No. 607,472.

Patented July 19, 1898.

F. H. RICHARDS.

BOX FILLING MACHINE.

(Application filed Nov. 26, 1897.)

(No Model.)

6 Sheets--Sheet 1.

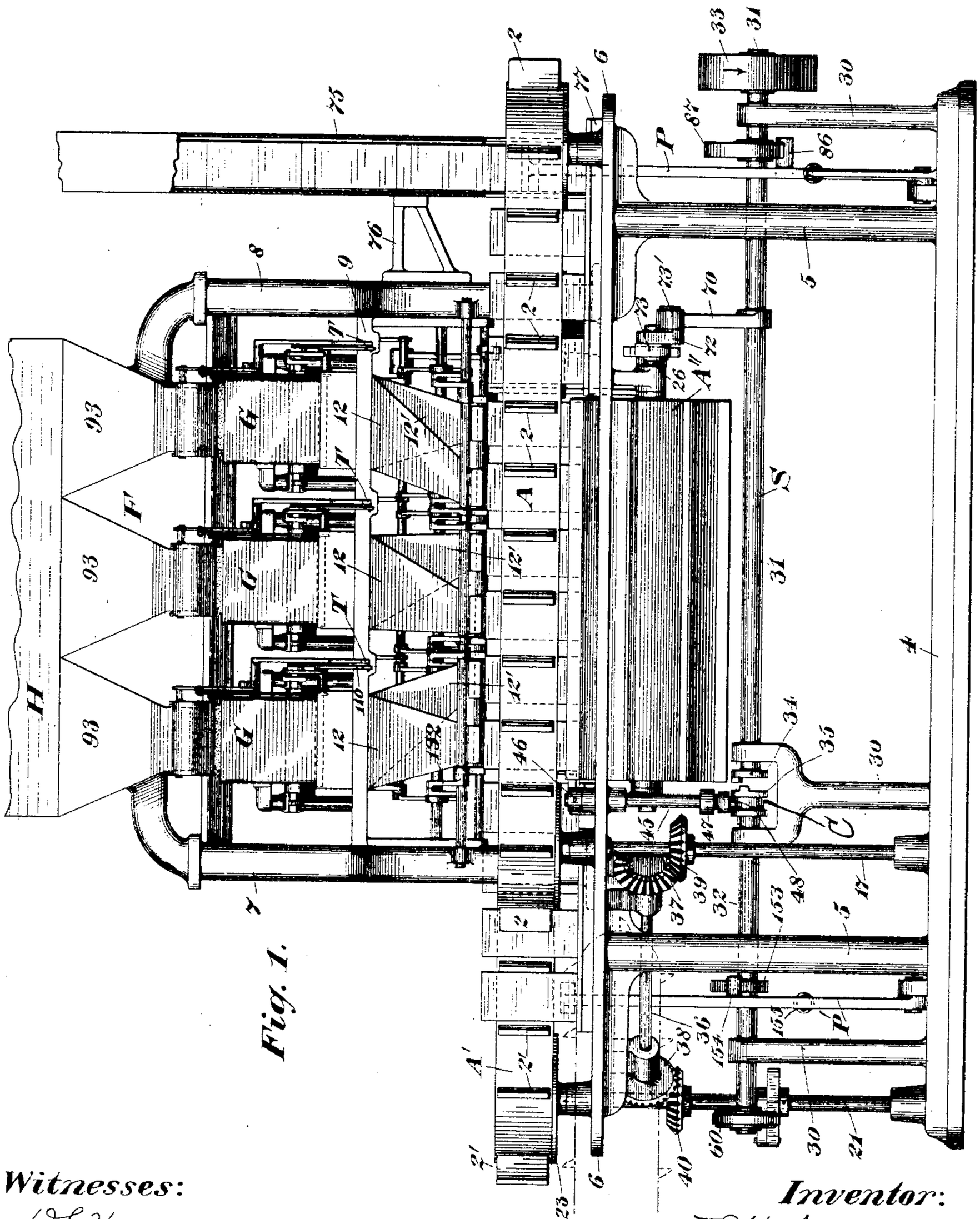

Fig. 1.

Witnesses:
D. S. Hawkins
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Inventor:
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Fig. 2.

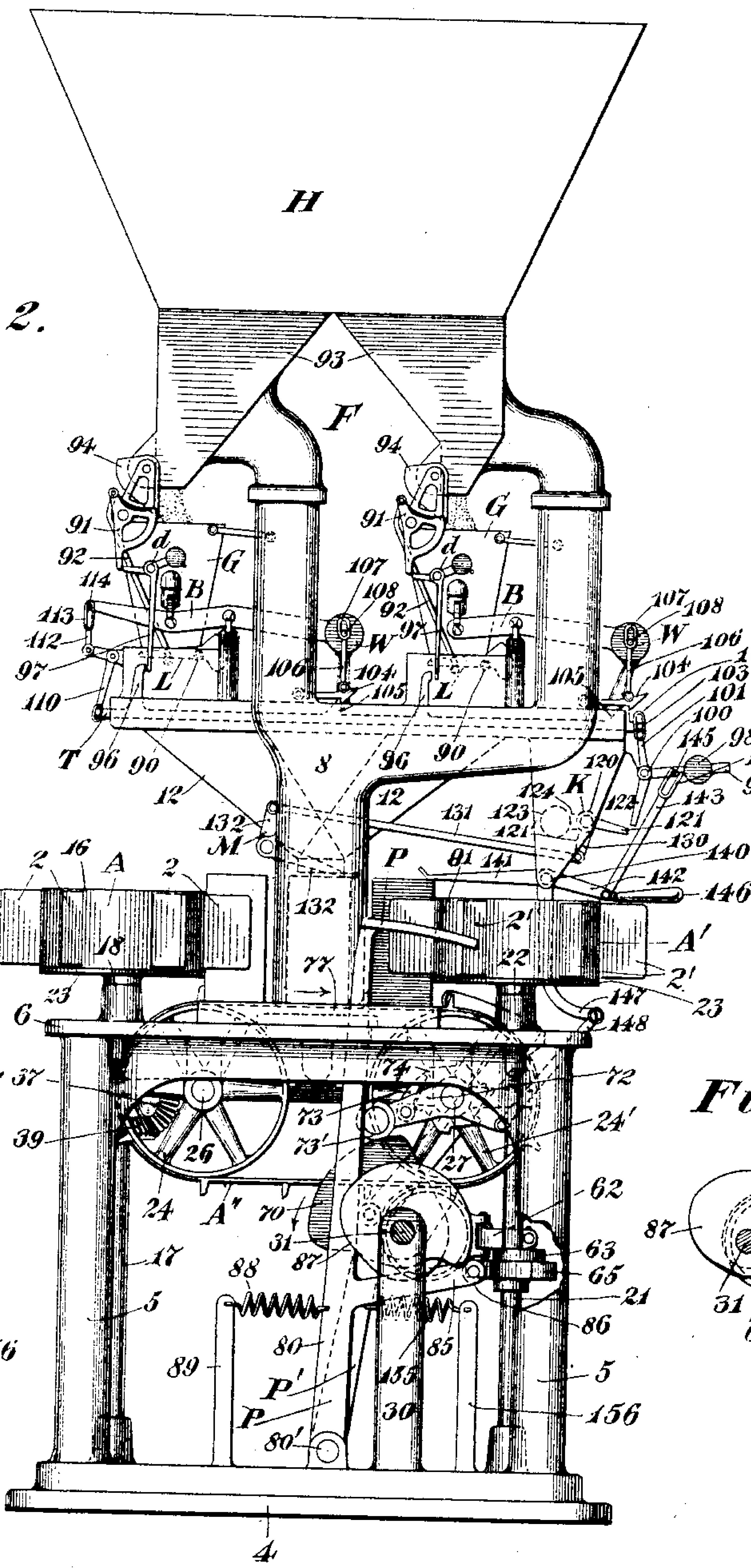


Fig. 11.

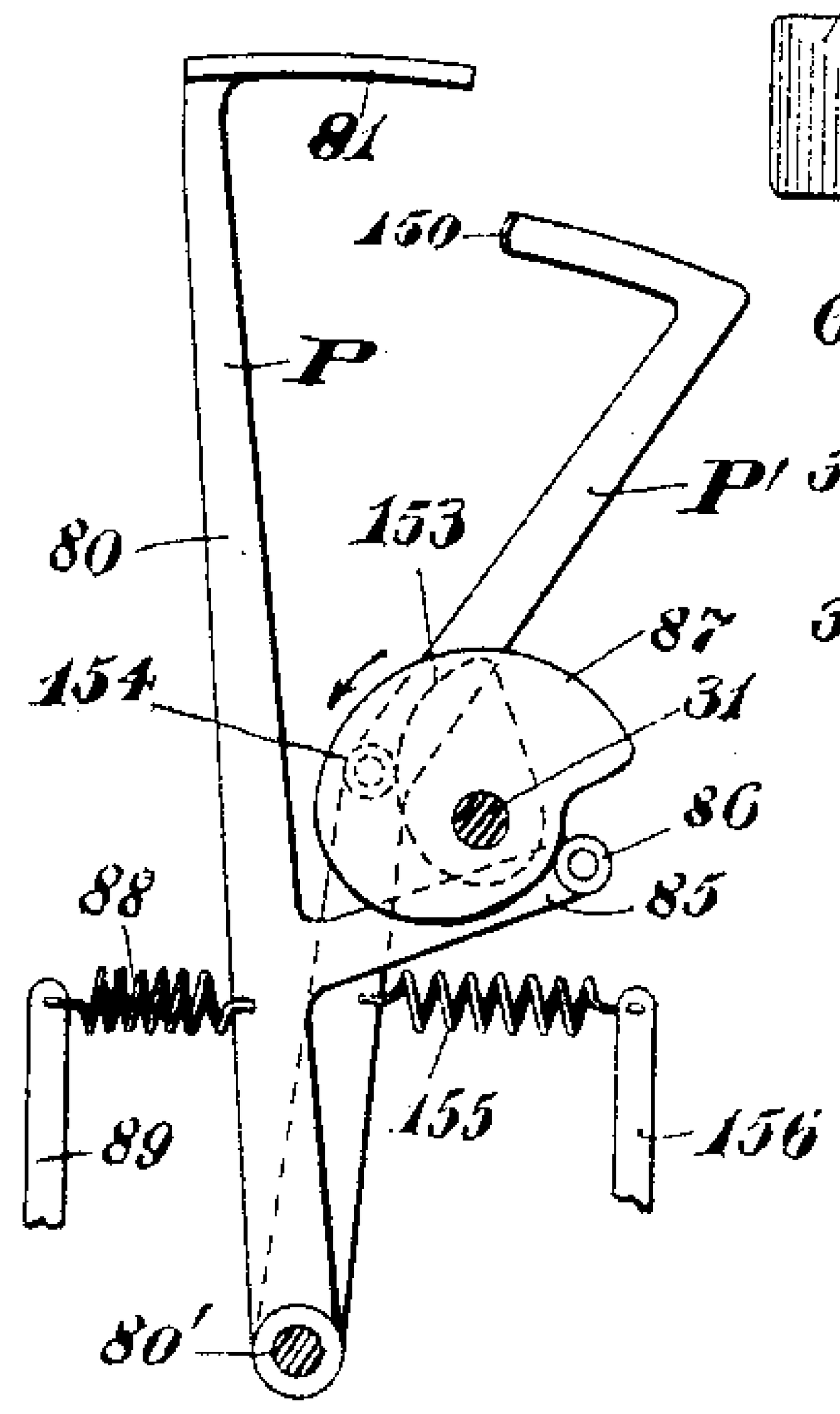
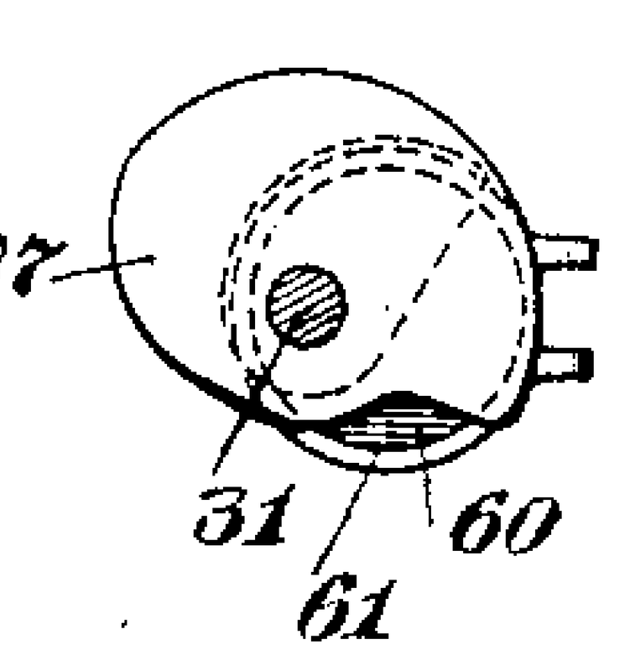


Fig. 12.



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6 Sheets—Sheet 3.

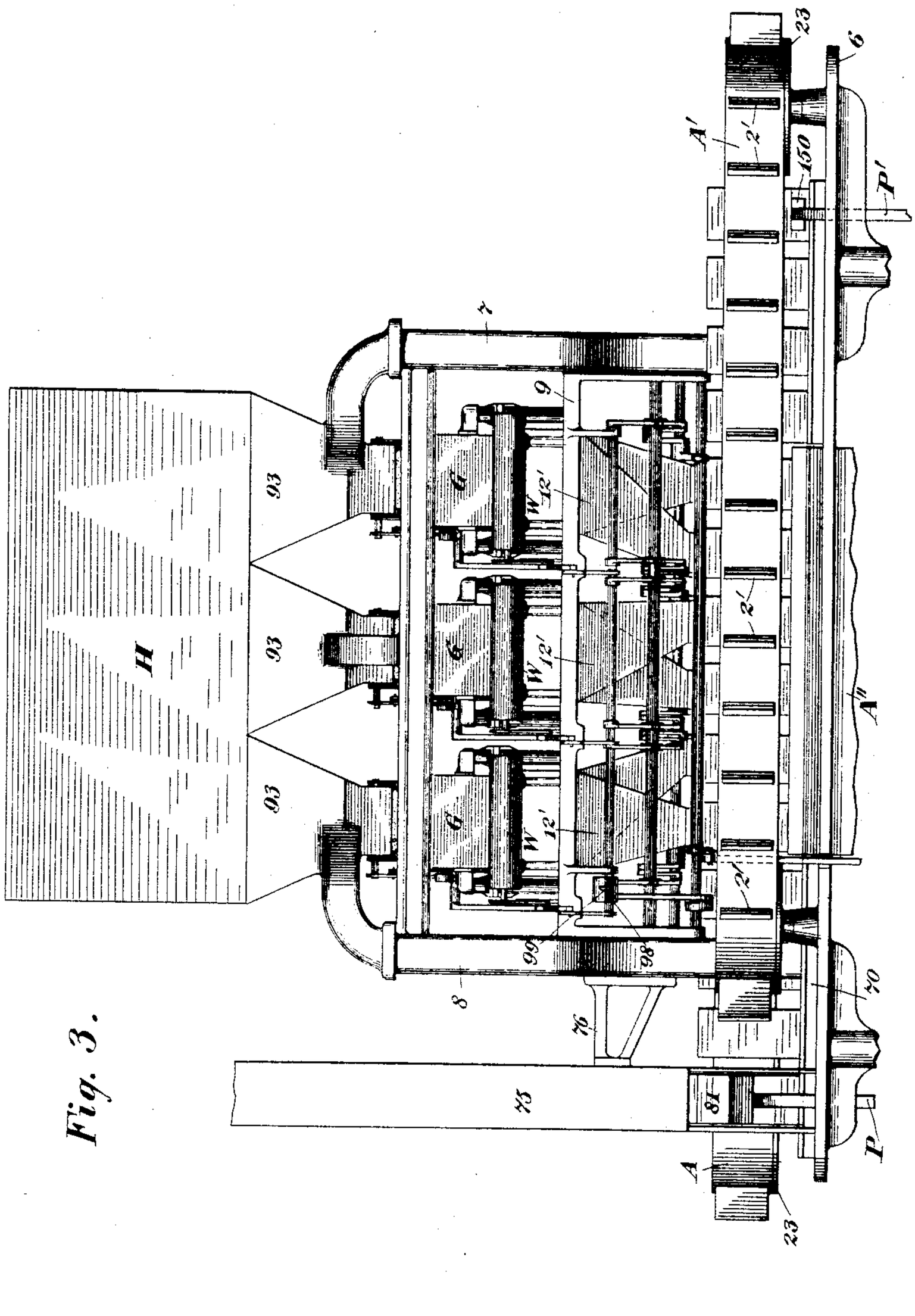

Fig. 3.

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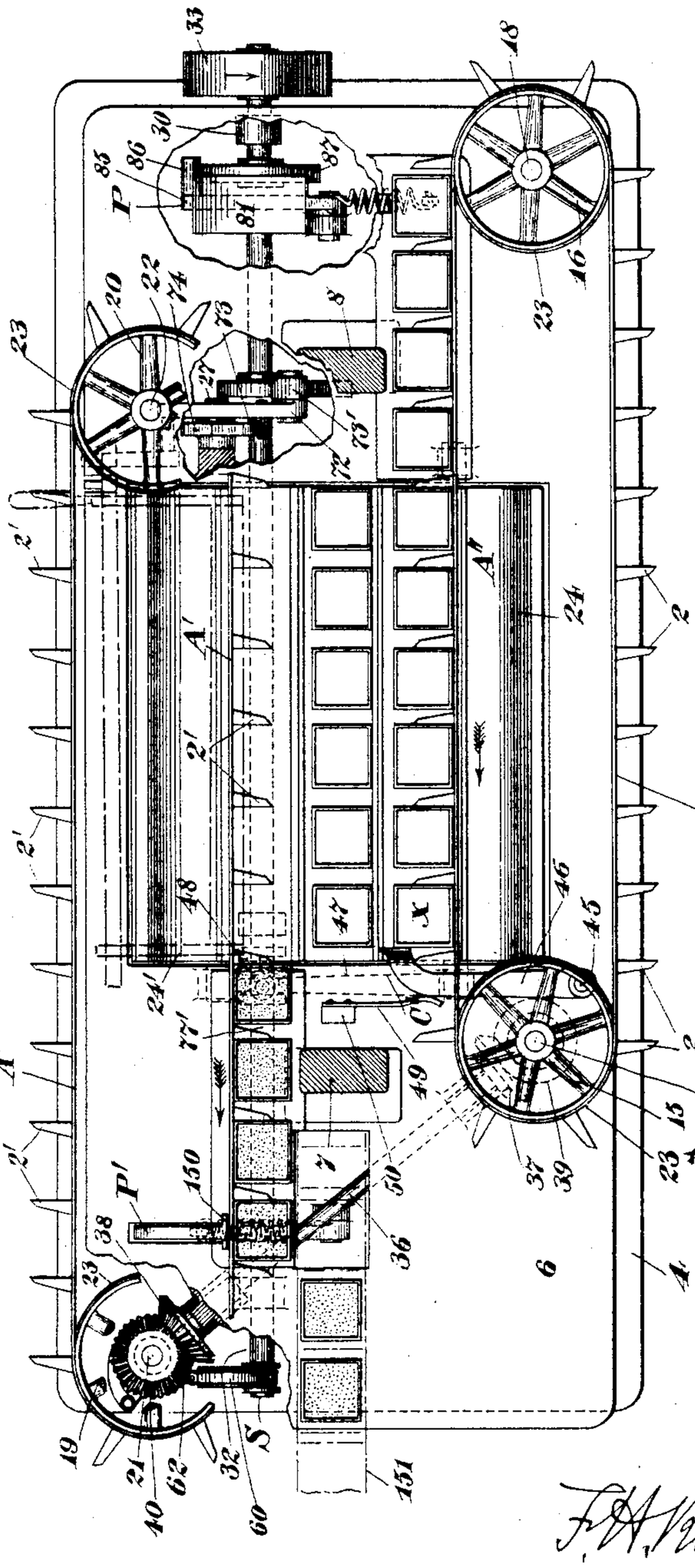
(No Model.) 6 Sheets—Sheet 4.

Fig. 4.



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(No Model.) 6 Sheets—Sheet 5.

Fig. 5.

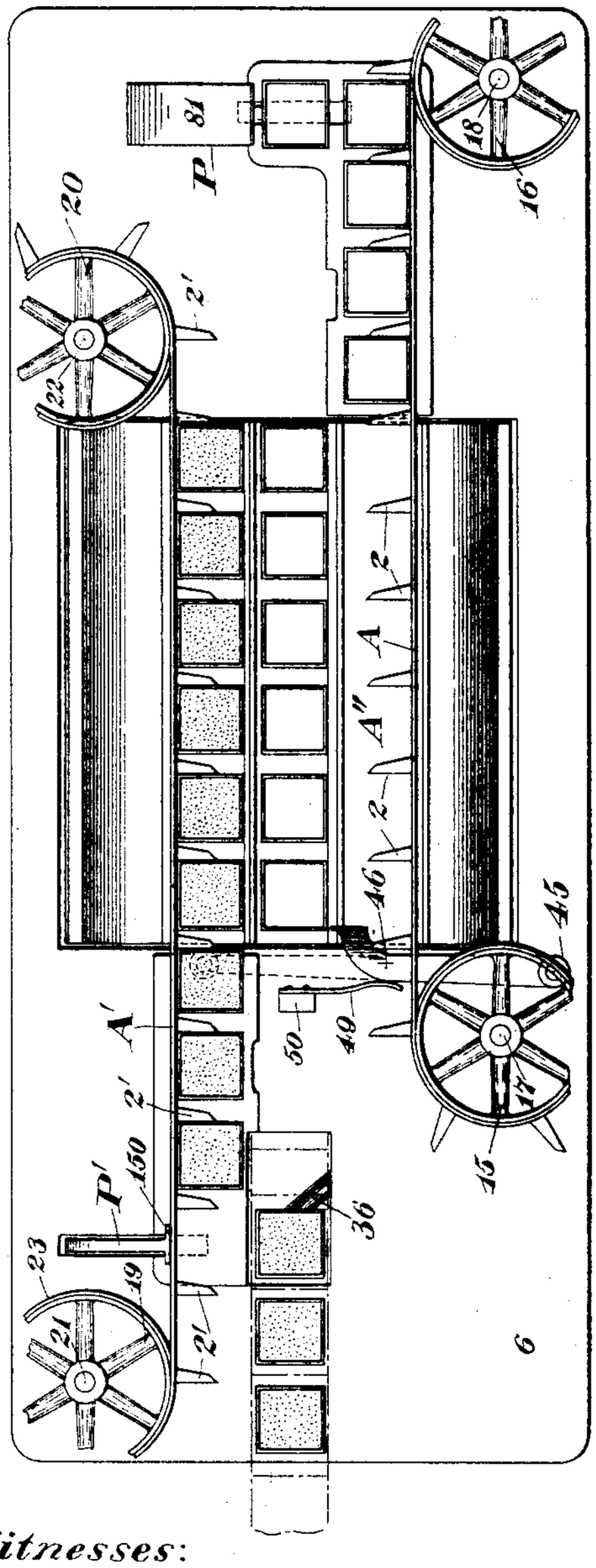
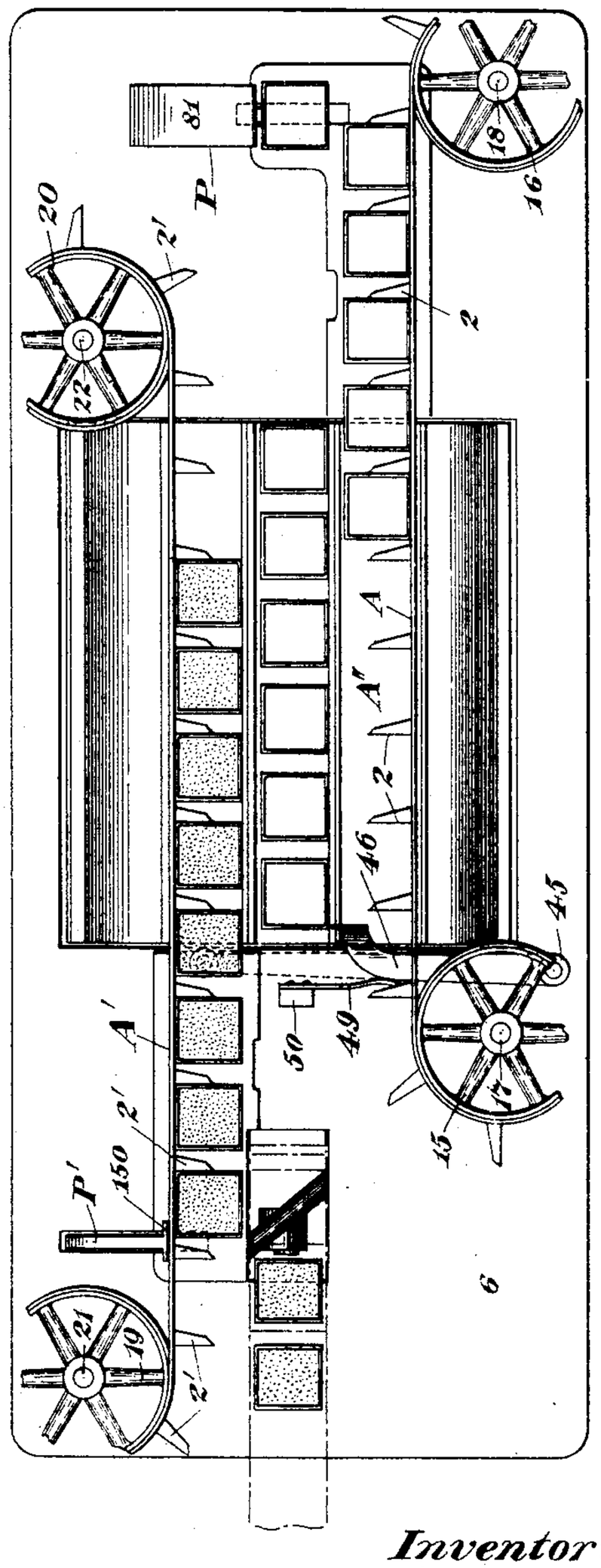


Fig. 6.



Witnesses:

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BOX FILLING MACHINE.

(Application filed Nov. 26, 1897.)

(No Model.) 6 Sheets—Sheet 6.

Fig. 9.

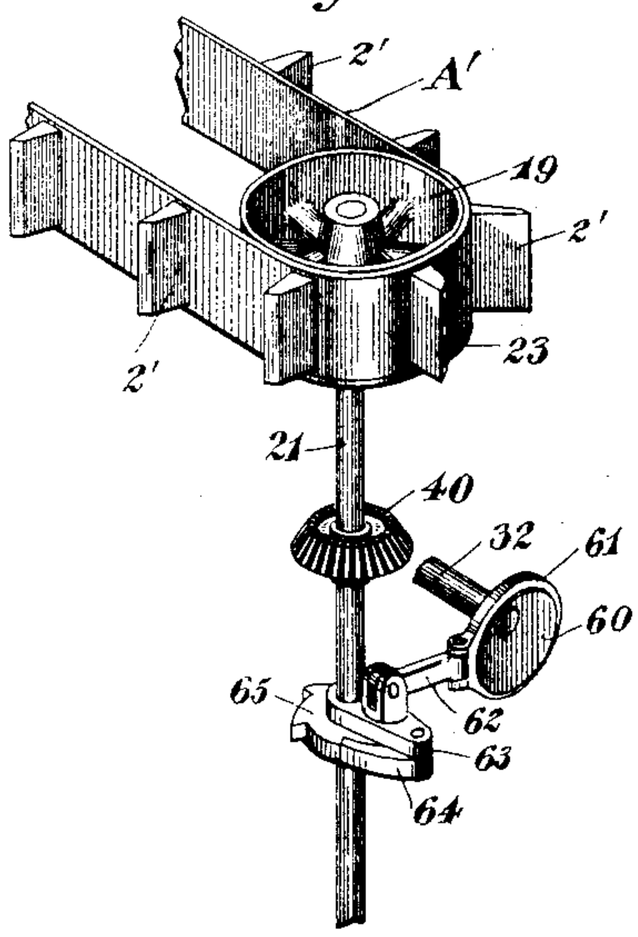


Fig. 10.

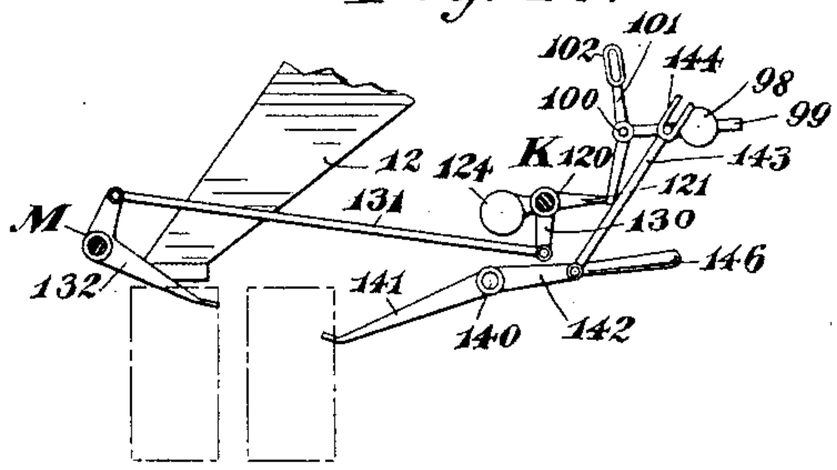


Fig. 7.

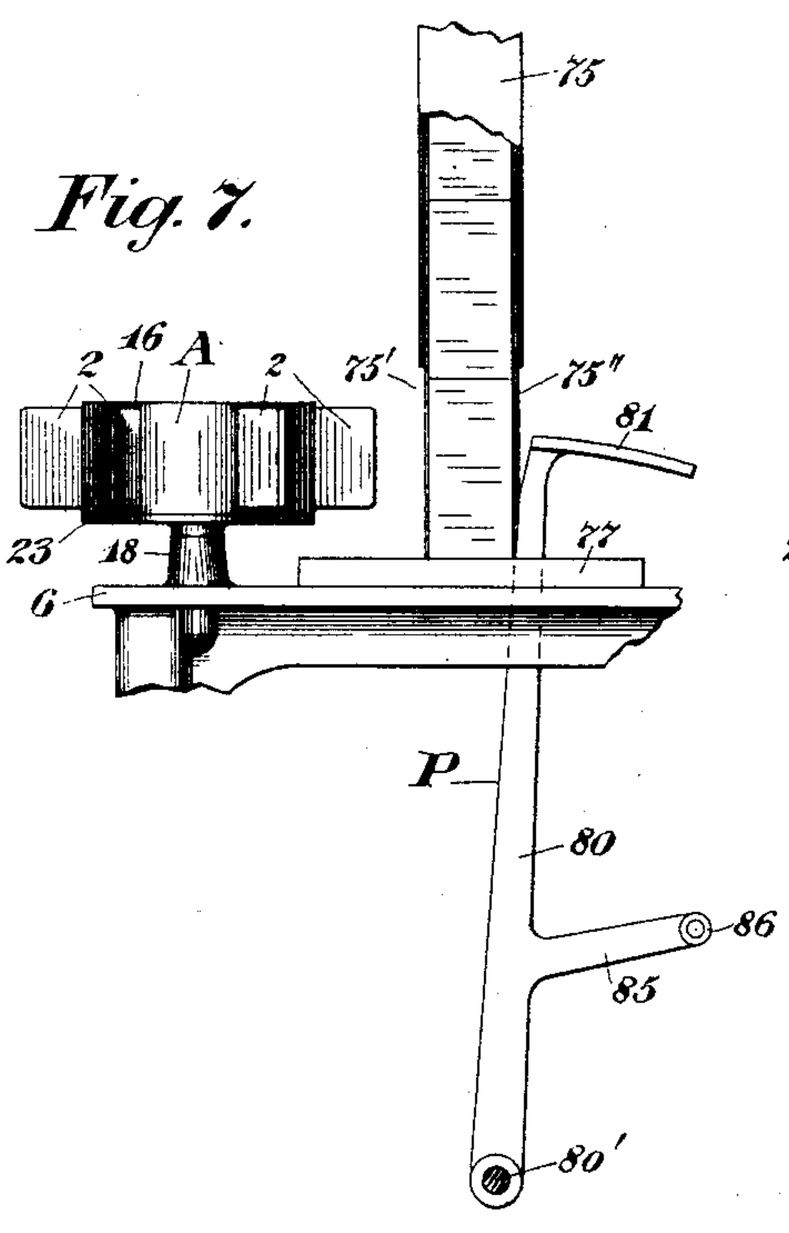
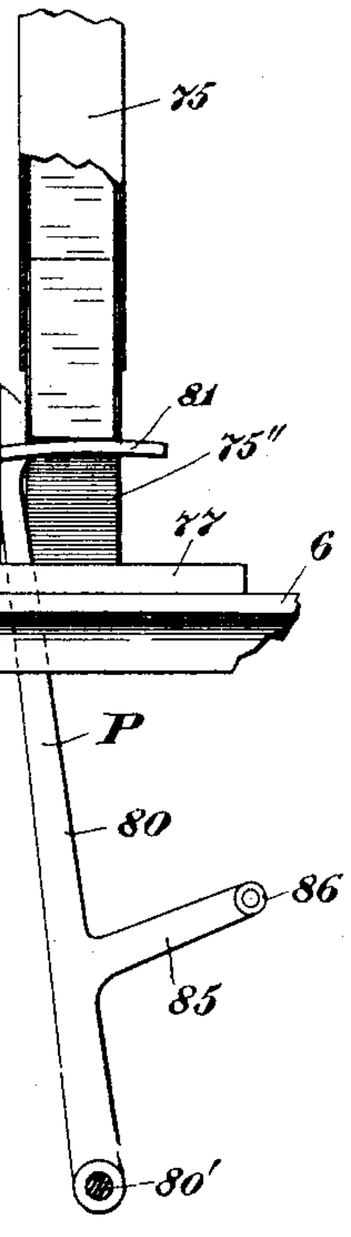


Fig. 8.



Witnesses:
D. S. Hawkins.
Fred. J. Dole.

Inventor:
F. H. Richards.

UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

BOX-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 607,472, dated July 19, 1898.

Application filed November 26, 1897. Serial No. 659,836. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Box-Filling Machines, of which the following is a specification.

This invention relates to box-filling machines, and more particularly to an automatically-operated machine adapted for filling boxes with predetermined charges of material and for removing the boxes when filled, the apparatus constituting a combined box filling and transferring machine for advancing an empty box or boxes into position to receive material from the filling means and then shifting the filled box or boxes away from said position; and said invention is in the nature of an improvement upon the machine covered by my contemporaneously-pending applications, Serial Nos. 655,736 and 659,839, filed, respectively, October 19 and November 26, 1897.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of my improved box filling and transferring machine. Fig. 2 is an end elevation of the machine as seen from the right in Fig. 1. Fig. 3 is a rear elevation of the same. Fig. 4 is a plan view of the box-transferring mechanism. Figs. 5 and 6 are similar views with certain of the parts removed. Figs. 7 and 8 are end elevations of the box-supplying means and a box-pusher, showing the latter in its retracted and advanced positions, respectively. Fig. 9 is a perspective view of part of the driving means for one of the feeders. Fig. 10 is an elevation of the load-discharge-controlling means. Fig. 11 is an elevation of the box-pusher and its operating means, and Fig. 12 is a similar view of the pusher-actuating cams and an eccentric constituting part of the feeder-driving means.

Similar characters designate like parts in all the figures of the drawings.

It should be understood that the term "box" herein is intended to cover all kinds of vessels or receptacles adapted to contain material and suitable for use in connection with a machine of this character.

My improved machine includes two main parts—viz., box-filling means and box-transferring means—and in connection with these main mechanisms suitable auxiliary and controlling devices are provided for regulating the movements of the box-filling and box-transferring means, so that they will operate in the proper manner.

The box-filling means comprises, preferably, a plurality of separately-operated weighing mechanisms, six of which are illustrated in the present case and are designated in a general way by F. These weighing mechanisms are substantially the same in construction and operation as that illustrated in Letters Patent No. 548,840, granted to me October 29, 1895, to which reference may be had, so that a specific description thereof is not necessary, except so far as may be demanded for a clear understanding of the manner in which said mechanisms coöperate with the box-transferring mechanism.

The machine includes, preferably, two simultaneously-operable box-advancing conveyers, such as A and A′, and an alternately and transversely operable box-shifting feeder adapted to convey a box from the box-conveyer A to the box-conveyer A′. The two box-advancing conveyers may be connected for simultaneous movement by suitable mechanism, hereinafter more particularly described, and each consists, preferably, of an endless traveling belt provided with a series of blades 2 and 2′, respectively, between which the boxes may be placed and carried forward by the two conveyers, the directions of the movement of which are indicated by the arrows in Fig. 4.

The box-shifting feeder that is designated by A″ consists, preferably, of an endless belt or apron of a width preferably to accommodate six boxes.

The framework for supporting the different parts of the machine consists of a base or bed 4, series of posts, as 5, rising therefrom, the platform 6, the uprights 7 and 8, supported upon the platform, and the bin or hopper H, joined to the uprights 7 and 8.

The weighing mechanisms are mounted upon the shelves 9, extending between the uprights 7 and 8. In the present case six weighing mechanisms are shown arranged in two rows of three each facing each other, and

the load-receivers G of the several weighing mechanisms may discharge their contents through the discharge-spouts 12 and 12′, respectively, the delivery ends of said spouts being in alinement longitudinally of the machine, as shown in Fig. 2, and being disposed at substantially equal distances apart.

The endless supply-conveyer A is carried around the pulleys 15 and 16 on the shafts 17 and 18, and the discharge-conveyer A′ is carried around the pulleys 19 and 20 on the shafts 21 and 22, the shafts 17 and 18 constituting the power-shafts. The shafts 17, 18, 21, and 22 are vertically disposed, and to hold the several endless conveyers in place on the carrying-pulleys 15, 16, 19, and 20 the latter are flanged, as at 23, along their under sides. The transfer-feeder A″ is carried by the drums 24 and 24′, whose horizontal shafts 26 and 27 are supported by suitable hangers depending from the platform 6.

The empty boxes are supplied by suitable means successively into the spaces between the blades 2 on the supply-conveyer A, which operates intermittently to carry six of said boxes forward over the transfer-feeder A″. When the six boxes are in proper position, the transfer-feeder A″ will be operated to carry the empty boxes into position to receive a corresponding number of loads from the weighing apparatus F. When the boxes are loaded, the transfer-feeder A″ is operated to conduct them to and between the blades 2′ on the discharge-conveyer A′. When the filled boxes are properly located, the feed-conveyer A starts, and moving in the same direction as the discharge-conveyer A′ conducts the filled boxes from the belt A″ and successively places them on the platform 6.

The two conveyers A and A′ are driven from the shaft S, supported by bearings, as 30, on the bed 4, and said shaft consists of two sections, as 31 and 32, the shaft-section 31 being continuously driven, as by the pulley 33, connected by a belt with a prime motor. (Not shown.)

The shaft S carries a coupling device of suitable construction, which may be a clutch, as C, controlled by the feed of the boxes, their respective clutch-halves 34 and 35 being fixed to the clutch-sections 31 and 32. The clutch member 35 is slidable on the shaft-section 32, so as to be coupled to or uncoupled from its companion on the continuously-driven shaft-section 31. When the two parts of the clutch are coupled, the shaft-section 32 will be driven, and it serves through proper connections to operate the conveyers A and A′, the transfer-feeder A″ being operated intermittently from the continuously-driven shaft-section 31, as will hereinafter appear.

A short shaft is represented at 36, obliquely disposed and having bevel-gears 37 and 38 at its opposite ends, meshing with similar gears 39 and 40 on the shafts 17 and 21, respectively.

The shaft-section 32 is provided at one end with an eccentric 60, embraced by the ring or collar 61, to which the pitman 62 is pivoted, the pitman being likewise attached at its opposite end to the pawl-carrier 63, to which the spring-actuated pawl 64 is secured. The pawl 64 coöperates with the ratchet 65, fixed to the shaft 21. The carrier 63 is loose on the shaft, and it will be evident that on the rotation of the shaft 32 and eccentric 60 thereon the pawl 64 will be reciprocated to rotate the ratchet 65, and consequently the shafts 21 and 17, by virtue of the intermediate connections between said last-mentioned shafts.

When the two members of the clutch C are coupled and the pulley 33 is rotated in the direction of the arrow in Fig. 1, the adjacent or working runs of the conveyers A and A′ will be moved in the direction of the arrows in Fig. 4, the two members of the clutch being uncoupled when six boxes have been fed onto the transfer-belt A″ by the conveyer A, the uncoupling of the clutch being caused by the leading box.

The clutch-actuator is designated in a general way by C′, and consists of the vertical shaft 45, provided at its opposite ends with the crank-arms 46 and 47, the arm 47 carrying the stud 48, fitting in the usual groove on the clutch member 35. The crank-arm 46 is spring-actuated in one direction and box-actuated in the opposite direction.

A spring is represented at 49, fixed to the stop 50 on the platform 6, the free end of the spring bearing against the crank-arm 46, the spring serving to hold the clutch members 35 and 34 in engagement, so that the two conveyers A and A′ can be driven.

A series of empty boxes being placed in the spaces between the several blades 2 on the supply-conveyer A, said boxes will be carried forward and onto the transfer-belt A″, which at this time is at rest, until the leading box *x* (see Fig. 4) strikes the clutch-operating arm or lever 46, at which time the two members of the clutch will be uncoupled to stop the supply-conveyer A. On the stoppage of the supply-conveyer A the transfer-feeder A″ is started to convey the series of six boxes into position to receive the loads from the filling or weighing apparatus F, the movement of the transfer-belt being stopped when the several boxes are in their load-receiving positions, as shown in Fig. 4. When the leading box passes out of contact with the clutch-operating lever 46, the two members of the clutch can be instantly coupled in the manner set forth to supply six empty boxes by means of the supply-conveyer A to the transfer-belt A″.

The transfer-feeder A″ is preferably operated from the continuously-movable shaft-section 31. The shaft-section 31 is provided with the cam 70, constituting a convenient driver for operating the transfer-conveyer, it being effective for transmitting its power through interposed mechanism controlled by the feed of the boxes to the transfer-conveyer A″ to effect the movement of a series of boxes

from the supply-conveyer A to the discharge-conveyer A′, the boxes being filled at a point intermediate their two positions and while on the supporting and transfer feeder A″.

The shaft 27 is loosely embraced by the rocker 72, to which the actuating-pawl 73 is pivoted, the pawl being coöperative with the ratchet 74, fixed to said shaft. The rocker 72 is gravitative when released into the path of the cam 70 and is held beyond the range of action of said cam by means controlled by the filled boxes when in the spaces between the blades 2′ of the conveyer A′, so as to prevent the working movement of the transfer-belt. When, however, the filled boxes are conducted from the transfer-belt A″, the rocker 72 can drop, and the cam 70 being in motion the working face thereof will engage the anti-friction-roll 73′ on the rocker 72 to elevate the latter, so that the pawl 73 is effective for rotating the ratchet 74, and consequently the shaft 27, thereby to drive the upper run of the belt A″ in the direction of the arrow in Fig. 2. When the transfer-belt has moved the proper distance, the rocker will be prevented from return movement until the filled boxes are displaced by the conveyer A′.

The empty boxes may be supplied to the conveyer A in any convenient manner, a gravity-chute 75 being represented for this purpose, and said chute is situated adjacent to the inner end of said conveyer and may be secured to the bracket 76 on the standard 8, as shown in Fig. 1, its lower end resting on the table 77, which is flush with the transfer-belt A″. The area of the chute 75 is slightly in excess of that of the boxes, so as to permit the latter freely to descend. The boxes are successively fed to the conveyer A by a pusher, as P, constructed to uphold the boxes in the chute and to which successive movements are imparted first to effect the release of an empty box and then to advance it between the blades 2 of the conveyer A. The front and rear walls of the chute 75 are removed, as at 75′ and 75″, to permit of the entrance therethrough of the pusher P, the latter being preferably reciprocatory to obtain the function set forth. The pusher consists in the present case of a bar 80, pivoted at 80′ below the continuously-driven shaft-section 31 and provided with the transverse head 81, which, as represented in Fig. 8, is adapted to support the empty boxes in the chute 75. On the retraction of the pusher P beyond or out of the chute 75, as indicated in Fig. 7, an empty box can drop onto the table 77, and on the opposite action of said pusher said box will be fed into a space between two of the blades on the conveyer A, as shown in Fig. 8, and these operations will continue so long as the pusher is in operation. The pusher is operated oppositely preferably by a cam and a spring, the cam in the present case serving to retract said pusher and the spring to advance it. The bar 80 has the laterally-projecting arm 85, carrying the antifriction-roll 86, adapted to be engaged by the working face of the cam 87, secured to the continuously-operative shaft-section 31, and on the rotation of the cam in the direction of the arrow, when the pusher is in its advanced position, as illustrated in Fig. 11, said pusher will be retracted, as shown in Fig. 7, so as to permit an empty box to descend to the table 77. When the effective portion of the cam 87 passes out of contact with the roll 86, the pusher will be advanced by a spring, as 88, to slide the empty box on the table 77 into a space between two of the blades of the conveyer A, as shown in Fig. 8. The spring 88 is a coiled one, and it is attached, respectively, to the pusher-bar 80 and the post 89 on the bed 4 of the machine.

As hereinbefore stated, the box-filling means consists, preferably, of one or more weighing mechanisms the discharge of which is controlled by the placing of a box in position to be filled, and the load-receivers G of the several weighing mechanisms include closers, as L, constituting load-dischargers, the closers being pivoted to the respective load-receivers, as at 90, and being held in their shut positions by gravitative latches, as *d*, pivoted upon the load-receivers in a manner common in this art. The latches engage the rockers 91, pivoted to the respective load-receivers and connected by rods 92 with the closers. On the disengagement of the several latches *d* from the corresponding rockers 91 the several closers will be released and can be forced open by the loads in the several load-receivers, which are simultaneously discharged into the spouts 12, and subsequently into a row of empty boxes on the transfer-belt A″ beneath the delivery ends of said spouts.

The load-receivers G are supported upon counterweighed scale-beams B in a well-known manner, the latter being counterweighted, as at W, and fulcrumed upon the framework of the machine, as is customary.

The hopper or bin H has two rows of supply-spouts, as 93, adapted for delivering streams of material into the respective load-receivers, the supply of material being controlled by the valves 94, one for each spout, and said valves may be operated in a manner substantially like that shown in the Letters Patent to which I have hereinbefore referred.

The several load-receivers are simultaneously dischargeable, this operation being insured in the present case by controlling the operation of the latch-trippers from the boxes. I preferably provide a series of three latch-trippers, as T, (see Figs. 2 and 3,) a tripper T being adapted to actuate the latches of two opposite machines, as shown in Fig. 2. The trippers consist of sliding bars supported for reciprocation in suitable guide-channels in the framing of the machine, adjacent to the latches, and they are provided with latch-operating fingers, as 96, (see Fig. 2,) adapted to engage the coöperative arms 97, secured to the latches. The actuator for the latches

may be of any suitable construction, it consisting in the present case of a weight 98, secured to a rock-arm 99 on the rock-shaft 100, carried by suitable bearings on the framework, said shaft being connected with the several trippers by means involving a slide-joint. The shaft 100 is provided at regular intervals with a series of three arms 101, terminating in loops 102, embracing studs 103 on the trippers T. The several trippers are preferably held under restraint by a series of gravity detents or catches, as 104, operated by one of the members of each weighing mechanism, as by the beams B. The catches 104 are pivoted to the framing of the machine and are adapted to engage the offsets 105 of the several trippers, as shown in Fig. 2, to hold the trippers T against operation by their actuator 98. A series of links, as 106, is pivoted to the several hooks of the catches 104, the links having at their upper ends the loops 107, embracing the studs 108 on the weights W of the several beams B, by reason of which construction the beams may have a certain amount of movement without tripping the catches. On the completion of all the loads all of the catches will be elevated by the beams, and when disengaged from the projections 105 on the several trippers the weight 98 is free to drop from its position shown in Fig. 2, and as it does so the trippers will be drawn to the right, thereby carrying the fingers 96 against the latch-arms 97 to disengage the latches from the rockers 91, whereby the closers are released and can be forced open by the several loads, the latter being discharged into the spouts 12 and by the latter directed into the empty boxes in line under the delivery ends of said spouts. The trippers T are released, it should be understood, as soon as the several catches 104 are disengaged from the corresponding projections 105 on said trippers; but the latter cannot be operated as set forth until the actuator 98 is released, said actuator being held against operation by a detent controlled by the placing of a series of empty boxes under the delivery ends of the spouts 12 by the feeder A″. On the discharge of the loads simultaneously by the several load-receivers the beam-weights drop, following which the several parts of the weighing mechanisms return to their primary positions to reload. The trippers T are preferably reset by the beam mechanism. A series of angle-levers, as 110, are pivoted at their angles on the framework, one of the arms of each being jointed to the tripper T, and the other arms thereof are pivoted to the links 112, having loops 113, embracing the pins 114 on the poising ends of the beams B, as shown in Fig. 2, by reason of which construction the beams can descend without affecting the tripper. When, however, the beams return to their primary positions, the links 112 are elevated and the trippers T are moved to the left until they are respectively engaged by the gravity-catches 104.

For holding the actuator 98 for the latch-tripper against action until a series of boxes is in proper position beneath the delivery ends of the spouts 12 I prefer to employ a series of detents equaling the number of boxes to be filled, the detent-releasing devices being operated by the respective boxes. The detents for holding the actuator 98 normally against operation are designated, respectively, by K, and they consist in the present case of angle-levers secured to the rock-shaft 120 on the framework, the arms 121 of said detent-levers being adapted to engage a corresponding series of arms 122 on the rock-shaft 100, (see Fig. 10,) the working arms 121 of the several detents being held in engagement with the arms on the shaft by a series of weights, as 123, secured to the arms 124 of the detents. When the detent-arms 121 are disengaged from the coöperating arms 122 and when the several catches 104 have been moved out of contact with the offsets or shoulders 105 on the three trippers T, the weight 98 can drop to effect the tripping of the latches *d*, as hereinbefore set forth. The arm 121′ of each of the detents is connected with a device operative by an empty box to effect the release of each of the arms 122, by reason of which the absence of a box under a spout 12 will not result in discharging the the load-receiver G. In other words, each box operates a detent-arm, and the actuator 98 is not released until all of the arms 121 are disengaged from the coöperating arms 122. The arms 121′ of the several detents K have pivoted thereto the links 131, pivoted to the arms 132 of the box-operated levers M, the arms 132 of the several levers being disposed in the path of the boxes on the transfer feed-belt A″. When a row of six empty boxes is advanced by the transfer-belt under the delivery ends of the spouts 12, the boxes will engage the free arms 132 of the levers M, thereby throwing the detent-arms 121, through the intermediate connections, out of engagement with the arms 122, as shown in Fig. 2. When the arms are thus disengaged and when the catches 104 are elevated, the trippers T, and consequently the tripper-actuator 98, are released, and the latter will drop, and as it does so it will draw the several trippers to the right, and the operating-fingers 96, actuating against the latch-arms 97, will disengage the several latches from the rockers 91, so as to effect the discharge simultaneously of the six loads into the row of boxes under the spouts 12.

Means are provided for stopping the operation of the transfer-belt A″ when a series of empty boxes have been fed under the delivery ends of the spouts 12, so as to hold the empty boxes under the several spouts a sufficient length of time to insure their being filled, and said means are preferably operated by the latch-tripping actuator 98.

A rock-shaft is shown at 140, having the gravitative yoke or frame 141 extending for-

wardly therefrom and in position to be upheld by a series of filled boxes, as represented in Fig. 2, and it also has the rock-arm 142, to which the rod 143 is pivoted, said rod being bifurcated, as at 144, and the bifurcation straddles the stud 145 on the actuator-arm 99. The arm 142 has the handle 146, the purpose of which will hereinafter appear. The shaft 140 carries the depending arm 147, to which the link 148 is pivoted, said link being likewise attached at its lower end to the rocker 72.

In Fig. 2 a series of filled boxes is shown under the free end of the frame 141 and upholding the latter. When the last of the boxes passes from under said frame, the latter drops, thereby elevating the rod 143 and carrying the under side of the bifurcation 144 against the stud 145, as shown in Fig. 2, and as said frame drops the rocker 72 is released and can gravitate into the range of the rotating cam 70, so as to be elevated by said cam, as hereinbefore specified, thereby effecting the operation of the transfer-belt A''. When the tripper-actuator 98 is released, as hereinbefore specified, and it falls, it forces the rod 143 downward and elevates the frame 141 and simultaneously lifts the rod 72 to the position shown in Fig. 2, a series of filled boxes in the interval having been fed under the frame 141, so that the latter is upheld to hold the transfer-belt A'' out of action. As the filled boxes are conducted from the transfer-belt A'' by the feed-conveyer A' they pass to the table 77', as shown in Fig. 4, and they may be ejected by a pusher, as P', (see Figs. 4 and 11,) consisting of an upright bar having the transverse head 150, adapted to successively engage the boxes as they are fed forward and push them from the spaces between the blades 2' onto a belt, as 151. (Shown only in dotted lines in Figs. 1, 4, 5, and 6.) The pusher P' may be operated, as is the pusher P, by a cam and spring, and it is preferably fixed to the shaft-section 32. The pusher P' is advanced by the cam 153 to successively force the filled boxes from the feed-conveyer A', said cam being adapted to engage the antifriction-roll 154 on the pusher, and the latter is retracted by a coiled spring, as 155, secured, respectively, thereto and to the post 156 on the bed 4.

In operation the feed-conveyer A will be supplied with empty boxes by the pusher P, working in the manner hereinafter set forth, which feeds the empty boxes from the supply-chute 75 into the spaces between the blades 2 of said conveyer, and the working run of the latter moving in the direction of the arrow the empty boxes will be advanced on the wide transfer-belt A'' until six of them are on said belt, at which time the leading box will have impinged against the clutch-operating lever 46 to stop the operation of the shaft-section 32 and of said conveyer A, as hereinbefore set forth. On the stoppage of the supply-conveyer A the handle 146 will be grasped by an attendant, and the frame, and consequently the rocker 72, will be lowered, so that the antifriction-roll 73' is forced into position to be operated by the rotating cam 70, by reason of which the pawl and ratchet 73 and 74, respectively, can move the upper run of the transfer-belt A'' in the direction of the arrow, (indicated in Fig. 2,) to carry the six empty boxes under the spouts 12. As soon as the leading box is carried out of contact with the clutch-lever 46 by the belt A'' the two shaft-sections 31 and 32 are instantly coupled by the spring 49 to advance a second series of six empty boxes. During this period of operation the loads in the several weighing mechanisms will have been completed and the catches 104 will have been raised by the beams, so that the three trippers T are released, and when the six empty boxes are positioned under the spouts 12 said boxes strike and elevate the fingers 132, so that the several detent-arms 121 are disengaged from the coöperating arms 122 on the actuator-shaft 100, by reason of which the actuator 98 can drop, thereby elevating the frame 141, as hereinbefore specified. When the boxes are filled, they are conducted forward by the transfer-belt A'' to the discharge-conveyer A', which moves them onto the table 77', from whence they are ejected onto the belt 151. When the boxes are filled, the frame 141 will be lowered so as to carry the roll 72' into position to be operated by the cam 71 to secure the operation of the transfer-belt A'' to conduct the filled boxes to the conveyer A'. As the six empty boxes are fed forward six filled boxes will be moved by the discharge-conveyer A' from the transfer-belt A'', at which time it is evident the latter is held against motion by the six filled boxes upholding the frame 141. When, however, the last filled box of the series just referred to has passed out of contact with the frame 141, the latter can drop to force the rocker 72 into position to be operated by the cam 70.

Having described my invention, I claim—

1. The combination, with a plurality of weighing mechanisms each including a load-receiver and a supporting scale-beam, of latches controlling the discharge of the loads; a tripper effective for simultaneously operating said latches; an actuator for said tripper; and catches for holding the tripper and operated by one of the members of the weighing mechanism.

2. The combination, with a series of load-receivers and their supporting-beams, of latches controlling the discharge of the loads; a tripper for simultaneously operating said latches; an actuator for the latch-tripper; and catches for holding the tripper and connected with the beams.

3. The combination, with a series of load-receivers each of which has a closer, of latches for holding the closer shut; a tripper effective for simultaneously actuating said latches; an actuator for the latch-tripper; catches for

holding the tripper; and scale-beams for supporting the load-receivers and connecting the catches for operating the same.

4. The combination, with a plurality of weighing mechanisms each including a load-receiver and a counterweighted supporting scale-beam; latches for controlling the discharge of the loads; a tripper effective for simultaneously operating said latches; an actuator for said tripper; and catches for holding the tripper and connected with weights, respectively, of the scale-beams for operation.

5. The combination, with a plurality of weighing mechanisms each including a load-receiver and a supporting scale-beam, of latches controlling the discharge of the loads; a tripper effective for simultaneously operating said latches; an actuator for said tripper; catches for holding the tripper and operated by one of the members of the weighing mechanism; and means for resetting said tripper.

6. The combination, with a plurality of weighing mechanisms each including a load-receiver and a supporting scale-beam, of latches controlling the discharge of the loads; a tripper effective for simultaneously operating said latches; an actuator for said tripper; catches for holding the tripper and operated by one of the members of the weighing mechanism; and means for resetting said tripper and operated by a member of said weighing mechanism.

7. The combination, with a plurality of weighing mechanisms each including a load-receiver and a supporting scale-beam, of latches controlling the discharge of the loads; a reciprocatory tripper operative on one stroke for simultaneously operating said latches; an actuator for imparting a working movement to said tripper; catches for holding the tripper and operated by one of the members of each of the weighing mechanisms; and independent means for returning the tripper to its primary position.

8. The combination, with a plurality of weighing mechanisms each including a load-receiver and a supporting scale-beam, of latches controlling the discharge of the loads; a tripper effective for simultaneously operating said latches; a gravitative actuator for said tripper; and catches for holding the tripper and operated by one of the members of each of the weighing mechanisms to cause the release of said tripper.

9. The combination, with a plurality of weighing mechanisms each including a load-receiver and a supporting scale-beam, of latches controlling the discharge of the loads; a tripper effective for simultaneously operating said latches; an actuator for said tripper; catches for holding the tripper and operated by one of the members of each of the weighing mechanisms to cause the release of said tripper; and connections between the tripper and a member of the weighing mechanism for resetting the tripper and involving a sliding joint.

10. The combination, with a plurality of weighing mechanisms each including a load-receiver and a supporting scale-beam, of latches controlling the discharge of the loads and each provided with an arm; a tripper provided with a series of fingers adapted to engage said arms; an actuator for said tripper; and catches for holding the tripper and operated by one of the members of each of the weighing mechanisms.

11. The combination, with a plurality of weighing mechanisms each including a load-receiver and a supporting scale-beam, of latches controlling the discharge of the loads; a tripper effective for simultaneously operating said latches; an actuator for said tripper; catches for holding the tripper and operated by one of the members of each of the weighing mechanisms; and a tripper-resetting lever connected, respectively, with the tripper and with a scale-beam.

12. The combination, with a plurality of weighing mechanisms each including a load-receiver and a supporting scale-beam, of latches controlling the discharge of the loads; a tripper effective for simultaneously operating said latches; an actuator for said tripper; gravitative catches pivoted to the framework and constructed for engaging and holding the tripper and operated by one of the members of each of the weighing mechanisms to effect the release of the tripper; a lever mounted on the framework and connected with the tripper; and a link pivoted to said lever and having a loop at one end embracing a stud on one of the scale-beams.

13. The combination, with a plurality of weighing mechanisms each including a load-receiver and a counterweighted scale-beam, of latches mounted on each load-receiver and controlling the discharge of the loads; a sliding tripper mounted on the framework and effective for simultaneously operating the latches; a counterweighted actuator for said tripper; pivoted catches for engaging and holding the tripper; a series of links connected, respectively, with the catches and their beam-weights, thereby to operate the latches to cause the release of the tripper; and means for resetting the tripper.

14. The combination, with a plurality of load-dischargers, of a device for effecting the simultaneous discharge of a series of loads; an actuator for said device; a detent normally operative for holding the actuator against operation; box-feeding means; and means operated by a series of empty boxes for causing the release of said actuator when said boxes are placed in their load-receiving positions.

15. The combination, with a plurality of load-dischargers, of a device for effecting the simultaneous discharge of a series of loads; an actuator for said device; a detent normally operative for holding the actuator against operation; box-feeding means; and a series of devices equaling in number the series of boxes to be filled and each operated by an

empty box, said last-mentioned devices when operated serving to cause the release of said actuator.

16. The combination, with a plurality of load-dischargers, of a device for effecting the simultaneous discharge of a series of loads; an actuator for said device; a series of detents for holding the actuator against operation; box-feeding means; and a series of devices corresponding in number and connected, respectively, with said detents, said devices being located for operation by a series of empty boxes when the latter are fed into position to receive their loads.

17. The combination, with a plurality of load-dischargers, of a device for effecting the simultaneous discharge of a series of loads; an actuator for said device; a series of detents for holding the actuator against operation; a series of spouts leading from the load-dischargers; a series of devices equaling in number and connected with the detents for operating the latter; and box-feeding means for supplying a series of empty boxes into position under said spouts to receive their loads, the empty boxes serving to actuate said detent-operating devices.

18. The combination, with a plurality of weighing mechanisms, of a device for effecting the simultaneous discharge of a series of loads; an actuator for said device; a detent normally operative for holding the actuator against operation; box-feeding means; and means operated by a series of empty boxes for causing the release of said actuator when said boxes are placed in their load-receiving positions.

19. The combination, with a plurality of load-dischargers, of a device for effecting the simultaneous discharge of a series of loads; an actuator for said device; means for effecting the release of said actuator at a predetermined point; a supply-conveyer constructed for supplying a series of empty boxes; an alternately-effective transfer-feeder for conducting the empty boxes into position to receive a series of loads; driving mechanism for said transfer-feeder; and means operated by said actuator for throwing the transfer-feeder out of action.

20. The combination, with a plurality of load-dischargers, of means for effecting the simultaneous discharge of a series of loads; a supply-conveyer constructed to supply a series of empty boxes; an alternately-effective transfer-feeder for conducting the empty boxes into position to receive a series of loads; driving mechanism for said transfer-feeder; and means for throwing the transfer-feeder out of operation with its driving mechanism when a series of empty boxes have been placed in their load-receiving positions.

21. The combination, with a plurality of load-dischargers, of a device for effecting the simultaneous discharge of a series of loads; supply and discharge conveyers constructed, respectively, for advancing a series of empty and filled boxes; a transfer-feeder effective for conducting a series of empty boxes from the supply-conveyer into position to receive charges of material and then to conduct the same to the discharge-conveyer; driving mechanism for said transfer-feeder; and means operated by the placing of a series of empty boxes in their load-receiving positions for throwing the transfer-feeder out of action.

22. The combination, with a series of simultaneously-effective box-conveyers, of an alternately-operable transfer-feeder adapted for conveying a series of boxes from one of the first-mentioned conveyers to the other; box-filling means; a member loosely carried by a shaft of the transfer-feeder and provided with means for operating said transfer-feeder; a driver for said member; and means controlled by the boxes for governing the operation of said member.

23. The combination, with a pair of simultaneously-effective box-conveyers, of an alternately-operable transfer-feeder adapted for conveying a series of boxes from one of the first-mentioned conveyers to the other; box-filling means; a ratchet operative with the transfer-feeder; a member operable with a pawl for actuating the ratchet; a driver for said member; and means controlled by the boxes for governing the operation of said member.

24. The combination, with a pair of simultaneously-effective box-conveyers, of an alternately-operable transfer-feeder adapted for conveying a series of boxes from one of the first-mentioned conveyers to the other; a ratchet secured to the other shaft of the transfer-feeder; a rocker loosely carried by said shaft and provided with a cam for operating the ratchet; a driver for said rocker; and means controlled by the boxes for governing the operation of said rocker.

25. The combination, with a pair of simultaneously-effective box-conveyers, of an alternately-operable transfer-feeder adapted for conveying a series of boxes from one of the first-mentioned conveyers to the other conveyer; box-filling means; a gravitative member loosely carried by a shaft of the transfer-feeder and provided with means for operating said transfer-feeder; a driver for said rocker; and means controlled by the boxes for governing the operation of said rocker.

26. The combination, with a pair of simultaneously-effective box-conveyers, of an alternately-operable transfer-feeder adapted for conveying a series of boxes from one of the first-mentioned conveyers to the other; box-filling means; a ratchet carried by a shaft of the transfer-feeder; a gravitative rocker loosely mounted on said shaft and provided with a pawl for operating the ratchet; a cam for engaging the rocker; and means controlled by the boxes for governing the operation of the rocker.

27. The combination, with a pair of box-

conveyers, of a transfer-feeder operable for conducting a series of boxes from one of the first-mentioned box-conveyers to the other; a shaft in two sections one of which is continuously driven; a coupling device the two members of which are fixed to the respective shaft-sections; box-controlled means for operating one of the members of the coupling device; and conveyer-driving mechanism connected with said shaft.

28. The combination, with supply and discharge conveyers, of a transfer-feeder operable for conducting a series of boxes from the supply-conveyer to the discharge-conveyer; a shaft in two sections one of which is continuously driven; means operative with the continuously-driven section of the shaft for actuating the transfer-feeder; means operative with the other shaft-section for operating said conveyers; a coupling device; and box-controlled means for engaging the members of the coupling device.

29. The combination, with supply and discharge box-conveyers, of a transfer-feeder adapted to convey a series of boxes from the supply-conveyer to the discharge-conveyer; a shaft in two sections one of which is continuously driven; means operative with the continuously-driven shaft-section for operating the transfer-feeder; connections between the other shaft-section and the supply and discharge conveyers for operating the latter; a clutch the respective members of which are fixed to the shaft-sections; a clutch-operating lever in position to be operated in one direction by a box on one of said conveyers; and independent means for operating said clutch-lever in the opposite direction.

30. The combination, with box supply and discharge conveyers, of a transfer-feeder adapted to convey a box or boxes from the supply to the discharge conveyer; a box-supplying device; a box-pusher adapted to uphold a series of boxes in the box-supplying device; means for retracting said box-pusher; and automatically-operating mechanism for alternately stopping and starting said conveyers and the transfer-feeder.

31. The combination, with supply and discharge conveyers, of a transfer-feeder operable for conducting a series of boxes from the supply to the discharge conveyer; a supply-chute; a box-pusher constructed to uphold a series of empty boxes; means for imparting successive movements to the box-pusher, first to effect the release of an empty box and then to advance it to the supply-conveyer; and a second box-pusher operable for ejecting the filled boxes from the discharge-feeder.

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Witnesses:
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