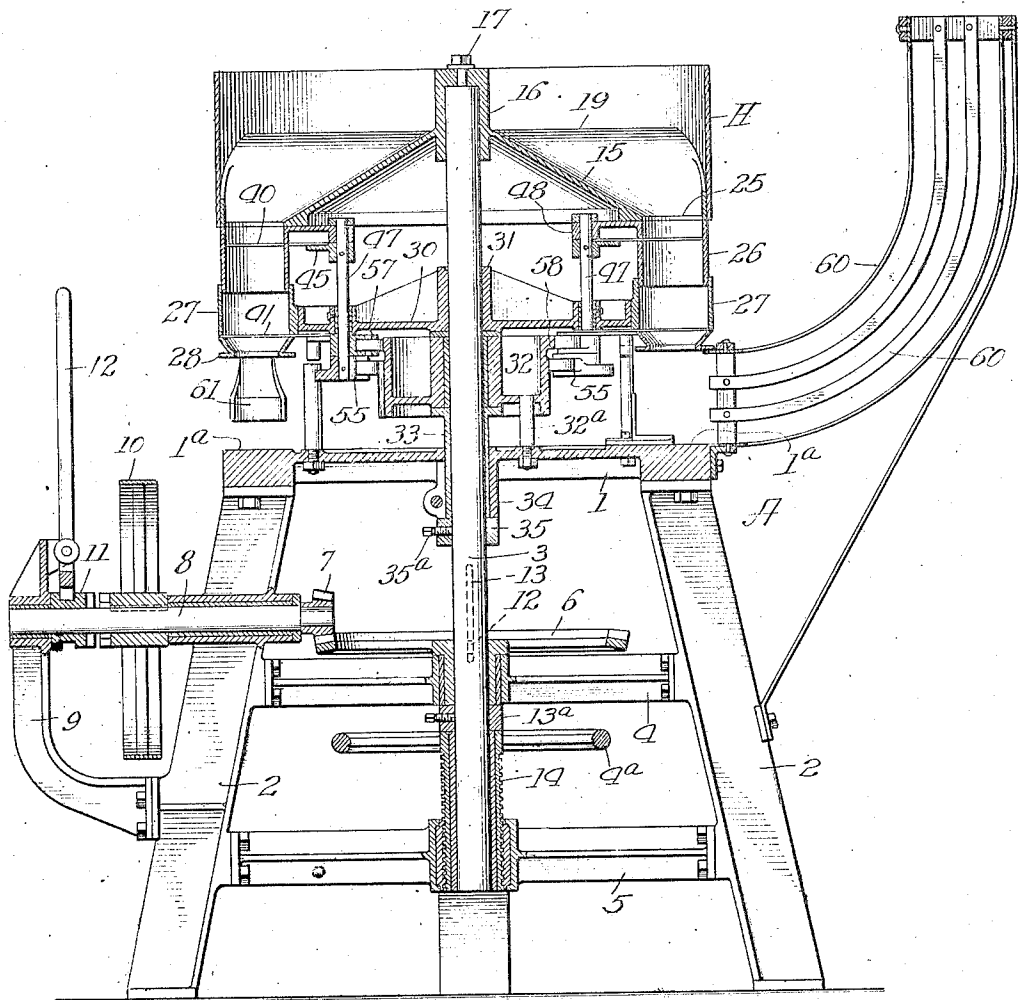
C. E. STEERE.
CAN FILLING MACHINE.
APPLICATION FILED JAN. 10, 1917.

1,346,141.

Patented July 13, 1920.

3 SHEETS—SHEET 1.

Fig. 1.



witnesses:
Robert H. Weir
Arthur M. Carlson

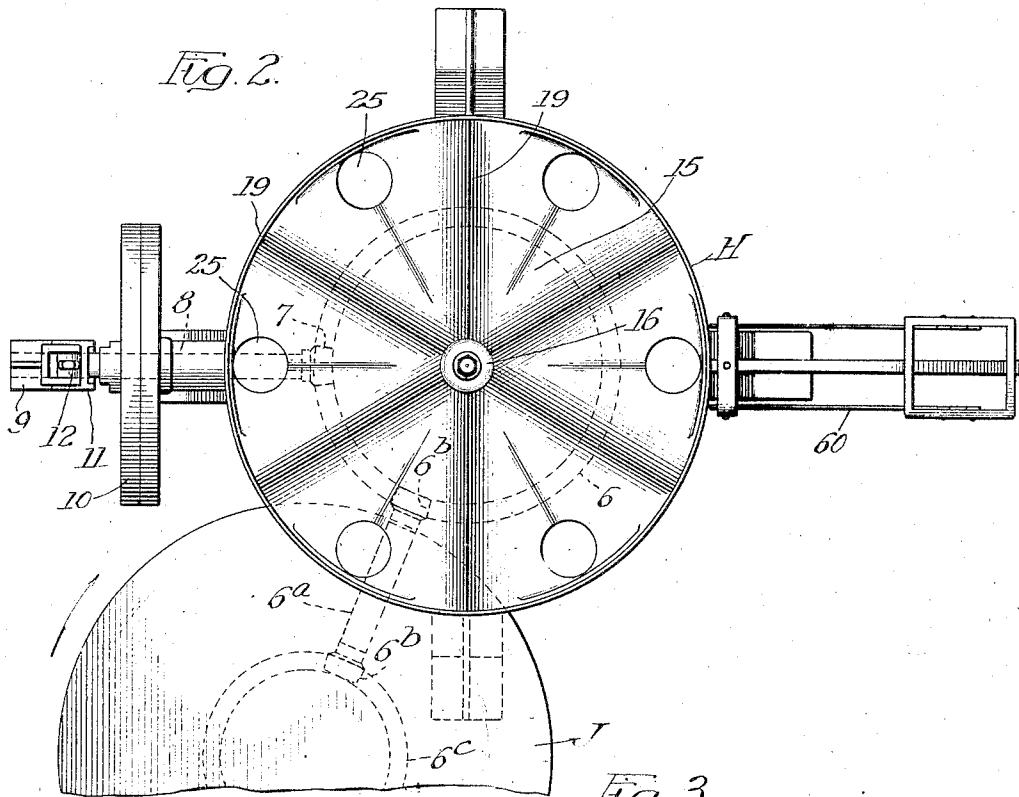
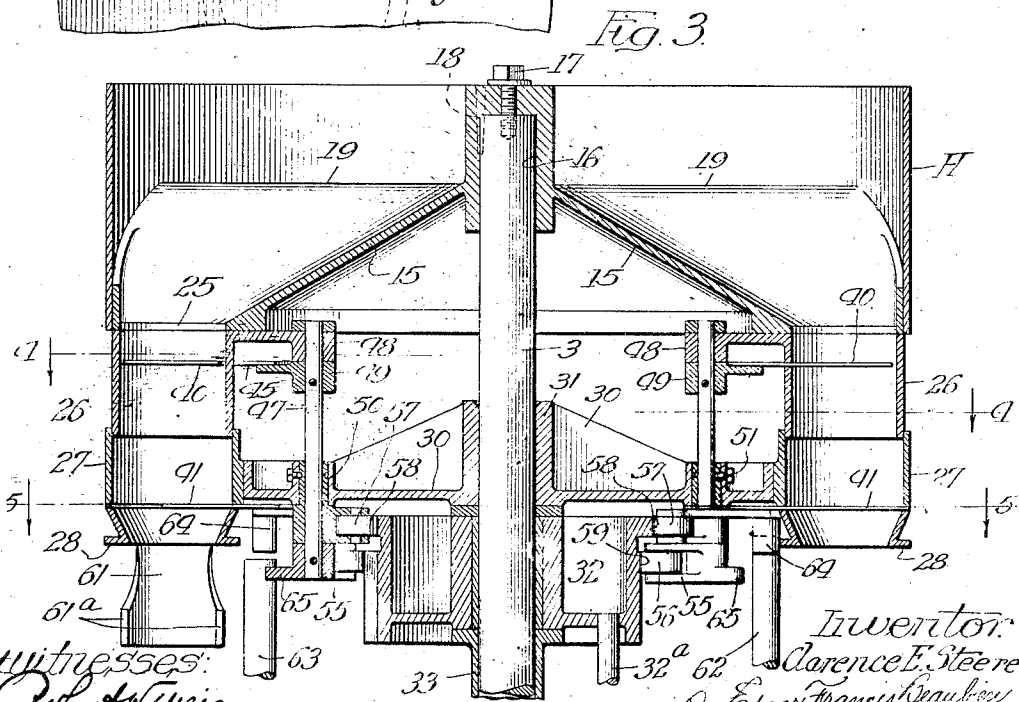
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 4.

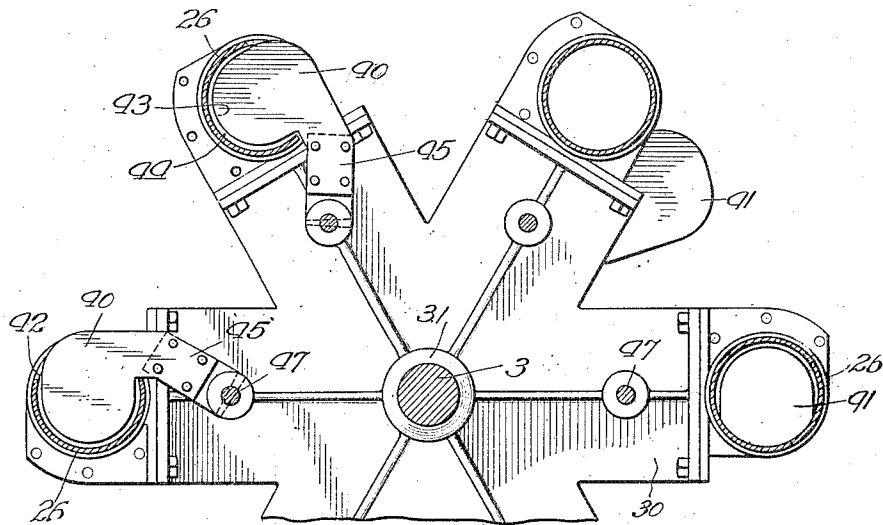
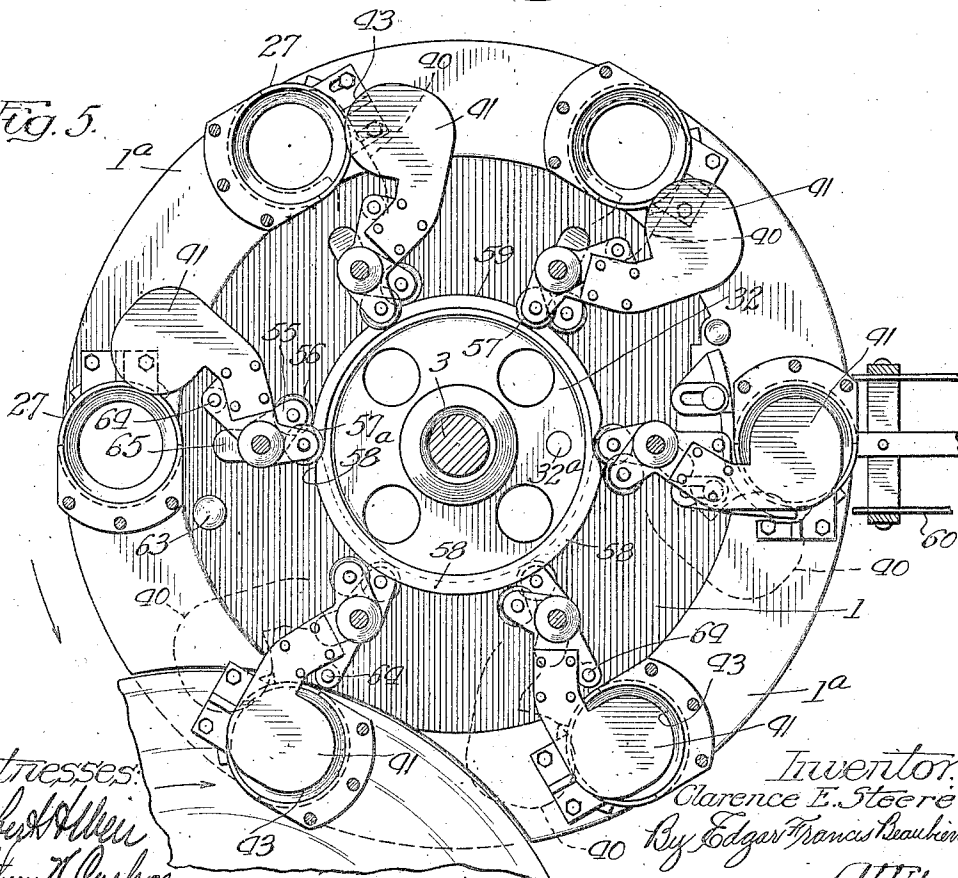


Fig. 5.



Witnesses:
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Inventor:
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By Edgar Francis Rankin,
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UNITED STATES PATENT OFFICE.

CLARENCE E. STEERE, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO HENRY SCARBOROUGH, OF MILWAUKEE, WISCONSIN.

CAN-FILLING MACHINE.

1,346,141.

Specification of Letters Patent.

Patented July 13, 1920.

Application filed January 10, 1917. Serial No. 141,537.

To all whom it may concern:

Be it known that I, CLARENCE E. STEERE, a citizen of the United States of America, and resident of Milwaukee, Milwaukee county, Wisconsin, have invented a certain new and useful Improvement in Can-Filling Machines, of which the following is a specification.

My invention relates to improvements in machines for charging or filling cans or similar vessels with material.

One of the objects of my invention is to provide a continuous rotary and automatic machine of this character which will be simple, durable and reliable in construction, and effective and efficient in operation.

Other objects of my invention will appear hereinafter.

My invention consists in the features of novelty exemplified by the construction, combination and arrangement of parts hereinafter described, shown in the accompanying drawings and more particularly set forth in the appended claims.

Referring to the accompanying drawings:

Figure 1 is a substantially central vertical section of an improved canning machine embodying my invention.

Fig. 2 is a top plan view of said machine, together with a rotary receiving table which I have designed to be used in conjunction with said machine.

Fig. 3 is an enlarged section of the upper portion of the structure shown in Fig. 1, *i. e.*, of the rotary filler head or can-filling unit.

Fig. 4 is a transverse sectional detail substantially on the line 4—4 of Fig. 3; and

Fig. 5 is a lower transverse sectional detail substantially on the line 5—5 of Fig. 3.

It will be obvious to one skilled in the art, after having obtained an understanding of my invention from the disclosures herein made, that the structure shown and described is capable of modification, reconstruction and reorganization without departing from the scope and spirit of the invention, and I desire it to be so understood.

This particular structure shown and hereinafter described, and which constitutes one embodiment of my invention, is designed and used more especially for charging or filling cans or similar vessels with peas and beans but the principles involved and functions performed are applicable to a wider

range of materials by such reorganization and modification of the structural parts and combinations as is desirable or necessary to adapt the invention to these other materials. In other words, the machine is capable of filling cans with bulk goods of a more or less solid nature as distinguished from liquids or fluids such as is generally known in the canning industry as syrups. For this latter purpose I have designed a machine which is embodied in and constitutes the subject matter of a co-pending application Serial No. 160,471, filed April 7, 1917, and which, while capable of use as an independent machine, is especially of value in conjunction with the present machine where the cans are to be charged with both bulk and syrup. The present structure shown in the drawings is especially adapted for filling cans of the open top type; that is cans which have open ends substantially equal in diameter to the diameter of the can itself but it is not necessary that the openings be that large. It is only essential that the can openings be large enough from a practical and commercial viewpoint to admit the material. The machine has a frame A comprising a horizontal table top 1 and legs or standards 2, and is arranged to support the various operating parts. The structure is built upright and substantially all of the operating parts are contained within the confines of the floor area occupied by the legs to reduce to a minimum the floor space required per machine. Because of this compactness the machine may be placed in batteries or banks occupying a minimum floor area or they may be placed in close proximity to syruping machines whereby the filling operations for both solids and syrups may be continuous. The table top 1 has a can runway or supporting surface 1^a which is annular shaped and disposed beneath the filling devices and which supports the cans in proper relation to the filling devices as they are propelled thereby. This supporting surface lies in a constant level or plane which has a definite and constant relation to the filling devices. The cans are successively fed to and delivered or taken from this supporting surface in the plane thereof. A vertically disposed rotary standard or post, which in this case is in the form of a shaft 3 centrally located with respect to the frame, rises above the table top 1 and supports the rotating multi-

ple filler head. This shaft has its bearings in the table top 1 and in horizontally disposed spiders 4 and 5 bolted to the legs or standards 2, all of which provides not only substantial bearings for the shaft but which also firmly holds the shaft in perfect vertical relation to the frame. The shaft is driven by a bevel gear 6 and a pinion 7 on the end of a short horizontal shaft 8 having its journals in the frame and in a bracket 9. The shaft 8 has a pulley 10 which may be driven from any suitable source of power. The pulley is loose on the shaft but is connected with and disconnected from the shaft by a suitable clutch 11 having an operating hand lever 12. The hub of the gear 6 is journaled in the spider 4 and the shaft extends through this hub but on account of the fact that the shaft is vertically or longitudinally adjustable, its driven relation to the gear is maintained by a key or spline 12 and slot 13 in the shaft. This shaft has a collar 13^a fastened to it, which because of the fact that the parts are in their uppermost adjusted position, is shown as abutting the bearing in the spider 4. This collar provides a shoulder for supporting the shaft or standard on an adjustable sleeve 14 which forms a long substantial bearing for the shaft and which is threaded for vertical adjustment in the spider 5, as shown in Fig. 1, this adjustment being extremely accurate. The upper end of the sleeve 4 carries a large hand wheel 4^a by which the sleeve may be conveniently manipulated. It is by means of this simple mechanism that the machine is not only adjusted to various sizes of cans, but also to vary the capacity of the measuring and filling devices in accordance with the size of the cans. At its upper end the central post or shaft supports and rotates a circular hopper or reservoir which contains the supply from which the individual measuring devices draw the material preparatory to depositing it into the cans. This hopper in the present machine is in the form of a hollow drum H open at its upper end, it being centrally mounted on but removably fastened to the upper end of said shaft. The bottom 15 of the hopper is inclined or tapered from its outer lower edge or rim upwardly toward the center for the purpose of insuring the movement of the material into the several measuring devices, and at the central portion of the bottom a long socket 16 is provided for the end of the shaft 3. This socket is closed at its upper end and a screw 17 is used for removably fastening the hopper in position. In addition to this, a key 18 insures a rigid connection between the shaft and hopper for rotating the hopper, all of which is consistent with a general purpose of making the structure such that its various elements and parts can be readily assembled and disassembled for repairs, clean-

ing and renewal. I also make the hopper bottom in such manner that the portions thereof between the several measuring devices are pitched or inclined upwardly to horizontal meeting lines or ridges 19 which are in this case disposed on radii midway between the centers of the measuring devices. This construction has several functions;—it forms individual chutes or guides for each of the measuring devices and keeps the material right at the mouths or entrances thereof even to the smallest quantity in the hopper, hence the hopper can be completely emptied. Furthermore, such construction not only divides the mass of material and distributes the load on the several gate valves of the measuring devices, but also prevents the rotary shifting of the mass of material in the hopper.

The hopper discharges its material directly into measuring chambers of which, in the present structure, there are six equally spaced around and depending from the bottom of the hopper. The hopper has a plurality of circular openings or outlets 25, and surrounding these openings are tubular extensions or funnels 26 which constitute the upper sections of the measuring devices, the outlets being substantially of the same diameter as the funnels to provide free and unrestricted direct passages from the hopper to the measuring devices. There is also a series of tubular members 27 which telescope with the upper extensions 26, and the relative adjustment of this series of extensions and tubular members, together with their respective valves, determines the measuring capacity of the measuring chambers. The lower ends are contracted, preferably to about the size of the opening in the end of the smallest size can, to form discharge outlets or mouths directly below the measuring chambers, whereby the material has practically no greater distance to drop than the depth of the can. This further carries out the idea of providing the most direct, shortest possible path for the material from the hopper to the can. A flat flange 28 in the plane of the mouth serves to cover those cans of the size which have openings larger than the mouths of the measuring devices and prevent any slopping or splashing of the material, but these flanges do not tightly contact with the rims of the cans because in this machine there is no vertical movement during the filling operation of either the cans or the mouths of the measuring devices, the space between said mouths and platen or can-supporting surface being constant. The support for the lower sections or tubular members consists of a horizontal spider 30 having radiating arms for the tubular members, and having a central hub 31 on the central shaft or standard 3, the shaft, however, being vertically movable in said hub, no driv-

ing connection between the hub and shaft being needed because the rotation is imparted to the spider and to the lower series of tubular members by reason of their telescoping connection with the hopper sections or extensions of the measuring devices. This hub rests upon the hub of a large central valve-operating cam member 32, which in turn rests upon the flanged upper end of a sleeve 33 surrounding the shaft. The cam member, however, is held against rotation by a pin 32^a upstanding from the table top 1 and enters a hole in the web of the cam-member, the pin moving in the hole more or less according to the vertical adjustment. The sleeve or bushing 33 is carried in a bearing 34 in the frame just beneath the table top 1 and preferably formed integrally therewith and this bearing is of the split type which, by the tightening of its parts, operates to firmly clamp the sleeve 33 and thus hold the various parts supported by the sleeve in a definitely adjusted position. When unclamped in this bearing, however, the sleeve may be supported by a collar 35 fastened on the shaft 3 by a set screw 35^a, or in any other manner to be adjustable if necessary. When supported the sleeve, as well as the parts supported thereby, will follow the vertical adjustment of the shaft. In other words, with the sleeve 33 released from its bearing and resting on the collar 35, the entire filler head can be raised or lowered as a unit by the simple operation of adjusting the shaft or standard 3, as previously described. This simple adjustment regulates the spacing between the measuring device mouths and the can runway or supporting surface and determines or fixes the level or plane in which said mouths operate in accordance with the height of the particular can or vessel being filled. Having adjusted or set the filler head to the proper point, the split bearing is then tightened to firmly clamp the sleeve 33 which thereby holds the cam and lower tubular sections or members in their adjusted positions. The shaft or standard 3 is then again adjusted to move the upper tubular sections or extensions relatively to the lower ones to regulate the capacity of the measuring chambers in accordance with the particular size of can to which the entire filler-head was adjusted. All of these adjustments are accomplished as before explained, by the simple operation of manipulating the hand wheel.

We now come to a consideration of the valves which control the filling and discharging of the measuring and filling devices. In the present machine, there are two series—an upper and a lower—of these valves, the upper series being associated with the hopper extensions or upper sections, and the lower series with the lower series of tu-

bular members. In this machine these valves are in the form of flat gates or blades 40 and 41, which operate in horizontal planes transverse to the axes of the measuring chambers. These gate valves enter slots 42 in the walls of the tubular funnels which are just large enough to admit them with sufficient clearance for the proper operation. This construction creates self-clearing or cleaning valve structures because each time the gate valves swing to open position the edges of the slots scrape off whatever material may have happened to cling to them. The forward edges 43 of both series are curved to conform to the curvature of walls of the measuring chambers. When these gate valves are closed, they are intended to completely prevent the material from passing them, but in the case of the upper series the closeness to which their edges approach the walls of the chambers is made dependent to a great extent upon the material being handled. If the material is fine grained or involves fine particles, then these gate valves are made so that their edges will actually contact, or practically so, with the walls of the chambers to prevent any leakage whatever past the gate valves. On the other hand, when the particles of material are coarse or large, as in the case of peas and beans, the gate valves are constructed to leave a clearance 44 between their edges and the walls, this being for the purpose of preventing the particles from actually being crushed and broken between the edges of the gate valves and said walls, but it is understood, however, that this clearance is sufficient to prevent crushing without allowing the material to pass through. The gate valves of the lower series of course do not require this clearance, because they are always in closed position before the material is admitted to the measuring chamber, and hence they do not have to work through a column of material in the manner that the upper gate valves do. The upper series of gate valves are carried on arms 45 which are mounted on vertical shafts or spindles 47. The shafts 47 are mounted to rotate in bearings 48 which in this case are formed integral with the hopper extensions, but they cannot move longitudinally in these bearings because of collars 49 above the bearings and hubs of the arms 45 below the bearings, consequently any vertical adjustment of the hopper will also carry the shafts therewith. These arms 45 are keyed to the shafts to be rotated thereby. The gates of the lower series, however, are mounted on bell-cranks which are rotatable independently of the shafts. The hubs of these bell-cranks are elongated to form bushings 50 which are rotatable in bearings in the arms of the spider, but they are maintained in definite relation to the spider by set screws 51 op-

erating in grooves in the bushings 50. Thus a relative adjustment of the upper and lower sections of the filler head operates to correspondingly space the gate valves relatively to each other when the capacity of the measuring chambers is varied.

The shafts 47, however, simply slide vertically in the bushings of the bell-cranks, and thus adapt themselves to the adjustment. At their lower ends these shafts carry arms 55 on the ends of which are rollers 56 which ride on the cam surface 59 of the large central cam, but the depth of this cam surface is such that even though the rollers 56 occupy different vertical positions with respect to the cam in accordance with the adjustment of the mechanism, their operating relation to the cam is maintained. The short arms of the bell cranks of the lower gate valve series have similar rollers 57 which likewise cooperate with a cam surface 58 on the upper portion of the central cam member. By reason of the construction previously described, these rollers 57, however, do not move vertically relative to the cam member when the adjustments with the machine are made because there is no relative movement between the cam member and the spider. The upper cam surface 58 operates the lower gate valves, and the lower one 59 operates the upper set of gate valves. These cam surfaces operate only to close the gate valves and they occupy each substantially one-half of the circumference of the cam member, but are oppositely disposed to each other because during substantially the initial or filling-half revolution of the filler head the upper gate valves are closed and during the remainder of the revolution the lower gates are closed. The cans are fed successively, by any suitable means, into the space between the mouths of the measuring devices and the supporting table surface upon which the cans travel. In this particular structure I have shown as a feeding mechanism a curved chute 60 leading from a suitable source of can supply. The cans are placed in the chute, one succeeding the other, and the weight of the column of cans operates to shift them in the chute as fast as the end can is removed, the cans being fed to the mechanism in a vertical position with their bottoms resting upon the table surface. Each measuring device has depending therefrom a suitable pusher or propelling device 61, which in this construction is simply a curved blade adapted to embrace the side wall of the can and propel the can before it. This blade is curved, however, on a radius corresponding to that of the curved wall of the smallest size can. This makes a self-centering arrangement for any size can within the range of the machine, because the can of larger diameter than the smallest simply contacts with the two vertical edges 61^a of

the pusher, thus causing the can to occupy the proper position with respect to the mouth of the filling devices. The cans are discharged from the machine in this structure at a point about three-quarters of a revolution (considering the direction of rotation of the machine) from the point at which they enter. They may be taken or discharged in any suitable manner best adapted to the requirements of the particular conditions. In the present structure I have shown a horizontal rotating table J positioned at the delivery point and overlapping the table or can runway, but its surface is made flush with the can runway surface so that the cans pass directly from the supporting surface onto this rotating table. The table J rotates in the same direction as the filler head; but as soon as the cans move onto the table J, they are carried by this table and shunted off from the can runway. By this table they may be carried to a syringing machine, such as disclosed in my copending application, hereinbefore mentioned, or disposed of in any suitable manner. In this machine the table J is driven from the central gear 6 by a shaft 6^a and bevel pinions 6^b, and the gear 6^c fastened to said table.

The gate valves are opened by pins or upstanding rods 62 and 63, which are adapted to be engaged respectively by small studs 64 on the lower gate valve arms and lugs 65 on the arms 55 of the upper gate valves. Reference to Figs. 3 and 5 clearly shows the relative position of these gate valve operating mechanisms. The cam surface 59 begins at a point such that it will operate to close the upper gate valves in succession preferably just before a can is engaged by a pusher. This cuts off the further supply of material from the hopper to the measuring chamber, this chamber having been previously filled on the last half of the preceding revolution. Shortly after the can is in position and starts to move with its measuring device the upstanding pin 62 operates to open the lower gate valve and permit the measured quantity of material to drop directly into the can. This filling operation may consume whatever portion of the half revolution the particular conditions require, because the lower gate valves are not closed and the upper ones opened until the cans and measuring devices have traveled the initial half revolution. However when the lower gate valve rollers reach the beginning 58^a of cam 58 the lower gate valves close, and shortly after the upper gate valves open by engagement with the upstanding pin 63 and permit the material to flow or drop from the hopper into the measuring chambers until the chambers are filled, this chamber filling operation may consume the whole or any portion of the remaining half revolution. The lugs 64

and 65 of the respective gate valves engage their respective pins 62 and 63 on the sides thereof and slide free thereof as soon as the gate valves are opened, hence these operating devices adapt themselves to any vertical adjustment of the machine and without special adjustment *per se*.

I claim:

1. In a can filling machine, the combination of a frame having a fixed can-supporting table member, means for moving cans on the table member, a vertical shaft supported in said frame, means for rotating the shaft, means for vertically adjusting said shaft, a multiple can filling head entirely supported and rotated by said shaft and comprising a rotating hopper and adjustable measuring funnels, said filling head being vertically adjustable as a unit by the adjustment of the shaft to adapt the structure to different sizes of cans.

2. In a can filling machine, the combination of a frame having a fixed can-supporting surface at a constant level, means for moving cans over said surface, a rotary reservoir, a plurality of measuring devices moving with said reservoir and embodying upper members connected with said reservoir, and lower members telescoping to form variable capacity measuring chambers, individual gate valves associated with said upper and lower members and controlling the filling and discharging of said measuring devices, a supporting and driving shaft for bodily raising and lowering the reservoir, measuring devices and gates as a unit with respect to level of said can-supporting surface to adapt the machine to different sizes of cans, means operable during the rotation of said measuring devices for individually operating said valves, and means for successively feeding the cans to said can-supporting surface in position for said measuring devices.

3. In a bulk filling machine, the combination of a rotary hopper and a series of measuring devices rotating therewith and embodying a series of funnels and a plurality of series of individual gate valves in said funnels, a stationary can supporting table, means for moving cans over said table, means for bodily raising and lowering said hopper and measuring devices as a unit relatively to said table to adapt the machine to different sizes of cans, and means for varying the vertical distances between said series of gate valves to vary the capacities of the measuring devices.

4. The combination of a rotary reservoir having a plurality of tubular extensions directly depending therefrom and communicating therewith, a horizontal rotary gate valve for each extension controlling the passage of material thereinto from the reservoir, an independent series of tubular mem-

bers telescoping with said extensions to form measuring chambers, an independent horizontal rotary gate valve for each tubular member, and means for relatively adjusting the tubular members and tubular extensions and their respective gates to vary the capacity of the measuring chambers.

5. The combination of a rotary reservoir having a plurality of tubular extensions depending directly therefrom and communicating therewith, a rotary gate valve for each extension controlling the passage of material thereinto from the reservoir, an independent series of tubular members telescoping with said extensions and forming therewith a plurality of measuring chambers, an independent rotary gate valve for each tubular member, means for adjusting said members and tubular extensions and their respective gate valves to vary the capacity of the measuring chambers, and mechanism for individually opening and closing said gate valves in time relation.

6. A rotary multiple can filling machine comprising a rotating reservoir having a plurality of telescoping funnels directly communicating therewith, an independent series of individual upper and lower gate valves for controlling the filling and discharging of said funnels; means for adjusting said telescoping members to relatively space the gate valves of the upper and lower series for varying the measuring capacity of said funnels, and means for actuating said gate valves individually in a predetermined time relation.

7. In a multiple can filling machine comprising a rotary reservoir having a plurality of depending telescoping funnels directly communicating therewith, an upper gate valve and a lower gate valve carried with each of said funnels for controlling the filling and discharging of the funnels, means for relatively spacing the upper and lower gate valves to vary the measuring capacity of said funnels, means for individually actuating said gate valves in a predetermined timed relation, and a can pusher associated with each funnel for propelling a can in proper relation beneath the funnel.

8. The combination of a rotary hopper having depending telescoping funnels directly communicating therewith, a vertical adjustable shaft for driving and vertically adjusting said hopper, a support for the lower sections of said funnels mounted on and adjustable by said shaft in unison with said hopper and adjustable on the shaft to adjust the sections of the funnels, a gate valve for each upper section and a gate valve for each lower section of said funnels, and a central stationary cam mounted on the shaft for actuating said gate valves.

9. The combination of a rotary hopper having depending telescoping funnels di-

rectly communicating therewith, a vertical adjustable shaft for driving and supporting said hopper, an independent support for the lower sections of said funnels mounted on
5 said shaft and adjustable therewith in unison with the hopper, gate valves for the upper and lower sections of said funnels, a central stationary cam mounted on the shaft for actuating said gate valves, and means
10 for adjusting the shaft to raise and lower the hopper with respect to the lower sections of the funnels, whereby the measuring capacity of the funnels is varied.

10. The combination of a rotary hopper
15 having a plurality of tubular outlets, a horizontal gate valve for each outlet, a vertical adjustable shaft supporting and rotating said hopper, a plurality of tubular members telescoping with said outlets and forming
20 therewith variable capacity measuring chambers, a horizontal gate valve for each of said tubular members, a common support for said tubular members relatively adjustable on the shaft, a stationary operating cam on the
25 shaft common to all of said gate valves, and an adjustable support for the shaft to raise and lower the hopper and the gate valves associated with the outlets thereof.

11. The combination of a constantly rotating hopper, a plurality of measuring funnels rotating with said hopper, a horizontally swinging flat gate valve moving with each funnel controlling the passage of material into the funnel from the hopper, a second
35 horizontally swinging flat gate valve moving with each funnel controlling the passage of material from the funnel, and means operable during the travel of said funnels and hopper for successively operating each gate
40 valve individually in predetermined time relation.

12. The combination of a rotary hopper having an annular series of depending measuring funnels rotating therewith, upper and
45 lower gate valves mounted on vertical pivots and traveling with said measuring funnels and individually movable into and out of said funnels to control the passage of material from the hopper to the funnels and from
50 the funnels to the cans, and means for op-

erating said gate valves in predetermined time relation.

13. The combination of a rotating hopper having an annular series of measuring funnels rotating therewith, upper and lower
55 gate valves rotating with said measuring funnels and individually rotatable into and out of said funnels to control the passage of material to and from the funnels, a central cam around which said gate valves and fun-
60 nels travel for operating said gate valves in predetermined time relation.

14. The combination of a constantly rotating supply hopper having an annular series of depending measuring funnels, a pair
65 of spaced gates moving with each funnel, a vertical shaft adjacent each funnel on which the gates are mounted to swing horizontally into and out of the funnel, and means disposed in the path of the moving gates for op-
70 erating the gates of each pair successively in predetermined time relation.

15. The combination of a constantly rotating supply hopper having an annular series of depending measuring funnels, a pair of
75 spaced gate valves moving with each funnel and mounted on a vertical pivot to swing horizontally into and out of said funnel, means disposed in operating relation to the moving gate valves for swinging the gate
80 valves of each pair in predetermined time relation, and a pusher carried by each funnel for propelling a can therewith.

16. In a can filling machine for granular material, the combination of rotating hopper
85 having a depending tubular funnel, said funnel having a slot in its wall, a plate mounted on a vertical pivot adjacent said funnel and forming a gate valve movable through said slot to open and close the passage through
90 said funnel, and when moved through the slot into the funnel to leave a narrow space between its edge and the interior wall of the funnel, and means for swinging said plate.

Signed by me at Chicago, Illinois, this 7th
day of August, 1916.

CLARENCE E. STEERE.

Witnesses:

E. H. CLEGG,
AMY JEHLE.