

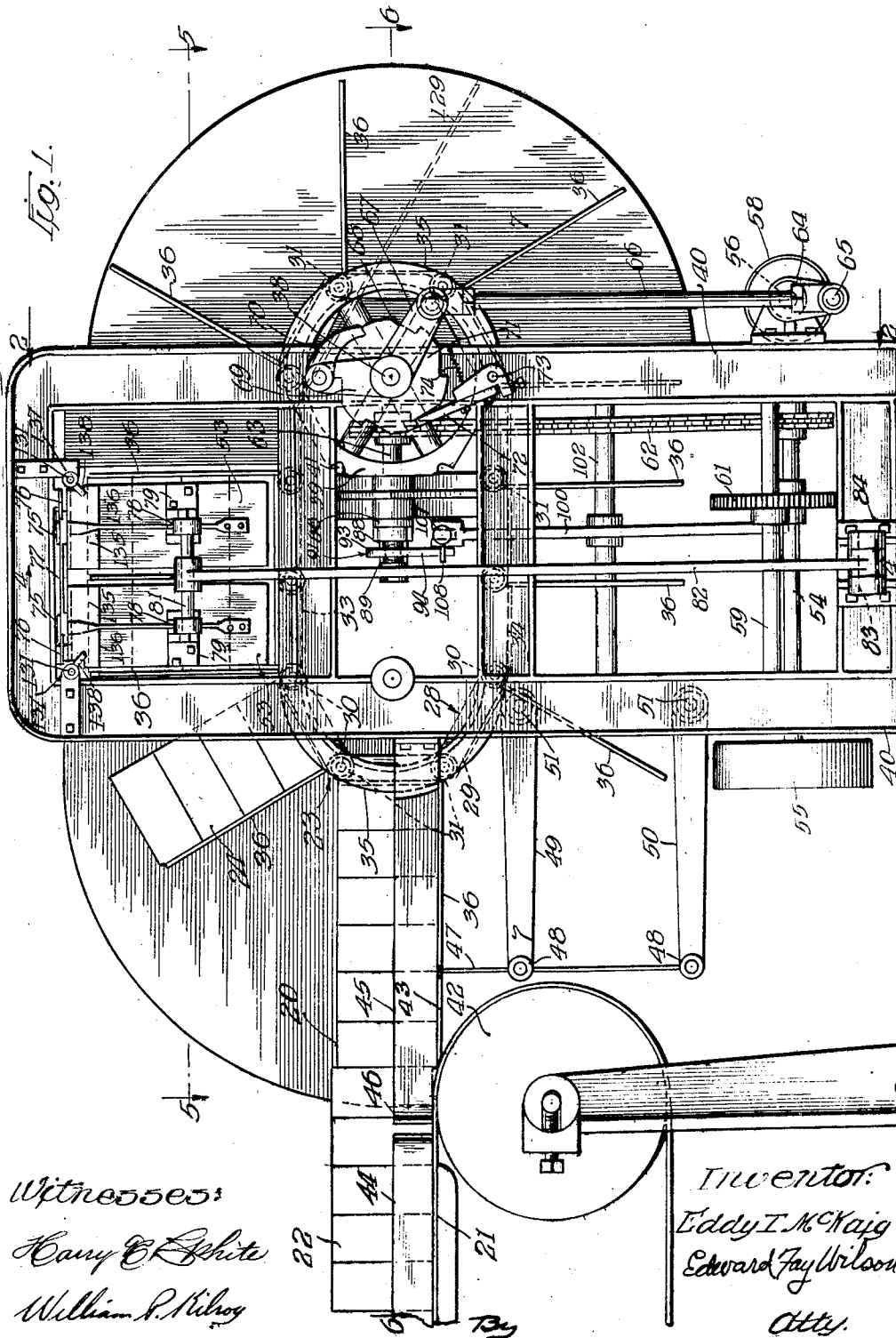
Jan. 5, 1932.

E. T. MCKAIG

1,839,925

ARTICLE PACKING MACHINE

Original Filed June 17, 1925 10 Sheets-Sheet 1



Jan. 5, 1932.

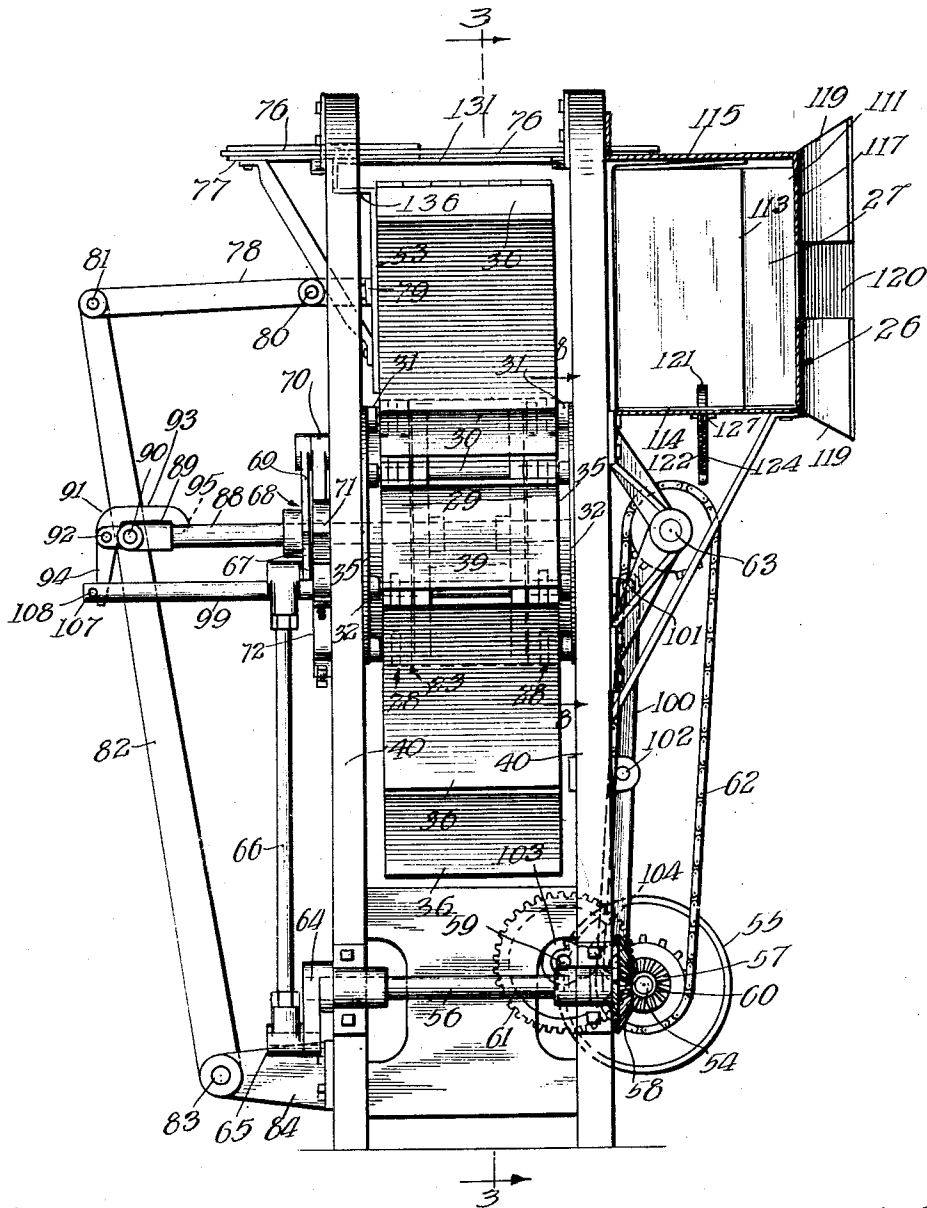
E. T. MCKAIG

1,839,925

ARTICLE PACKING MACHINE

Original Filed June 17, 1926 10 Sheets-Sheet 2

Fig. 2.



Witnesses:

Harry C. White

William B. Nelson

Inventor:

Eddy T. McKaig

Edward Fay Wilson
att.

134

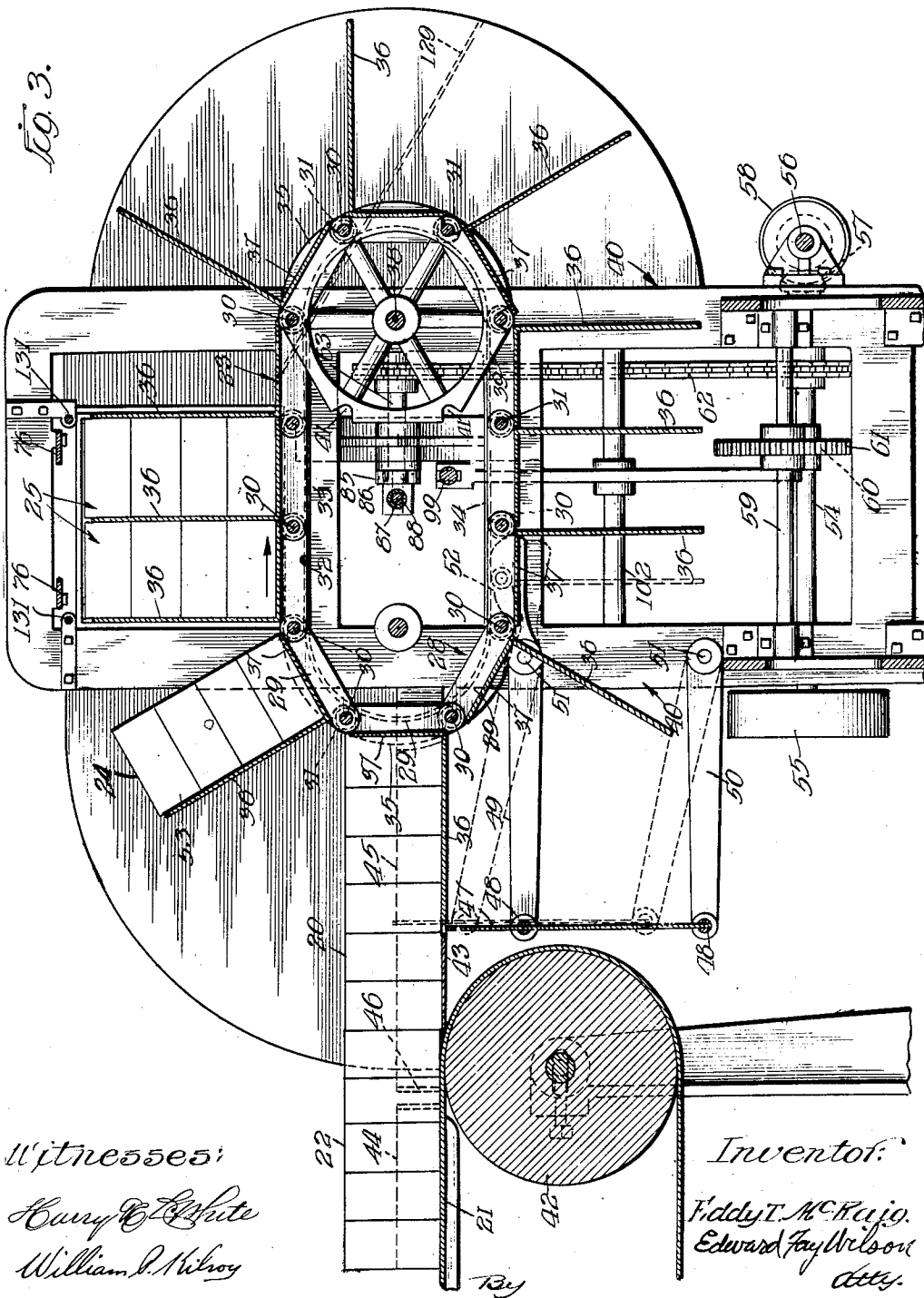
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E. T. McKAIG

1,839,925

ARTICLE PACKING MACHINE

Original Filed June 17, 1926 10 Sheets-Sheet 3



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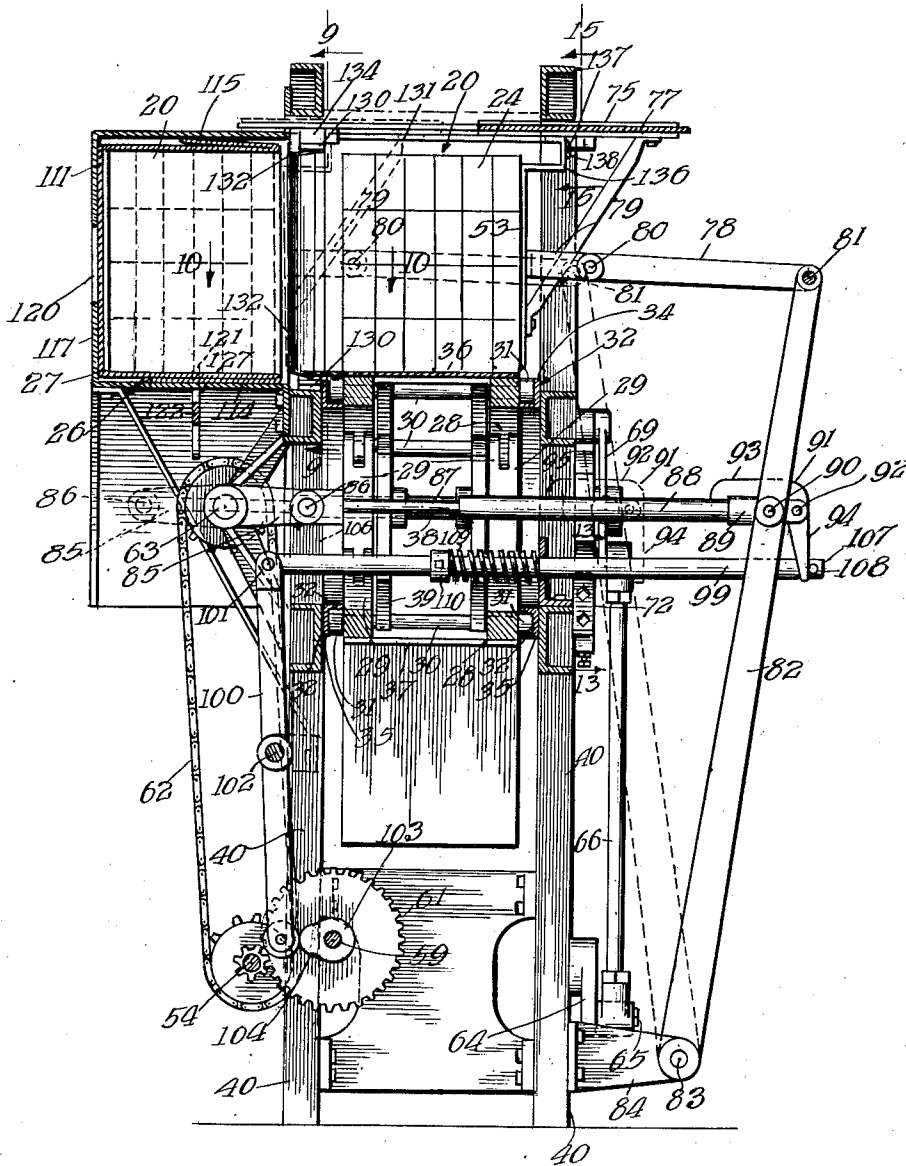
E. T. MCKAIG

1,839,925

ARTICLE PACKING MACHINE

Original Filed June 17, 1926 10 Sheets-Sheet 4

FIG. 4.



Witnesses:

Harry W. White.

William R. Hilkey

Inventor

Eddy T. McKaig

Edward Fay Wilson

By

att'y.

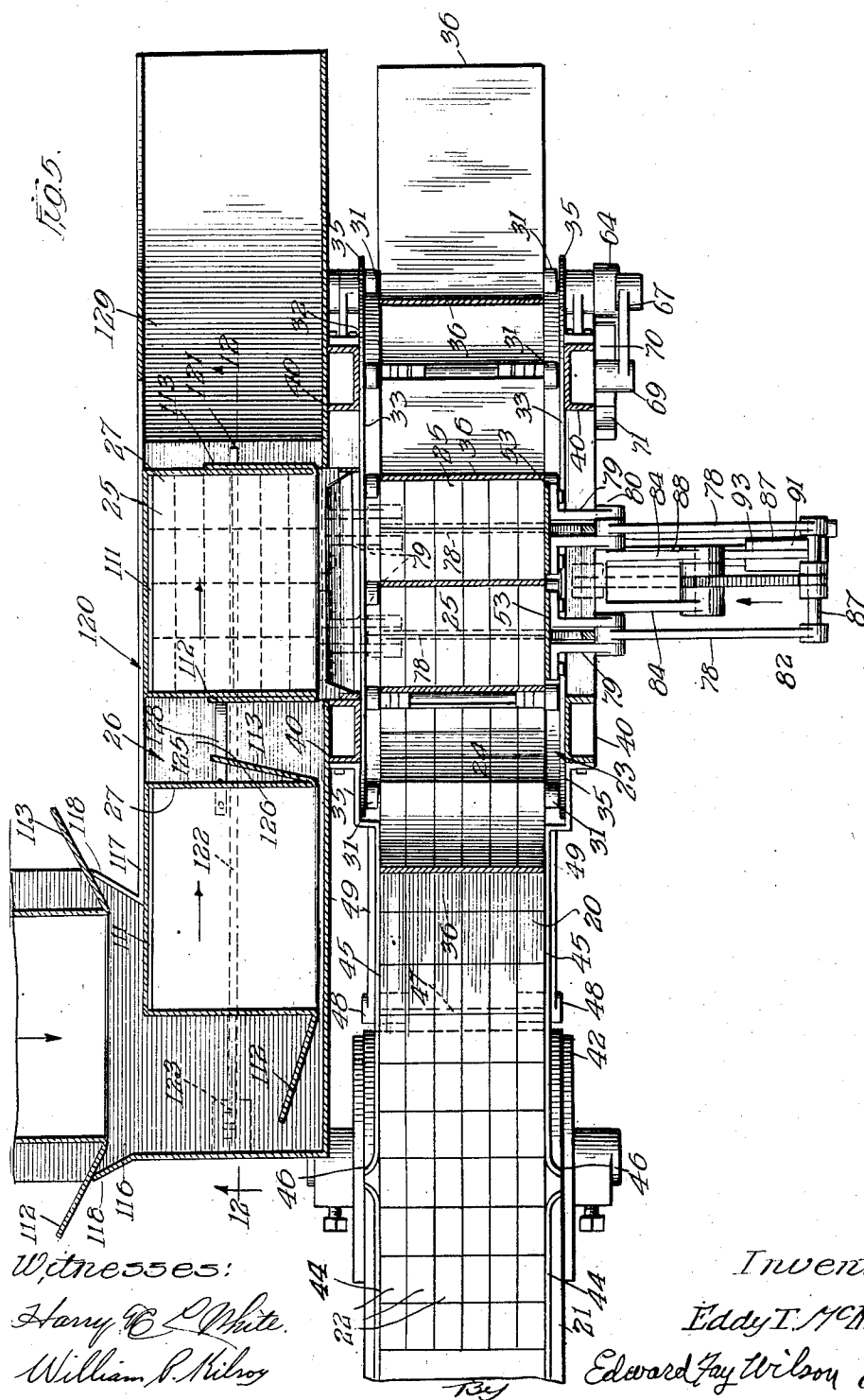
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E. T. McKAIG

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ARTICLE PACKING MACHINE

Original Filed June 17, 1926 10 Sheets-Sheet 5



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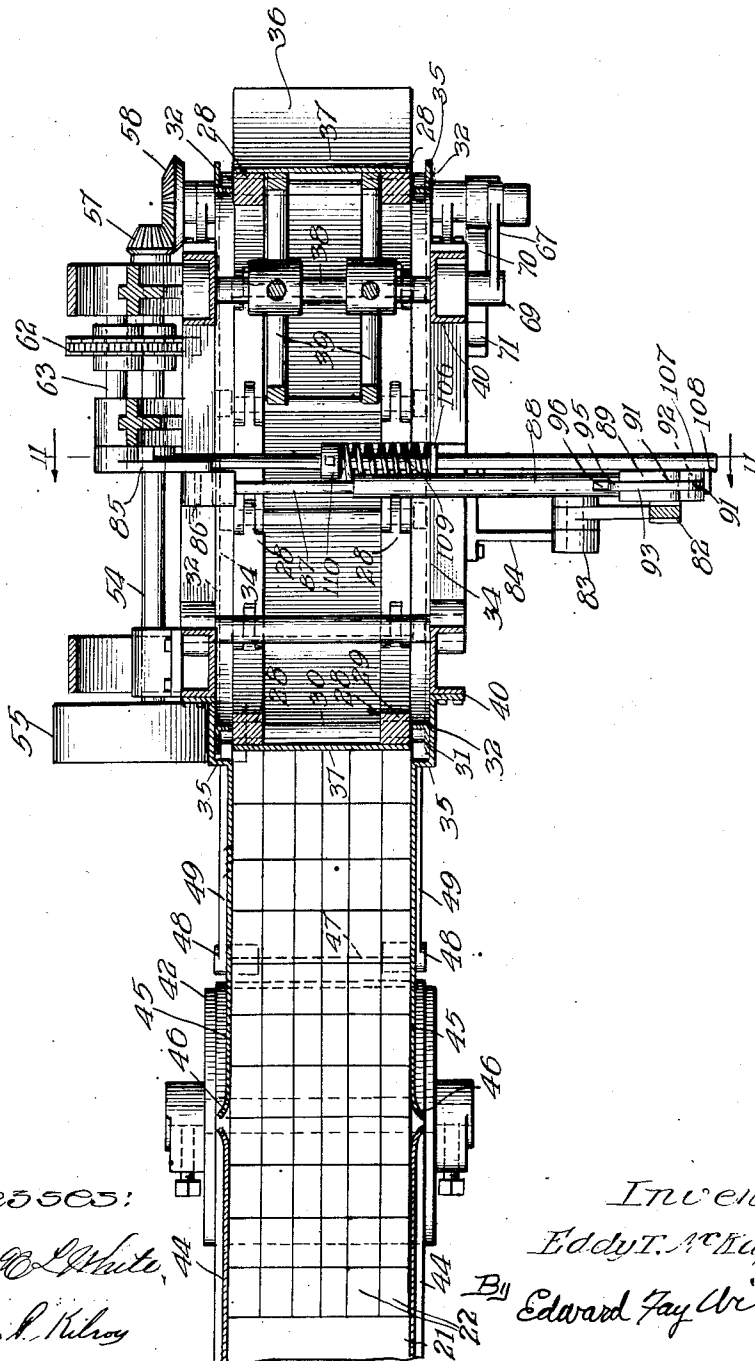
E. T. MCKAIG

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ARTICLE PACKING MACHINE

Original Filed June 17, 1926 10 Sheets-Sheet 6

FIG. 6.



Witnesses:

Harry O. White

William A. Kilroy

Inventor:

Eddy T. McKaig

By Edward Fay Wilson
Att'y

Jan. 5, 1932.

E. T. MCKAIG

1,839,925

ARTICLE PACKING MACHINE

Original Filed June 17, 1926 10 Sheets-Sheet 7

Fig. 7.

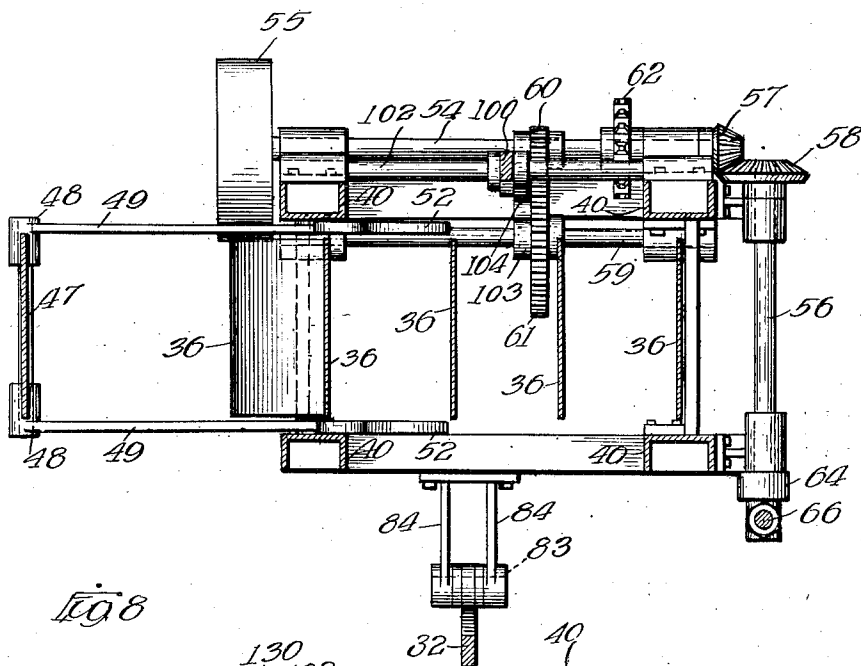
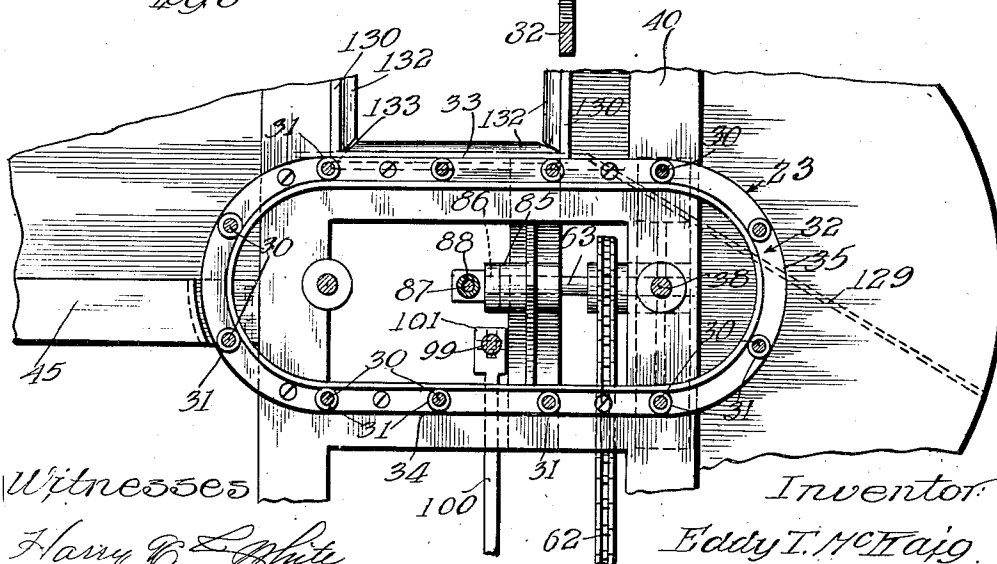


Fig. 8.



Witnesses

Harry C. White

William P. Kilroy

Inventor

Eddy T. McKaig

Edward Fay Wilson

Atty.

By

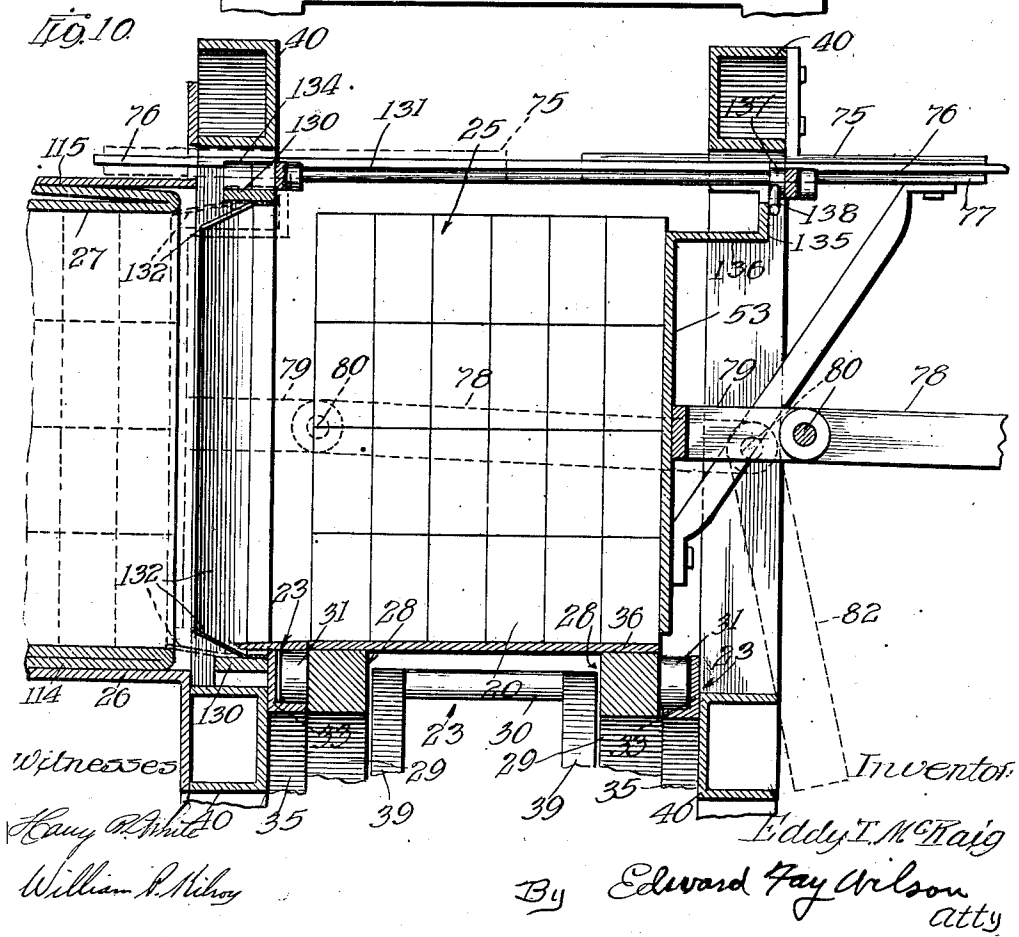
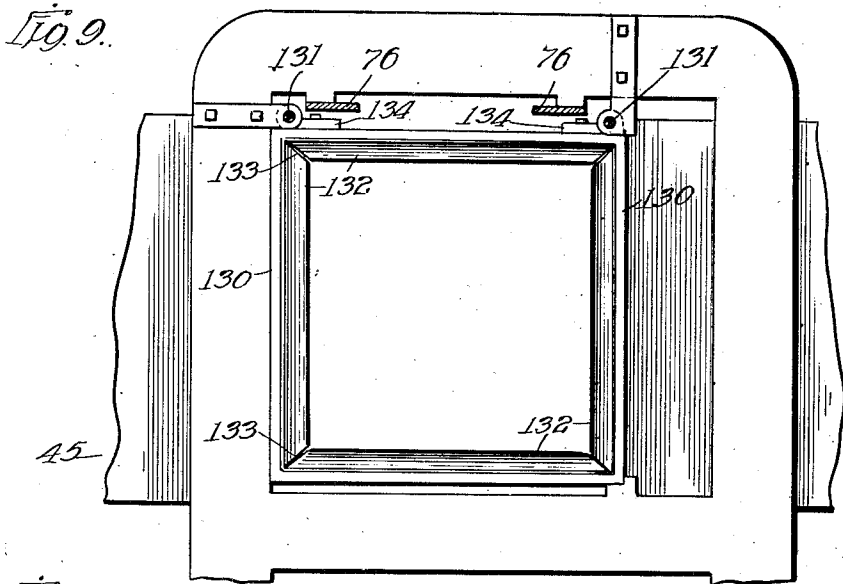
Jan. 5, 1932.

E. T. McKAIG

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ARTICLE PACKING MACHINE

Original Filed June 17, 1926 10 Sheets-Sheet 8



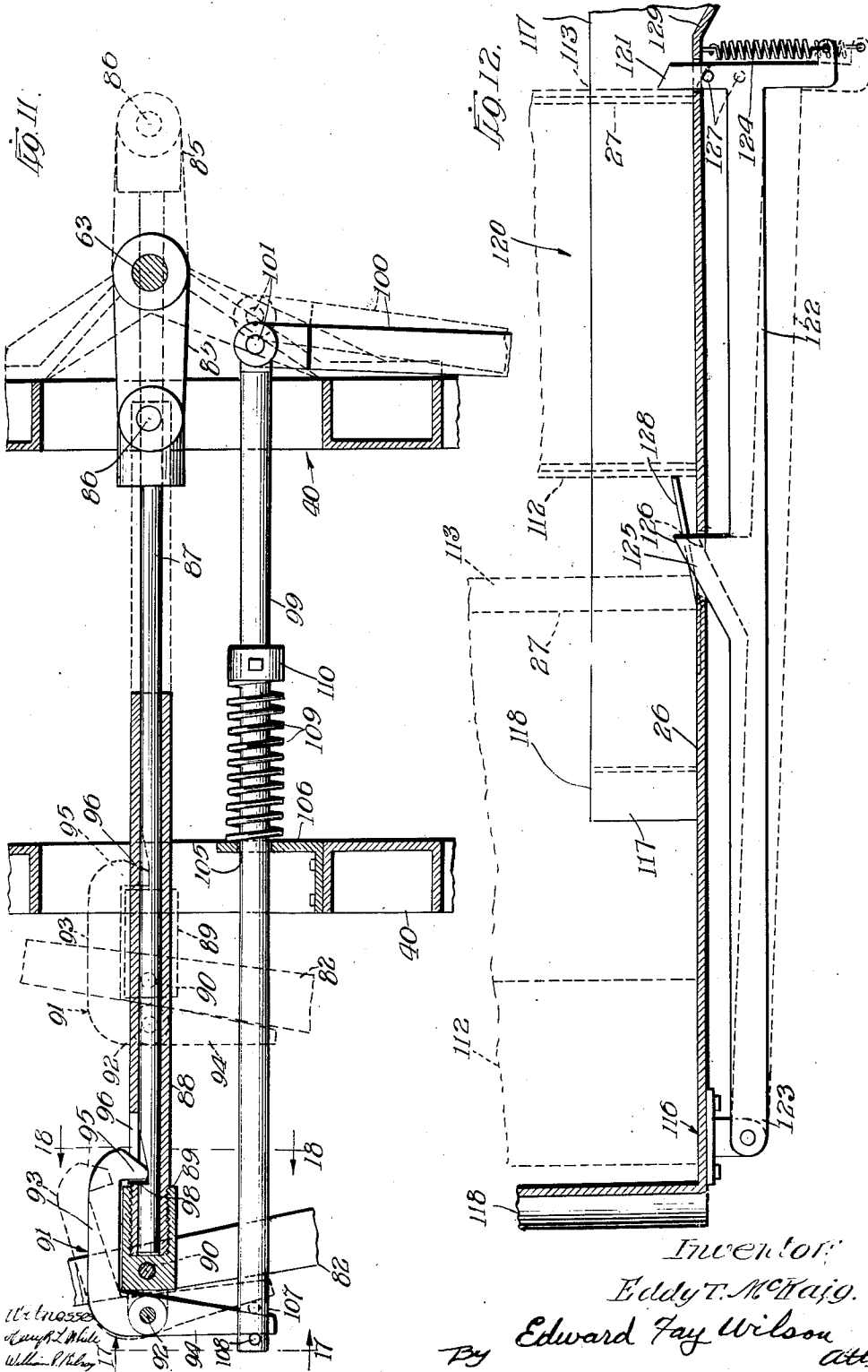
Jan. 5, 1932.

E. T. McKAIG

1,839,925

ARTICLE PACKING MACHINE

Original Filed June 17, 1926 10 Sheets-Sheet 9



Inventor:

Eddy T. McHarg.

By Edward Fay Wilson Atty.

Jan. 5, 1932.

E. T. McKAIG

1,839,925

ARTICLE PACKING MACHINE

Original Filed June 17, 1926 10 Sheets-Sheet 10

FIG. 13.

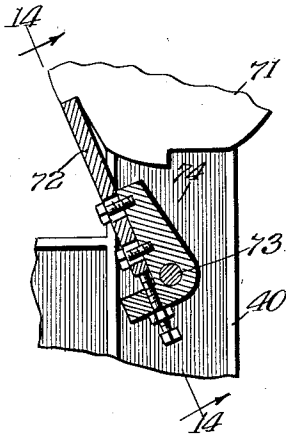


FIG. 14.

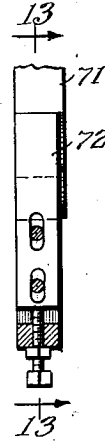


FIG. 15.

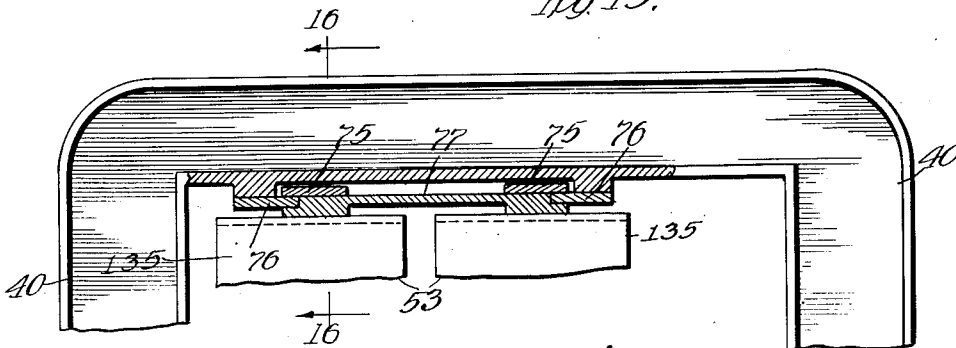


FIG. 16.

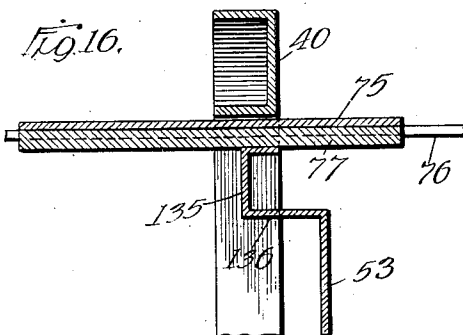


FIG. 17.

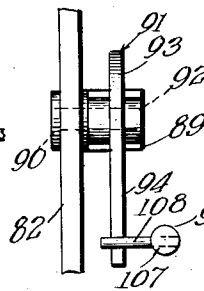
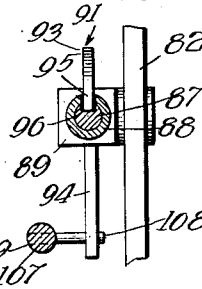


FIG. 18.



Witnesses:

Harry C. Smith
William B. Hilkey

Inventor:

Eddy T. McKaig

Edward Fay Wm.

Atty.

UNITED STATES PATENT OFFICE

EDDY T. MCKAIG, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
STANDARD-KNAPP CORPORATION, OF NEW YORK

ARTICLE PACKING MACHINE

Application filed June 17, 1926, Serial No. 116,687. Renewed May 18, 1931.

My invention relates to improvements in machines for packing articles such as food packages, etc., in boxes for storage and shipment.

5 The object of my invention is to provide a machine by which the articles to be packed can be accumulated in a sufficient quantity to completely fill the box to be packed, and by one movement of the packing plunger the accumulated articles can be inserted into the box. Usually a filled box contains a plurality of layers of the articles, each layer consisting of a plurality of rows and each row consisting of a plurality of the articles or packages. I have heretofore devised and patented machines adapted to accumulate a single row of the articles and insert the articles row by row. I have also devised a machine for accumulating the articles in complete layers and inserting the layers in succession. In both of these earlier forms relative adjusting movement between the inserting mechanism and the box is necessary in order to properly place the successive layers. In the present invention the machine first accumulates all the articles required to completely fill the box, the accumulated articles being arranged in a compact pile and the whole pile is pushed into the box, thus greatly simplifying the machine and making it possible to fill the boxes very much more rapidly.

35 The boxes commonly employed for this purpose are made of corrugated paper or pasteboard and are closed at top and bottom by means of four flaps formed with and extending from the sides of the box, means are provided for holding one of these boxes with the flaps at one side folded back, the side thus opened being presented horizontally toward the accumulating and packing mechanism. In front of this position of the box means are provided for accumulating the articles in a sufficient quantity and in a suitable pile or stack to fill the box and for positioning the accumulated articles in front of the open side of the box. Also pusher means are provided for shifting the accumulated pile of articles into the box by one forward movement of the pusher.

Other features of the invention relate to means for properly guiding the articles into the box, for retaining the accumulated articles in position and for transferring them from the accumulating position to the packing position.

Still other features of importance will become apparent from the following description taken in conjunction with the accompanying drawings forming part of this specification and in which:—

Fig. 1, is a front elevation of a packing machine embodying my invention in one form;

Fig. 2, is a vertical, sectional view on the line 2—2 of Fig. 1;

Fig. 3, is a vertical, sectional view on the line 3—3 of Fig. 2;

Fig. 4, is a vertical, sectional view on the line 4—4 of Fig. 1;

Figs. 5, 6 and 7, are horizontal, sectional views on the lines 5—5, 6—6 and 7—7, respectively, of Fig. 1;

Fig. 8, is a vertical, sectional view on the line 8—8 of Fig. 2;

Figs. 9 and 10, are vertical, sectional views on the lines 9—9 and 10—10, respectively, of Fig. 4;

Fig. 11, is a fragmentary, vertical, sectional view on the line 11—11 of Fig. 6;

Fig. 12, is a fragmentary, vertical, sectional view on the line 12—12 of Fig. 5;

Fig. 13, is a fragmentary, sectional view on the line 13—13 of Figs. 4 and 14 and illustrates an adjustable ratchet-wheel stop;

Fig. 14, is a vertical, sectional view on the line 14—14 of Fig. 13;

Fig. 15, is a fragmentary, vertical, sectional view on the line 15—15 of Fig. 4;

Fig. 16, is a vertical, sectional view on the line 16—16 of Fig. 15; and

Figs. 17 and 18, are fragmentary, vertical, sectional views on the lines 17—17 and 18—18, respectively, of Fig. 11.

The improved packing machine of my invention, as illustrated in the drawings, is adapted to receive a plurality of rows of articles, such as the rectangular packages 20, delivered to the machine by a horizontal conveyer delivery belt 21, and, as shown in

Fig. 5, the packages 20 are shown as being delivered in six rows 22.

The machine is provided with a conveyer chain device which is designated generally by 23, which is adapted to receive the several rows of packages from the belt 21 and remove from the accumulated rows a sufficient quantity to form a layer, as shown at 24. The chain conveyer is adapted to arrange a plurality of the layers 24 of packages 20 in a compact pile or stack 25 in position to be pushed into a box, as an entity, or as a unitary stack. Arranged alongside of the chain conveyer 23 is a chute 26, Fig. 5, through which boxes 27 are moved past the packing position of the stack 25 of the packages. Packing mechanism is provided for pushing the stack, as an entity, into one of the boxes 27 which is positioned to receive same.

The chain conveyer 23 consists of two parallel endless chains 28, each made up of links 29 pivotally connected at their ends, the links being substantially equal in length to one dimension, preferably the height of the packages 20. The links are pivotally connected at their ends and the two chains 28 are cross connected to form the conveyer 23 by transversely extending pins or shafts 30. The shafts 30 project at their ends beyond the chains and carry anti-friction rollers 31 on their ends, and endless tracks 32 are provided upon which the rollers 31 run. The tracks 32 have horizontal middle sections 33 at top and 34 at bottom which are connected at their ends by half circle portions 35. Each pair of opposed links 29 has mounted thereon a flat plate 36 which projects out at right angles to the links upon which it is mounted. Each pair of links also carries a second plate 37 also rigid with the links upon which it is mounted and which lies flat on the links, that is, at right angles to the plate 36. These plates constitute the conveyer elements for receiving, transporting and stacking the packages.

The chain conveyer 23 is driven by means of a shaft 38 mounted concentric with the semi-circular tracks 35 at one end and which carries chain wheels 39 rigidly mounted thereon. The shaft 38 and the tracks 32 are mounted upon a suitable rigid built up frame 40.

The wheels 39 are provided in their peripheries with notches 41 for receiving the transverse pins or shafts 30. The chain conveyer is moved step by step the length of a link, the upper stretch being moved to the right, Fig. 5, by suitable driving mechanism to be described, and the parts are so arranged that one of the plates 36 extends out horizontally at the receiving end of the mechanism, as best shown in Fig. 3, in position to receive the packages 20 from the conveyer belt 21. The conveyer belt 21 is constantly driven and is trained around a suitable belt

pulley 42 arranged adjacent to the packing machine. Between the top of the pulley and the packing machine there is a flat horizontal guide plate 43 arranged, along which the packages 20 are pushed toward the packing machine as they leave the belt 21. Suitable side guides 44 are arranged at the sides of the belt 21 and suitable guide plates 45 are arranged on the machine between which the packages 20 are received and which guide the packages as they are carried up by the conveyer 23 from the receiving position. The guide plates 45 extend out substantially to the center of the belt pulley 42. The receiving edges of the plates 45 are flared slightly outwardly, as shown at 46 (Fig. 6), to prevent the packages catching on the edges of the plates as they are pushed into the machine.

The packages 20 are delivered to the machine by being pushed across the guide plate 43 by the oncoming packages and, consequently, the packages stand in close contact along the several rows 22, and as the conveyer belt 21 is constantly operating I provide means for holding back the packages during the time the conveyer 23 is moving forward to lift a received layer up from the receiving position. This stop means consists of a vertically arranged stop plate 47 held and movable vertically past the machine end of the guide plate 43 and past the position of the outer end of the plate 36 which is in receiving position. This stop plate is mounted on the outer ends 48 of vertically swinging upper arms 49 and lower arms 50 which extend out horizontally from the frame 40. The upper arms 49 extend back beneath the lower horizontal stretch of the conveyer 23 past their pivotal supports 51 and are provided with cam surfaces 52 adapted to be engaged by the anti-friction rollers 31 and be depressed thereby, thus lifting the stop plate 47. The arrangement is such that the stop plate 47 rises coincident with the lifting of the receiving plates 36 and drops back again to its lower position at the time or immediately after the next plate 36 is in receiving position. As soon as the stop plate 47 has dropped out of the path of the packages the next receiving plate 36 is filled with the packages by the operation of the belt 21, to form the next layer 24.

As the conveyer 23 is moved forward step by step, the layer 24 is first lifted to an inclined position, as shown in Fig. 3, and upon the next movement is set in vertical position to form part of the stack 25. In the machine illustrated it requires two layers to form a stack of proper size and number of packages to fill one of the boxes 27 and the two layers required to fill one of the boxes must be arranged in compact adjacent position, as it is required that when the boxes 27 are packed they shall be substantially completely filled.

To accumulate a stack of two of the layers 24 the chain conveyer is arranged to present at least three of the link sections in horizontal position upon the upper stretch of the conveyer and as the links are just enough longer than the height of the packages to allow room between the vertically arranged layers for the plates 36 the layers stand in adjacent and close or compact relation when moved to the upper stretch of the conveyer. The three horizontal link sections for the accumulated stack are necessary because the plates 36 serve as side guides for the layers as they are pushed into the boxes 27 and, consequently, besides the plates 36 of the link sections which carry the two layers forming the stack the next preceding plate 36 is required to be in vertical position to form the guide at the forward side of the stack, as best shown in Fig. 3.

In Fig. 4 which is a vertical section at right angles to Fig. 3 the pushing or packing mechanism is illustrated. This packing mechanism consists of a plunger having a pair of vertically arranged pusher plates or heads 53, one for each of the layers 24 which make up the stack 25. These plates are enough narrower than the height of the packages to pass freely between the plates 36 and are arranged in the plane of the adjacent guide plate 45 when in position to receive the accumulating layers of packages in front of them, as best shown in Fig. 5.

The plates 53 are moved back and forth transversely of the machine to push the accumulated stack of articles from the conveyer 23 into the boxes, and as it requires in this instance two of the layers to make the stack the pusher plates 53 are pushed forward to pack a box once for each two successive movements of the conveyer 23.

The movement of the conveyer 23 step by step with a rest period between allows time for the forward movement of the packages to form a layer on the horizontally projecting receiving plate 36 and for the ejection of the articles from the conveyer by the packing mechanism. While many ways could probably be devised for controlling and timing the operations of the several operating parts of the machine I prefer the apparatus, to be described.

I preferably arrange a power or driving shaft 54 near the bottom of the frame 40 extending longitudinally of the machine, and which may be constantly driven by any suitable means such as a belt on the belt pulley 55. The drive shaft 54 is connected to drive a transverse shaft 56 by a pair of 2 to 1 mitre gears 57, 58. It is also connected to drive a longitudinal shaft 59 by a pair of 4 to 1 spur gears 60, 61. It is also connected by a drive chain 62 and suitable chain wheels to drive a longitudinal shaft 63 located near the top of the frame at the same speed as the drive

shaft 54. The shaft 56 runs at half the speed and the shaft 59 at one-fourth of the speed of the drive shaft 54. The chain shaft 56 extends through to the opposite side of the frame 40 and at its opposite end carries a crank 64 provided with a crank pin 65 (see Fig. 1) connected by a rod 66 to one arm 67 of a bell crank 68 mounted to swing freely around on the shaft 38 upon which the chain wheels 39 are secured. The other arm 69 of the bell crank 68 carries a pivotally mounted dog 70 which is adapted to engage in the teeth of a ratchet disk 71 on the downward stroke of the rod 66. The disk 71 is secured to the shaft 38. To prevent the disk 71 and shaft 38 turning back, a dog 72 is provided, pivotally mounted on a stationary pin 73 and yieldingly held against the disk 71 by a spring 74. As it is necessary to adjust the stationary positions of the plates 36 accurately in relation to the cooperating parts of the machine, I make the dog 72 adjustable lengthwise and I also make the rod 66 adjustable as to length. By means of these adjustments I am enabled to cause the plates 36 to accurately register with the delivery plate 43 for receiving the packages.

One revolution of the shaft 56 is sufficient to move the chain conveyer 23 the amount of one link and is sufficient to lift the plate 36, which has received a layer, to the inclined position and to set the next plate 36 in position to receive a layer. As in the form of machine illustrated two layers are accumulated for filling each box, the pusher plates 53 are retained in their rear position, shown in full lines, Fig. 4, during two successive movements of the chain conveyer 23 and then during the time that the rod 66 is dropping down, the plates 53 are moved forward to push the accumulated layers into a box and are also drawn back to clear the plates 36 of the chain conveyer 23.

To obtain this quick backward and forward movement of the plates 53 I provide the following described mechanism. The plates 53 are rigidly dependent from horizontal guide bars 75 carried in suitable guides 76 at the top of the machine and above the plates 53. These bars 75 are rigidly connected by cross bars 77 (see Fig. 15) so that the two plates 53 form a divided pusher abutment or plunger. This is for the purpose of passing the plate 36 which lies between the two accumulated layers of packages. Each plate 53 is connected by a horizontal link 78, which is pivotally connected at its forward end by means of a bracket 79, secured on the back of one of the plates 53 by means of a horizontal pivot pin 80, and at its rearward end is connected to a cross bar 81 secured in the upper end of a swinging lever 82 which is mounted at its lower end to swing back and forth on a pin 83 carried in a bracket 84 projecting from the frame 40. This lever 82 is

swung forward and back through the medium of the shaft 63 which is constantly rotated by the chain 62. For swinging the lever 82, the shaft 63 carries a crank 85 to the crank pin 86 of which is connected a rod 87 (see Fig. 11) which extends longitudinally of the machine and is mounted to slide back and forth in a tube or pipe 88. The outer end of the pipe carries a cap 89 to which the lever 82 is pivotally connected at 90. As the rod 87 moves back and forth once for each revolution of the drive shaft and as the lever 82 swings back and forth once for each four revolutions of the shaft 63, I arrange means for clutching the tube 88 to the rod 87 each fourth movement of the rod 87. This means consists of a bell crank 91 pivotally mounted on the outer end of the cap 89 at 92 and having one arm 93 extending back over the tube 88 and the other arm 94 dependent. The arm 93 has a hook 95 at its free end adapted to drop through a slot 96 in the tube 88 and into a notch 97 in the rod 87 near its free end. The notch 97 has a square shoulder 98 at its rear end adapted to engage the hook 95 and lock the tube 88 to the rod 87, so that the tube with the lever 82 will be drawn to the right (Fig. 11) to push the accumulated layers into the box. On the backward stroke the rod 87 pushes against the cap 89 and withdraws the packing plates 53 to their original positions out of the path of the conveyer plates 36. For holding the hook 95 out of engagement for three successive movements of the rod 87 and engaging it therewith on the fourth, I provide a second rod 99 arranged substantially parallel with and below the rod 87. One end of the rod 99 is pivotally connected to the upper end of a swinging lever 100, at 101. The lever 100 is pivoted between its ends on a pivot 102 carried by the frame 40, and its lower end projects down close to the shaft 59. The shaft 59 carries a cam 103 having a projection 104 adapted to contact with the lower end of the lever 100 and swing the lower end to the right (Fig. 2) and the upper end to the left (Fig. 11) once for each four revolutions of the shafts 54 and 63. The rod 99 is guided in an opening 105 in a plate 106 secured to the frame 40 at the side of the machine opposite to the lever 100. The free end 107 of the rod 99 extends adjacent to and beyond the normal position of the arm 94 of the bell crank 91 and a pin 108 projecting out from the side of the rod is adapted to engage the arm 94 of the bell crank. A compression spring 109 on the rod 99 and arranged between the plate 106 and a collar 110 on the rod tends to hold the rod 99 to the right, Fig. 11, with the lower end of the lever 100 against the cam 103. During the time that the cam projection 104 is not in contact with the lever 100 the rod 99 is held at its limit to the right, Fig. 11, and the pin 108 of the rod 99 holds the arm 94 of the bell

crank 91 to the right, as shown in dotted lines, Fig. 11, and with the hooked arm 93 lifted. When, however, the cam projections 104 swings the lower end of the lever 100 to the right the upper end is swung to the left against the push of the spring 109 and the bell crank 91 is released and the hooked arm 93 drops down by gravity, the hook enters the notch 97 in the rod 87 and locks the rod 87 to the tube 88 and upon the next movement of the rod to the right, Fig. 11, draws the tube 88 to the right and swings the lever 82 to the right, Fig. 11, or in toward the machine to the dotted position in Fig. 11. The swinging in of the lever 82, as hereinbefore described, moves the packing plates 53 across the conveyer chain 23, thus pushing the accumulated layers of packages off of the conveyer chain and into the packing box 27 set to receive same. Upon the next half revolution of the crank 85 the rod 87, tube 88, lever 82 and the packing plates 53 are withdrawn. As this occurs the cam projection 104 has left the lever 100 and, consequently, the rod 99 has been forced to the left, Fig. 11, and the projection 108 is in position to withdraw the hook 95 and unlock the tube 88 from the rod 87 and permit the rod 87 to slide back and forth without moving the tube 88.

The boxes 27 which this machine is adapted to fill are made of heavy pasteboard, they are made up ready for use having walls continuous to form the body and which is closed at the two opposite sides by flaps hinged to the walls and adapted to be folded down to close the box. The flaps 111 at the one side of the box are folded down, before the box is put into the chute 26, to close the back or bottom of the box and the flaps 112, 113, 114 and 115 at the front or top of the box are folded or turned out so that an open side of the box can be presented to the packing mechanism.

The chute 26 is rectangular in cross-section, that is, it is the shape of the boxes and is arranged horizontally and at a height so that as the boxes 27 pass along same they can be presented with their open sides to receive the accumulated packages as the stack 25 is pushed forward by the forward movement of the plates 53. The chute 26 is provided with a flared opening 116 in its rear wall 117 at one end, the outwardly flared flanges 118 serving to assist in swinging the flaps 112 and 113 back against the sides of the box, and similar flared flanges 119 (Fig. 2) serve to fold the top and bottom flaps 114 and 115 back against the sides of the box. The bottom flaps 111 are held closed in by hand as the box is entered into the chute and as soon as entered the box is moved along the chute toward the filling point by hand, the back wall 117 of the chute being provided with a central longitudinal slot 120 to permit the hand of the operator to push the box along the slot. The parts of the back above and below the slot 120 retain

the bottom flaps closed and the top and bottom walls of the chute retain the top and bottom flaps 114 and 115 at the front of the box folded back during the passage of the box through the chute.

As the boxes 27 are moved through the chute 26 by hand it is necessary to provide means so that the box shall be accurately set for receiving the articles as they are pushed in by the plates 53. For this purpose I provide a stop 121 (see Fig. 12) adapted to enter the chute from the bottom and arranged so that when the forward wall of the box 27 comes against same the box will be accurately set to receive the stack of packages. This stop 121 is formed on the free end of a swinging lever 122 which is arranged longitudinally of the chute 26 beneath the bottom wall of same and is pivotally mounted at its opposite end 123 to swing up and down. The lever 122 is yieldingly held with the stop 121 projecting into the chute by a spring 124 which connects the lever with the floor of the chute. In order to permit the box, after being filled, to be pushed along the chute to allow the next box to take its place the lever is depressed. For depressing the lever I provide an inclined projection 125 on the lever 122 adapted to project up through an opening in the floor of the chute 26 into the path of the boxes 27 as they approach the packing position. The forward wall of an approaching box slides along the top inclined surface 126 of the projection 125 and forces the projection and the lever 122 down, thus withdrawing the stop projection 121 and permitting the filled box to be pushed along the chute to the delivery end. A stop pin 127 on the projection 121 limits it in its upward movement.

For the purpose of preventing the closure flaps 112 and 113 of the box 27 interfering with the movement of the boxes along the chute 26, I provide a yielding inclined stop 128 secured to the bottom wall of the chute and adapted to be depressed by the box as the box is moved along the chute. As a box is moved along the chute 26 to the filling position the forward closure flap 113 is held back by the hand of the operator until it is close enough to the box which is in the filling position so that it cannot again swing forward. At this time the box engages the inclined stop 125 and releases the filled box and the further forward movement of the following box pushes the filled box along the chute and permits the following box to be positioned for filling. The hand of the operator which pushes the box to the filling position holds the rear flap 112 folded back against the adjacent side of the box until the box is set in the filling position, at which time the yielding stop 128 rises and holds the flap 112 against the side of the box and out of the way of the next following box. A short distance beyond the filling position the floor of the chute 26 is in-

clined downwardly, as shown at 129, Figs. 5 and 11, at a sufficient angle to cause the filled boxes to slide down the chute to be delivered from the machine.

As the boxes 27 are made of non-rigid material they are not all accurate as to shape and the open sides of the boxes might not all receive the stacked packages readily. In order to accurately align the boxes with the stack of packages as they are inserted I provide a funnel-like device which is pushed into the open side of the box in advance of the entering stack and which spreads open within the open side of the box and accurately guides the entering stack. This funnel guide device consists of a square frame 130 (see Figs. 4 and 10) mounted in front of the opening in the front wall of the chute through which the stack of packages is pushed into the boxes 26. This frame is arranged between the conveyer chain 23 and the chute 26 and is of a size to permit the stack 25 of packages 20 to pass freely through same. The frame is mounted to have a limited back and forth movement, that is, in the direction of movement of the plates 53 and hangs down from guide rods 131 which extend above and parallel with the movement of the packing plunger. Rigidly secured to the inner surfaces of the frame 130 are inwardly inclined yielding guide plates 132, preferably made of thin spring sheet metal. There are four of these plates, one for each side of the frame and they are slightly mitred at their ends 133 to permit these plates to incline freely inwardly, as shown. The plates 132 are of such width and inclined inwardly at such an angle that the opening between their inner edges is not large enough to permit the stack of packages to pass through. These inclined guide plates form a yielding funnel, the small end of which is small enough to freely enter the open side of the box, positioned to be filled, and as the stack of packages is pushed forward by the packing plunger the stack engages the plates 132 and carries the funnel forward projecting its small end into the box. At this point the frame 130 or its mounting 134 strikes a suitable stop such as the front wall of the chute and the further forward movement of the stack spreads the guide plates 132 within the open side of the box, as shown in dotted lines, Fig. 10, and they serve to accurately position the box and guide the packages into same.

The connections 135 of the plates 53 with the guide bars 75 from which they depend are formed with offsets 136 (see Figs. 10 and 16) to pass the frame 130 at the inner limit of the movement of the plunger and permit the plates 53 to push the stack clear into the box. To withdraw the funnel from the box the guide rods 131 for the frame 130 carry stops 137 near their rear ends and from which rigid projections 138 extend into the path of the

connections 135 of the plates 53 so that as the plates 53 approach their rear or completely withdrawn position the frame 130 is withdrawn and the filled box is free to be removed from the machine.

It should be understood that the specific machine shown and described is typical merely of my invention, as it is obvious that having worked out the invention in one form, many modifications will readily suggest themselves to one skilled in the art, consequently I do not limit or confine my invention to the specific embodiment of my invention herein shown and described.

I claim:

1. In a packing machine, an article accumulator and conveyer, comprising a series of articulated plates, article supports extending out at right angles to the plates, and adapted to be successively positioned horizontally to receive a layer of articles, the onward movement of the conveyer adapted to position the plates horizontally and the supports vertically to position a plurality of layers in front of a box to be filled, and means for shifting the positioned articles into a box.

2. In a packing machine, means for positioning a quantity of articles in a compact pile and sufficient to fill a box in position before a box to be filled, means for pushing the pile of articles into the box, and a yielding funnel adapted to be engaged by the forward end of the pile of articles and be pushed into the box in advance of the pile and guide the articles as they enter the box.

3. In a packing machine, means for positioning a quantity of articles in a compact pile and sufficient to fill a box in position before a box to be filled, means for pushing the pile of articles into the box, a frame through which the articles are passed as they are pushed into the box, yielding guides carried by the frame adapted to be engaged by the pile of articles and be moved into and expanded into the box and serve to guide the articles as they enter the box.

4. In a packing machine of the kind described, means for accumulating articles in successive layers and arranging a predetermined number of layers in a compact pile and sufficient to fill a box to be packed, means for holding a box in position to receive the arranged articles, a frame through which the articles are passed as they enter the box, yielding guide plates carried by the frame and projecting into the path of the articles, the plates adapted to be engaged by the articles and carried forward thereby into the mouth of the box, said plates adapted to be spread against the inner periphery of the open side of the box to serve as a funnel to guide the articles into the box, and means for withdrawing the guide plates from the box.

5. In a box packing machine, means for

holding a box with an open side presented horizontally, means for projecting an arranged pile of the articles, sufficient for filling a box, into the box, and means adapted to be projected into the open side of the box by the articles and in advance of the articles and adapted to guide the articles as they are entered into the box.

6. In a machine for packing articles in boxes, a packing mechanism adapted to move a stack of articles sufficient to fill a box, into a box in one packing operation, a chute along which boxes are moved past the packing mechanism, a stop for retaining a box in packing position, and means for releasing the box from the stop by the next successive box.

7. In a box packing machine, a chute along which boxes are moved past a packing mechanism, a stop for retaining a box in packing position and means operable by the next box in succession for releasing the box from said stop.

8. In a box packing mechanism, a chute along which boxes are moved past a packing mechanism, a stop for retaining the boxes in packing position, means operable by the next successive box for releasing the stop, and said chute terminating in a downwardly inclined delivery end adapted to receive the filled boxes when moved forward out of packing position by the next successive box.

9. In a machine adapted to pack boxes, each having an open side adapted to be closed by four flaps, one hinged to each edge of the open side of the box, a chute along which the boxes are moved past a packing mechanism, two opposite walls of the chute adapted to hold two of said flaps turned back while the box is being packed, and a yielding stop adapted to engage the trailing flap and prevent it swinging out of turned back condition until engaged by the next successive box.

10. In a packing machine, an article accumulator in the form of an endless chain belt, article receiving plates spaced along the belt and adapted to project outwardly at right angles to the belt, means for placing a layer of the articles on each successive plate as it is in horizontal position, a stop plate on the belt at right angles to each article receiving plate, means for moving the belt step by step to position successive receiving plates in article receiving position, the belt operating to accumulating sufficient layers in juxtaposed parallel position for filling a box, and means movable across the belt for projecting the accumulated articles from the belt into a box.

11. In a box packing machine, a conveyer chain movable step by step and adapted to receive articles to be packed in the form of successive layers and to arrange the layers in compact parallel relation for projection into a box, a box chute arranged parallel with the chain, means for retaining a box in the chute

in packing position, and article projecting means movable across the chain for projecting the accumulated articles, as an entity, into a box in the chute.

5 12. In a box packing machine, a conveyer chain for accumulating articles to be packed, means for moving the chain step by step, the chain adapted to arrange the accumulated
10 articles in a compact stack to be entered, as an entity, into a box, article projecting means movable across the chain for pushing the
15 stack into a box and mechanism connecting the chain and the projecting means whereby the projecting means is adapted to project the articles at selected intervals of the step
by step movement of the chain.

13. In a box packing machine, a conveyer chain for accumulating articles to be packed, means for moving the chain step by step, the
20 chain adapted to arrange the accumulated articles in a compact stack to be entered, as an entity, into a box, article projecting means movable across the chain for pushing the
25 stack into a box and mechanism connecting the chain and the projecting means whereby the projecting means operates to push the articles into a box once for each two successive
movements of the chain.

14. In a packing machine of the kind described, an article projector, an operator for the projector, movable back and forth continuously, and means for connecting the projector to the operator on each alternate forward
30 movement thereof.

15. In a packing machine of the kind described, a series of receiving plates adapted to be successively placed in horizontal position for receiving articles from a conveyer belt in the form of a layer, means for successively moving said plates to vertical position
40 to arrange a predetermined number of said layers in vertical position preparatory to moving them into a box, a stop arranged adjacent to the outer ends of the plates when in horizontal position, means for lifting the
45 stop substantially simultaneously with the raising of each said plate to hold back the oncoming articles until the successive plate is moved to horizontal receiving position.

16. In a packing machine, a chain conveyer having plates extending out at right angles to the chain and adapted to be successively placed in horizontal position for receiving
50 articles to be packed from a continuously operative conveyer belt, means operable by the chain belt for periodically stopping the delivery of articles to said plates, said chain conveyer operative to arrange successively
55 received quantities of articles in adjacent layers for projection into a box.

17. In a packing machine, a chain conveyer having plates extending out at right angles to the chain and adapted to be successively arranged in horizontal position for receiving
60 articles to be packed from a continuously operative

conveyer, a vertically movable stop arranged between the conveyer belt and the receiving plates, the conveyer chain operative to lift the received articles from the receiving position, and means operatively connecting said stop and conveyer chain for lifting the stop simultaneously with the lifting of each receiving plate and thereby prevent the delivery of articles from the conveyer belt.

18. In a packing machine, a conveyer chain, article receiving plates projecting out at right angles to the chain and adapted to be successively arranged in horizontal position for receiving the articles, the conveyer operable to arrange a plurality of plates in vertical position with the articles between them, a packing plunger movable across the conveyer for pushing the articles into a box, the plunger having a plurality of article engaging parts adapted to pass between the plates in the packing movement.

19. In a box packing machine, means adapted to accumulate articles in successive layers, means for holding a box to be filled, means for positioning the layers on edge for projection into the box, and means for simultaneously projecting a plurality of said layers into a box.

20. In a packing machine, means for delivering similar articles to a machine in a plurality of parallel streams, means for segregating portions of the plurality of streams to form layers, means for assembling the layers to form a stack, and means for shifting the stack into a box.

21. In a packing machine, means for delivering similar articles to a machine in a plurality of parallel streams, means for segregating portions of the plurality of streams to form layers, means for assembling the layers to form a stack, means for positioning a box to be filled in relation to the stack, means for shifting the stack as an entity into a box, the segregation and stack forming means serving as guides in the shifting operation.

22. The improvements herein described, comprising means for delivering a plurality of horizontal streams of articles to be packed to a packing machine, an endless conveyer provided with spaced flights, each of which is adapted to receive and divide off a section of the plurality of streams sufficient to form a layer, the conveyer adapted to raise the layers and assemble them in a compact relation to form a stack, means for positioning and holding a box to be filled in relation to said stack and means for shifting said stack as an entity into a box.

23. In an article packing machine adapted to receive articles to be packed in a plurality of parallel streams from a continuously operating horizontal conveyer, means for successively segregating a specified number of articles from the several rows to form suc-

cessive layers, means for arranging a plurality of layers on edge and close together to form a stack ready to be projected into a box and means for moving the stack as an entity into a box.

24. An article packing machine embodying a carrier for receiving and holding a supply of articles, means for intermittently advancing the carrier, means for feeding the articles to the carrier, means for ejecting the articles from the carrier, and means for intermittently arresting the feeding of the articles to the carrier while the operation of the feeding means remains constant.

25. An article packing machine embodying a carrier for receiving and holding a supply of articles, means for intermittently advancing the carrier, means for feeding the articles to the carrier, means for intermittently ejecting the articles from the carrier, and means responsive in its operation to the operation of said ejecting means for arresting the feed of the articles to the carrier and while the operation of said article feeding means remains constant.

26. An article packing machine embodying a traveling conveyor for delivering the articles to the machine, a carrier for receiving the articles from the conveyor and for conveying them to a discharging station, means for intermittently operating the carrier, means automatically rendered active at a predetermined point in the cycle of operation of the machine for arresting the movement of the articles by the conveyor while the operation of the conveyor remains constant, and means for ejecting the articles from the carrier into a box.

27. In a box packing machine, a conveyor for accumulating articles to be packed, means for advancing the conveyor step by step, the conveyor adapted to arrange the accumulated articles in a compact relation preparatory to filling a box, means movable across the conveyor for shifting the articles into a box, and means for intermittently operating the shifting means after a predetermined number of step movements of said conveyor for simultaneously shifting into a box the articles accumulated by a like plurality of step movements.

28. In a packing machine, means for holding a box with an open side presented horizontally, means for accumulating articles in a plurality of layers in position to be shifted into the open side of said box, partitions separating said layers, an article shifter provided with a separate pusher part for each layer, and means for moving the shifter to simultaneously shift all of said layers.

In testimony whereof, I have hereunto set my hand, this 27th day of May, 1926.

EDDY T. McKAIG.