F. J. HEYBACH.

CAN FILLING MACHINE.

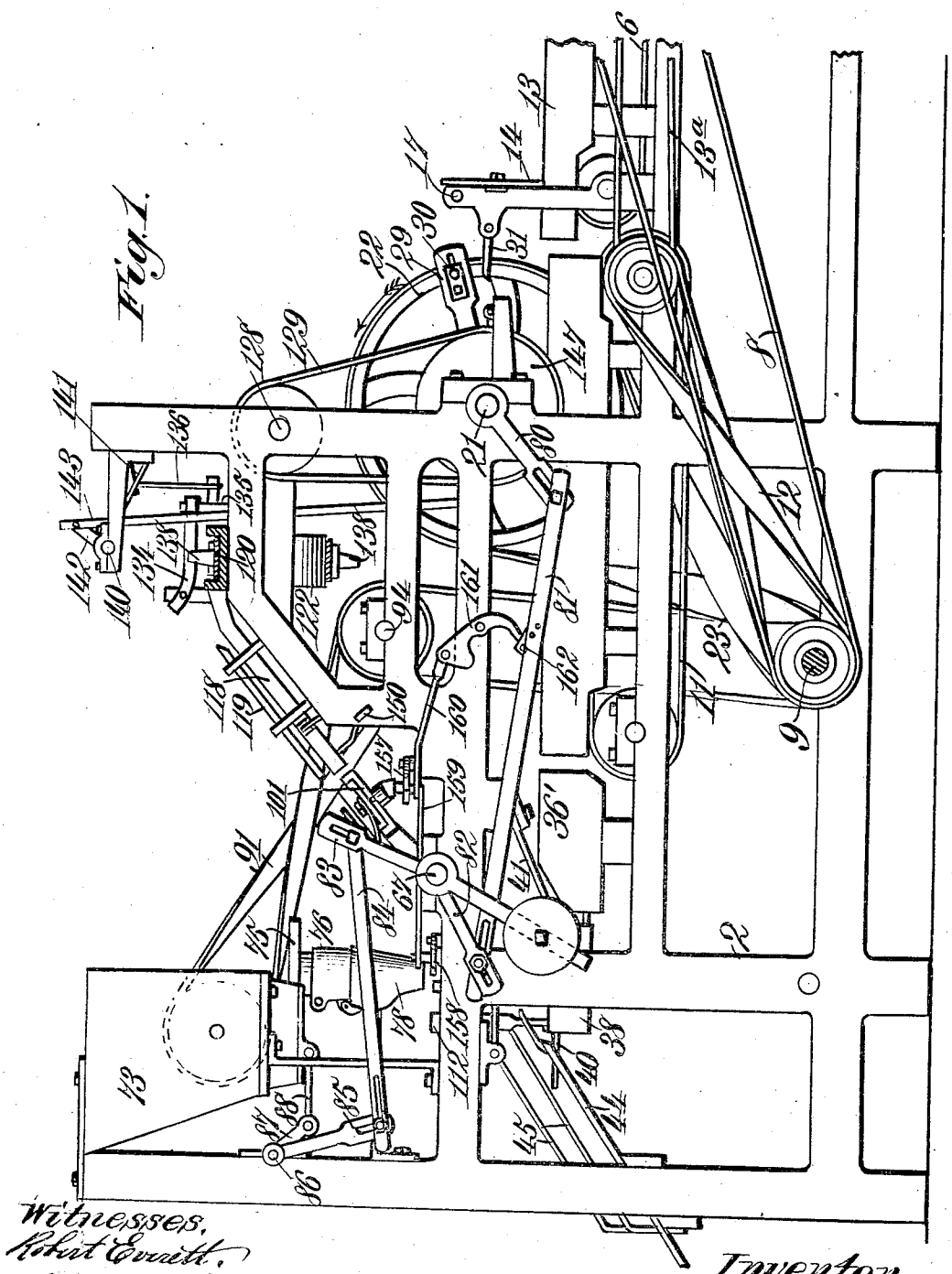
APPLICATION FILED JAN. 23, 1905.

935,504.

Patented Sept. 28, 1909.

6 SHEETS—SHEET 1.

Fig. 1.



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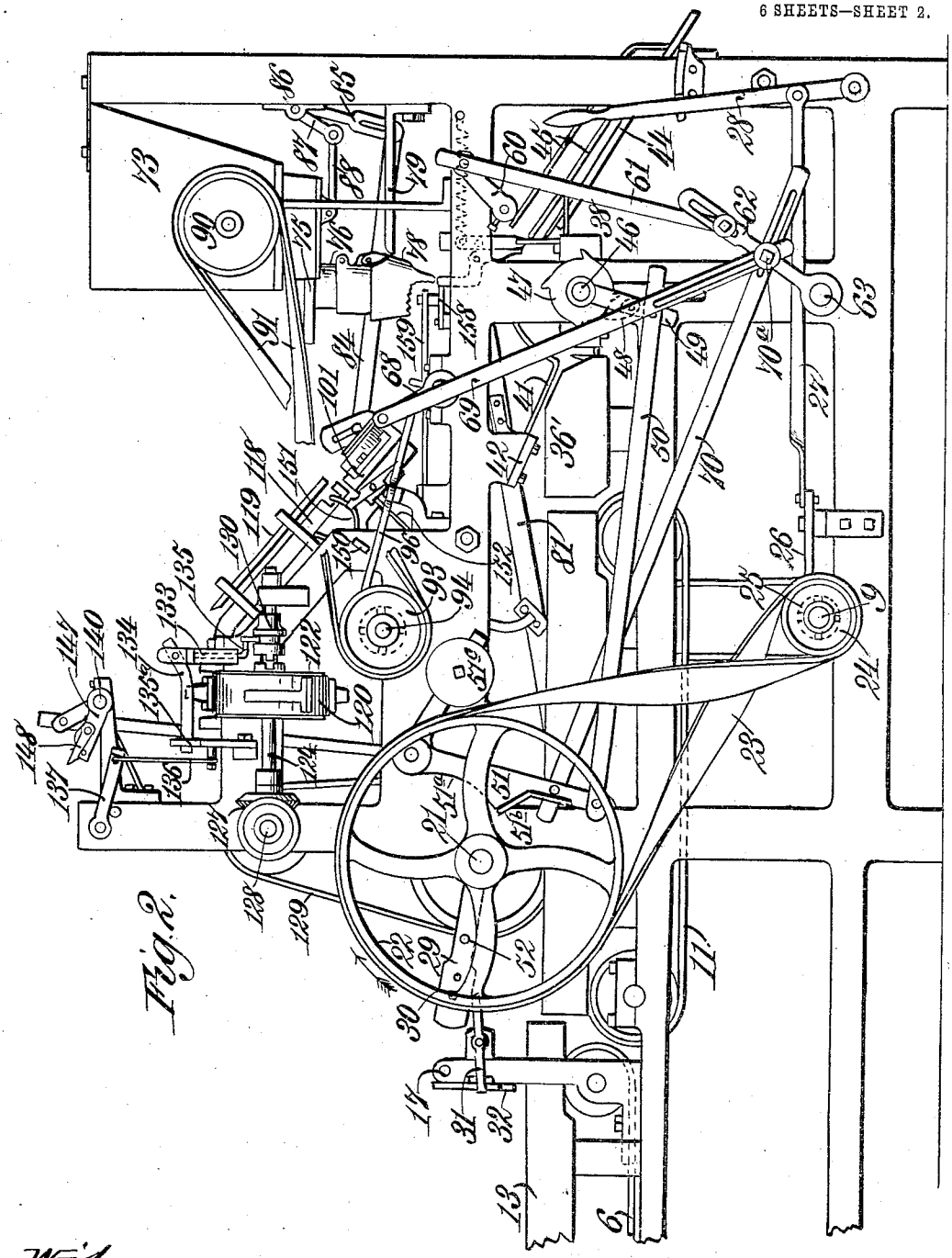

Fig. 2.

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6 SHEETS—SHEET 3.

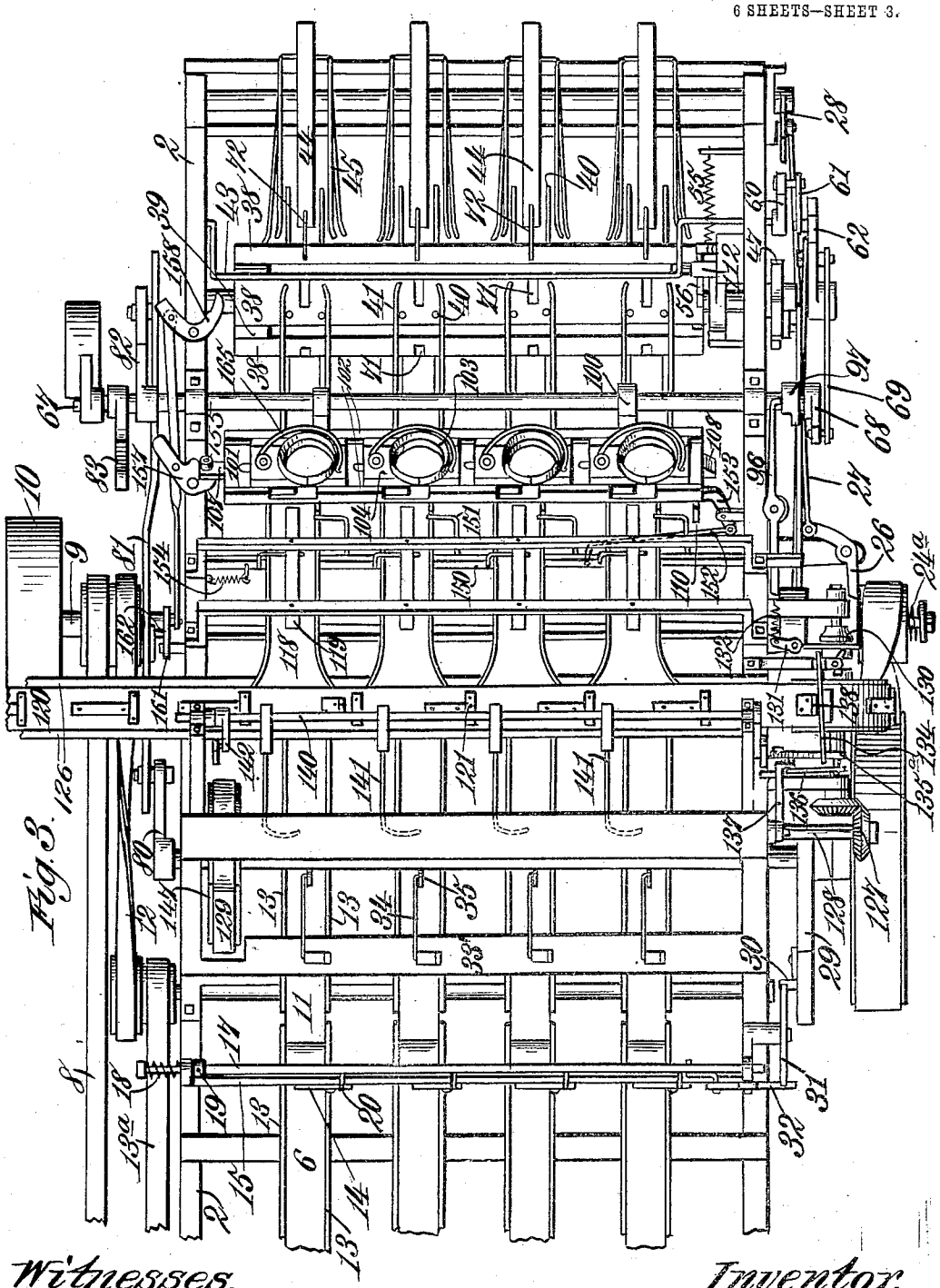

Fig. 3.

Witnesses.
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6 SHEETS—SHEET 4.

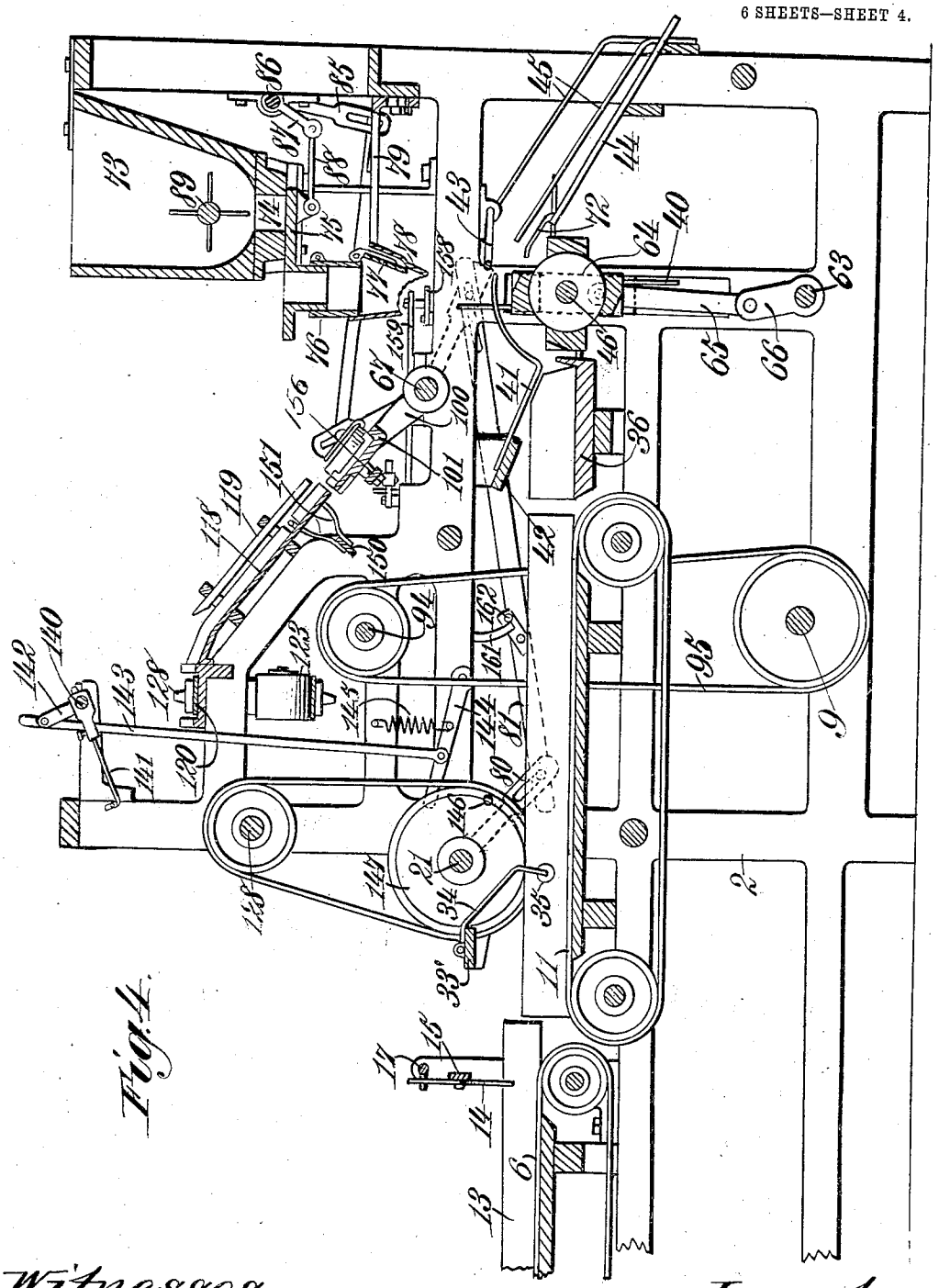

Fig. 4.

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6 SHEETS—SHEET 5.

Fig. 6.

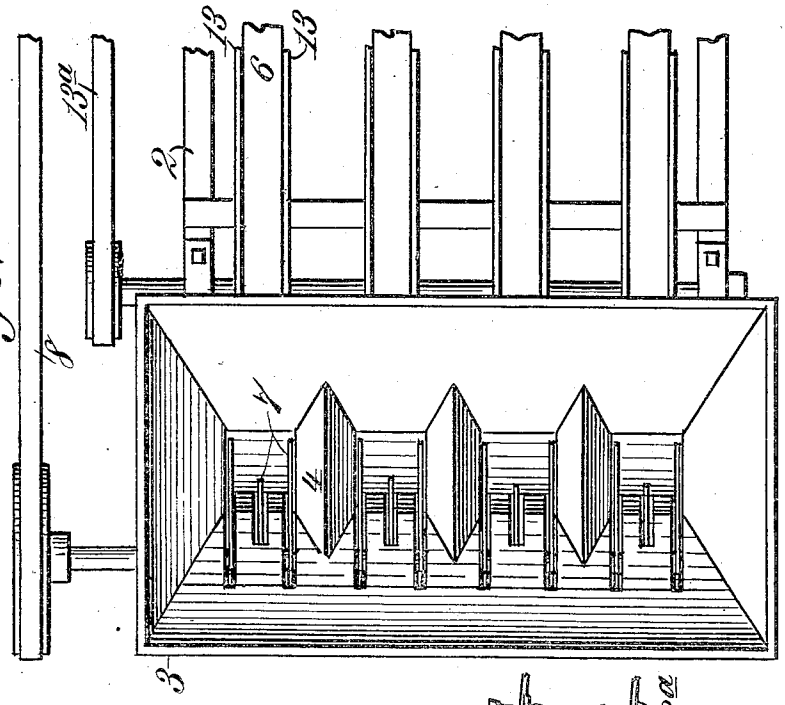
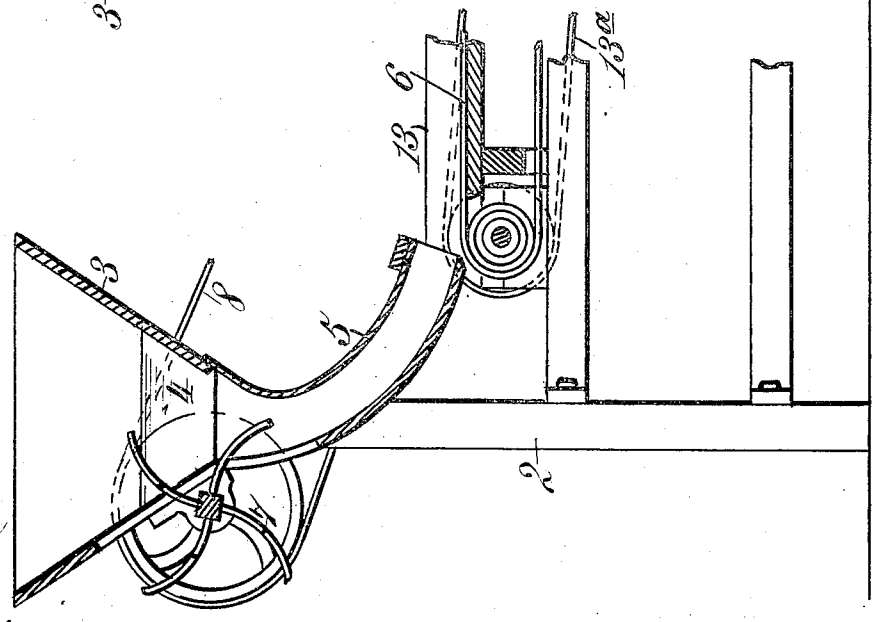


Fig. 5.



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935,504. Patented Sept. 28, 1909.

6 SHEETS—SHEET 6.

Fig. 7.

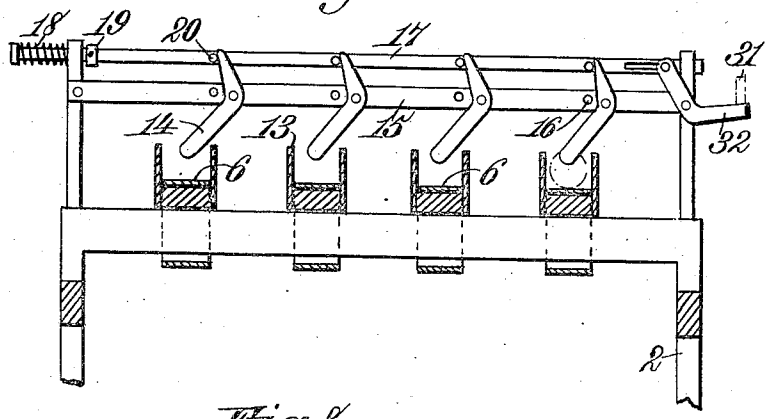
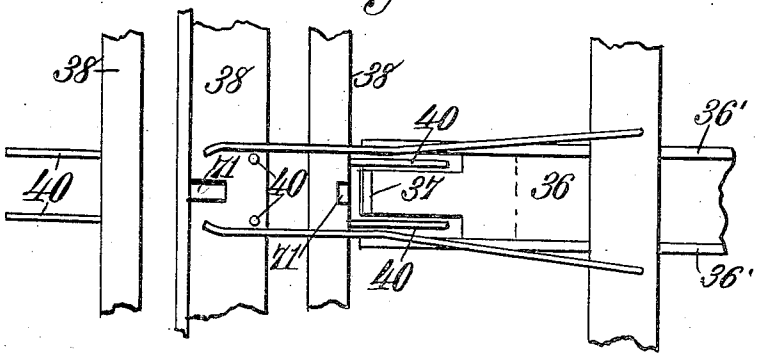


Fig. 8.



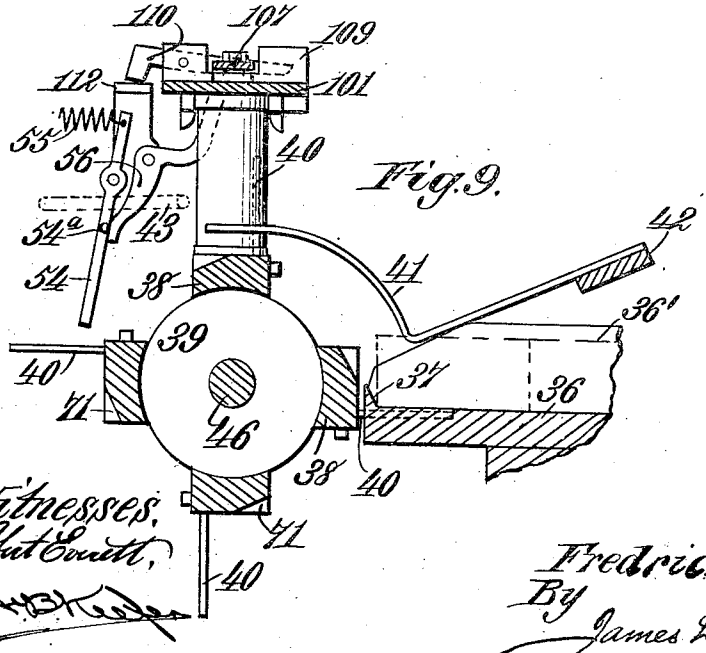
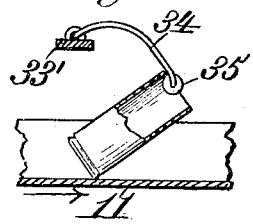


Fig. 9.

Fig. 10.



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UNITED STATES PATENT OFFICE.

FREDRICK J. HEYBACH, OF SAVANNAH, GEORGIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE AMERICAN AUTOMATIC MACHINERY COMPANY, OF SAVANNAH, GEORGIA, A CORPORATION OF GEORGIA.

CAN-FILLING MACHINE.

935,504. Specification of Letters Patent. **Patented Sept. 28, 1909.**

Application filed January 23, 1905. Serial No. 242,376.

To all whom it may concern:

Be it known that I, FREDRICK J. HEYBACH, a citizen of the United States, residing at Savannah, in the county of Chatham and State of Georgia, have invented new and useful Improvements in Can-Filling Machines, of which the following is a specification.

My present invention relates to improvements in can filling machines, and it has for its object primarily to provide an efficient machine of this class which is capable of receiving cans or other appropriate receptacles promiscuously into a hopper or other suitable supply device from which latter they are discharged upon a can-feeding or transferring means which serves to convey the empty cans automatically to and to position them before a suitable filling mechanism after which they are filled and tops are automatically applied to the filled cans and the latter are then removed from the filling position, devices being provided whereby all of the cans will be so handled that they will be properly presented to the filling machine, the various operations of the machine in the present instance being automatic.

In the drawings accompanying and forming a part of this specification, I have illustrated the invention as applied to a machine organized for filling and topping or capping cans, and I will, in the following description, set forth the organization thus illustrated in detail, but it should be understood that I do not limit myself to the disclosure thus made, for material variations may be made within the scope of my claims succeeding said description.

By the machine involving my invention, I can supply with rapidity empty cans to a filling mechanism, where the cans receive their proper charges, following which they have tops or covers applied thereto, and these operations I am enabled to perform in a thorough and effective manner, and wholly automatically and without waste of the material.

Referring to said drawings: Figure 1 is a side elevation of the principal portion of the machine, the only parts omitted being the hopper for containing the empty cans and a part of the primary feeding means. Fig. 2 is an opposite side view of the same portion of the machine. Fig. 3 is a top plan view of the parts represented in Figs. 1 and 2. Fig. 4 is a sectional elevation of that part of the machine represented in the preceding views. Fig. 5 is a sectional elevation of the empty can hopper, and a part of the primary feeding means. Fig. 6 is a top plan view of the parts represented in Fig. 5. Fig. 7 is a view in cross-section showing stops for arresting the motion of the empty cans near the delivery end of the primary feeding means. Fig. 8 is a top plan view of a part of a can transferring drum and certain guiding devices associated therewith. Fig. 9 is a sectional elevation of the parts represented in the preceding view, a top clamp and certain adjunctive means. Fig. 10 is a view of a can positioning device.

Like characters refer to like parts in all the figures.

The framework for supporting the different parts of the machine may be of any suitable character. The one illustrated is denoted in a general way by 2. At or near one end of the machine, (see for example Figs. 5 and 6,) is a hopper 3 for containing the empty cans which have had bottoms previously applied thereto. The hopper is interiorly divided into four divisions by several partitions, each designated by 4, and which taper toward their top, as clearly indicated in Fig. 6, to present wedge-like structures in order not to interfere with the proper gravitation of the empty can bodies toward the outlets of the hopper, which outlets extend between the partitions and between the outermost ones and the side walls of the hopper. From the several outlets, spouts, as 5, lead, to respectively transfer the cans from the hopper to primary feeding means, as 6, which latter conducts the cans to secondary feeding means for subsequent filling, as will hereinafter more particularly appear. The empty cans are placed into the hopper 3 and gravitate toward the spouts 5, and to prevent the cans from choking or clogging in the lower portion of the hopper or at the entrance of the respective spouts 5, I provide, in connection with the hopper an agitating device, the one illustrated being denoted in a general way by 7, and consisting of a rotary shaft suitably supported upon the hopper and having a number of arms thereon, which work through slots in the outer wall of the hopper and spouts respectively, in order to

keep the empty cans loosened up sufficiently to prevent their crowding in the lower portion of the hopper, and so that the cans can enter one by one or individually, the several spouts extending from the bottom portion of the hopper. The hopper is illustrated as provided with several of these spouts, four being shown, but this is an immaterial point. It will be understood however that by the construction illustrated, there are four empty cans simultaneously supplied to the primary feeding means 6.

The agitator 7 may be operated continuously in any desirable way, for example by means of belting, denoted in a general way by 8, and connecting pulleys on the agitator shaft and main shaft 9 respectively. (See Figs. 2, 3 and 4). The main shaft in turn may be operated in any desirable way, for example, by means of the pulley 10 (see Fig. 3), connected by belting, not illustrated, with some suitable form of motor.

The primary feeding means 6, to which reference has been made may be of any suitable character, and is represented as being in the nature of a force feeding device, that is, a device for positively moving the cans, and as being made up of several feed belts arranged side by side and extending longitudinally of the machine, the upper runs of the several belts being shown as horizontally disposed and constituting the effective portions thereof.

The empty cans are presented by the primary feeding means to secondary feeding means, denoted in a general way by 11, and also shown as a number of endless belts extending longitudinally of the machine. The upper runs of the belts composing the secondary feeding means however are situated in a horizontal plane below the upper runs of the belts forming the primary feeding means 6, and the driving mechanism is so arranged that the secondary feeding means will be operated at a more rapid rate than the primary feeding means. This operating means may be of any suitable character. It is represented as belting, (see Fig. 3), a crossed belt 12 being shown as connecting a pulley on the main shaft 9 and a pulley on the rear shaft of the secondary feeding means, while a belt 13^a connects the pulley on the said rear shaft of the secondary means and a pulley on the rear shaft of the primary feeding means, the belt 12 being shown as crossed and the different pulleys being so proportioned as to secure the difference in speed between the primary and secondary feeding means which, as indicated, are illustrated as made up of a number of belts.

To prevent lateral motion of the cans I mount above the upper runs of the belts composing the primary and secondary feeding means parallel walls, each denoted by 13, see for example Figs. 5 and 6, the distance between each pair of coöperating walls slightly exceeding the diameter of the cans. Each can, as will be understood, is advanced through the machine by a feed belt constituting a part of either the primary or secondary feeding means, and between a pair of parallel longitudinally extending walls, the cans falling from the belts of the primary feeding means onto the belts of the secondary feeding means.

To prevent the cans crowding each other on the secondary feeding means, as while on said secondary feeding means, the cans are operated upon so as their open sides all point in the same direction, I momentarily arrest the feed of the cans on the primary feeding means 6, and for this purpose show a plurality of automatically operable stops, each designated by 14, and represented as levers, somewhat angular in form, pivotally supported upon a cross-beam 15 of the framing; see for example Figs. 4 and 7. The lower arms of the levers, which constitute the operative or stop portions thereof, normally extend across the parallel walls 13 of the primary feeding means 6, at which time their upper arms rest against suitable stops, as 16, on said beam 15. In Fig. 7 the upper arms of the stop levers are shown as being out of contact with the stops or pins 16, having been drawn away from such position by their actuating means, which I will now set forth.

Suitably supported for longitudinal sliding motion above the cross-beam 15 is a bar 17, about one end of which is a coiled spring 18, bearing against a collar on said sliding bar and also against the framing, a suitable stop collar, as 19, on the bar preventing undue motion of the said sliding rod 17 when the same reaches its initial position. On the rod are a number of pins, as 20, one for each stop lever 14. Normally, as will be evident, the effective portions of the levers 14 are in the path of the cans on the primary feeding means, so that when the first can in each row strikes a lever, it and the ones behind it will be arrested in their progress toward the secondary feeding means. When, however, the levers are operated to release the cans, they will be positively fed by the primary feeding means to the secondary feeding means 11, and between the parallel walls 13, forming a part of the same. It will be apparent that when the rod 17 is drawn to the right in Fig. 7, the pins 20 will be carried against the upper arms of the levers 14 so as to move the levers out of their normal positions to free the cans, and during the said motion of the rod, the spring 18 is compressed, whereby it can, by expanding when the rod 17 is released, return the latter to its original position, and as the pins on the rod move away from the levers 14, they also

can return automatically to their original positions with their upper arms against the stops 16, the lower arms of the levers being weighted to secure such automatic action.

On the framing of the machine, above the main shaft 9 is a shaft 21, carrying a pulley 22 at one end; (see Fig. 2, for example) of large diameter, connected by a crossed belt, as 23, with a pulley 24, of small diameter, on the main shaft 9. The said pulley 24 runs loose on the said main shaft, but may be coupled thereto at the will of an attendant, through the medium of a clutch member, as 25, fixed to said main shaft. A lever 26, (see said Figs. 2 and 3) serves to disconnect the pulley from the member 25 in opposition to a spring 24ª. Said lever is connected by a rod 27 with a hand lever 28, both levers 26 and 28 being fulcrumed upon the machine frame. Upon the operation of the hand lever 28, the pulley 24 can, through the intervention of the intermediate parts, be moved laterally and disengaged from the clutch member 25 to stop the shaft. When the lever 26 is freed, the spring 24ª will throw the pulley into engagement with the clutch member.

Rigidly fixed to the shaft 21 is an arm 29, to which is connected for adjustment longitudinally of said arm, a pin 30 (see Fig. 2 for example) which pin is adapted to engage the outer portion of a lever 31 fulcrumed upon the framework of the machine, and which lever 31, in returning, is adapted to operate the lever 32 of angular form, pivoted at its angle in the vicinity of what is shown in Fig. 7 as the right end of the rod or bar 17. The lever 31 engages one branch of the lever 32, while the other branch of the latter is connected by a loose joint, say a pin and elongated slot one, with the sliding rod or bar 17. When the pulley 24 is clutched to the main shaft 9, the pulley 22, and hence the arm 29, will be operated, and the parts will be so organized and timed that at the correct moment the actuating pin 30 for the lever 31 will strike the same and rock said lever 31 so that the latter can rock the lever 32 to draw the rod 17 to the right in Fig. 1, and effect the operation of the stop levers 14 and the cans formerly held back thereby, in order that when said cans are released, they will be fed by the primary feeding means 6 onto the secondary feeding means 11. When the pin 30 passes free of the lever 31, the other parts will be released so that the spring 18 can return the rod 17 to its original position and so that the levers 14 may automatically return to their original positions, as previously set forth.

As will be understood from what I have hereinbefore stated, the cans placed in the hopper 3 have bottoms applied thereto, but are not topped, for the reason that the charges of material are supplied through the open upper sides, and it is essential that the open parts of the cans should be properly positioned when presented to the filling mechanism, and I will set forth the means illustrated for securing the advantage in question. A cross-bar, as 33′, see for example Figs. 4 and 10, extends across the machine above the entering end of the secondary feeding means 11, and from the same depend flexible members, as 34, which may be satisfactorily made from wire, and which carry anti-friction rolls 35 at their free or lower ends. The number of the wires 34 corresponds with the number of belts making up the secondary feeding means 11, and they are laterally separated a distance equaling that between said belts, and are located respectively over the latter, as clearly indicated in said Fig. 10. The pendent flexible members, the upper ends of which, as will be understood, are rigidly connected with the cross-bar 33′, so hang that the rolls 35, connected with and forming a part of the same, are presented in the path of the cans, so that should the open side of a can be to the front, the anti-friction roll 35 will enter said can, and as the feed belt advances forward, the pendent member 34 will cause the can to swing, in order that its bottom will be caused to face toward the front of the machine, considering that part of the latter to the right in Fig. 2 as the front. In other words, each can which is presented with its open side toward the front of the machine to a pendent member 34, is given a complete half turn by said pendent member. Should the bottom of the can strike an anti-friction roller, the pendent member will be simply lifted as the said can is moved forward by the feeding means, thereby permitting the free feed of the can. After the cans pass the respective turning devices, all their bottoms will face in one direction, or toward the front of the machine. By reason of the fact that the anti-friction rolls 35 are employed, there will be no retardation in the turning motion of the cans. It should be understood that the cans approach the pendent members in indiscriminate order, some of them with their mouths pointing in one direction, while the bottoms point in the opposite direction, but after they pass the turning devices they are all properly positioned for presentation subsequently to the filling mechanism.

The cans are advanced by the secondary feeding means 11 onto a table or shelf 36, see Fig. 4 for example, the upper side of which is in the same horizontal plane as the upper runs of the belts composing said secondary feeding means. The table or shelf 36 is divided into pockets by vertical walls 36′ alined longitudinally with the walls 13 of the secondary feeding means, and while between the walls 36′, the foremost can in each

pocket abuts against a stop, as 37, preventing it from being crowded into the space between two of the strips 38 of the drum 39, should the latter be turning. I have set forth that it is not essential that I should employ a plurality of spouts 5. In like manner it is not necessary that I should employ a plurality of belts for the two feeding means.

There are four strips 35 secured to the periphery of the drum 39, they being equidistantly separated and serving as seats for the cans, the bottoms of the cans resting upon said strips or seats. Extending perpendicularly from the strips are fingers 40, which may be conveniently made from stiff wire and arranged in coöperating pairs, each pair of fingers being adapted to bring a can to a vertical position. In the arrangement shown it will be apparent that each strip 38 is provided with eight fingers, although, as will be understood from the foregoing, this is not absolutely necessary. The table or shelf 36, which forms a temporary support for the cans, and onto which they are fed by the secondary feeding means, is slotted depthwise and entirely through the same for the passage of the fingers 40. The drum 39, as will hereinafter appear, is given a quarter of a turn on each step. In Fig. 4, two of the fingers 40 are represented as occupying a horizontal position and under a can, the fingers, as they were brought to such position, passing through the slots in the table 36. Upon the movement of the drum through a quarter of a circle, the two fingers which are under the can, will lift the latter to a vertical position, such position being assumed when the drum has completed said quarter turn, the fingers naturally occupy a similar disposition, and during this motion the can will drop upon the strip 38 which coöperates with the two fingers just alluded to. When the can is in a vertical position, it will be ready to receive a measured charge of material, which may be any desired substance. When the foremost can in Fig. 4 is lifted, during the motion just set forth, above the can immediately behind it, the latter can be pushed forward by the cans behind it until it strikes against the stop 37, and when the quarter turn is completed, the lowest fingers 40 in said Fig. 4 will have reached a position under and in contact with what is shown in said figure as the second can. Each can, as it is moved from its horizontal to its vertical or charge-receiving position, passes between guide devices, as 41, arranged in parallel planes, and fastened at their inner ends to a beam or board 42 extending across the machine, and which prevent lateral motion of the can, so that the latter will be moved with certainty toward its charge-receiving position. It will be understood that there will be in the organization illustrated, simultaneously, four cans, in position to receive charges, and to prevent forward displacement of the cans, they strike, when in their charge receiving positions, the crossbar of a bail 43 pivotally supported by the framework of the machine, and which is subsequently moved out of its can holding position, so that the cans can be projected down the inclined receiving feed boards 44 and between guide wires, as 45, associated therewith, to be disposed of in any suitable way.

The step-by-step fed drum, and some of the associated parts which I have just described, are clearly illustrated in Figs. 8 and 9. By reason of the fact that the guide devices 41 are free at their forward ends, they are laterally resilient, so that the can, when filled and topped, can be positively and automatically given a movement longitudinally of a strip 38, in order to positively separate the top of said can from the topping mechanism or from a clamp forming a part of the same, as will hereinafter more particularly appear.

The drum 39 is rigidly fastened to a shaft 46, see for example Figs. 2 and 4, the shaft rigidly carrying at one end a four-toothed ratchet wheel 47, with which a pawl 48, pivotally carried by the arm 49, coöperates. The upper end of the said arm 48, constituting a convenient pawl carrier, is loosely associated with the shaft 46, while the lower portion thereof is jointed to one end of the rod 50, the opposite end of said rod being likewise connected with what might be considered the lower arm of the angle-lever 51, the upper arm of said angle-lever having a balance-weight 51^c adjustable thereon, and by the employment of which the lever, when in its original position, has no tendency in itself to move in either direction. The lower arm of the said lever 51 has thereon two cam portions 51^a and 51^b adapted to be successively engaged by the pins 52 and 30, the latter, as will be remembered, serving also to operate the lever 31. When a can strikes the stop 37, a pair of pins 40 will be under and against the can, so that when the pin 52, on the rotation of the pulley 22, rides against the face of the cam portion 51^a of the lever 51, the lower arm of said lever will be swung to the right in said Fig. 2, thereby moving the rod 50 and arm 49 in corresponding directions, so that the pawl 48 can fall behind one of the teeth of the ratchet wheel 47. When the pin 52 has passed out of contact with the cam portion 51^a, the pin 30 will ride against and along the effective face of the cam portion 51^b so as to impart an opposite motion to the lower arm of the lever 51, thereby returning said lever to its original position, during which motion the pawl 48 is effective for imparting a quarter of a turn to the ratchet wheel 47 and a corre-

sponding movement to the drum 39, so as to elevate the two pins under the can from the horizontal to the vertical, during which motion they carry the empty can supported upon them to its charge-receiving position, the can, during such motion, seating upon a coöperating strip 38.

I provide means for controlling the movement of the drum 39, said drum having a movement bodily, as will hereinafter appear, in addition to its step-by-step rotation. This movement bodily of the drum, is up and down in the present case. The means illustrated for securing the result just mentioned will now be set forth, and assure the positioning of the drum accurately to receive a can or cans.

Fulcrumed on the framework of the machine is a lever 54, see for example Fig. 9, which is normally disposed in the path of the strips 38, so that should the drum be given but a portion of a quarter of a turn, one of the strips, or what is, for the time being, the outermost one, will strike against the lower end of the lever 54, as the drum rises, in order to horizontally aline the inner and outer strips 38 and bring the pins on the inner strip directly under and in contact with the cans on the platform 36. The lever 54 is normally held in its working relation by a coiled spring, as 55, connected with the lever and also with the frame. An actuator for throwing the drum controlling or positioning lever 54 into its ineffective position is shown at 56 as consisting itself of a lever, the lower or effective arm of which is arranged to engage a pin 54^a on the coöperating lever 54. In Fig. 9, the lever 54 is shown in its inoperative position, or that into which it has been moved by the actuating lever 56. As will be understood, the lever 54, when in its operative position, stands approximately vertically, its pin 54^a resting at this time against the actuating lever 56, the upper end of which, it will be seen, is somewhat bent, and is disposed in the path of and adapted to be struck by a top transferring device, so that the lever 56 can be operated to operate in turn the lever 54 to move the latter free of the strip 38 which it engages, so that the drum can be operated one step to move the filled cans away from the charge-receiving positions, and a series of empty cans to their charge-receiving positions. Before the drum is operated to secure the results set forth, the bail 43 will be also operated to carry it away from against a row of filled and topped cans.

The topping mechanism will be generally described hereafter.

The bail 43 is movably mounted, it having horizontally disposed journal portions, as will be clearly seen upon an inspection of Fig. 3, sustained for rocking motion by bearings on the framework, one of the journal portions being extended outward beyond the side of the framework, and having rigidly attached thereto a crank-arm 60, as clearly shown in Fig. 2. To this crank-arm is pivoted one end of a rod 61, the other end of the rod being connected by an adjustable joint with the crank-arm 62, fastened to the shaft 63 extending across the machine. The adjustable joint between the crank-arm 62 and rod 61 may be of any desirable character. For example, it may be in the nature of a pin and elongated slot, the elongated slot in the present case being formed in the arm 62, while the rod or link 61 carries the coöperating pin, which is in the form of a set-screw or equivalent part. The bail 43 is shown as being in its operative position in Figs. 4 and 9, for example. When the bail is swung up above the tops of the cans, the latter are freed, so far as the bail is concerned. When the arm 62 is swung over toward the right from the position it occupies in Fig. 2, the link 61 will be drawn down, which operation occurs subsequent to the filling and topping of a can or series of cans. It will therefore be apparent that when the link 61 is drawn downward, corresponding motion will be applied to the arm 60 to elevate the bail 43 to release the can or series of cans which it held. Upon the return swing of the arm 62, or as the latter moves from the left toward the right in said Fig. 2, the bail will be returned to its initial position, through an upward thrust imparted to the link 61 by the arm 62, where it will again be positioned to maintain the cans being filled against outward displacement.

The drum 39, in addition to the step-by-step rotary motion, is bodily movable, it being arranged in the present case for up and down movement, and the reason for this will hereinafter appear. The shaft 46 which carries said drum 39 is supported by suitably guided bearings or blocks, as 64, to which are pivoted the upper ends of the pitmen or links 65, the opposite ends of said pitmen or links being likewise respectively jointed to the crank-arms 66 on the shaft 63, see for example Fig. 4. It will be understood that the bearings or blocks 64 have a vertical movement. Therefore, as the crank arms 66 swing upon the turning of the shaft 63, the drum 39, through the intermediate connections, may be either raised or lowered, in accordance with the direction of motion of the said crank-arms 66.

Carried by the framework of the machine at a point above the transverse shaft 63, is another transverse shaft 67, (see for example Figs. 2 and 4,) the ends of which project beyond the framework. To one of the said ends is attached the crank-arm 68; see Fig. 2, to which is pivoted the upper end of a rod 69, the lower end of said rod being connected

by a slip or sliding joint with the arm 62. This slip or sliding joint may be of any suitable character. It is represented as being of the pin and slot form, the slot being formed in the link or rod 69 and the pin being carried upon the crank-arm 62, and by such joint the rod 69 may have lost or relative motion with respect to the crank-arm.

Jointed to the lower branch of the angle lever 51 is a rod 70, connected also to the crank-arm 62 by the same kind of joint between said crank-arm and rod 69. In fact the same pin 70^a is common to the two joints. The rod 70 can therefore also have relative or lost motion with respect to the crank-arm 62. When therefore the lower branch of the angle lever 51 is moved to the right in Fig. 2 under the action of the pin 52, in the manner hereinbefore described, the rod 70 will be swung in a corresponding direction, moving simultaneously with the rod 50, which latter is being operated to carry the pawl 48 into its operative position in order to effect the turning of the drum 39. As the rod 70 moves toward the right, the link 61 is drawn down and pulls the crank-arm 60 in a like direction in order to swing the bail 43 upward and release a row of cans. After the cans are released by the bail, the rod 50 will be drawn to the left in the manner hereinbefore described, in order to effect the turning of the drum 39 to carry a series of filled and topped cans away from the positions they occupy when filled and to bring a second series of cans up to the filling station. As the rod 50 moves to the left, or is returned to its initial position, the same motion is followed with respect to the rod 70, but owing to the joint described between said rod 70 and crank-arm 62, the latter will not be returned to its original position by the rod.

It will be remembered that the upper end of the rod 69 is connected to the crank-arm 68, which is rigidly fastened to the shaft 67, which shaft is given a partial turn simultaneously with the advancing movement of the lever 51, the shaft, as it moves, swinging the crank-arm 68 toward the right, and subsequently returning it to its initial position. The manner of driving the shaft 67 will be hereinafter described. It might be stated at this point that the shaft 67 carries the top-transferring member, constituting a part of the top-applying means hereinafter more particularly described. As the crank-arm 68 swings over toward the right, on the advancing partial rotation of the shaft 67, see Fig. 2, the rod 69 is thrust downward, such motion occurring simultaneously with the movement of the rod 70 toward the right in said figure. Owing to the joint however between the lower end of the rod 69 and the crank-arm 62, the said rod, on its downward thrust, does not perform any work. After the tops have been applied to a series of cans, the shaft 67 is given its return movement, thereby, through the crank-arm 68, elevating the rod 69, and when the rod reaches a predetermined position, it will swing the crank-arm 62 from its shifted position to its primary position, or that which it is shown as occupying in Fig. 2, in order, through the intermediate described parts, to return the bail 43 to its can holding or operative position. During the time the rods 50 and 70 were drawn to the left in Fig. 2, the bail 43, as will be understood, was in its ineffective position, so that when the rod 50 was returned to its original position, the drum 39, as will be evident, could be readily operated through the intervening parts in order to effect the discharge of several filled cans onto the respective receiving boards 44, and the bringing of a series of empty cans into position to receive charges of material.

During the swing of the crank-arm 62, the crank-arms 66 move of course in unison therewith, so that the links 65 will be first drawn down and subsequently elevated. As the said links are lowered, the drum 39 will be correspondingly lowered, so as to secure a longitudinal movement of the fingers 40, and the opposite will take place upon the upward thrust of the links 65 as the several crank-arms 62 and 66 return from their shifted to their original positions. It will be understood that the links 65 are drawn down during the time a series of cans is being fed from the table 36 to upright positions or in positions to receive charges of material, and naturally while filled cans are being moved away toward the feed boards 44.

In each of the strips 38, upon which the cans are seated, is formed a series of openings or apertures 71, located respectively in a plane intermediate the coöperating fingers 40 and above which the cans, when in their charge receiving positions, are situated, and these apertures or openings 71 are adapted to receive can dislodging devices, as 72, represented as pins or projections, extending at an angle upward and inward from the upper ends of the inclined receiving boards 44. When the drum therefore rotates, to carry a series of filled cans away from the positions they occupy when receiving their charges, these dislodging devices or pins 72 enter corresponding apertures 71, in order to lift the cans free of the strip 38 upon which they are seated, so as to assure the movement of the cans toward and onto the coöperating feed boards 44 and between the guide members 45 associated with the feed-boards. As the filled cans are moved away, as just set forth, the drum 39, as will be remembered, has a downward movement, so that the fingers 40, against which the cans rest, while effective for moving the cans toward the feed-boards, will not press the same down against said feed-boards, as in

case they did, the cans might be mashed, but on the contrary, the said fingers are given a longitudinal movement and sweep along the cans, so that the latter will not be injured, but at the same time will be moved onto the said feed-boards.

The can filling mechanism is represented as including in its organization a supply hopper, as 73, to receive powdered or other suitable material, said hopper having a series of outlets 74 extended downward from its bottom. Located under the bottom of the hopper is a slide 75, which is suitably guided for horizontal movement and which, when in its retracted position or that it is represented as occupying in Fig. 4, covers the outlets 74. It will be understood that there are in the present case four outlets, such number corresponding with the number of the cans that are simultaneously filled. From the inner portion of the slide 75 a series of spouts 76 depend, these being of tubular construction and corresponding in number with the outlets 74. The tubular spouts, as shown clearly in Fig. 4, are of telescopic construction, whereby their capacity may be readily regulated to conform to that of the cans being filled. The upper sides of the spouts are open, while the same applies to the lower ends thereof, only that said lower ends are adapted to be closed by valves or flaps, as 77, hingedly connected to the spouts in any desirable way. The valves 77 work respectively in funnels, as 78, rigidly associated with and depending from the respective spouts 76, the funnels serving to properly guide the granular or powdered substance into cans placed thereunder, and which is received from the spouts.

Connected with the framework in any desirable manner are arms 79, (see for example Fig. 4,) one for each valve, and the inner ends of these arms are adapted to engage against the bottoms of the valves 77, by virtue of which, when the slide is in its outer position, the valves will be held closed. When in said outer position, and when the several valves are closed, the upper open sides of the several spouts 76 will register with the outlets 74 of the supply or feed hopper 73, so that the powdered or granular substance within the hopper can gravitate through the outlets into the several spouts and fill the latter. As the slide 75 is moved inward, it will, when it reaches a certain point, cover the outlets 74 so as to cut off the further gravitation of the powdered or granular material, and during such period of operation, the valves 77 will open by their weight, assisted by the pressure of the material against the same, and when they reach a certain inclination, or the proper charge-supplying position for the cans, the material can pass from the spouts and from the valves into the empty cans, the funnels of course guiding the material into said cans and preventing scattering thereof.

It will be remembered that the shaft 21 carries upon one end thereof the pulley 22. Rigidly connected with the opposite end of said shaft is a crank-arm 80, (see for example Fig. 1) connected by some suitable form of adjustable joint with one end of the rod 81. The joint named may be that of the familiar slot and pin form. The opposite end of said rod is united by means of a slip joint with the crank-arm 82 connected with one end of the shaft 67, the opposite end of which, it will be remembered, carries the crank-arm 68. The shaft 67 carries another crank-arm 83 connected with one end of the rod 84, the opposite end of said rod being connected with the crank-arm 85. It should be stated at this point that the connection between the inner end of the rod 84 and the crank-arm 83 is an adjustable one, while the connection between the outer end of said rod and the crank-arm 85 is a combined adjustable and slip or slide one, so that the rod 84 can have relative or lost motion with respect to the crank-arm 85. The crank-arm 85 is connected rigidly with a rock-shaft 86, which in turn rigidly carries a second crank-arm 87, to the lower end of which a link 88 is pivoted, the lower end of said link being likewise jointed to the underside of the slide 75, see for example Figs. 1, 2 and 4. In Fig. 1 for example the slide 75 is shown as being at its inner position in order to cause the delivery to a series of cans of charges of material, the shaft 21 at this time rotating in the direction shown by the arrow in Fig. 1. The crank-arm 80 of course moves through a full circle. As it commences to move from the position in which it is shown in said Fig. 1, it draws the rod 81 to the right, thereby, through the intermediate parts, thrusting the rod 84 to the left, and when the rod 84 has moved a certain distance, the crank-arm 85 is swung outward, so as, through the intermediate parts, to move the slide 75 outward, during which motion, as will be remembered, the spouts 76 are carried in position to receive charges of material. During the time that the rod 84 is being moved to the left in Fig. 1, can tops are being moved toward the filled cans. In other words, the spouts are bodily carried from over the cans, so that the tops can be freely applied thereto without hindrance from the spouts. While the crank-arm 80 has a rotary movement, the rod 81 has a reciprocatory motion, it having been pointed out that as said rod 81 was drawn to the right in Fig. 1, the slide 75, through the intermediate connections, was pulled back to its original position. As the rod 81 is moved toward the right, it will not, during the first stage of its motion, impart any movement to the crank arm 82, owing to the described connection between these two

parts, for the cans, as will be understood, are being topped during this particular period. When, however, the tops have been applied, the rod 81 serves to swing the crank-arm 82 from the right in Fig. 1 to the position it is shown as occupying in said figure, so that the crank-arm 83 will be swung from the left in said figure toward the position it is illustrated as occupying therein. On the motion of the crank-arm toward the right in said figure, the rod 84 will be carried therewith, but it will not become immediately effective for operating the arm 85, owing to the described connection between these two parts. When however the top transferring device is well out of the way, a series of empty cans in the meantime having been moved into their charge-receiving positions, the slide, through the crank-arm 85, shaft 86, crank-arm 87 and link 88 is moved inward. The top-transferring device is carried rigidly upon the shaft 67, and when in position to receive tops, the slide will be in its inner position. When however the top-transferring device is operated to transfer the tops and apply the same to the filled cans, the slide 75 will be moved outward and at a certain point in the return motion of the said top-transferring device, or that set forth hereinbefore, the slide 75 will be moved inward.

Within the supply hopper 73 is an agitator 89, of some suitable form, the shaft of which is suitably supported by the side walls of the hopper, and is provided at one of its ends, or that which projects outside of the hopper, with a pulley or band-wheel 90 connected by a belt 91, shown as crossed, to a pulley 93, on the shaft 94; see for example Fig. 1. The shaft 94 is represented as belted by a belt as 95, to the main shaft 9, which, it will be remembered, is continuously operative, or is operative as long as the machine is in action. The agitator 89 is not however continuously operative, but is periodically thrown into action, and I will now set forth the means for securing this result.

The pulley 93 runs loose on the supporting shaft 94 and coöperates with a fixed clutch member of some suitable kind, the pulley 93 being normally held out of engagement with the clutch member by the lever 96 fulcrumed upon a suitable bracket upon the framing of the machine. One end of the lever 96 engages the said pulley 93, while the opposite end of said lever is engaged by a cam, as 97, carried on the intermittently operable shaft 67, see for example Fig. 3, in such a way that the lever acts against the pulley to normally hold the same out of engagement with the coöperating clutch member. When however the let off or releasing portion of the cam 97 comes opposite the forward end of the lever 96, the latter and hence the pulley 93 will be released, so that the pulley can be moved into engagement with the coöperating clutch member by the action of a spring. I do not deem it necessary to show this particular feature in detail, as the same is a common expedient in many mechanical arts. I deem it proper to state however that the let off portion of the cam reaches a position to release the lever 96 at the time the slide 75 is in its inner position, so that the agitator 89 can be operated to loosen up the material in the supply hopper 73 and cause its free gravitation into the several spouts 76. The cam 97 will be operated in order to effect the release of the lever 96 as the top-transferring device hereinafter described, is moved from its top-receiving to its top-applying position. On the return motion of the cam, the effective part thereof will so operate the lever 96 that the pulley 93 will be returned to its original position to throw the agitator 89 out of action.

Rigidly fastened to the rock shaft 67 are arms 100, (see for example Figs. 3 and 4) joined at their upper ends by a cross-head, as 101, said members constituting part of the top-transferring mechanism. The top-transferring mechanism is arranged to transfer four tops applied thereto, and the cross-head 101 carries four clamps of suitable construction which grip a corresponding number of tops. The cross-head 101 has longitudinally thereof and along its opposite sides, parallel walls, each denoted by 102, between which the jaws 103 and 104 of the respective clamps are fitted, the jaws 103 being stationary with respect to the supporting cross-head 101, while the jaws 104 have a sliding motion longitudinally of said cross-head and toward and from the respective coöperating jaws. When said cross-head is in its normal position, as illustrated in Fig. 3, the jaws should be open in order that a top can be entered therebetween. The jaws are subsequently closed by the movement of the sliding jaws 104 in unison, in order to clamp or grip the tops.

The sliding jaws are suitably connected with the rod 107 which is adapted for longitudinal motion with respect to and on the said cross-head in order to simultaneously close or open the several jaws 104. Upon one end of the rod 107 is a latch 108, shown as a spring latch, the free portion of which plays in an aperture in the perpendicular portion of an angle plate 109 attached to the cross-head 101 on the face thereof opposite that with which the several jaws are associated. The shouldered portion of the latch is adapted to engage the keeper 110 pivotally mounted upon said angle plate 109. The long branch or arm of the keeper 110 constitutes the effective portion thereof and is normally maintained in position to cooperate with the latch 108 to hold the several jaws 104 closed by a suitable spring, not shown, pressing thereagainst. It will be

evident that when the said long branch or arm of the pivotally mounted keeper 110 is moved to what is shown as downward it will be carried free of the latch 108, in order to release the latter and consequently the several jaws 104. It might be well to state at this point that such operation of the pivoted keeper is secured by the short arm thereof striking against the fixture 112 on the framing of the machine when the cross-head reaches its shifted position, as indicated in Fig. 9. When this position is reached, the said keeper will be positively disengaged from the latch. The fixture or bracket 112 supports the levers 54 and 56, the functions of which have hereinbefore been set forth.

In one of the parallel walls 102, or what is shown as the upper one in Fig. 3, for example, are formed suitable apertures, the width of which equals or, if necessary, slightly exceeds the diameters of the can tops. These openings are intended for the passage of said tops toward and into the jaws 103 and 104 when the latter are open or when the jaws 104 are separated from their coöperating jaws. The jaws 103 and 104 are suitably shaped to present seats for the can tops, when the jaws are closed, and they are also suitably shaped for the reception of the upper portions of the cans, whereby the cans may properly enter the space in which the tops are supported, the cross-head 101 to secure such result having a downward motion in the present case, relatively to the cans which, for the time being, are stationary, and of course filled.

As previously set forth, the cross-head 101 normally occupies the position shown in Figs. 1, 2 and 4, for example, the apertures therein for the caps at this time being opposite certain inclined feed or supply boards 118, down which the tops gravitate, said tops being positively moved onto the feed boards, as will hereinafter appear. The tops, when they leave the feed boards, enter the receiving apertures in the cross-head and then pass into the jaws 103 and 104, these jaws at this time being separated or open. The means for operating the rod 107, whereby the jaws 104 can be operated with respect to the companion jaws 103 will be hereinafter more particularly described.

I will provide a pair of parallel guide strips, as 119, to coöperate with each feed board 118, to prevent lateral motion of the tops supplied to said feed boards by an ejecting device coöperative with the transversely disposed belt 120, (see Figs. 1 to 4 inclusive for example). The transverse feed belt 120 is horizontally disposed, has a step by step motion imparted thereto and has, on its outer face, a number of equidistantly disposed cross strips 121, and against which the tops to be applied to the cans are engaged, while supported upon the upper run of said belt. The belt travels around the pulleys 122 and 123, the latter being of less diameter than the former, so that the entering end of the belt is given an upward pitch. The shaft 124 of the pulley 122 and the shaft for the pulley 123 may be supported in any desirable way. One portion of the belt extends considerably outward beyond the side members of the framework of the machine, and along the inclined portion of said belt are suitably mounted guide strips 126 arranged in parallelism and serving to prevent lateral displacement of the can tops from the belt. The tops are supplied to the belt in any desirable way, for example by hand, with their open sides up. The pulley 122 runs loose on the shaft 124 and the latter is connected by bevel gearing, denoted in a general way by 127, (see for example Fig. 2) with the stub shaft 128 represented as belted by a belt 129 to the counter-shaft 21. Coöperative with the pulley 122 is a clutch member 130 splined to the shaft 124, (see said Fig. 2), and slidable thereon. The shifting device for the clutch member 130 is illustrated as a lever 131, (see for example Fig. 3) suitably fulcrumed upon the framing of the machine, and connected with a spring 132, the purpose of which is to normally actuate the lever in such a way that the clutch member 130 will be held in working relation with the said pulley 122 in order to drive the belt 120. It will be understood that when the belt operates, the upper run thereof moves toward the bottom of Fig. 3. The belt, as will be also understood, is intermittently stopped so that a series of can tops, carried thereby, can be ejected toward the top transferring means. An actuator for the clutch shifting lever 131 is shown at 133, and as consisting of a shaft having a crank-portion 135 at its lower end to engage against said lever, while the upper end of said actuating member 133 is also cranked, the crank portions being flattened and the lever 134 being fitted flatwise against such flattened portions. The two parts 134 and 133 are pivotally united, as clearly shown in Fig. 2, whereby the lever 134 can have, in addition to lateral motion, an up and down motion. The tail of the lever 134 rests upon a lever 135^a fulcrumed on the framework and connected by a link 136 with a lever 137 normally resting against a stop on the framework of the machine.

Upon the outer surface of the belt or can top carrier 120 are located a number of tappets 138, equidistantly disposed, and separated in the present case a distance equaling that between four of the cross-pieces 121. The tappets 138 are adapted to successively engage the lever 134. It will be assumed that the clutch member 130 and pulley 122 are coupled or engaged and that

the shaft 124 is in motion, and that can tops are upon the upper run of the belt 130, the latter at this time being in motion. When a tappet 138 on the moving belt strikes the lever 134, the latter will be moved laterally and when the carrier engages the lever 134, the latter will be moved downwardly in Fig. 3, whereby the actuating member 133 will be operated in such direction as to act against the lever 131 to move the clutch member 130 out of engagement with said pulley 122, the operation being concluded when four of the can tops register with the feed boards 118. When the clutch member is disengaged from the pulley, the belt will be stopped, and while stopped, the four can tops are ejected from the belt and onto said feed boards, and I will now set forth the means shown for securing this result.

Upon suitable supports or brackets near the topmost part of the framing, is supported a shaft 140, to which are rigidly attached knock-off devices or ejectors for the can tops, consisting of arms 141 having curved can top engaging outer ends. To the said shaft 140 is attached a crank-arm 142, to which is pivotally connected one end of a rod 143, the other end of the rod being likewise jointed to a lever 144 mounted on the framework. To the lever 144 between its fulcrum and the point at which the rod 143 is attached thereto is connected one end of a coiled spring 145, shown for example in Fig. 4, the other end of said spring being connected with the framework. Normally of course the ejectors or knock-off devices 141 are out of the path of the moving belt, and they are maintained in this relation by the power of the spring 145. The actuator for the lever 144 is shown at 146, and as consisting of a pin or projection on the pulley 147 on the main shaft 21, and around which the belt 129 passes. At about the time the can top forwarding belt 120 is automatically stopped, in the manner hereinbefore described, the actuator or pin 146 will strike the free end of the lever 144 and will thrust the same and hence the rod 143 upward, whereby the knock-off devices or ejectors 141, of which, as will be understood, there are four, will strike four tops on the said belt and will sweep the same therefrom and onto the feed-boards 118. When the pin 146 passes free of the lever 144, the latter, and hence the ejectors or knock-off devices will be returned to their original positions by the force of the spring 145.

The shaft 140 carries means for throwing the belt 120 into action, and I will now set forth the means illustrated for securing this result. One end of the shaft 140, or that illustrated in the foreground in Fig. 2, is connected to an arm 147, of which the pawl 148, pivotally mounted thereon, forms a part, the pawl being of the gravity type and resting normally against a suitable stop on the body of the arm. When the ejectors 141 are swung downward to dislodge the four tops from the belt, in the manner described, the arm 147 will swing therewith, or to what is shown in Fig. 2 as downward, the pawl, during the downward stroke of the arm engaging the lever 135, but not operating the same, although the pawl, on such engagement, is swung about its axis, so that the arm can pass by the said lever 135 to permit the pawl to engage under the same, which operation is concluded at the time the can tops are removed from the belt. When therefore the arm 147 is swung upward to its original position, which result, as will be apparent, is accomplished through the intervention of the spring 145, the pawl 148, which, during the upstroke is immovable downwardly, engages and then elevates the lever 135, which in turn elevates the lever 134, so as to carry the latter above a tappet 138 which it engaged. When the lever 134 is lifted free of the tappet, the former is relieved from the lateral pressure of the latter, whereby the vertically disposed actuating member or shaft 133, and hence the shifting lever 131 will be also released, so that the spring 132 of said lever 131 can so operate on the latter as to cause the clutch member 130 to again engage the pulley 122 to start the belt 120. The belt will be again stopped when a tappet 138 strikes the lever 134, when the operation set forth with be repeated. To prevent crowding of the can tops at the delivery end of the feed-boards 118, and to prevent the simultaneous supply of two tops to the top-transferring mechanism hereinafter described, I provide controlling means whereby only one top at a time can leave a feed-board, and I will now set forth the means illustrated for securing this result.

Extending across the machine and below the feed-boards, is a horizontally slidable bar 150, shown best in Fig. 3. This bar carries thereon four coöperating pairs of feed controlling fingers, each designated by 151, each pair coöperating with a feed-board. The fingers are of cranked or elbow form, and the working portion of one finger for each pair is adapted to extend across a feed-board at once place in the length thereof, while the working portion of the other finger of the pair is adapted to subsequently extend across the feed-board at another point in the length thereof. The working portions of the fingers, when extending across the feed-boards are slightly above the upper surface thereof, or a distance sufficient to prevent the gravitation of the tops thereabout. It will be understood therefore that each pair of fingers comprises an upper and a lower effective portion, which are alternately extended across the feed-boards. In Fig. 3, the upper portions of the fingers are

extended across the feed-boards. To the slide 150, near one end thereof, is connected a link 152, the opposite end of the link being connected with an angular lever 153, fulcrumed on the framing of the machine and adapted to be engaged by the cross-head 101. To the sliding bar 150, near the opposite end thereof, is connected a spring 154, also connected with the framing of the machine.

The cross-head 101 is represented in Fig. 3 in its normal position, or that it occupies for the supply to the can top clamps thereon, of can tops, the upper effective portions of the several fingers 151 extending across the feed-boards 118, while the lower effective portions of the coöperating fingers are drawn back, so that the can tops located below the upper effective portions are free to travel into the clamps mentioned. When however the cross-head 101 moves in the manner hereinbefore described, to transfer and apply tops to filled cans, the said cross-head will pass clear of the lever 153 and release the same, and consequently the slide 150, whereby the spring 154, which was stretched, can pull the transversely sliding bar 150 in such direction as to carry the upper effective portions of the fingers 150 from across the feed-boards 119 and to move the lower effective portions of the coöperating fingers across said feed-boards, whereby the latter will arrest the progress of the said tops and prevent their falling from the lower ends of the feed-boards, as it will be understood that at this time the cross-head 101 is out of its normal position. When however the cross-head reaches its initial position, it strikes the lever 153 and imparts a return movement to the sliding bar 150 to carry the lower effective portions of the fingers 151 out of engagement with the lowermost tops on the feed-boards and to carry the upper effective portions of the coöperating fingers between the first and second tops in each group of tops. When the lowermost tops are released, they pass from the feed-boards through the cap-receiving apertures in the cross-head 101 and into the space between the coöperating jaws 103 and 104, the jaws 104 at this time, as will be understood, being separated from the companion jaws 103. It will be remembered that when a longitudinal movement is imparted to the rod 107, the jaws 104 can be moved simultaneously toward and from their companion coöperating jaws, in a direction corresponding with that in which the said rod 107 is moved. Upon the rod 107, at or near what might be considered the outer end thereof, and on the opposite sides of the same, are pins 155 and 156, as illustrated in Figs. 3 and 4. The cam portion of a lever 157 coöperates with the pin 155, while the cam portion of a lever 158 coöperates with the pin 156; see Fig. 3. The two cam levers 157 and 158 are fulcrumed upon the framing for movement about vertical axes. The inner ends of two rods, designated by 159 and 160 respectively, (see Fig. 1 for example) are jointed together, and are connected to the outer branch of the cam lever 157 at their joint, the latter being of such character that it will permit up and down motion of the rod 160 with relation to the companion rod 159. This joint may be a loose one. The outer end of the rod 160 is connected to one end of the oscillatory lever 161, mounted on the framework of the machine, and which is adapted to be moved alternately in opposite directions by an actuator represented as a pin 162 on the rod 81 which, as will be remembered, has a back and forth motion on the revolution of the crank-arm 80. The outer end of the rod 159 is connected with the outer branch of the cam lever 158; see for example Fig. 3.

When the cross-head 101 swings back from its shifted to its original position, after the application of several tops to a corresponding number of cans, the jaws 104 of the top clamps will be separated from the companion jaws. When the said normal position is reached, the pin 155 will engage the cam portion of the lever 157; see Fig. 3. It will be assumed that a number of can tops have been supplied to the clamps, made up of the jaws 103 and 104. When this is done, the pin 162 will strike the lever 161, and, rocking the said lever, will cause the latter to thrust the rods 160 and 159 to the left in Fig. 1. As the rods move in such direction, the operative portion of the cam lever 157 will ride against the pin 155, so as to impart a longitudinal movement to the rod 107, so that the jaws 104 can be moved toward the companion jaws 103 to clamp the tops herebetween. When the motion of the rod 107 just alluded to is completed, the latch 108 associated therewith will snap over the yieldingly mounted keeper 110, so as to maintain the several jaws positively locked closed. When the jaws are locked closed, the shaft 67 will be caused to rock in the manner hereinbefore described, so as to cause the cross-head 101 to swing in the manner hereinbefore described, to conduct the clamped tops to a series of cans which, at this time are filled, the slide 75 of course being retracted, and with its associated parts being out of the path of the cross-head. The cross-head is carried over above and then down onto the filled cans, so that the upper portions of said cans can enter not only the mouths of the clamps, but can enter the tops supported by the jaws, the cross-head being given a sufficient swing to assure this result. When the cross-head practically reaches its shifted position, the keeper 110 is

operated in the manner hereinbefore described, to release the spring latch 108 and consequently the rod 107 and jaws 104, whereby the latter can be separated from the companion jaws 103 to release the tops then applied to the cans. The result just set forth, it will be understood, is accomplished by drawing the released rod 107 in the proper direction. When the cross-head was swung over, the pin 156 was carried against the effective portion of the cam 158, the latter at this time being stationary, and the pin 162 being to the right of the lever 161. When however the rod 81 is moved from the left toward the right in Fig. 1, the pin 162 will strike the lower branch of the lever 161 after the tops have been applied, so that through said lever, the rods 160 and 159 are drawn to the left, the rod 159 serving to directly actuate the lever 158 in such manner that it will operate against the pin 156 then directly against the same, so that the rod 107 will be drawn in the proper direction. During such movement of the rod, the jaws 104 will be moved away from the companion jaws 103. The jaws 104, it will be understood, remain open during the return movement of the cross-head, and also in such relation until the pin 155 is operated by the effective portion of the cam 157, this taking place after a series of can tops is supplied to the respective clamps on the cross-head 101.

Connected with the several movable jaws 104 are can moving devices, which may be conveniently made of wire in bail form and which are designated by 165. These bails are shown as connected with the movable jaws 104, for example, by means of screws, and they are so positioned when the jaws are closed as not to interfere with the application of the tops to the filled cans. When however the jaws 104 are separated from the companion jaws 103, the bails 165 are naturally moved therewith, so that the free portions of the bails can engage the filled cans near their tops and move them sidewise, so that the tops on the cans are carried free of the fixed jaws 103. At this point the drum 39 will be operated to carry the filled and topped cans away from the filling and topping station.

It will be understood that when the cross-head 101 reaches its shifted position, or that it occupies during the top applying period, it strikes the upper end of the curved portion of the angle-lever 56 and operates the latter, so that said lever 56 can operate the stop lever 54 in such manner as to throw the latter out of the path of the strips 38 on the rotative drum 39.

The operation of the machine is certain, rapid and wholly automatic, and the several acts in the filling and topping of the machine occur in proper order. In referring to the automatic operation of the machine, I of course exclude the supply of can bodies with bottoms attached thereto, to the hopper 3, and the supply of can tops to the intermittently movable belt 120, for I have hereinbefore pointed out that these results may be and are advantageously accomplished by hand.

In operation, empty can bodies with bottoms previously united therewith, are supplied to the hopper 3, and, in the manner hereinbefore described, travel toward the primary feeding means 6, which conveys the can bodies, or, as they might be properly termed, cans, to the secondary feeding means 11. The movement of the cans from the primary to the secondary feeding means is controlled by the means hereinbefore described. The cans, while under the action of the secondary feeding means, are turned, if necessary, to have their mouths all face in the same direction, or, in the present case, away from the drum 39. At a certain point, empty cans are placed upon a strip 38 of the drum 39, following which the drum is given a quarter of a turn, as hereinbefore described, to bring the empty cans to their charge-receiving position. The drum, as will be apparent, has, in addition to the turning motion, a movement bodily, for the purpose hereinbefore described. When the cans reach the filling position, the charges of material will be supplied to a row of the same by the tubular spouts 76, which, at this time, are in their advanced positions, and the valves 77 of which are open, as indicated in Fig. 4. When the cans are filled, the said spouts are returned to their primary or charge-receiving positions by the movement of the slide 75 in the manner hereinbefore described, during which movement the several valves 74 are closed in unison, by their engagement with the several arms 79. After the cans are filled and the spouts 76 moved away from over the same, the cross-head 101 carrying a series of four tops, is swung over to simultaneously apply said tops to the filled cans, the tops being initially clamped and then released in the manner hereinbefore described. When the cans are topped, the drum 39 is given a turn through a quarter of a circle, and during this motion the dislodging fingers 72 enter the apertures under the filled cans so as to positively separate said cans from the strip 38 upon which they rest, and during this time, the drum is given a downward motion, so as to carry the fingers 40 longitudinally of the cans, in order not to press the same against the feed-boards 44 onto which said cans are delivered by the action of the fingers 72, aided by the compound motion of the drum.

I have described in a brief way the operation that occurs in filling and topping the cans, and I deem this brief description to

be only necessary, for in describing the structure of the machine illustrated, I have accompanied the description of each sub mechanism with a description of the operation thereof.

In applying a title to the apparatus in the opening statement of this, my specification, I employ, for convenience, the designation "Can filling machine", this being one that is familiar in the art to which my invention relates. I have indicated that the machine may be used for other purposes than the filling of cans and applying tops thereto. In like manner I wish it distinctly understood that I use a number of terms hereinbefore in their generic senses. For example, where I employ the term "tops", I do not wish to confine myself to the application simply of tops to cans, for the parts so termed may be the bottoms of the cans. In other words the term "tops" is employed to embrace not only tops, so-called, but bottoms as well.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a machine of the class described, a hopper having a plurality of spouts, an agitator for the cans in the hopper, having arms, the hopper and spouts being slotted to receive said arms as they revolve, and the spouts serving to convey cans from the hopper, feeding means to receive the cans from the spouts, and automatically operable means located substantially at the delivery end of the feeding means for engaging the foremost cans.

2. In a machine of the class described, the combination of feeding means, can filling means, and a plurality of flexibly suspended members located over the feeding means and having anti-friction rollers at their free ends to enter the mouths of the cans on the feeding means to bodily turn the cans to cause the mouths thereof to all face in the same direction before they reach the can feeding means.

3. In a machine of the class described, the combination of a hopper for containing empty cans, feeding means for receiving the cans from the hopper, guide walls between which the cans travel while on the feeding means, a suitably fulcrumed lever located at the delivery end of the feeding means and adapted to engage the foremost can, a spring-actuated rod having a pin for engaging the lever, and means for automatically operating the rod in opposition to the spring, to cause the pin on the rod to move the lever into a can releasing position.

4. In a machine of the class described, the combination of a hopper for containing cans and having a plurality of spouts for the passage of the cans, feeding means for receiving the cans from the spouts and composed of a plurality of belts arranged side by side, and guide walls above the working portions of the respective belts, between which the cans travel while on the belts, levers arranged substantially at the delivery ends of the belts and across the space between the respective walls, said levers constituting stops for the cans, a spring-actuated rod having pins to engage the respective levers, and means for actuating the rod in opposition to its spring to cause the pins on the rod to engage the levers and move the latter into can-releasing positions.

5. In a machine of the class described, a can feeding belt, a drum having a can seat provided with fingers extending therefrom, a stationary platform between the belt and drum, slotted for the passage of the fingers, the belt being adapted to feed a can onto the platform, and the fingers, on the motion of the drum, being adapted to pass through the slotted portion of the platform and to move the can therefrom as the drum turns to a substantially upright position, means for turning the drum to secure the function set forth and for causing the can to be subsequently moved away from the charge-receiving position, means to receive the filled can, means for positively separating the filled can from the drum to cause it to pass to the can receiving means, and means for imparting a movement bodily to the drum to cause the fingers to traverse longitudinally the filled can.

6. In a machine of the class described, a can feeding belt, a drum having a can seat provided with can engaging fingers extending therefrom, a stationary platform between the belt and drum, slotted for the passage of the fingers, mechanism for turning the drum to cause the fingers to engage the can, separate it from the platform, and bring it to a charge receiving position, and means for supplying the can with a charge of material.

7. In a machine of the class described, a can feeding belt, a drum having a seat for a can, and fingers extending therefrom, a stationary platform onto which a can is fed from the belt, located between the latter and the drum, and slotted for the passage of said fingers, means for operating the drum to cause the fingers to elevate the can to a substantially upright position, means for supplying the can with a charge of material when in such upright position, and an automatically operable device for engaging the can, opposite the fingers, to hold it from outward displacement.

8. In a machine of the class described, can feeding means, a drum having can seats, onto which a plurality of cans are received from the can feeding means, mechanism for imparting to the drum a step-by-step motion, to first carry the cans from the feeding

means to a charge receiving position, and subsequently moving the cans away from the charge receiving position, means for simultaneously filling the several cans when in their charge receiving position, means for holding the cans from displacement while being filled, and mechanism for automatically operating said last mentioned means after the cans are filled, to thereby carry the same free of the cans.

9. In a machine of the class described, can feeding means, a drum having can seats, onto which a plurality of cans are received from the can feeding means, mechanism for imparting to the drum a step-by-step motion, to first carry the cans from the feeding means to a charge receiving position, and subsequently moving the cans away from the charge receiving position, means for simultaneously filling the several cans when in their charge receiving position, means for holding the cans from displacement while being filled, mechanism for automatically operating said last mentioned means after the cans are filled, to thereby carry the same free of the cans, and fingers supported independently of the drum, the seats being apertured to receive the fingers as the drum rotates, to cause the positive separation of the filled cans from the drum.

10. In a machine of the class described, can feeding means, a drum having strips equidistantly disposed on the periphery thereof and provided with fingers arranged in pairs and extending perpendicularly therefrom, a stationary platform between the can feeding means and the drum, and slotted for the passage of the fingers, the latter serving to engage a series of cans, and, as the drum turns, to carry the same from the platform to a substantially upright position, means for supplying the cans with charges of material while in such upright position, and mechanism for imparting a step-by-step motion to the drum a distance equaling that between the strips.

11. In a machine of the class described, can feeding means, a drum having strips equidistantly disposed on the periphery thereof and provided with fingers arranged in pairs and extending perpendicularly therefrom, a stationary platform between the can feeding means and the drum, and slotted for the passage of the fingers, the latter serving to engage a series of cans, and, as the drum turns, to carry the same from the platform to a substantially upright position, means for supplying the cans with charges of material while in such upright position, mechanism for imparting a step-by-step motion to the drum a distance equaling that between the strips, and an automatically operable stop device arranged to engage the cans opposite the fingers, when said cans are in their upright positions, and to subsequently release the same.

12. In a machine of the class described, can feeding means, a drum having strips equidistantly disposed on the periphery thereof and provided with fingers arranged in pairs and extending perpendicularly therefrom, a stationary platform between the can feeding means and the drum, and slotted for the passage of the fingers, the latter serving to engage a series of cans, and, as the drum turns, to carry the same from the platform to a substantially upright position, means for supplying the cans with charges of material while in such upright position, mechanism for imparting a step-by-step motion to the drum a distance equaling that between the strips, an automatically operable stop device arranged to engage the cans opposite the fingers, when said cans are in their upright positions, and to subsequently release the same, receiving means for the cans, and fingers associated with the receiving means, the strips being apertured to receive the fingers as the drum is moved to carry the cans away from the charge receiving positions.

13. In a machine of the class described, can feeding means, a drum having strips equidistantly disposed on the periphery thereof and provided with fingers arranged in pairs and extending perpendicularly therefrom, a stationary platform between the can feeding means and the drum, and slotted for the passage of the fingers, the latter serving to engage a series of cans, and, as the drum turns, to carry the same from the platform to a substantially upright position, means for supplying the cans with charges of material while in such upright position, mechanism for imparting a step-by-step motion to the drum a distance equaling that between the strips, an automatically operable stop device arranged to engage the cans opposite the fingers, when said cans are in their upright positions, and to subsequently release the same, receiving means for the cans, and fingers associated with the receiving means, the strips being apertured to receive the fingers as the drum is moved to carry the cans away from the charge receiving positions, and means for imparting a downward movement to the drum while the fingers are entered in said apertures.

14. In a machine of the class described, can-feeding means, and a member supported above the can-feeding means and adapted to enter the mouths of the cans to reverse their position while upon the said can-feeding means.

15. In a machine of the class described, can-feeding means, a flexible member supported above the can-feeding means and having a projection to enter the open ends of the

cans as they are advanced by the can-feeding means to reverse said cans while on the can-feeding means.

16. In a machine of the class described, the combination of a hopper or receptacle to receive cans or the like promiscuously, transferring means for receiving the cans from said hopper, a device for reversing the position of certain cans while on said transferring means and as they are advanced whereby the mouths of the cans will all face in the same direction, and means to receive the cans from said reversing device and to set them in upright position.

17. In a machine of the class described, the combination of a can-supplying device, transferring means for receiving open-mouthed cans or receptacles from the supplying device, a device arranged to enter the open mouths of certain cans and operative to reverse their position on said transferring means while such cans are being advanced by said transferring means whereby the mouths of all of the cans will face in the same direction, and means for setting the cans in upright position.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FREDRICK J. HEYBACH.

Witnesses:
R. E. ROSSITER,
A. E. SHEARWISE.