

June 29, 1948.

W. DE BACK
CAN FILLING MACHINE

2,444,155

Filed Nov. 27, 1944

5 Sheets-Sheet 1

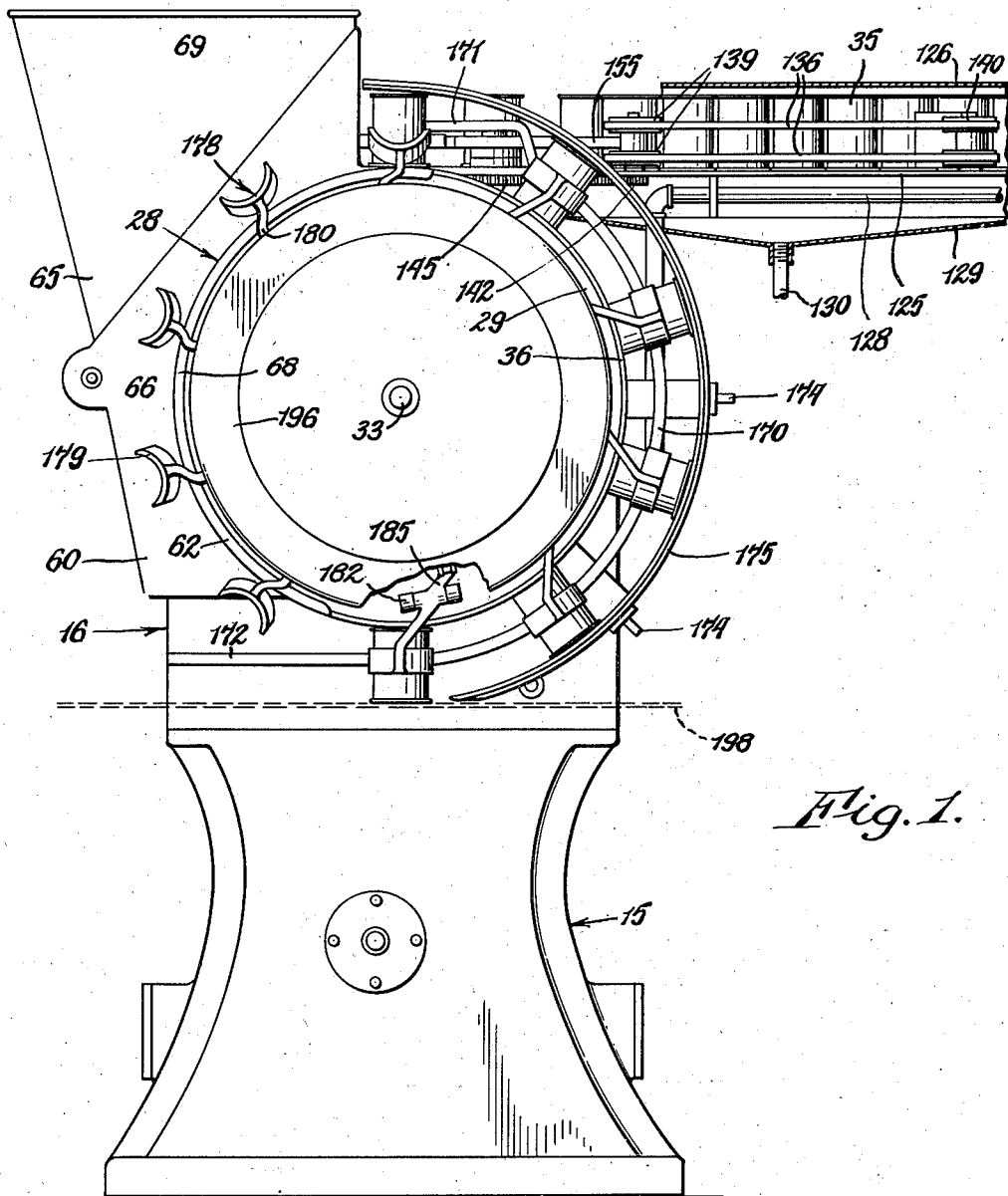


Fig. 1.

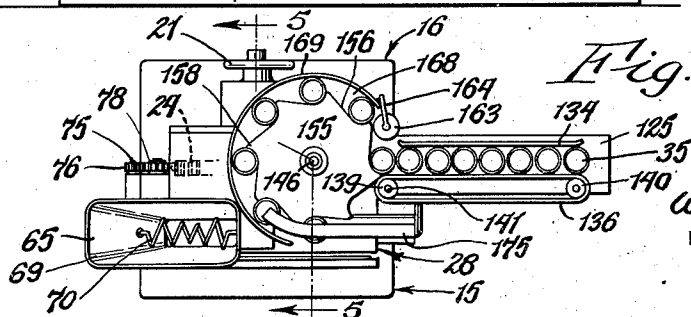


Fig. 2.

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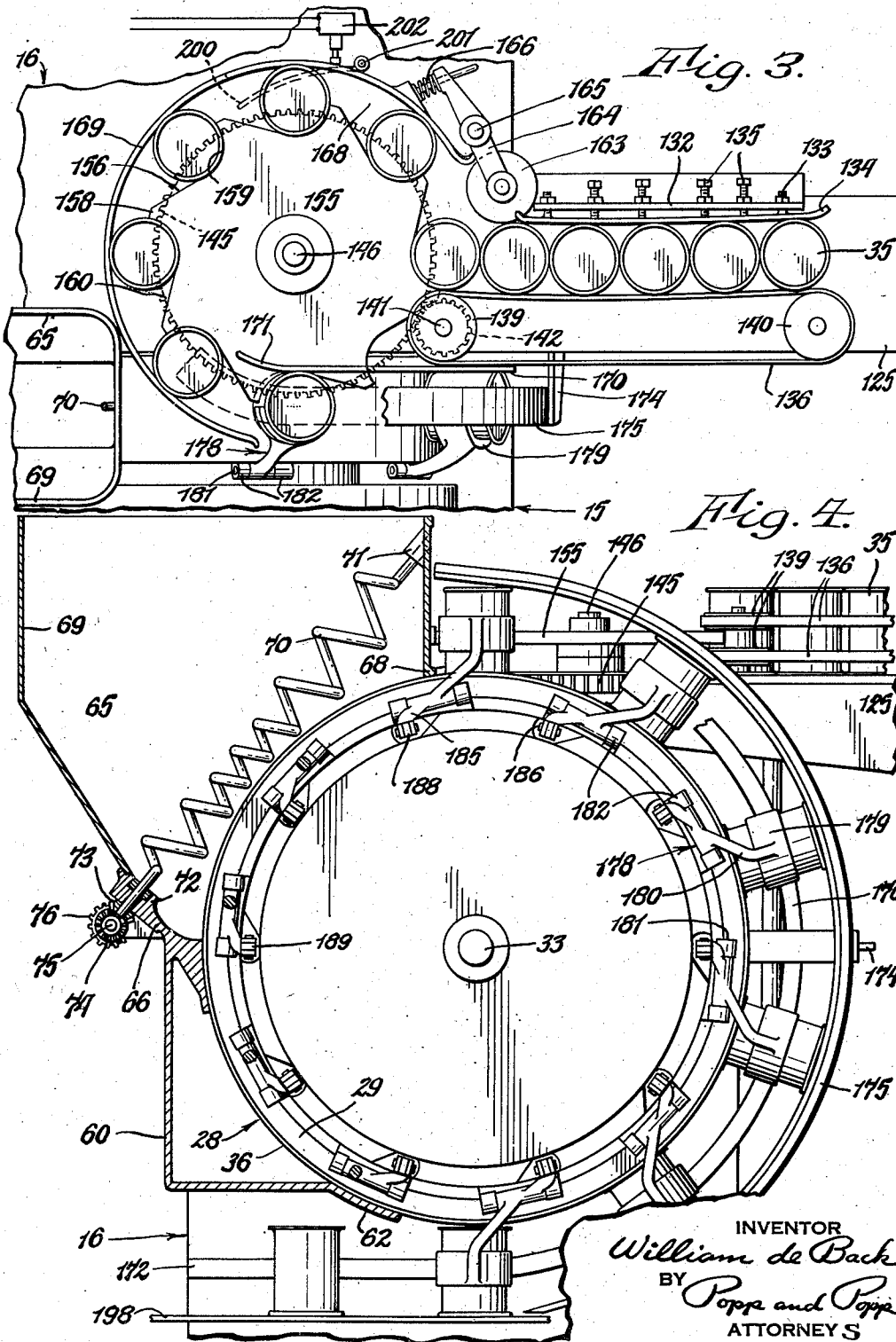
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W. DE BACK
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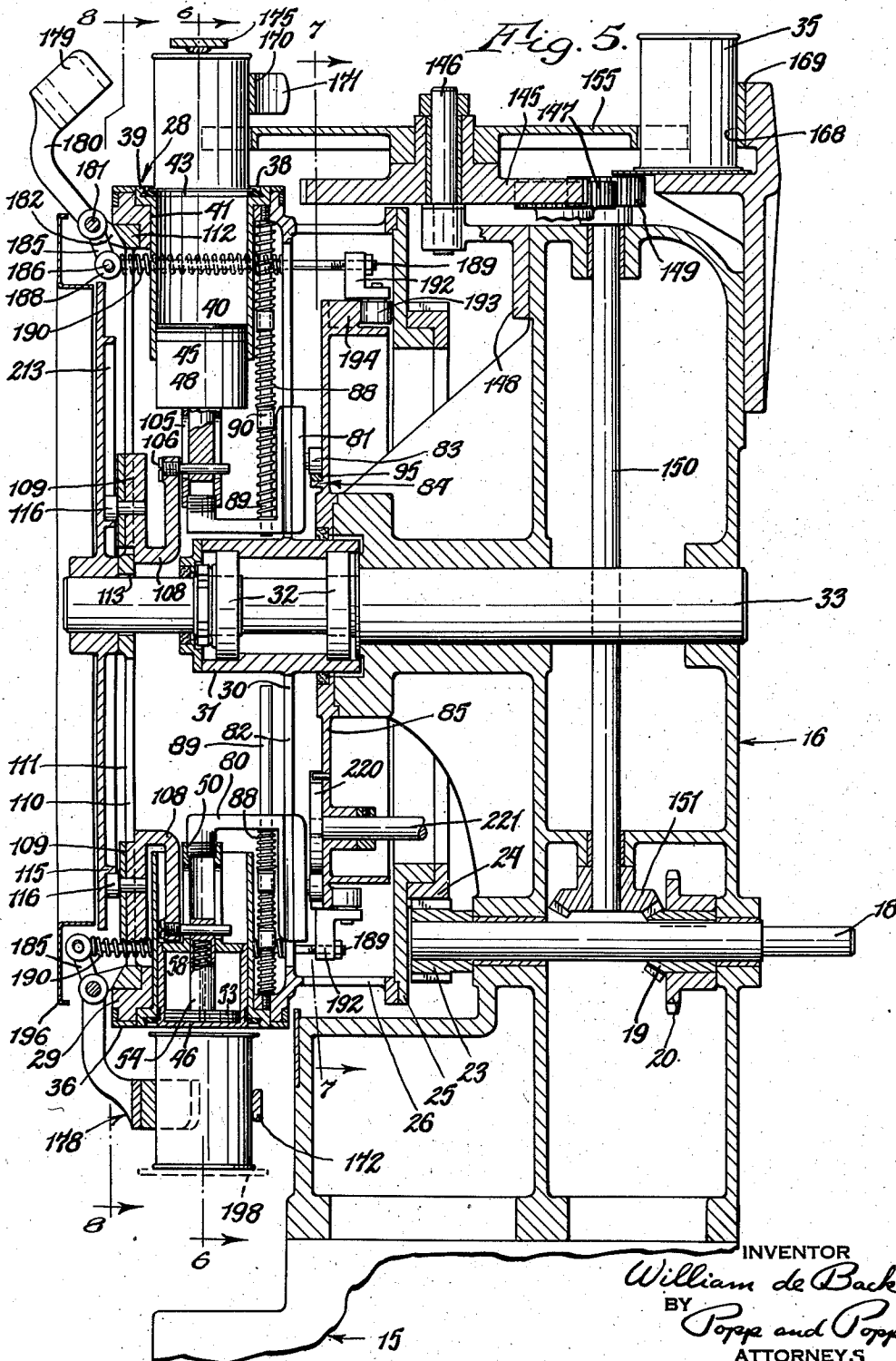
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5 Sheets-Sheet 4

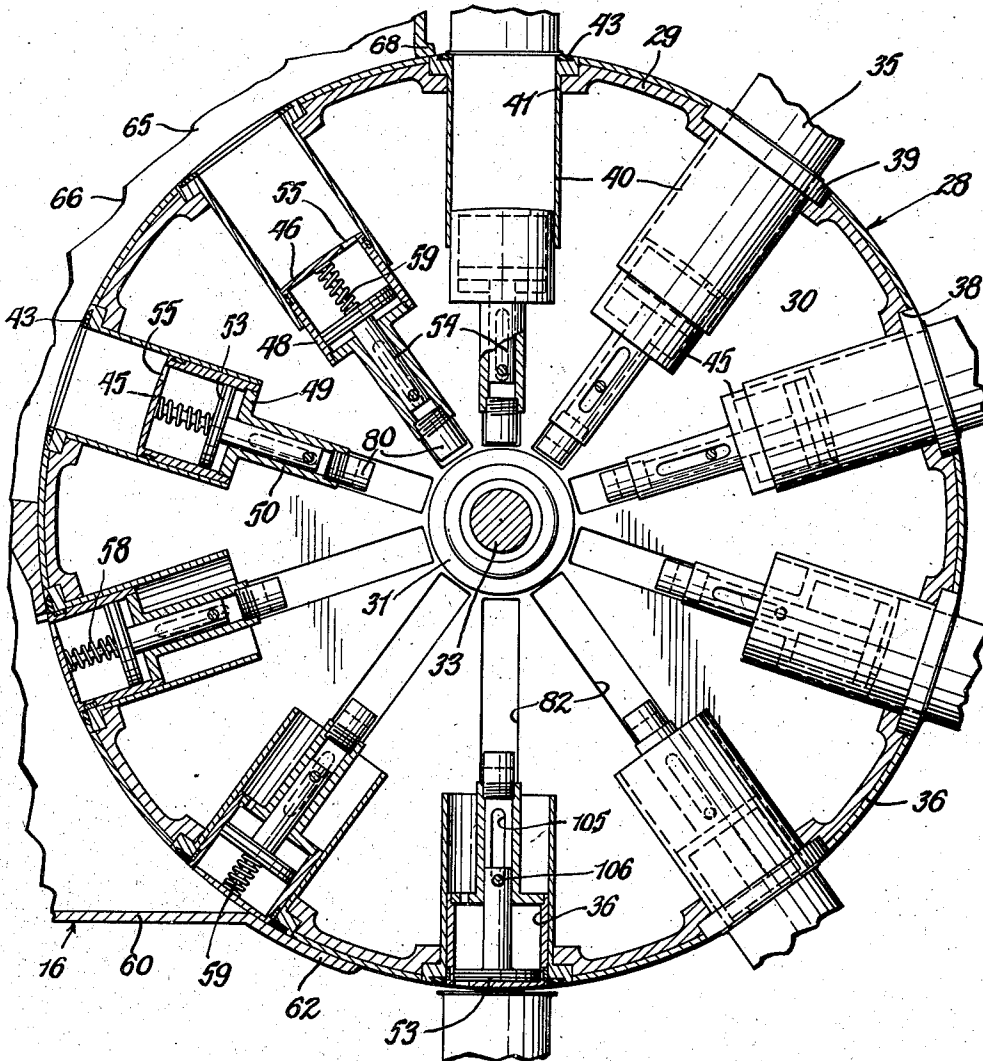


Fig. 6.

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CAN FILLING MACHINE

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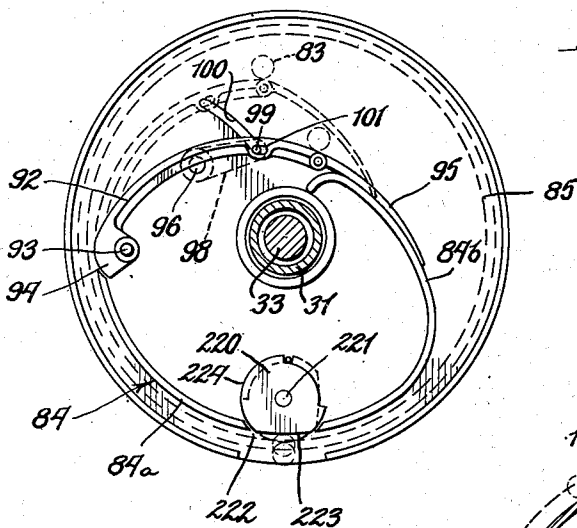


Fig. 7.

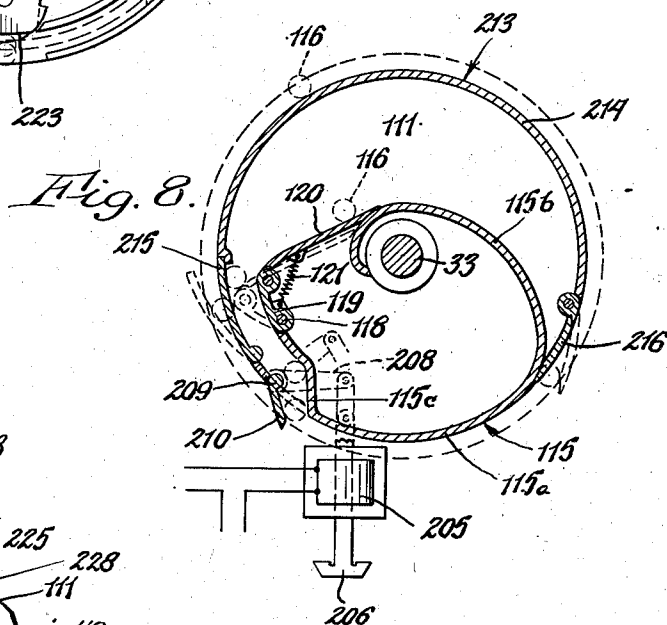


Fig. 8.

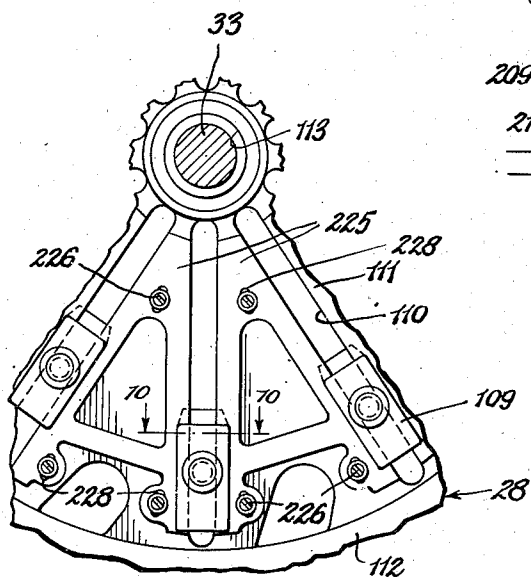


Fig. 9.

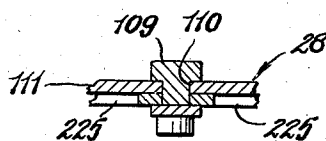


Fig. 10.

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UNITED STATES PATENT OFFICE

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CAN-FILLING MACHINE

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Application November 27, 1944, Serial No. 565,197

26 Claims. (Cl. 226—100)

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This invention relates to a can filling machine and more particularly to a high speed can filling machine which fills a succession of cans with measured amounts of fruit or vegetables and a liquid and discharges the filled cans for further processing.

One of the principal objects of the invention is to provide such a can filler which operates at high speed, rapidly receiving empty cans and discharging them in a filled condition for further processing.

Another object of the invention is to provide such apparatus which will accurately fill each can with the exact amount of solid and liquid content for which the machine is set, the measured amounts of liquid and solids being separately fed to each can for this purpose.

Another aim is to provide such a can filling machine which is reliable in operation and is not adversely affected by out of round or other otherwise slightly defective cans being supplied to the machine.

Another purpose is to provide such a machine in which the solids and liquids can be fed to the machine either in batches or as a continuous stream, thereby to render the machine applicable to the particular conditions encountered in the cannery in which the machine is installed.

Another object is to provide such a machine in which the absence of a can in any one of the pockets which receive the succession of cans is immediately detected and the machine adjusted to prevent the empty pocket from being filled with either liquid or solid material.

Another object is to provide such a machine which can readily be adjusted to provide the exact fill of liquid and solid contents of each can as desired.

Another object is to provide such a machine in which leakage of the liquids or solids in filling the cans is avoided.

Another object is to provide such a can filling machine in which the contents in the filled can can be tamped thereby to secure a solid pack.

Other objects are to provide such a can filling machine which is simple in construction, considering the function which it performs and which will stand up under conditions of severe and constant use without getting out of order or requiring repairs.

In the accompanying drawings:

Fig. 1 is a side elevation of a can filling machine embodying the present invention.

Fig. 2 is a simplified top plan view thereof on a reduced scale.

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Fig. 3 is a fragmentary top plan view on an enlarged scale.

Fig. 4 is a fragmentary vertical longitudinal section through the liquid reservoir and solid material hopper and showing the face plate removed.

Fig. 5 is a fragmentary vertical transverse section taken on line 5—5, Fig. 2.

Figs. 6, 7 and 8 are fragmentary vertical longitudinal sections taken on the correspondingly numbered lines on Fig. 5.

Fig. 9 is a fragmentary view, similar to Fig. 6 and showing a modified form of the invention.

Fig. 10 is a fragmentary sectional view taken on line 10—10, Fig. 9.

The operating parts of the can filling machine are mounted on a standard which comprises a base section 15, which can contain an electric motor (not shown) to drive the machine, and a top section 16 which is formed to support the various parts of the machine as hereinafter described.

Suitably journaled in this top section 16 of the standard is a main drive shaft 18 which carries a bevel gear 19 keyed thereto, a drive sprocket 20 being fast to the hub of this bevel gear 19. This drive sprocket 20 can be connected by a chain or in any other suitable manner (not shown) with the power source within the base 15 of the machine. The end of the main drive shaft 18 also is shown as projecting outwardly from the rear side of the top section 16 of the standard; this permitting a hand wheel 21 to be attached thereto as shown in Fig. 2 or permitting the operating power to be taken from an external source.

A gear 23 is fast to the forward end of the main drive shaft 18, this gear meshing with a vertical bull gear ring 24. This bull gear ring 24 is fast to a disk 25 which projects radially outward from the forward face of the bull ring gear and is secured at its periphery to the rear flange of a drum 26 which can be provided with holes in its periphery, as shown in Fig. 5, to permit access to the interior thereof. This drum 26 is integral with a can filling wheel indicated generally at 28. This can filling wheel has a cylindrical rim 29 which is integral with the drum 26 and has an integral rear vertical wall 30 which is integral with a hub 31. This hub is supported by a pair of anti friction bearings 32 on the projecting end of a stationary horizontal rod 33, this rod being secured to the top section 16 of the standard in any suitable way.

The cans 35 to be filled are brought with their mouths or open ends into engagement with the periphery of the rim 29 of the can filling wheel

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28 and this rim is preferably faced with a cylindrical sleeve or tire 36. At spaced intervals this facing sleeve or tire 36 of the can filling wheel is provided with a circular opening leading to a pocket 38 provided in the rim 29 of the can filling wheel, each of these pockets 38 receiving the end flange 39 at the outer end of a radial sleeve or cylinder 40, the body of each of these cylinders extending through a circular opening 41 in the bottom of each pocket 38 as best shown in Fig. 6. The sleeves or cylinders 40 are therefore radially supported at their outer ends on the rim 29 of the can filling wheel through which they extend, these sleeves or cylinders 40 being regularly spaced around the can filling wheel. The purpose of these radial sleeves or cylinders 40 is to receive measured charges of the liquid and solids which are discharged against a can 35 held with its mouth or open end against the outer end thereof. To prevent leakage while the cans 35 are being so filled, the end flange 39 of each sleeve or cylinder 40 is provided with a ring or gasket 43 of rubber or other soft, resilient, plastic material which surrounds the bore of the sleeve or cylinder and is adapted to receive the open end of the can, as hereinafter described, and provide a leaktight seal between each can and the can filling wheel.

Within each of these radial sleeves or cylinders 40 is arranged a compound piston or pair of pistons, one drawing a measured charge of liquid into the cylinder and the other drawing a charge of solids into the cylinder. The piston 45 for the solids comprises an end head 46 and an integral skirt 48, this skirt sliding in the bore of the corresponding cylinder 40 and being provided with one or more piston rings to prevent leakage. The inner end of each skirt 48 is closed by an end head 49, this end head having an axial tubular stem 50 which extends radially toward the axis of the can filling wheel, the bore 51 through this tubular stem 50 leading to the chamber formed between the heads 46 and 49 of the piston. Within this chamber is mounted the plunger or piston 53 for the liquid, each piston 53 sliding in the bore of the corresponding skirt 48 and having one or more piston rings to prevent leakage. This plunger or piston 53 for the liquid is provided with a stem 54 which slides in the bore 51 of the tubular stem 50 of the piston 45 for the solids.

The solids or liquids are drawn into the sleeves or cylinders through the outer ends thereof and to permit the plunger 53 to act on the liquids, the outer head 46 of each piston 45 for the solids is provided with one or more openings 55, these openings permitting the liquid to enter the chambers 56 in an amount dependent upon the degree of retraction of the plungers 53. Also in each of these chambers 56 is arranged a helical compression spring 58, these helical compression springs being shown as each surrounding a stem 59 fast to the bottom of the piston head 46 and sliding in a bore provided in the stem 54 of the corresponding plunger 53, the springs 58 being seated in these bores, as shown at the bottom of Fig. 5. These helical compression springs 58 tend to hold the plungers 53 in their fully retracted position and hence tend to hold the chambers 56 fully distended.

The can filling wheel 28 rotates clockwise as viewed in the drawings and to fill each sleeve or cylinder 40 with a measured amount of liquid, the periphery of the can filling wheel is first brought into a liquid reservoir 60. This liquid

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reservoir 60 is shown as formed integrally with the top portion 16 of the machine standard and as having an open side facing the periphery of the can filling wheel 28, the rim 62 of the reservoir around this open side engaging the periphery of the can filling wheel so as to prevent leakage of the liquid between the reservoir and can filling wheel, this reservoir being located on the rising side of the can filling wheel. The reservoir 60 can be maintained full of the liquid, such as brine or syrup, in any suitable manner.

After leaving the liquid reservoir 60 the periphery of the can filling wheel passes under the open bottom of a solid material hopper 65. The lower part 66 of this hopper is preferably made integral with the top section 16 of the machine standard and around its open lower end is provided with a rim 68 which engages the periphery of the can filling wheel 28 so as to prevent leakage of the solids between the hopper and the can filling wheel. The upper part 69 of the hopper is preferably removably attached to the bottom part 66 so as to facilitate the cleaning thereof and this upper part is open to permit the solid materials to be poured as a stream or in batches into the hopper.

It is desirable to agitate the solid materials in the hopper 65 without, however, bruising the same, so as to insure their flow into the open ends of the sleeves or cylinders 40 presented by the rotating periphery of the can filling wheel 28. For this purpose a wire spiral 70 is arranged in the bottom of the hopper with its axis arranged generally tangential to the can filling wheel 28 and with its convolutions closely approaching the periphery thereof. The upper end of this wire spiral 70 is preferably journaled in a bearing 71 in the upper wall of the lower part 66 of the hopper, as best shown in Fig. 4 and the lower end of this wire spiral 70 projects through a bearing 72 in the lower wall of the lower part 66 of the hopper. To the lower end of the wire spiral 70 which projects outwardly from the hopper is secured a bevel pinion 73 which meshes with a bevel pinion 74 fast to a horizontal shaft 75 which is suitably journaled on the exterior of the lower part 66 of the hopper. This shaft extends forward and at its rear end is fast to a gear 76. As best shown in Fig. 2, this gear 76 meshes with an idler gear 78 which is suitably journaled on the rear wall of the hopper and which meshes with the bull gear ring 24 through a suitable hole provided in the top portion 16 of the machine standard.

Means are provided for reciprocating each piston 45 for the solid materials in proper sequence to draw in a charge from the hopper 65 and to expel this charge into a can positioned on the periphery of the can filling wheel 28. For this purpose the inner end of the stem 50 of each piston 45 is fast to the end of an arm 80 which, as best shown in Figs. 5 and 6 projects forwardly from an elongated shoe 81 the longitudinal sides of which are slidably mounted in radial slots 82 provided in the rear wall 30 of the can filling wheel 28. Each of these shoes 81 carries a roller 83 on its rear side, these rollers riding on a cam track 84 provided on the front face of a stationary cam disk 85. The hub of this cam disk is arranged to surround the hub 31 of the can filling wheel 28 and is fixed to the adjacent part of the top section 16 of the machine frame.

The roller 83 of each shoe 81 is held in engagement with the radially outwardly facing side of the cam track 84 by a plurality of helical com-

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pression springs 88 which are interposed between the rim 29 of the can filling wheel 28 and the arm 80 of each shoe 81 so that these springs also serve to yieldingly hold each piston 45 for the solid materials in its retracted position in the bore of the corresponding cylinder or sleeve 40. Each series of these helical compression springs 88 surround a rod 89 which is fast to the rim 29 of the can filling wheel 28, as shown in Fig. 5, and projects radially inward through a hole provided in the arm 80 of the corresponding shoe 81. Small sleeves 90 are interposed between the ends of the springs 88 of each series. The purpose of providing these helical compression springs 88 in series with the small sleeves 90 interposed therebetween is to permit the remainder of the springs to function if one of the springs should break. Thus if a single spring were provided and were to break, the broken ends would wind up on each other and the spring would be rendered inoperative. By sectionalizing the springs as shown such breaking and winding up of one spring would not affect the other two springs which would continue to function in retracting its piston 45 and in keeping its roller 83 in engagement with the cam track 84.

A side elevation of the cam plate 35 and its cam track 84 is shown in Fig. 7. From this view it will be seen that the cam track has a radially salient part 84a and a radial receding part 84b. When a roller 83 is traveling along salient part 84a its piston 45 is held in its fully projected position in the outer part of its sleeve or cylinder 40, against the resistance of its springs 88, as illustrated at the bottom of Figs. 5 and 6. This position is maintained while the filled can is being discharged from the bottom of the can wheel and while the piston is traversing the liquid reservoir 60. At about the nine o'clock position of the piston 45 it enters the solid materials hopper 65 and its roller 83 also encounters the receding part of the cam track. As the roller moves radially inward under the influence of the springs 88 in following this receding portion of the cam track 84, its piston 45 likewise moves inwardly thereby drawing a charge of the solid materials from the hopper 65 into its sleeve or cylinder 40. At about the twelve o'clock position a can is applied, upside down, over the mouth of the sleeve or cylinder 40 and at this time the piston 45 is fully retracted, as illustrated at the top of Figs. 5 and 6. Thereafter the roller 83 encounters a rising part of the cam track 84 and is forced outwardly, together with its piston 45, against the resistance of its springs 88. This forces the charge of solid materials from the cylinder or sleeve 40 into the can, the transfer being complete before the six o'clock position when the can is released.

It will be seen that the amount of the charge of the solid materials in each sleeve or cylinder 40, and hence in each can, can be adjusted by varying the shape of the cam track 84, that is by varying the degree of radial projection of this cam track opposite the opening at the bottom of the hopper 65 for the solid materials. To this end that portion of the cam track 84 along the hopper 65 is in the form of an arcuate arm 92 which is pivoted to the cam disk or plate 35 at 93 and has a rounding nose 94 which provides a smooth transfer of the rollers 83 from the stationary cam track section 84a to this movable section 92 of the cam track in all positions of adjustment of the latter.

This movable section 92 of the cam track can be moved from the full to the dotted line position shown in Fig. 7 or to any intermediate position.

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In the full line position the pistons 45 are drawn radially inward their maximum extent while traversing the hopper 65 for the solid materials and hence the maximum charge of solid materials will be drawn into the sleeves or cylinders 40. In the dotted line position shown in Fig. 2, of the movable section 92 of the cam track, the pistons 45 are drawn inwardly their minimum extent while traversing the hopper 65 for the solid materials and hence the minimum charge of solid materials will be drawn into the sleeves or cylinders 40. In order to provide a smooth passage of the rollers 83 from the outer end of the movable section 92 of the cam track to the stationary part 84b thereof in all adjusted positions of the movable cam track section 92, a tail piece track section 95 is pivoted on the outer end of the movable section 92 and has its outer end arranged to slide along the radially outward face of the stationary part 84b of this cam track.

In order to adjust the movable section 92 of the cam track to any position intermediate the full and dotted line positions in Fig. 2 to so vary the fill of solid materials in each can, a shaft 96 is pivoted on the cam disk or plate 35 to project rearwardly therefrom. On this adjusting shaft is fixed a lever 98, this lever being mounted in rear of the cam disk or plate 35 and having a pin 99 at its outer end which projects through an arcuate slot 100 in the cam disk or plate 35, this arcuate slot being concentric with the adjusting shaft 96. The pin 99 engages a slot 101 in the movable section 92 of the cam track. Any manual means (not shown) can be employed to move the adjusting shaft 96 to different positions and it will be seen that in any position of this adjusting shaft its arm 98 and pin 99 will hold the movable section 92 of the cam track in a position to effect a corresponding fill of each can.

In a similar manner any desired charge of liquid can be provided in each can. For this purpose the tubular stem 50 of each piston 45 is longitudinally slotted on its front and rear sides, as indicated at 105 in Figs. 5 and 6, and in these slots of each piston stem is arranged a pin 106 which extends through the stem 50 of the corresponding plunger 53 and extends outwardly from the slots 105. To one end of each of these pins 106 is secured the arm 108 of an elongated shoe 109, the sides of this shoe being guided by the longitudinal edges of radial slots 110 provided in a cam disk or plate 111. This cam disk or plate 111 has a rim 112 which is secured to the rim 29 of the can filling wheel 28 and is provided at its center with a hole 113 around the horizontal supporting rod 33 on which the can wheel 28 is journaled. This cam disk or plate 111 carries a cam track 115 which projects axially inward from its inner face and is engaged on its radially outward side by rollers 116 carried by the several shoes 109. The cam track 115a is provided with axially salient and receding portions 115 and 115b and as the rollers 116 traverse the cam track the shoes 109 and plungers 53 are reciprocated to draw the desired charge of liquid into the chamber 55 inside each piston 45 and to expel this charge into the can. Each plunger 53 is yieldingly held in its radial inward position by its helical compression spring 53, these springs thereby yieldingly holding the rollers 116 against the radially outward faces of the cam track 115 and causing these rollers to follow this cam track.

As with the cam track for the solid materials, it will be seen that the amount of the charge of liquid drawn into each piston 45 by its plunger

53, and later expelled into each can, can be adjusted by varying the shape of the cam track 115, that is, by varying the degree of radial projection of this cam track opposite the opening of the reservoir 60, for the liquid. To this end, as best shown in Fig. 8, that portion of the cam track 115 along the reservoir 60 is offset radially inward, as indicated at 115c and terminates adjacent an adjusting shaft 118 which is journaled in the cam disk or plate 111 and can be manually set to any desired adjusted position by any suitable manual means (not shown). This adjusting shaft 118 carries a movable section 119 of the cam track 115, in the form of an arm onto which the rollers 116 ride smoothly from the stationary section 115c onto the movable section 119 of the cam track in all positions of adjustment of this movable section of the cam track.

Upon manual adjustment of the adjusting shaft 118, this movable section 119 of the cam track 115 can be moved from the full to the dotted line position shown in Fig. 8, or any intermediate position. In the full line position the plungers 53 are permitted to remain drawn inwardly their maximum extent, this being the position determined by the innermost part of the cam track section 115c and hence the maximum charge of liquid is retained in the pistons 45. In the dotted line position, shown in Fig. 8, of the movable section 119 of the cam track, the plungers 53 are moved outwardly while traversing the liquid reservoir 60 and hence a part of the charge of liquid previously drawn into the pistons 45 is expelled back into the reservoir 60. The charge of liquid retained in the pistons 45 is thereby reduced and hence less liquid is transferred to the cans. In order to provide a smooth passage of the rollers 116 from the outer end of the movable section 119 of the cam track to the stationary part 115b thereof, in all adjusted positions of the movable cam track section 119a, a tail piece track section 120 is pivoted on the outer end of the movable track section 115 and has its outer end arranged to slide along the radially outward face of the stationary part 115b of the cam track. This sliding engagement is insured by a tension spring 121 interposed between the hub of the movable cam track section 119 and an intermediate part of the tail piece 120.

The empty cans 35 to be filled are placed open end down on a receiving table or shelf 125 which can be secured to project from the top section 16 of the machine frame. If desired the cans on this table can be housed by a casing 126 as shown in Fig. 1 and the passing cans sterilized by upwardly directed jets of steam or water from a spray pipe 128. The water and condensate are caught in a pan 129 and wasted through a drain 130.

A wall 132 rises from the rear side of the feeding table 125 and on the front face of this wall is secured, by stud bolts 133 or in any other suitable manner, a horizontal metal strip 134 along which the cans are rolled in single file. In so rolling along this strip 134 the out-of-round cans are trued up and to adjust the forward projection of the strip 134 it is backed at spaced intervals by adjusting screws 135 carried by the wall 132.

The cans are rolled in single file along this horizontal strip 134 by the rear stretches of a pair of endless conveyer belts 136 which pass around vertical drive pulleys 139 at the inner end of the table 125 and around vertical idler pulleys 140 at the outer end of the table. The drive pulleys 139 are fast to a vertical drive shaft 141 which

is journaled in the top section 16 of the machine frame in any suitable manner and which carries a pinion 142 at its lower end.

This pinion 142 meshes with a large horizontal gear 145 which, as best shown in Fig. 5, is journaled on a vertical stub shaft 146 which is in turn mounted on a bracket 148 carried by the top section 16 of the machine frame. Through an idler 147 this large gear 145 is turned by a pinion 149, this pinion 149 being fast to a vertical shaft 150 which is journaled in the top section 16 of the machine frame in any suitable manner. A bevel gear 151 is fast to the lower end of this vertical shaft 150 and meshes with the bevel pinion 19, this last bevel pinion being fast to the main drive sprocket 20 as previously described.

On the hub of the large horizontal gear 145 is secured a can feed wheel 155. As best shown in Fig. 3, the periphery of this can feed wheel is formed to provide a series of pockets 156 formed by radially extending teeth or fingers 158. The advance side 159 of each of these teeth or fingers is shaped to conform to the curvature of the can and the trailing side 160 of each of these teeth or fingers inclines or slopes gradually to the base of the next succeeding finger 158 thereby to provide a pocket which freely receives the foremost can of the file being fed to the can wheel 155 and a pocket which securely holds the can fed thereto.

The can wheel 155 rotates counterclockwise as viewed in Fig. 3 and the can received by each pocket 156 from the file of cans fed by the endless belts 136 is first moved toward a roller 163 which is mounted to rotate about a vertical axis on the end of an arm 164. This arm is mounted to oscillate at its center about a pivot 165 carried by the top section 16 of the machine frame and a spring 166 moves the arm 164 to urge the roller inwardly or toward the cans being received in the pockets 156 of the can wheel 155. The purpose of this roller is to insure the proper placement of the cans 35 in the pockets 156 of the can wheel. Thus if one of the cans should be caught by the end of a finger or tooth 158 of the can wheel without having fully entered the pocket 156 it will engage and push outwardly on the roller 163. This roller thereupon exerts an inward pressure on the misplaced can which forces it into the bottom of the pocket 156 and in proper position to enter a circular can way 168 provided by a semi-circular track or guard 169 which surrounds the can wheel 155 from a point just beyond the placing roller 163 to the can transfer station near the top of the can filling wheel 28. This track or guard 169 serves to retain the cans 35 in the pockets 156 of the can wheel 155 even when this can wheel is rotating at a high rate of speed.

The forward parts of the can wheel 155 and the circular rail 169 extend over the top of the can filling wheel 28 and lead the succession of cans to the periphery thereof. The rotation of the can wheel 155 and can filling wheel 28 are synchronized so that each can is delivered over a corresponding sleeve or cylinder 40 with its mouth in engagement with the rubber washer or gasket 43 at the mouth of each sleeve or cylinder. At the top or crest of the can filling wheel the cans are successively transferred from the can wheel 155 to the can filling wheel 28 and for this purpose the upper end 171 of a rail 170, as best shown in Fig. 3, extends horizontally over the can wheel 155 tangentially thereto and behind the cans being brought to the transfer station at the crest of the can filling wheel 28. This upper end 171 of the rail 170 is arranged oppo-

site the leaving end of the semi-circular rail 169 and is preferably curved so as to engage each can as it is conveyed toward this transfer station and move it away from the axis of the can wheel 155, out of its pocket 156 and onto the periphery of the can filling wheel 28 in line with a corresponding sleeve or cylinder 40 thereon.

The rail 170, the upper end of which so serves to transfer the cans from the can wheel 155 to the can filling wheel 28, continues around the periphery of the can filling wheel 28 and terminates, below the can wheel 28, in a horizontal terminal portion 172. The portion of the rail 170 which curves around the can wheel 28 is held in spaced relation thereto by L-shaped brackets 174 which are mounted on the top section 16 of the machine frame and the lower horizontal end 172 of this rail is secured directly to the top section 16 of the machine frame. This rail engages the rear sides of the succession of cans 35 being conveyed around on the periphery of the can wheel and serves to prevent rearward displacement of the cans so conveyed.

In order to hold the cans in engagement with the rubber gaskets 43 as they travel around with the can filling wheel, another semi-circular rail 175 is carried by the forwardly projecting ends of the L-shaped brackets 174. The upper end of this semi-circular rail 175 is raised, as indicated in Fig. 1, to receive each can thereunder at the transfer station and in the continued movement of the cans along this rail 175 on the can filling wheel the rail comes into engagement with the closed ends of the cans and holds each can in firm engagement with the rubber gaskets 43 which surround each sleeve or cylinder 40 of the can filling wheel. This engagement is maintained until the cans reach the bottom of the can filling wheel 28.

The forward displacement of the cans 35 traveling around on the periphery of the can filling wheel is prevented by a series of C-shaped individual holders 178 each of which engages a can at the transfer station at the top of the can filling wheel 28 and releases this can at the bottom of this can filling wheel. Each of these holders comprises a C-shaped shoe 179 adapted to engage the bilge of the can at its forward side to hold the corresponding can against the rail 170 and mounted on the end of an arm 180. As best shown in Fig. 4 each arm 180 is provided with an elongated hub which, as best shown in Fig. 5, is mounted on a pivot pin 181. These pivot pins are arranged tangential to the can filling wheel 28 so that the movement of the arms 180 brings the C-shaped shoes into engagement with the forward side of a can positioned over the corresponding sleeve or cylinder 40 of the can filling wheel, and each pin 181 is carried by a pair of ears 182 projecting forwardly from the rim 112 of the cam disk or plate 111 which is secured to the rim 29 of the can filling wheel 28 as previously described.

To move each C-shaped shoe 179 into and out of engagement with each can positioned on the can filling wheel 28, a lever 185 projects from the hub of each arm 180 toward the axis of rotation of the can filling wheel 28. At its free end each of these levers 185 is bifurcated and carries a pivot pin 186 which connects with the enlarged head 188 provided at the forward end of a rod 189. These rods 189 extend rearwardly between the several sleeves or cylinders 40 of the can filling wheel 28 and each is guided by the rear wall 30 of the can filling wheel 28 in any

suitable manner for axial movement relative to the can filling wheel. A helical compression spring 190 surrounds each rod 189 and is interposed between its head 188 and the rear wall 30 of the can filling wheel 28. These springs 190 therefore urge the C-shaped clamping shoes 179 into engagement with the cans on the can filling wheel.

The rear end of each rod 189 connects with a shoe 192 which carries a roller 193; these rollers being arranged to rotate about axes arranged radially of the can filling wheel 28. Each of these rollers 193 engages a cam track 194 on the periphery of the cam disk or plate 85; this cam track having a rearwardly projecting salient portion along the ascending side of the can filling wheel 28 and a receding portion along the descending side of the can filling wheel. It will therefore be seen that at the top of the can filling wheel, at the can transfer station, the springs 190 move each roller 193 and shoe 192 forwardly thereby to move the rod 189 forwardly and swing its lever 185 and arm 180 to bring the corresponding C-shaped shoe 179 into engagement with a can on the periphery of the can filling wheel 28. This engagement of the C-shaped shoes 179 with the cans continues while the same are traveling along the descending side of the can wheel, and with the rollers 193 in engagement with the receding part of the cam track 194. At the bottom of the can filling wheel 28 these rollers 193 arrive at the salient part of the cam track 194 and hence the cam track draws each rod 189 and its arm 180 to swing its C-shaped shoe 179 out of engagement with the can. The salient part of the cam track continues up the rising side of the can filling wheel 28 and hence holds the C-shaped shoes in a forwardly projected inoperative position while traversing the rising side of the can filling wheel as best shown in Fig. 1.

The lower end of the track 175 terminates adjacent the upper stretch of an endless conveyor 198. Since the C-shaped holders 178 are withdrawn from the cans at this point, the filled cans are released and permitted to travel along on the endless conveyor 198 for further processing.

In order to enclose the working parts of the holders 178 at the rim of the can filling wheel 28, a front cover plate or ring 196 can be arranged at the front of the machine. This covering ring can be secured to rotate with the can filling wheel or it can be secured to the stationary cam disk or plate 111 by any suitable means (not shown).

A no can no fill control is incorporated in the can filler so that if for any reason one of the pockets 156 fails to receive a can, the corresponding piston and plunger 45 and 53 for the solid material and liquid, respectively, are rendered inoperative and will not receive or expel a charge into the space that otherwise would be occupied by a can. To this end, as shown in Fig. 3, an arm 200 is pivoted to the top of the top section 16 of the machine frame near the receiving station for the can wheel 155 and has its free end projecting horizontally in the direction of movement of the cans and under the semi-circular rail 169 and into the path of the cans being conveyed by the can wheel. The succession of passing cans holds this arm out, the arm being urged inwardly by a spring loaded switch 262. In this position of the arm 200 this switch is open.

If for any reason any pocket 156 of the can wheel 155 fails to receive a can 35, when this

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pocket passes the arm 200 it is urged inwardly to the dotted line position shown in Fig. 3. In this position the switch 232 is closed. A solenoid 205 (Fig. 8) is in circuit with this switch 200 and when the switch is so energized this solenoid draws its armature 206 outwardly or away from the axis of rotation of the can filling wheel 28. This solenoid is arranged near the bottom of the cam plate 111 for the liquid plungers 53 and the inner end of its armature or core is connected to the free end of a horizontal lever 208 which is fulcrumed on this cam plate 111 at 209. To the fulcrumed hub of this lever 208 is secured a switch section 210 of the cam track 115, the free end of this switch section being movable into engagement, when the solenoid 205 is so energized, with the cam track 115 at the juncture of the sections 115a and 115c thereof so that the roller 116 of the corresponding liquid filling plunger 53 will ride on this switch section 210 instead of following the part 115c of the cam track. At the fulcrumed end of the switch section 210 the switch roller 116 rides onto a secondary track 213 which is concentric with the axis of rotation of the can wheel 28 and also concentric with the salient part 115a of the cam track 115.

The major part 214 of this secondary or non-fill cam track 213 is integral with the cam plate or disk 111 but opposite the movable section 119 of the main track a pivoted section 215 is shown as inserted therein. It was found with the minimum fill position of the movable section 119 of the main cam track 115, shown by dotted lines in Fig. 8, that the rollers 116 would not clear the secondary or non-fill track 214. To retain the compactness of the machine and still avoid this interference, the movable section 215 was inserted in the secondary cam track at this point, the rollers 116 passing the summit of the outwardly adjusted main track section merely moving the movable track section 215 out of the way as illustrated by dotted lines in Fig. 8. The return of the rollers 116 from the section 214 of the secondary cam track to the salient part 115a of the primary cam track is effected by a tail piece 216.

The arm 200 moves inwardly because of an empty pocket 156, this pocket, in the machine shown, being the fifth can space from the transfer station. Therefore it is necessary to render inoperative the piston 45 and plunger 53 of the fifth cylinder 40 from the transfer station, this being that one which has just entered the rising side of the can filling wheel 28 as viewed in Fig. 6. The closing of the circuit through the switch 202 and solenoid 205 energizes the solenoid to move the switch track section 210, Fig. 8, to engage the place of juncture of the main track sections 115a and 115c just before the roller 116 of this fifth plunger 53 arrives at this point. Consequently this roller is compelled to ride around the concentric secondary cam track 213 and back to the salient part 115a of the main cam track without inward movement. Since the roller 116 cannot move inwardly its plunger 53 likewise cannot move inwardly to draw a charge of liquid from the reservoir 60 into its sleeve or cylinder 40. Upon reference to the bottom of Fig. 5, it will also be seen that when the liquid plunger 53 cannot move inwardly the main piston 45 likewise cannot move inwardly and draw a charge of solid materials into the sleeve or cylinder 40. In consequence neither the piston 45 for the solid materials nor the plunger 53 for the liquid is withdrawn

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to draw a charge of either into the fifth sleeve or cylinder 40 or to expel a charge into the canless space when this space comes into line with the can filling wheel 28.

Means are also provided for tamping the charge in each can to secure compactness in the fill, such means being rendered operative or inoperative at will. For this purpose, as shown in Figs. 5 and 7 a disk 220 is fast to a manually controlled adjusting shaft 221 which in turn is journaled on the cam disk or plate 35 with its periphery in a space 222 left in the salient part 84a of the cam track 84 and at the bottom of the cam disk 85. This disk has a receding face 223 which forms a continuation of the radially outward face of the cam track 84, as shown by full lines in Fig. 7, this being the "no tamp" position of this disk. When this disk 220 is turned counterclockwise 45°, the salient part 224 is caused to project radially outward from the effective face at the cam track, as shown by dotted lines in Fig. 7, this being the "tamp" position of this disk. In the no tamp position of the disk 220 its face 223 merely provides a continuation of the cam track 84 and consequently the disk 220 has no effect upon the operation of the machine. When however the salient part 224 of this disk is caused to project outwardly from the effective surface of the cam track 84, the rollers 83 are caused to ride over the inverted hump provided by the disk 220 and hence these rollers, and the pistons 45 connected therewith, are given a downward push, thus projecting the pistons 45 into the cans at the bottom of the can filling wheel and serving to compact the contents therein.

In the modified form of the invention shown in Figs. 9 and 10 V-shaped adjusting members are provided on the cam disk or plates to take up wear on the shoes sliding in the radial slots therein. In this view is illustrated a fragmentary front elevation of the disk 111 fitted to the front face of the can filling wheel 28 and having the slots 110 for guiding the shoes 109 which are connected to reciprocate with the plungers 53 as previously described. Wear between these shoes and slots is shown as taken up by a V-shaped wear plate 225 secured to one face of the disk 111 by screws 226. These screws extend through slots 228 in each wear plate which extend radially so that the V-shaped wear plates can be adjusted radially. The opposite edges of each wear plate engage the opposite longitudinal sides of a pair of the shoes 109 and it will therefore be seen that the radial inward adjustment of the wear plates 225 serves to take up wear between the edges of these wear plates and the shoes 109.

Operation

The cans 35 are placed, open side down, upon the table or shelf 125 in position to be caught by the endless conveyer belts 136 and conveyed in single file toward the can wheel 155. A sterilizer hood 126 can surround this table or shelf and heated by sprays of steam from the steam pipe 128 to sterilize the cans and the cans are preferably rolled against the adjustable strip 134 so as to round up any out-of-round cans.

Each tooth 158 of the can wheel picks up the foremost can of the file advanced by the endless belts 136, the can wheel rotating counterclockwise as viewed in Fig. 3, and if a can is not properly placed in any pocket 156 between these teeth, the spring loaded roller 163 presses it into the pocket. The cans are conveyed by the can wheel around the semi-circular rail 169 to the transfer station

at the top of the can filling wheel 28. As long as a continuous succession of cans is picked up by the can wheel the arm 200 is held out in the full line position shown in Fig. 3 and the switch 202 held open.

At the can transfer station the upper end 171 of the semi-circular guide rail shifts each can laterally onto the rubber gasket 43 on the periphery of the can filling wheel 28 and surrounding the mouth of a corresponding radial sleeve or cylinder 40 of this can filling wheel. This can filling wheel 28 is driven clockwise as viewed in the drawings and in sequence with the can wheel 155 so that each can pocket 156 of the can wheel presents the open mouth of its can to the open mouth of a corresponding sleeve or cylinder 40 of the can filling wheel in regular succession.

The ends of the cans so transferred from the can wheel to the can filling wheel are engaged by the leading end of the semi-circular end track 175 which holds the cans firmly against the gaskets 43 while they are being filled on traversing the descending side of the can filling wheel 28. At the bottom of the can filling wheel the filled cans are released from the lower end of the semi-circular track 175 onto the endless conveyer 198 which carries the filled cans away for further processing.

At the transfer station the C-shaped shoes 179 mounted on the swinging arms 190 are successively swung into engagement with the forward sides of the can to press the cans against the semi-circular side rail 170 and to maintain the cans in centered position on the rubber gaskets 43 while traversing the descending side of the can filling wheel 28 and while being filled. These C-shaped shoes are moved into engagement with the cans at the filling station by a stationary cam track 194 (Fig. 5) which has an axially salient portion starting at the bottom and continuing along the ascending side of the can filling wheel to the top thereof, this cam track having a receding portion continuing along the descending side of the can filling wheel. As each sleeve or cylinder 40 approaches the transfer station at the top of the can filling wheel, the roller 193 associated therewith rides off the salient portion of the cam track 194 thereby permitting the associated spring 190 to push the two armed lever 180, 185 so as to move the C-shaped shoe 179 into contact with the forward side of the can at the transfer station and force this can into engagement with the semi-circular side rail 170, this relation being maintained along the descending side of the can filling wheel 28. When the cans reach the bottom of the can filling wheel 28 for transfer to the conveyer 198 the rollers 193 (Fig. 5) encounter the salient part of the stationary cam track 194 and are moved toward the rear of the machine. This successively draws each shoe 192 and rod 189 rearwardly against the resistance of the spring 190 and actuates the double lever 180, 185 to retract the C-shaped shoe 179 from the can. This retracted position of these parts is maintained by the salient part of the cam track 194 until the transfer station at the top of the can filling wheel 28 is again passed.

As each sleeve or cylinder 40 traverses the rising side of the can filling wheel 28 it is filled first with a measured charge of liquid from the reservoir 60 and then with a charge of solid materials from the hopper 65, the solid material in the latter being agitated and packed into the open mouths of the sleeves or cylinders 40 by the revolving spiral wire 70.

To draw the measured liquid charge into each sleeve or cylinder 40 when the periphery of the can filling wheel 28 comes into contact with the liquid in the reservoir 60 at the bottom of the rising side of the can filling wheel (Fig. 4) the roller 116 associated with the sleeve or cylinder 40 at the bottom of the rising side of the can wheel passes from the radially salient part 115a (Fig. 8) of its stationary cam track to the part 115b thereof. This permits the corresponding roller 116 to move radially inward toward the axis of the can filling wheel, this inward movement being effected (Fig. 6) by the springs 53 which move the plungers 53 inwardly, the stems 54 of these plungers being connected (Fig. 5) with the shoes 109 which carry the rollers 116 riding on the stationary cam track 115. Since the plungers 53 are drawn inwardly while traversing the liquid reservoir 60, a charge of liquid is drawn through the openings 55 into the pistons 45.

The amount of liquid so drawn into the pistons 45 is determined by the manual setting of the track section 119 (Fig. 8) which is fast to the adjusting shaft 118. Thus, by setting this adjusting shaft and track section in the full line position shown in Fig. 8 it will be seen that the retraction of each plunger 53 effected by the part 115c of the cam track is maintained so that a relatively large quantity of liquid is drawn into each piston 45. Upon however moving the adjusting shaft 118 and cam track section 119 to the dotted line position shown in Fig. 8 it will be seen that before leaving the liquid reservoir 60 the plunger 53 is moved outwardly to return a part of the liquid charge in the piston 45 to the reservoir. In consequence a smaller amount of liquid is retained in the piston 45 for ejection into a can. In order to permit the rollers 116 to pass the extremity of the track section 119 in its extreme dotted line position (Fig. 8), the opposite section 215 of the secondary or no fill track 213 is in the form of a pivoted section which can be moved by each roller 116 to the dotted line position shown as it traverses the track section 119.

After each piston 45 so receives a charge of liquid from the reservoir 60, its sleeve or cylinder 40 moves under the open lower end of the hopper 65 for the solid materials so that the rotating spiral wire 70 can pack a charge of solid material into the open mouth of the sleeve or cylinder 40. To draw the measured charge of the solid materials into each sleeve or cylinder 40, when the periphery of the can filling wheel 28 comes into contact with the solid materials in the hopper 65, this being during its rising upper quarter, (Fig. 4) the roller 83 associated with the sleeve or cylinder 40 at the bottom of this quarter passes from the radially salient part 84a (Fig. 8) of its stationary cam track to the movable section 82 thereof. This permits the corresponding roller 83 to move radially inward toward the axis of the can filling wheel, this inward movement being effected (Fig. 5) by the springs 88 which move the pistons 45 inwardly, the stems 50 of these pistons being connected with the shoes 31 which carry the rollers 83 riding on the stationary cam track 84. Since the pistons 45 are drawn inwardly while traversing the hopper 65 for the solid materials, a charge of the solid materials is drawn into each sleeve or cylinder 40.

The amount of solid materials so drawn into the sleeves or cylinders 40 is determined by the setting of the track section 92 (Fig. 7) which is fast to the adjusting shaft 95. Thus, by setting the adjusting shaft 95 and track section 92 in the full

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line position shown in Fig. 7 it will be seen that the retraction of each piston 45 effected by the movable section 92 of the cam track is maintained so that a relatively large quantity of solid material is drawn into each sleeve or cylinder 40. Upon however moving the adjusting shaft 95 and cam track section 92 to the dotted line position shown in Fig. 7 it will be seen that each piston 45 is withdrawn to a much smaller degree on traversing the solid materials hopper 65. In consequence a smaller amount of solid materials is drawn into each sleeve or cylinder 40 for ejection into a can.

The rollers 83 and 116 (Figs. 7 and 8) on leaving, respectively, the movable cam track sections 92 and 119 ride over the tail pieces 95 and 120 onto the parts 84b and 115b of the cam tracks, these parts 84b and 115b leading to a peak in the lower descending quarter of the can wheel 28. Since the cans, as previously described, have been fed to traverse this descending side of the can wheel 28, the outward movement of the plungers 53 and pistons 45 in traversing the sections 84b and 115b, respectively, of the cam track forces the liquid and solid contents of the sleeves or cylinders 40 into the cans. When the rollers reach the peaks of these cams the plungers and pistons are fully projected, this condition being maintained during the continued movement of the rollers over the sections 84a and 115a to the point at which each sleeve or cylinder 40 comes into register with the reservoir 60 and the sequence of operations above described is repeated.

It is sometimes desirable to tamp the contents in the filled cans in order to compact the fill. To this end the disk 220 is mounted on the adjusting shaft 221 (Fig. 7) and is arranged to have a salient portion 224 project through the section 84a of the cam track when adjusted to the dotted line position shown in Fig. 7. When each roller 83 travels over this salient projection of the disk 220 it is moved radially outward from the axis of the can filling wheel 28 thereby to carry its shoe 81 (Fig. 5) arm 80, piston rod 50 and piston 45 radially outward. This projects this piston 45 beyond its sleeve or cylinder 40 and into the can so as to tamp or compact the contents in the filled can. When the disk 220 is turned to the full line position shown in Fig. 7 the rollers 83 merely ride over its receding portion 223 as a continuation of the part 84a of the cam track and hence no tamping is effected.

If for any reason the can wheel 155 fails to pick up a can 35 in any of its pockets 156, the lever 200 (Fig. 3) swings into the empty space and the switch 202 closes. This energizes the solenoid 205 (Fig. 8) and moves its armature to swing the lever 203 and switch section 210 of the cam track into engagement with the part of the cam track 115 between the sections 115a and 115c thereof. The roller 116 of that sleeve or cylinder 40 coming into register with the liquid reservoir 60 is therefore caused to ride along the switch section 210 of the cam track onto the secondary concentric track 213 composed of the sections 215 and 214 and the tail piece 216. It will be noted that the assumed empty space is fifth from the transfer station (Fig. 3) and that the roller 116 so switched to the secondary track 213 is associated with that sleeve or cylinder 40 which is likewise fifth from the transfer station so that the sleeve or cylinder 40 which will come into line with the empty space is that one which is affected by this operation.

The roller 116 (Fig. 8) so switched by the switch

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210 to the secondary cam track 213 cannot, of course, move inwardly as would be the case if it were left to follow the primary track 115 and the movable sections associated therewith. In consequence the shoe 109 (Fig. 5) and plunger 53 associated with this roller cannot move inwardly toward the axis of the can filling wheel nor can the corresponding piston 45 move inwardly inasmuch as the plunger 53 is at this time against the end head 46 of the piston 45. Therefore a charge of neither liquid nor solids is drawn into the sleeve 40 nor are the plunger and piston moved to expell a charge into the canless space on the can filling wheel.

From the foregoing it will be seen that the present invention provides a reliable and high speed can filler which accurately fills each can with separately measured charges of liquid and solids and which will tamp the charge in each can to insure compactness. The filler is also compact and comparatively simple in construction and will stand up under conditions of severe and constant use without getting out of order or requiring repairs.

I claim as my invention:

1. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders opening at its rim, means forming a chamber enclosing a rising part of said rim and traversed thereby and adapted to contain material to be packed into the cans, means at the top of said wheel and placing cans in engagement with its rim with their open ends over said cylinders, means holding said cans in said engagement with said rim for a part of the descending side thereof, and means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said part of the descending side thereby to transfer a charge of said material from said chamber to each of said cans.

2. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, a piston in each of said cylinders, a gasket of soft resilient plastic material surrounding the outer open end of each cylinder, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, means providing sealed contact between said chamber and periphery to prevent leakage of said material from said chamber, means at the top of said wheel and placing cans on said periphery with their open ends against said gaskets, means holding said cans in engagement with said gaskets for a part of the descending side of said wheel, and means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said part of the descending side of said wheel thereby to transfer a charge of said material from said chamber to each of said cans.

3. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of openings in its periphery surrounded by an annular pocket, a cylinder fitted in each of said openings and having a rim fitted in the corresponding pocket, a piston in each of said cylinders, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, means providing sealed contact between said chamber and periphery to prevent leakage of said material from said cham-

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ber, means at the top of said wheel and placing cans with their open ends against said rims, means holding said cans in engagement with said rims for a part of the descending side of said wheel, and means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said part of the descending side of said wheel thereby to transfer a charge of said materials from said chamber to each of said cans.

4. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain solid material to be packed into said cans, a rotor in said chamber and rotating about an axis arranged generally tangential to said wheel and having peripheral portions arranged adjacent the periphery of said wheel and packing the solid material into the open ends of the passing cylinders, means at the top of said wheel and placing cans in engagement with its periphery with their open ends over said cylinders, means holding said cans in said engagement with said periphery for a part of the descending side thereof and means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said part of the descending side thereby to transfer a charge of said solid material from said chamber to each of said cans.

5. A can filling machine, comprising a can filling wheel having a plurality of cylinders opening at its rim, a piston in each of said cylinders and having a skirt and an end head, said end head being provided with an opening, a plunger in each of said pistons and sliding along the skirt thereof, means forming a pair of chambers each enclosing a part of said rim and adapted to be traversed thereby, one of said chambers being adapted to contain a liquid and the other being adapted to contain solid material, means placing cans in engagement with said rim with their open ends over said cylinders, means holding said placed cans in said engagement with said rim for a predetermined distance, means reciprocating each of said plungers inwardly on traversing said liquid chamber to draw a charge of liquid into its piston, means reciprocating each of said pistons inwardly on traversing said solid material chamber to draw a charge of solid material into its cylinder, and means reciprocating each pair of pistons and plungers outwardly on traversing said predetermined distance thereby to transfer charges of liquid and solid material from said chambers to each of said cans.

6. A can filling machine, comprising a rotating can filling wheel having a plurality of cylinders opening at its rim, a piston in each of said cylinders, means forming a chamber enclosing a part of said rim and traversed thereby and adapted to contain material to be packed into the cans, means placing cans in engagement with said rim with their open ends over said cylinders, means holding said placed cans in said engagement with said rim for a predetermined distance, means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said predetermined distance thereby to transfer a charge of said materials from said chamber to each of said cans, and means for adjusting the amount of said inward movement of said pistons while so traversing said chamber.

7. A can filling machine, comprising a can fill-

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ing wheel having a plurality of cylinders opening at its rim, a piston in each of said cylinders and having a skirt and an end head, said end head being provided with an opening, a plunger in each of said pistons and sliding along the skirt thereof, means forming a pair of chambers each enclosing a part of said rim and adapted to be traversed thereby, one of said chambers being adapted to contain a liquid and the other being adapted to contain solid material, means placing cans in engagement with said rim with their open ends over said cylinders, means holding said placed cans in said engagement with said rim for a predetermined distance, means reciprocating each of said plungers inwardly on traversing said liquid chamber to draw a charge of liquid into its piston, means reciprocating each of said pistons inwardly on traversing said solid material chamber to draw a charge of solid material into its cylinder, means reciprocating each pair of pistons and plungers outwardly on traversing said predetermined distance thereby to transfer charges of liquid and solid material from said chambers to each of said cans, and means for separately adjusting the amount of said inward movement of said pistons and plungers while so traversing their respective chambers.

8. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, a piston in each of said cylinders, a piston rod extending inwardly from each of said pistons, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, means adjacent the top of said wheel and placing cans in engagement with its periphery with their open ends over said cylinders, means holding said cans in engagement with said periphery for a part of the descending side thereof, and means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said part of the descending side thereby to transfer a charge of said material from said chamber to each of said cans, comprising a cam track fixed to a stationary part of the machine and encircling the axis of said can filling wheel, said cam track having radially salient and receding portions, means operatively connecting said stems to follow said cam track and means for varying the effective radial position of said receding portion thereby to vary the amount of said material drawn into each cylinder.

9. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, a piston in each of said cylinders, a piston rod extending inwardly from each of said pistons, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, means adjacent the top of said wheel and placing cans in engagement with its periphery with their open ends over said cylinders, means holding said cans in engagement with said periphery for a part of the descending side thereof, and means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said part of the descending side thereby to transfer a charge of said material from said chamber to each of said cans, comprising a wall secured to the rim of said can filling wheel and extending inwardly toward the axis of rotation thereof and

provided with radial slots corresponding in number and position to said cylinders, a shoe fixed to each of said stems and sliding in a corresponding one of said slots, a roller fixed to each of said shoes, a cam track fixed to a stationary part of the machine and engaged by said rollers and encircling the axis of said can filling wheel, said cam track having radially salient and receding portions, said receding portion being placed to engage the rollers of those pistons traversing said chamber, and means for varying the effective radial position of said receding portion thereby to vary the amount of said material drawn into each cylinder.

10. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, a piston in each of said cylinders, a piston rod extending inwardly from each of said pistons, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, means adjacent the top of said wheel and placing cans in engagement with its periphery with their open ends over said cylinders, means holding said cans in engagement with said periphery for a part of the descending side thereof, and means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said part of the descending side thereby to transfer a charge of said material from said chamber to each of said cans, comprising a roller fixed to each of said piston rods, a cam track fixed to a stationary part of the machine and engaged by said rollers and encircling the axis of said can filling wheel, said cam track having radially salient and receding portions, said receding portion being placed to engage the rollers of those pistons traversing said chamber, means for varying the effective radial position of said receding portion thereby to vary the amount of said material drawn into each cylinder comprising an adjusting shaft journaled in said stationary part, a movable track section secured to said adjusting shaft and forming a continuation of a fixed part of said cam track and rotatable with said adjusting shaft toward and from the axis of rotation of said can filling wheel and a tail piece connecting the free end of said movable track section with said fixed part of said cam track.

11. A can filling machine, comprising a can filling wheel having a plurality of cylinders opening at its rim, a piston in each of said cylinders and having a skirt and an end head, said end head being provided with an opening, a plunger in each of said pistons and sliding along the skirt thereof, means forming a pair of chambers each enclosing a part of said rim and adapted to be traversed thereby, one of said chambers being adapted to contain a liquid and the other being adapted to contain solid material, means placing cans in engagement with said rim with their open ends over said cylinders, means holding said placed cans in said engagement with said rim for a predetermined distance, means reciprocating each of said plungers inwardly on traversing said liquid chamber to draw a charge of liquid into its piston, means reciprocating each of said pistons inwardly on traversing said solid material chamber to draw a charge of solid material into its cylinder, means reciprocating each of said pistons and its plunger outwardly on traversing said predetermined distance thereby to transfer charges of liquid and solid material from said chambers

to each of said cans, comprising a cam track fixed to a stationary part of the machine and encircling the axis of said can filling wheel, said cam track having radially salient and receding portions, means operatively connecting said pistons to follow said cam track, a second cam track fixed to a stationary part of the machine and encircling the axis of said can filling wheel, said second cam track also having radially salient and receding portions, and means operatively connecting said plungers to follow said second cam track.

12. A can filling machine, comprising a can filling wheel having a plurality of cylinders opening at its rim, a piston in each of said cylinders and having a skirt and an end head, said end head being provided with an opening, a plunger in each of said pistons and sliding along the skirt thereof, means forming a pair of chambers each enclosing a part of said rim and adapted to be traversed thereby, one of said chambers being adapted to contain a liquid and the other being adapted to contain solid material, means placing cans in engagement with said rim with their open ends over said cylinders, means holding said placed cans in said engagement with said rim for a predetermined distance, means reciprocating each of said plungers inwardly on traversing said liquid chamber to draw a charge of liquid into its piston, means reciprocating each of said pistons inwardly on traversing said solid material chamber to draw a charge of solid material into its cylinder, means reciprocating each of said pistons and its plunger outwardly on traversing said predetermined distance thereby to transfer charges of liquid and solid material from said chambers to each of said cans, comprising two walls secured to the rim of said can filling wheel and extending inwardly toward the axis of rotation thereof and each provided with radial slots corresponding in number and position to said cylinders, a shoe connected with each of said pistons and sliding in a corresponding one of said slots of one of said walls, a roller fixed to each of said shoes, a cam track engaged by said rollers and encircling the axis of rotation of said can filling wheel and fixed to a stationary part of the machine, said cam track having radially salient and receding portions, a shoe connected with each of said plungers and sliding in a corresponding one of said slots of the other of said walls, a roller fixed to each of said last shoes, a second cam track engaged by said last rollers and encircling the axis of rotation of said can filling wheel and fixed to a stationary part of the machine, said second cam track having radially salient and receding portions, said receding portion of both cam tracks being placed to engage the rollers of the cylinder traversing the corresponding chamber, and means for varying the effective radial position of said receding portion of each of said cam tracks thereby to vary the amount of liquid and solid material drawn into each cylinder.

13. A can filling machine, comprising a rotating can filling wheel having a plurality of cylinders opening at its rim, a piston in each of said cylinders, means forming a chamber enclosing a part of said rim and traversed thereby and adapted to contain material to be packed into the cans, means placing cans in engagement with said rim with their open ends over said cylinders, means holding said placed cans in said engagement with said rim for a predetermined distance, means reciprocating each of said pistons inwardly on trav-

ersing said chamber and outwardly on traversing said predetermined distance thereby to transfer a charge of said materials from said chamber to each of said cans, and means for reciprocating each of said pistons outwardly beyond its cylinder and into the corresponding can on traversing said predetermined distance thereby to enter the corresponding can and compact the contents therein.

14. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, a piston in each of said cylinders, a piston rod extending inwardly from each of said pistons, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, means adjacent the top of said wheel and placing cans in engagement with its periphery with their open ends over said cylinders, means holding said cans in engagement with said periphery for a part of the descending side thereof, means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said part of the descending side thereby to transfer a charge of said material from said chamber to each of said cans, comprising a cam track fixed to a stationary part of the machine and encircling the axis of said can filling wheel, said cam track having radially salient and receding portions, and means operatively connecting said stems to follow said cam track, and means for compacting the contents of each can comprising an additional salient provided on the salient portion of said cam track and reciprocating each of said pistons outwardly beyond its cylinder and into the corresponding can on traversing said part of the descending side of said can wheel.

15. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, a piston in each of said cylinders, a piston rod extending inwardly from each of said pistons, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, means adjacent the top of said wheel and placing cans in engagement with its periphery with their open ends over said cylinders, means holding said cans in engagement with said periphery for a part of the descending side thereof, means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said part of the descending side thereby to transfer a charge of said material from said chamber to each of said cans, comprising a cam track fixed to a stationary part of the machine and encircling the axis of said can filling wheel, said cam track having radially salient and receding portions, and means operatively connecting said stems to follow said cam track, and means for compacting the contents of each can, comprising a disk rotatably mounted in the said salient portion of said cam track, and in one position forming a continuation of said cam track and in another position projecting a salient portion beyond said cam track, said last salient portion reciprocating each of said pistons outwardly beyond its cylinder and into the corresponding can.

16. A can filling machine, comprising a rotating can filling wheel having a plurality of cylinders opening at its rim, a piston in each of said cylinders, means forming a chamber enclosing a part of said rim and traversed thereby and adapted

to contain material to be packed into the cans, means feeding a succession of cans and placing them individually in engagement with said rim with their open ends over said cylinders, means

5 holding said placed cans in said engagement with said rim for a predetermined distance, means for reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said predetermined distance thereby to transfer a charge of said material from said chamber to each of said cans, means for rendering said reciprocating means for any one of said pistons inoperative, a member urged to move into the path of said succession of cans and so moving

10 when a can in said succession is missing, and means operatively connecting said member with said means for rendering any one of said pistons inoperative, said member being so located along said succession of cans as to render inoperative that piston associated with the space of the missing can.

17. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, a piston in each of said cylinders, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, means adjacent the top of said wheel and feeding a succession of cans and placing them individually in engagement with its periphery with their open ends over said cylinders, means holding said cans in engagement with said periphery for a part of the descending side thereof, means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said part of the descending side thereby to transfer a charge of said material from said chamber to each of said cans, comprising a primary cam track fixed to a stationary part of the machine and encircling the axis of said can filling wheel, said cam track having radially salient and receding portions and means including rollers engaging said cam track and each operatively connected to a corresponding piston to compel said pistons to follow said cam track, and means for rendering said reciprocating means for any one of said pistons inoperative, comprising a secondary cam track fixed to a stationary part of the machine and encircling the receding portion of said primary cam track, a switch movable to connect said secondary cam track with said salient portion of said primary cam track to receive said rollers therefrom, means for returning said received rollers to said salient portion of said primary cam track, a member urged to move into the path of said succession of cans and so moving when a can in said succession is missing, and means operatively connecting said member to close said switch and thereby render any one of said pistons inoperative, said member being so located along said succession of cans as to render inoperative that piston associated with the space of the missing can.

18. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, means at the top of said wheel and placing cans in engagement with said periphery with their open ends over said cylinders, a generally semi-circular

stationary rail concentric with said can filling wheel and spaced radially from the periphery thereof and engaging the ends of said cans to hold them in engagement with said periphery along the descending side of said wheel, and means for reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said descending side of said can filling wheel thereby to transfer a charge of said material from said chamber to each of said cans.

19. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, means at the top of said wheel and placing cans in engagement with said periphery with their open ends over said cylinders, a generally semi-circular stationary rail concentric with said can filling wheel and spaced radially from the periphery thereof and engaging the ends of said cans, to hold them in engagement with said periphery along the descending side of said wheel, a second generally semi-circular stationary rail concentric with said can filling wheel and arranged to engage the corresponding sides of said cans along the descending side of said wheel, and means for reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said descending side of said can filling wheel thereby to transfer a charge of said material from said chamber to each of said cans.

20. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, means at the top of said wheel and placing cans in engagement with said periphery with their open ends over said cylinders, a generally semi-circular stationary rail concentric with said can filling wheel and arranged on one side of said wheel to engage the corresponding sides of said cans along the descending side of said wheel, a holder mounted on said can filling wheel adjacent each cylinder and movable toward and from the adjacent side of the corresponding can to hold it in engagement with said semi-circular rail, means for moving said holders toward said cans at the top of said can filling wheel and holding them against said semi-circular rail on the descending side of said can filling wheel, means for retracting said holders from said cans at the bottom of said can filling wheel and holding them retracted while traversing the ascending side of the can filling wheel, a second generally semi-circular stationary rail concentric with said can filling wheel and spaced radially from the periphery thereof and engaging the ends of said cans to hold them in engagement with said periphery along the descending side of said can wheel, and means for discharging the contents of each of said cylinders outwardly on traversing said descending side of said can filling wheel thereby to transfer a charge of said materials from said chamber to each of said cans.

21. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, a piston in each of said cylinders, a piston rod extending inwardly from each of said pistons, means forming a

chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, means adjacent the top of said wheel and placing cans in engagement with its periphery with their open ends over said cylinders, means holding said cans in engagement with said periphery for a part of the descending side thereof, and means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said part of the descending side thereby to transfer a charge of said material from said chamber to each of said cans, comprising a wall secured to the rim of said can filling wheel and extending inwardly toward the axis of rotation thereof and provided with radial slots corresponding in number and position to said cylinders, a shoe fixed to each of said stems and sliding in a corresponding one of said slots, a roller fixed to each of said shoes, a cam track fixed to a stationary part of the machine and engaged by said rollers and encircling the axis of said can filling wheel, said cam track having radially salient and receding portions, and a plurality of V-shaped wear plates secured to one face of said wall for movement toward and from the axis thereof, the sides of said wear plates engaging the sides of said shoes along said slots.

22. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, a piston in each of said cylinders, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, a can wheel rotating about a vertical axis and having a plurality of spaced can receiving pockets in its periphery, said periphery of said can wheel extending over the top of said can filling wheel, means for feeding cans bottom side up successively to the pockets of said can wheel, means synchronizing the rotation of said can wheel with said can filling wheel to deliver said cans to said can filling wheel with their open ends over said cylinders, means holding said cans in engagement with the periphery of said can filling wheel while traversing the descending side thereof, and means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said descending side of the can filling wheel thereby to transfer a charge of said material from said chamber to each of said cans.

23. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, a piston in each of said cylinders, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, a horizontal stationary surface leading to the top of said can filling wheel, a can wheel rotating above said surface about a vertical axis and having a plurality of can receiving pockets in its periphery, means for feeding cans bottom side up successively to the pockets of said can wheel, means synchronizing the rotation of said can wheel with said can filling wheel to deliver said cans to said can filling wheel with their open ends over said cylinders, means holding said cans in said engagement with the periphery of said can filling wheel while traversing the descending side thereof, and means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing

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said descending side of the can filling wheel thereby to transfer a charge of said material from said chamber to each of said cans.

24. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, a piston in each of said cylinders, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, a can wheel rotating about a vertical axis and having a plurality of spaced can receiving pockets in its periphery, said periphery of said can wheel extending over the top of said can filling wheel, means for feeding cans bottom side up successively to the pockets of said can wheel, a semi-circular rail concentric with and spaced from the periphery of said can wheel and forming a can way leading from said feeding means to the top of said can filling wheel, means synchronizing the rotation of said can wheel with said can filling wheel to deliver said cans to said can filling wheel with their open ends over said cylinders, means holding said cans in engagement with the periphery of said can filling wheel while traversing the descending side thereof, and means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said descending side of the can filling wheel thereby to transfer a charge of said material from said chamber to each of said cans.

25. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, a piston in each of said cylinders, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, a can wheel rotating about a vertical axis and having a plurality of spaced can receiving pockets in its periphery, said periphery of said can wheel extending over the top of said can filling wheel, means for feeding a straight line of cans bottom side up radially toward the axis of said can wheel to be successively picked up by the pocket thereof, means synchronizing the rotation of said can wheel with said can filling wheel to deliver said cans to said can filling wheel with their open ends over said cylinders, means holding said cans in engagement with the periphery of said can filling wheel while

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traversing the descending side thereof, and means reciprocating each of said pistons inwardly on traversing said chamber and outwardly on traversing said descending side of the can filling wheel thereby to transfer a charge of said material from said chamber to each of said cans.

26. A can filling machine, comprising a can filling wheel rotating about a horizontal axis and having a plurality of cylinders extending radially inward from its periphery, means forming a chamber enclosing a rising part of said periphery and traversed thereby and adapted to contain material to be packed into said cans, a can wheel rotating about a vertical axis and having a plurality of spaced can receiving pockets in its periphery, said periphery of said can wheel extending over the top of said can filling wheel, means for feeding a straight line of cans bottom side up radially toward the axis of said can wheel to be picked up by the pockets thereof, a spring loaded roller urged toward the periphery of said can wheel immediately beyond said straight line of cans and urging each can into the bottom of its pocket, means synchronizing the rotation of said can wheel with said can filling wheel to deliver said cans to said can filling wheel with their open ends over said cylinders, means holding said cans in engagement with the periphery of said can filling wheel while traversing the descending side thereof, and means for discharging the contents of each of said cylinders outwardly on traversing said descending side of the can filling wheel thereby to transfer a charge of said material from said chamber to each of said cans, said can feeding means comprising a horizontal stationary member engaging one side of said straight line of cans and an endless conveyer engaging the opposite side of the straight line of cans and pressing said straight line of cans against said stationary member to true up out-of-round cans.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,097,887	Lacey	Nov. 2, 1937
1,218,315	Redd	Mar. 6, 1917