

Aug. 14, 1934.

C. H. WILD

1,969,830

CARTON FILLING MACHINE

Filed Feb. 21, 1931

3 Sheets-Sheet 1

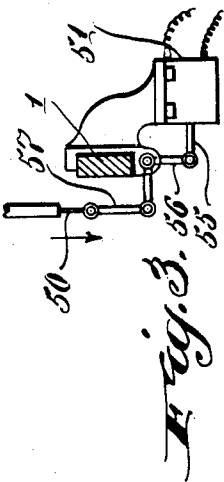
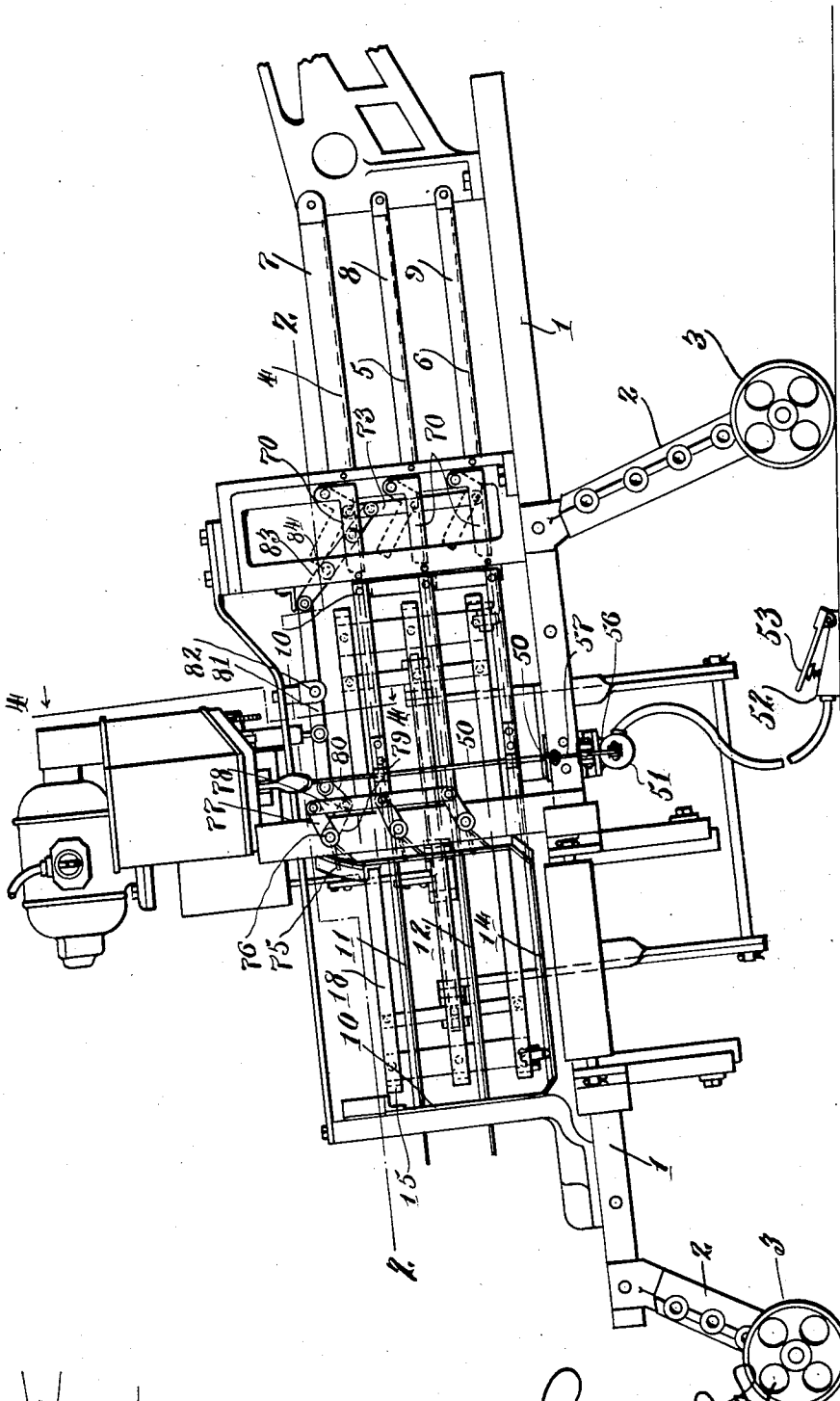


Fig. 1.

Fig. 3.

WITNESSES
Per W. Hand

Inventor
Charles H. Wild.
By Edwin H. Harnwell
Attorney

Aug. 14, 1934.

C. H. WILD

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CARTON FILLING MACHINE

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8 Sheets-Sheet 2

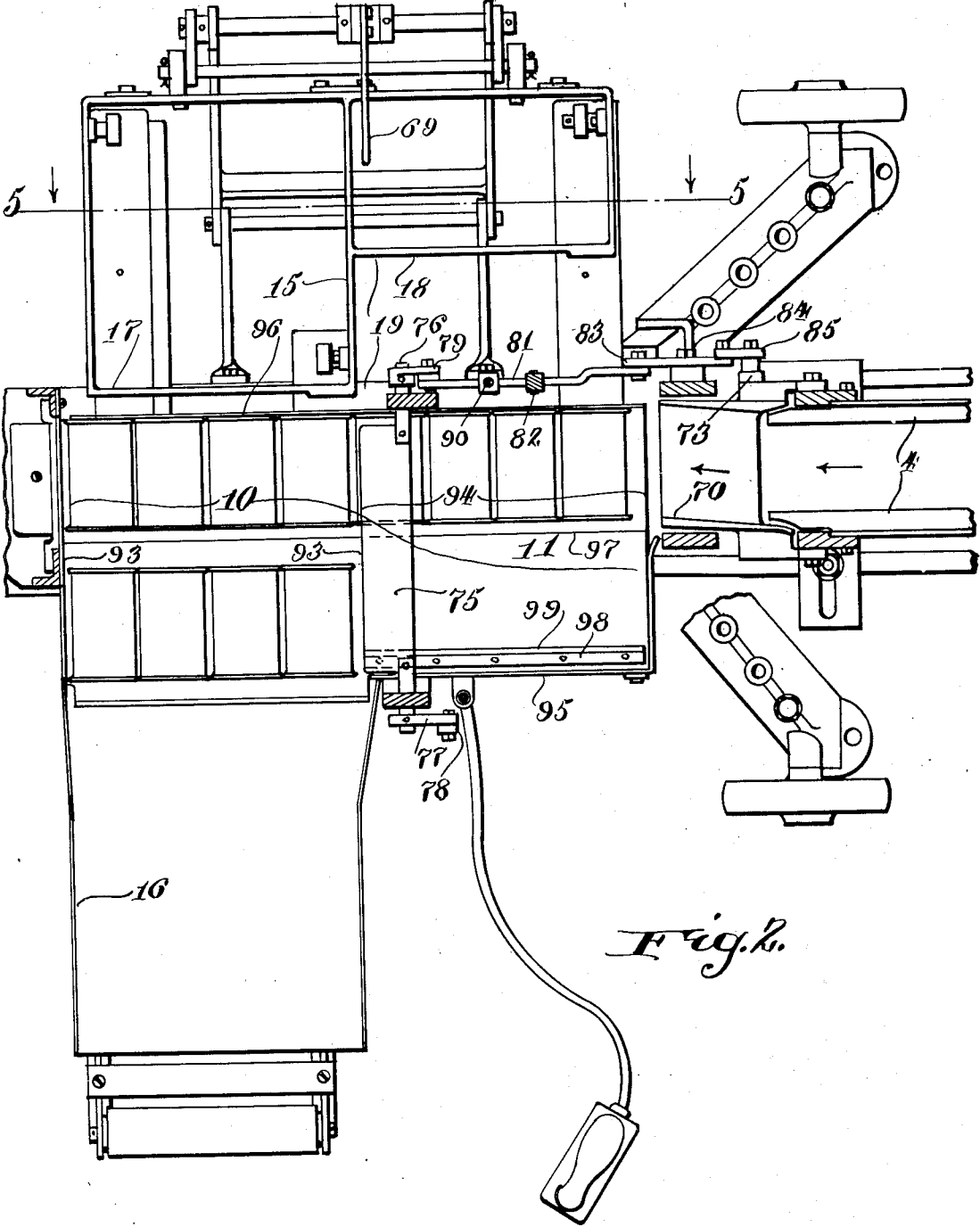


Fig. 2.

WITNESSES
T. H. St. Louis

INVENTOR
Charles H. Wild
BY
Edwin F. Annals
ATTORNEY

Aug. 14, 1934.

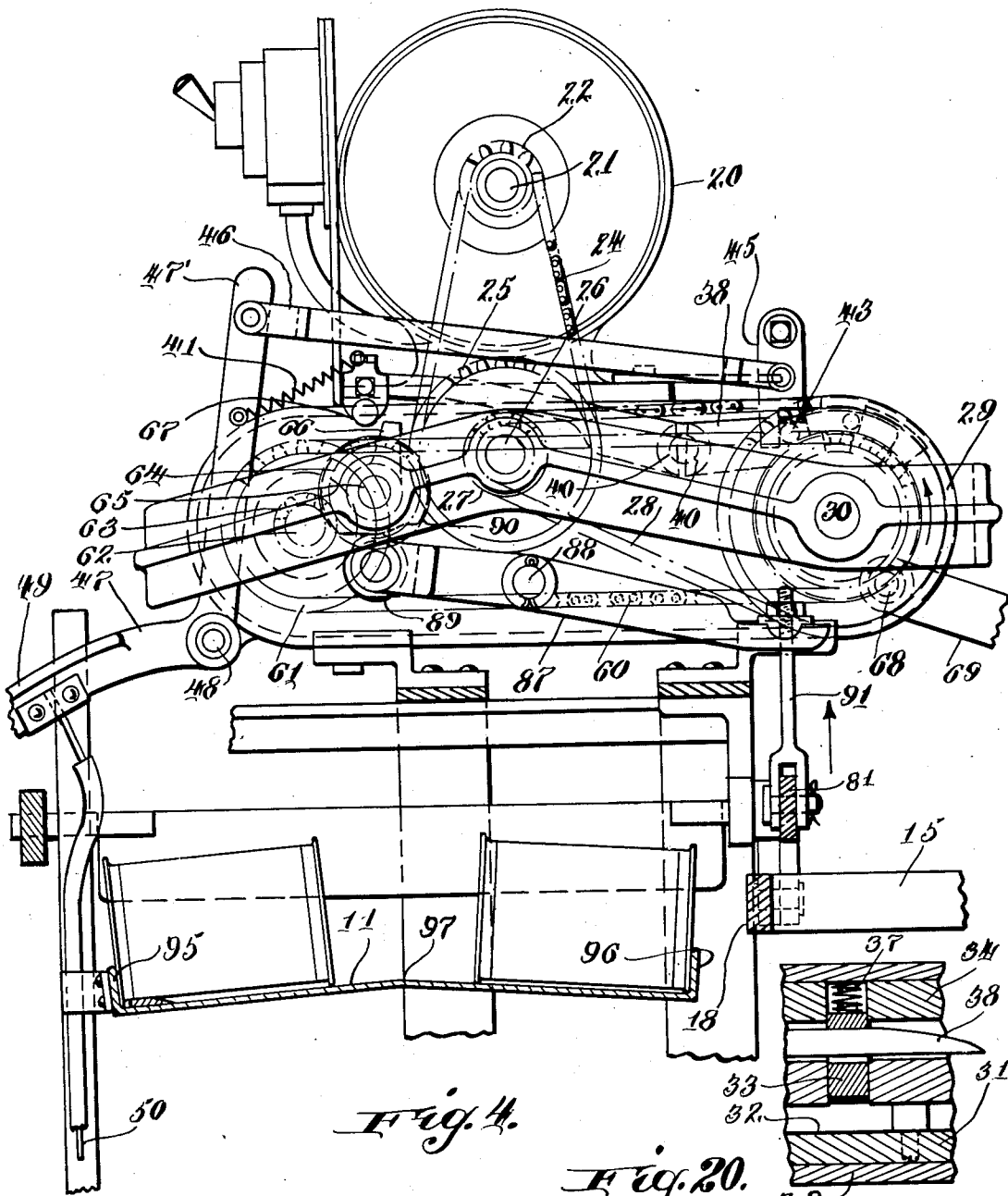
C. H. WILD

1,969,830

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8 Sheets-Sheet 3



Witness
Robert H. Hunt.

Fig. 20.



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Inventor

Charles H. Wild

By Edwin Samuels

Attorney

Aug. 14, 1934.

C. H. WILD

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CARTON FILLING MACHINE

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8 Sheets-Sheet 4

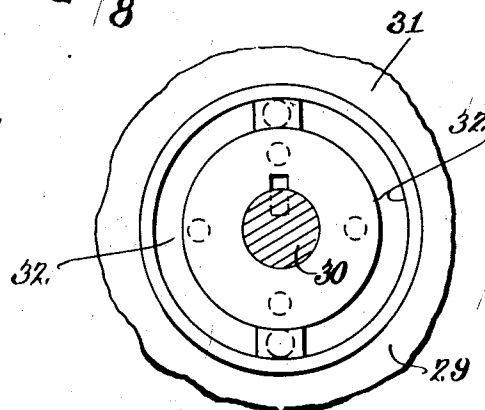
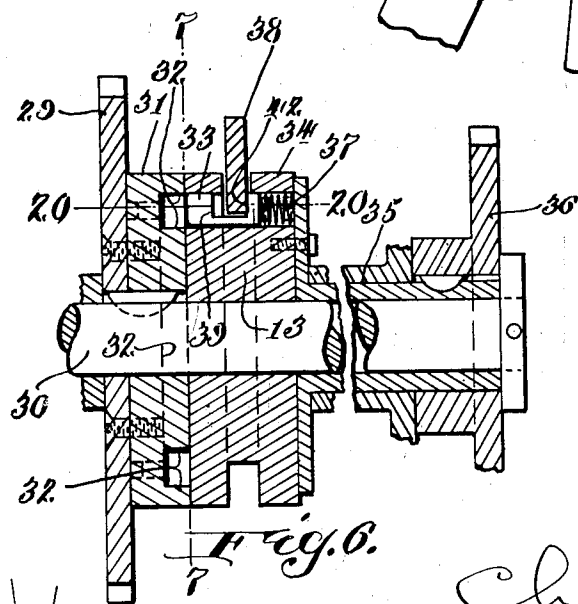
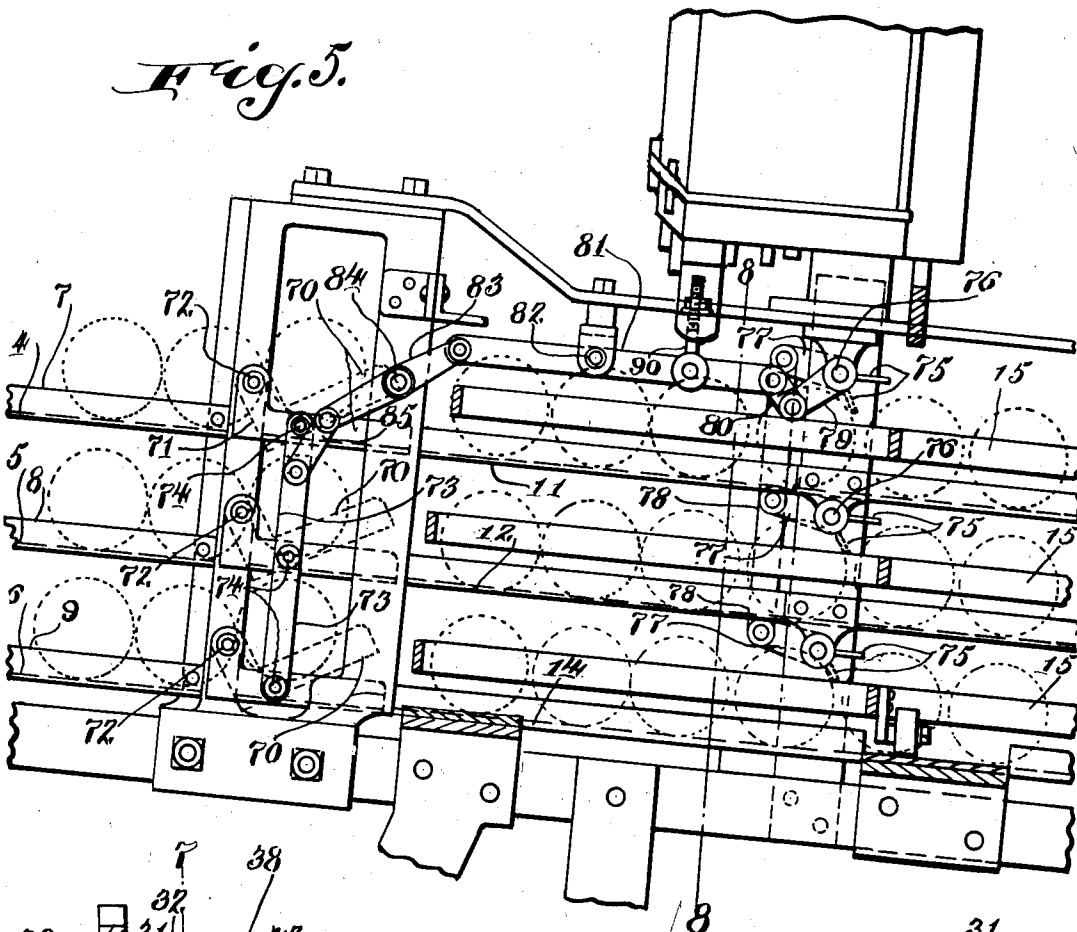


Fig. 1.

Inventor

Charles Henry Wild

By Cotton F. Samuels

Attorney

WITNESSE
For the Defendant: *[Signature]*

Aug. 14, 1934.

C. H. WILD

1,969,830

CARTON FILLING MACHINE

Filed Feb. 21, 1931

8 Sheets-Sheet 5

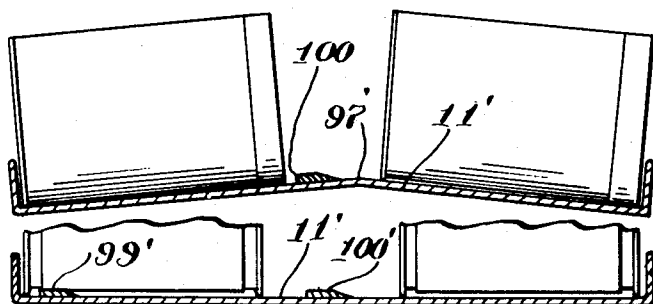
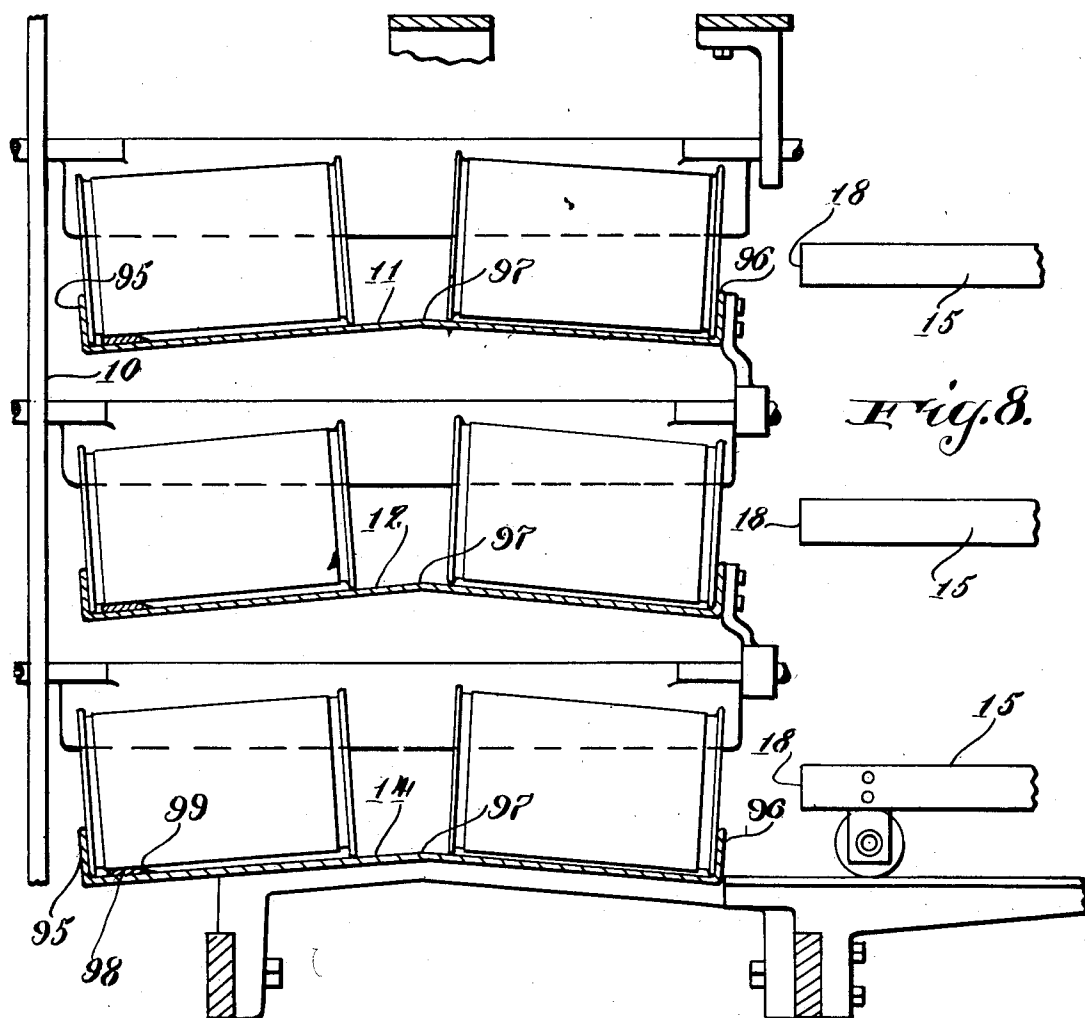


Fig. 9.

Inventor

Fig. 10. Charles H. Wyllie

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Edwin Hammett

Attorney

WITNESS
 Peter H. Hunt.

Aug. 14, 1934.

C. H. WILD

1,969,830

CARTON FILLING MACHINE

Filed Feb. 21, 1931

8 Sheets-Sheet 6

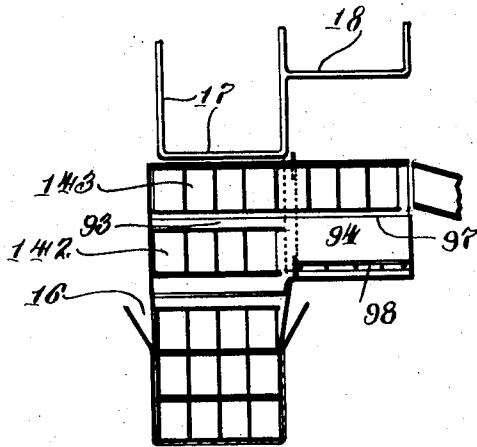


Fig. 11.

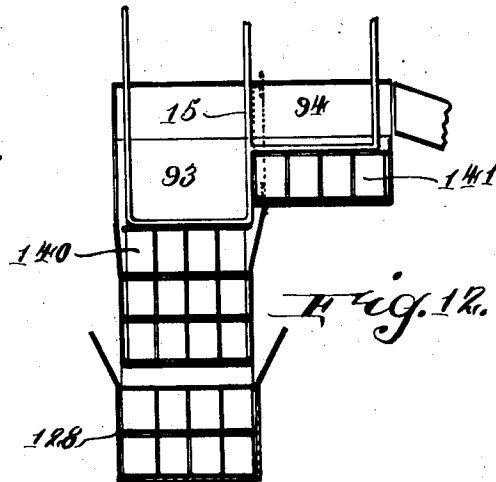


Fig. 12.

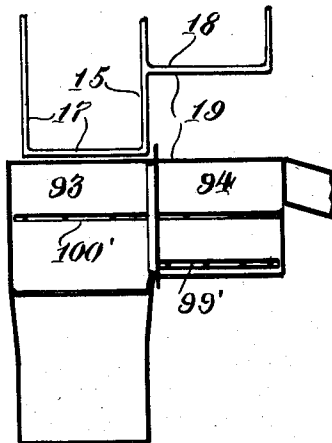


Fig. 13.

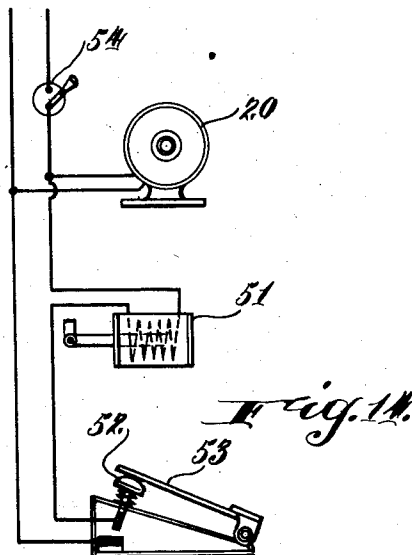


Fig. 14.

WITNESS
T. S. Hand

Inventor
Charles H. Wild
By Edwin J. Farnell
Attorney

Aug. 14, 1934.

C. H. WILD

1,969,830

CARTON FILLING MACHINE

Filed Feb. 21, 1931

8 Sheets-Sheet 7

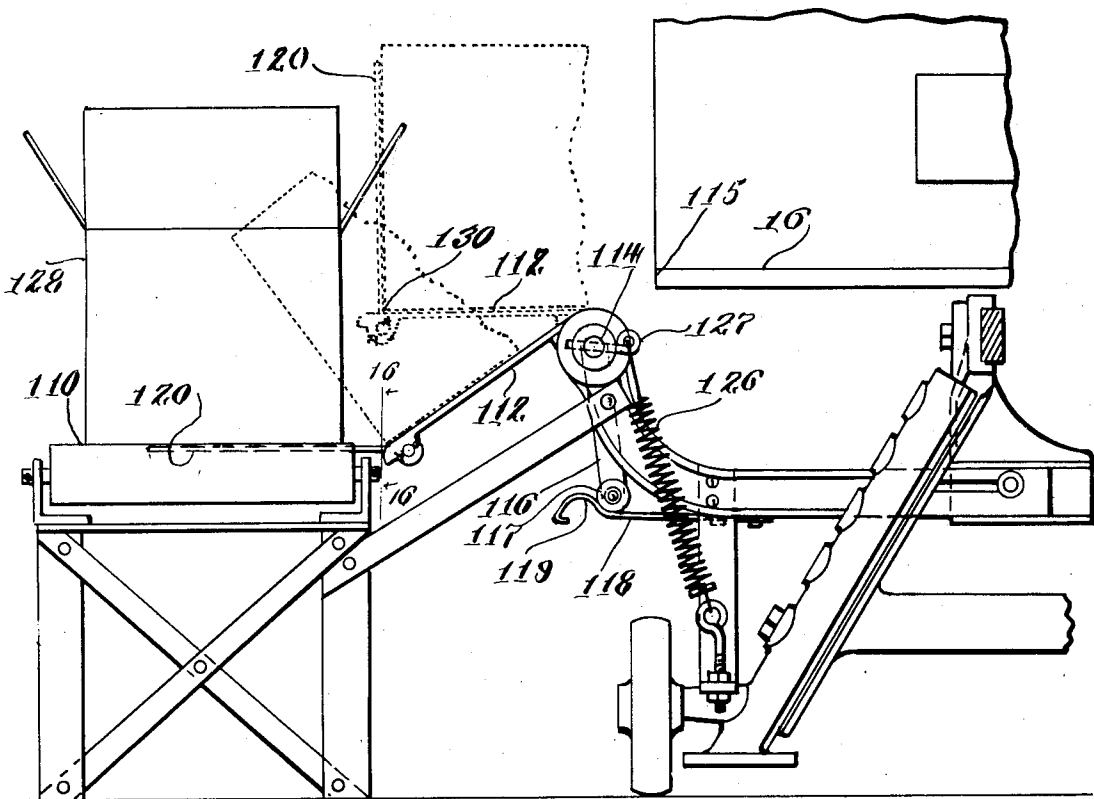


Fig. 15.

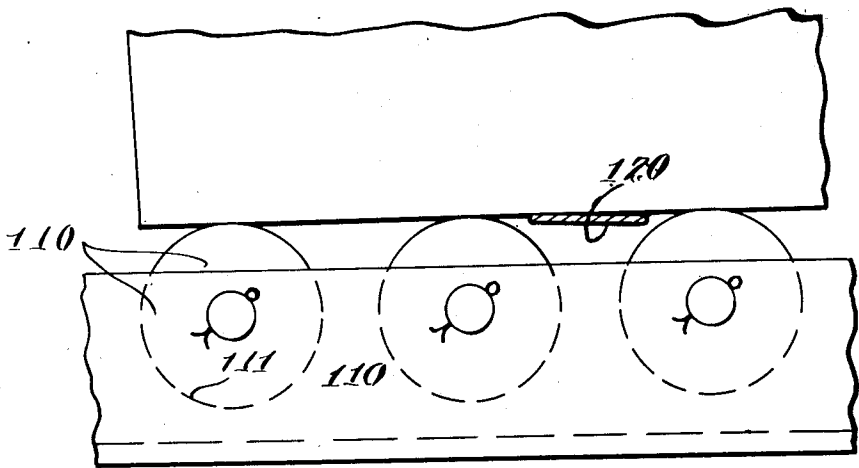


Fig. 16.

WITNESSES
R. H. H. H. H.

Inventor
Charles H. Wild
By Edwin H. H. H.

Attorney

Aug. 14, 1934.

C. H. WILD

1,969,830

CARTON FILLING MACHINE

Filed Feb. 21, 1931

8 Sheets-Sheet 8

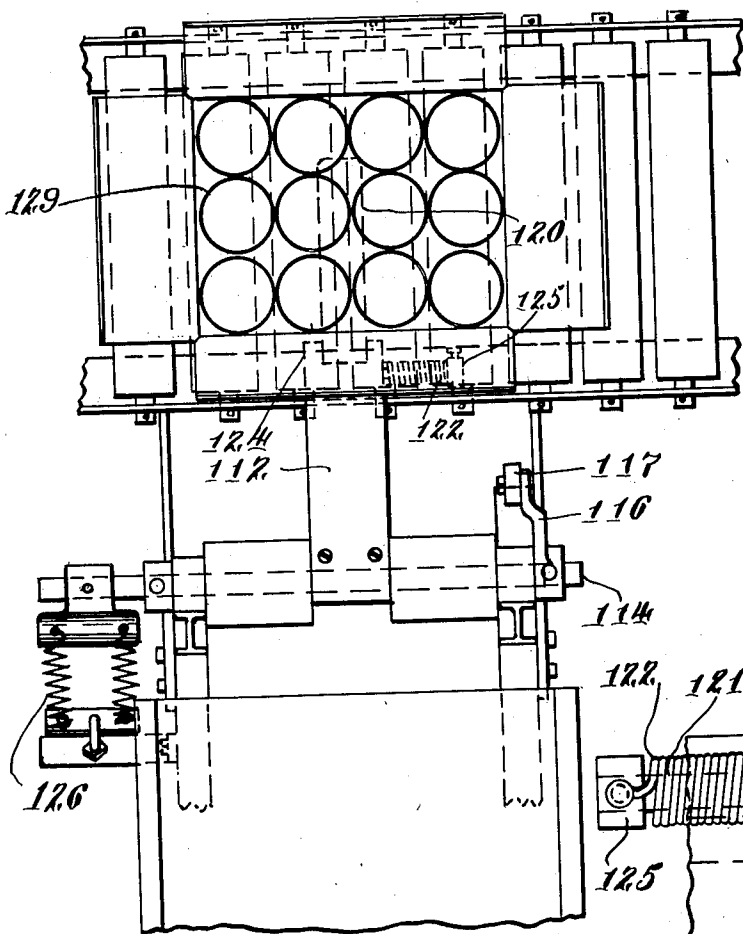


Fig. 17.

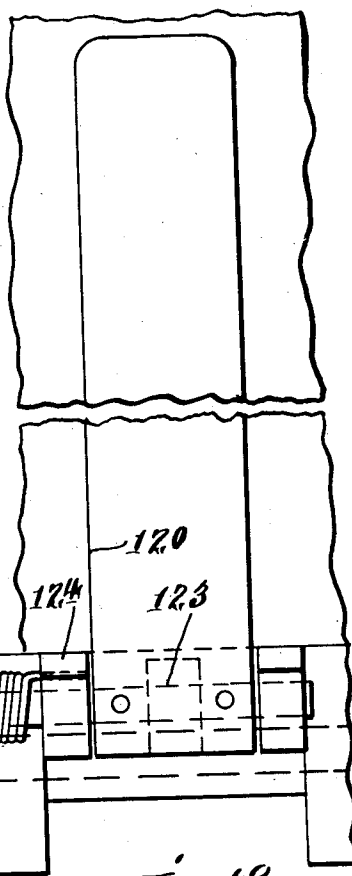


Fig. 18.

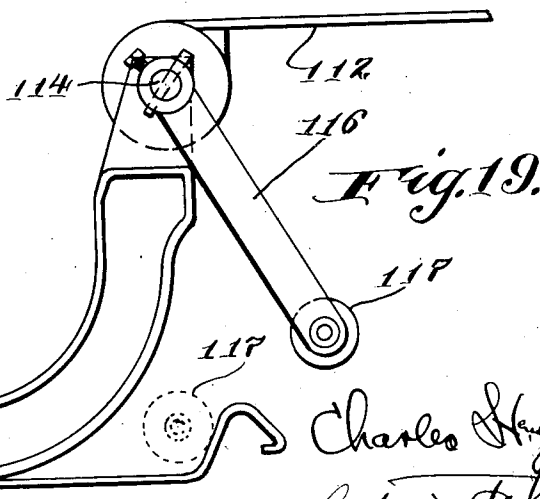


Fig. 19.

WITNESSES
T. J. L. L. L.

Inventor
Charles H. Wild
By Edwin H. Hammele

Attorney

UNITED STATES PATENT OFFICE

1,969,830

CARTON FILLING MACHINE

Charles Henry Wild, Baltimore, Md., assignor to
Burt Machine Company, Incorporated, Balti-
more, Md., a corporation of Maryland

Application February 21, 1931, Serial No. 517,482

15 Claims. (Cl. 226—15)

The invention relates to a machine for filling cartons with cans. In the preferred form shown the cans are fed from a runway into a load forming enclosure in which the cans are assembled on the path of a plunger which reciprocates transversely to the direction of the runways and through the load forming enclosure, transferring each load in turn thus assembled from the load forming mechanism into one of a series of cartons which are in turn placed in line with the plunger and on the opposite side of the load forming enclosure therefrom to receive a corresponding charge of cans.

The machine in the form illustrated is of the same general type and resembles as to portions of its construction the machine described in my prior United States Patent No. 1,787,739 and it is likewise adapted to be power operated as by means of the electric motor shown.

The present invention provides an improved form of machine in which each load instead of consisting of a single layer of cans as in the patent cited above, consists of a plurality of layers. While this idea is not broadly new, the invention includes improved apparatus and combinations of parts whereby the means for assembling cans in the load forming mechanism and rearranging the cans as fed in a single layer to form a load comprising a plurality of layers is brought into a practical form in which it is adapted for use on a commercial machine which is available to meet the present demand for a carton filling machine which is not only quick but reliable and uniform in its operation.

The invention further relates to improved features and details of the load forming enclosure and shelves or case supports whereby the cans are guided and controlled in this passage along the shelves, and to other improved features and details comprising a new combination and arrangement of can gates, a remote control and a device for turning cartons thus loaded and delivering them on to a conveyor whereby they may be carried forward to the closing and pasting mechanism or, if desired, to a station where closing and pasting is performed by hand and to other features as more fully described therein.

In the accompanying drawings I have shown for purposes of illustration of the invention a case filling machine embodying the features of the invention combined in the preferred form of construction, it being understood, however, that the invention is not limited to the details shown but is capable of more general application.

In the drawings:

Figure 1 is a side elevation of the machine looking at the same from the position of the operator where the cans are delivered to the cartons.

Figure 2 is a sectional plan which may be treated as taken on the line 2—2 of Figure 1, looking downwardly.

Figure 3 is a detail of the tripping mechanism, or remote control.

Figure 4 is a fragmentary section on an enlarged scale looking to the left in Figure 1 and taken on or substantially on the line 4—4 in Figure 1, and showing the plunger actuating and the gate actuating mechanism.

Figure 5 is an enlarged section taken on the line 5—5, Figure 2.

Figure 6 is a section in a vertical plane taken on the axis of the automatic clutch.

Figure 7 is a section on the line 7—7 of Figure 6, looking to the left.

Figure 8 is a section through the load forming mechanism on the line 8—8, Figure 5, intended particularly to illustrate the load forming support.

Figure 9 is a fragmentary view illustrating a single support of the load forming mechanism in an alternative form, the section being taken on the same plane as Figure 8.

Figure 10 is a similar section showing still another alternative form of support adapted for use in applicant's load forming mechanism in accordance with the invention.

Figures 11, 12 and 13 are diagrammatic features showing different positions of the plunger and load and the manner in which the funnel cooperates with the casing.

Figure 14 is a circuit diagram.

Figure 15 is an elevation looking from the right in Figure 2 at the delivery end of the funnel and showing applicant's improved apparatus for delivering the casings from the funnel and turning right side up and on to a conveyor.

Figure 16 is a fragmentary view looking to the left in Figure 15 from the line 16, 16 in said figure.

Figure 17 is a top plan view of the turnover mechanism and of the end of the funnel showing a carton which has just been delivered to the conveyor.

Figure 18 is a view of the turnover and delivery forearm looking to the right from line 1a, Figure 15.

Figure 19 is a view looking from the right in Figure 17 and looking at the opposite side of

the machine from that seen in Figure 15 showing the delivery arm control.

Figure 20 is a detail of the periodic clutch in the form of a section on line 20—20, Figure 6.

Referring to the drawings by numerals, each of which is used to indicate the same or similar parts in the different figures, the machine as shown for purposes of illustration as an example of the application of the invention in the preferred form, includes a frame or support 1, which as seen in Figure 1 has legs 2 which are supported on wheels or rollers 3. Mounted on this frame are canways in three tiers indicated by reference characters 4, 5 and 6, respectively. As seen in Figure 1, these ways have side guides 7, 8 and 9, and in the preferred form each way is preferably adapted to carry a single line of cans, though the width of the way in relation to the cans is not essential.

In the form shown the cans are fed by gravity although any suitable feeding means may be provided. The machine also includes load forming mechanism 10 having can supports 11, 12 and 14, see particularly Figures 1 and 5, the ways and the can supports in the form of the invention shown being inclined in the direction of feed to provide for the feeding of the cans by gravity as already suggested.

The machine as illustrated and best shown in plan, Figure 2, has a piston 15 which is reciprocated transversely of the feed through the forming mechanism 10 already described in order to deliver a charge or load of cans at each stroke to a carton suitably placed over and enclosing the end of the funnel at 16.

In the preferred form of the machine shown, the piston has a loading front 17 in line with the funnel which is offset in the direction of the loading thrust and a transfer or load assembly front or portion 18 which is offset to the rear, i. e. oppositely to the direction of the operating stroke from the surface 17 to which it is shown as parallel. The extent of the offset is indicated by reference character 19. This is preferably equal to or substantially equal to the width of the can feeding ways, 4, 5 or 6, it being assumed for convenience that the Figure 2 shows the top way, 4.

The purpose of this offset or step 19, whereby the transfer face 18 is spaced backwardly from the loading face 17 is to provide for the transfer from the line of feed at each stroke of a single layer of cans of a length corresponding to the length of the assembly front and of a height corresponding to the number of ways so that another layer from the ways may take its place forming a plural large load as hereinafter described.

The manner of actuating the piston which corresponds closely to that described in my previous patent above cited will now be briefly outlined.

Referring particularly to Figure 4, the construction includes a motor 20 mounted on a suitable support at the top of the machine having a shaft 21 carrying a sprocket 22 which drives a chain 24 which, in turn, meshes with a larger sprocket 25 mounted on a shaft 26 having suitable bearings in the upper part of the frame. This shaft in turn carries a small sprocket 27 driven from sprocket 26 and sprocket 27 drives chain 28 which meshes with a sprocket 29 mounted on a shaft 30 also having suitable bearings in the machine frame. This sprocket 29 is illustrated in Figure 6 at the left in connection with the automatic or periodic clutch 13 which

is also shown and fully described in my patent above cited. The sprocket 29 is shown as keyed to the continuously rotating shaft 30 and it is provided with a hub 31 having keeper slots 32 to receive a bolt or latch 33 which is mounted in the other clutch member 34 which rotates freely on the shaft and is connected by a sleeve 35 to a driving sprocket 36. The bolt 33 is operated by a spring 37 and a cam plate or arm 38 which engages in its operative position a notch 39 in said bolt.

Cam arm 38 is pivotally mounted at its center at 40 on the machine frame, see Figure 4, and this arm extends to the left in Figure 4, beyond the pivot, being drawn downwardly at its rear end by a spring 41. At its forward end the arm 38 is not only formed with a cam surface at 42 to withdraw the bolt 33 at the proper time as in said patent, but it is further provided with a latch pin 43, Figure 4, which is engaged by a pivoted latch 45 which is controlled by the following mechanism. This latch control includes a connecting rod 46 extending to the left in Figure 4, which is in turn connected to the top end of the upright arm 47' of a bell crank lever 47 pivoted on the machine at its center at 48. This bell crank has an arm 49 extending downwardly to the left in Figure 4. To this arm 49 is connected any suitable operating means as a pull wire 50, see Figure 4. This may be operated by a solenoid 51 Figure 3, included in the motor circuit or otherwise and controlled by a pedal switch 52, Figure 1, operated by a pedal 53, see also circuit diagram, Figure 14, which also includes a switch 54 for controlling the motor circuit. This switch may be in any desired position being well adapted to serve as a remote control, making it possible to operate the machine from a distance. It is obvious that any pull, either by means of the solenoid or applied in any way to the wire 50 will swing the bell crank lever 47 counterclockwise as seen in Figure 4 and release the latch 45. In this connection reference is had to Figure 3, which shows the solenoid core 55, connected to a bell crank 56 which is connected by a link 57 to the pull wire 50 already described whereby the pull of the solenoid is transmitted to the wire. This can be accomplished in any suitable manner, either by electric or mechanical means as preferred and from a distant point if desired.

The swing of the bell crank 47 in counterclockwise direction as described, will swing the latch 45 pendulumlike to the left in Figure 4, releasing the cam lever 38 which will also swing counterclockwise about its center 40 under the tension of spring 41, raising the forward end of the lever having the cam surface 42 thereon, see Figure 6, so that the bolt 39 is released and permitted to advance into the corresponding slot 32 in the hub 31 of the continuously rotating sprocket 29. Under these circumstances the sprocket 36 which is connected by the sleeve 35 to the clutch member 34 of periodic clutch 13 will rotate with the said clutch member for a predetermined period sufficient to advance and withdraw the plunger 15, at the end of which period the clutch member will be disengaged as follows:

The sprocket 36 carried by the intermittent member of the periodic clutch 13 drives a chain 60 which operates a sprocket 61 on the shaft 62 which chain as arranged has parallel and horizontal upper and lower traverses to be further described. This shaft 62 carries a pinion 63 which meshes with and operates a second pinion 64 on a shaft

65, which carries a cam dog 66. The gears are so timed that the cam dog at the end of a single reciprocation of the plunger or at the end of the operation as predetermined, strikes a follower 67 on the rear end of the lever 38, throwing the cam portion of the lever 42 back into the slot 39 in the bolt 33, at which time the pin 43 on this lever near the lower end, see Figure 4, is again engaged by the swinging latch 45, which is to some extent controlled by the spring 41, which connects the rear end of the lever 38 to the corresponding upper end of the bell crank 47, applying a suitable tendency to both of said members.

The chain 60 which is thus operated intermittently by the intermittent clutch 13 which may be controlled as desired by the cam 38, carries a wrist pin 68 on which is mounted one end of a connecting rod 69, which is connected at its other end, see Figure 2, to the plunger or piston 15, whereby the latter is given a single reciprocation for each complete operation of the intermittent clutch.

To prevent contact of the cans in the forming mechanism in the feeding of the cans from the chute to the load forming mechanism with the cans on the ways whereby the labels would be rubbed and in some instances some of the cans would be caught and jammed, a separating mechanism or gate is provided at 70, the same being repeated in connection with the way for each tier. This mechanism in accordance with the preferred form of applicant's invention, comprises a portion of the way which is swung upwardly and backwardly contrary to the direction of feed so that the last can on the ways, or more particularly the can on the gate, is raised and given a tendency to roll backward contrary to the feed, accomplishing a complete separation of the cans on the ways from the cans comprising the load, or in the load forming mechanism. Each gate or separator 70 is shown in the form of an angle lever having an upwardly extending arm 71 which is supported and pivoted at its upper end whereby each gate is supported at 72 on the frame.

In the form of the invention shown the three gates corresponding to the ways 4, 5, 6, are connected together by a vertical connecting rod 73, each of which is pivotally connected to the corresponding gate at 74.

In view of the manner of transferring a portion of the cans from their position substantially in line with the ways to a position at one side of this line to permit the feeding of the second layer of cans to form the load in the manner being described and particularly in view of the advance of each additional separating means are found desirable between the load immediately in front of the advance faces 17 of the piston and the partially formed load in front of the rearwardly spaced transferring face or faces 18. The combination of the two sets of spacers or gates for the two different purposes of separating the cans on the ways from the load in the process of formation and a second set of separating means to separate the load in the process of formation from the load actually being advanced in the direction of the funnel is an important feature of the invention. The separating means which we will refer to as intermediate separators or gates between the load being advanced toward the funnel and the load in the course of assembling as to which there is essentially relative

motion in the direction of the plunger stroke, are indicated by reference character 75, see Figure 5. Each said gate or separator is secured to a corresponding shaft 76 mounted in the frame, there being one said gate for each tier of cans and for each corresponding support and to each said shaft there is secured an arm 77, and these arms are connected together by vertical connecting rod 78 corresponding to the connecting rod 73. In addition to this, there is an actuating arm 79, secured to the upper shaft 76, or to any one of these shafts 76 as is most convenient, and this actuating arm 79 is connected by a link 80 to the horizontal rocking lever 81, which, pivotally mounted on the frame at 82, is pivotally connected at its opposite end to a rocking lever 83 adjacent the gates 70. This lever 80 is pivotally mounted near its center at 84 on the frame and connected by means of a link 85 to the vertical connecting rod 73 which actuates the gates 70 which control the cans coming from the ways so that both sets of gates 70 and 75, are operated simultaneously, preferably from a single source. However operated, they separate the cans on the ways by means of the gates 70 from the cans in the preliminary loading stage, i. e., the assembly arms 94, which are about to be transferred from their position substantially in alignment with the ways to the second position in which they are combined with a second layer and the second set of gates referred to as intermediate gates 75, separate the cans in this preliminary stage from those in the delivery arms 93 in front of the forward surface 17 of the plunger by which the cans are advanced toward the funnel 16. The sets of gates separately considered are also features of the invention.

This simultaneous actuation of the gates is accomplished in the formation of the invention shown by means of a rocking lever 87, Figure 4, which is pivotally mounted at its center 88 on the frame, and carries a follower 89 at one end which is operated by a cam 90 on the shaft 65 actuated through the intermittent clutch 13. This lever is connected at its opposite end by means of a link 91 to the forward arm of the lever 81 which has just been described as connected to the actuating mechanism of both sets of gates to operate them. Rocking lever 87 rocks lever 81 and operates the gates.

In this manner the timing of the gates can be easily controlled and is thereby made to precede the contact of the piston with the cans.

The provision of two sets of can gates or separators as will be understood, has an important function in connection with the double function of the plunger, whereby one set of cans is advanced or moved transversely relative to the cans on the ways, the cans thus advanced being in the preliminary loading stage and another set of cans, i. e., the load already formed in line with the funnel, is advanced toward the funnel and relatively to the cans on the preliminary loading stage.

In this connection it is of interest that the load forming mechanism 5 comprises a delivery portion 93 in direct alignment with the funnel and in front of the advanced faces 17 of the plunger, and known as the delivery or funnel loading enclosure, and an assembling enclosure 94 in front of the transfer surfaces 18 of the piston, this latter enclosure is actually closed by side guides 95 on the front side, as seen in Figure 2, the funnel or delivery enclosure 93 being open

at the front at 98 into and in connection with the funnel 16.

It is of particular interest in connection with the present construction that the top gate 70 of the ways is inclined in a horizontal plane away from the observer in Figure 2 and in the direction of the forward guides 96, Figure 8, imparting to the cans a tendency to move up close to the rear guides 96, tending to align them evenly along this guide, and it is of further interest that to maintain this alignment and avoid any tendency of the cans to swing sidewise or diagonally, each can support or shelf 11, 12 and 13, Figure 5, and particularly Figure 8, is inclined downwardly from the center line 97 of each support, said line being drawn in the direction of feed from the ways and the enclosure being downward from said line 97 toward the side guides 95 and 96 of the can supports, it being understood that the guide 95 is discontinued opposite the funnel, the support being extended laterally in the direction of the motion of the cans into the funnel as shown at 98 in Figure 2. The incline has the tendency, as already pointed out, to keep the ends of the cans in close contact with the guides and to maintain the alignment and prevent deflection and consequent tendency to cramp.

It is further of interest that in addition to inclining the support in this way after the manner of the roof of a house of very flat pitch, the ridge or center line 97, corresponding to the ridge pole and the side guides 95, 96 to the gutters, the supports 11, 12 and 14 may be provided adjacent the guide 95 with a track 98, which extends in the direction of the feed of the cans from the ways and engages the corresponding edge beads of the cans, being bevelled as to the edge 99 toward the plunger so as to eliminate any chance that the cans moving in front of the plunger and in the direction of the stroke, will be caught or obstructed in their motion. This track 98 is preferably a short track extending only across the assembling enclosure. Figure 9 shows a similar can support or shelf 11' for the load forming mechanism having a center ridge 97' from which the two sides of the support are inclined in both directions, and a track 100 very much like the track 98, only it is so placed as to guide the can from the end nearest the center of the support, the same being intended for use in connection with those cans which do not have any flange or bead.

Figure 10 shows still another form in which the load forming support is flat, being provided with a long center track 100' and a short side track corresponding to the track 99 for engaging the flanged or beaded edges of the cans, the same being indicated by reference character 99'.

In this connection it will be understood that in accordance with the invention the can supports for the load enclosure may be formed with or without the center ridge 97, 97', the ridge being the preferred construction and the tracks 99 and 100 may be used together or separately with or without the inclination of the can support downwardly from the center line or ridge 97.

The disclosure also includes a turning mechanism for the filled cartons as they are delivered from the funnel, see Figures 15 to 19. In this connection it will be understood that the cartons being filled are placed, one at a time, over and enclosing the end of the funnel 16, the cans as they advance and fill the carton, serving to push the carton off of the end of the funnel so that if not supported it will drop with its load of

cans. This operation is illustrated in Figures 11 to 13, which will be described in connection with the operation.

Figures 15 to 19 show a turning mechanism for delivering filled cartons to a conveyor 110 shown as composed of rollers 111. The cartons may be moved along the rollers in any suitable manner not shown or by gravity. The transfer mechanism comprises a supporting arm 112 shown fragmentarily in Figure 19 in horizontal position which is its normal position. This supporting arm is mounted to rotate about a shaft 114, Figure 17, adjacent parallel to and a little below the bottom edge of the delivery end of the funnel at 115. Rigid with the arm 112 and at an acute angle thereto, there is shown a depending controller arm 116, carrying at its lower end a roller 117 which engages a spring detent 118 in the form of a spring arm projecting from the frame and having at its end an upwardly convex portion 119 which impedes the advance of the roller in either or both directions acting as an obstacle to the same in swinging the support 112 either upwardly or downwardly. The convex portion 119 is so located as to check the downward swing of the arm 112 just as the carton reaches the level of the conveyor 110 as hereinafter described.

Pivotally mounted on the end of the upper arm 112 and extending outwardly therefrom is the forearm or plate 120, the same being connected to the supporting arm by spring hinge 121, the same being shown as having a spring 122, which in the preferred form shown is arranged similarly to a screen door hinge, being wrapped around a shaft 123 which is carried in suitable bearings 124 on the end of the arm 112, to which shaft the arm 120 is secured. The spring 122 is connected at one end to the shaft bearing member 124, which is integral with the supporting arm 112 and at the other end it is secured to a collar 125 which is, in turn, secured to the shaft 123. The supporting arm 112 is also provided with a positioning spring 126 shown in the form of a helical spring connected at one end to the frame at a low point near one of the wheels and at the other end to a radial pin 127 projecting from the shaft 114, which carries the arm 112, and on the opposite side thereof to the direction of the projection of said arm 112. This spring has a tendency to hold the frame 112 in a horizontal position when the roller 117 has passed the convex portion of stop 119 on the spring 118.

In operation the turnover or delivery mechanism is put in operative position by the thrust of the operative hand tending to raise it toward horizontal position causing the roller 117 to pass the convex portion 119 on the spring stop 118.

As the case 128 filled with cans 129 is forced off of the end of the funnel 16, it moves to the left in Figure 15 before being dropped, being thus deposited on the supporting arm 112 which is then in horizontal position, but which, as the weight of the case filled with cans is transferred to it, swings downwardly to the left as shown, the forearm 120 being at the time turned upwardly against the side of the case or carton which is at the left in Figure 15. As the arm 112 swings downwardly due to the excess load, the case acquires sufficient momentum to rotate it about the lower left hand corner 130 and the forearm 120 yields to the weight of the case and the cans, flexing the spring 121, so that the arm 120 swings downward to horizontal position between the rollers 111 as shown in Figure 16. In this position the roller 117 has passed the

convexity at 119 so that the mechanism is held in delivery position till the carton runs off of it, the supporting arm 112 and the rest of the mechanism being returned to normal by a touch from the operator which causes the roller 117 to pass the stop 119, the spring 126 serving to thereafter return the arm 112 to normal or horizontal position.

The operation of the delivery mechanism needs no further description. In the operation of the machine, the cans are fed along the inclined ways, 4, 5 and 6, on which they are placed in any suitable manner either by the operator or by means of a conveyor. As they roll down the ways, they tend in the first instance to fill with a single tier of cans the portion of the load forming mechanism, i. e., the assembling enclosure 94, which is immediately opposite the ways, although the cans are slightly deflected by the inclination of the gates 70 as shown in Figure 2, and by the inclination of the can supports from the ridge 97 to the right and also to the left toward the guides 96 and 95, as seen in Figure 8. As already pointed out, this inclination imparts a tendency to the cans to move in the direction of the guides and prevents cramping and disalignment. Before the plunger advances, both sets of gates 70 and 75 are actuated, the gates 70 being raised and the gates 75 being lowered in the form of the invention shown. This, as already pointed out, is accomplished by suitable connections from the cam 90, Figure 4, including the rocking lever 87, which is connected to both sets of gates, although other mechanism may, of course, be substituted for this and for the other details of applicant's construction. By the advance of the plunger the single layer of cans in the funnel loading enclosure will be advanced ahead of the portion of this layer of cans in the assembling enclosure 94, and as the plunger advances, they will be moved toward the mouth of the funnel, this layer of cans being indicated by reference character 140 in Figure 12 and the single layer of cans located in the assembly portion 94 of the load forming mechanism will then be advanced to the front of the assembly enclosure as indicated in Figure 12 at 141. When the plunger is withdrawn a new layer of cans will move forward from the ways for the entire length of the enclosures 93 and 94, taking the place of the single layer just described, and the cans 141 will move forward to the position 142 shown in Figure 11, the single layer of cans referred to in both 93 and 94 areas being indicated by reference character 143. At the next advance of the plunger, the cans in front of the forward pushing surfaces 17 of the plunger will be advanced toward the funnel 16, pushing the cans 142 in front of them and the remainder of the cans in line with the ways and the area 94, and in front of the transfer portion 18 of the plunger will be transferred to the forward side of the assembly enclosure 94. A carton being placed over the funnel 16 in the manner already described will be filled and pushed off of the funnel by the action of the plunger advancing the cans as best shown at 128 in Figure 12. As already pointed out, the inclination of the can supports in a lateral direction, as shown in Figure 8, gives to the cans a tendency to move to the side against the guides 95, 96 and the tracks 99 contribute to the desired result in guiding the cans and preventing the tendency to cramp. The guides or tracks 99 may be placed either in position to engage the flange or bead of the can as shown in Figure 8, or engage the end of the can

particularly where there is no bead as in Figure 19 at 100, or the inclination of the support may be dispensed with and one or more tracks or guides 99' or 100' may be used.

The two sets of can gates employed in connection with the stepped plunger having the two sets of operative surfaces 17, 18, spaced apart to advance the cans into the plunger and to assemble the load as described, are of particular importance, as this arrangement makes this type of machine operative in a practical way and acceptable commercially, a result which has not been previously attained.

I have thus described specifically and in detail a case filling machine embodying the features of my invention in the preferred form in order that the manner of constructing, operating and using the same may be clearly understood, however, the specific terms are used descriptively rather than in a limiting sense, the scope of the invention being defined in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a machine for filling cartons with cans, ways for the cans, a load forming enclosure comprising an area for assembling the load and a delivery area, plunger means spaced apart in the direction of stroke, one said means cooperating with each said enclosure, a gate for separating the cans on the ways from those in the enclosure and another gate for separating the cans in the assembling area from those in the delivery area, automatic means for operating both said gates prior to the advance of the plunger, one gate being in the form of a fragmentary can support and means for raising the same, the other gate being adapted to move downwardly from above the cans.

2. In a machine for filling cartons with cans a load forming enclosure having can supports, ways for feeding cans to the supports, the supports being each inclined laterally to the direction of feed from a central ridge and guiding means substantially parallel to the ridge and a plunger for moving the cans transversely to the ridge in feeding them to the cartons.

3. In a machine for filling cartons with cans a load forming enclosure having can supports, ways for feeding cans to the supports, each support being inclined downward laterally to the direction of feed from a central longitudinal elevated portion guiding means spaced outwardly from said ridge and a plunger for moving the cans transversely to said longitudinal elevated portion in feeding them to the cartons, the load forming enclosure having an assembling section and a delivering section.

4. In a machine for filling cartons with cans a load forming enclosure having can supports, ways for feeding cans to the supports, the support being inclined downward laterally to the direction of feed from a central longitudinally extended high portion, and a piston for moving the cans transversely over this high portion in feeding them to the cartons, the load forming enclosure having an assembling section and a can feeding section, and the plunger having a delivery front and a transfer or assembling front, one being in advance of the other.

5. In a machine for filling cartons, load forming mechanism, means for feeding the cans to the load forming mechanism, a plunger and funnel cooperating with the load forming mechanism, the load forming mechanism including supports inclined downwardly in both directions which are lateral to the direction of the ways, said supports

having a track extending in the direction of the ways for guiding the cans.

6. In a machine for filling cartons with cans and the like a load forming mechanism, means for feeding the cans to the load forming mechanism, a plunger cooperating with the load forming mechanism, the load forming mechanism including supports inclined downward from a longitudinally extending central elevated portion, in a direction, lateral to the direction of the ways, said supports having a track extending in the direction of the machine for guiding the cans, said track being adjacent and parallel to said central elevation.

7. In a machine for filling cartons with cans and the like, load forming mechanism, a plunger and funnel cooperating with the load forming mechanism, the load forming mechanism including supports inclined downwardly from a longitudinal central elevated portion in both directions which are lateral to the direction of the ways, said supports having a continuous track extending in the direction of the ways for guiding the cans, said track being adjacent and parallel to said elevated portion, and extending substantially the entire length of the load forming mechanism.

8. In a machine for filling cartons with cans and the like, load forming mechanism, means for feeding the cans to the load forming mechanism, a plunger and funnel cooperating with the load forming mechanism, the load forming mechanism including supports inclined downwardly from a central longitudinally extending elevated portion in both directions laterally to the direction of the ways, said supports having a continuous track extending in the direction of the ways for guiding the cans, said track being remote from said elevated portion.

9. In a machine for filling cartons with cans and the like a load forming mechanism, means for feeding the cans to the load forming mechanism, a plunger and funnel cooperating with the load forming mechanism, the load forming mechanism including supports inclined in both directions laterally to the direction of the ways, said supports having a continuous track extending in the direction of the ways for guiding the cans, said track being remote from the peak of the inclination and extending substantially half only of the length of the load forming enclosure.

10. In a machine for filling cartons with cans a load forming enclosure, ways for feeding the cans to the enclosure, a plunger cooperating with the enclosure moving transversely to the direction of feed, tracks for guiding the cans through the enclosure in the direction of the ways, said tracks having a guide surface to engage the cans near the edges and being bevelled on the side toward the plunger to prevent interference with the motion of the cans in response to the plunger.

11. The combination in a machine for filling cartons with cans of a plunger, a funnel and means for receiving the cans from the funnel and delivering them, comprising a spring supporting arm and a spring forearm pivotally mounted on said supporting arm adjacent the mouth of the funnel, said spring fore arm yielding to the weight

of said cartons upon the same being delivered to a conveyor, said spring forearm acting as means for yieldingly delivering said cartons to said delivery conveyor.

12. The combination with a machine for filling cartons with cans having a plunger and a funnel, a supporting arm pivoted adjacent the mouth of the funnel to receive the cartons as delivered therefrom, resilient means tending to hold the arm substantially in horizontal position to receive the cartons, a conveyor adjacent the arm, the said resilient means being adapted to yield to the weight of the carton and deliver the same turned to upright position on said conveyor, the said arm having a yielding forearm normally at right angles thereto adapted to support the carton in receiving position yielding to the weight of the carton as it is delivered.

13. The combination with a machine for filling cartons with cans having a plunger and a funnel, a supporting arm pivotally mounted adjacent the mouth of the funnel to receive the carton as delivered therefrom, resilient means tending to hold the arm substantially in horizontal position to receive the loaded cartons, a conveyor adjacent the arm, the said resilient means being adapted to yield to the weight of each carton and deliver the same turned to upright position on said conveyor, the supporting arm having a spring forearm pivotally mounted on the end to prevent slipping of the carton prior to turning.

14. The combination with a machine for filling cartons with cans having a plunger and a funnel, a supporting arm pivotally mounted at an end adjacent the mouth of the funnel to receive the cartons as delivered therefrom, resilient means tending to hold the arm substantially in horizontal position to receive the cartons, a conveyor adjacent the arm, the said resilient means being adapted to yield to the weight of the carton and deliver the same turned to upright position on said conveyor, the supporting arm having a spring forearm pivotally mounted on its swinging end to prevent slipping of the carton prior to the turning, the resilient means controlling the supporting arm including a depending arm and a plate spring having a convex stop thereon.

15. In a machine for filling cartons with cans, ways for the cans, a load forming enclosure comprising an area for assembling the load and a delivery area, plunger means spaced apart in the direction of the stroke, said load forming enclosure, said ways and said plunger being adapted to operate in connection with a plurality of tiers of cans, one said means cooperating with each said area, a set of gates for separating the cans on the ways from those in the enclosure and another set of gates for separating the cans in the assembling area from those in the feeding area, automatic means for operating both said sets of gates prior to the advance of the plunger, the gates of one set being in the form of fragmentary can supports and having means for raising the same, the other set of gates being adapted to move downwardly from above the cans.

CHARLES HENRY WILD.