Jan. 14, 1936. C. H. WILD 2,027,946

CARTON FILLING MACHINE

Filed Oct. 5, 1931 10 Sheets-Sheet 1

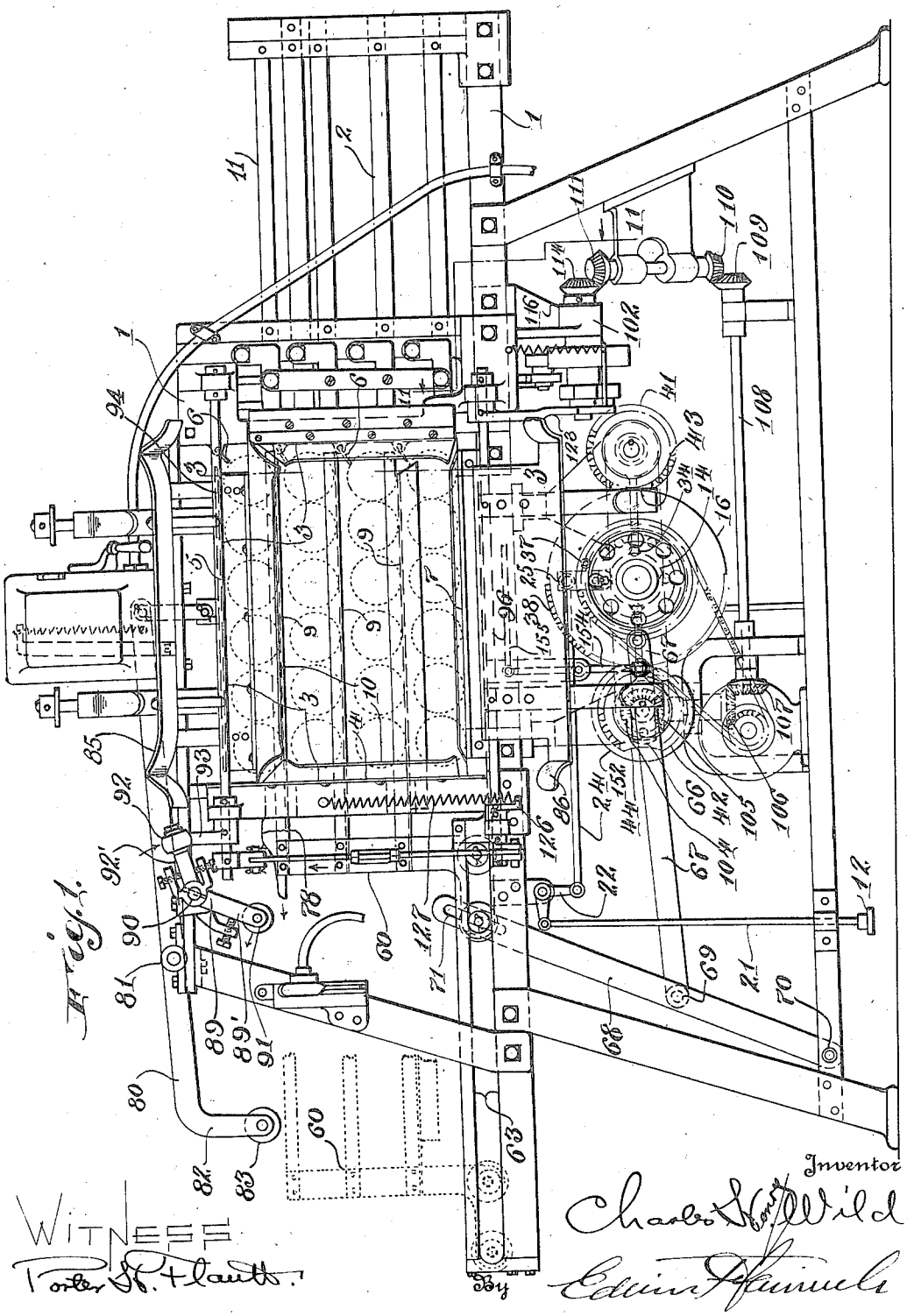


Fig. 1.

Witness
Porter H. Faulk.

Inventor
Charles H. Wild.
By Edwin S. Samuels
Attorney

Jan. 14, 1936. C. H. WILD 2,027,946

CARTON FILLING MACHINE

Filed Oct. 5, 1931 10 Sheets-Sheet 2

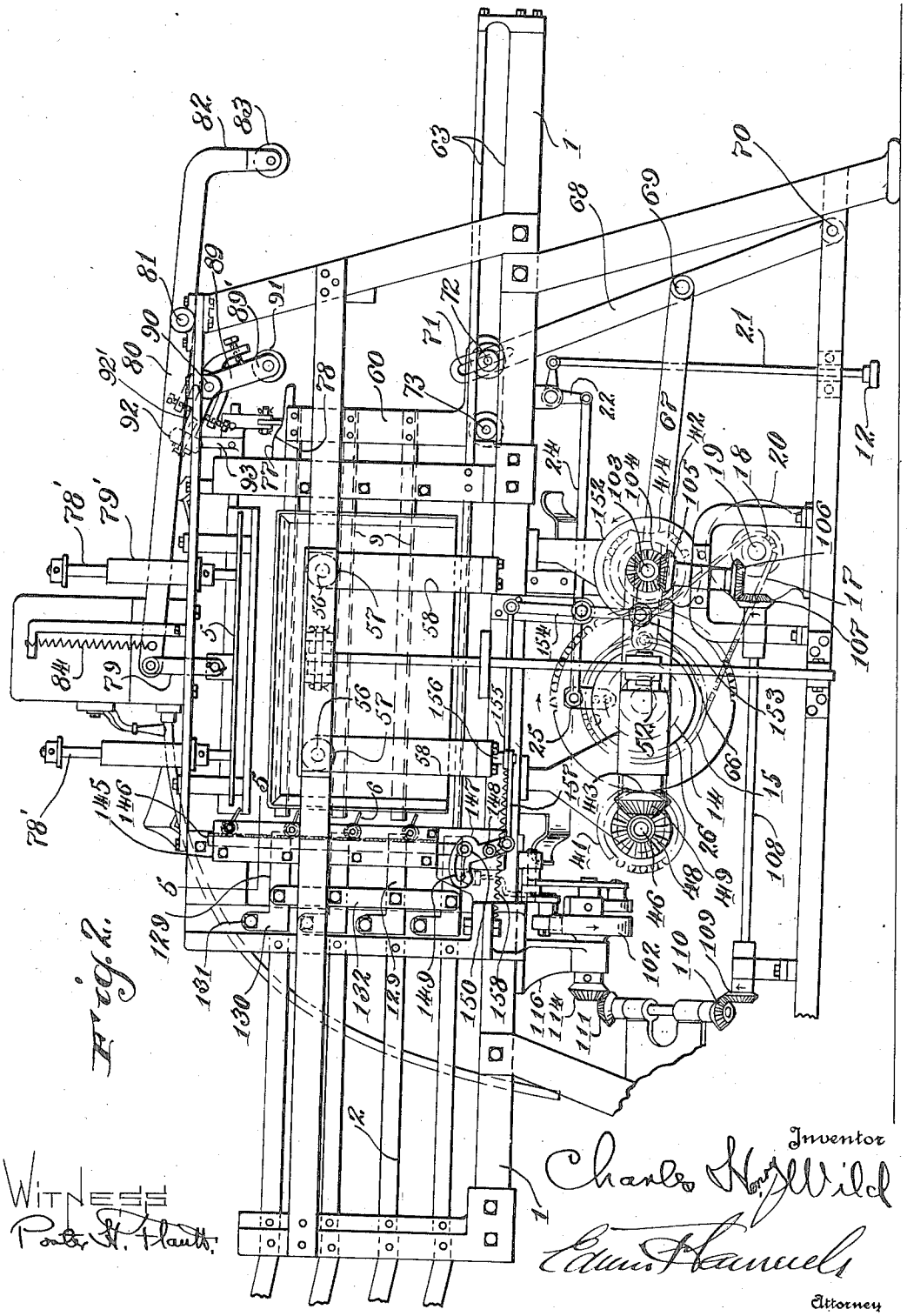


Fig. 2.

Witness:
Porter W. Flautt.

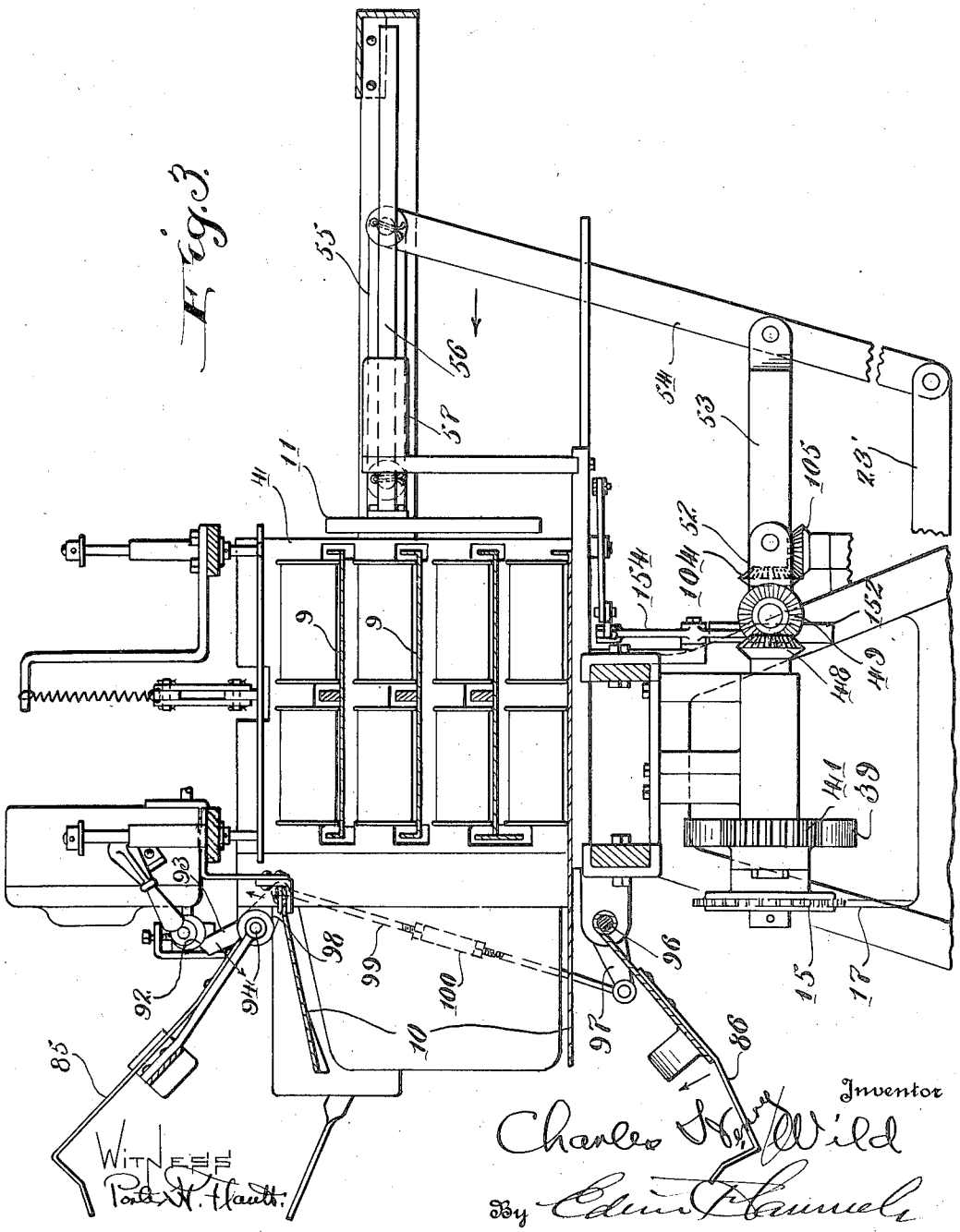
Inventor
Charles H. Wild
Edwin Hamuels
Attorney

Jan. 14, 1936. C. H. WILD 2,027,946

CARTON FILLING MACHINE

Filed Oct. 5, 1931 10 Sheets-Sheet 3

Fig. 3.



Witness
Paul H. Hauth.

Inventor
Charles H. Wild
By Edwin Thomas
Attorney

Jan. 14, 1936. C. H. WILD 2,027,946

CARTON FILLING MACHINE

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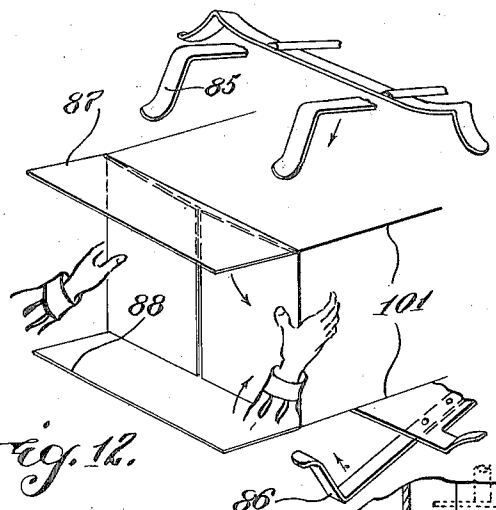


Fig. 12.

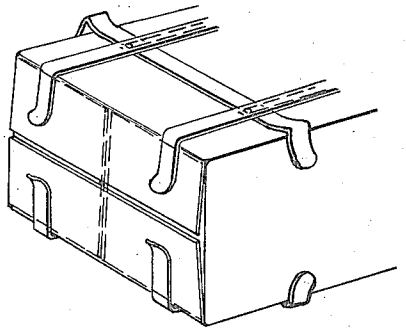


Fig. 13.

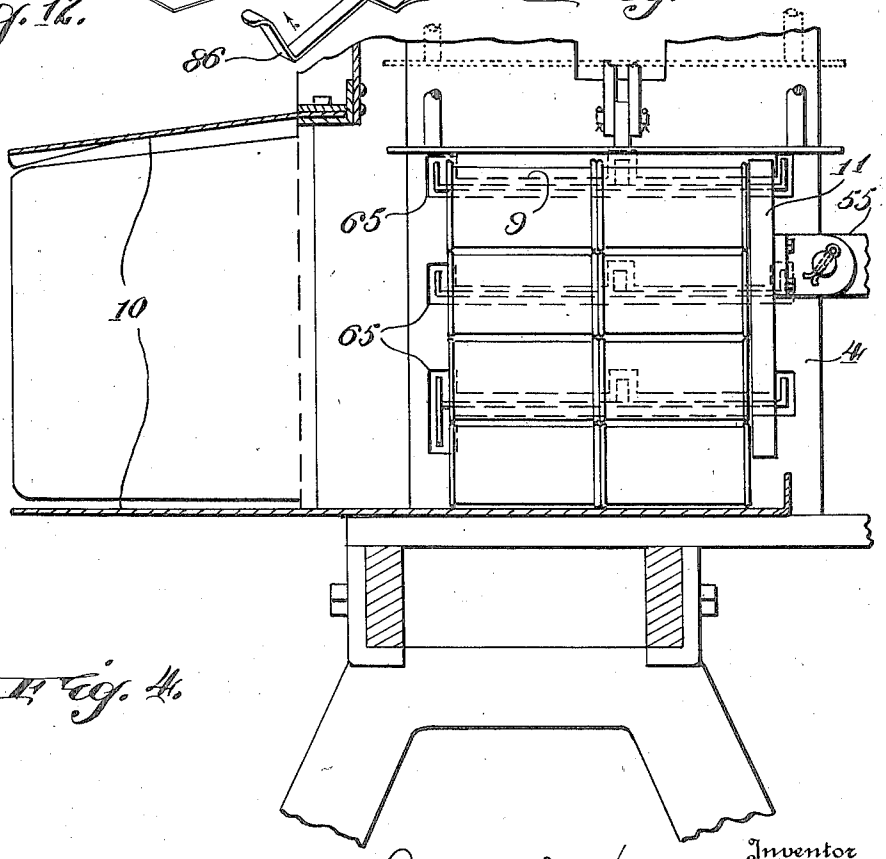


Fig. 14.

Witness

Inventor

Charles H. Wild

By Edwin P. Samuels

Attorney

Jan. 14, 1936. C. H. WILD 2,027,946

CARTON FILLING MACHINE

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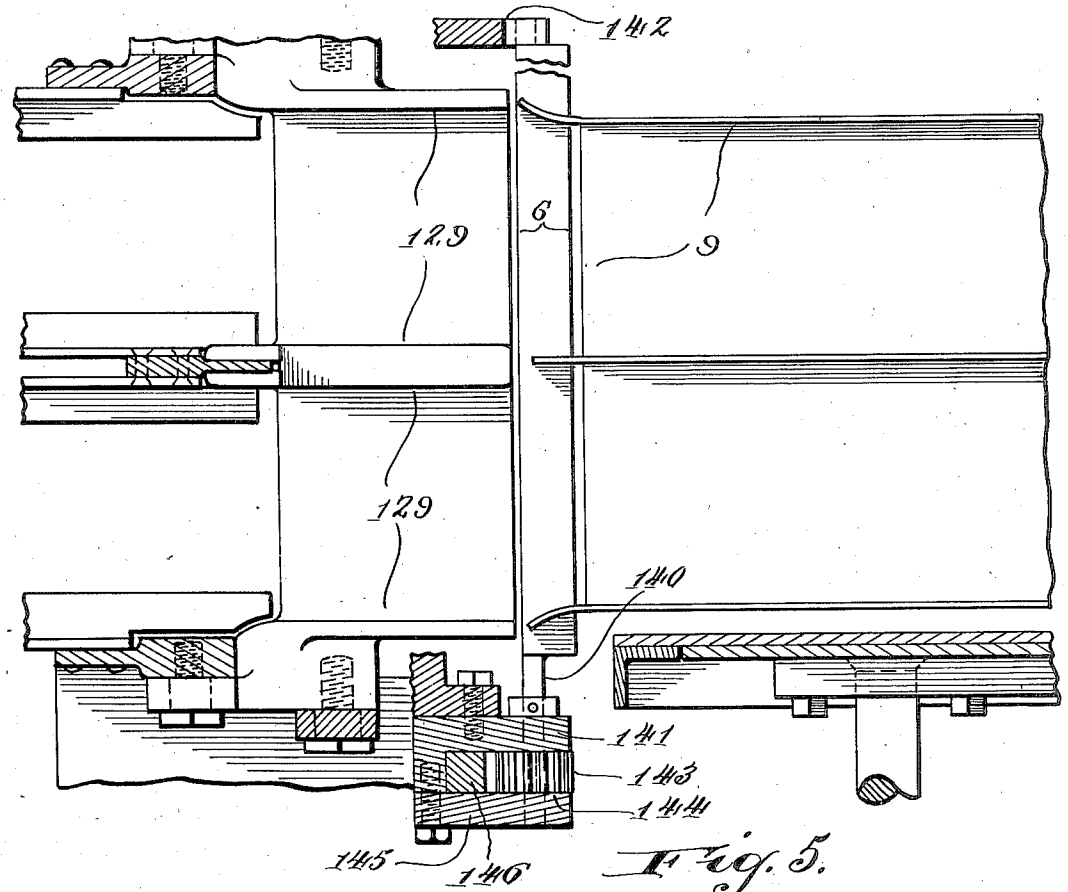


Fig. 5.

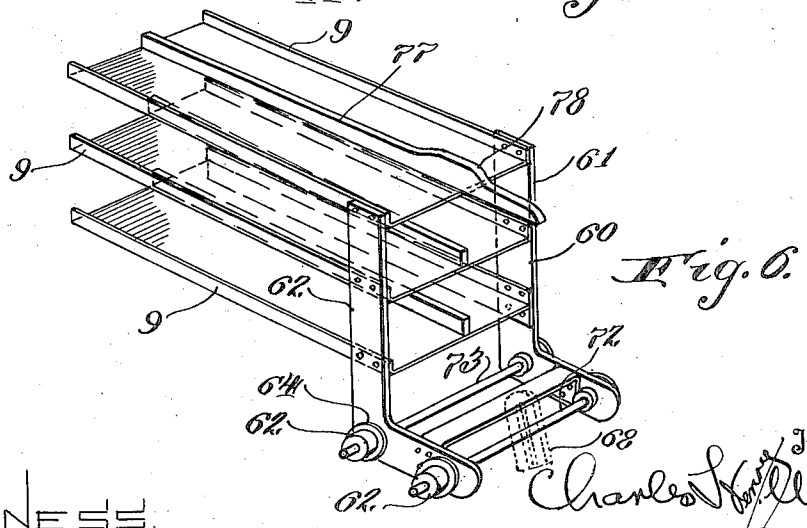


Fig. 6.

Witness:
Porter M. Flavell.

Inventor
Charles H. Wild

By Edwin S. Symmes

Attorney

Jan. 14, 1936. C. H. WILD 2,027,946

CARTON FILLING MACHINE

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Fig. 8.

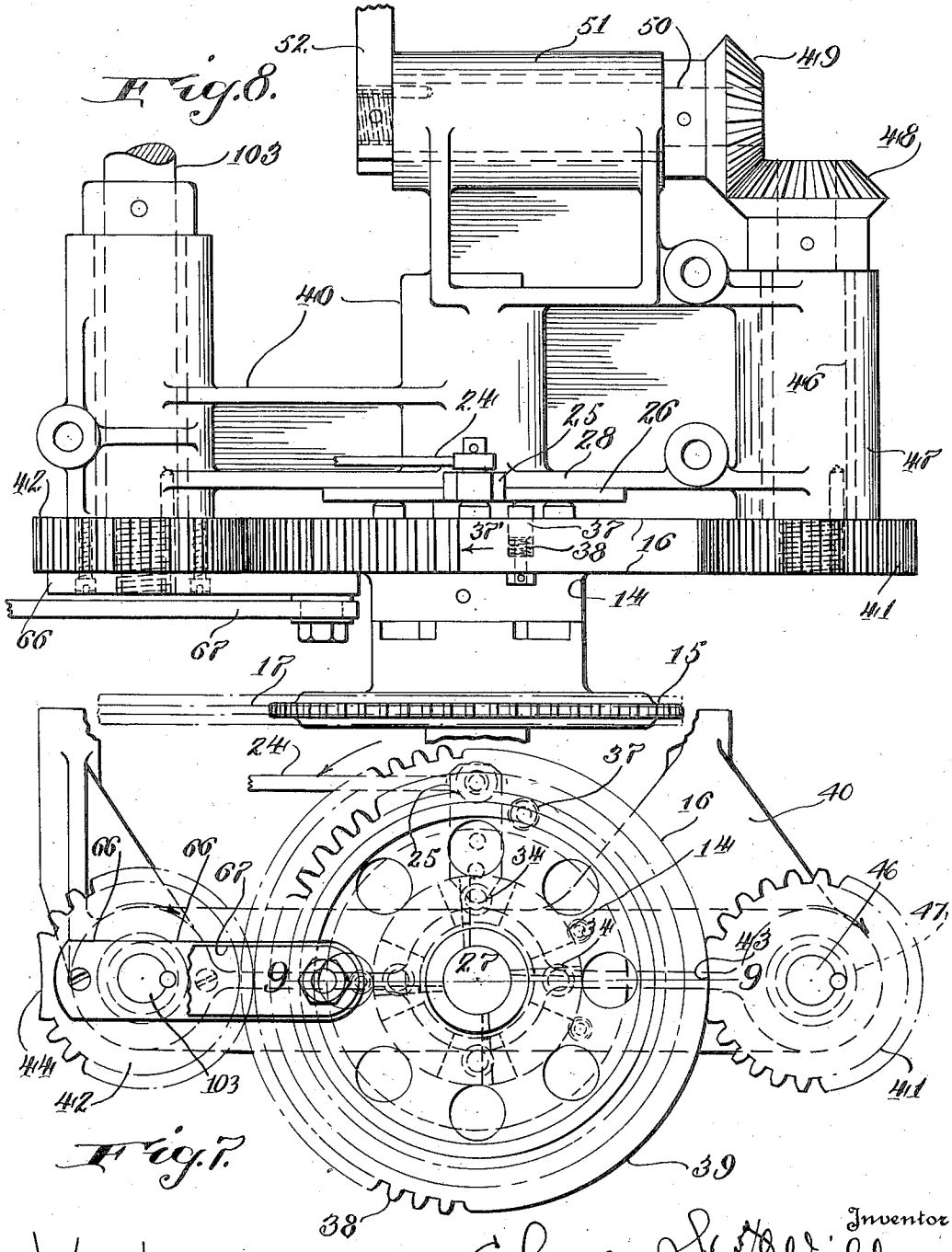


Fig. 7.

Inventor

Charles H. Wild.

By Edwin Hamuele

Attorney

WITNESS

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CARTON FILLING MACHINE

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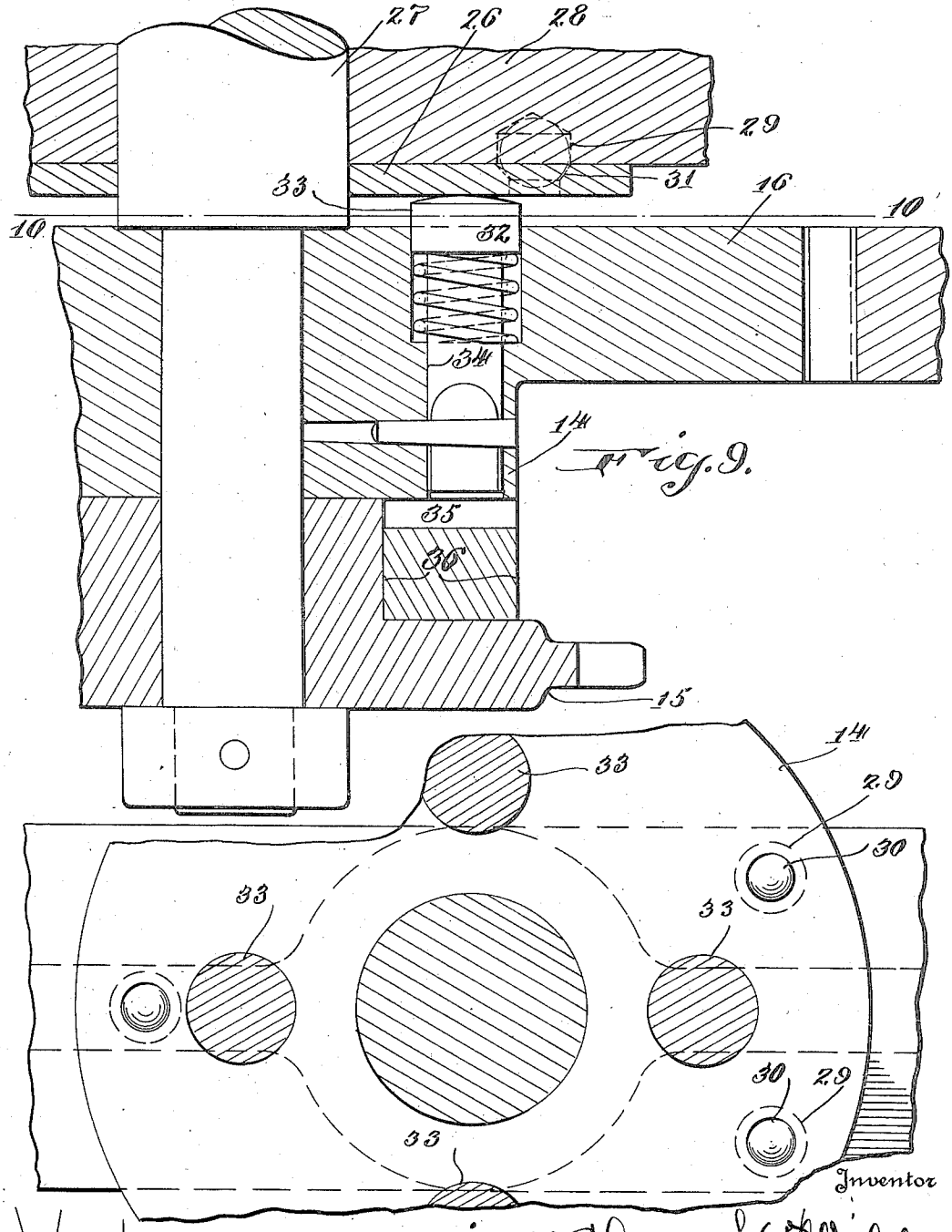


Fig. 9.

Fig. 10.

Inventor

Charles H. Wild

By Edwin Hammele

Attorney

WITNESS

Walter H. Haueter

Jan. 14, 1936. C. H. WILD 2,027,946

CARTON FILLING MACHINE

Filed Oct. 5, 1931 10 Sheets-Sheet 8

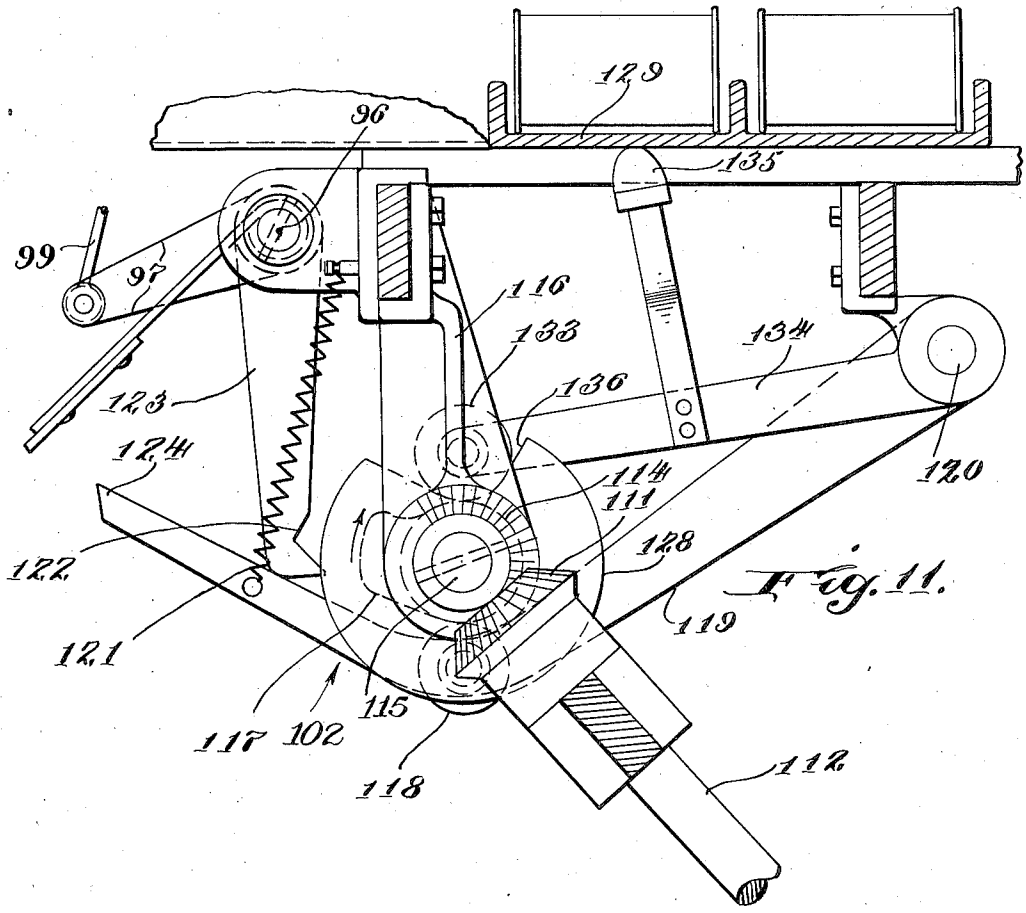


Fig. 11.

Witness
Paul H. Hault.

Inventor
Charles Henry Wild.
By Edwin Hammond
Attorney

Jan. 14, 1936. C. H. WILD 2,027,946

CARTON FILLING MACHINE

Filed Oct. 5, 1931 10 Sheets-Sheet 9

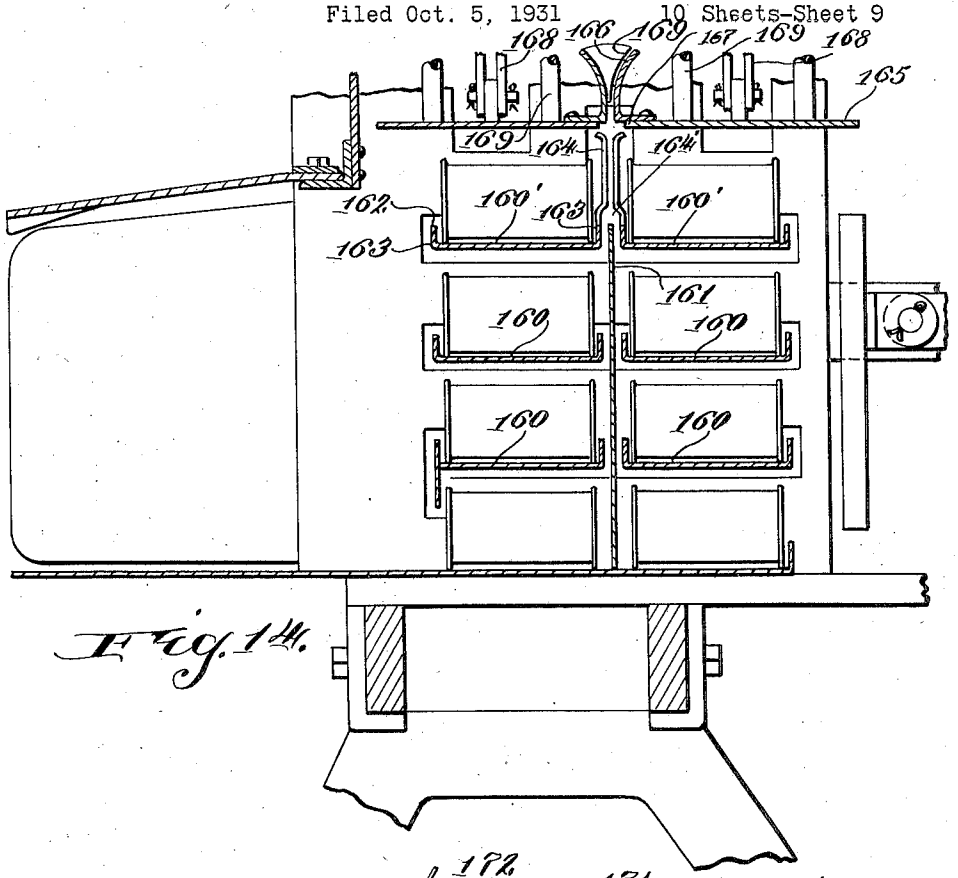


Fig. 14.

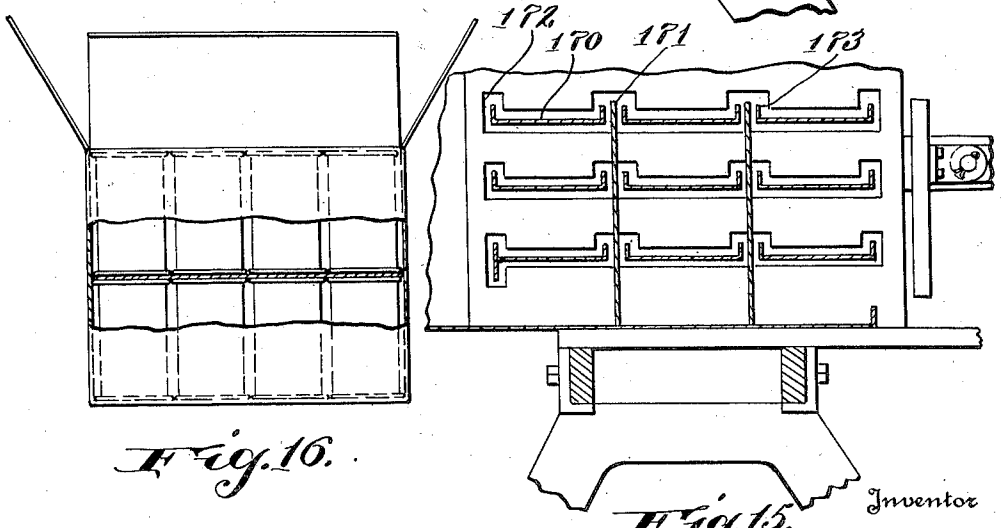


Fig. 16.

Fig. 15.

Inventor

Witness

Charles H. Wild

By Edwin H. Samuels

Attorney

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CARTON FILLING MACHINE

Filed Oct. 5, 1931 10 Sheets-Sheet 10

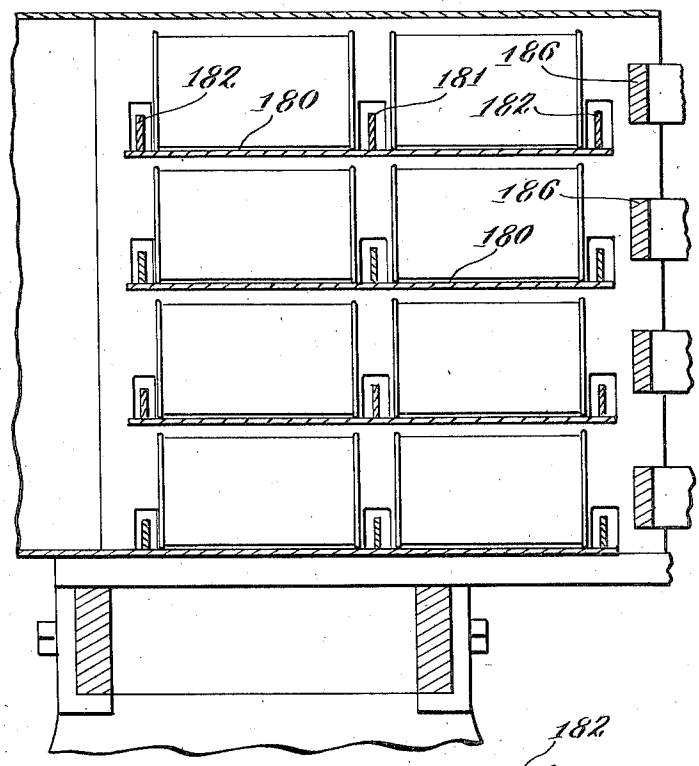


Fig. 17.

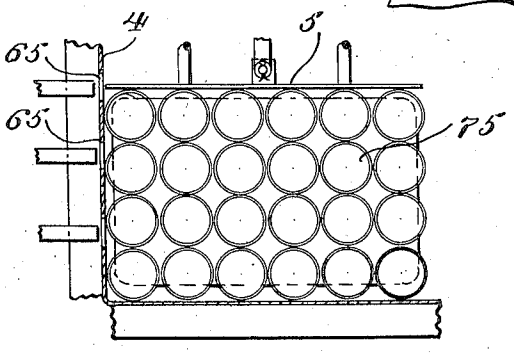


Fig. 19.

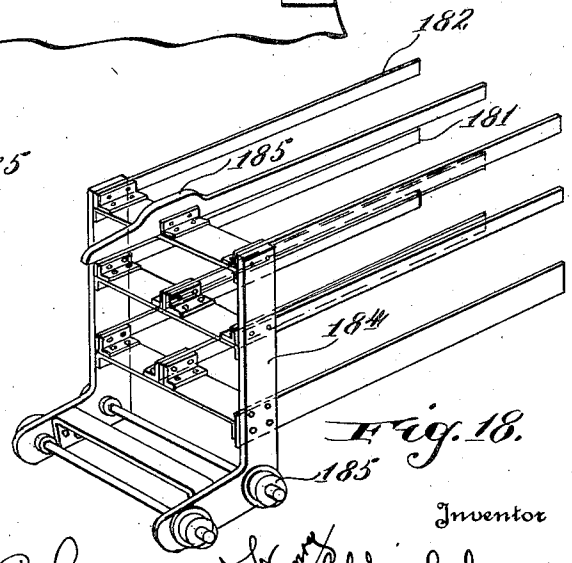


Fig. 18.

Witness

Inventor

Charles H. Wild

By Edwin L. Reynolds

Attorney

Patented Jan. 14, 1936 2,027,946

UNITED STATES PATENT OFFICE

2,027,946

CARTON FILLING MACHINE

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

Application October 5, 1931, Serial No. 566,854

31 Claims. (Cl. 226—15)

The invention relates to the type of machine used in filling cartons or boxes with cans. Such machines include a load forming enclosure having a plurality of shelves, one over the other, to which the cans are fed from runways along which they roll in one, two or more lines corresponding to the layers of cans in the filled box or carton. The shelves correspond to the number of rows of cans in each layer. From this load forming enclosure the cans are moved in a direction transverse to the shelves and ways by means of a plunger which pushes them from the shelves and advances each load in turn through a funnel into the carton which is held for this purpose in line with the funnel.

It has been found in the operation of these machines that the cans which in many instances vary considerably from exact cylindrical shape are thrown out of alignment in dropping from the shelves, and as they advance they are further deranged and become jammed, the individual cans being in that way damaged, or they may cramp the plunger or otherwise injure or interfere with the operation of the machine. It is found to assist in obtaining uniformly satisfactory operation to have the cans well settled and nested in front of the plunger before it advances.

The principal object of the invention is to withdraw the shelves or otherwise remove the supporting or guiding means from between the cans so that the load settles and becomes nested or is otherwise suitably arranged as hereinafter described, before it is engaged and advanced by the plunger. This permits any irregularities as to the form of the cans which frequently exist to become equalized by the nesting and settling of the cans or otherwise causing them to retain their relative positions as they advance toward the carton. Thus jamming, cramping of the machine and injury to the cans is avoided. To further assist in guiding, arranging and presenting the cans to the cartons in the preferred form of machine, there is a top plate over the shelves which is lowered as the shelves are withdrawn and the load settles.

Another object is to provide for the admission of liners or separators in the form of paper pads or sheets between the layers of cans before they are introduced into the carton or box. This is provided for by spacing the shelves carrying the separate layers of cans apart to admit the liners between them, and preferably providing a slotted guide for the liners, the individual shelves thus arranged having side guides which are withdrawn with the shelves. The liners are held between the cans as they settle. It will be understood in this connection that while the machine in the preferred form feeds a plurality of lines of cans to a load forming mechanism which is arranged to form a load comprising a plurality of layers of cans, one corresponding to each line, the cans of each layer being arranged one over the other, end to end, the machine may be made to fit a single line of cans and to form a load comprising a single layer or any desired number of layers. To provide suitable guiding means for the cans and to avoid interference with the plunger, the invention also includes removable side guides.

It will be understood that in the previous machines in which the cans were moved transversely to the shelves into the carton, these cans could not be efficiently guided and controlled laterally to their advance after they entered the load forming mechanism, as side guides would interfere with the motion of the cans toward the carton. The present invention provides for the removal of the guides alone or the shelves alone which in this instance may not be provided with side guides or both the guides and the shelves may be moved just prior to the passage of the plunger through the load forming area. In this way the cans are properly guided into correct loading position and may be further permitted to rest and settle before loading, and there is no interference by the guides with the motion of the cans toward the carton.

In the accompanying drawings I have illustrated a machine embodying the invention in the preferred form, also including various modifications.

In the drawings:

Figure 1 is a front elevation of the machine taken from the position in which the operator stands.

Figure 2 is a rear elevation of the machine, i. e. taken from the side from which the plunger advances.

Figure 3 is a section on the line 3, 3 in Figure 1 showing the shelves in position and the load of cans assembled on the shelves which are about to be withdrawn prior to the advance of the plunger.

Figure 4 is a section similar to the section Figure 3, taken on the same line, showing the machine after the shelves have been withdrawn and the top plate lowered into position immediately above the load to serve as an additional guiding means as the cans are advanced. The plunger

has moved from its position in Figure 3, into contact with the cans.

Figure 5 is a sectional plan on the line 5, 5 in Figure 2 showing a shelf with the can guides.

Figure 6 is a perspective view showing the shelves and carriage removed from the machine, the shelves being in their assembled relation to the carriage.

Figure 7 is an elevation of the intermittent gearing including the intermittent drive gear, the plunger gear and the shelf gear as seen from the front.

Figure 8 is a top plan view of the same including the periodic clutch.

Figure 9 is a section on the line 9, 9 in Figure 7, on an enlarged scale showing the details of the clutch.

Figure 10 is a section on the line 10, 10 in Figure 9.

Figure 11 is a section on the line 11, 11 in Figure 1.

Figure 12 shows a carton with the top and bottom rear flaps open, the fingers being about to move them to closed position.

Figure 13 is a perspective view showing a carton with the rear flaps held in closed position by the closing fingers which are a feature of the machine.

Figure 14 is a view taken in the plane of Figure 3, showing a modified form in which each shelf is formed in sections corresponding to the number of layers of lines of cans to be handled, the sections being spaced apart to admit a liner between the lines of cans.

Figure 15 is a similar section on the same plane showing still another modified form in which each shelf is divided into three sections spaced apart to provide for three layers of cans and arranged to admit a liner between each two adjacent layers.

Figure 16 shows a carton containing two layers of cans loaded in accordance with the operation of the machine of the invention and including a liner between the layers of cans.

Figure 17 is a view corresponding to Figure 3 showing still another modification in which the guides only are removed.

Figure 18 shows the guides assembled with the carriage with which they are formed in integral relation, and on which they are supported as they move to and from operative position, the carriage and guides being removed from the machine for convenience of illustration.

Figure 19 shows a load of cans after the removal of the shelves and the lowering of the top plate, the cans being ready to be advanced into the carton, the view being in a plane transverse to the motion of the plunger by which they are about to be advanced, the plunger being shown in dotted lines.

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 consists of a frame 1, on which are mounted can ways 2, leading to the load forming enclosure 3. This enclosure 3 comprises a can stop plate 4 (see particularly Figures 3 and 4) which is transverse to and located in the path of the cans and terminates their advance into the load forming enclosure. The enclosure also preferably includes a top plate 5 which overlies the load and in the preferred form may be moved downwardly into contact with the load after the shelves are removed. The enclosure also includes can separators 6 for supporting the cans at the end or side adjacent the ways, i. e. opposite the plate 4, can gates 129 for cutting off and stopping the line of cans on the ways, and a stationary bottom plate or shelf 7 beneath the load.

In addition to these elements, the load forming enclosure contains shelves 9 of any suitable number, corresponding to the number of tiers or rows of cans comprising the load to be fed to the carton or box. These shelves are in the preferred form of the invention, made removable as hereinafter described, and the number of movable shelves is in accordance with the form of the machine shown, one less than the number of tiers of cans, the bottom tier of cans resting on the bottom plate 7. After removal of the shelves the entire load is supported on the stationary bottom plate or shelf 7.

In addition to the load forming mechanism and ways described, the machine includes a funnel 10 on one side of the load forming mechanism, and the plunger 11 opposite and in line with the funnel, and this plunger is advanced through the load forming mechanism when the load is suitably arranged and presented, moving the loads of cans in turn through the funnel into the carton after which it is withdrawn, the operation of the plunger being similar to that of other machines of this general type.

It will be understood that in the operation of the machine in the preferred form the shelves are withdrawn just prior to the advance of the plunger and returned to receive the next load, as it is fed to the load forming enclosure.

Figure 1 shows in front view and Figure 2 in rear view in connection with the general assembly of the machine, the mechanism for withdrawing the shelves, reciprocating the plunger and returning the shelves to the load receiving position. This mechanism is intended to be actuated to perform a single operation or cycle whenever a load has been received in the load forming mechanism. To this end the mechanism may be tripped in any suitable manner, either automatically or by the operator in charge, the manner of tripping not being essential to the invention. The machine in the form shown is intended to be tripped by the operator, and for this purpose it includes a foot pedal 12. Both the plunger and the means for actuating the shelves or cam guides as hereinafter described, are operated, controlled and timed by an intermittent or periodic device shown in the form of a single revolution or periodic clutch 14, shown in detail and in Figures 9 and 10, and in connection with the cooperating mechanisms in Figures 7 and 8. This periodic member or one revolution clutch 14 in the form of the invention shown connects a continuously operating sprocket 15 to an intermittently rotating gear 16.

The sprocket 15 is driven in the invention shown by a chain 17 which is, in turn, actuated by a similar sprocket 18 on the shaft 19 of an electric motor 20 though the clutch may of course receive its rotary motion in any manner directly or indirectly from any preferred source of rotation or from any suitable prime mover.

The tripping mechanism for the intermittent drive in the form of the invention shown consists in addition to the pedal 12 of a connecting rod 21 which communicates the motion of the pedal to a bell crank lever 22 pivotally mounted on a suitable bracket depending from the frame 1, the bell crank lever actuates a horizontal thrust rod 24 which is connected at its opposite end by means of an upright arm 25, or in any suitable manner, to a thrust plate 26 which is shown as circular in form and mounted to oscillate about

the shaft 27. This shaft also carries the sprocket 15 and gear 16 connected by the one revolution clutch mechanism or periodic clutch mechanism 14 to be described.

The thrust plate 26 as shown bears at one side against a stationary plate or support 28 which may be integral with the machine frame. The stationary support or plate 28 is provided with a plurality of sockets 29 preferably arranged upon a uniform radius about the shaft 27 and containing projecting therefrom preferably for less than half the diameter steel or other hardened balls 30, one in each socket. The portion of each ball which projects from the stationary support 28 normally enters similarly spaced and registering sockets 31 in the thrust plate 26. The sockets 31 are of sufficient depth to permit the plate 26 to approach closely to or to lie in contact with the stationary plate 28 when its angular position is such as to cause the sockets 31 and balls 30 therein to register with the sockets 29 in the stationary plate 28. The plate 26 is movable in the direction of the axis of shaft 27 and is urged toward the support 28 by spring plungers 32 mounted in the intermittently rotating gear 16, bearing at their forward ends or heads 33 against the plate 26. These plungers 32 in the form of the invention shown are formed integrally with clutch pins 34 which in the engaged position of the clutch project from the intermittent gear 16 on the side opposite from the pressure plate 26 and into clutch pin slots 35 in the continuously rotating sprocket 15 whereby the sprocket is connected to the intermittent gear to actuate the same, causing it to rotate therewith during its period of operation. To engage the clutch and to thereby cause the loading mechanism to be operated for a single cycle, the operator presses the pedal 12 or any suitable control, which, as aforesaid, may be automatic, rocking the arm 25 and thence the plate 26 to the right in Figures 1, 8 and 9, and to the left in Figure 2, throwing the sockets 31 in said plate out of registration with the sockets 29 in the stationary member 28 whereby the balls 30 engaging the curved sides of the sockets 31, move or press the plate 26 forwardly or toward the observer in Figures 1, 7, 8, 9 and 10.

The forward motion of the plate 26 serves to advance the clutch pins 34 so that they enter the sockets 35 of which there are four in the form of the invention shown, see Figure 7, engaging the clutch pin sockets 35 in the clutch ring 36 of said sprocket 15 which is secured to the gear as shown in Figure 9. In this way the intermittent gear 16 is locked by the clutch to the continuously rotating sprocket 15 for the period of operation of the reciprocating loading mechanism. The termination of this period of operation in the form of the invention shown, i. e., the disengagement of the clutch, results from contact of the arm 25 with a spring stop pin 37, Figure 8.

Referring particularly to Figure 8, it will be noted that the stop pin 37 is slightly in advance of the arm 25 in the direction of its motion resulting from pressure on the pedal 12 and that the stop is also spaced slightly away from the front surface of the arm 25 in the direction of the front of the machine. When the thrust rod 24 and the arm 25 are moved to the right in Figure 8 by pressure on the pedal 12, the action of the balls 30 on the curved sides of the sockets 31 causes the arm 25, which is carried by the plate 26 to advance as it moves to the right so that it engages the front end surface of the stop 37, which yields slightly compressing its spring 38, it being understood that the intermittent gear 16 is stationary at the time. The forward motion of the plate 26, however, which engages the clutch pins 34 and causes the gear 16 to rotate with the sprocket 15 in a counterclockwise direction as indicated by the arrow 37' in Figure 8, moves the stop pin 37 across the front surface of the arm 25 without affecting the motion of this arm or the plate 26 which remains in its advanced position holding the clutch pins 34, also advanced and therefore holding the clutch in engagement for a complete revolution of the gear 16. When arm 25 clears pin 37 the latter moves rearwardly so it projects into line with arm 25. As the pin 37 approaches its initial position, it engages the arm 25 which from the right in Figure 8, it being understood that this arm being integral with plate 26, has been held in a forward position and in the path of the pin 37 for the entire revolution ever since the pin 37 cleared arm 25. The plate 26 is then returned to its initial angular position in which the sockets 30 register with the sockets 29 in the stationary member 28. The plate 26 is then forced back into contact with plate 28 by spring plunger 32. In returning to its original position the arm 25 goes to the left in Figure 8.

The intermittent gear 16 which is thus connected to the continuously rotating sprocket 15 by the operation of the periodic or single revolution clutch 14, which may be tripped by the operator or in any suitable manner, is in the form of the machine shown, of the type having a portion of its periphery provided with teeth 38, a portion of the teeth being omitted in this instance from half of the periphery of the gear, a smooth circular surface concentric with the gear and indicated by reference character 39, being substituted for the teeth for half the length of the circumference, i. e., over an arc of 180 degrees. The intermittent gear 16 with its shaft 27 are mounted on a bracket 40 which also carries mounted on the same bracket and meshing with the gear 16 at suitable intervals, the plunger gear 41 on one side and the shelf gear 42 on the other side. Each of these gears has a portion of its teeth omitted and has substituted for the omitted teeth a corresponding plane surface 43 on the plunger gear, and 44 on the shelf gear. These portions 43 and 44 from which the teeth are omitted are concave outwardly, the plane surfaces being preferably concentric with the gear 16 and hence with the shaft 27 when these concave portions 43, 44 from which the teeth are omitted are disposed toward the said gear 16, i. e., in the positon of the gear 41, as shown in Figure 7. In this position concave surfaces 43 and 44 contact plane surfaces 39. These contacting positions are assumed, not simultaneously, but successively.

The plunger gear 41 is secured to a shaft 46 mounted in a suitable bearing 47 in the bracket 40, the shaft extending rearwardly and carrying at its rear end a bevel gear 48 which meshes with a bevel gear 49 on shaft 50 which is at right angles to shaft 46 and parallel to the plane of rotation of the intermittent gears 16, 41, 42. This shaft 50 is also mounted in a suitable bearing 51 in the bracket 40 and carries at its opposite end secured thereto a crank 52 known as the plunger crank, see also Figure 3. The motion of this crank is transmitted by a connecting rod 53 to an upright rocking arm pivoted at its lower end below the point of connection to the rod 53 to

the rocking support 23', and at its upper end to a thrust rod 55 to which the plunger 11 is secured. The plunger in the form of the invention shown is guided by means of guide rods 56 rigidly secured thereto and passing through slide guide bearings 57 supported on brackets secured to the frame of the machine.

In the form of the invention shown the shelves 9 of the load forming mechanism with the exception of bottom shelf 7 which is stationary, are mounted on and secured to the shelf carriage 60. This carriage is shown removed at 60 in Figure 6. The carriage frame consists of L shaped side bars 61, arranged upright and in parallel relation. The bottom arms of the L's which are also parallel and horizontal are provided with four rollers 62, two on each side and projecting outwardly therefrom, the rollers on each side being spaced apart in the direction of the length of the ways. These rollers are engaged between the upper and lower carriage guide ways 63 shown in Figures 1 and 2, and they are further provided at their inner ends adjacent the side frames 61, with guide flanges 64 which engage the corresponding inner surfaces of the upper and lower guide ways 63. The shelves 9 are advanced and retracted through suitable openings 65 in the rear stop plate 4.

To operate the shelves and advance and retract them at the proper time relatively to the operation of the plunger, the carriage 60 is connected to any suitable source of motion, preferably to the shelf gear 42. In the form of the machine shown, the shelf gear 42 has secured to its front face a crank 66. This crank is pivotally connected at its outer front end to a shelf connecting rod 67 which actuates the rocking arm 68, being pivotally connected thereto at an intermediate point 69 thereof. This rocking arm 68 is pivotally mounted at its lower end at 70 on the machine frame and at its upper end it is slotted at 71 in the direction of its length, the slot being most conveniently engaged with the middle portion of the shaft 72, which carries the outer pair of rollers 62, though the exact manner of connecting the rocking arm 68 to the carriage is more or less immaterial, and it might be conveniently engaged with either shaft 72 or 73.

The relative timing of the motion of the shelves 9 and the plunger 11 is controlled as aforesaid by the intermittent gear 16, the shelves being withdrawn as the plunger advances and advanced after the plunger is withdrawn.

Referring to Figure 7, it will be apparent that the plunger 11 is for the time being stationary, the concave surface 43 on the plunger gear being in contact with the central portion of the circumferential surface 39 of the intermittent gear 16. In this figure the teeth of the shelf gear 42 are in engagement with the teeth 38 of the intermittent drive gear 16, the concave blank surface 44 of shelf gear 42 being directly opposite the point of engagement. The clutch 14 is disengaged.

When the operator presses on the pedal and the clutch 14 is engaged, it being understood that the load forming mechanism has been filled with cans, the gear 16 begins to rotate in counterclockwise direction as indicated by the arrow in Figure 7. The gear 41 and the plunger 11 remain stationary but the shelf gear 42 is rotated for half a revolution withdrawing the shelves 9. When the shelves are withdrawn, the concave surface 44 of the plunger gear 42 comes in contact with the circumferential surface 39 of the intermittent driving gear 16 and the motion of the shelves stops for a half a revolution of the intermittent drive 16. As the teeth of the shelf gear 42 pass out of mesh with the teeth of the intermittent gear 16, the teeth 38 of this intermittent gear come into engagement with the teeth of the plunger gear 41, which is turned for a complete revolution, advancing and retracting the plunger 11, moving the loaded cans into the funnel 10, it being understood that prior to the advance of the plunger the cans being dropped by the shelves as the latter are withdrawn, have settled or nested to the position illustrated in Figure 19, the cans composing the load being indicated by reference character 75.

In this operation the lowering of the top plate takes place in advance of the plunger in a manner to be described.

After the reciprocation of the plunger and its return to retracted position, the teeth 38 pass out of contact with the plunger gear 41 and the circumferential surface 39 of the intermittent drive gear 16 engages the concave surface 43 of the gear 41 which remains stationary for half of the revolution of the intermittent gear 16. At the same time the teeth 38 of the intermittent gear come into engagement with the teeth of the shelf gear rotating it through a half revolution to the position shown in Figure 7, in which the shelves are advanced to receiving position in the load forming enclosure, being passed through the openings 65 into back stop plate 4 at which time periodic clutch 14 is released by contact of the arm 25 with the pin 37, returning it to the left in Figure 8 to the position in which the sockets 31 in the thrust plate 26 registered with the sockets 29 in the stationary member 28 permitting the balls 30 to enter the sockets 31. The plate 26 then yields to the thrust of the plungers 33 permitting the clutch pins 34 to be withdrawn, when the operation of the intermittent or periodic mechanism controlled by the trip ceases.

From examination of Figure 6, it will be noted that the shelf carriage 60 is provided with a cam 77, having an upwardly disposed cam surface 78 elongated in the direction of the ways and of the motion of the shelves in moving into and out of the load forming mechanism. It will also be observed (see Figure 2) that the top plate 5 which overlies the cans as assembled in front of the plunger forming the top wall of the load forming enclosure in the preferred form, is mounted to slide in a vertical direction, being carried on rigid vertical guide rods 78' which co-operate with and slide in vertical slide guide bearings 79' supported in the frame at the top. The top plate 5 is connected at the center by means of a link 79 to a rocking bar 80 which extends to the right in Figure 2, which is a rear view. This rocking bar 80 is pivoted intermediately at 81 on the frame and at its right hand end in Figure 2 it is turned downwardly having a depending portion 82 in the forked end of which is pivoted a cam roller 83 which engages the cam surface 78 as the carriage 60 approaches the extreme withdrawn position. The operation of the cam rocks lever 80 serving to lower the top plate 5 into contact with the top of the load. The top plate is drawn upwardly against the action of the cam by tension spring 84, which returns the lever 80 to the position shown in Figure 2.

The machine as shown, see particularly Figures 1, 3; 4, 12 and 13, includes automatically operated fingers 85 at the top and 86 below for

closing the top and bottom flaps 87, 88 of the carton about to be filled and holding it in receiving position. These fingers may also be actuated by the cam 78 carried by the shelf carriage. To this end the machine as shown, see particularly Figure 2, is provided with a bell crank follower lever 89 pivotally mounted on the frame at 90 and carrying at the end of its depending arm 89' a cam follower roller 91 and on the opposite end of its swinging arm 92' an actuating roller 92. This actuating roller 92, see Figures 1 and 2, engages and co-operates with a dog 93, mounted on the shaft 94 of the upper set of carton closing fingers 85. The lower set of fingers 86 is mounted on a suitably located shaft 96 beneath the bottom of the funnel as in Figure 3. This shaft 96 is provided with a forwardly extending arm 97 secured thereto and the upper shaft 94 has a rearwardly extending arm 98, the respective forwardly and rearwardly extending arms 97 and 98 being connected together by a tension rod 99, which may be adjustable by means of a turnbuckle 100. It will be easily understood that as the shelf carriage 60 is withdrawn the cam 78 will engage the roller 91 in the early stages of the retracting stroke of the shelves, causing the fingers 85 and 86 to swing downwardly and upwardly, respectively, closing the top and bottom flaps of the carton 101, held in receiving position on the funnel 10, but the cam 78 immediately passes out of engagement with the roller 91 so it is necessary or desirable to provide other means for holding the fingers in engagement with the carton during the advance of the plunger and until the filling operation is completed. This is accomplished by the mechanism illustrated in Figure 11 and indicated in a general way by reference character 102. This mechanism is also shown in connection with the assembly of the machine front view, Figure 1, and rear view, Figure 2. This mechanism 102 is driven from the shelf gear shaft 103, which carries a bevel gear 104, which meshes with a bevel gear 105, carrying on the shaft therewith a second bevel gear 106, which meshes with a gear 107 on a long shaft 108 which carries at its opposite end by bevel gears 109, 110, 111 or in any suitable manner the gears 110 and 111 being on a shaft 112 which drives through the bevel gear 111 a smaller bevel 114 on a shaft 115 parallel to the ways and carried in a bracket 116 depending from the machine frame. This shaft 115 carries a cam 117 which engages a roller 118 carried by a latch lever 119 which is pivotally mounted at 120 on the frame and at its outer swinging end is drawn upwardly against the action of the cam by a tension spring 121. This latch lever engages and co-operates with a corresponding notch 122 in a depending arm 123 mounted on the shaft 96 of the lower fingers 86 which is extended along the machine for this purpose as seen beneath the load forming enclosure in Figure 1.

The point of the latch at 124 is drawn by the spring 121 into engagement with the notch 122 in the closed position of the fingers when they are first advanced into this position by the action of the cam 78, and at the end of the loading operation the fingers are released by the operation of the cam 117 depressing the lever 119 by contact with roller 118 thereon, the fingers being immediately thereafter returned to normal open position by the operation of spring 127, Figure 1, which engages an arm 126 projecting from the shaft 96 oppositely to the lower set of fingers 86 throwing them downwardly, and as they are connected by the rod 99 to the upper set, the latter are thrown upwardly.

The flap closing mechanism is also effective as an automatic means for holding the cartons during the loading operation and independently of the closing feature.

The shaft 15 also carries secured thereto a cam 128 which operates the can gates 129, which serve to cut off the load in the manner fully explained in applicant's previous patent. These gates are in the form of portions of the ways 2 pivoted by means of upright arms 130 to the frame at 131 and connected together by connecting rod 132.

The follower 133 which engages the cam 128 is mounted on a swinging arm 134 pivoted at 120 and this arm 134 carries an upright thrust member 135 which is thrown upwardly by the action of the cam engaging the bottom of the lower set of gates, and moving the gates upwardly in unison on account of their connection to each other by means of the connecting rod 132. In the form of the invention shown the gates 129 are closed, i. e., raised throughout the period of operation, being opened when the clutch is released which is the position illustrated in Figure 11, the cam notch 136 corresponding to the released position of the clutch.

The function of the can gates 129 is to cut off the load on the ways from the load on the shelves and prevent interference of the cans which are advanced with the plunger with the cans on the ways from advancing during the operation of the plunger, and particularly to prevent the partial entrance into the path of the plunger of the forward cans on the ways.

The cans comprising the load, particularly the ones on the edge of the load adjacent the ways and the gates, are further held in position by can supporting members or separators 6, see Figures 1 and 2, which cooperate with the gates 129.

The mechanism for operating the separators is best illustrated in Figures 2 and 5. Each of the separators 6 is provided with trunnions 140 mounted in suitable bearings 141, 142, in the frame. The trunnion 141 of each separator 6 carries a pinion 143 which may be supported in a guide slot 144 in a suitable upright 145 secured to the frame. This guide slot 144 also contains a vertically sliding rack 146 which meshes with the pinions 143. To operate the separators 6, the rack 146 is moved up and down at suitable intervals oscillating the pinions 143 and the separators or separator plates or blades 6.

The rack 146 is reciprocated by means of a cam lever 147 (see Figure 2) which oscillates about a pivot 148 suitably supported on the upright 145. This cam member 147 has an eccentric slot 149 which co-operates with and actuates a follower 150, which is mounted on the rack 146. The cam member 147 is actuated and oscillated to move the follower 150, and the rack 146 by means of a cam 152 mounted on the shaft 103 of the shelf gear 42. This cam engages a follower 153, mounted on the lower end of a centrally pivoted vertically disposed lever 154 supported on a suitable bracket on the frame. This lever 154 actuates a connecting rod 155 which engages one end of a horizontal central pivoted lever 156 transverse to the plane of Figure 2. The other end of said lever is connected to the cam lever 147 on the opposite side of its pivot from the cam slot by way of a connecting rod 157, the follower 153 is held in contact with the cam 152 by a spring 158 connected to the remote end of le-

ver 156 or in any other suitable manner, all such details being widely variable.

Referring now to Figures 14 and 15, which show a device for permitting the insertion of a liner or paper pad between the layers of cans, Figure 14 shows a machine adapted to handle two rows of cans corresponding to two layers of cans in the filled cartons. To this end a double shelf has been substituted for each of the shelves 9 of the load forming mechanism of the type of machine just described. The double shelves which are adapted to the feeding of two layers of cans consist of two shelf members 160 spaced apart to admit the separators one of which is shown at 161. The members 160 composing the double shelves 162 are preferably in the form of troughs having upright portions or guides 163 on the outer edge and 164 on the inner edges, the shelves 162 and inner guides 164 are spaced apart to form an opening 164' to admit the separators. The top shelf 160' is provided with projecting guide plates 164 on each of the double shelves projecting upwardly from the inner set of side guides between the cans. The top plate 165 is also provided with a central slot 167 registering with the opening between the shelves and having guide plates 166 on each side of the slot projecting and diverging upwardly therefrom after the manner of a flat funnel.

The top plate 165 is operated as in the previous instance except that there is a double set of links 168 with a double set of guide rods 169 spaced away from the center to provide for the admission of the spacers at the center of the plate and shelves.

Figure 15 shows a machine adapted to the handling of three rows of cans corresponding to three layers of cans in the filled cartons. The shelves corresponding to the shelves 9 in the load forming mechanism of the machine first described, consist each of three shelf members 170, spaced apart to admit the spacers or pads 171 between them and having side guides 172 and inner guides 173 spaced apart to admit the separators. The top plate in this instance would be correspondingly arranged, having two spacer guides 166 instead of one, as in Figure 14. The shelves of the machine, Figures 14 and 15, are operated as in the machine, Figure 1.

Figures 17 and 18 illustrate a machine of somewhat similar structure to the machine first described, the spacers or side guides being removable to facilitate the transfer of the cans through the funnel by the plunger without moving the shelves. This makes it possible to provide efficient guiding means for cans up to the time they are transferred from the load forming mechanism without interference with the action of the plunger and without moving the shelves proper. This eliminates the tendency of the cans to get out of line, but does not permit them to become settled and nested prior to the advance of the plunger as in the construction previously described.

In Figure 17 the load forming mechanism is provided with three shelves 180, each of the shelves being adapted to accommodate two rows of cans so that the filled carton would contain two layers provided it is filled by a single loading operation, but the numbers of layers is immaterial. Each of the shelves has a can guide or side guide 181 at the center between the rows of cans and a side guide 182 at each side. The side guides for the entire load forming mechanism are secured at their ends opposite to the end from which the cans are fed to a carriage 184 having rollers 185, the carriage and rollers corresponding exactly to the carriage 60 and rollers 62 of the machine previously described, and it is provided with a cam 185 for actuating the top plate and the carton closing fingers and gates, though other means may be substituted for actuating these members in either type of machine. The carriage 184 with the guides 181 and 182 may be operated in a manner exactly similar to that of the machine first described by means of similar mechanism, or in any suitable manner. A suitable plunger 186 is shown in Figures 17 and 18, the plunger being arranged in a plurality of sections in order that it may enter between the shelves to advance the cans into the plunger when the side guides are removed in the operation of the machine.

The operation of the machine has been quite fully described in connection with the description of the structure. The cans which are fed to the load forming mechanism roll along the ways 2 which lead to the respective shelves 7, 9 and 9a. When a load is completed, the cans on the ways are held against further advancement by raising of the gates 129 and the cans at the side of the load adjacent the ways are held in position and prevented from rolling backwardly toward the gates by means of can separators 6. The shelves 9 are next withdrawn, permitting the cans comprising the load to settle and become nested equalizing any irregularities and preventing jamming and cramping of the cans due to displacement in dropping from the shelves as they are moved by the plunger transversely to the feed into the box or carton. As soon as the shelves have been withdrawn the plunger 11 is advanced in the manner described, the fingers 85, 86 having at the time of the withdrawal of the shelves been closed upon the carton which is thus held in registration with the funnel 10 in can receiving position. The fingers 85, 86 also serve to close and hold the rear top and bottom flaps 87 and 88.

In the preferred form of the machine as shown, the top plate 5 is lowered into contact with the top of the load immediately after the shelves are withdrawn, and it is held in this position while the cans are advancing into the carton, further contributing to the uniformity and regularity of the machine in its operation and particularly in the guiding of the load and holding of the cans in their nested arrangement as they enter the funnel. In the form of the machine shown in Figures 14 and 15, the operation described is varied by the insertion of the separators, spacers or pads 171, one of these being used between two layers of cans in Figure 14 and two such separators being inserted between three layers of cans as shown in Figure 15. To provide for the separators each shelf may be made in the form of a separate trough 160, 160', spaced apart for the insertion of the spacers, and also in the form of the invention shown, the top plate is slotted and provided with a guide or funnel 66.

In accordance with the illustration, Figures 17 and 18, the cans comprising the load are held in position on the shelves by means of side guides 181, 182, which are removed as the plunger is advanced to provide for and permit the advance of the cans as they are moved by the plunger through the funnel into the carton. These side guides as previously described are mounted on a carriage and operated in removing and replacing them in a manner identical with the movement of the shelves. The removal of the guides in this

way permits the cans to be guided and directed to the proper position in the load without interference by the guides with the operation of the plunger or the advance of the cans into the cartons as moved by the plunger. Both the side guides and the shelves are means for conducting the cans to their position in the load, and this term is used in this sense in the claims.

I have thus described specifically and in detail a machine embodying the features of my invention in the preferred form in order that the manner of constructing, operating, applying and using the invention in its various forms may be clearly understood; however, the specific terms herein 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. The combination in a machine for filling cartons with cans, of a load forming enclosure, means for feeding cans thereto, means within the load forming enclosure arranged in a plurality of tiers, one above the other for conducting the cans to their respective positions in the load, a plunger and means for reciprocating the same transversely to the said conducting means to move each load from the load forming enclosure into the corresponding carton, means for withdrawing said conducting means in advance of the forward stroke of the plunger and returning said means to operative position when the plunger is retracted.

2. The combination in a machine for filling cartons with cans, of a load forming mechanism comprising shelves, means for feeding cans to the shelves and means for holding them thereon, a plunger mounted to reciprocate transversely to the shelves, means for positioning a carton in line with the plunger and the load forming mechanism, and means for withdrawing the shelves just prior to the advancement of the plunger on each stroke and for returning the shelves to their position in the load forming mechanism when the plunger is retracted.

3. The combination in a machine for filling cartons with cans, of load forming mechanism comprising shelves, means for feeding cans to the shelves and means for holding them thereon, a plunger mounted to reciprocate transversely to and across the shelves, means for positioning a carton in line with the plunger and the load forming mechanism, and means for withdrawing the shelves before the plunger advances and for returning the shelves to their position in the load forming mechanism when the plunger is retracted, the load forming mechanism including a top plate, the machine being provided with means for lowering the top plate as the shelves are withdrawn and for raising it to can receiving position prior to the feeding of the next load of cans to the load forming mechanism.

4. In a machine for filling cartons with cans, load forming mechanism, means for feeding the cans to the load forming mechanism, shelves spaced one over the other for supporting the cans therein in a plurality of tiers, a plunger mounted to move through the load forming mechanism transversely to the shelves and means for reciprocating the same, means timed to co-operate with the plunger for withdrawing the shelves in advance of the plunger on each stroke and for returning them to their position in the load forming mechanism when the plunger is withdrawn, and means for positioning a carton in line with the plunger.

5. In a machine for filling cartons with cans, load forming mechanism, means for feeding the cans to the load forming mechanism, shelves spaced one over the other for supporting the cans therein in a plurality of tiers, a plunger moving transversely to the shelves and means for reciprocating the same transversely to the shelves, means timed to co-operate with the plunger for withdrawing the shelves in advance of the plunger and means for returning them on each stroke, the means for operating the shelves and the plunger alternately including a periodic mechanism.

6. In a machine for filling cartons with cans, load forming mechanism, means for feeding cans to the load forming mechanism, shelves spaced one over the other for supporting the cans therein in a plurality of tiers, a plunger moving transversely to the shelves and means for reciprocating the same transversely to the shelves, means timed to co-operate with the plunger for withdrawing the shelves in time with each stroke prior to the advance of the plunger, and means for actuating the shelves and the plunger including a periodic mechanism and intermittent gearing operating the plunger and shelves alternately.

7. In a machine for filling cartons with cans, load forming mechanism including superimposed shelves arranged in tiers, side guides for the cans on the shelves, a plunger and means for reciprocating the same transversely to the shelves to move the cans therefrom, means co-operating with the plunger for removing the guides in advance of the plunger and returning them to operative position when the plunger is withdrawn.

8. In a machine for filling cartons with cans, load forming mechanism including shelves, side guides for the cans on the shelves, can spacers overlying the shelves, a plunger and means for reciprocating the same transversely to the shelves to move the cans into a carton in co-operative relation to the load forming mechanism and in line with the plunger, means co-operating with the plunger for removing the guides and shelves in advance of the plunger and for returning them to operative position as the plunger is withdrawn, said means for moving the plunger and the guides and shelves comprising periodic mechanism and means for tripping the same.

9. In a machine for filling cartons with cans, load forming mechanism including shelves, side guides for the cans and the shelves, can spacers overlying the shelves, a plunger and means for reciprocating the same transversely to the shelves to move the cans, means for positioning a carton in co-operative relation to the load forming mechanism in line with the plunger, means co-operating with the plunger for removing the guides and shelves in advance of the plunger for returning them to operative position as the plunger is withdrawn, said means for moving the plunger and the guides and shelves comprising periodic mechanism and means for tripping the same, and intermittent gearing for moving the plunger and the shelves and guides alternately.

10. The combination in a machine for filling cartons with cans of load forming mechanism having shelves, ways for feeding the cans to the shelves, a loading plunger, means for reciprocating the plunger transversely to the shelves, means for reciprocating the shelves in the direction of their length, withdrawing them in advance of the

plunger, and returning them to operative position when the plunger is withdrawn, can gates for separating the cans on the ways from the cans on the shelves and preventing their advance toward the load forming mechanism during the operation of the plunger, means connecting the gates together to operate together.

11. The combination in a machine for filling cartons with cans of load forming mechanism having shelves, ways for feeding the cans to the shelves, a loading plunger, means for reciprocating the plunger transversely to the shelves, means for reciprocating the shelves in the direction of their length withdrawing them in advance of the plunger and returning them to operative position when the plunger is withdrawn, can gates for separating the cans on the ways from the cans on the shelves and preventing their advance toward the load forming mechanism during the operation of the plunger, means connecting the gates together to operate together, and means connected to the plunger operating means for operating said gates.

12. The combination in a machine for filling cartons with cans of load forming mechanism having shelves, ways for feeding the cans to the shelves, a load and plunger means for reciprocating the plunger transversely to the shelves, means for reciprocating the shelves in the direction of their length withdrawing them as the plunger advances and returning them to operative position as the plunger is withdrawn, can gates for separating the cans on the ways from the cans on the shelves and preventing their advance toward the load forming mechanism during the operation of the plunger, means for operating the gates, and can separators engaging the cans comprising the load which are adjacent said gates to prevent back motion of the cans toward the gates.

13. The combination in a machine for filling cartons with cans of load forming mechanism having shelves, ways for feeding the cans to the shelves, a plunger and means for reciprocating the plunger transversely to the shelves, means for reciprocating the shelves in the direction of their length withdrawing them as the plunger advances and returning them to operative position as the plunger is withdrawn, can gates for cutting off the cans on the ways from the cans on the shelves and preventing their advance toward the load forming mechanism during the operation of the plunger, means for operating said gates, can separators engaging the cans comprising the load which are adjacent said gates to prevent back motion of the cans toward the gates and means for operating said separators, cam fingers for closing and holding the cartons in alignment with the plunger, and means for operating said fingers.

14. The combination in a machine for filling cartons with cans of load forming mechanism having shelves, ways for feeding the cans to the shelves, a plunger and means for reciprocating the plunger transversely to the shelves, means for reciprocating the shelves in the direction of their length alternately to the reciprocations of the plunger, withdrawing them as the plunger advances and returning them to receiving position when the plunger is withdrawn, can gates for cutting off the cans on the ways from the cans on the shelves and preventing their advance toward the load forming mechanism during the operation of the plunger, a movable top plate overlying the load forming mechanism and means operated in sequence with the withdrawal of the shelves for lowering the said top plate into contact with the cans comprising the top of the load as the shelves are withdrawn.

15. The combination in a machine for filling cartons with cans, of load forming mechanism, having shelves, ways for feeding the cans to the shelves, a plunger and means for reciprocating the plunger transversely to the shelves, means for reciprocating the shelves in the direction of their length alternately to the motion of the plunger, withdrawing them in advance of the plunger and returning them to operative position when the plunger is withdrawn, means for cutting off the cans on the ways from the cans on the shelves and preventing their advance toward the load forming mechanism during the operation of the plunger, means connected to the plunger, operating means for operating said cut-off means, can separators engaging the cans comprising the load to prevent back motion of the cans toward the ways, and means connected to the shelf moving means for operating said separators, cam fingers for closing and holding the cartons in alignment with the plunger, means operated in connection with the shelves for controlling and operating said fingers, a movable top plate overlying the load forming mechanism and means operated in connection with the withdrawal of the shelves for lowering the said top plate into contact with the cans comprising the top of the load as the shelves are withdrawn, the means for operating the plunger and for moving the shelves comprising and including a periodic clutch and means for tripping the same, and intermittent gearing for moving the plunger and shelves alternately.

16. In a machine for filling cartons with cans, a load forming enclosure, means for feeding the cans to the enclosure means therein for guiding and supporting each can to its relative position in the load, a plunger and means for reciprocating the same transversely to said guiding and supporting means through the load forming enclosure to move each load from the load forming enclosure into the corresponding carton means for supporting a carton to receive the cans, a part of the guiding means being in the path of the cans as moved by the plunger, said guiding and supporting means being movable in the direction of motion of the cans in feeding and means for moving said guiding means and support in said direction out of the path of the cans as the plunger advances.

17. In a machine for filling cartons with cans, a load forming enclosure including shelves having side guides for the cans, each shelf being wide enough to receive a plurality of cans and having guides between the cans, the guides between the cans being spaced apart and the shelves being open between the guides providing a vertical opening between the lines of cans in the load forming enclosure for the insertion of a separator, means for feeding cans to the shelves, said guides extending in the direction of feed, a plunger and means for reciprocating the same transversely to the shelves to move the cans into the cartons, and means for withdrawing the shelves as the plunger is advanced, permitting the separator to move with the corresponding load of cans into the carton where it is positioned between the layers of cans.

18. In a machine for filling cartons with cans, a load forming enclosure including shelves, having side guides for the cans, each shelf being adapted to receive a plurality of cans and having

guides between the cans, the guides between the cans being spaced apart and the shelves being open between the guides providing a vertical opening between the lines of cans in the load forming enclosure for the insertion of a separator, means for feeding cans to the shelves, said guides extending in the direction of feed, a plunger and means for reciprocating the same transversely to the shelves to move the cans from the load forming enclosure into the cartons, and means for withdrawing the shelves as the plunger is advanced, causing the separator to move with the load of cans into the carton where it is deposited and positioned between the layers of cans, the load forming mechanism including a funnel for the separators overlying and aligned with the opening between the said guides.

19. In a machine for filling cartons with cans, load forming mechanism including shelves having side guides for the cans, each shelf being wide enough to receive a plurality of cans and having guides between the cans, the guides between the cans being spaced apart and the shelves being open between the guides providing a vertical opening between the lines of cans in the load forming mechanism for the insertion of a separator, means for feeding cans to the shelves, a plunger and means for reciprocating the same transversely to the shelves to move the cans into the cartons, and means for withdrawing the shelves as the plunger is advanced, causing the separator to move with the load of cans into the carton where it is deposited, and positioned between the layers of cans, the load forming mechanism including a top plate overlying the cans, said top plate having a slot and guiding means in connection therewith for the separators aligned with the opening between the side guides.

20. In a machine for filling cartons with cans, load forming enclosure, means for feeding the cans thereto, shelves to support the cans in the load forming mechanism, a plunger and means for reciprocating the same transversely to the shelves to move the cans from the load forming enclosure in the carton filling operation, means for reciprocating the shelves in the direction of their length, withdrawing them from the load forming mechanism and returning them thereto in sequence with the operation of the plunger, a top plate overlying the cans and means operated in sequence with the plunger for lowering the top plate immediately after the shelves are withdrawn.

21. In a machine for filling cartons having end flaps with cans, shelves, means for feeding the cans to the shelves, a load forming enclosure including the shelves, a plunger, means for reciprocating the same transversely to the feed to move the cans from the load forming enclosure, and closing fingers engaging the opposite sides and flaps of the carton to hold the same with the end flaps closed in line with the plunger as the plunger advances, and means for causing positive operation of the fingers automatically in sequence with the operation of the plunger to close the rear flaps of the carton and grip the carton.

22. In a machine for filling cartons with cans, a load forming enclosure, can conducting means therein, means for feeding the cans to the conducting means, a plunger, means for reciprocating the same through the load forming enclosure transversely to the conducting means, means for withdrawing the conducting means from the path of the plunger and returning it thereto, a funnel and carton engaging fingers co-operating with the funnel, means for operating the fingers to close them as the conducting means is withdrawn.

23. In a machine for filling cartons with cans, load forming mechanism, including can conducting means, means for feeding the cans to the can conducting means, a plunger, means for reciprocating the same through the load forming mechanism transversely to the feed, means for withdrawing the can conducting means from the load forming mechanism prior to the advance of the plunger carton holding fingers, means for operating the fingers to close them as the can conducting means are withdrawn, said closing means being operated in conjunction with the withdrawal of the can conducting means, said operating means including a latch for holding the fingers in closed position while the can conducting means are withdrawn.

24. In a machine for filling cartons with cans, a load forming enclosure, can conducting means therein, ways for feeding the cans to the enclosure, a plunger for moving the cans from the load forming enclosure into the cartons, means for reciprocating the same transversely to the conducting means, a carriage for the conducting means and a track for the same on the opposite side of the load forming mechanism from the ways, means for reciprocating the carriage and the conducting means alternately with the operation of the plunger, withdrawing the conducting means as the plunger advances and returning the conducting means to receiving position as the plunger is retracted.

25. A machine for filling cartons with cans, comprising load forming enclosure, can conducting means in the load forming enclosure, means for feeding cans to the conducting means, a plunger mounted to reciprocate transversely to the feed, moving the cans from the load forming enclosure into the cartons, the conducting means being mounted to reciprocate in the direction of the feed and on the opposite side of the load forming enclosure from the feed, means for operating the conducting means and the plunger to reciprocate alternately moving the conducting means out of the path of the plunger as it advances and returning said conducting means to receiving position when the plunger is withdrawn, comprising a periodic clutch and an intermittent gear operated thereby.

26. A machine for filling cartons with cans, comprising load forming enclosure, can conducting means in the load forming enclosure, means for feeding cans to the load forming enclosure, a plunger mounted to reciprocate transversely to the feed, moving the cans from the load forming enclosure into the cartons, the can conducting means being mounted to reciprocate in the direction of the feed and on the opposite side of the load forming mechanism from the feed, means for operating the conducting means and the plunger to reciprocate alternately, moving the conducting means out of the path of the plunger as it advances and returning said conducting means to receiving position when the plunger is withdrawn, comprising a periodic clutch having a continuously rotating member, an intermittently rotating member and intermittent gear operated thereby, said periodic clutch having spring retracted clutch pins adapted to connect said members, a plate mounted to oscillate about the axis of the clutch and adapted to force the pins into engagement against the action of the springs, means for advancing the

plate and pressing the clutch pins into engagement as it is rocked from normal position, and automatic means for returning the plate to normal position at the end of the period of operation of the clutch, permitting the springs to withdraw the clutch pins.

27. A machine for filling cartons with cans, comprising a load forming enclosure, can conducting means in the load forming enclosure, means for feeding cans to the conducting means, a plunger mounted to reciprocate transversely to the feed, moving the cans from the load forming enclosure into the cartons, the can conducting means being mounted to reciprocate in the direction of the feed and on the opposite side of the load forming mechanism from the feed, means for operating the can conducting means and the plunger to reciprocate alternately moving the conducting means out of the path of the plunger as it advances, and returning it to receiving position when the plunger is withdrawn, comprising a periodic clutch and an intermittent gear operated thereby, said clutch comprising an intermediately rotated member and a continuously rotating member and clutch pins carried by said intermediately rotated member and adapted to engage the continuously rotating member, springs holding said pins normally retracted, an oscillating plate adapted to advance the clutch pins against the pressure of the spring into operative engagement with the continuously rotating member, means for tripping said clutch connected to said plate to oscillate the same, and means for advancing the plate as it is oscillated, pressing the pins into engagement with the continuously rotating member and means carried by the continuously rotating member for returning the plate to normal position at the end of a single rotation of the intermittently rotating member permitting the pins to move out of engagement, releasing the latter, said releasing means being mounted to yield to the plate to pass the same at the beginning of the operation of the intermittently rotating member.

28. In a machine for filling cartons with cans, load forming mechanism adapted to receive a plurality of layers of cans comprising a load to form the same for delivery to a carton, means for spacing the layers apart to admit a liner or separator between the layers of cans and means for moving the load of cans with said separator between said layers from the load forming mechanism into a carton.

29. In a machine for filling cartons with cans, a load forming enclosure, a plunger, means for reciprocating the plunger through the load forming mechanism, means for positioning a carton in receiving relation to the load forming mechanism, and downwardly and upwardly swinging L-shaped fingers mounted at the top and bottom, respectively, of the area occupied by the carton on the positioning means for gripping the carton and closing the rear flaps and means connecting said fingers to the plunger for operating said fingers in definitely timed relation to the movement of the plunger for gripping the carton thus positioned during the advance of the plunger and for releasing it immediately thereafter.

30. In a machine for filling cartons with cans, a load forming enclosure including shelves and a shelf carriage, a plunger, means for reciprocating the plunger through the load forming enclosure, means for removing the shelves from the load forming enclosure in advance of the plunger and for returning the same to operative position as the plunger is withdrawn, means for positioning a carton in receiving relation to the load forming enclosure, and means associated with the shelf carriage and operable by movement of the same and adapted to operate in definitely timed relation thereto to grip the carton thus positioned during the advance of the plunger and to release the same immediately thereafter.

31. In a machine for filling cartons with cans, a load forming mechanism including superimposed shelves arranged in tiers, means for feeding cans to the same, means in the load forming enclosure for conducting each can to its relative position in the load, a plunger, means for reciprocating said plunger transversely to said conducting means to move each load into its carton, a portion of said means being in the path of the plunger, and means for withdrawing said conducting means from the path of the plunger in a substantially horizontal direction prior to the advance of the plunger and for returning the same when the plunger is withdrawn.

CHARLES HENRY WILD.