C. S. BUCKLIN.

CAN FILLING MACHINE.

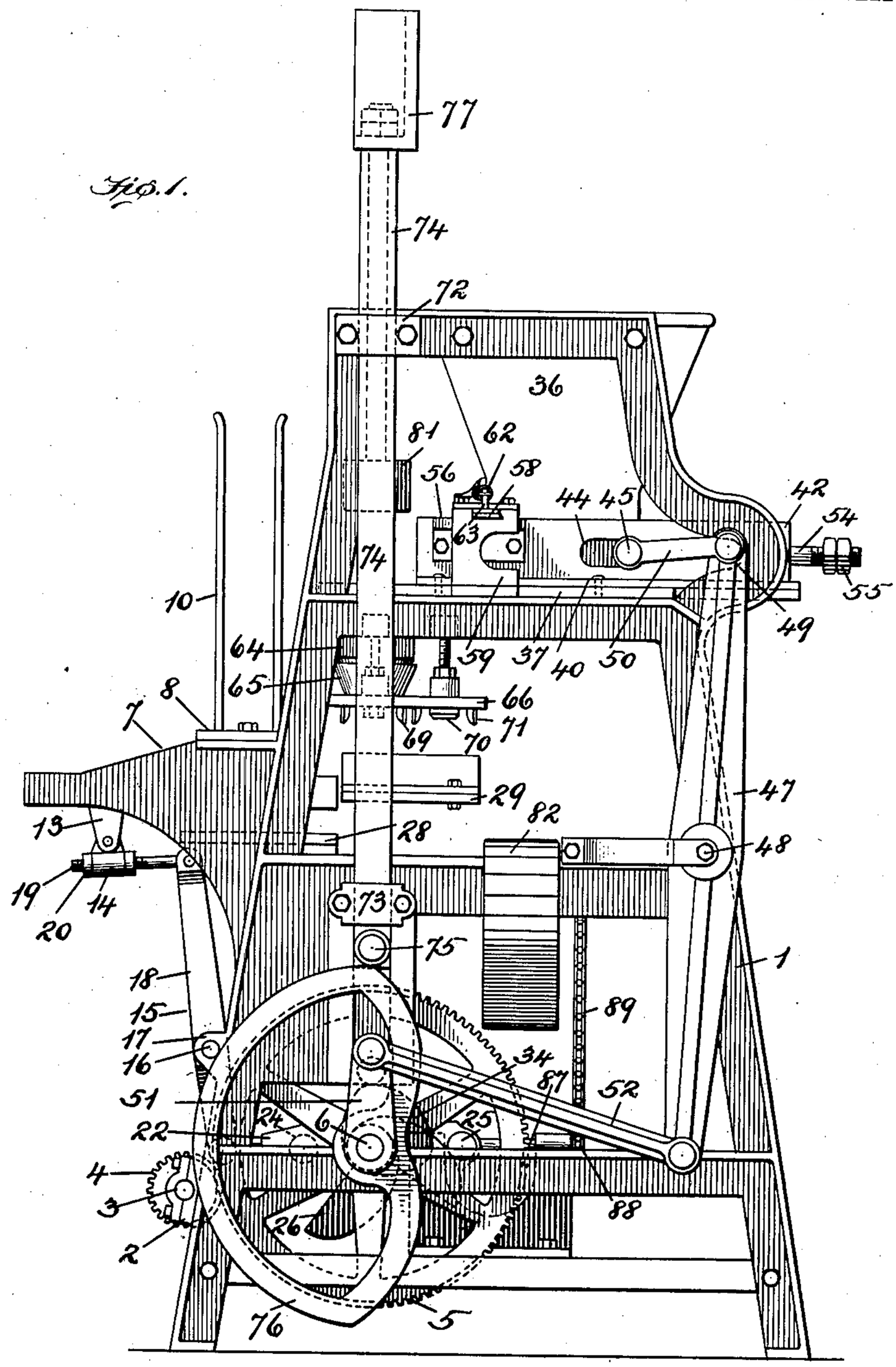
APPLICATION FILED APR. 7, 1908.

931,561.

Patented Aug. 17, 1909.

4 SHEETS—SHEET 1.

Fig. 1.



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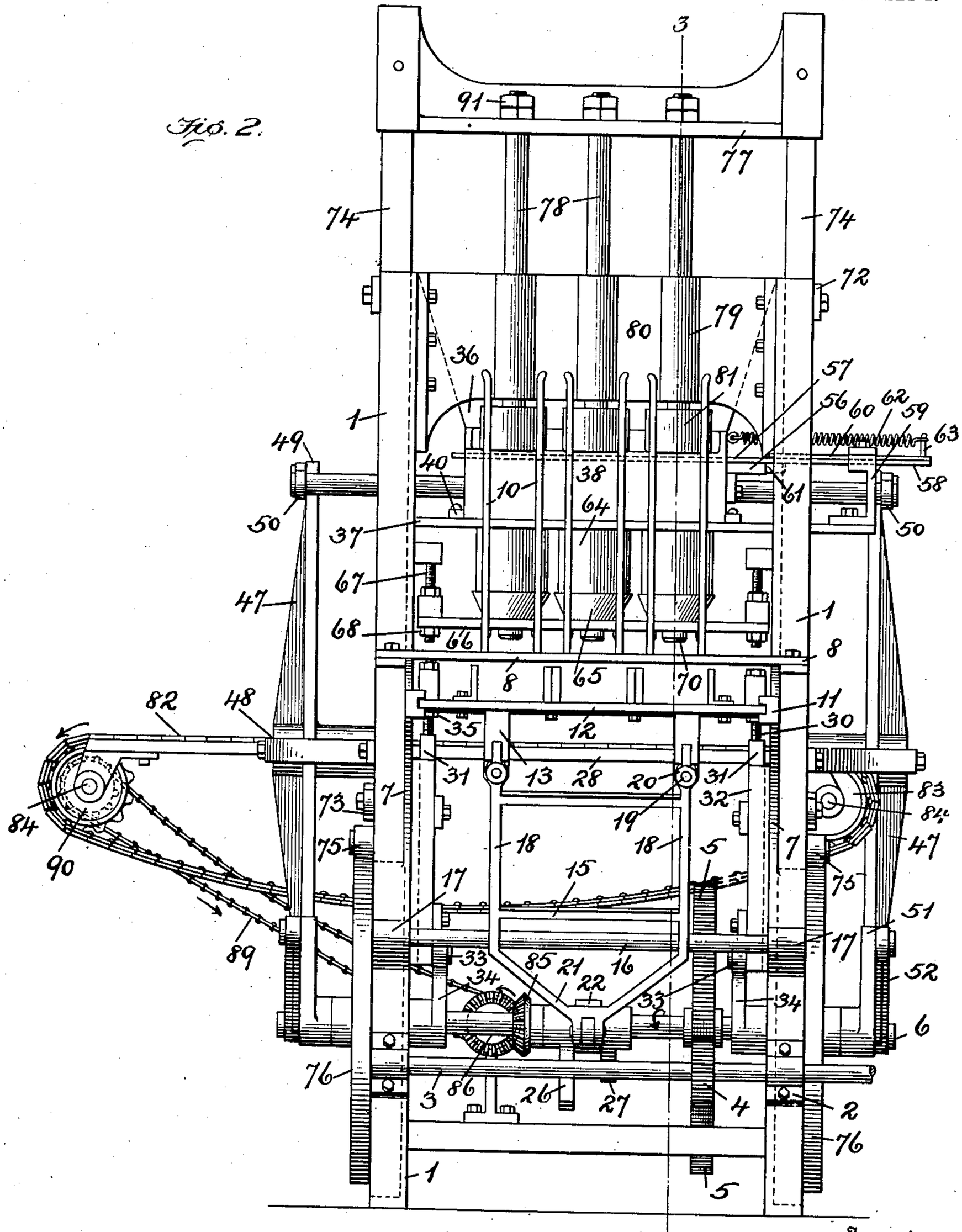
4 SHEETS—SHEET 2.

Fig. 2.



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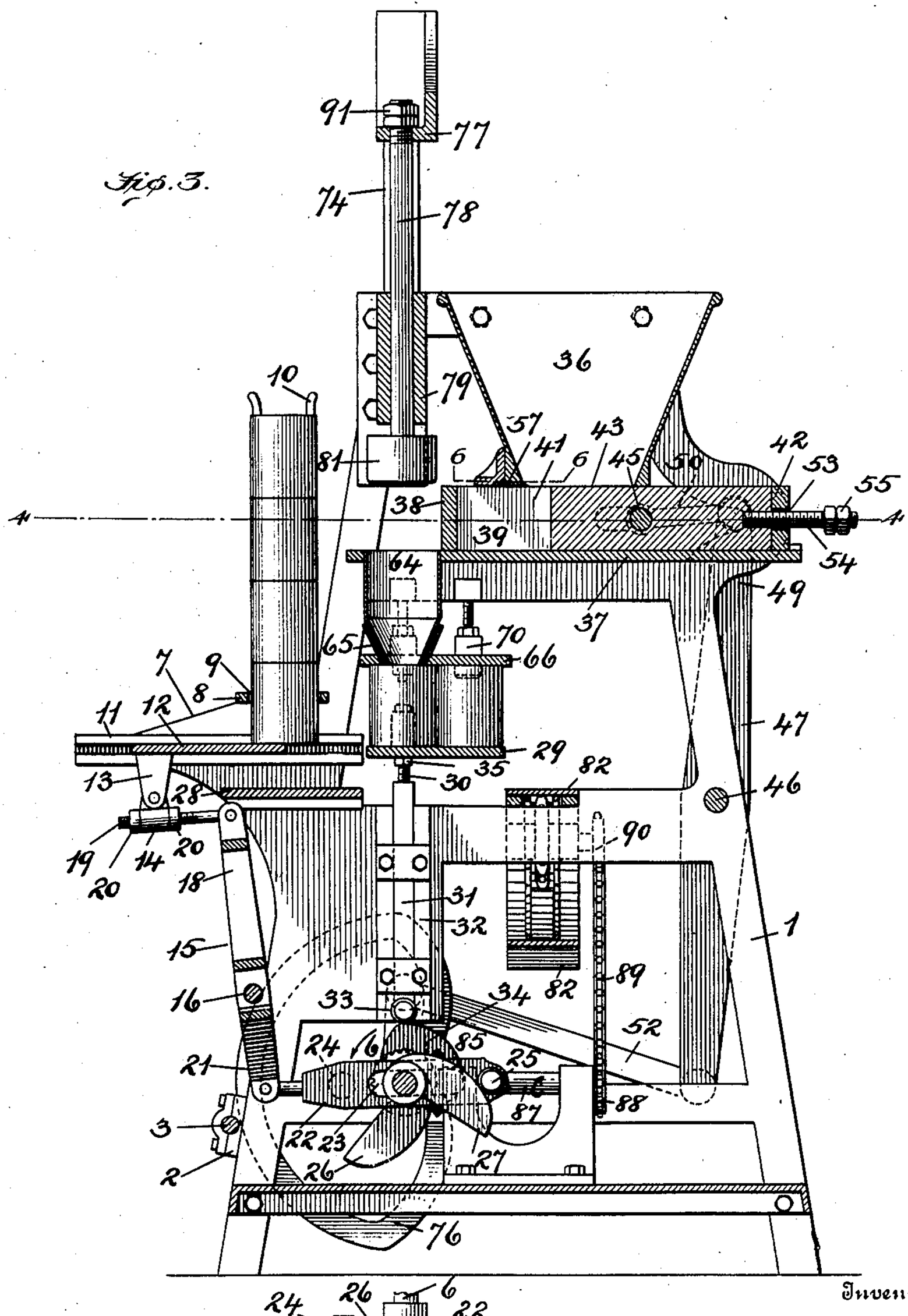
4 SHEETS—SHEET 3.

Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 4.

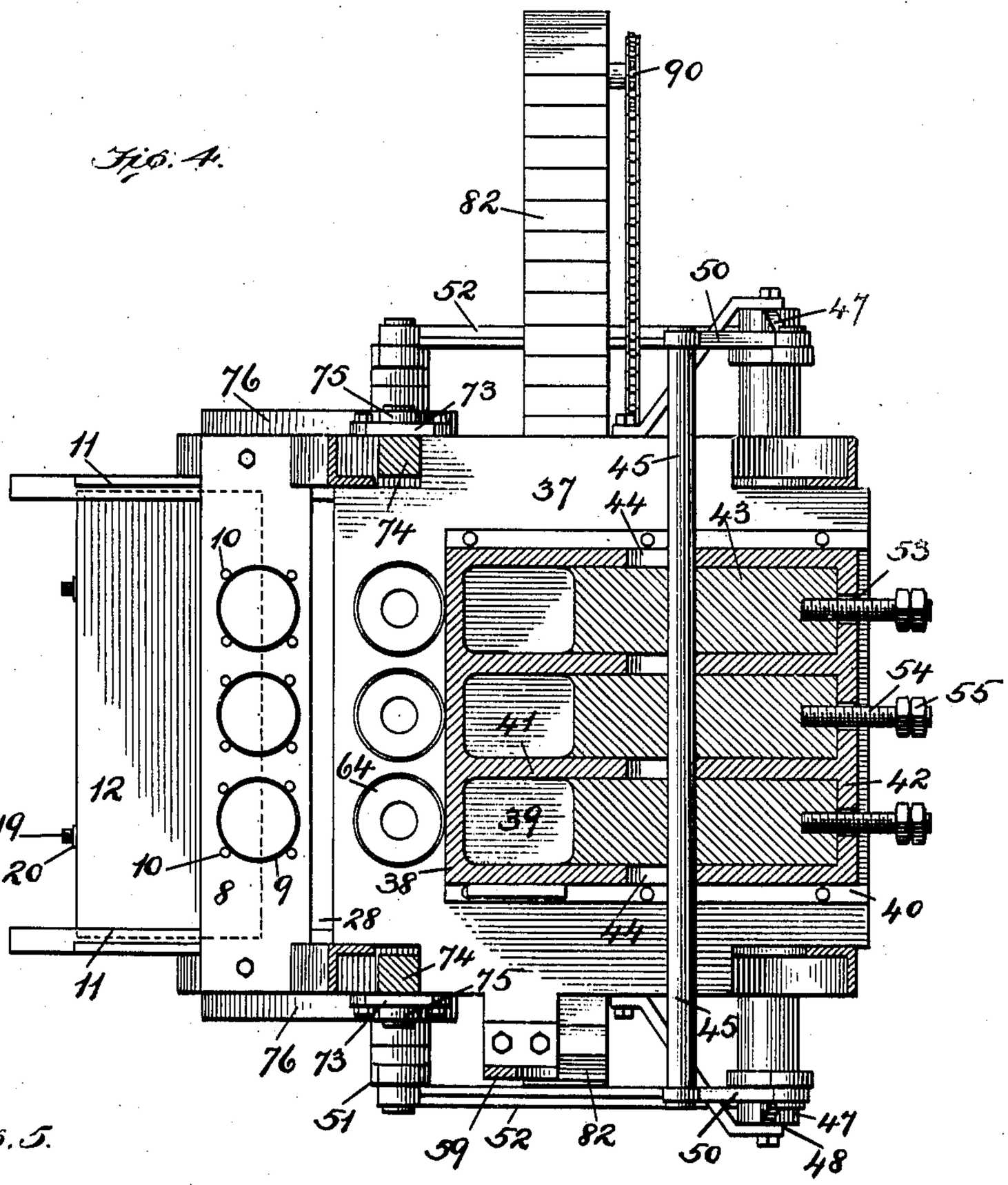


Fig. 5.

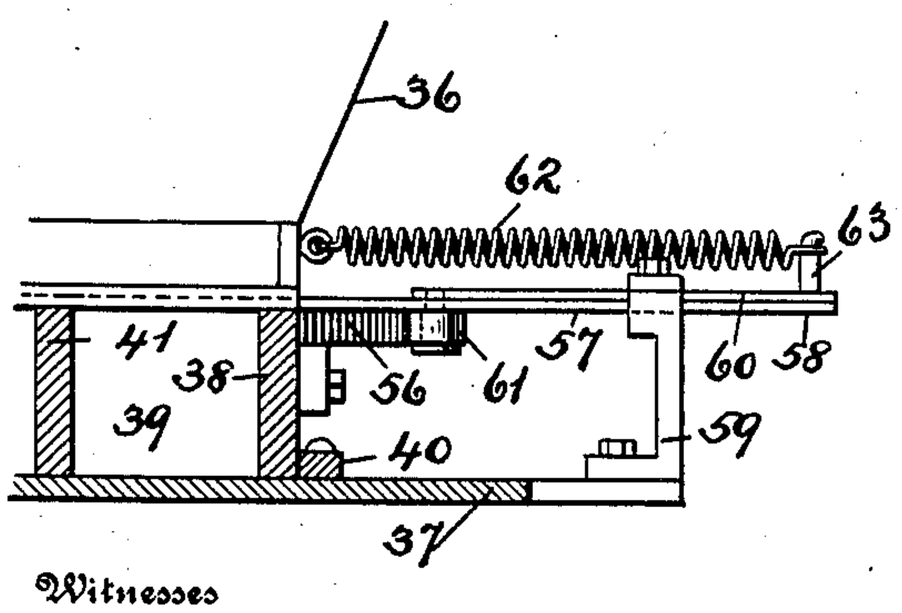
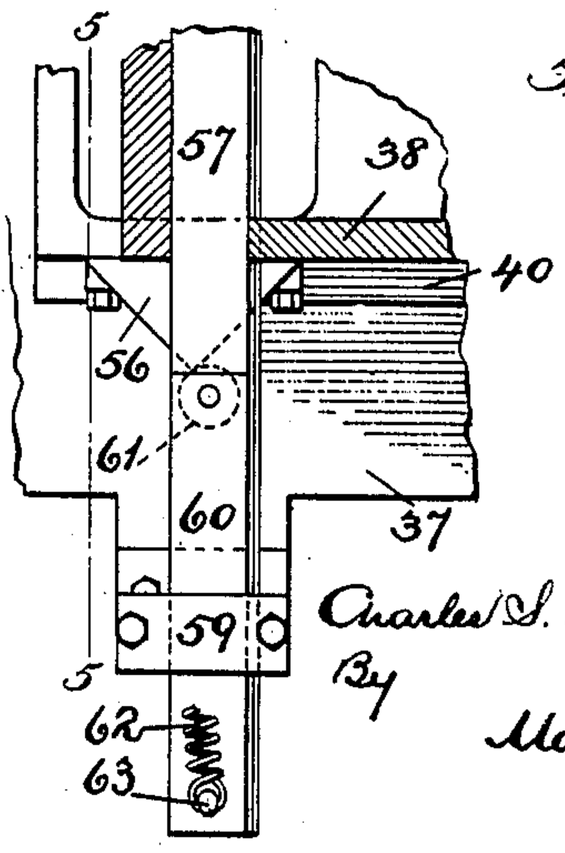


Fig. 6.



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CHARLES S. BUCKLIN, OF BALTIMORE, MARYLAND.

CAN-FILLING MACHINE.

No. 931,561. Specification of Letters Patent. Patented Aug. 17, 1909.

Application filed April 7, 1908. Serial No. 425,605.

To all whom it may concern:

Be it known that I, CHARLES S. BUCKLIN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Can-Filling Machines, of which the following is a specification.

This invention relates to improvements in can filling machines and has among its objects to provide an improved construction of machine of this class which shall possess the qualifications of simplicity in construction and operation.

Another object of the invention is to provide an improved construction of transfer mechanism that will feed the empty cans to the filling mechanism without liability of damage to them.

Another object is to improve the construction of mechanism for receiving and transferring the material from the hopper in measured quantities so that the material will be deposited in the cans during the successive operations with uniformity as to quantity and thus avoid overfilling some cans and underfilling or depositing less than there should be in others.

Another object is to provide improved devices for compressing the material discharged from the hopper and prior to forcing it into the cans so that it may be delivered into suitable nozzles in a compact form in order that suitable plungers may force it into the cans.

In packing tomatoes the condition thereof varies,—for example when the tomatoes are firm they will pack in the measuring device so as to form spaces between them whereas when they are fully ripe they are not so firm and in this latter condition they will enter and pack closer in the measuring device. These conditions result in the quantity varying according to the condition of the tomato and one of the objects of my invention is to provide means for compressing the materials so as to fill the cans with uniformity without regard to the condition of such material.

A further object of the invention is to provide an improved mechanism between the hopper and transfer device that will shear the material that projects from the transfer device as it is drawn from beneath the hopper, and thus prevent the material from backing up into the hopper during such transfer, and another object is to combine in a filling machine means for compressing the material, and a plunger mechanism for forcing the material into the can without injurious contact therewith.

The invention is illustrated in the accompanying drawings in which,—

Figure 1 shows a side elevation of a machine embodying the features of my invention. Fig. 2 illustrates the same in front elevation. Fig. 3 shows a vertical longitudinal section through the machine,—the section being taken on the line 3—3 of Fig. 2. Fig. 4 illustrates a horizontal cross-section through the upper portion of the machine at the measuring device,—the section being taken on the line 4—4 as indicated in Fig. 3. Fig. 5 shows a vertical elevation through the outer end of the measuring device and shows the reciprocating knife and devices for operating the same,—the location of this section being indicated by the line 5—5 of Fig. 6. Fig. 6 illustrates a plan view of the knife and a horizontal sectional view through one corner of the hopper,—this latter section being taken on the line 6—6 of Fig. 3, and Fig. 7 shows a plan view of the devices for causing a reciprocation of the horizontal transferring device for moving a row of empty cans from beneath the can-feed chutes to the vertical filling position.

Referring to the drawings by numerals, 1, designates the vertical side frames at opposite sides of the machine which are provided at or adjacent their lower ends with bearings, 2, that sustain a horizontal driving shaft, 3. This driving shaft projects laterally at one side of the machine and it may be provided with a pulley or other device for effecting its revolution. A pinion, 4, is mounted on this driving shaft and meshes with and drives a large gear, 5, which is keyed or otherwise secured, to a second horizontal shaft, 6, at the rear of and in a plane slightly above the driving shaft. This horizontal shaft, 6, plays an important part in the operation of the machine in that it carries devices for actuating all the movable parts and simplifies the machine both in construction and operation.

The side frames, 1, at their front sides each carry an outwardly-projecting bracket, 7, which sustain the opposite ends of a horizontal plate, 8. This plate is provided with a plurality of openings, 9, and around the openings the plate serves as a support for the lower ends of vertical guide rods, 10,

which are so disposed as to serve as vertical guides or chutes for the empty cans that are to be filled. In the present instance the horizontal plate, 8, is provided with three openings which have a circular form, but obviously a more or less number of openings and guide rods or chutes may be provided, without in the slightest degree departing from the spirit of the invention, the number and shape of openings may be varied according to the capacity desired and the shape of can to be filled. It is to be understood however that the size of the openings will be such as to enable the free passage of the cans therethrough, as clearly illustrated in Fig. 3. Beneath the horizontal plate, 8, the brackets are provided with horizontal guides, 11, which may be formed in the sides of the brackets or may have the form of horizontal grooved bars, but in any event these guides are provided at the inner sides of said brackets so as to sustain the opposite ends of a movable plate or bar, 12, that is to be reciprocated in a horizontal direction between the brackets for the purpose of transferring the lowermost can from beneath each of the openings, 9, and placing them in position where they can be filled. This transfer plate or bar is provided with spaced-apart bifurcated arms or lugs, 13, on its bottom side in each of which a swinging sleeve, 14, is pivotally mounted.

A yoke frame, 15, is pivotally mounted on a horizontal rod, 16, which latter has its ends supported in suitable brackets, 17, on the side frame, and said yoke-frame is provided at its upper end with side arms, 18, with each of which the inner ends of rods, 19, are pivotally connected. These rods are threaded and the threaded ends thereof pass through the swinging sleeves, 14, that are pivoted with respect to the transfer plate or bar. Locking collars, 20, are provided on the rods, 19, at opposite ends of the swinging sleeves so as to provide an adjustment between the rods and transfer plate or bar. The lower or conveying end 21, of the yoke-frame is bifurcated and said end is pivotally connected to the outer end of an oscillating bar, 22, that is loosely sustained on the horizontal shaft, 6. This oscillating bar is provided with a slot, 23, that extends longitudinally between its ends and through which said horizontal shaft, 6, projects. At the forward end, one side of this oscillating bar carries a loose roller, 24, which has position in front of the slot, 23, while at the rear end the opposite side of said bar carries a roller, 25. Both of these rollers have a fixed position on the bar although they may revolve in their respective positions. Cams, 26, and, 27, are secured on the horizontal shaft, 6, at opposite sides of the oscillating bar, 22,—the cam, 26, turning with the shaft in a plane that will require it to contact with the roller, 24, while the cam, 27, at the opposite side may contact with the roller, 25. By means of this arrangement of bar, 22, rollers, 24 and 25, and cams 26 and 27, at each side of the bar, the latter will be made to reciprocate longitudinally across the shaft and to oscillate or move up-and-down while reciprocating. The cam, 26, forces the bar outwardly while the cam, 27, will force it inwardly or rearwardly. The back-and-forth movement of the bar, 22, is provided for the purpose of rocking or swinging the yoke frame, 15, on the horizontal rod, 16, so as to impart a horizontal reciprocating movement to the transfer plate or bar, 12, to effect the shifting of the row of cans.

Below the transfer plate or bar, the machine is provided with a stationary table or support, 28, onto which the cans drop when the transfer plate or bar has been withdrawn outwardly from beneath them. As shown in the drawings, see particularly Fig. 3, the transfer plate or bar is making its outward stroke because the cam, 27, has not yet passed the roller, 25, and the bar, 22, has not quite reached the limit of its inward or rearward movement. When this limit is reached however, the transfer plate will be entirely withdrawn from beneath the cans and the latter will drop until the lowermost can in each pile or vertical row will rest upon the stationary support or table, 28. When in this latter position the upper end of the lowermost can will have position in a horizontal plane just beneath the horizontal plate, 8, and in front of the transfer plate so that, when the transfer plate or bar, 12, makes its next inward or rearward stroke it will push the cans from the stationary support or table, 28, onto a vertically-movable table or elevator, 29. The elevator, 29, is sustained from beneath by suitable screw posts, 30, that are carried by vertically-movable slide-bars, 31. These slide-bars are mounted in guides, 32, at the inner side of each vertical frame, 1, and rollers, 33, are mounted on their inner surfaces adjacent their lower ends. Cams, 34, are keyed or otherwise secured to the horizontal shaft, 6, and the positions of these cams are such that the rollers, 33, on the slide-bars will rest upon and ride over the cam surfaces thereof. As there are two slide bars,—one at each end of the elevator table, there are also provided two cams, 34, so that as the cams turn with the shaft, 6, the slide bars and elevator table will be raised or lowered or permitted to remain stationary according to the shape of the cams.

In the normal starting condition the slide-bars and elevator table are in their lowermost positions, that is the elevator table, 29, will be in a plane flush with the stationary table, 28, so that the lowermost can in each row may be pushed rearwardly by

the transfer bar, 12, from the table, 28, onto the elevator table, 29, and during this transfer of the cans the cams, 34, will permit the elevator to remain stationary. By means of suitable nuts, 35, the position of the elevator table may be adjusted vertically with respect to the screw-threaded posts, 30. When the horizontal row of empty cans has been transferred from the stationary table onto the elevator the cams will operate to raise said row of cans to the point where they are to be filled with a predetermined quantity of material. The mechanism and devices for effecting the transfer of the material from the hopper to the measuring device and from the latter to the cans will therefore now be described in their order.

A hopper, 36, is sustained at the upper ends of the side frames and the lower end of this hopper is bottomless or open, see Fig. 3. Below the hopper and also supported between the side frames there is provided a horizontal table, 37, while between the hopper and table I locate the measuring device. By reference to Figs. 3, 4 and 5 it will be seen that the measuring device, in the present instance comprises a frame, 38, having a plurality of longitudinal compartments, 39, and that the frame is open or coverless both at the top and bottom. This frame has its bottom resting upon the table, 37, and is held against lateral or side displacement by means of guide rails, 40, and the open top of the frame fits snugly beneath the bottom of the hopper. The number of compartments in the frame may vary but will be determined by the number of cans that are to be filled at one time. In the present instance the machine has been designed to fill three cans at a time and consequently the measuring device will be provided with a like number of compartments, the various adjacent compartments being separated by longitudinal vertical partitions, 41, that extend from the front to the rear wall, 42, of the frame. Each compartment of the measuring device is provided with a compression plunger, 43, which fits snugly in its compartment between the parallel walls, 41, thereof, and the bottom surface of each plunger rests upon the table, 37. These plungers in the present instance, have the form of rectangular blocks which are of less length than the length of the compartments so that by suitable means, the plungers may be moved lengthwise of the compartments for a limited distance independently of the frame and then move simultaneously with the said measuring frame.

The parallel walls, 41, of the measuring frame are each provided with a longitudinal slot, 44, as clearly shown in Figs. 1 and 4, while a horizontal rod, 45, extends through all the slots in said walls and also through the compression plungers in each compartment. This rod fits snugly in horizontal openings that extend entirely through each plunger, and between the plungers, the rod projects freely through the slots, 44, in the measuring frame walls so that the rod and plungers may make a limited longitudinal movement in the compartments without causing a movement of the frame.

The vertical frames, 1, sustain a horizontal shaft, 46, see Fig. 3, the outer ends of which sustain vertical levers, 47. These levers are pivotally mounted at, 48, on said shaft-ends and the length of said levers is such that their upper ends, 49, will terminate adjacent to and at the rear of the projecting ends of the rod, 45, so that links, 50, may connect said rod and lever ends. On each end of the horizontal shaft, 6, I mount cranks, 51, and connecting rods, 52, connect the lower ends of the levers, 47, with said cranks. By means of these connections, the revolution of the shaft, 6, will impart a rocking movement to the levers, 47, and a horizontal reciprocation of the compression plungers, 43,—the plungers making a preliminary movement in the measuring frame independently of the latter and then a final movement carrying the frame with them over the top surface of the table, 37. The provision of the longitudinal slots, 44, in the frame partitions permit the preliminary movement of the plungers.

In order to vary the size of the measuring compartments, 39, I provide for adjusting the preliminary stroke of the compression plungers so that said stroke may be less than the length of the slots, 44, and by reference to Figs. 3 and 4 this adjusting means will be described. In the present instance the rear wall, 42, of the measuring frame is provided with a plurality of openings, 53, which extend through the wall at the rear of the compression plungers. Screw-threaded rods or stems, 54, pass freely through the openings, 53, and said rods or stems screw into the rear ends of the compression plungers. Nuts, 55, on the outer ends of the stems may be so adjusted thereon as to limit the forward movement of the plungers prior to the movement of the measuring frame. When the rod, 45, is moved forward through the slots, 44, the compression plunger will move forward in each of the compartments and during this movement the stems, 54, will merely pass freely through the openings, 53, until the nuts, 55, contact with the rear wall, 42, of the frame whereupon the frame and plunger will travel together. When the measuring frame and plungers therein are at their normal or rearward position the compartments, 39, will register or be in communication with the hopper so that the material therein may drop by gravity into the compartments. The forward stroke of the upper ends of the vertical

levers, 47, will cause the plungers to move toward the front ends of the compartments and in making this preliminary movement the plungers will slightly compress the material in the compartments in front of the plungers. During this compression and preliminary movement of the plungers the material in the compartments, 39, rests and slides upon the flat top surface of the stationary table, 37, and when the preliminary stroke is complete the frame and plungers then travel together toward a point of discharge. When the final stroke of the plunger takes place or that stroke which also carries the frame with it I have found it expedient to provide some means for shearing any material that may project at the upper side of the compartments or which may only be partly in said compartments and the devices for effecting this shearing operation will now be described, reference being made particularly to Figs. 1, 5 and 6 of the drawings.

At the forward end of the measuring frame and to one vertical side thereof I secure a cam-plate, 56, which has a double inclined working face of a V-shape. This cam-plate is rigidly attached to the side of the frame so as to travel or be reciprocated in a horizontal plane with the frame. Just above the cam I mount a blade, 57, so that its inner end will project horizontally through the front bottom edge of the hopper. The outer end, 58, of the horizontal blade is supported by a bracket, 59, that rests upon and projects upwardly from an extension or arm of the table, 37, while on top of projecting end of the blade I secure a horizontal reinforce plate, 60, which merely serves to stiffen the blade and prevent the outer projecting end thereof from bending as it is drawn in and out. A roller, 61, is carried at the bottom side of the blade and reciprocates horizontally therewith. In the position shown in Figs. 5 and 6 the roller and blade are at the outward limit of their stroke and the cam plate is moving rearwardly to permit the blade to return as the roller travels toward the frame by rolling along the forward incline surface of the cam. A spring, 62, has one end attached to the side of the hopper and its other end secured to a pin, 63, at the outer end of the blade and the function of this spring is to return the blade as the cam permits the roller to move inwardly. By reference to Fig. 3, the exact position of the edge of the blade with respect to the hopper bottom will be clearly understood. When the measuring frame makes its forward stroke to convey the filled compartments to the discharge point the cam will cause the blade to make one outward and return stroke so that on each stroke of the measuring device the blade will make one complete reciprocation and serve to shear the material as it passes beneath the front wall of the hopper.

The forward or front end of the table, 37, is provided with a plurality of depending nozzles, 64, the upper open ends of which are flush with the top surface of said table so that the measuring frame may slide along said table and over said nozzles. The positions of these nozzles are such that they will register with the compartments, 39, when the frame has been moved outwardly so that the material received into the compartments from the hopper may be carried forward and dropped into the nozzles. The lower ends of the depending nozzles are tapered and project into or telescope with correspondingly shaped funnels, 65, that are sustained at the upper side of an adjustably-sustained horizontal plate, 66. This plate is hung pendently from the side frames by means of screw-threaded posts or rods, 67, and suitable locking devices, 68, so that it may be adjusted vertically and thereby enable the machine to be used for filling cans of various sizes and heights. It will of course be understood that openings are provided in the plate, 66, through which the material may pass into the cans, which are positioned on the elevator table, 29. By reference to Fig. 1 it will be seen that the bottom of the horizontal plate is provided with downwardly-projecting lugs, 69, which serve to center the cans beneath the openings as is common in various constructions of can-filling machines. It will also be seen by reference to Fig. 1 that at the rear of the nozzles the bottom surface of the plate, 66, is provided with a short plug, 70, and centering lugs, 71, arranged around said plug. This plug serves to enter the opening of the cam after it has been filled and on the next elevation of the table 29, so as to push or crowd the material down into the can and thus leave the top of the can ready for wiping and capping without disturbing the contents. After the material has been transferred from the hopper to the depending nozzles it is to be forced into the can and in order to do this without crushing the material I have provided a plunger that will operate in such manner as to force the materials downward through the nozzle without coming into injurious contact with the material, as will now be explained.

At the outer side each frame is provided with upper and lower guide brackets, 72, and, 73, respectively through which vertical posts, 74, extend. The lower end of each post carries a roller, 75, which travels on the working surface of a cam, 76, that is mounted on the horizontal shaft 6, between the cranks, 51, and the side frames, see Figs. 1 and 2. The revolution of these cams imparts a vertical reciprocating movement to the posts, 74. At the upper ends, the posts are con-

nected by a cross frame or head, 77, so that the posts and head will travel together. A plurality of plunger rods, 78, hang pendently from the frame or head and are guided in suitable bearings, 79, that are formed in a vertical bracket, 80, that is sustained between the frames. The lower pendent ends of the rods, 78, carry plunger heads 81, that correspond in shape and size with the nozzles, 64, so that when the rods, 78, are lowered the plunger heads will snugly fit and enter the nozzles and compress the air on top of the material therein and thus form a cushion between the heads and the material in the nozzles. As the compression of the air takes place the material will be forced downward through the nozzles into the cans and the crushing force of the plungers will be broken or cushioned. The plunger rods are preferably hung loosely from the head, 77, so that said plungers may be guided mainly by the bearings, 79, in making their vertical strokes and at their upper ends the rods are provided with adjusting nuts, 91, that permit of a vertical adjustment of said rods and plungers.

In the operation of the machine after one row of cans has been filled the elevator table, 29, will lower carrying the filled cans with it when it reaches its lowermost stroke the top surface thereof will be flush with the top surface of the stationary table, 28, so that when the next row of empty cans is pushed onto the elevator the row of previously-filled cans will be moved rearwardly on the elevator and the latter will again rise,—this time carrying one row of filled cans and another row of empty cans. As this stroke of the elevator is made, the filled cans will contact with the centering lugs, 71, so as to center the openings of the filled cans with respect to the short plugs, 70, and as the upward stroke is completed these plugs will enter the can openings and slightly compress the material through the opening. When the elevator again drops or lowers and another row of empty cans is pushed rearwardly the first row of filled cans will be pushed laterally onto a traveling conveyer belt, 82, and carried off. This conveyer belt travels in a horizontal plane and passes over suitable sprockets, 83, mounted on horizontal shafts, 84. A bevel gear, 85, on the shaft, 6, drives a pinion, 86, on a shaft, 87, which carries a sprocket, 88, and a chain, 89, travels around said latter sprocket and extends upwardly to a sprocket, 90, on one of the horizontal shafts, 84, and through these devices the conveyer, 82, is driven.

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

1. A can-filling machine comprising a hopper, a can support, a frame adjacent the hopper discharge, a transfer device movable in the frame, means for first moving the transfer device independently of the frame to compress the material and then move the frame and transfer device together, and a plunger.

2. A can-filling machine comprising a hopper, a can support, a frame interposed between the hopper discharge and can support, a compression plunger in the frame and movable across the hopper discharge, means for first moving the compression plunger independently of the frame and then moving the frame and compression plunger together, and a plunger beyond the compression plunger for moving the material toward the can support.

3. A can-filling machine comprising a hopper, a can support, a frame movable across the hopper and having a chamber therein, a compression plunger in said frame-chamber and also movable across the hopper outlet, and means for limiting the independent movement of the plunger in the frame.

4. A can-filling machine comprising a hopper, a can support, a frame movable across the hopper outlet and having a chamber therein, a compression plunger movable in said frame-chamber and also across the hopper outlet, and means for varying the independent movement of the plunger in the frame chamber.

5. A can-filling machine comprising a hopper, a can support, a frame movable across the hopper outlet and having a plurality of chambers therein, a compression plunger in each chamber of said frame, means for moving all of said plungers with respect to the frames to effect a compression of material in front of the plungers, and means for moving the plungers and frame together to transfer the material.

6. A can-filling machine comprising a hopper, a can support, a frame movable across the hopper outlet and having a plurality of chambers therein, a compression plunger in each chamber, means for operatively connecting all the plungers, and means for operating the plungers and frame together.

7. A can-filling machine comprising a hopper, a can support, a frame having a plurality of partitions and forming a plurality of compartments,—said partitions having slots, a rod extending through the slots and connecting the plungers and means for moving the rod and plungers in the frame.

8. A can-filling machine comprising a hopper, a can support, a frame movable across the hopper outlet and having a chamber therein, a plunger movable in said frame, and a blade operating between the hopper on the one side and the frame and plunger on the other side.

9. A can-filling machine comprising a

hopper, a can support, a frame movable across the hopper outlet, a plunger movable in said frame, a blade interposed between the frame and hopper, and means operating between the frame and blade for reciprocating the blade.

10. A can-filling machine comprising a hopper, a can support, a frame movable across the hopper outlet, a plunger movable in the frame, a blade interposed between the hopper outlet and the frame, a cam on the frame, a roller on the blade and coacting with the cam, and means for moving the frame and reciprocating the blade.

11. A can-filling machine comprising a hopper having an opening at its bottom, a frame below the hopper and having a plurality of partitions therein,—said frame and partitions being movable beneath the hopper outlet, plungers in the frame between adjacent partitions and said plungers being movable in the frame independently of the latter, means for moving all the said plungers and then moving the plungers and frame together, a movable can support, and a plurality of vertical plungers,—one for each plunger in the frame and said vertical plungers being movable through the frame and past the plungers therein.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES S. BUCKLIN.

Witnesses:
G. FERDINAND VOGT,
JOHN W. HEWES.