

Aug. 15, 1944.

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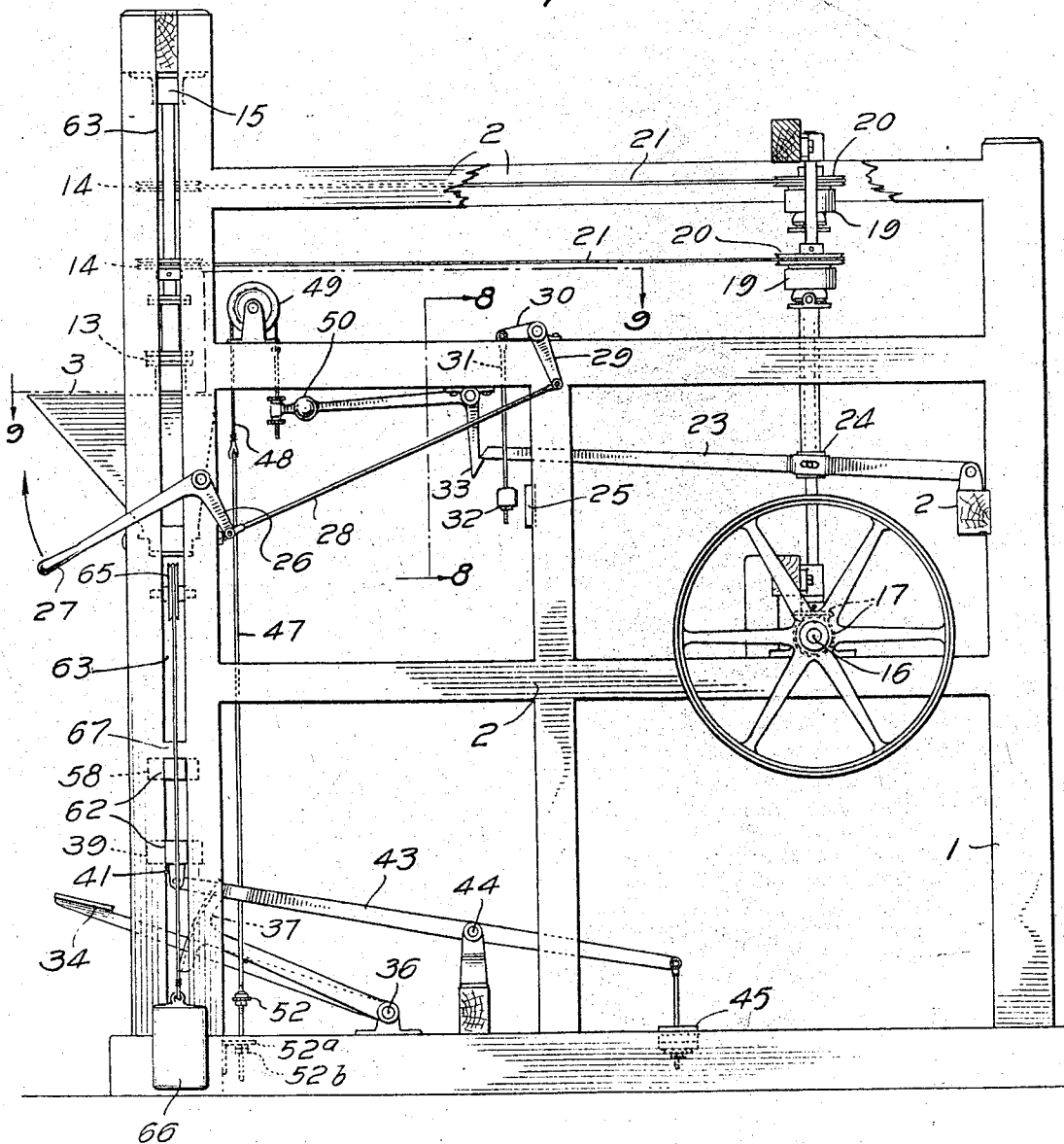
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MACHINE FOR FILLING CONTAINERS

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Fig. 1.



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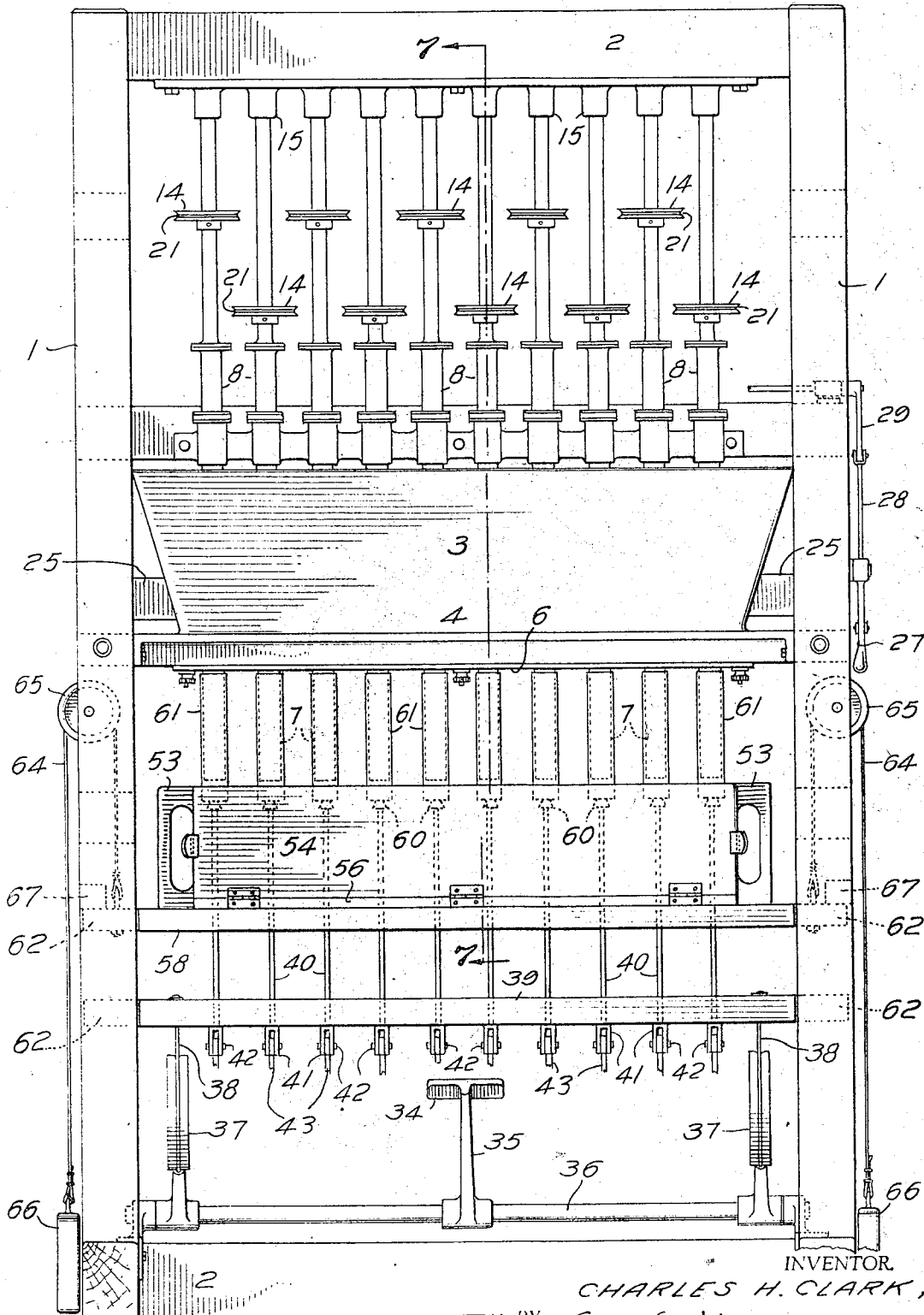


Fig. 2.

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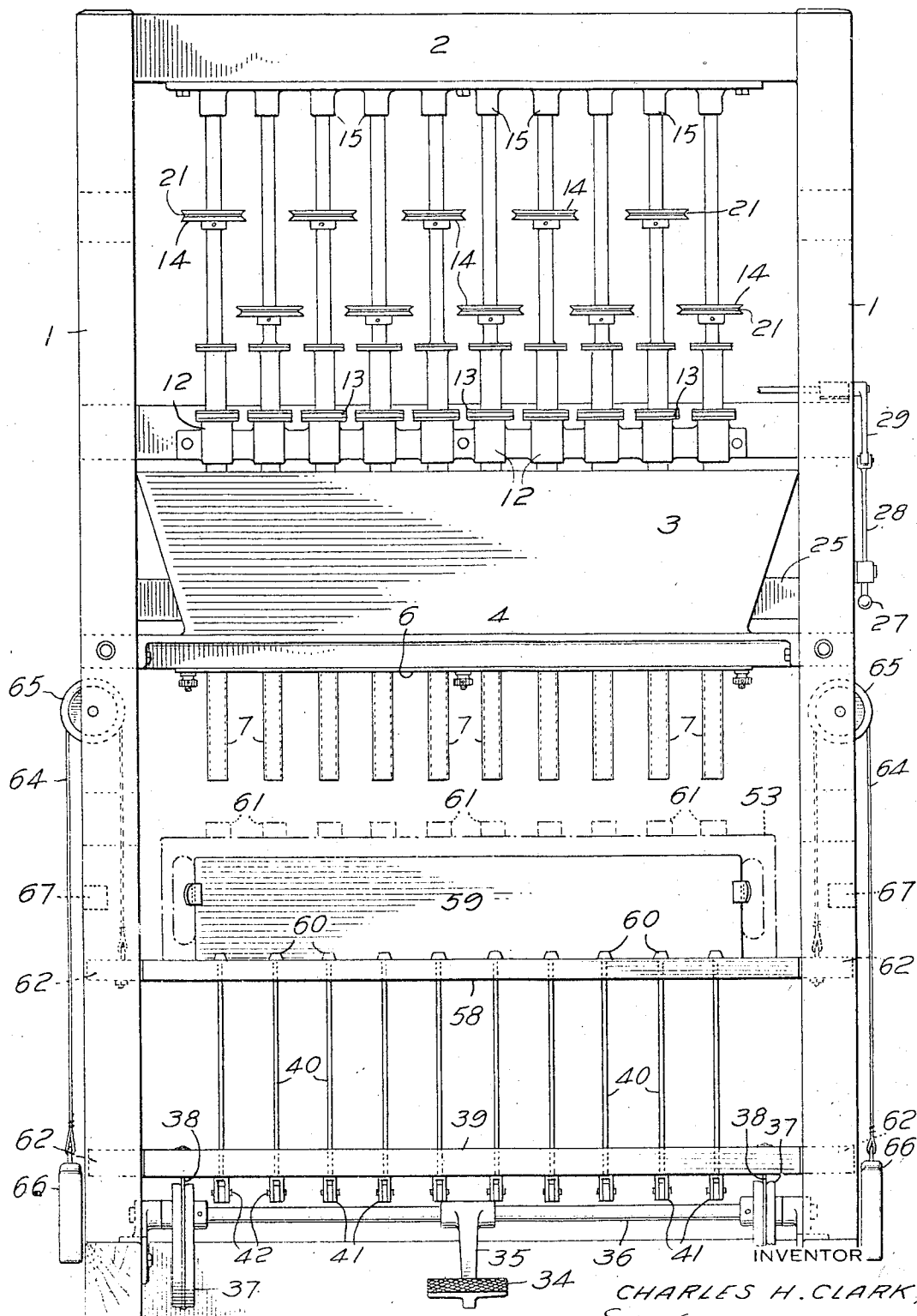


Fig. 3.

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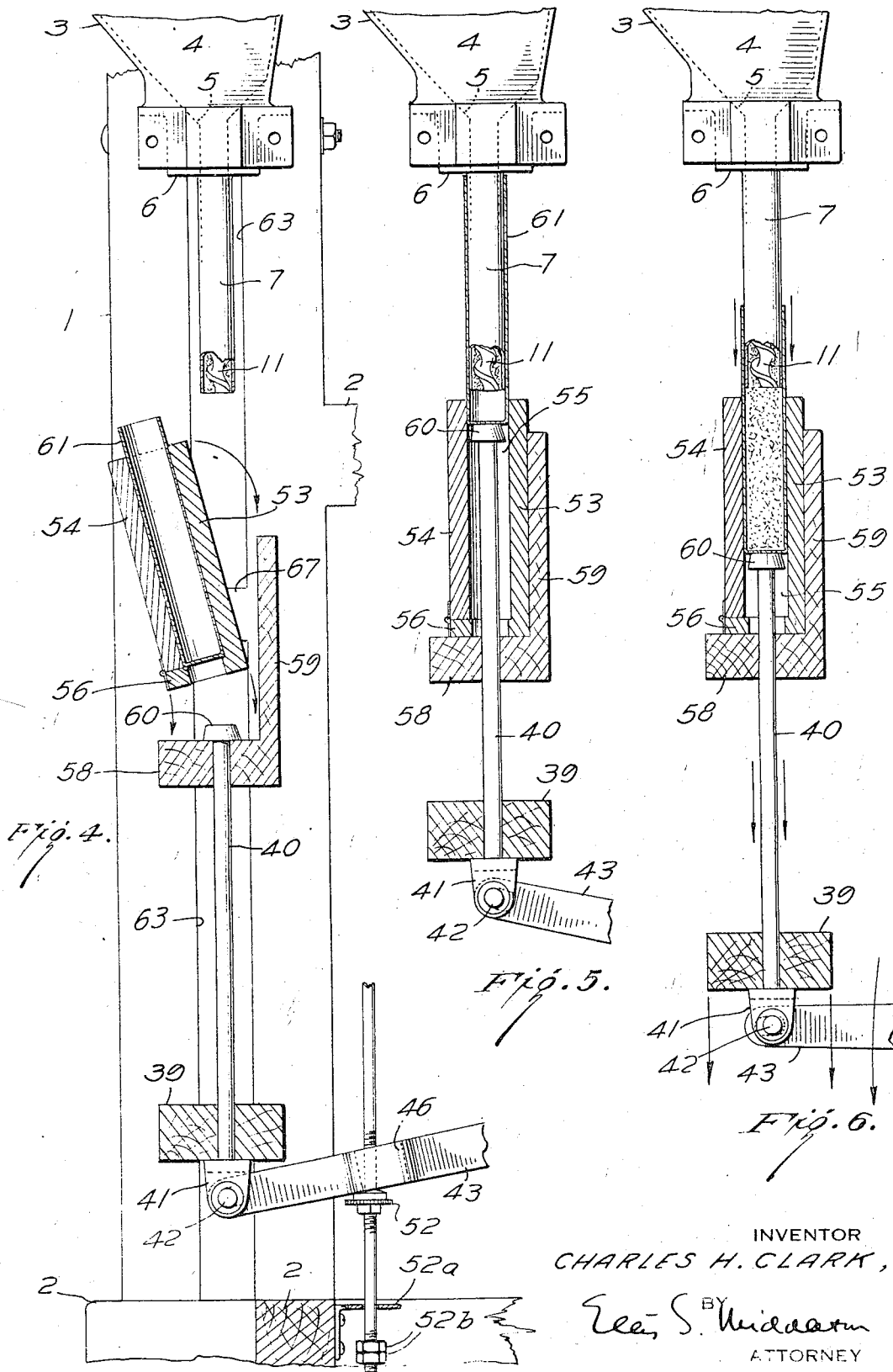
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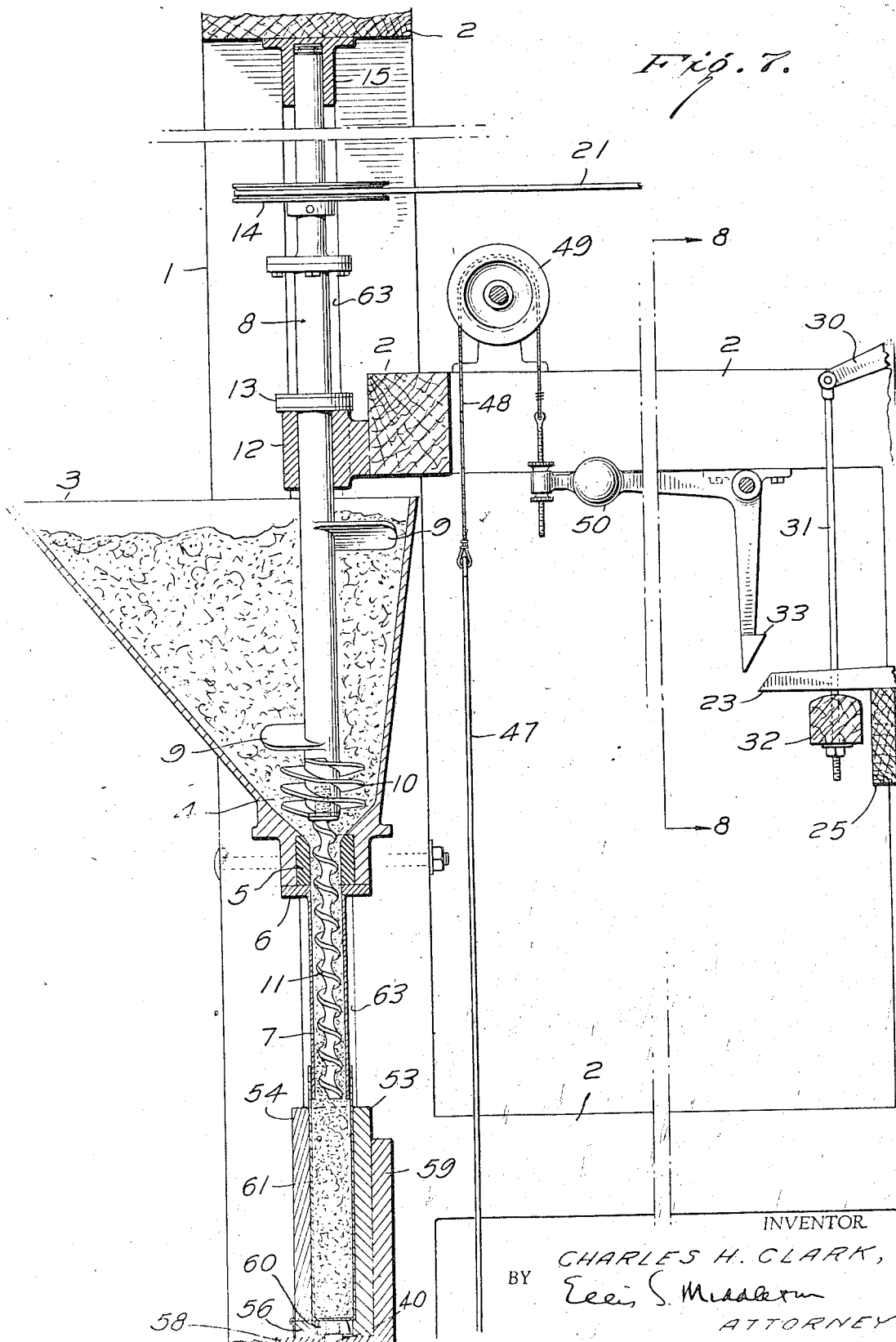
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Fig. 7.



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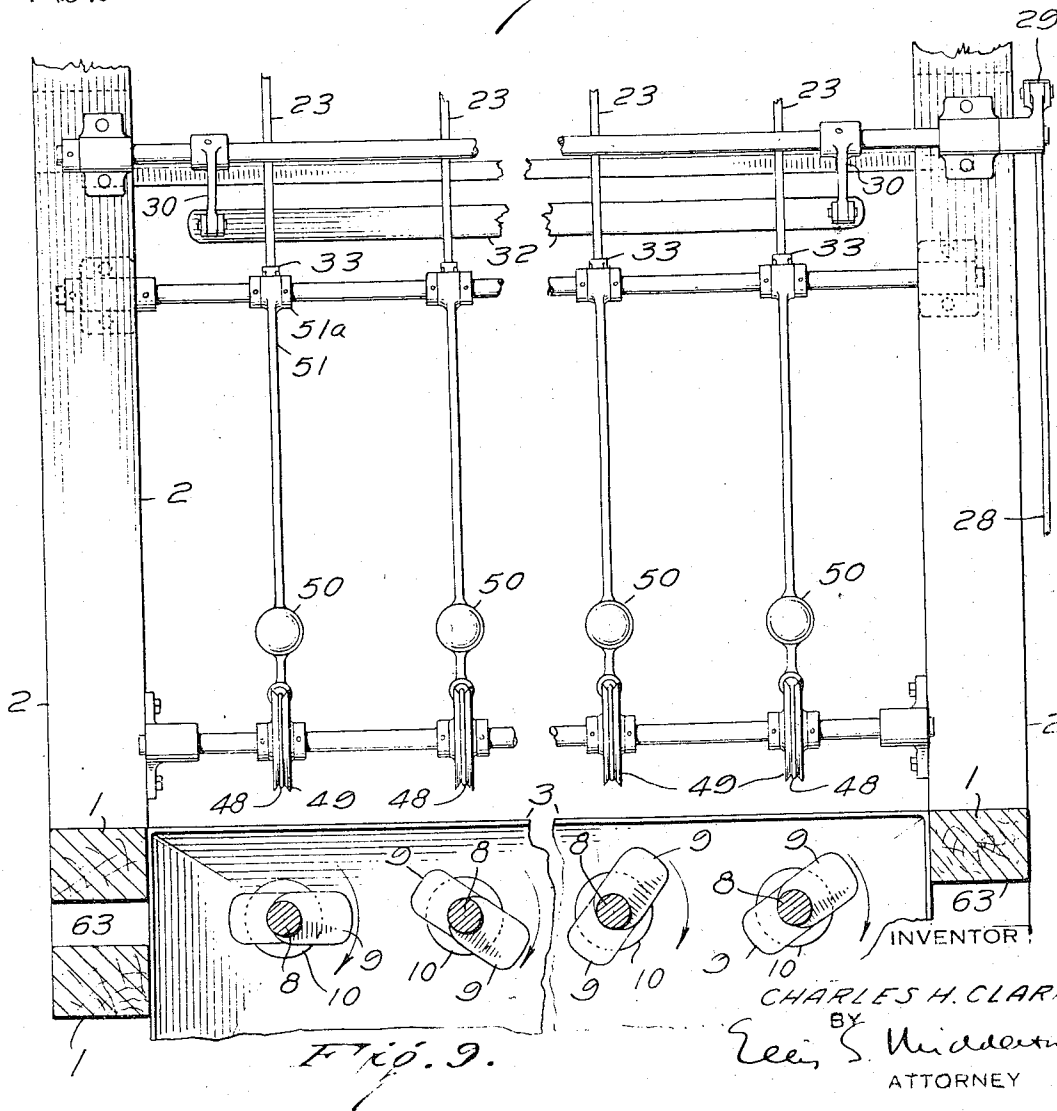
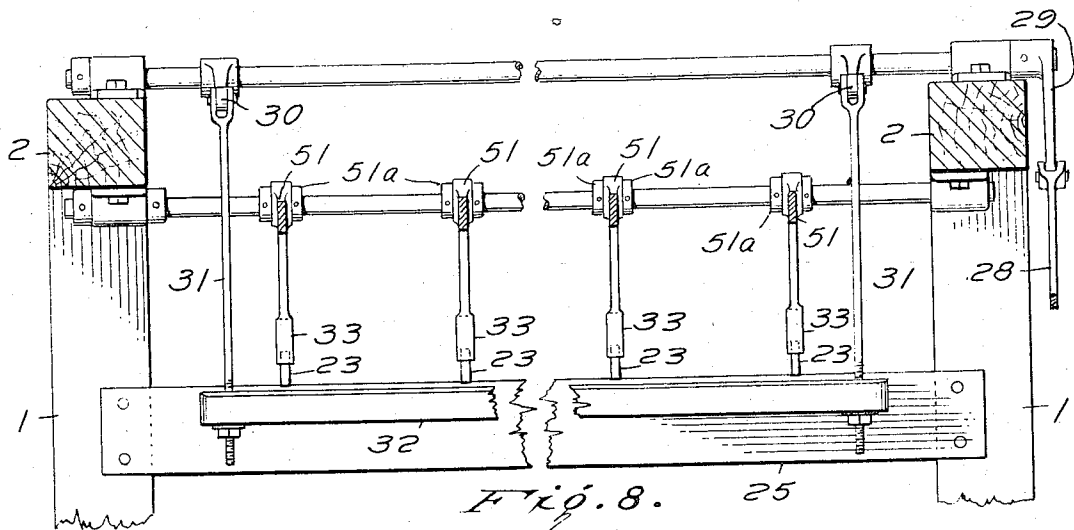
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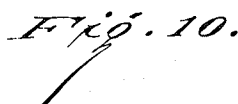
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UNITED STATES PATENT OFFICE

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MACHINE FOR FILLING CONTAINERS

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Application August 20, 1942, Serial No. 455,525

4 Claims. (Cl. 86—3)

The present invention relates generally to a machine for filling containers with plastic or jelly-like substances, and is particularly concerned with a device for loading blasting gelatine or explosive material of a jelly-like consistency into cartridges or other containers.

The principal object of the invention is to provide a machine of the above type for general application, of simple construction, as nearly automatic in operation as possible and which will handle a number of filling operations at one time, while each container or cartridge is not only independently filled, but the mechanism is so arranged that in case of failure to fill any particular cartridge, the machine will proceed to fill the remaining cartridges.

Another important object is to provide a machine of the type described which will be positive in operation and to obtain any desired degree of compression of the plastic or gelatinous load in the shells being filled.

Still another object of the invention is to arrange the parts in such manner that the containers or cartridges will be completely filled with the gelatinous explosive without causing a jamming or stoppage in the feed mechanism.

Other objects and advantages will be apparent as the description proceeds.

To this end the invention contemplates a hopper for receiving the gelatinous explosive or other material to be fed into cartridges or containers, provided with a series of feed screws, projecting downwardly therefrom so that a number of containers may be filled simultaneously. Each feed screw is located within a feed tube, the screw or feeding mechanism extending substantially to the bottom of such tube.

A table is provided beneath the feeding tubes adapted to receive a holder containing a plurality of empty cartridges or containers to be filled. Mechanism is provided for raising the empty cartridges so that the latter telescopically engage the said tubes, each tube at the start of the loading or filling operation extending substantially to the bottom of the cartridge.

The table is arranged to be supported against suitable tension devices such as weights, so that when the mechanism is started, the feed screws in each feed tube will rotate and extrude the material from the hopper through the feed tubes and into the empty container, such material first making contact with the empty container at the bottom thereof. As the feeding operation continues, the container is forced downwardly off the tube and against the tension device, the lat-

ter being chosen so as to obtain the desired degree of compactness. When the tube is filled to the desired extent the feeding mechanism is automatically stopped, the table lowered to a point sufficient to permit the filled containers to be removed, empty containers replaced in the holder and the operation repeated.

Suitable mechanism is provided whereby the operator may manually control the operation of the machine so as to stop it at any point in case of failure to properly function. The mechanism is so arranged that in case of defective filling of any container, not only does this not interfere with the continuous filling of the remainder of the containers, but that one or ones partially or wholly filled may be removed without disturbing the remaining operation.

The invention further consists in the novel arrangement, combination and construction of parts more fully hereinafter described as shown in the accompanying drawings in which:

Fig. 1 is a side elevation of a machine embodying the present invention, in cartridge loading position.

Fig. 2 is a front view of the machine in Fig. 1.

Fig. 3 is a similar view, showing the loading table in lowered position.

Fig. 4 is a fragmentary side elevation of the device of Fig. 3, showing the manner of placing a cartridge holder filled with empty cartridges in filling position.

Fig. 5 is a view similar to Fig. 4 at the start of the filling operation.

Fig. 6 is a similar view showing the parts in position wherein a cartridge is partially filled.

Fig. 7 is a fragmentary, sectional elevation along the line 7—7 of Fig. 2, showing the hopper and feed mechanism with a completely filled cartridge in place.

Fig. 8 is a vertical, sectional view along the line 8—8 of Fig. 1.

Fig. 9 is a longitudinal, sectional view along the line 9—9 of Fig. 1.

Fig. 10 is a fragmentary, perspective view of a device embodying the present invention showing its means of operation, the parts being in substantially the position shown in Figs. 1 and 2.

Referring now with particularity to the embodiment illustrated, a framework is shown to consist of uprights 1 with cross members 2 adapted to support the mechanism.

A hopper is shown at 3 having a restricted lower area terminating in a casting 4, carrying a rubber or other non-sparking bushing 5, the latter being held in place by plate 6 secured in

any desired manner to the bottom of the casting. To the plate 6 is secured a feed tube 7. By providing other plates with different sized feed tubes, cartridges or containers of any desired size may be filled by using the same mechanism.

Inasmuch as one of the objects of the invention is to provide for a plurality of individual feeds from a single hopper, a number of feed mechanisms are provided as shown in Figs. 2 and 3. In Fig. 7, each of the feed devices includes a feed shaft 8 provided with a plurality of stirring fins 9 inside the hopper and a feed helix 10 located at the restricted bottom area of the hopper.

Detachably secured to the bottom of shaft 8 and beneath the helix 10 is a feed screw 11 extending to the bottom of feed tube 7 and slightly spaced from the interior periphery thereof so as to eliminate friction, and yet close enough to insure extrusion and outward movement of the filling material being moved therethrough.

Where other sized cartridges or containers are to be filled, different sized feed screws 11 may be used, with corresponding bushings 5 and feed tubes 7.

The feed shaft 8 is suitably mounted in a bearing 12, fastened to a cross member 2 and provided with a collar 13 to prevent downward movement. The upper portion of the shaft carries a driven pulley 14. The upper end of the shaft is mounted in a journal 15 fixed to the upper cross member 2.

The drive mechanism for the feed shaft and associated parts (Fig. 1) includes a driven shaft 16 rotated by any suitable prime mover, the shaft 16 through a pair of beveled gears 17 causing constant rotation of a vertical shaft 18 (Fig. 10).

Clutch mechanisms, of which one is indicated generally at 19, are of any standard design and carry drive pulley 20 connected to driven pulley 14 by means of belt or cable 21.

Mounted on the vertically rotating shaft 18 is a sleeve 22 which, when moved upwardly, causes the clutch 19 to engage and pulley 20 to rotate.

Suitably fulcrumed on an intermediate cross member 2 (Fig. 1) is a clutch-operating lever 23, having a member 24 (Fig. 10) engaging the bottom of movable sleeve 22. That part of the clutch-operating lever on the side of member 24 away from the fulcrum is of sufficient extent to tend to occupy the lower position as shown in Fig. 10, and thus permit the sleeve 22 to drop and occupy a clutch-disengaging position. A stationary cross bar 25 supports the clutch-operating lever in the clutch disengaging position (Fig. 7).

The clutch-operating lever may be raised into a clutch-engaging position (Figs. 1 and 10) by means of a crank arm 26, having a starting lever 27 which, through connecting rod 28, moves crank 29 and arm 30, which raises connector 31 and elevator bar 32. The starting lever 27 is moved in the direction of the arrow in Figure 1 until the elevator bar has raised all of the clutch-operating levers to the point where the ends thereof will engage and rest upon the seat of each dog 33. At this point the clutches are in engagement, and consequently feed shafts 8 will rotate.

Rotation of all feed shafts 8 may be stopped by stepping upon foot pedal 34 (Figs. 1 and 10) carried by a lever 35, attached to a shaft 36. This shaft also has affixed thereto a quadrant element 37. Attached to the bottom of the quadrant is a cable 38, the upper end of which is

secured to a pull-down bar 39. Through this bar pass cartridge elevators 40, the bar resting upon the enlarged and bifurcated ends 41 of the cartridge elevators. A pin 42 connects bifurcated end 41 of the carriage elevator with a cartridge elevator lever 43, fulcrumed at 44 between a pair of spacing collars 44a and weighted as at 45.

Passing through a slot 46 (Figs. 4 and 10) in cartridge elevator lever 43 is a connecting rod 47 connected to a cable 48 which passes over a pulley 49 and is adjustably secured to the weighted end 50 of a bell crank 51 held between collars 51a in a carrying shaft. One arm of the bell crank carries the dog 33 adapted to engage the end of the clutch-operating lever 23.

The connecting rod 47 (Figs. 4 and 10) has mounted thereon a stop 52 which bears against the bottom of the cartridge-elevating lever 43 so that when the pull-down bar 39 reaches a certain low position, the cartridge elevator 43 will engage the stop 52 and through the described train of mechanism move dog 33 in a clock-wise direction. This releases the end of the clutch-operating lever 23, permits the same to fall and the clutch to disengage. The feed screw then stops rotating. Stop 52a and lock nuts 52b limit upward movement of rod 47.

In order to place a bank of cartridges or containers in the position to be filled, reference is made to Figs. 3 and 4. There a holder is indicated at 53 comprising a block of wood or the like having a hinged front position 54 so arranged that when the parts are in closed position they provide a series of cylindrical recesses 55, each of which is adapted to take a cartridge or container. The main portion 53 of the holder is provided with a base 56 also having cylindrical recesses 57 but of a diameter slightly less than that of recesses 55, for a purpose more fully described hereinafter. A series of empty cartridges or container 61 having been placed in the holder, the front portion 54 is closed and locked in place by any suitable means, and then the holder placed on the cartridge holder elevating table 58. This element is provided with an upstanding back portion 59 so that the cartridge holder is adequately supported thereby.

Cartridge elevator 40 extends upwardly through the main portion of the cartridge holder elevating table 58 and terminates in a head 60 which snugly fits the recess 57 in the main portion of the cartridge holder 53 but bears against the bottom of a cartridge 61. Thus downward movement of one cartridge elevator causes head 60 to engage the elevator table 58 and pull the same downwardly therewith. The head 60 is removable and may be replaced by a larger member in the event larger cartridges are to be filled. The table 58 is provided with reduced ends 62 which slide within slots 63 (Figs. 1, 4 and 7) in the uprights 1, as is also the case with the cartridge elevator pull-down bar 39 (Figs. 9 and 10). Attached to the end portions of the table 58 is a cable 64 which passes over pulley 65 and is connected with a weight 66 which tends to maintain the table 58 in position against the stops 67 (Fig. 2).

The operation of the device is as follows:

A series of empty cartridges 61 are loaded onto a holder of appropriate size, locked in place, and then the holder seated on the table 59 (Fig. 4) after the latter has been pulled down to a sufficient extent to permit the tops of the cartridges to clear the bottoms of the feed tubes 7 by stepping on the foot pedal 34. This action results by

reason of the fact that movement of the foot pedal 34 in a downward direction causes rotation of shaft 36 and a downward pull on cable 38 attached to the pull-down bar 39. Downward movement of the bar 39 engages the bifurcated end 41 of the cartridge elevator 40, and the head of the latter engages the table 58 and pulls it down. As soon, therefore, as the bank of cartridges is in place, the foot pedal 34 is released whereupon the weight 66 attached to the table 58 pulls it upwardly until the table comes to rest against the stop 67. In this position the cartridges have telescopically engaged the feed tubes 7, the ends of the latter being substantially at the bottom of the empty cartridges (Figs. 2 and 10).

The hopper having been supplied with material to be filled into the cartridges the starting lever 27 is oscillated in a clock-wise direction, which through the described chain of mechanism raises the elevator bar 32 which moves the entire series of clutch-operating levers 23 into the upper position, and thereby moves the corresponding sleeves 22 into clutch-operating position. This action causes rotation of the various feed shafts 8 and consequent feeding of the gelatinous material into the individual cartridges.

As the feed continues, and the material is extruded into the cartridges, they are forced downwardly (Fig. 6) and back into the holder against the head of the cartridge elevator and against the action of weight 45. This action continues until each cartridge is full. At this point the cartridge elevator will be at its lowest position, and in this position will trip the dogs 33 holding the clutch-operating levers 23 in operative position, by a slight pull down on connecting rod 47. As soon as the clutch-operating levers 23 are released they fall by their own weight, thus disengaging the clutches and stopping the feeding mechanism. The foot lever 34 is then depressed to further lower the table 58 and the cartridge holder until the tops of the cartridges have cleared the bottom of the feed tube and the cartridge removed. The parts are now in the position of Figs. 3 and 4. The full cartridges are then

replaced with empty ones and the operation repeated.

It is to be noted that inasmuch as each feeding mechanism has its own clutch and drive pulley, that in the event that if for any reason one feed device operates a little bit slower than the rest, it will continue to rotate through continued engagement of its clutch mechanism after the others have stopped, for all clutches remain engaged until their particular cartridge elevator reaches its lower-most position, that is, a clutch-disengaging position. Consequently all an operator has to do is to observe that all driving pulleys have ceased to rotate, which indicates to him that all cartridges are full.

What is claimed is:

1. A cartridge-filling mechanism comprising a feed tube, a cartridge holder adapted to contain a cartridge, means for elevating the cartridge holder so that when a cartridge is held therein, the top of the latter will fit over the end portion of the feed tube, means adapted to elevate a cartridge from the holder onto the feed tube and means to feed material through the tube into the cartridge, whereby during the feeding the cartridge is moved off of the tube and back into the cartridge holder.

2. The device of claim 1 with means for lowering the cartridge holder a sufficient amount so that a filled cartridge therein clears the bottom of the feed tube.

3. The device of claim 1 with means for lowering the cartridge holder a sufficient amount so that a filled cartridge therein clears the bottom of the feed tube, said cartridge holder lowering means being operatively connected to a clutch mechanism for disengaging power from the feeding means during the last portion of the cartridge holder lowering movement.

4. The device of claim 1 with means for lowering the cartridge holder a sufficient amount so that a filled cartridge therein clears the bottom of the feed tube and means to return the cartridge-holder to its initial position.

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