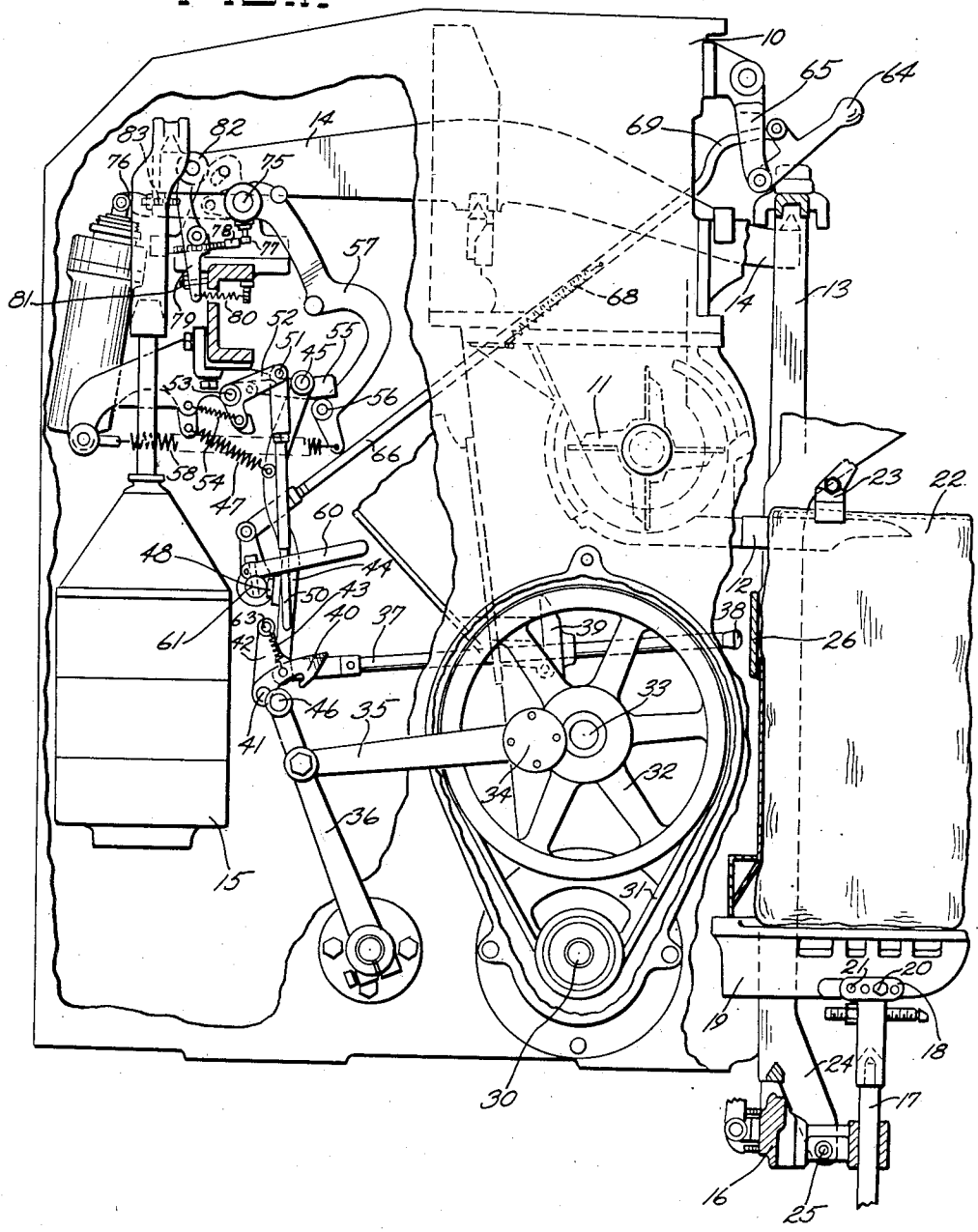
June 6, 1944. W. R. PETERSON 2,350,529

BAG FILLING APPARATUS WITH POWER DISCHARGE

Filed Oct. 17, 1940 6 Sheets-Sheet 1

FIG. 1.



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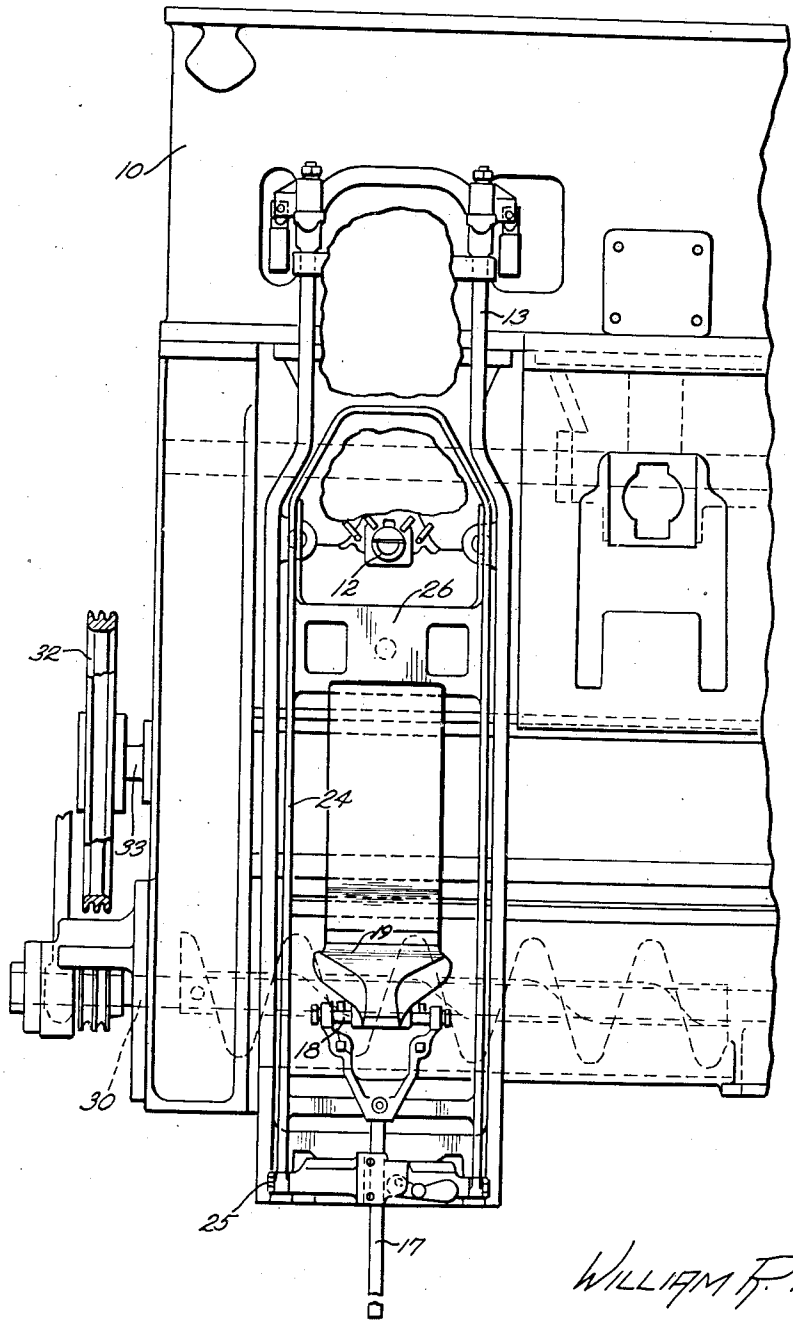
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BAG FILLING APPARATUS WITH POWER DISCHARGE

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FIG. 2.



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BAG FILLING APPARATUS WITH POWER DISCHARGE

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FIG. 3.

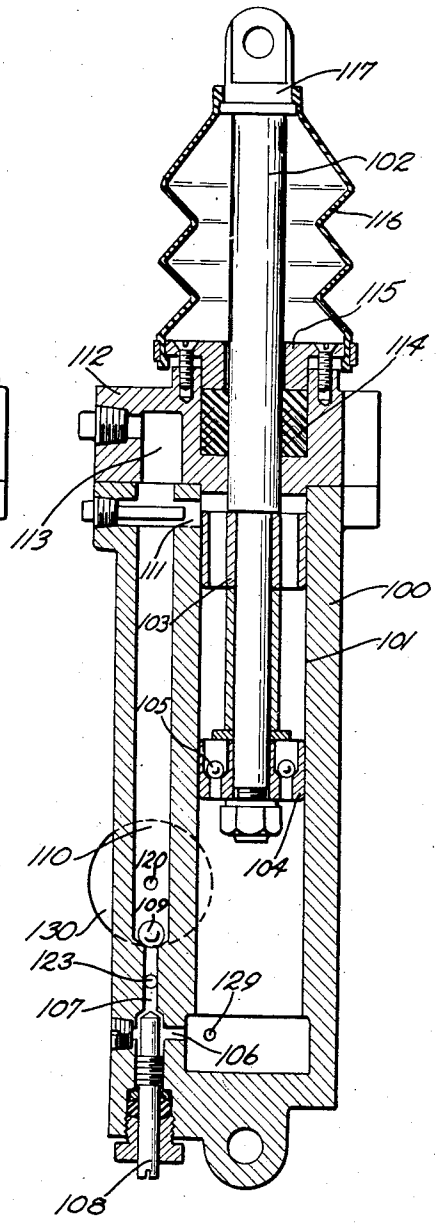


FIG. 4.

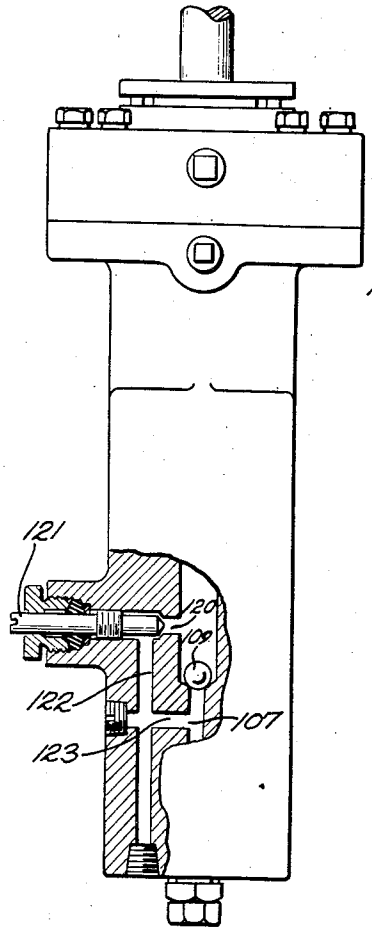
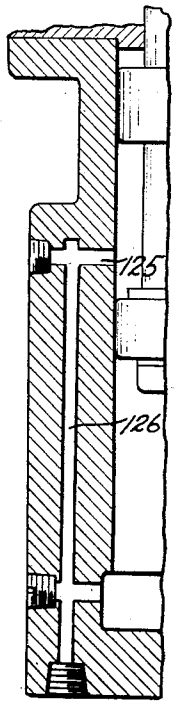


FIG. 5



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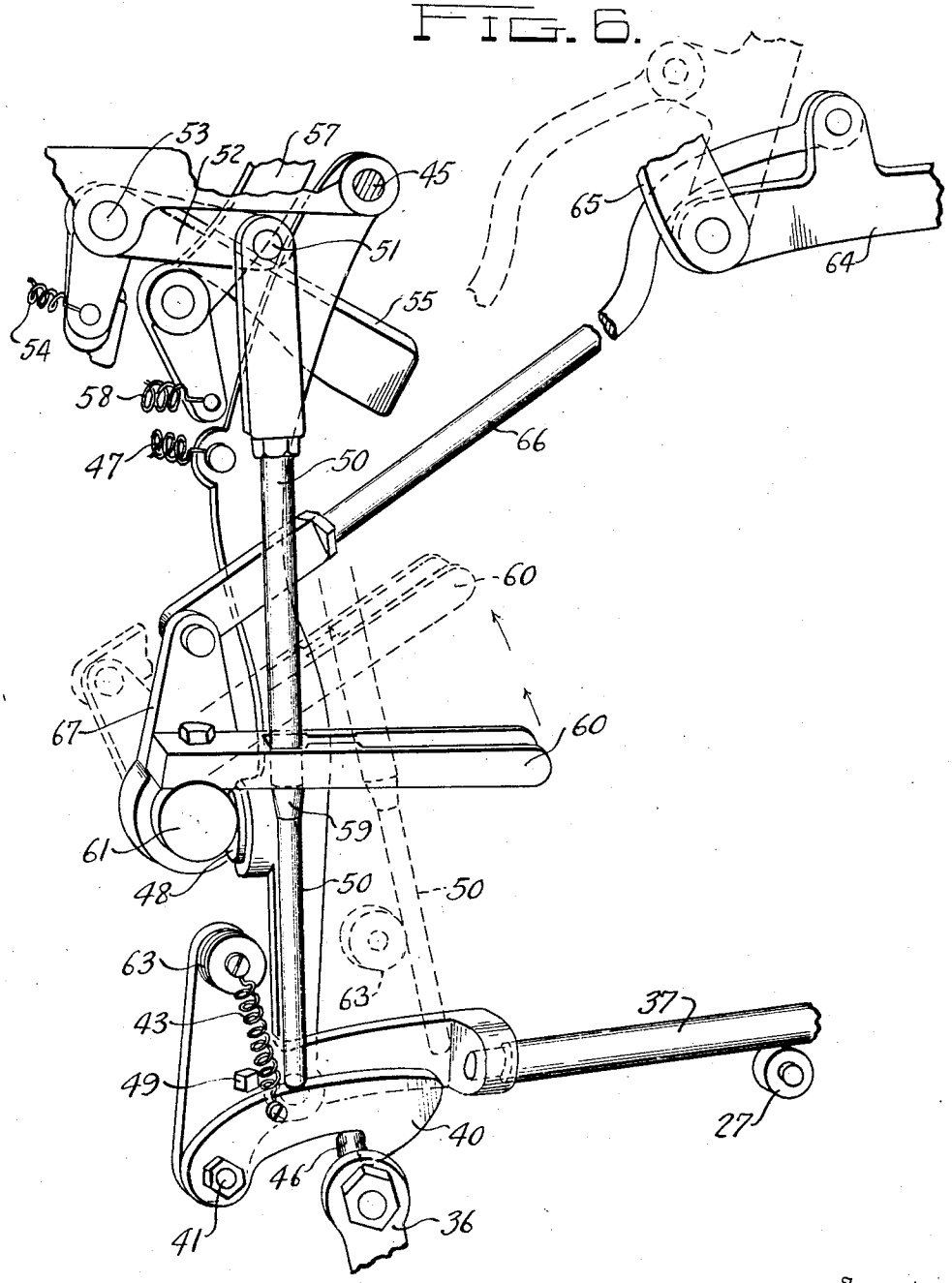
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BAG FILLING APPARATUS WITH POWER DISCHARGE

Filed Oct. 17, 1940 6 Sheets-Sheet 4

FIG. 6.



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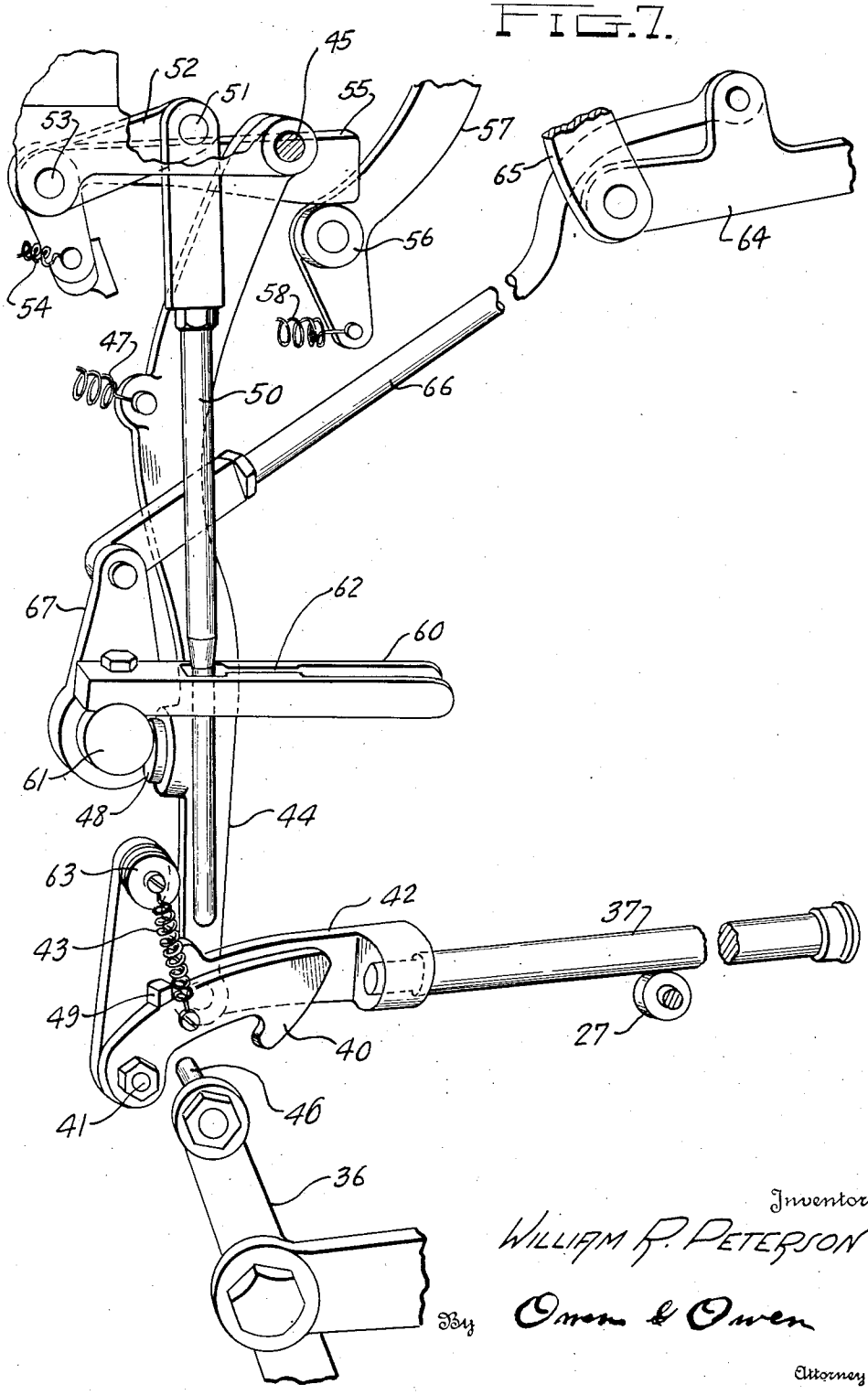
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BAG FILLING APPARATUS WITH POWER DISCHARGE

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FIG. 7.



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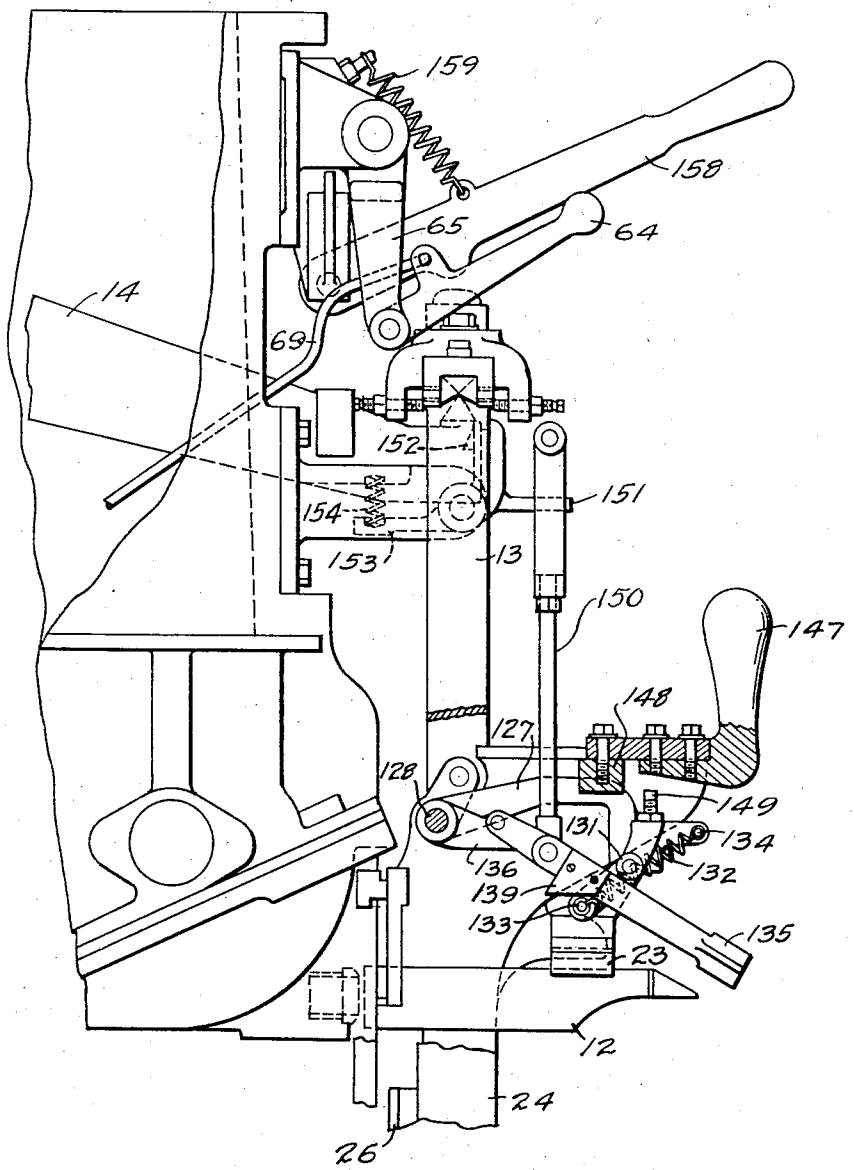
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BAG FILLING APPARATUS WITH POWER DISCHARGE

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FIG. 8.



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UNITED STATES PATENT OFFICE

2,350,529

BAG-FILLING APPARATUS WITH POWER DISCHARGE

William R. Peterson, Oswego, N. Y., assignor to St. Regis Paper Company, New York, N. Y., a corporation of New York

Application October 17, 1940, Serial No. 361,609

8 Claims. (Cl. 249—60)

This invention relates to apparatus for filling valve bags, and more particularly to apparatus comprising means to discharge the filled bags.

A continuation in part hereof for "Valve bag filler with timed discharge," filed October 25, 1943, Serial No. 507,521, shows certain common subject matter, is based in details upon an earlier construction, and is intended to contain any broad claims reading upon the common subject matter.

An object of the invention is to provide apparatus which will discharge filled bags automatically, and then comprises means for adjustably timing the discharge of the bag in relation to the completion of the filling operation.

Another object of the invention is to provide apparatus comprising power discharge means for the filled bag.

Another object of the invention is to provide normally automatically operating discharge means which may be rendered inoperative at will without interfering with other operations of the apparatus.

Further objects and details of the invention will appear as the description proceeds.

In the accompanying drawings forming a part of this specification,

Figure 1 is a side elevation of apparatus embodying one form of the invention, with parts removed and with parts broken away, to show more fully the important features of novelty;

Fig. 2 is an elevation from the right hand side of Fig. 1, likewise with parts broken away and parts removed;

Fig. 3 is a longitudinal vertical section of a shock absorbing and timing cylinder;

Fig. 4 is a view of the cylinder shown in Fig. 3 from the left hand side of that figure partially in section to show certain passages;

Fig. 5 is a partial sectional view through the cylinder along another vertical line to show certain passages.

Fig. 6 is an enlarged detail view of the tripping mechanism for the automatic discharge;

Fig. 7 is a view similar to Fig. 6, showing the parts in a different position;

Fig. 8 is an enlarged side elevation, partly in section, of the bag clamp and scale lock mechanism.

The apparatus relates to a well known type of bag filling machine employed extensively for filling valve bags with cement or the like and certain of the features which do not relate to the present improvement are removed for purposes of clearer illustration.

In the construction shown, there is indicated a hopper 10 which is supplied with material by any suitable means. The lower part of the hopper 10 opens into a housing in which there is a discharge propeller 11 indicated in Fig. 1 by dotted lines. The material is discharged through a spout 12.

A frame which has a general A-shape and is usually spoken of as the A frame 13 is suspended from one end of a scale beam 14, the other end of which supports a suitable counter-balancing weight 15. At the lower end of the A frame, there is a web 16 in which there is mounted a vertically adjustable rod 17. On the top of rod 17 there is a head 18 on which a bag bottom support 19 is mounted by means of a pivot bolt 20 which may be inserted through any one of a series of holes 21. In Fig. 1, there is indicated a bag 22 supported at its bottom by support 19 and having a tube 12 inserted through the usual valve into the bag. A clamp 23 is indicated for holding the bag upon the tube, as best shown in Fig. 8.

Mounted on web 16 by means of pivots 25 there are members 24 connected by a cross-piece 26 adapted to engage the rear side of the bag and assist in discharging it as will be indicated more clearly below.

In the construction shown there is indicated a drive shaft 30 driving a belt 31 which in turn drives a pulley 32 on shaft 33. A crank pin 34 turned by shaft 33 is connected by a link 35 to a lever 36. During the normal operation of the machine, shaft 33 is constantly rotating and consequently lever 36 is constantly oscillating.

A rod 37 carries a bumper end 38 suitable for contacting member 26 and discharging the bag at the proper time. The rod is mounted upon a suitable antifriction support 27 (see Fig. 7) and carries a dust guard 39, as shown in Fig. 1.

A hook 40 is pivoted at 41 upon a head 42 mounted on the rear end of rod 37. Hook 40 is normally raised by a spring 43. A link 44 is pivoted at its lower end to head 42 and is pivoted at 45 at its upper end to the frame of the machine and so supports the head in an oscillating path. The hook 40 is depressed at suitable intervals to be engaged by the upper end of lever 36, and when depressed, engages a pin 46 on the upper end of lever 36, and so the rod is forced to the right with the lever. Spring 47 draws the link 44 to the left until a bumping block 48 thereon engages a portion of the frame. A stop 49 limits the upward movement of hook 40.

The depression of hook 40 is caused by a rod 50 pivoted at 51 at its upper end and to a bell crank lever 52 on shaft 53. Spring 54 connected to the other end of the bell crank lever aids gravity in tending to depress rod 50. A latch member 55 mounted on shaft 53 normally rests upon an anti-friction roller 56 on a lever 57. Lever 57 is constantly urged to the left by a spring 58 and is allowed to move to the left by certain latch means which will be more fully described below.

When lever 57 is allowed to move to the left, as viewed in Fig. 1, roller support 56 riding along

the lower side of member 55 permits that member to lower and shaft 53 and bell crank lever 52 to oscillate and lower rod 50 so as to depress hook 40 into the path of the upper end of lever 36. It will be noted that the end of hook 40 is beveled so that if lever 36 does not happen to be in its extreme left position when the hook is lowered, the hook is cammed up upon the next movement of the lever to the left, as shown in Fig. 6, spring 54 allowing this yielding movement of the hook, but immediately depressing the hook as soon as the lever has moved far enough to the left. Upon the next stroke of the lever to the right, rod 37 is driven therewith and presses against cross-piece 26, thereby moving it against the bag and discharging the bag. After the cross-piece 26 has moved a sufficient distance about pivots 25, the center of gravity of the bag 22 is moved to the right of pivot 20 and thereafter bottom support 19 tilts with the bag as the bag is discharged. The lower end of rod 50 is passed through a slot between members 60 pivotally mounted at 61.

As shown most clearly in Figs. 6 and 7, the rod 50 is smaller at its lower end and larger at its upper end, having an intermediate shoulder 59. Normally, this shoulder is above a slotted guide member 60 which is pivotally mounted on the frame at 61. When the rod is lowered, as shown in Fig. 6, the shoulder is lowered. The slot of member 60 is narrowed at 62. When the hook operates to drive rod 37 to the right, a pin 63 in head 42 forces rod 50 to the right and the tines of the fork yield sufficiently so that the rod passes through this narrow portion of the slot, and its weight does not return it to the left until the shoulder 59 is raised above the narrow portion 62 of the slot.

Upon the return of roller 56 to the position in which it is shown in Fig. 1, rod 50 is lifted so shoulder 59 is above guide 60 and the rod is free to swing back to the position in which it is shown in Figs. 1 and 7. But at times it is desired to render the automatic bag-discharge inoperative for a time. For this purpose there is provided a handle 64 pivoted in a conveniently accessible position to a bracket 65 and connected by a link 66 to an arm 67 on guide 60. When handle 64 is raised, as shown in Fig. 1, spring 68 forces link 66 to the left and raises guide 60 to the position shown in Fig. 1, and in dotted lines in Fig. 6. In this position, narrow portion 62 of the guide prevents the swinging of rod 50 to the left and so keeps it out of alignment with hook 40.

Link 66 is curved at 69 so that lowering handle 64 brings the pivot of the handle above the line between the pivots at the ends of link 66 and so locks guide 60 in its lowered position.

Lever 57 is controlled as follows. This lever is pivoted at 75 upon a suitable stationary bracket and has an extension 76 which is connected to a combined shock absorber and timer which will be described later. The lever 57 is locked in the position in which it is shown in Fig. 1 by means of an adjustable screw 77 engaging a screw 78 in a lock latch 79. The screw 78 is very close to the fulcrum of the latch and spring 80 biasing the latch towards the right, as viewed in Fig. 1, is sufficient to lock the lever in position. A stop screw 81 limits the movement of the latch to the right and determines the position of screw 78.

On the upper end of lock latch 79 there is a roller 82. Carried on the weight end of scale beam 14 there is a screw 83. When the bag on spout 12 is filled sufficiently, weight 15 is overbalanced and the bag drops, the weight end of the scale rising. When this happens, screw 83 contacts roller 82, swinging lock screw latch 78 and releasing screw 77.

The combined shock absorber and timer comprises a casting 100 in which there is a cylindrical opening 101. A piston rod 102 carries pistons 103 and 104 within cylinder 101. Both pistons 103 and 104 are bored longitudinally of the cylinder, but piston 104 carries ball valves 105 in these openings so that they are effective only when the piston is being lowered. Also, the vertical passages controlled by balls 105 are somewhat limited so that when the piston is depressed, the movement is slowed up by this restriction upon the flow of the liquid which is employed in the cylinder.

At the bottom of the cylinder there is a lateral opening 106 connected to a vertical passage 107. This vertical pasage 107 is restricted by a needle valve 108 so that its effective cross-section can be adjusted. Passage 107 leads past check ball 109 into an enlarged vertical passage 110 which communicates by a lateral passage 111 with the top of the cylinder.

Cylinder head 112 is provided with an air chamber 113 above the oil or the like normally employed in the cylinder. Packing 114 around rod 102 is compressed by a gland nut 115 to which there is attached a flexible shield 116, the top of which is connected to head 117 upon piston rod 102, which is pivotally connected to extension 76. By this means the packing is protected from dust.

It will be seen that when the piston rod is being lowered the movement is restricted by the passages through piston 104 plus the adjustable passage past valve 108, which is sufficient to vary the resistance to the downward movement of the piston as much as is necessary. Upon the upward movement of the piston the balls 105 close the passages through piston 104, thereby forcing the liquid to seek other passages in order to reach the lower end of the cylinder. As will be seen from Figs. 3 and 4, the liquid from the upper portion of cylinder 101 may pass out through port 120 past adjustable needle valve 121 and through passages 122, 123 to passage 107, thereby by-passing check valve 109. Obviously this will be a passage restricted not only by needle valve 108, but also to any desired degree by needle valve 121.

Port 125 is so related to the stroke of the piston rod that when the piston rod is in its lower position the port is uncovered. After the piston rod has moved up a certain distance, piston 103 covers port 125. After it has passed upward a sufficient additional amount, piston 103 again uncovers port 125. As a consequence, the initial upward movement of the piston rod is relatively free since the liquid is permitted to pass through passage 126, but during an intermediate period while piston 103 covers port 125, the liquid can pass only past needle valves 121 and 108 and consequently at that time the movement of the piston rod is comparatively slow. After piston 103 uncovers port 125 again, the remainder of the upward passage of the piston rod is relatively rapid.

For quick and accurate adjustment of the important needle valve 121, a dial plate 130 may be attached to that needle, as indicated on Fig. 3.

The operation of the parts of the apparatus has been referred to as the description proceeded,

but for convenience, the operation will be summarized as follows:

With the parts in the position in which they are shown in Fig. 1, the material is being fed into the bag. When the bag has received a sufficient weight of material, the weight 15 is overcome and the spout and bag drop to a lower position. The feed of material is then cut off either by spout 12 dropping out of alignment with the outlet for the material, or by other well known means.

The release of screw 77 by the swinging of latch 79 because of contact screw 83 with roller 82 enables spring 58 to draw lever 57 to the left, as viewed in Fig. 1. However, the movement of the lever is retarded by the adjustment of the combined shock absorber and timer as described above so that a properly adjustable interval elapses between the swing of the beam and the shutting off of the flow of material to the bag before lever 57 moves far enough to permit the downward movement of rod 50. During this interval, the compressed air remaining in the bag at the end of the filling operation is allowed to escape. At the close of the adjusted interval, rod 50 is lowered and presses hook 40 downward so that upon the next oscillation of lever 36, rod 37 is shoved to the right and discharges the bag, the bag bottom support tilting about pivot 20 to aid in discharging the bag. Plate 26 insures the proper movement of the top of the bag and that it is stripped from the filling spout.

Immediately after the bag is discharged, the bag support returns to its normal position because the center of gravity thereof is to the left of pivot 20, as viewed in Fig. 1. Preferably the load end of the beam is held down by a latch until an empty bag is placed upon the tube and the latch is released, either separately or by movement of the clamp 23 to its operative position. The structure of the clamp and the means for locking the load end of the beam in its lowered position form no part of the invention claimed in this application, any convenient arrangement for these purposes being capable of use with the mechanisms claimed herein; but the construction fully disclosed in my co-pending application for "Bag filling apparatus with hand discharge" filed October 1, 1940, Serial No. 359,219 may be referred to as suitable for the purpose. In the construction disclosed in said co-pending application and indicated sufficiently for present purposes in Fig. 8, there is a clamp-holding bracket 127 mounted for lateral adjustment upon a cross-piece 128 of the A-frame.

A bag clamp 23 is pivoted at 131 upon bracket 127 in position to clamp a bag upon spout 12. A spring 132 connects a pin 133 upon the bag clamp with a pin 134 on bracket 127, the pins and pivot of the clamp being so arranged that when the clamp is in clamping position, as indicated in Fig. 8, the spring passes below the pivot 131 of the clamp and so holds it down in clamping position, but when the clamp is raised, the spring passes the pivot point 131 and so maintains the clamp in raised position until it is forcibly lowered.

An operating handle 135 is attached to an arm 136 of a bell crank lever which is loosely mounted upon shaft 128 between uprights of frame 13. The handle 135 is provided with a plate 139 in position to contact pin 133 to which spring 132 is attached when handle 135 is lowered.

The upper ends of members 24 are provided with a handle 147 and with an abutment 148 which contacts an adjustable pin 149 on clamp 23 when handle 147 is moved forward, or when pusher 37 operates to discharge the bag. When handle 64 is operated to render the automatic discharge inoperative, the discharge may be effected by handle 147.

Extending upward from handle 135 there is a rod 150 provided with a yoke embracing the forward end of an arm 151 on a scale latch 152. Another arm 153 of the scale latch is normally pressed downward by a spring 154, as indicated on Fig. 8.

A handle 158 is pivoted upon the hopper above the A-frame and is normally held upward in the position in which it is shown in Fig. 8 by a spring 159, but can be moved down when desired to depress the A-frame and the load end of the scale beam.

When the bag is discharged either automatically or by hand, contact of pins 148 and 149 tilts the bag clamp and releases the bag from the spout and at the same time pin 133 contacts plate 139 and raises handle 135. At the same time, rod 150 is raised so that latch 152 is forced by spring 154 into latching position on the end of the scale beam. By this latch, the scale beam and A-frame are maintained in their lowered position.

After the bag has been discharged, another bag is placed upon the spout and then handle 135 is moved down until plate 139 contacting pin 133 forces spring 132 past the line of pivot 131, after which the spring snaps the bag clamp into holding position.

Depression of handle 135 also depresses rod 150 and arm 151 of latch 152, thereby releasing the latch and allowing the scale beam to return upward. This causes return of spout 12 to registering position with the discharge opening so that the filling of the bag is started and the procedure is repeated. As soon as the bag is discharged, if no lock is used, or upon the release of the lock when used, the weight 15 returns the scale beam to the position in which it is shown in Fig. 1, the beam contacting extension 76 of lever 57 on its way down, thereby forcing lever 57 to the right and piston 104 toward the bottom of cylinder 100, the shock absorber preventing a sudden jar to the apparatus by cushioning this return movement of the beam to the desired extent. This releases roller 82 and latch 79 so that the lower end thereof is returned by spring 80 to the position where stop 81 contacts the stationary portion of the frame. The return movement of the scale beam likewise swings lever 57 to the right, bringing screw 77 in position to be locked by screw 78. This movement of lever 57 raises rod 50, allows it to swing back to the position in which it is shown in Fig. 1, and resets it for operation with another bag.

It will be seen that the apparatus disclosed herein will automatically discharge filled bags under normal conditions, but that the automatic discharge means may be rendered inoperative by a simple movement of handle 64. Also, the device provides for an accurately adjustable interval between the cutting off of the flow of material to the bag by the dropping of the load end of the scale beam and the discharge of the bag. The exact apparatus shown and desrcibed works very well for these purposes and has many minor advantages for convenient and efficient operation; but it will be understood that many changes in the apparatus may be made within the scope of

the appended claims while retaining important advantages of the invention.

What I claim is:

1. In apparatus for filling valve bags comprising a scale beam, a spout mounted on the load end of the scale beam and adapted to enter the valve of a bag, means to feed material to and through said spout, and means operative immediately upon the lowering of the load end of the beam to stop the feed of material from said feeding means, a constantly moving power-driven element, a discharge rod for discharging a filled bag from the spout, a timer rendered effective by the lowering of the load end of the beam, and means rendered operable by the timer to connect the element to the rod for producing discharging movement of the rod a predetermined time after said lowering.

2. In apparatus for filling valve bags comprising a scale beam, a spout mounted on the load end of the scale beam and adapted to enter the valve of a bag, means to feed material to and through said spout, and means operative immediately upon the lowering of the load end of the beam to stop the feed of material from said feeding means, a cylinder and piston, a spring urging the piston towards one end of the cylinder, an adjustable passage governing the escape of fluid from in front of the piston when the piston is moved by the spring, a latch holding the piston against movement responsive to the spring, connections releasing the latch upon the lowering of the load end of the beam, a constantly moving power-driven element, a rod for discharging a filled bag from the spout, and means for connecting the element to the rod for effecting discharge movement of the rod when the piston has been moved a predetermined distance by the spring.

3. In apparatus for filling valve bags comprising a scale beam, a spout mounted on the load end of the scale beam and adapted to enter the valve of a bag, means to feed material to and through said spout, and means operative immediately upon the lowering of the load end of the beam to stop the feed of material from said feeding means, a cylinder and piston, a spring urging the piston towards one end of the cylinder, an adjustable passage governing the escape of fluid from in front of the piston when the piston is moved by the spring, a latch holding the piston against movement responsive to the spring, connections releasing the latch upon the lowering of the load end of the beam, and means for discharging the bag rendered operative by movement of the piston in response to the spring for a predetermined distance and connections moving the piston against the action of the spring by ascent of the load end of the beam.

4. In apparatus for filling valve bags comprising a scale beam, a spout mounted on the load end of the scale beam and adapted to enter the valve of a bag, means to feed material to and through said spout, and means operative immediately upon the lowering of the load end of the beam to stop the feed of material from said feeding means, a cylinder and piston, a spring urging the piston towards one end of the cylinder, an adjustable passage governing the escape of fluid from in front of the piston when the piston is moved by the spring, a latch holding the piston against movement responsive to the spring, connections releasing the latch upon the lowering of the load end of the beam, and means for discharging the bag rendered operative by movement of the piston in response to the spring for a predetermined distance and connections moving the piston against the action of the spring by ascent of the load end of the beam, there being an adjustable passage governing the escape of fluid from in front of the piston when it is moved against the action of the spring.

5. Apparatus for filling receptacles comprising a scale beam having a load end and a weight end, a support for a receptacle on the load end of the beam, means for feeding material to a receptacle on the support while the load end of the beam is up and stopping the feed when said load end drops, means to discharge a filled receptacle from the support, and a timing and shock-absorbing unit initiating the discharge action of the discharge means a predetermined time after the load end drops and acting as a shock absorber for the descent of the weight end of the beam.

6. In apparatus for filling bags comprising a scale beam, a spout mounted on the beam and adapted to enter the valve of a bag, means for feeding material to and through the spout, and means stopping the feed of material from said feeding means upon the dropping of the load end of the beam, a cylinder and piston, connections initiating the movement of the piston in one direction by the lowering of the load end of the beam, means to discharge a filled bag from the spout, and connections rendering the piston and cylinder effective as a timing means to render the discharge means operative a predetermined time after the dropping of the load end of the beam, and effective as a shock absorber for the dropping of the weight end of the beam.

7. In apparatus for filling bags comprising a scale beam, a spout mounted on the scale beam and adapted to enter the valve of a bag, and means to feed material to and through the spout, a constantly power-driven element, bag discharge means, connections for connecting the dicharge means to the element for effecting bag discharge, means rendering said connections inoperative after one discharge action, means actuated by the drop of the weight end of the beam to set the connections for operation, and means responsive to the drop of the load end of the beam to release the connections for operation.

8. In apparatus for filling bags comprising a scale beam, a spout mounted on the scale beam and adapted to enter the valve of a bag, and means to feed material to and through the spout, a constantly power-driven element, bag discharge means, connections for connecting the discharge means to the element for effecting bag discharge, means rendering said connections inoperative after one discharge action, means actuated by the drop of the weight end of the beam to set the connections for operation, and means responsive to the drop of the load end of the beam to release the connections for operation, the last said means comprising a timing device for regulating the interval between the drop of the load end of the beam and the discharge of the bag.

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