No. 689,474. Patented Dec. 24, 1901.

L. F. FALES.

PACKAGE FILLING MACHINE.

(Application filed May 7, 1900.)

(No Model.) 13 Sheets—Sheet 1.

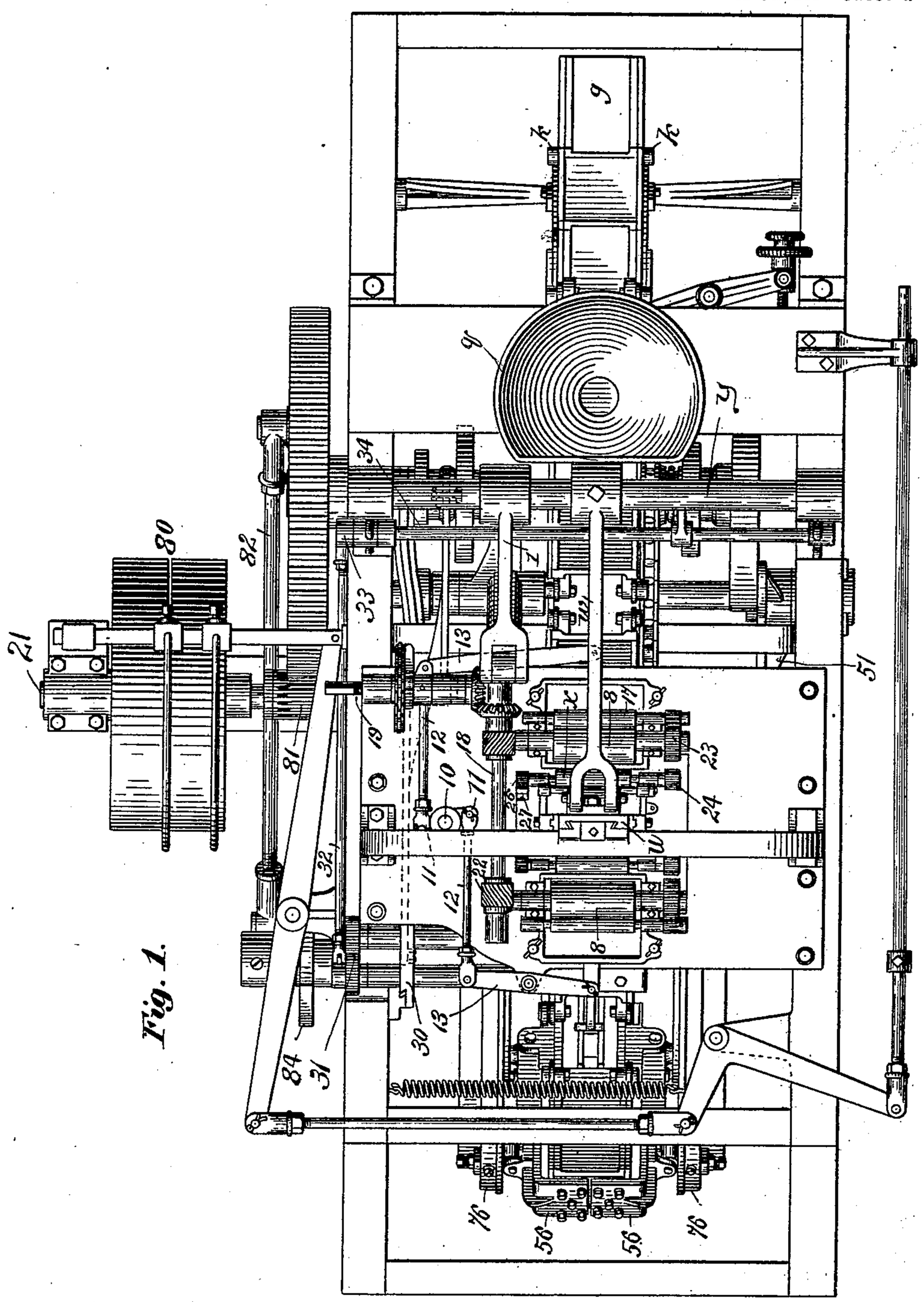

Fig. 1.

Witnesses:
Walter E. Lombard.
J. D. Carpenter

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No. 689,474. Patented Dec. 24, 1901.

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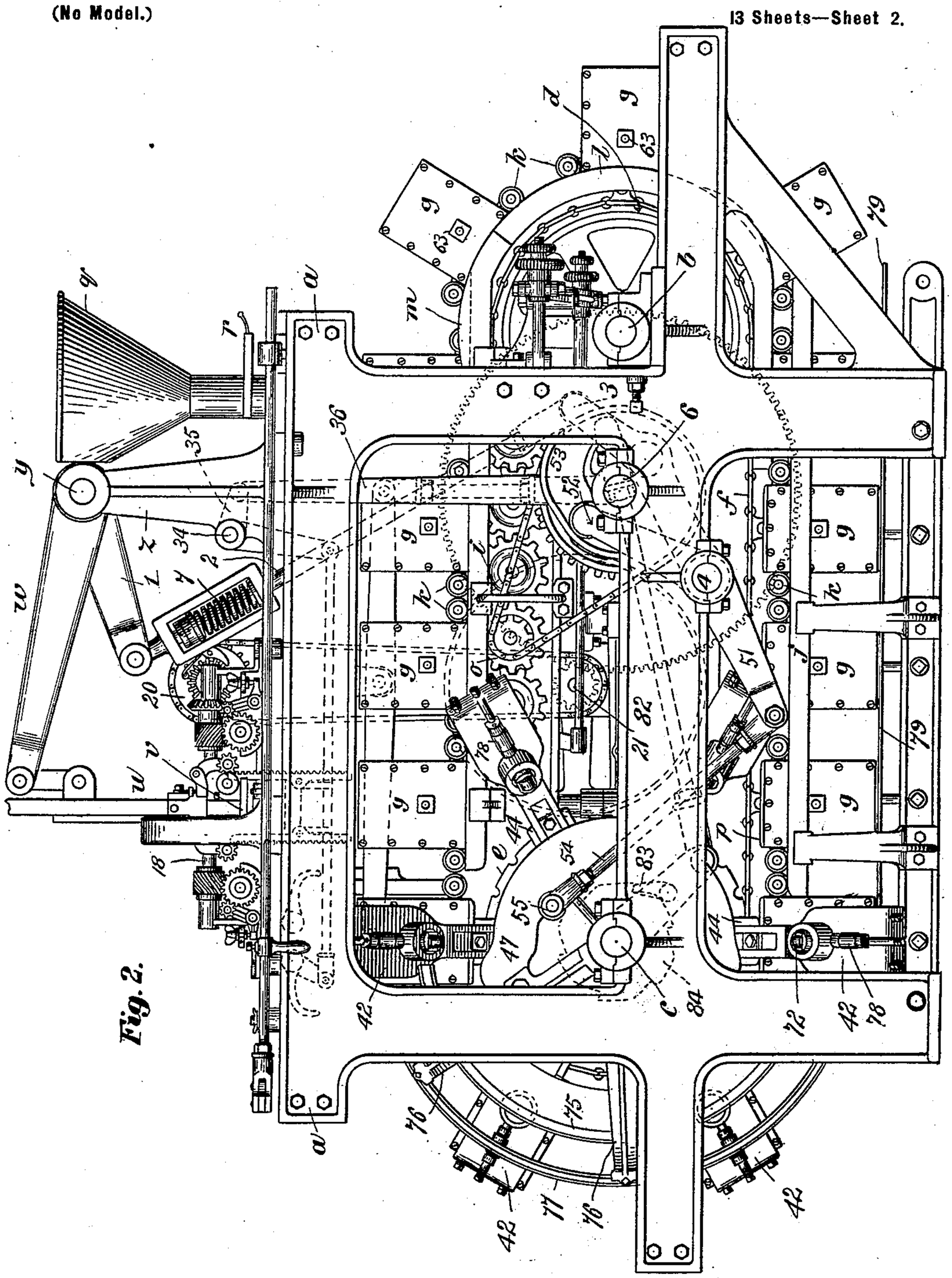

Fig. 2.

Witnesses:
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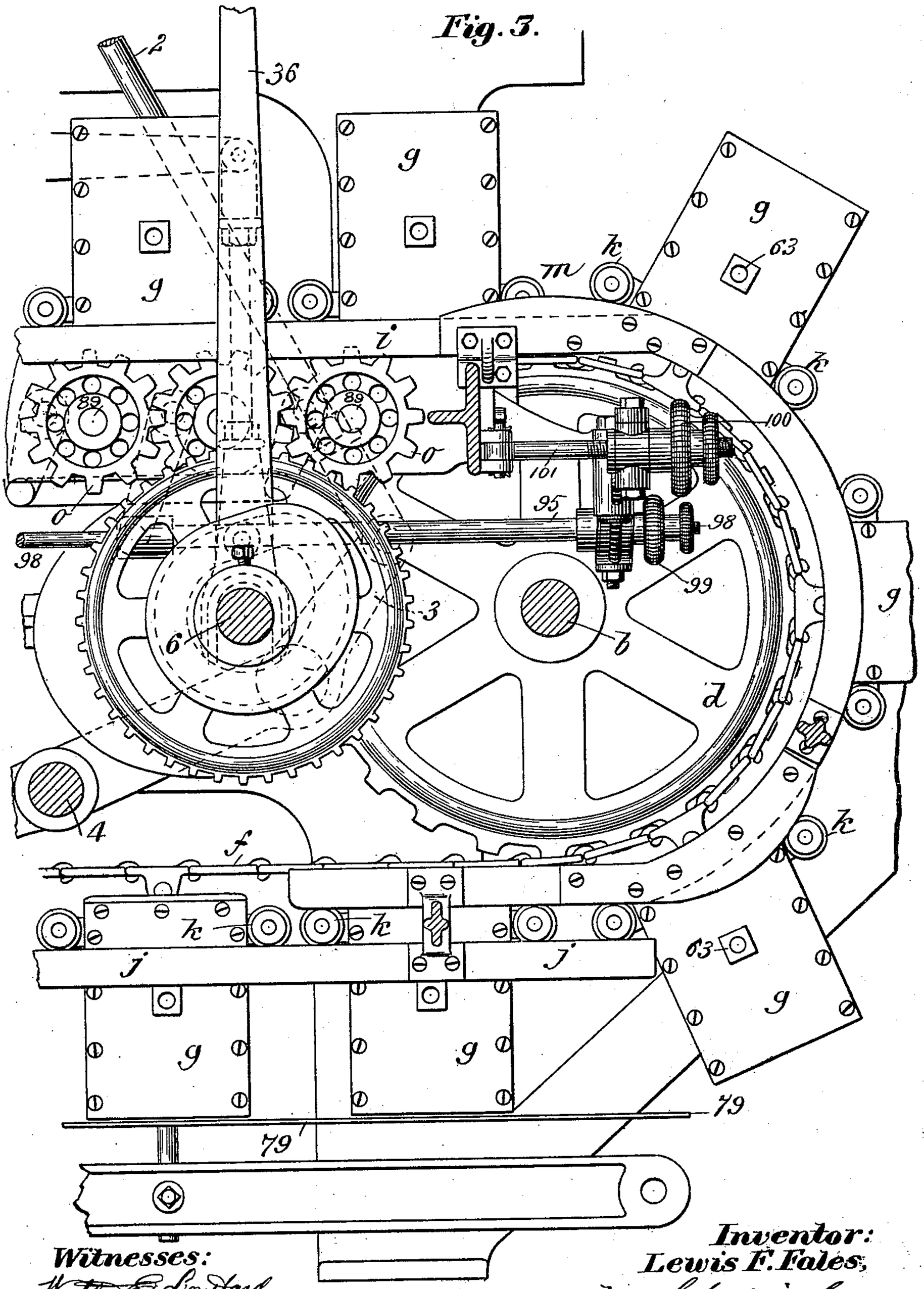
Fig. 3.



Witnesses:
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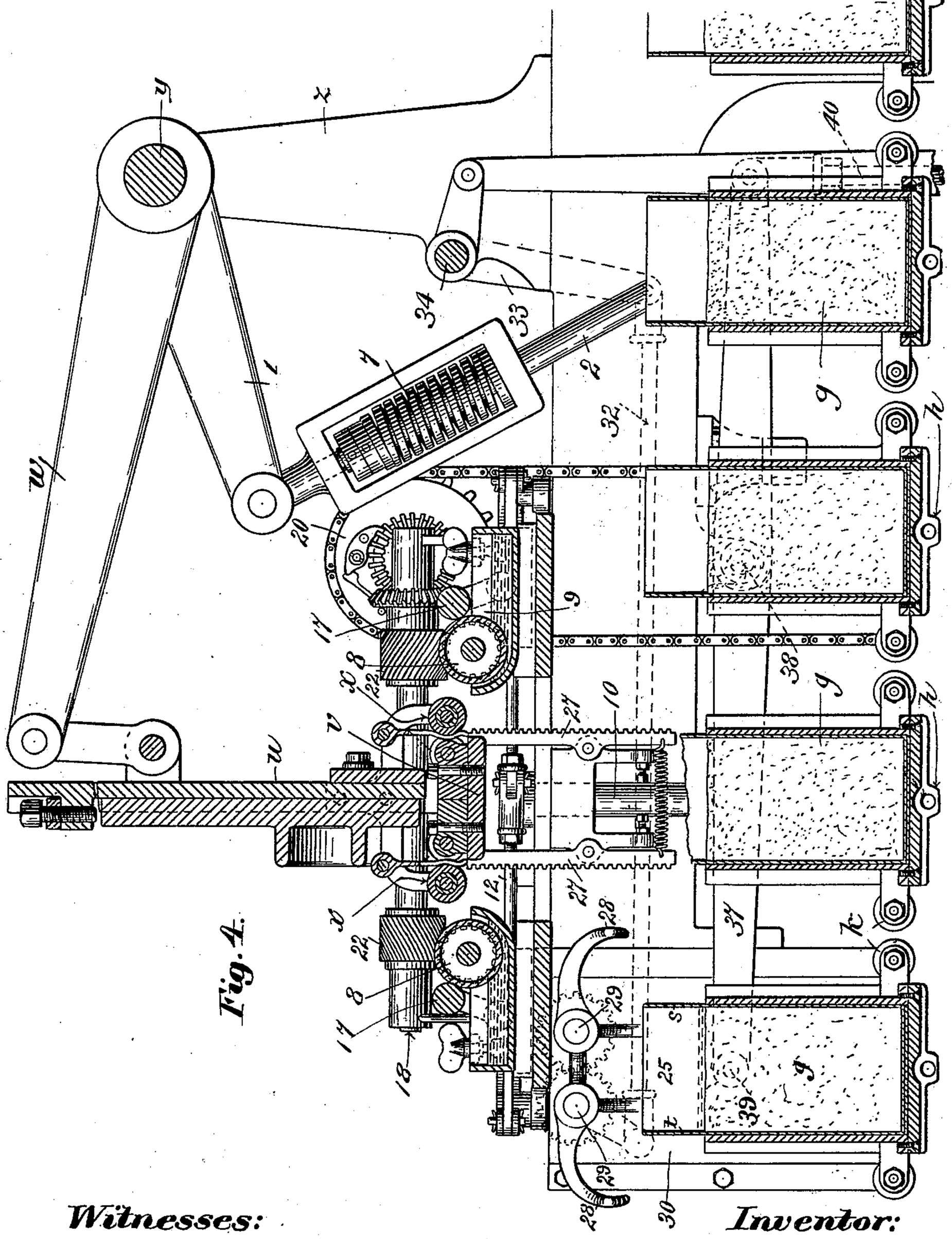

Fig. 4.

Witnesses:
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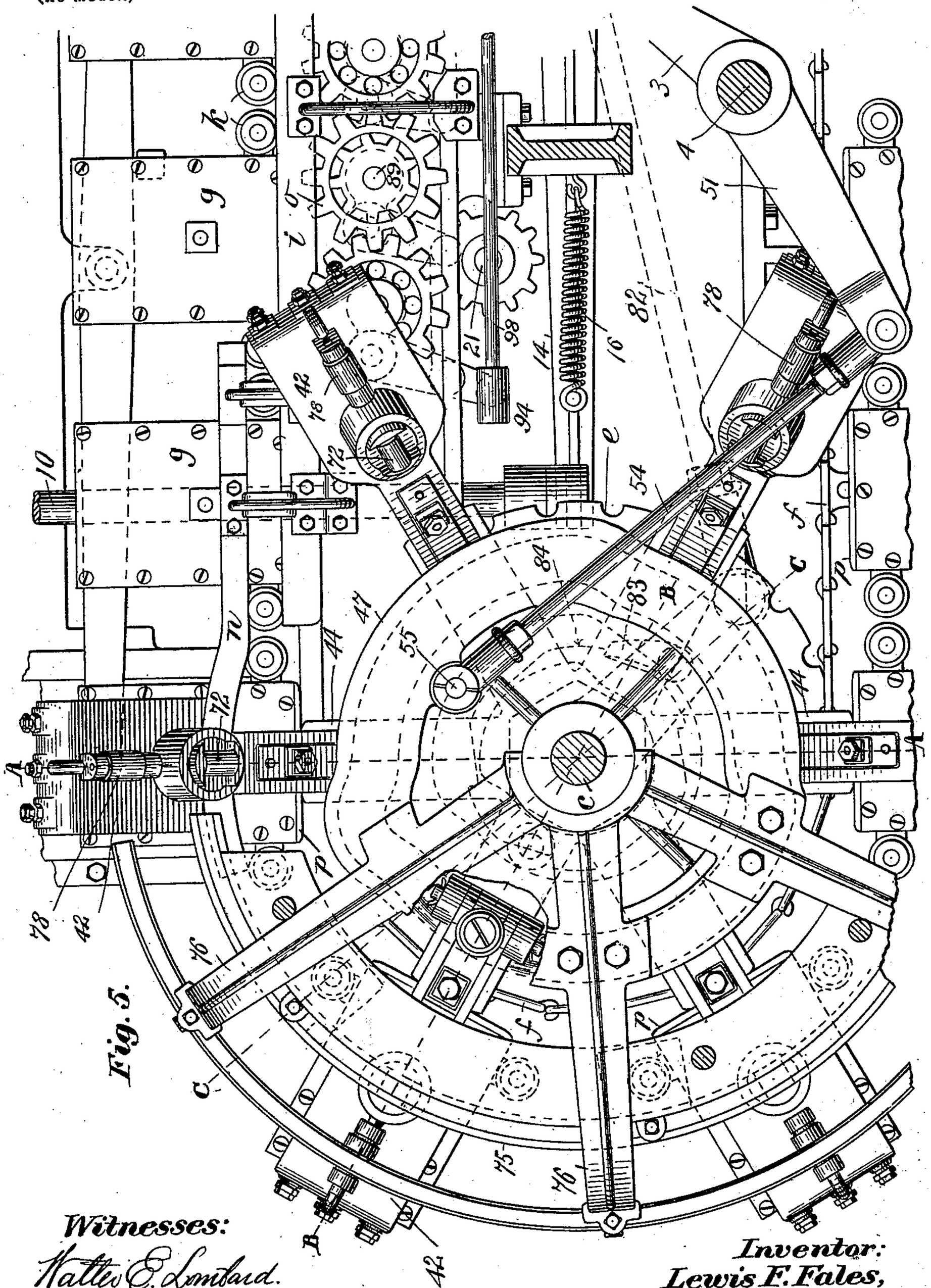

Witnesses:
Walter E. Lombard.
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L. F. FALES.

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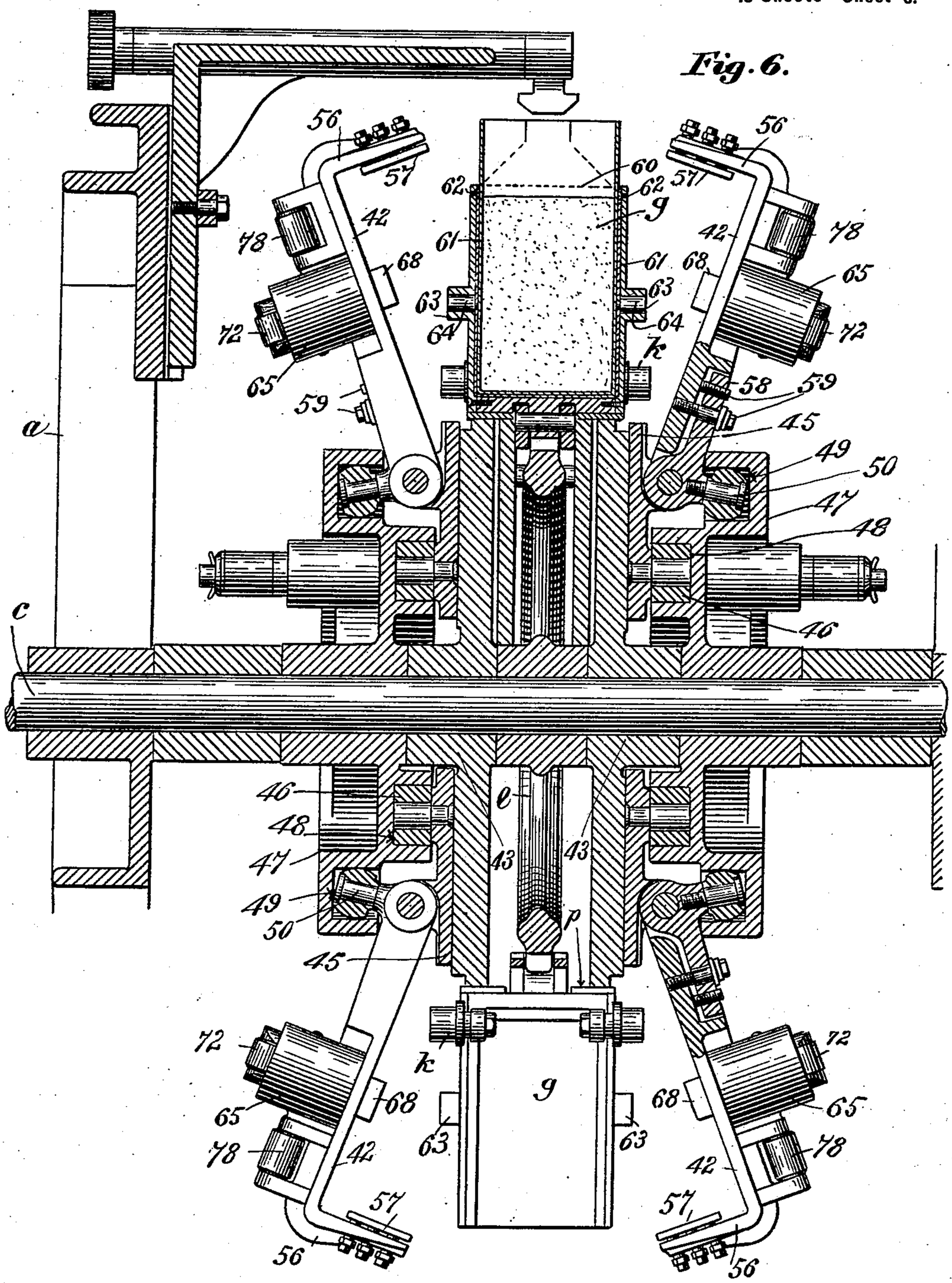
(No Model.) 13 Sheets—Sheet 6.

Fig. 6.



Witnesses:
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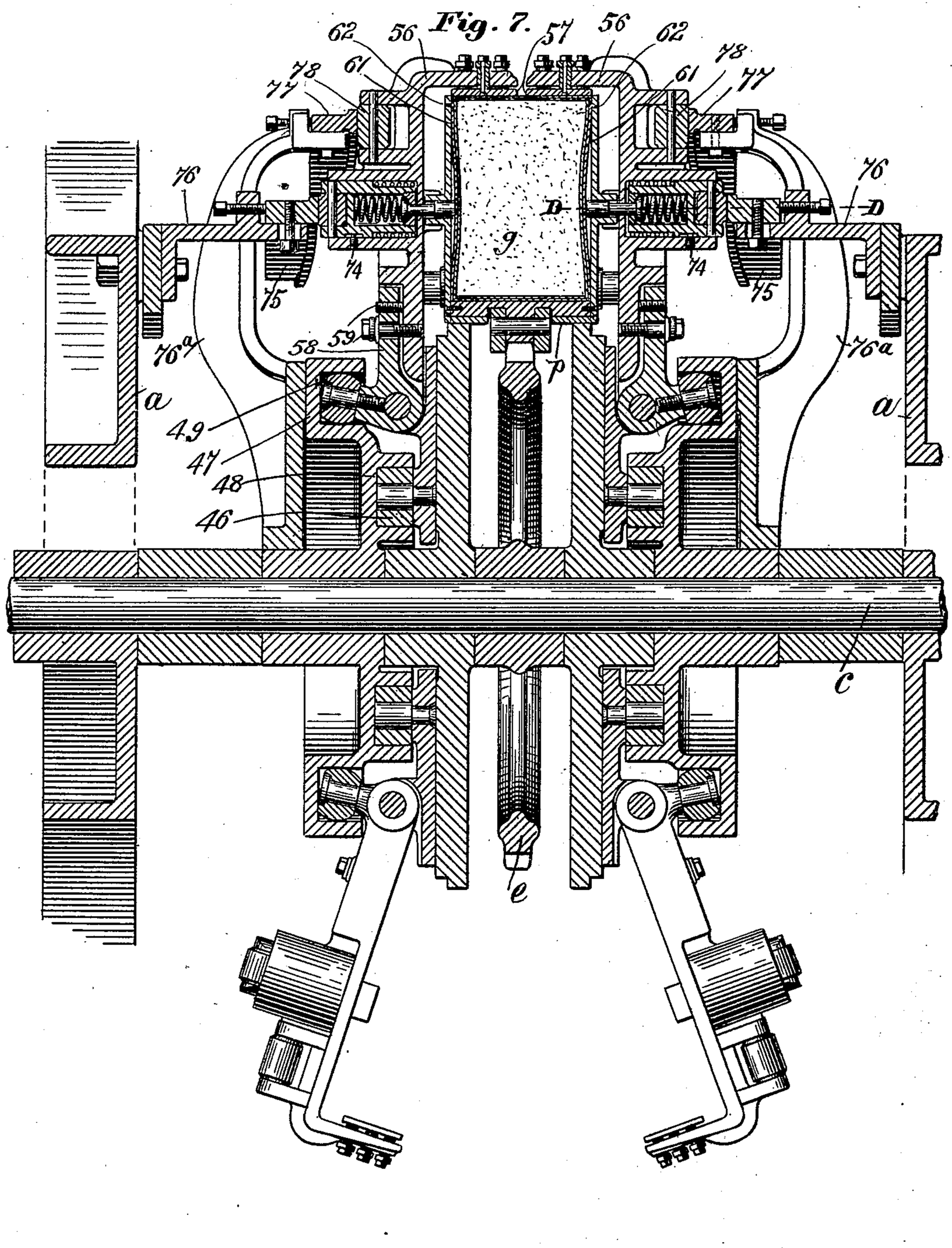
Fig. 7.



Witnesses:
Walter G. Lombard.
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PACKAGE FILLING MACHINE.

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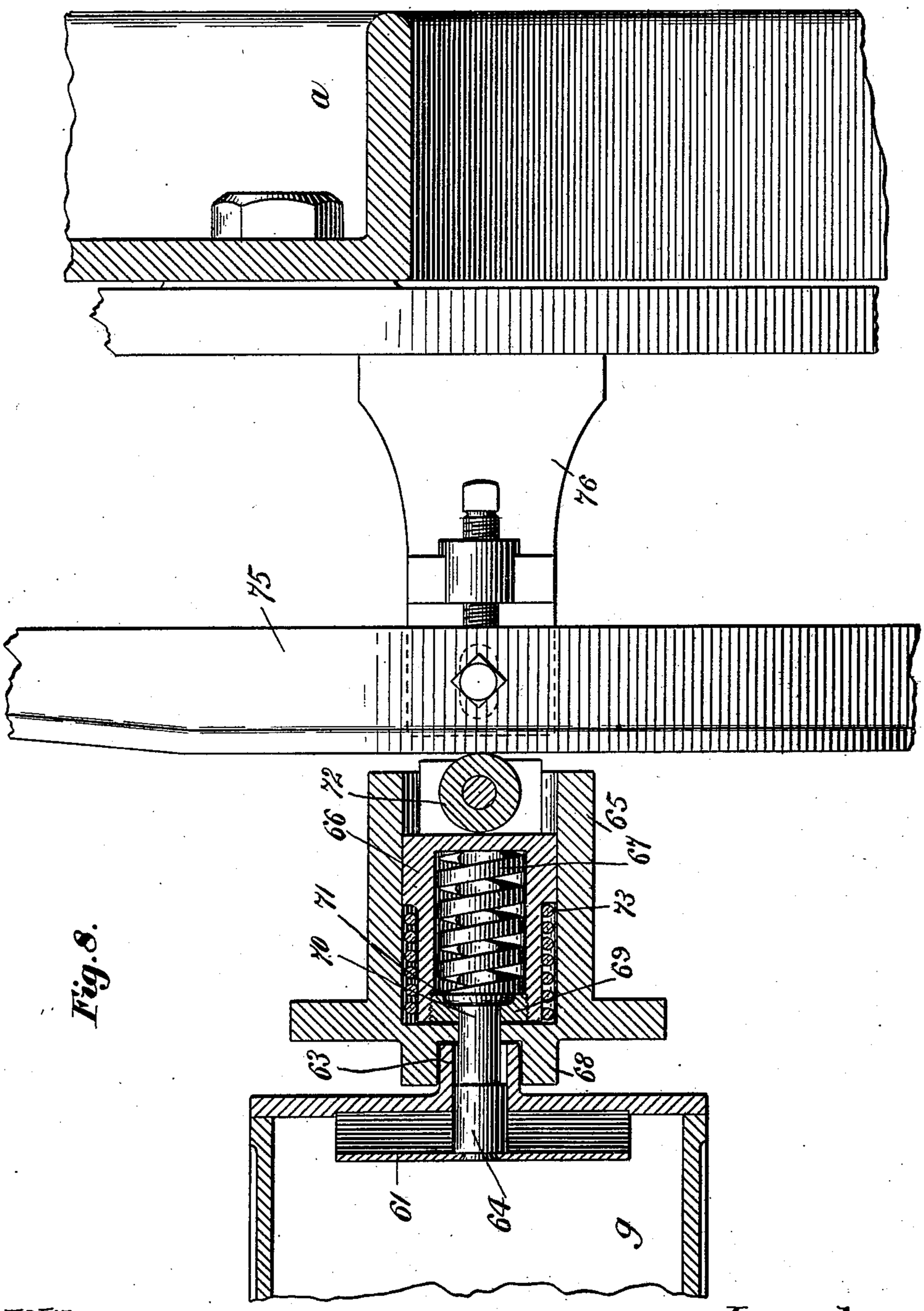

Fig. 8.

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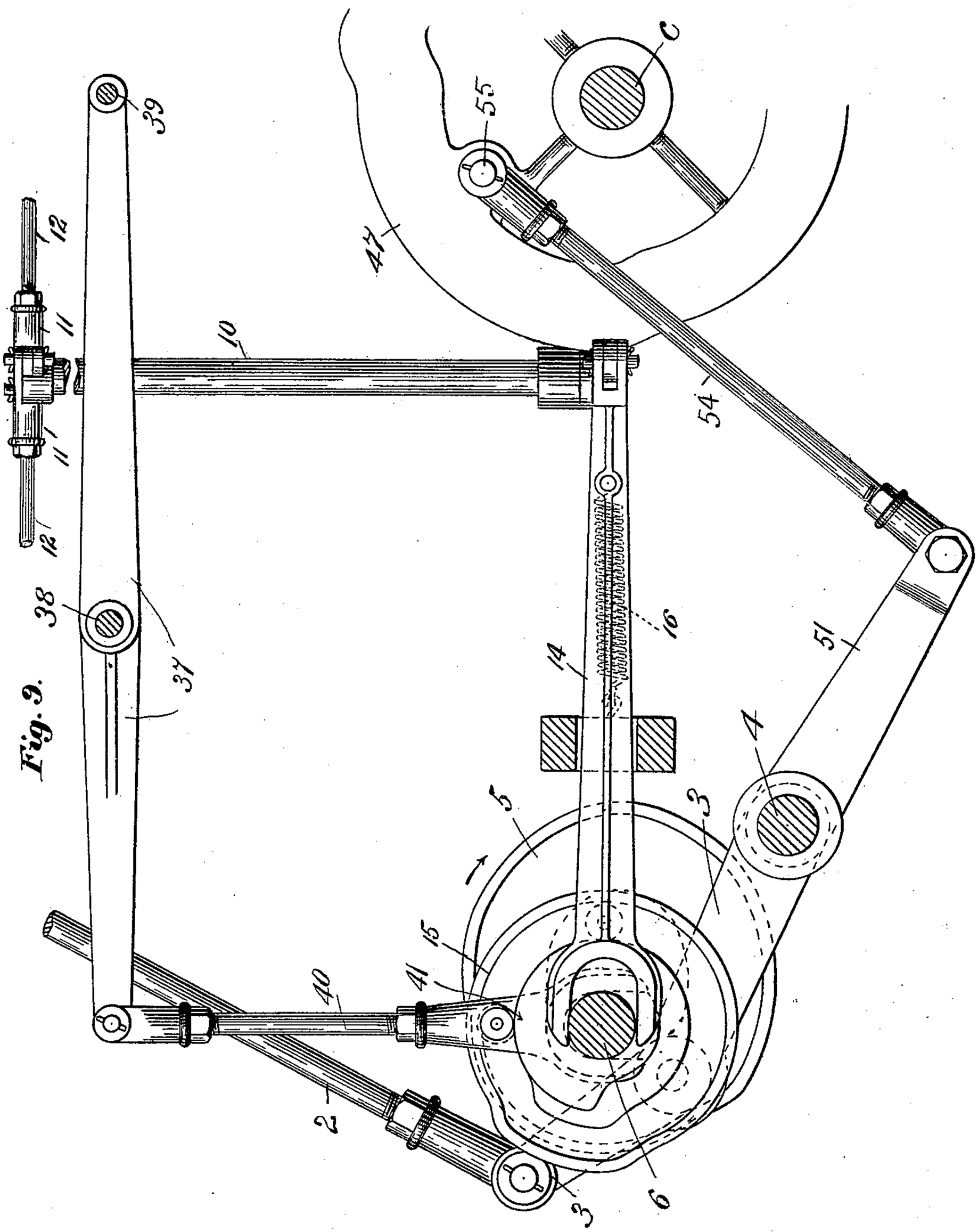

Fig. 9.

Witnesses:
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PACKAGE FILLING MACHINE.

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Fig. 10.

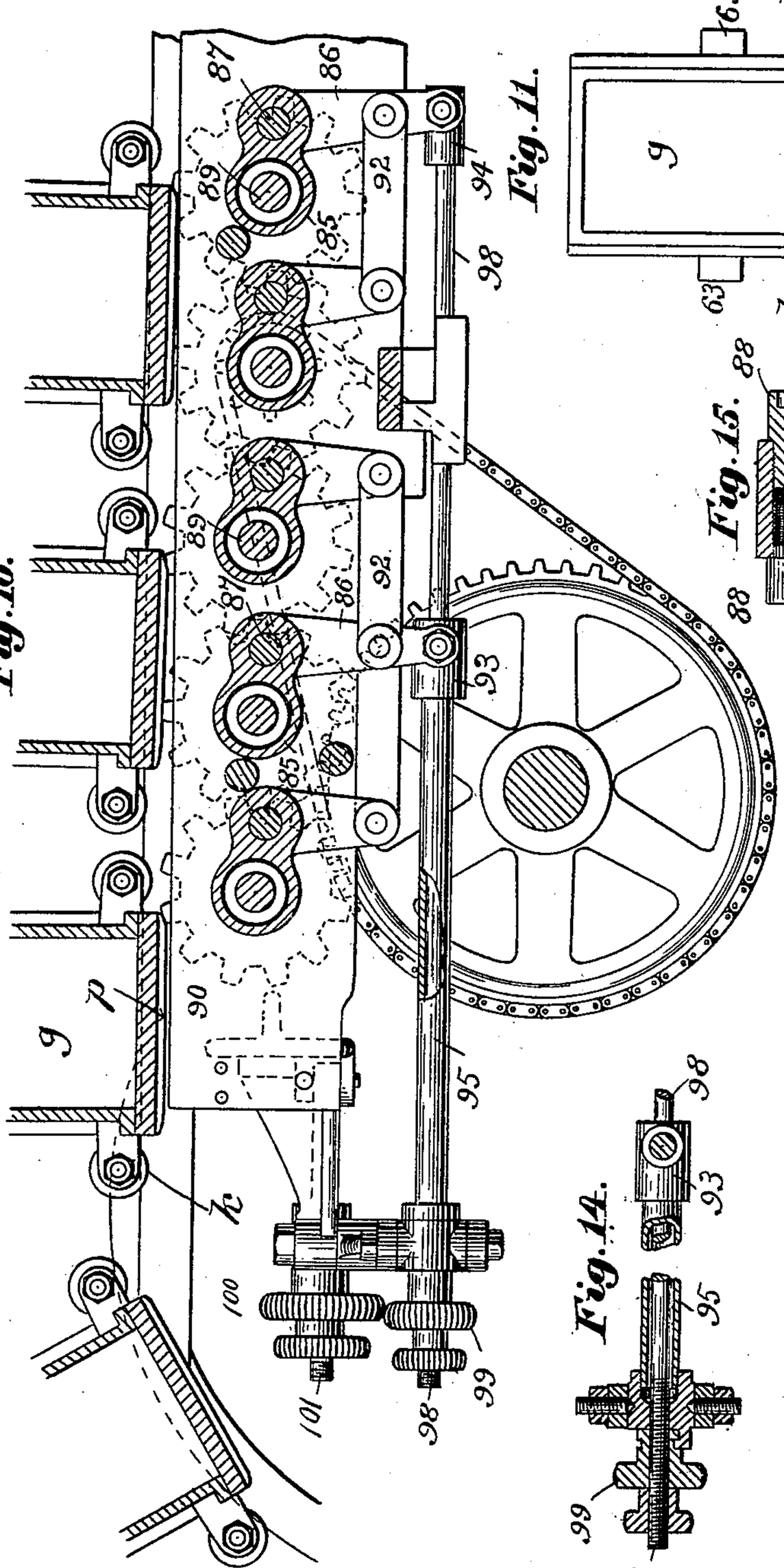


Fig. 11.

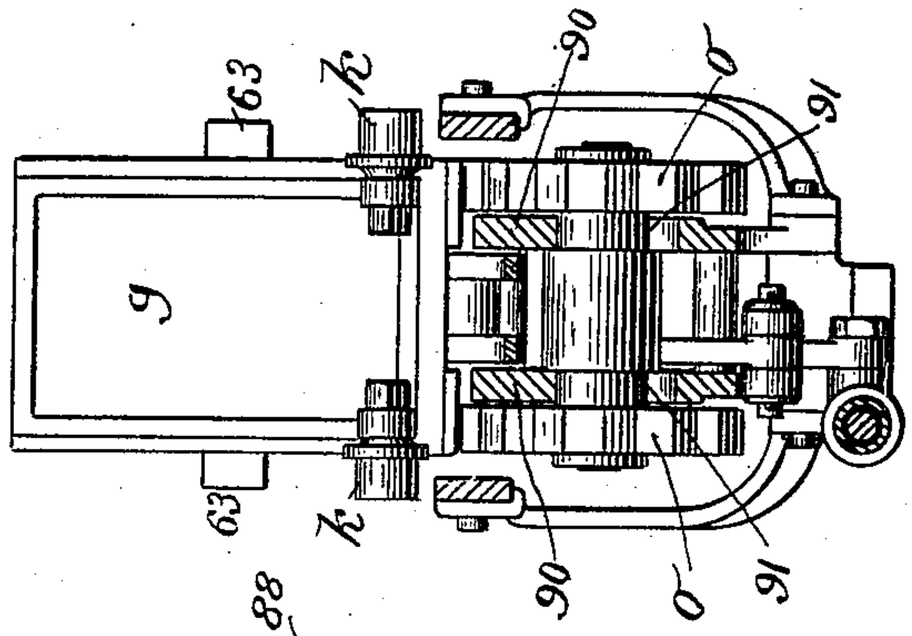


Fig. 15.

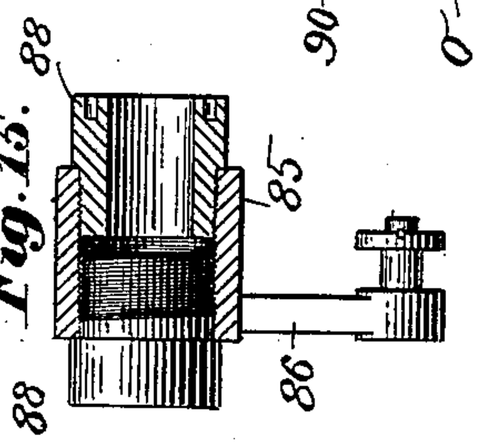


Fig. 12.

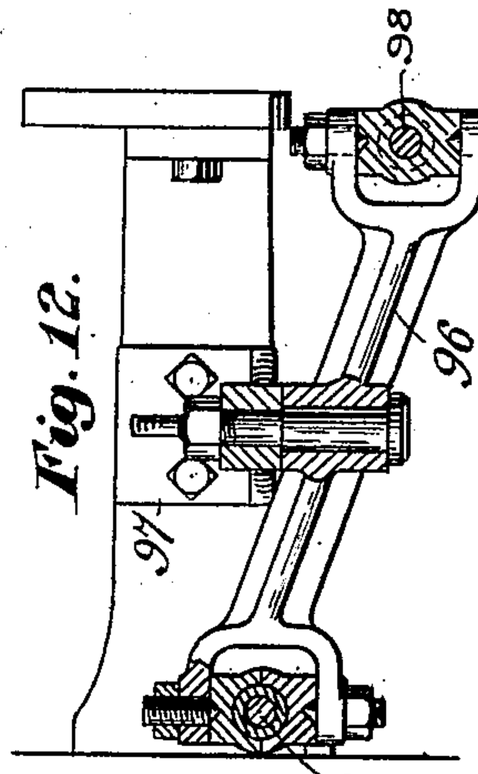
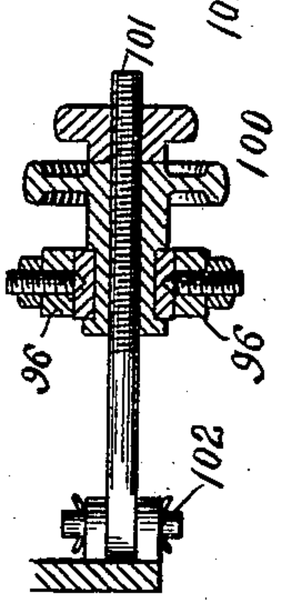


Fig. 14.

Fig. 13.



Witnesses:
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PACKAGE FILLING MACHINE.

(Application filed May 7, 1900.)

(No Model.) 13 Sheets—Sheet II.

Fig. 16.

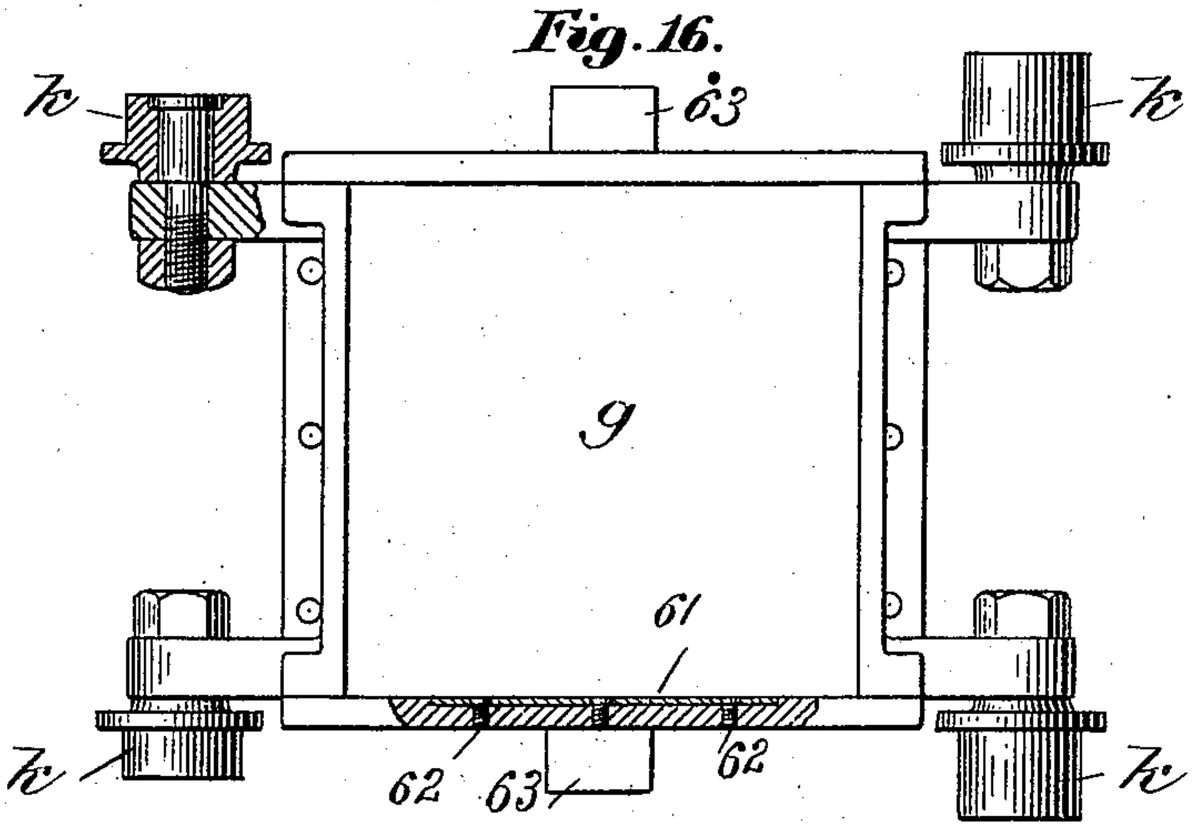


Fig. 17.

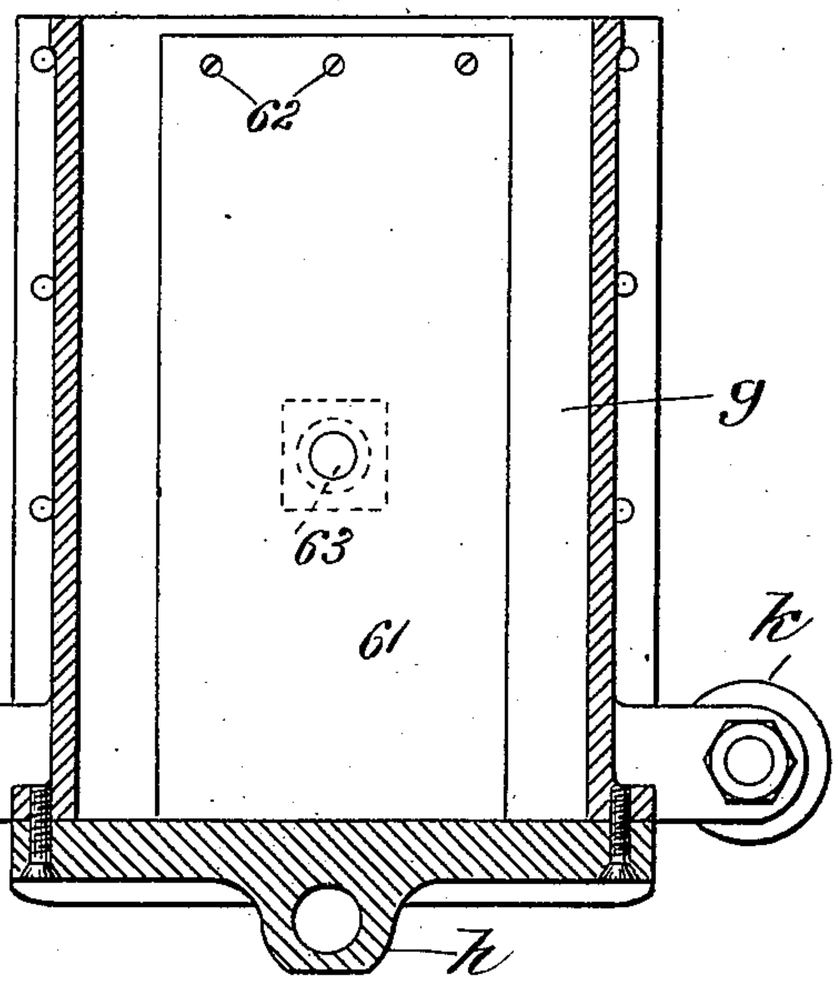
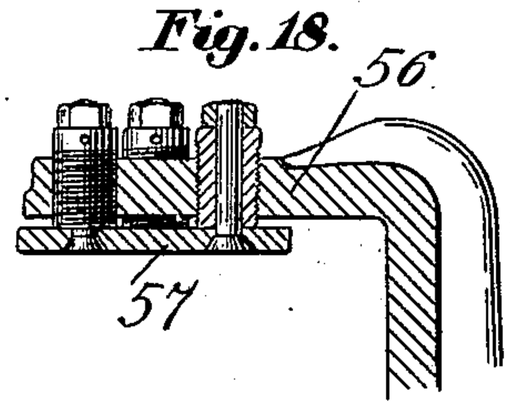


Fig. 18.



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PACKAGE FILLING MACHINE.

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(No Model.) 13 Sheets—Sheet 12.

Fig. 20.

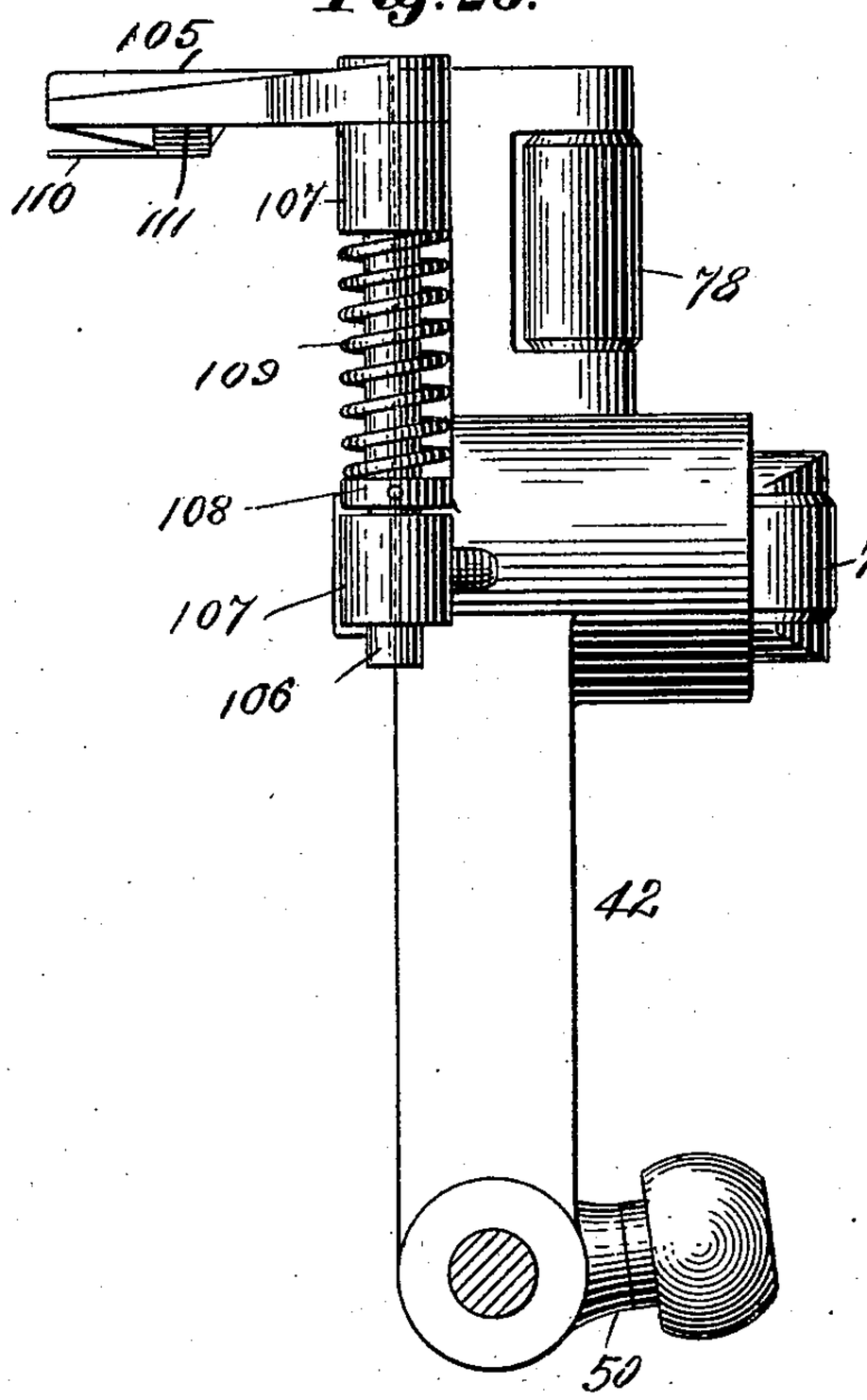


Fig. 19.

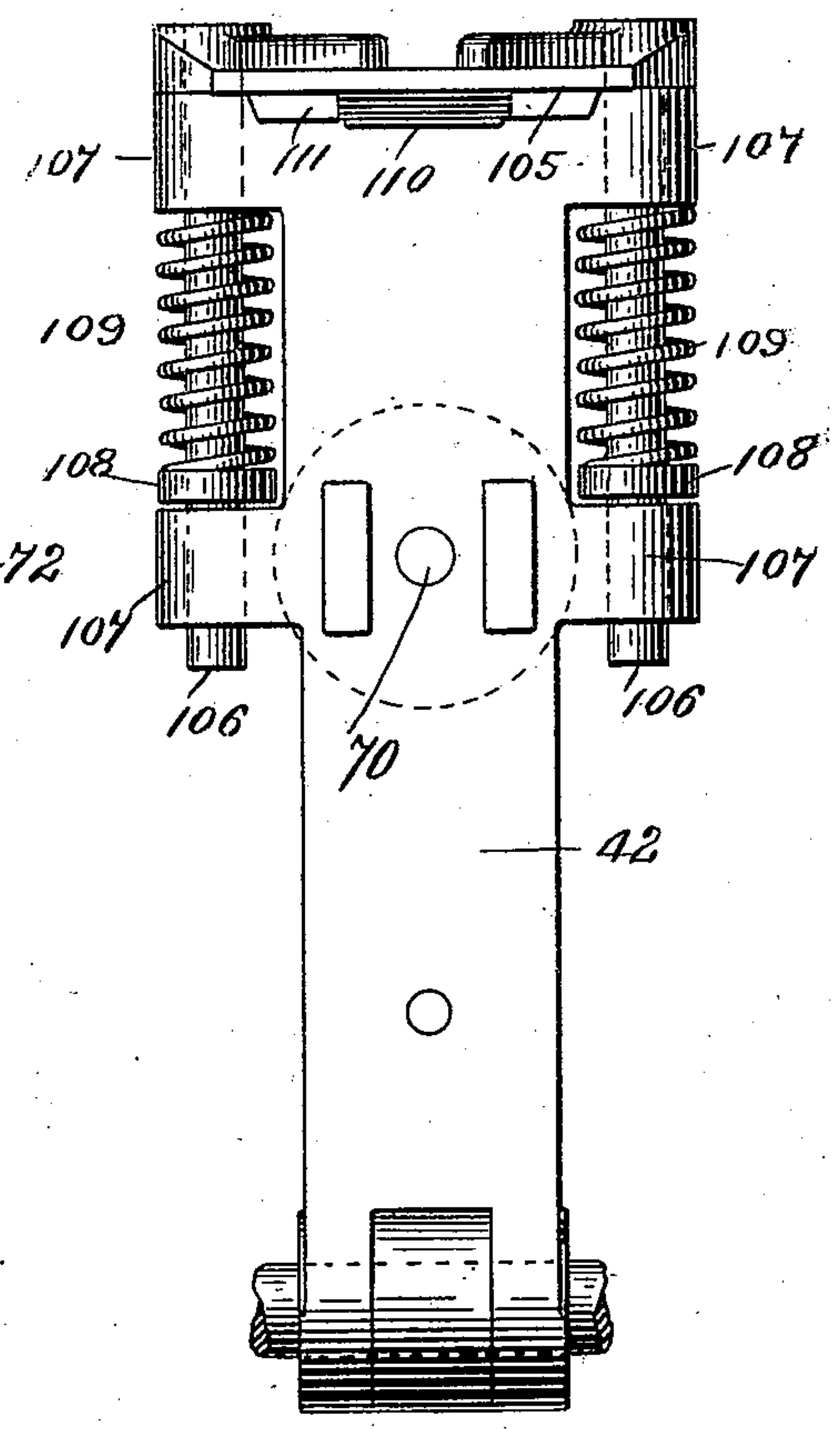


Fig. 21.

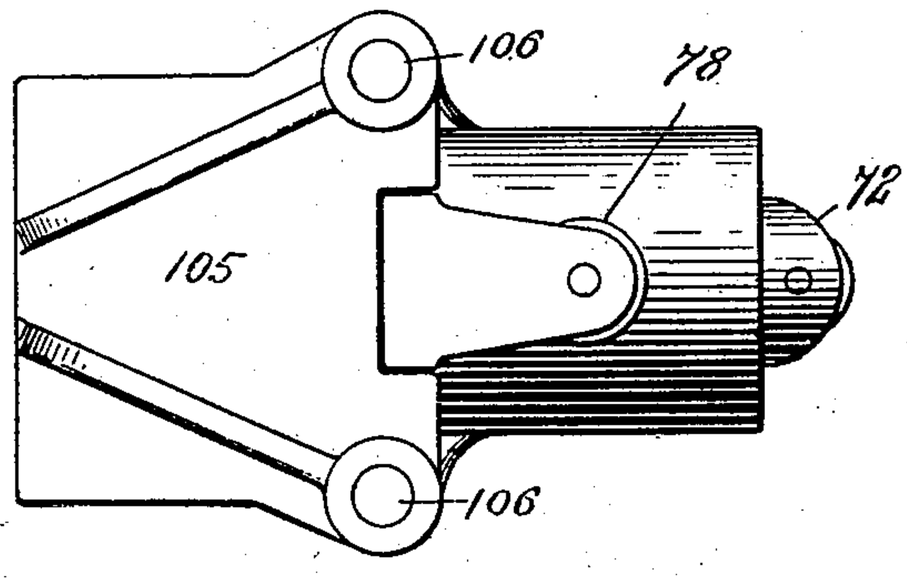
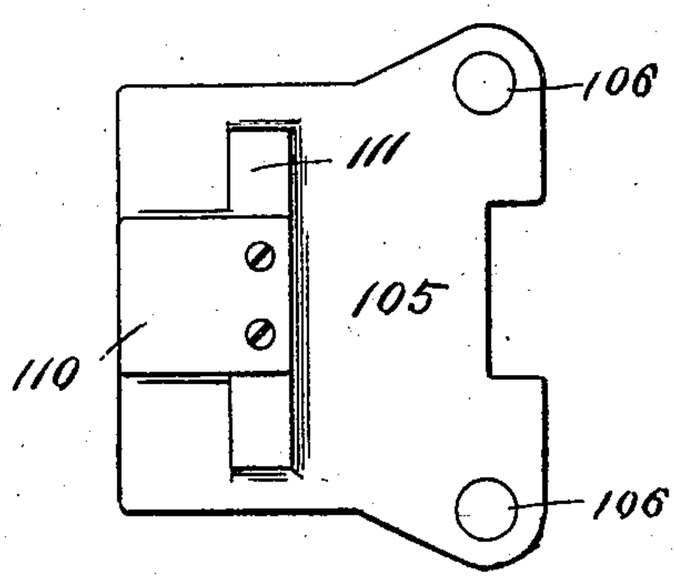


Fig. 22.



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L. F. FALES.

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Fig. 23.

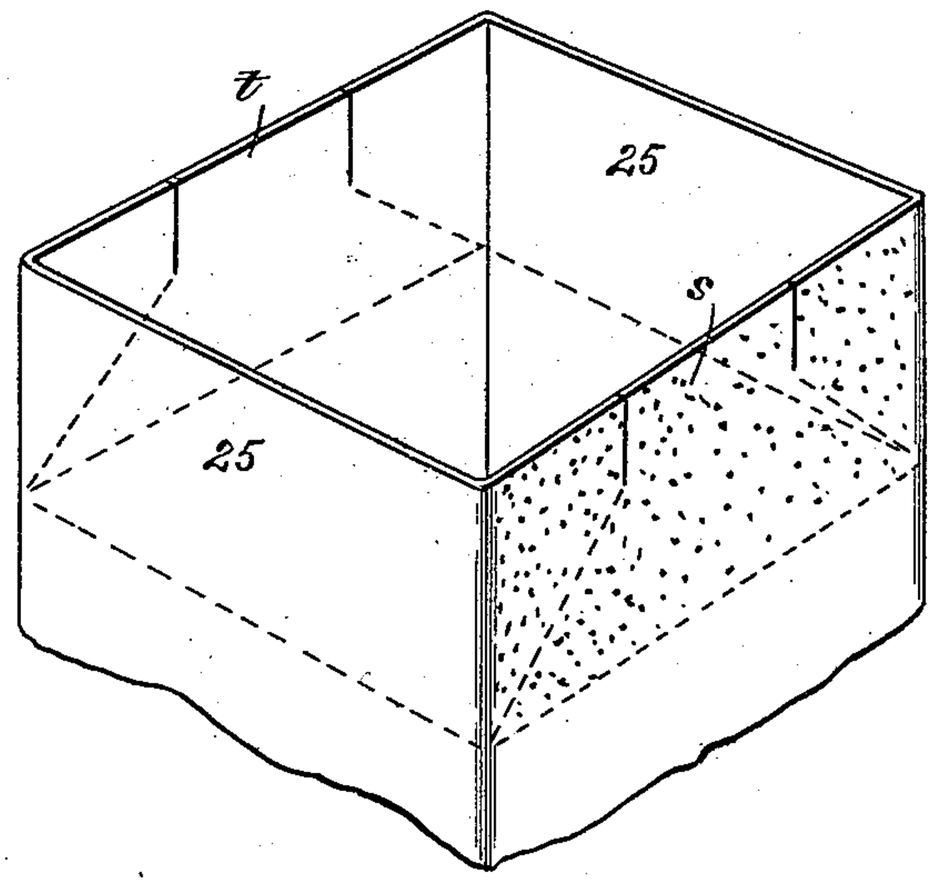


Fig. 24.

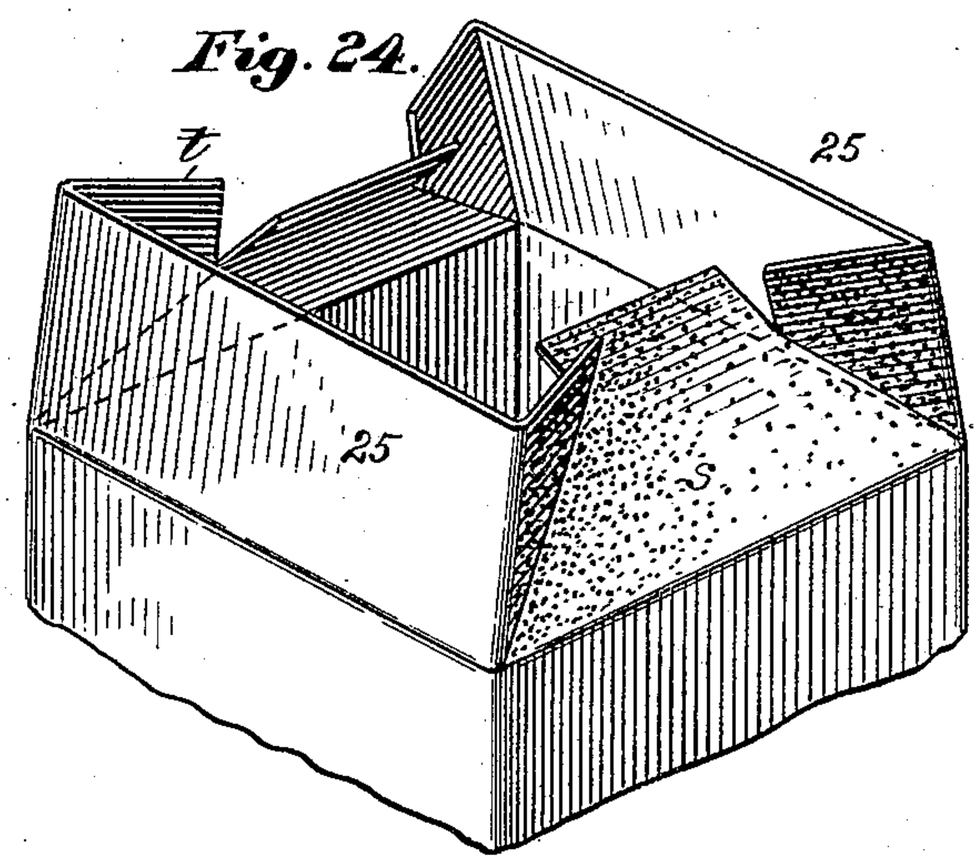
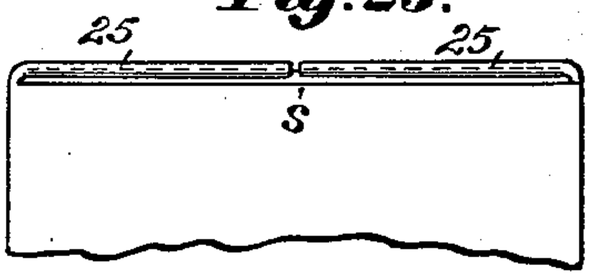


Fig. 25.



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UNITED STATES PATENT OFFICE.

LEWIS F. FALES, OF WALPOLE, MASSACHUSETTS, ASSIGNOR TO F. W. BIRD & SON, OF EAST WALPOLE, MASSACHUSETTS, A FIRM.

PACKAGE-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 689,474, dated December 24, 1901.

Application filed May 7, 1900. Serial No. 15,710. (No model.)

To all whom it may concern:

Be it known that I, LEWIS F. FALES, a citizen of the United States of America, residing at Walpole, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Package-Filling Machines, of which the following is a specification.

This invention relates to machines for automatically filling and sealing packages with material supplied thereto from any convenient source; and the object of the invention lies in the adaptation of mechanism for receiving, sealing, and delivering a suitable container and operating in conjunction with automatic weighing devices which at predetermined periods in the passage of the container through the machine will discharge thereinto the amount of material which the weighing mechanism is adjusted to and the container adapted to receive.

A further object of the invention is the adaptation to the machine of devices whereby the level of the material in the containers is automatically and temporarily brought to the plane of the folding-lines of the end-closing portion of said container to the end that a point of resistance may be provided by said material against which the infolded end-closing portions of the container may be pressed to insure their adhesion one to another; and the invention consists in the construction and arrangement of the coacting groups of mechanisms for the purpose above described, all as set forth in the following specification and clearly pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a plan view of a package-filling machine embodying this invention. Fig. 2 is a side elevation of the same. Fig. 3 is a side elevation of one end of the machine, on an enlarged scale, the side frame of the machine being removed. Fig. 4 is a vertical section taken longitudinally through the gumming and folding mechanism and showing the line of package-receiving pockets in section. Fig. 5 is an elevation of the end of the pocket opposite to that end shown in Fig. 3 and is on the same scale as the latter and is shown with the side frame removed. Fig. 6 is a vertical section on line A A, Fig. 5, showing a container in a pocket of the machine ready to have its end portions infolded to close the end of the container. Fig. 7 is a sectional view taken on line B B, Fig. 5, showing the end-closing portions of a container infolded. Fig. 8 is an enlarged sectional plan view on line D D, Fig. 7. Fig. 9 shows in side elevation, looking from the driving side of the machine, the cam-actuated mechanism which imparts movement to the cam-wheel by which the pocket-engaging arms are moved and by which the folding-fingers are operated and the plunger given its vertical reciprocatory movements. Fig. 10 is a longitudinal section through several of the pockets, showing the relation thereof to the pocket-jarring mechanism. Fig. 11 is a transverse section between two of the gears of the jarring mechanism, showing a pocket lifted off the track by the gears. Fig. 12 is an end view, partly in section, of the adjusting-lever for the jarring mechanism. Fig. 13 is a detail view showing the engagement of one end of said lever with a screw-threaded rod attached to the machine. Fig. 14 is a similar view to Fig. 13, showing the detailed construction of the operative engagement of the other end of said lever with adjusting connection running to the jarring devices. Fig. 15 shows the detailed construction of a bearing for the gears of the jarring mechanism. Fig. 16 is a top plan view of one of the package-receiving pockets. Fig. 17 is a vertical section of the same. Fig. 18 is a vertical sectional view of the upper end of one of the pocket-embracing arms. Fig. 19 is a front elevation of a modified construction of one of the arms which swing in over the top of the pocket to fold and press down the end-closing portions of the container. Fig. 20 is a side elevation of the same. Fig. 21 is a top plan view, and Fig. 22 is a view of the under side of the plate which covers one-half of the end of the package within the pocket. Fig. 23 is a perspective view of the open end of a container the end of which the folding mechanism in this machine is adapted to close, the folding-lines of the container being shown in dotted lines. Fig. 24 is a perspective view of the end of the container shown in Fig. 23 and illustrating the position of the end-clos-

ing portions just prior to the swinging in of the folding-arms to close the package. Fig. 25 is a portion of the end of a container, showing the appearance thereof when closed.

This machine is designed to receive and automatically fill, seal, and deliver packages of any material which may be passed through any of the well-known automatic weighing-machines; and, briefly stated, the machine consists of an endless chain belt having pockets thereon to receive containers of pasteboard or any other material which the machine is adapted to close or seal automatically. The chain belt has an intermittent movement through the machine and the first stop of the pocket and container is under the weighing mechanism, the next under the gumming devices, where the end-closing portions of the container are gummed, the next under the folding devices, where the open end of the container is closed. It is at this point of the passage of the container through the machine that the contents thereof are automatically brought to the plane of the folding-line of the end-closing portions of the container, and this plane of the material is maintained during the time that endwise pressure is exerted against the end of the container to effect the adhesion of the gummed portions thereof, whereby said container is closed. The closed packages are held in the pockets until they arrive nearly at the point from which the container is placed in the pockets on the chain belt, where at each stop the package slides out of the pocket onto a platform or onto a conveyer-belt, as desired.

This machine consists of a suitable frame *a*, in which are located the two chain-belt shafts *b* and *c*, (see Fig. 2,) parallel with each other and in the same horizontal plane. Chain-wheels *d* and *e* are keyed on these shafts midway between the side frames, and a chain belt *f* runs on these wheels. The links of this chain belt are of such form and dimension as will afford a proper base and support for the pockets *g*, and at each point on said chain where a pocket is to be located one of the ordinary chain-links is replaced by one having upstanding lugs thereon, between which a downhanging lug *h* (see Fig. 4) on the bottom of the pocket is located. A pin passing through both pivotally attaches the pocket to the chain belt *f*. The peripheries of the chain-wheels *d* and *e* are provided with teeth, as usual, for engaging the links of the chain belt. The pockets are of metal and their weight is taken off from the chain belt during their transit through the machine by a metal track *i* alongside the upper course of the chain belt and by a similar track *j* parallel with and somewhat above the chain belt along its lower course, said pocket being provided with flanged rolls *k*, (see Figs. 16 and 17,) on which it is carried on said tracks, thus relieving the chain belt of all strains transverse to its horizontal line of movement.

At that point in its movement where the chain passes over the chain-wheel *d*, at the forward end of the machine, a circular track *l* for the rolls on the pockets to run on is provided. At this point the weight of the pockets coming on the chain belt *f* is easily supported by it, for the links of the latter engaging with the chain-wheel in front of and behind the pocket affords a sufficient support for the chain to carry said pockets.

It will be noticed by referring to Fig. 16, which shows a top plan view of one of the pockets, that the flanged rolls *k* at the rear end of the pocket are provided with treads of greater width than those at the front of the pocket, and when the pockets run off from the curved tracks *l* at the forward end of the machine in coming around the chain-wheel *d* in position to receive a new container the upper end of the curved track (see Fig. 3) is widened at *m*, and the straight horizontal track *i* on the top of the machine is extended toward the front until it intersects said curved track. When a pocket arrives at this widened portion *m* of the curved track *l*, the narrow front wheels will run off the track, the pocket being supported in the center thereof on the chain-wheel and also by a rear wheel as long as the pocket tilts backward. As the pocket comes more nearly to an upright position the front rolls thereof drop in between the widened part *m* of the curved track and in due time take the horizontal track *i*, the rear wheels still riding on said widened part of the track by reason of their wider treads, the said rear wheels eventually running onto the straight track *i*. The flanges of the front and rear wheel are of course in line.

By means of the above track construction the true radial position of the pockets relative to the chain-wheel is maintained during the passage of said pockets therearound.

On the rear end of the machine, where the chain belt begins to take the curve of the chain-wheel *e*, a retaining-rail or guide-rail *n* (see Fig. 5) is provided, one end of which is straight and is supported on rigid arms over and in the same vertical plane as the end of the track *i*, and the forward end of said guide-rail is given a curve substantially concentric with said chain-wheel to the end that as the rear end of the pockets tip up as the latter incline forward in passing around the chain-wheel the rolls *k* on the rear of said pockets will engage the under side of said guide-rails, and thus take the strain off of the chain until the pocket has progressed so far that the engagement of the links of the chain with its wheel *e* shall afford proper support for said pocket, together with the support of the folding arms, to be described, which engage said pockets at this point.

As the pockets travel from the point at which they receive the charge of material from the weighing devices to the point at which they are gummed and sealed they must be subjected to a jarring or shaking movement

for settling down the contents thereof as compactly as possible, and to this end the said pockets are made to run over a series of slowly-rotating gears *o*, (see Figs. 2, 3, and 5,) the teeth of which strike the bottoms of the pockets near the sides thereof as the latter move slowly over them. Said gears *o* are made with their teeth widely spaced, so that the contact of each tooth with the pocket will impart thereto a distinct shock or jar. As shown in Figs 4, 5, and 17 most clearly, the bottoms of the pockets are provided with plates or strips *p* of some hard metal, against which the teeth of said gears impinge. These plates or strips are removable to provide for the easy substitution of new ones for those worn out. The gears *o* are supported in vertically-movable boxes, whereby their contact with the bottoms of the pockets may be regulated, as hereinafter described.

As seen in Figs. 1 and 2, a hopper *q* is located over the front end of the machine, the mouth of whose spout lies directly over the top of the pocket as the latter moves step by step through the machine, and said spout is provided with a cut-off slide *r*, whereby the operator may prevent the delivery of material into a container in one of the pockets if he so desires. Over this hopper *q* may be located any one of the well-known automatic weighing mechanisms in such position that it will deliver periodically an amount of material to fill one of the containers in the pockets of the machine.

As the machine is set in motion each pocket *g* is provided with a container while the pocket is passing upward around the chain-wheel *d*, but before it reaches a position beneath the hopper *q*. Each pocket in turn is moved upward and stops under the spout of the hopper, and the delivery periods of the weighing-machine and the step-by-step movement of the pockets through the machine are made synchronous. As each container stops under the hopper to be filled those preceding it are subjected to the next step in the process necessary to the completion and delivery of a package of whatever material the machine may be operating on. After the container has been filled the next two stops of the machine leave the two preceding pockets over the shaking devices, whereby the contents of the containers in those pockets are settled down to practically a normal level. The next step will bring the container under the gumming mechanism. This is shown in Fig. 4. It should be stated here that the present machine is designed to fill the open-mouthed bags while in the pockets of the machine and to close their tops. The pockets completely inclose the containers, except that the sides of the latter project above the pockets by the amount which is to be turned over to close the top of the bag. The folding-line of the containers in effecting a closure of the open end is in the plane of the top of the pockets. In closing the open end of the bag or container two opposite sides of the pocket are infolded across the top of the container after the container has been filled, and the two other sides are then folded down transversely across the portion already infolded. This form of end closure requires that only the outside surface of the projecting sides first infolded should be gummed, and the gumming devices shown herein and soon to be described are arranged to gum those surfaces.

In the preferred construction of container thin pasteboard is used, and in order to insure a proper folding of the container the two sides which are first infolded are usually stamped or creased along the lines which are produced in making the fold, as indicated in Fig. 24. The form of fold made is also shown in said figure, and the gummed portions of one of the end-closing portions is indicated by the shading on Fig. 23.

After the pockets have come to a stop over the gears *o*, whereby their contents are shaken down, the next step through the machine brings them under the gumming devices, at which point the sides of the container *s* and *t* have gum applied thereto, as indicated by the shade-lines on said Fig. 23. Simultaneously with the gumming of the end portions of the container the contents thereof are subjected to more or less pressure by a plunger *u* on the head *v*, on which the gum-rolls *x* are carried which apply gum to the container, as stated. At the moment of gumming the end-closing portions of the container stand upright above the top of the pocket, as shown in Fig. 4. Said gumming devices and the operating mechanism thereof are illustrated on an enlarged scale in Fig. 4, which is a vertical longitudinal section taken substantially through the center of the plunger *u*. The latter has a vertically-reciprocating movement imparted to it at the proper time for descending into a container for the purposes stated and is actuated by a lever *w*, secured on a rock-shaft *y*, supported transversely of the frame of the machine on standards *z*. At one side of said lever *w* is secured another lever 1, which actuates said rock-shaft *y* by means of a connecting-rod 2, extending down to and connected with the end of an arm 3, as shown in Figs. 2 and 9, hung loosely on a rock-shaft 4, engaged by a face-cam 5 at a point between said shaft and the point of the connection of the arm 3 with the rod 2. The shaft on which the face-cam 5 is carried is indicated by 6 and is the main cam-shaft of the machine. Fig. 9 is a view of this main cam-shaft and some of its cams looking from the opposite side of the machine from that shown in Fig. 2. Said connecting-rod 2 is made endwise yielding by the interposition between its ends of a yoke, one end of which is pivotally secured to the end of said lever 1, and through its opposite end said rod 2 projects. The latter extends entirely through said yoke and has a bearing in both ends

thereof, and a spring 7 is located on that portion of said rod within the yoke bearing on the bottom of the latter and against the collar screwed onto the rod 2 in the upper end of the yoke. Said collar will bear on the upper end of the yoke on the upstroke of the lever 1 and against the spring 7 on the downstroke. This construction provides a rigid connection for moving the plunger *u* upward and a yielding connection for forcing it downward, thereby avoiding the danger of straining any part of the mechanism should an excessive amount of material be deposited in the container by a defect of the weighing mechanism which would prevent a full descent of the plunger. This construction also provides means for preventing the application of more than a known degree of pressure against the contents of a container upon the descent of the plunger *u*. The requirements of this machine render it desirable, but not essential, that the said gum-rolls *x* should not run in contact with the gum-supplying rolls 8 in the gum-boxes 9 when the plunger *u* is at rest in a raised position, and therefore to supply gum to the said rolls *x* on said head *v* of the plunger mechanism has been provided to impart to said gum-boxes 9 a sliding movement toward the said plunger-head *v* just before the latter descends, whereby the rolls in the said gum-boxes will come for a moment into contact with the said rolls *x* and supply them with the adhesive necessary to gum the end-closing portions of the container, and this gum-box-moving mechanism and that for rotating the supply-rolls in the gum-boxes 9 are constructed as follows, reference being had principally to Figs. 1, 2, 4, and 9 of the drawings: The said gum-boxes 9 are mounted to slide longitudinally on the frame in any suitable way in a direction toward the plunger *u* from each side thereof, and said movement is imparted to said boxes simultaneously by a vertical shaft 10, having two short oppositely-located arms 11 (shown only in Figs. 1 and 9) on the upper end thereof, with which connecting-rods 12 extend in opposite directions to levers 13, pivoted on a suitable support midway between their ends, whereby a rotatory oscillation of said vertical shaft 10 will impart swinging movements to the free ends of the said levers 13 toward each other. Said free ends of the levers 13 are pivoted to the sliding gum-boxes 9, and suitably-timed oscillatory movements are imparted to said shaft 10 by a connection (shown in Fig. 9) of a crank-arm on the lower end thereof with a longitudinally-sliding cam-arm 14, a cam-roll on the free end of which engages with a cam 15 on the said main cam-shaft 6. A retracting-spring 16 between a part of the frame and said cam-arm 14 holds said cam-roll in engagement with its cam 15.

The gum-supplying rolls 8 in the gum-boxes 9 are continuously rotated and are provided with the usual wiper-rolls 17, bearing thereon. Movement is imparted to the said rolls 8 by a continuously-running shaft 18, (see Figs. 1, 2, and 4,) driven by a bevel-gear connection with a shaft 19, Fig. 1, on which is a sprocket-wheel 20, which runs over a similar wheel below it on the end of the driving-shaft 21, which extends through to the inside of the frame. On the said shaft 18 and on the ends of the shafts of the said rolls 8 are spiral gears 22, which form of gear connection permits the rolls to move with the gum-boxes without running out of mesh with the driving-gears on the shaft 18, the gears on the latter being made with a face wide enough to provide for this movement of the gum-boxes. When the gum-boxes move up to gum the rolls *x*, a pinion 23 on the end of the rolls 8 engages a pinion 24 on the end of the rolls *x*, rotating the latter while gum is applied thereto, and the pinion 23 is permanently in mesh with a pinion on the end of the wiper-rolls for rotating the latter continuously.

The position of the parts shown in Fig. 4 is that showing the plunger *u* at rest and the gum-boxes 9 withdrawn from the path of movement of said plunger, which is the position these boxes occupy just before and after gum has been applied to the rolls *x* on the head of the plunger. Assuming the latter to be the case and the rolls *x* duly supplied with gum, the plunger next moves down to compress the contents of the container and the rolls on the plunger-head to apply gum to the outside of two oppositely-located end-closing portions of the container. In Fig. 4 the filled containers are shown in the pockets in section and the end-closing portions thereof to be gummed by the rolls *x* are indicated by *s* and *t*, and those forming the outer layer on the bottom of the container are indicated by 25.

On the ends of the gum-rolls *x* opposite to that on which the pinions 24 are secured are the pinions 26 (shown only in Fig. 1) and which when the parts are in the position shown in Fig. 4 may rotate freely, (as when gum is being applied to the said rolls *x*;) but upon the descending movement of the plunger these pinions 26 engage a rack 28, supported on the machine in such position as to give to the rolls *x* a rotary movement inward and upward, to the end that just after the plunger-head *v* enters between the upstanding end-closing portions of the container the said rotary movement of the rolls *x* will have an upward-drawing effect on said end-closing portions and the gum on said rolls will be applied evenly thereon. Upon the upward movement of the plunger the rotary movement of the rolls *x* will be reversed, and at the end of the said upward movement the pinions 26 run off from the end of the racks 27, leaving said rolls free again to be rotated by the engagement of pinions 23 and 24 upon the next movement of the gum-boxes toward the plunger. The reversal of the rotary movement of the gum-rolls on the plunger at

the moment the upward movement of the latter begins prevents the container from being drawn out of the pocket by said rolls.

The racks 27 are pivotally supported about midway between their ends, as shown in Fig. 4, and their lower extremities united by a spring under tension, to the end that should the teeth of the pinions 26 fail to properly engage the topmost tooth of said racks on the descent of the plunger-head *v* then the racks will give sufficiently to allow the teeth of the pinion to pass over the top of the tooth on the racks to a point of engagement therewith.

The next position occupied by the container is that shown by the one on the extreme left-hand end of Fig. 4—viz., in proper position under the folding-fingers 28—by whose action the gummed end-closing portions *s* and *t* are infolded to such an extent as will permit the end-closing portions 25 to be folded over them by the next succeeding movement and pressed down upon them to seal the end of the container. Said folding-fingers 28 are secured on the ends of parallel shafts 29, located in long hubs on the side of a slide 30, having a vertical movement in the frame of the machine, the said fingers being located over the center of the pockets. The opposite ends of the shafts 29 have intermeshing gears 31 secured thereon, (see Figs. 1 and 4,) and on one of them is a crank-arm connected to one end of a horizontal rod 32, extending toward the front of the machine and engaging a down-hanging arm 33 on a rock-shaft 34, supported in the base of the standards *z*. Another arm 35, horizontally located on said rock-shaft 34, is connected with a vertical rod 36, (shown in dotted lines in Fig. 2,) extending down to the main cam-shaft 6, where it engages a suitable cam, whereby properly-timed vertical movements are imparted to said rod 36 for giving a rotatory oscillatory movement to the folding-fingers 28. This movement takes place after the slide 30 has been given a downward movement to permit the folding-fingers to begin their inwardly-swinging movement near the scored folding-line of the end-closing portions *s* and *t*. The said vertical movement of the slide 30 is imparted thereto by lever connections, (shown clearly in Fig. 9,) in which the horizontal lever 37, pivoted at 38 on the frame of the machine, is connected pivotally at 39 with said slide 30, and the opposite end thereof is connected with a vertical cam-lever 40, a cam-roll on which engages a cam 41 on the cam-shaft 6. From this description it is seen that the slide 30 moves downward with the curved folding-fingers extended, as shown in Fig. 9, and these fingers then swing inward, forcing the closing portions *s* and *t* of the container toward each other, and at this moment the action of the folding-arms 42 takes place. Referring to Fig. 6, which is a vertical section of these arms and their actuating cams and supports and of the chain-wheel *e*, it is seen that they operate in pairs on each container from opposite sides of the latter, and the movements of the arms on each side of the container are identical, and their function is to fold the side portions 25 down onto the gummed surfaces of the portions *s* and *t* while the latter are held by the folding-fingers 28 in a position inclined toward one another, substantially as shown in Fig. 24, said folding-fingers retiring as soon as the sides 25 begin their inward movement by the operation of the folding-arms 42. These arms have three movements—first, they rotate synchronously with the chain-belt movement and in the same direction; second, their outer ends have a swinging movement toward and from each other, and, third, they have a radially-sliding movement toward and from the chain-belt shaft *c*, on which they are supported. Figs. 5, 6, and 7 of the drawings particularly show the construction of this mechanism, all carried on shaft *c*.

The chain-wheel *e* is located about midway between the side frames of the machine, and on each side thereof are two hubs 43, provided with flat radial arms 44, so spaced that the ends of each pair of said arms will when the latter arrive at a vertical position over the chain-belt shaft *c* be located under a pocket *g*, and the distance separating the two oppositely-placed arms will bring the ends of said arms directly under the sides of the pockets, the said plates *p* thereof bearing on the ends of the arms, the latter forming a rigid support for said pockets. On each of said arms 44 is a sliding plate 45, on which is a cam-roll 46, and lugs between which the folding-arms 42 are pivotally supported. Both the chain-wheel *e* and the hubs 43 are keyed on the said shaft *c*. Next to the said hubs 43 are located on the shaft the cam-wheels 47, each provided with two cam-grooves, one, 48, for the reception of the cam-rolls 46, whereby the plates 45 are given the radial movement referred to above, and the other groove 49 for engagement with the short arm 50 of the folding-arms 42, whereby they are given their inwardly-swinging movement. The said cam-wheels 47 are loose on the said shaft *c* and have identical rotary movements imparted to them simultaneously and independently of the shaft by means of connections from each of said wheels to arms fixed on the rock-shaft 4. One of these arms 51 is shown in side elevation in Figs. 2 and 5, and the other of said arms is shown in elevation in Fig. 9. That one of the said arms 51 shown in Figs. 2 and 5 has an extension 52 thereon, on which a stud is located, which engages a face-cam 53 on the main cam-shaft 6, whereby there is imparted a rocking motion to the rock-shaft 4 at proper intervals. Through the arms 51 and connecting-rods 54, extending from the ends thereof to studs 55 on the cam-wheels 47, (see Figs. 2, 5, and 9,) oscillatory movements are given to the latter. Means are thus provided for imparting to said

cam-wheels 47 a properly-timed oscillation on the shaft *c*, whereby at the moment a pocket arrives in proper position and the sides *s* and *t* of the container therein have been infolded by the action of the folding-fingers 28 the arms on opposite sides of said pocket will be first simultaneously swung toward the pocket by the action of the cam-groove 49 on the short arm 50 of said folding-arms 42, and immediatsly following this movement said folding-arms are moved bodily toward the shaft *c* by the action of the cam-groove 48 on the rolls 46. The said folding-arms are, as shown in the drawings, made with their upper extremities 56 lying at right angles to the main body of the arm, and said extremities are provided with adjustable plates 57, each adapted to cover substantially one-half of the area of the top of a container. Thus when the two folding-arms have been moved toward each other to the fullest extent of their inwardly-swinging movement the top of the container will be entirely covered and the radial movement of the arms will then press the said plates firmly down against the portions 25, the contents of the container serving as a backing for the latter, which thereby may be forced down with as much pressure as may be thought desirable to effect the adhesion of said parts 25 to the gummed sides *s* and *t* of the container.

Means for effecting the fine adjustment of the folding-arms to an exact position relative to the side of the pockets are provided by making the arms 42 in two parts, as shown in the sectional view of the arm on the right of Fig. 6 of the drawings. Both of said parts are pivoted on the sliding plate 45, and the shorter one, 58, of the two parts lying parallel with the other has two screws 59 therein, one bearing on the side of said longer arm and the other entering a suitably-threaded hole in said arm, whereby said longer arm may be adjusted in the plane of its swinging movement relative to said shorter arm and the two then locked together to move as one.

In the ordinary use of a machine of this class, as shown and described above, the boxes or containers are of uniform dimensions, so that they may fit properly in their pockets, and the lines on which the projecting portions of the open ends of the containers are folded to close them are also uniform in all containers adapted to hold the same quantity of material. It will be remembered that in closing the tops of the containers the projecting portions are folded in and down upon the top of the material, which material serves as a backing against which the folded-in portions may be pressed in order to close the tops of the containers effectively. If the material with the given weight of which the containers are filled were always of the same bulk for that weight, the containers and pockets would be made of such a size that the material after having been pressed down would come to the folding-line of the containers, so that it would afford a proper backing against which to press the folded tops; but it is the fact that the material, from one cause or another, varies considerably in bulk for a given weight, and therefore the containers must be of such dimensions that they will hold a given weight in the form of its greatest bulk, and as the said bulk may vary from one extreme to the other between the filling of one box and the next there may be in two successive containers a difference of level of the material so great that when the end-closing mechanism operates to fold the top of the container and seal it the level of the material therein will be below the plane of the lines on which the projecting portions of the container are folded, so that there will be no point of resistance for the infolded top of the container to bear upon and proper adhesion of the gummed surfaces will not be secured. Under such circumstances the imperfectly-sealed container must be opened and the material must be turned back into the machine and the container destroyed.

Means will now be described whereby the level of material in the containers is in all cases automatically and temporarily brought to the folding-lines of the container at the time when the top portion is infolded to close the end of the container whatever may be the variation in bulk of the weight of material emptied into the containers.

By referring now to Fig. 6 it will be seen that a box or container in a pocket has arrived at the point of its movement through the machine where the end-closing portions *s* and *t* of the container, having been previously gummed together with the parts 25, are to be folded in one upon the other ready to be overlapped by the ends of the folding-arms 42 and pressed down against the material in the box, whereby they will be caused to firmly adhere to one another and effectually seal the end of said box or container. It will be observed, however, that the material in said box does not reach the plane of the folding-lines 60, which, as stated, are substantially in the plane of the upper end of the pocket, and if no provision were made for backing up the end-closing portions of the container from the inside of the latter then when the folding-arms 42 are brought down by their radial movement, heretofore described, to the plane of said folding-line the end-closing portions of the container would not become adhered together and the package would be so imperfectly sealed that any finely-ground material would escape therefrom or the end of the package might even be forced open by the weight of the material therein and lost. To remedy this defect and to provide means for always backing up the end-closing ends of the box from the inside with a definite pressure of the material therein, whether the level of said material has to be artificially raised either an eighth of an inch or several times that distance, I provide in a package-receiving pocket means

for compressing the box or package or container therein transversely at a point some distance below the top thereof, whereby the material in said box or package above the point of compression will be forced upward. This transverse compression or constriction of the box or package is applied after the folding-arms 42 have moved up from each side and grasped the pocket and by a radial movement toward the axis of their rotation have assumed the position shown in Fig. 7. At about the time the folding-arms assume the position shown in Fig. 7 and the parts thereof overhanging the package have been moved down substantially to the plane of the top of the pocket the above-referred-to transverse compression of the container in the pocket takes place and forces the material therein up against the under side of the infolded end-closing portions of the container, crowding the latter against the ends of the folding-arms with whatever pressure desired, and in this position the package makes substantially a half-revolution with the chain-wheel—that is, from a point vertically above the axis of the latter to a point diametrically opposite—said transverse compression at the latter point being taken from the package, which is left free in the pocket and will of its own weight drop therefrom as the pocket moves onward and upward around the chain-wheel at the forward end of the machine. The preferred construction in carrying out this part of my invention is to make the pockets *g* of fixed dimensions and to insert therein two thin spring-plates 61, which lie closely against opposite sides of said pockets between the latter and the side of the box or container. These plates extend from the top to the bottom of said pockets, and the upper edge thereof is secured by screws 62 or other means to the pockets. The said plates 61, as seen in Fig. 4, are narrower than the side walls of the pockets and are let into the surface thereof to leave it normally smooth and unbroken. At opposite points on each of the side walls of the pockets is a boss 63, (distinctly shown in Figs. 6 and 8,) in which is a plunger 64, one end of which lies normally flush with the end of said boss and the opposite end of which is secured to the flexible plate 61. On each of the folding-arms 42 at equal distances from their axis is cast a cylindrical boss 65, which projects outwardly from said arm and is bored out to receive a plunger 66, which in turn is counterbored from its inner end to receive a coiled spring 67. This construction is seen in Fig. 8 most clearly. On the inner surface of the folding-arms are two rectangular lugs 68, spaced at such distance apart as will permit the entrance therebetween of the bosses 63 on the pocket when the folding-arms close in toward said pocket. By this means the arms 42 and the pockets are interlocked and the latter supported in true radial position in their course around the chain-wheel *e*, and whereby also the parts operating to compress the sides of the container in said pocket will be maintained in true alinement. The open end of the counterbore in the plunger 66 is suitably closed by a disk 69, screwed into it. Before said disk is screwed into place a pin 70, having a head 71 thereon, is passed through a hole in the center of the disk, whereby when the latter is put in place the head of said pin will bear on the end of said spring 67. In the outer end of the plunger 66 is a roll 72, whose axis is at right angles to the path of movement of the folding-arms 42. The plunger 66 is normally forced outward from the boss 65 by a coiled spring 73, located on the turned-down inner end of said plunger, and which spring bears against the inner closed end of the boss 65 and against the shoulder on the plunger which is formed by turning down its inner end. At any convenient point on said boss 65 a screw 74 (see Fig. 7) is inserted, whose point engages a slot in the plunger, whereby the movement of the latter within said boss is limited.

A cam-rail 75 is supported concentrically with the axis of the folding-arms 42 on each side of the path of the pockets around the chain-wheel *e* on brackets 76, which are bolted to the frame of the machine, (see Figs. 1 and 3,) and which extends from a point just forward of the vertical line through the axis of the chain-wheel above the latter to a similar point below said wheel. At the point where the folding-arms 42, after they have been swung inward and moved radially downward against the top of the pocket, enter between said cam-rails 75 the latter are separated a little to admit them freely, (see Fig. 7;) but from said point of entrance the cam-rails trend gradually inward and then run in parallel lines nearly to the opposite end of the rails, where they again taper outwardly, as at their upper ends. As the folding-arms intermittently revolve about their axis they are caused to close in toward the sides of the pockets by the engagement of their short arms 50 in a cam-groove 49 in said cam-wheel 47, and when said arms arrive at the proper position with their inturned ends overlapping the top of the box or container in the pockets another cam-groove 48 in said cam-wheel 47, with which the cam-rolls 46 engage, causes both arms to move radially toward their axis until they arrive at the position shown in Fig. 7. A bearing-rail 77 is secured on the outer ends of the brackets 76^a, (see Fig. 5,) and against these rails rolls 78, hung in the folding-arms 42, are adapted to bear, whereby these arms are held closely to the sides of each pocket as the latter pass around the chain-wheel.

It is obvious that the closing in of the folding-arms 42 and the radial movement thereof must take place before the arms enter between the ends of the cam-rails 75; but when these movements have taken place the rolls 72 in the end of the plunger 66 will lie in the plane of the edge of the cam-rails and said

plungers axially in line with the pin 70 and the plungers 64, and the continued movement of said folding-arms brings the said plungers between the contracted portions of said cam-rails, whereby they are gradually forced inward. This movement compresses the coiled spring 73, and the pins 70 are forced against the end of the plunger 64, which in turn forces the spring-plates 61 toward each other, as shown in Fig. 7, and compressing the package or container between its ends forces the material therein against the previously gummed and infolded end-closing portions of said container, and the ends of the folding-arms overlapping the top of the container being the abutment against which the material in the container is forced by the said constriction of its area at a point between the two ends thereof.

The amount of pressure which it is desired to exert against the end-closing portions of the container from beneath is determined by the resistance to compression of the springs 67, which may be determined by any of the well-known methods before the springs are put onto their plungers, and thus a known pressure may be applied to squeeze together the gummed end-closing portions of the container between the material in the latter and the overlapping ends of the folding-arms, and said pressure may be maintained until the pockets arrive at the end of the cam-rails 75 after having made a half-circuit around the chain-wheel *e*.

As already set forth, the containers in the pockets which receive the material are made of such dimensions as will enable them to contain a given weight of material in the form of its greatest bulk. When material is delivered into said containers in this form, it is manifest that but a very slight movement of the spring-plates 61 can take place before the spring 67 will yield, thus permitting always the same extent of movement of the plunger 66; but the degree of movement of the plunger 64 will necessarily vary according to the bulk of the material in each container; but whether that bulk be relatively great or small the maximum pressure which can be applied to effect the compression of a package or container is always represented by the resistance of the spring 67.

Of course if the material delivered into the container is in the form of its smallest bulk for a given weight the cam-rails 75 are arranged to still provide a sufficient movement of the plates 61 to bring the material in the container to a bearing against the under side of the end portions thereof, which close it.

When the pockets arrive at the point where the rolls 72 run off from the parallel portion of the cam-rails 75 onto the outwardly tapering ends thereof, the spring-plates 61 will first expand to their normal length, and then the spring 73 will force the plunger 66 away from the pockets and withdraw the pin 70 from contact with the plunger 64, whereupon the plates 61 resume their normal positions in the sides of the pockets. This will leave a container in the pocket free to drop out of the latter as soon as the arms 42 are swung outward, which operation is effected by the same movement of the cam-wheels 47 which causes the pair of arms above to swing inward, the cam-grooves 48 therein being reversed at the point where it acts upon the arms to swing them outward. At this point in the revolution of the arms around the chain-wheel *e* the now open ends of said pockets run close to the surface of a smooth narrow table 79, (shown only in Fig. 2,) which prevents said containers from dropping out of the pockets as they slide along on said table to the end thereof which lies under the chain-wheel *d*, and as the pockets pass around said wheel, following the course of the chain, the containers will drop out. In practice a belt conveyer receives them at this point, carrying them to another point in the building for boxing and shipping. This conveyer is not shown.

The cam-rails 75 are made adjustable in their supports to the end that they may be separated or brought nearer to each other to adapt the machine to various materials.

As previously stated, the cam-wheel 47 has slight oscillatory movements on its shaft, whereby the proper movements are imparted to the folding-arms 42, and as the cam-rails 75 and the bearing-rail 77 are supported on this plate the upper ends of said rails have a slight movement toward the folding-arms at the moment the latter have completed their simultaneous movement toward one of the pockets. At the time this oscillatory movement of the circular cam-plate takes place the cam-rolls on the other folding-arms lie in concentric portions of the cam-grooves 48 and 49, and hence the relation of said arms to the ends of the pockets is not disturbed.

As hereinbefore stated, the folding-arms 42 are timed to move with the pockets *g* and to maintain proper relative positions thereto during the passage of the pockets around the chain-wheel *e*, and the proper intermittent movement whereby the movement of the pockets is regulated is imparted to the shaft on which the chain-wheel *e* is supported by a pawl-and-ratchet device on the side of the machine on which are located the driving-pulleys 80 of the usual tight and loose type. These are shown in Fig. 1 of the drawings, and the ratchet device is shown in Figs. 2 and 5. The driving-pulleys are on the driving-shaft 21, on which is a pinion 81 in mesh with a large gear-wheel secured on the end of the main cam-shaft 6, and from this wheel a connecting-rod 82 extends toward the shaft *c* (see Figs. 1 and 5, in the latter figure this rod being shown in dotted lines only) and engages the end of an arm loosely hung on said shaft and carrying the pawl 83, which engages the ratchet-wheel 84, secured on said shaft outside of the frame of the machine, whereby the wheel carrying the folding-arms 42 and the

chain-wheel *e* are periodically rotated to bring the pockets in the successive positions they occupy in their course through the machine.

Reference has been made to the shaking devices located between the chain-wheels *d* and *e* and under the horizontal portion of the chain belt *f*, extending from the top of one of these wheels to the other. This shaking device is illustrated in detail in Figs. 10 to 15 of the drawings, inclusive, and it consists in a series of gears *o*, hung in pairs in swinging supports, one of which is illustrated on an enlarged scale in Fig. 15. This construction shows a hollow hub 85, on which is cast an elbow-lever 86, and at the angle of said lever it is pivotally supported on a shaft 87, and in each end of said hub is screwed a steel bushing 88. The downhanging free end of said elbow-lever 86 is engaged by a horizontal connection extending back to the front end of the machine, at which point certain adjusting devices, to be described, are applied to said horizontal connections for operating said gears to cause the teeth thereof to strike with more or less force against the bottom of the pockets *g* as the latter move over them, as hereinbefore stated, each tooth lifting the pocket and allowing it to drop onto the next succeeding tooth. A shaft 89 has a bearing in the bushings 88, and on each end thereof, projecting beyond the latter, is secured a gear *o*, the distance between which is such as to bring said gears under the plates *p* on the under side of the pockets *g*, as shown in Fig. 11. The said shaft 89, on which said gear-supports are hung, is supported in two parallel bars 90, secured to the frame of the machine, one of which is shown in side elevation in Fig. 10 and both in end section in Fig. 11. A swinging movement of the levers 86 will cause said gears to swing in a vertical plane toward and from the bottoms of the pockets *g*. Perforations 91 are made through these bars 90 at the several points thereon opposite the axis of the gear-shaft 89, the ends of which project through said bars, the gears *o*, attached to the outer ends of said shaft 89, lying in close proximity to the sides of the bars 90. In the drawings five pairs of gears *o* are shown, and the depending levers 86 of the gear-supports for the three left-hand gears and the same levers of the two right-hand gears are connected together by rigid horizontal bars 92, and one of the said levers of the first group of three and of the second group of two are extended somewhat below the ends of the other levers of said groups, and the longer lever of said group of three is pivotally secured to a stud on a collar 93, and the longer lever of the two of the second group of gears is connected in a similar manner to a collar 94. Said first-named collar 93 is fixed on a tube 95, which extends toward the front end of the machine, and is there supported, as shown in Fig. 12, in one end of an arm 96, pivotally hung at its center on a bracket 97 on the frame of the machine. A rod 98 carries said collar 94 and extends back through the tubular connection 95, the end thereof projecting beyond the arm 96 and provided with a screw-thread, which is engaged by an adjusting-nut 99, whereby said rod may be moved longitudinally in said tubular connection to swing the levers 86 of the two gears *o*, lying at the right hand of Fig. 10, without imparting movement to the levers 86 of the group of three gears lying at the left-hand end of said Fig. 10. The latter may be moved separately by loosening the adjusting-nut on the end of the rod 98 and then swinging said arm 96 on its pivot, whereby said group of three levers may be swung independently of the group of two connected with said rod. Said movement is imparted to said arm 96 by the nut 100, engaging the threaded end of a rod 101 and also the end of the arm 96, (see Figs. 12 and 13,) whose opposite end is pivotally attached to the frame of the machine at 102. By manipulating the nut on said rod 101 said arm 96 may be swung and the said tubular connection 95 moved endwise to swing said levers 86, attached to it, by means of the collar 93. The object of this construction of these adjusting devices, which permit of the separate adjustment of the groups of three and two gears, is to provide means for imparting, by means of the two first gears which the pockets encounter on their way through the machine, a gentle shaking movement and by means of the next three gears a more severe shaking, or vice versa, as desired. Some substances require less shaking than others to settle them to a normal level in the containers, and the adjustment of the shaking devices provides means for imparting to the containers whatever degree of shaking may be necessary to effect the desired result. The gears *o* are so located that the teeth of one will mesh with the next one, whereby the rotation of one will impart rotary movements to all of them, and one of said gears is rotated by means of a sprocket-wheel 103, (shown in dotted lines in Fig. 10,) attached to one of the gears *o*, and a sprocket-chain on said wheel runs over a second sprocket 104, fixed on the main cam-shaft 6.

In Figs. 19, 20, 21, and 22 there is illustrated a construction of the folding-arms 42 whereby yielding pressure may, if desired, be applied to the top of the container when the said arms move down radially against the said container to the position shown in Fig. 7, and that construction consists in supporting the plate 105 on two studs 106, supported and having a sliding movement in bosses 107, cast on said arms 42. Close to the upper side of the lower boss 107 are secured on said studs 106 the collars 108, and between said collars and the under side of the boss 107 on the upper ends of the arms are spiral springs 109. Thus pressure applied to the under side of the plate 105, as in the act of forcing the arms 42 down against the top of a package, would result in the application of a pressure to said

package equaling only the strength of resistance of the spring 109. In Fig. 22 the under side of one of the plates 105 is shown, and it is seen that this is provided with a thin plate 110, of spring metal, the outer edge of which is flush with the edge of the plate 105 and the inner edge of which is supported on a raised projection 111, which is of such length and is so placed as to adapt it to bear on one edge of the top of the package when the folding-arms 42 have imparted to it the aforesaid radial movement. From the point where the plate 110 is secured to the said projection 111 the latter tapers downward to the edge of the plate, as shown in Fig. 20. This is to afford a certain support to said spring-plate if the pressure against the package should force it back thus far. The object of the projection 111 and the plate 110 is to prevent the package from becoming so enlarged by the endwise pressure exerted thereon as to render it liable to stick in the pocket, and thereby be carried beyond the point where it should drop out to be conveyed away from the machine. The construction shown in Figs. 19 to 22, inclusive, and more especially in the construction of the bearing-surfaces on the under side of the plate 105, which come in contact with the top of the package, is adapted to crowd the material from the edge toward the center of the package rather than to cause an enlargement thereof, which would result if equal pressure were applied over the entire surface of the package which is exposed in the open end of the pocket.

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

1. In a package-filling machine, a flexible conveyer, a series of pockets attached thereto adapted to receive containers, a wheel rotatable in a vertical plane located near each end of the machine over which said conveyer runs, whereby, during a portion of their movement through the machine, the open end of said pockets is uppermost, and during the remainder of their movement said pockets are reversed, a device for delivering material into said containers, and mechanism for jolting said pockets, in combination with a plunger for leveling the top of said material, gum-rolls on said plunger, end folding and closing devices for said container, and means for applying endwise pressure to the latter, substantially as described.

2. In a package-filling machine, a track, a series of pockets for receiving suitable containers adapted to run on said track at equal distances apart, devices for delivering material into said containers, devices for jolting said pockets, a plunger adapted to enter the open end of said containers, gum-rolls on said plunger, means for infolding the end of said container to close the latter, and for applying and maintaining pressure thereon until said container leaves said pocket, combined with mechanism for moving said pockets intermittently, substantially as described.

3. In a package-filling machine, a series of pockets of fixed dimensions and adapted to receive a suitable container, adapted to move through the machine from one end thereof to the other in one plane, and to return in a lower plane, means for delivering material into said containers, mechanism for gumming and sealing the open end of the latter during their movement in said first plane, combined with mechanism for shifting said pockets in a circular path from one of said planes to the other and for retaining said containers therein under endwise pressure during the reversal of the pockets consisting of oppositely-swinging arms for closing over the end of the pocket, and means for imparting movement to said arms radially of said circular path, substantially as described.

4. The combination in a package-filling machine comprising a series of pockets for receiving suitable containers traveling step by step through the machine, of devices for delivering material into said containers, mechanism for gumming and sealing the open end of the latter, means for shaking or jolting said pockets, prior to the sealing of the containers, consisting of a series of gears whose peripheries intersect the line of movement of the bottom of said pockets, whereby a tooth of said gears will lift a pocket and drop it onto the succeeding tooth, and means for rotating said gears, substantially as described.

5. The combination in a package-filling machine comprising a series of pockets for receiving suitable containers, traveling step by step through the machine, mechanism for delivering material into said containers, means for gumming and sealing the open end of the latter, mechanism for shaking or jolting said pockets, prior to the sealing of the containers, consisting of a series of gears whose peripheries intersect the line of movement of the bottom of said pockets, whereby a tooth of said gears will lift a pocket and drop it onto the succeeding tooth, a driving mechanism for rotating said gears, and devices for adjusting them to lift said pockets more or less, substantially as described.

6. The combination in a package-filling machine comprising a series of pockets for receiving suitable containers traveling step by step through the machine, mechanism for delivering material into said containers and means for gumming and sealing the open end of the latter, mechanism for shaking or jolting said pockets, prior to the sealing of the containers, consisting of two groups of gears whose peripheries intersect the line of movement of the bottom of the pockets, whereby a tooth of said gears may lift a pocket and drop it onto the succeeding tooth; a driving mechanism for said gears, and means of adjustment for each of said groups independently, substantially as described.

7. In a package-filling machine comprising a series of pockets traveling through the machine, a conveyer-belt to which said pockets are attached at regular intervals, wheels for said conveyer rotatable in a vertical plane at each end of the machine, a series of pocket-engaging rotating arms located each side of the path of said pockets, and whose axis is the conveyer-wheel shaft, means for effecting the registration of said arms with the pockets in passing around said wheel, and for moving said arms into a position engaging opposite sides of the pockets and covering the open end of the latter, and mechanism for moving said arms radially, for the purpose described.

8. In a package-filling machine a series of pockets traveling through the machine horizontally, in one direction with their open ends uppermost, and in the opposite direction in a lower plane, in a reversed position; a circular path for said pockets from one plane of movement to the other, and a series of pocket-grasping rotatable arms arranged in pairs one on each side of said path and adapted to swing into engagement successively with said pockets, to support them during their movement in said circular path from the upper to said lower plane, substantially as described.

9. In a package-filling machine comprising a series of pockets of fixed dimensions traveling through the machine with a step-by-step movement, horizontally, in one direction with their open ends uppermost, and in the opposite direction in a reversed position and in a lower plane; tracks for supporting said pockets in their upper and lower horizontal planes of movement and from one of said planes to the other at one end thereof; arms for grasping said pockets and supporting them in radial position during their movement from the opposite ends of said upper plane to said lower plane of movement, and mechanism for effecting the withdrawal of said arms from said pockets on said lower plane, substantially as described.

10. In a package-filling machine, a series of pockets adapted to move in a path comprising two horizontal portions, one over the other, and two circular end portions uniting said horizontal portions; a substantially continuous track along the uppermost horizontal portion and around one end portion of said path; means, consisting of arms pivotally supported on each side of the pocket and having a swinging movement transversely to the movement of the pocket for engaging the latter before it enters the circular end portion of its path, for carrying said pockets around the trackless portion of said path, and whereby they are inverted; a second track along the lower horizontal portion of said path, on which track said pockets are suspended in inverted position, said second track being below the end of the circular portion of the track and extending beyond it, and means for holding said pockets to said tracks, substantially as described.

11. In a package-filling machine, a plurality of pockets for receiving suitable containers having a step-by-step movement through the machine, means for delivering material into said containers, a vertically-moving plunger adapted to enter the latter to compress said material, rolls carried on said plunger adapted to gum end portions of said container, pinions on said rolls, a vertical rack in the path of movement of said pinions, and out of engagement therewith when said plunger is in its elevated position, means for gumming said rolls, fingers for infolding the gummed portions of said containers, arms for grasping said pockets, pressing down said end portions of the container against the material therein, and closing the open end of said pockets during a part of their movement through the machine, substantially as described.

12. The combination in a package-filling machine comprising a series of pockets for receiving suitable containers moving step by step through the machine, devices for delivering material into said containers, of a vertically-moving plunger for compressing said material, gum-rolls on said plunger for gumming two oppositely-located end portions of said container, means for imparting to said rolls a rolling frictional contact in a line contrary to the movement of the plunger, gum-boxes movable toward and from said plunger for applying gum to said rolls prior to the gumming movement of the latter, folding-fingers movable toward and from the open end of the container and swinging inwardly to fold two oppositely-located gummed portions of the latter, and arms for folding other portions over said gummed portions and for applying continuous pressure thereto, during the movement of said containers through a part of the machine, substantially as described.

13. The combination, in a package-filling machine comprising mechanism for delivering material into a container and mechanism for gumming and folding end-closing portions of the latter to close the end thereof, of devices, following the operation of the folding mechanism, for contracting said container at a point below the top thereof whereby material therein may be forced against said end-closing portions, substantially as described.

14. The combination, in a package-filling machine comprising mechanism for delivering material into a container and mechanism for gumming and folding end-closing portions of the latter to close the end thereof, of devices, following the operation of the folding mechanism, for applying lateral pressure to opposite sides of said container between its ends, whereby material therein may be forced against the end-closing portions thereof, substantially as described.

15. The combination, in a package-filling machine comprising mechanism for delivering material into a container and mechanism

for gumming and folding end-closing portions of the latter to close the end thereof, of devices, following the operation of the folding mechanism, for applying a yielding lateral pressure to said container between its ends whereby material therein may be forced against said end-closing portions, substantially as described.

16. The combination, in a package-filling machine comprising mechanism for delivering material into a container and mechanism for gumming and folding end-closing portions of the latter to close the end thereof, of a device, following the operation of the folding mechanism consisting of a member adapted to move toward and from the side of the container and to yield in the line of its movement under a given pressure, whereby said side of the container may be pushed inward between its ends to force the material therein against said ends, substantially as described.

17. In a package-filling machine, a pocket of fixed dimensions having one open end for receiving a container, mechanism for gumming and folding end-closing portions on said container for closing the same, and package-compressing mechanism comprising a flexible member on opposite inner sides of the pocket, plungers bearing on said flexible members, cam-rails, and a spring between said plungers and cam-rails, and means for moving said pocket between said cam-rails, substantially as described.

18. In a package-filling mechanism, a pocket of fixed dimensions having one open end for receiving a container, and mechanism for compressing said container comprising a flexible member on the inner wall of said pocket, and secured to the latter by one end thereof, a plunger adapted to bear on said member, and means for moving said plunger against said member, substantially as described.

19. In a package-filling mechanism, a pocket of fixed dimensions having one open end for receiving a container, and mechanism for compressing said container laterally comprising two flexible members on opposite inner walls of the pocket, and secured by one end to the latter, endwise-yielding plungers adapted to bear on said flexible members, approximately midway between the ends thereof, and means for moving said plungers toward said members, substantially as described.

20. The combination in a package-filling machine comprising a pocket for receiving a container, mechanism for gumming end-closing portions on said container, mechanism for folding said portions comprising a pair of arms adapted to swing over said pocket in the plane of the folding-lines of said end-closing portions; of devices for contracting said container between its ends, consisting of oppositely-located flexible plates in the inner walls of said pocket, and means on said arms adapted to force said plates against the container, whereby pressure against the end-closing portions of the container may be effected by the movement of the material therein toward the ends of said container, substantially as described.

21. In a package-filling machine, a pocket for receiving a container having end-closing portions thereon; means for filling said container and gumming said end-closing portions; folding-arms closing over the latter and constituting an abutment against which said gummed end portions may be forced by the movement of material in said container thereagainst, and means for moving said material, substantially as described.

22. In a package-filling machine, a suitable pocket having fixed dimensions and adapted to receive a container, means for closing the end of said container, and mechanism for forcing a part of the material therein against said end after the closure thereof, substantially as described.

23. In a package-filling machine, a suitable pocket having fixed dimensions for receiving a container, combined with means for closing the open end of said container and devices actuated by the operation of said end-closing means for forcing a part of the material therein against said end after the closure thereof, and with predetermined pressure, substantially as described.

24. In a package-filling machine, mechanism for filling a container, devices for closing and sealing an open end of the latter, whereby an abutment is provided for said end, and mechanism acting after the sealing of the container for reducing the cross-sectional area of the package at a point between said sealed end and the opposite end thereof, whereby the contents of the container may be forced against the sealed end, substantially as described.

25. In a package-filling machine, means for shaking down the contents of a container consisting of a series of gears whose peripheries intersect the line of movement of said containers through the machine, whereby a tooth of said gears will lift a container and drop it onto the succeeding tooth, combined with means for moving said container, and means for rotating said gears, substantially as described.

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