

Aug. 26, 1941.

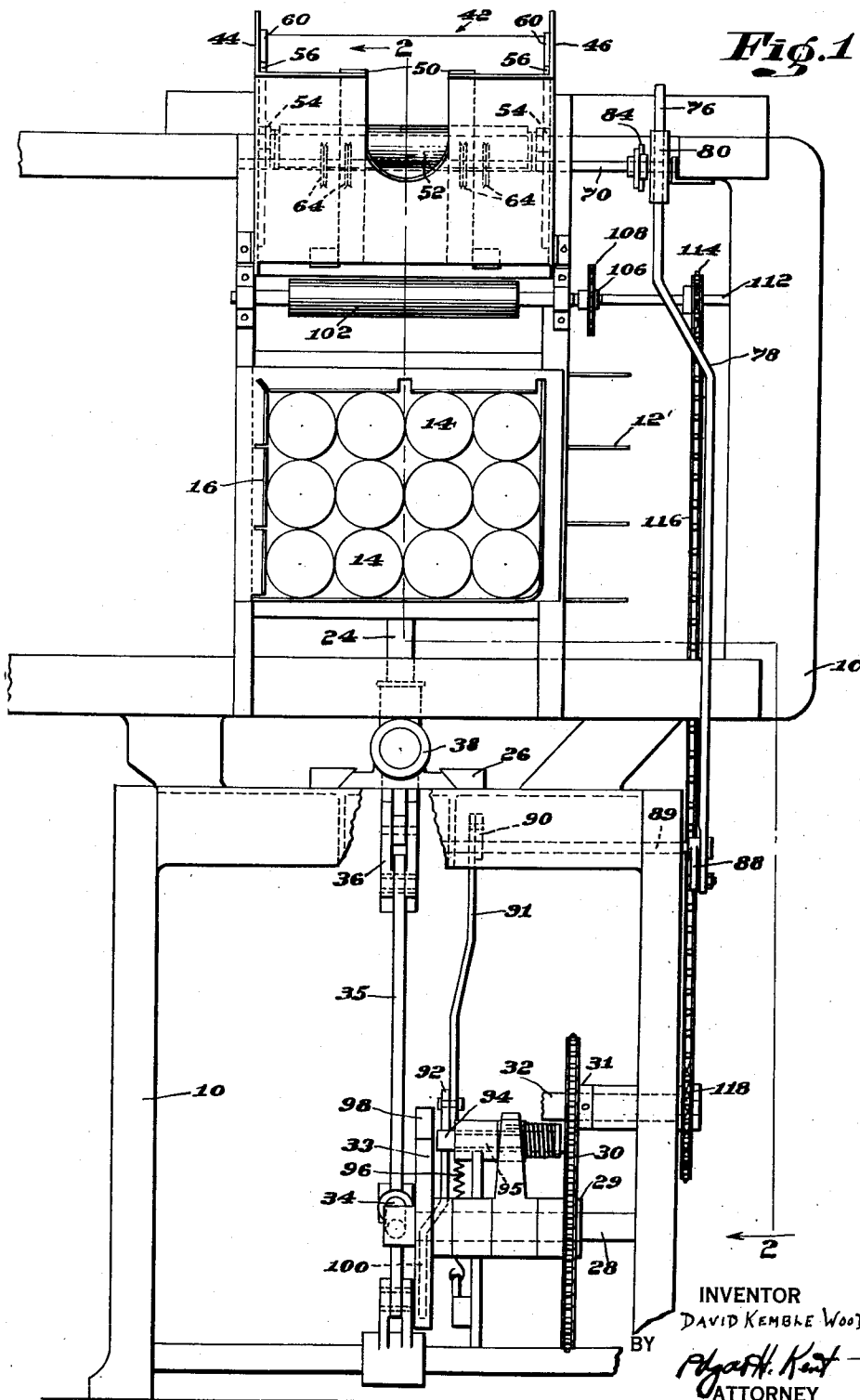
D. K. WOOD

2,254,097

PACKAGING MACHINE

Filed Jan. 27, 1940

3 Sheets-Sheet 1



Aug. 26, 1941.

D. K. WOOD

2,254,097

PACKAGING MACHINE

Filed Jan. 27, 1940

3 Sheets-Sheet 2

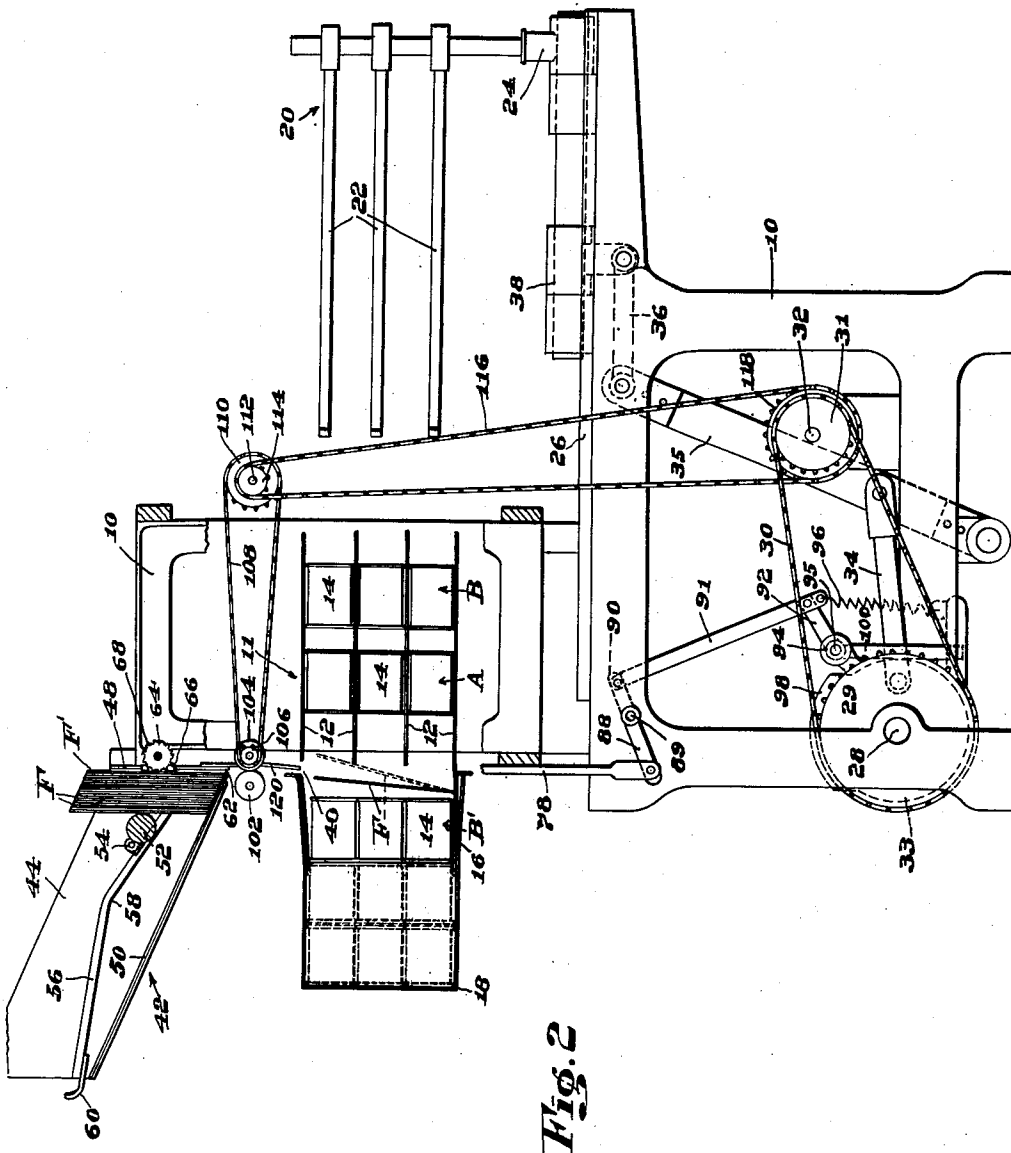


Fig. 2

INVENTOR
DAVID KEMBLE WOOD
BY
Edgar H. Hart
ATTORNEY

Aug. 26, 1941.

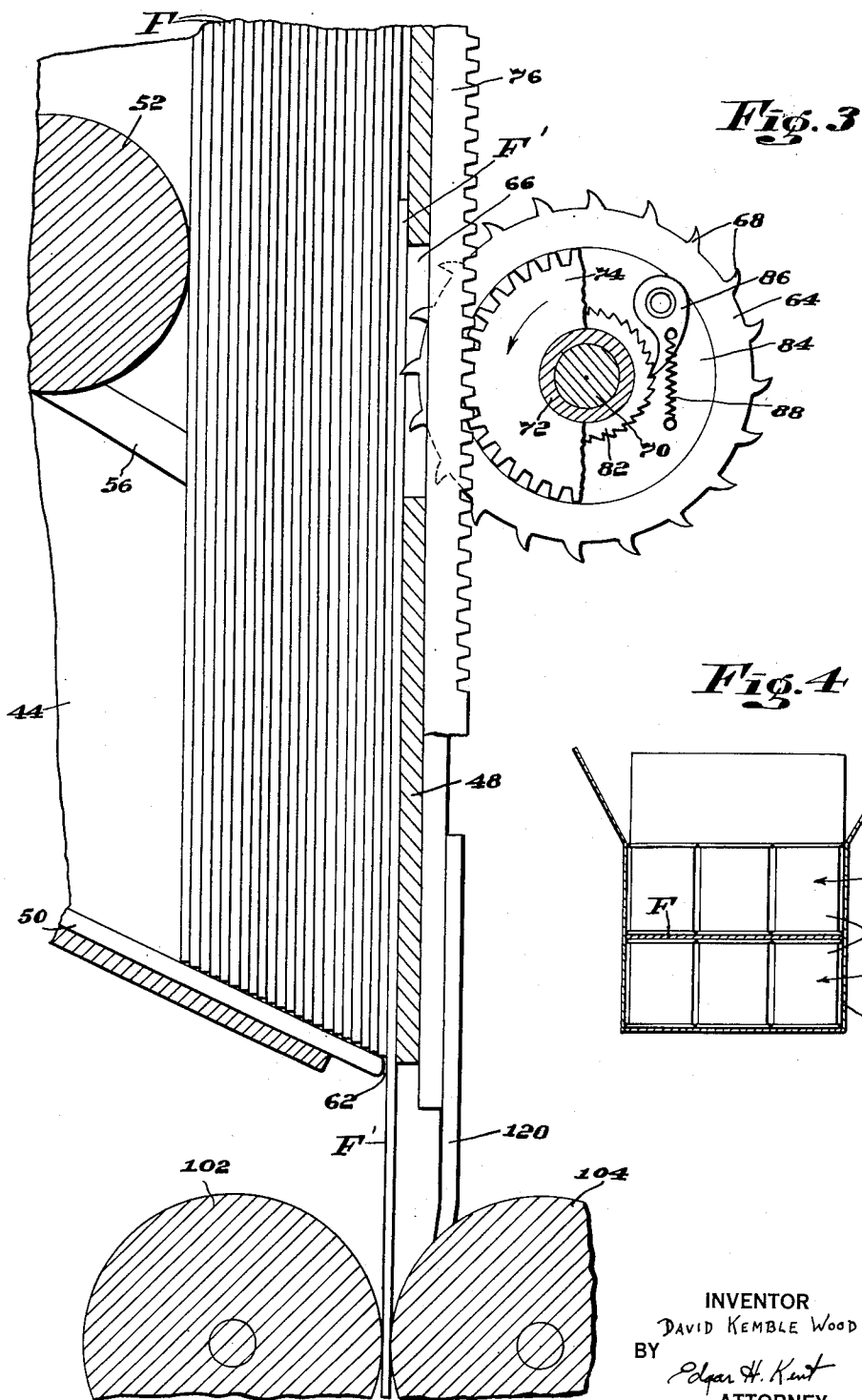
D. K. WOOD

2,254,097

PACKAGING MACHINE

Filed Jan. 27, 1940

3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,254,097

PACKAGING MACHINE

David Kemble Wood, Honolulu, Territory of Hawaii, assignor to Hawaiian Pineapple Company, Limited, Honolulu, Territory of Hawaii, a corporation of the Territory of Hawaii

Application January 27, 1940, Serial No. 315,980

3 Claims. (Cl. 226-14)

The present invention relates to machines for packing filled containers, such as cans, in cartons, and more particularly such machines of the type wherein the several layers of containers to be packed in a carton are formed outside the carton and then transferred bodily thereto.

In packing containers such as cans, it is the practice to insert a sheet of cardboard or the like as a filler pad between successive horizontal layers of the cans to prevent marring and denting of the cans by one another, as is liable to take place during shipment and handling if an upper layer is allowed to rest upon a lower layer. When the cans are packed with the aid of packing apparatus of the type above referred to, heretofore in use, the filler pads are inserted by hand by the machine operator after the layers have been formed but before they are transferred to the carton. As the machine is usually stopped by the operator until he has placed a pad between the can layers to be transferred to a carton at the next operation, it will be apparent that insertion of the filler pads by the operator materially slows the production of the machine.

An object of the invention is to provide an improved machine of the character referred to, equipped with means whereby a filler pad is automatically positioned between successive layers of containers in each carton packed by the machine, thus materially reducing the work of the operator. A further object of the invention is to provide such a machine wherein the filler pad inserting means will properly perform its function without necessitating any stopping of the machine, thus substantially increasing the production of the machine as compared with prior machines. Other objects and advantages of the invention will be apparent from the ensuing more particular description and from the accompanying drawings, wherein:

Fig. 1 is an end elevation of part of a can-packing machine embodying filler pad inserting mechanism of the present invention;

Fig. 2 is a partial side elevation, partial vertical section on the line 2-2 of Fig. 1;

Fig. 3 is an enlarged detail view, partly in section, partly in elevation, of the discharge end of the filler pad magazine and of part of the pad discharging and feeding mechanism;

Fig. 4 is a vertical section of a packed carton, showing the filler pad in position between two layers of cans.

Referring now to the accompanying drawings,

the reference numeral 10 designates the main frame of the machine on which is supported the can magazine 11 comprising a plurality of superposed plates or flights 12 on which the cans 14 are arranged in vertically aligned rows, each stack of vertically aligned rows conforming in number and arrangement of cans to a layer of a packed carton. In the apparatus shown, the magazine is designed to form in this manner two such stacks A and B, each stack comprising three superposed horizontal rows of four cans.

Attached to the frame 10 at the left hand side of the magazine as viewed in Fig. 2 and aligned therewith is located a tubular delivery frame or funnel 16, open at both ends, over which are sleeved the open top flaps of a carton 18 to be packed. At the opposite side of the magazine is located the can ejector means 20 comprising a plurality of horizontally disposed plungers 22 mounted at one end in superposed spaced relation upon an upstanding frame 24 slidably mounted in a bed 26 on the frame 10.

In transferring the cans from the magazine, the ejector means 20 is moved to the left of its retracted position in Fig. 2, causing each of the plungers 22 to contact first the ends of one of the rows of cans in the stack B in the magazine, then to advance the cans of stack B across the plates 12 into engagement with the cans in stack A, then to push both stacks of cans A and B out of the magazine into the funnel 16. At the outer end of the funnel there is located a third stack of cans B' which has been left in that position on the previous packing stroke of the ejector 20. As the stack of cans A is forced out of the magazine it engages the stack B', and further advance of the ejector forces the stacks B' and A into the carton to form the bottom and top layers, respectively, in the carton. The forward movement of the ejector is continued until the stack of cans B reaches the position previously occupied by the stack B', this forward movement being sufficient to force the packed carton off the funnel 16 whence it falls onto a suitable receiving platform (not shown), and the ejector is then withdrawn to its retracted position shown in Fig. 2.

To reciprocate the ejector 20 on the bed 26 in the manner just described, there is provided on the frame 10 a shaft 28, carrying a sprocket wheel 29 connected by chain 30 to a sprocket 31 on the main shaft 32 driven from a suitable source of power (not shown). Shaft 28 has fixed

thereto a crank disc 33 which drives the ejector 20 through connecting rod 34, lever 35, link 36 and cross-head 38 connected to the frame 24.

The apparatus so far described is the packing end of a can-packing machine of a well-known type, similar to that shown and described in Patent No. 2,043,411, issued June 9, 1936, to which reference may be had and wherein will be found illustrated suitable tilting runway mechanism for supplying cans to the magazine between retraction of the ejector therefrom and the next forward stroke, illustration and description of such mechanism being omitted herefrom as unnecessary to an understanding of the invention.

Referring again to Fig. 2, it will be seen that when the ejector is retracted from its extreme forward position, there is a vertically unobstructed space between the stack of cans B' and the sides of the plates 12 of the magazine 11. Between the top of the magazine 11 and the top of the funnel 16, there is provided a small opening or slot 40 communicating with this space and of sufficient size to permit insertion of a filler pad F edgewise therethrough. Prior to the present invention it has been the practice, as previously stated, for the operator to insert a filler pad through the slot 40 between successive reciprocations of the ejector means, and since a complete reciprocation of the ejector means normally takes about two seconds, it will be apparent that there is not time enough for manual insertion of the filler pad unless the ejector is momentarily halted between thrusts. The present invention provides means, now to be described, for automatically inserting a filler pad through the slot 40 into the gap between can stacks B' and A between successive reciprocations of the plungers 22 through said gap.

Referring to Figs. 1 and 2, there is attached to the frame 10, above the funnel 16, a magazine 42, having side plates 44 and 46, an end plate 48 attached to said side plates and to the frame 10, and flat slide rails 50 attached to lateral extensions of the side plates 44 and 46 which form the bottom of the magazine, these rails 50 being inclined downwardly from the outer end of the magazine toward the end plate 48. Within the magazine are stacked the filler pads F, vertically disposed with their bottom edges resting on the rails 50. The filler pads are pressed toward the end plate 48 by a gravity roller 52 connected at each end to trolleys 54 mounted to run freely on inclined tracks 56 attached to the side plates 44 and 46 of the magazine. As is indicated in Fig. 2, the inclination of the tracks 56 increases sharply at points 58 part way toward the inner end of the magazine, the points 58 corresponding approximately to the location of the last filler pad F' of a fresh supply inserted in the magazine.

When it is desired to load a supply of filler strips into the magazine, the roller 52 is drawn outwardly on the tracks 56 beyond the points 58, and may be conveniently held in retracted position by means of offset portions 60 in the tracks at their outer ends. The supply of filler pads F' is then inserted in the magazine in the position indicated in Fig. 2 and the roller 52 is allowed to coast on the tracks 56 into engagement with the outermost pad of the new supply.

As shown in Figs. 2 and 3, across the bottom of the magazine, adjacent the lower edge of the end plate 48, there is provided a slot 62 in approximate vertical alignment with the slot 40. The

innermost filler pad F' of the supply in the magazine overlies said slot 62 and is adapted to be ejected therethrough by mechanism to be hereinafter described, but is held from unintended passage through the slot by the pressure of the roller 52, forcing it against the end plate 48.

For ejecting the filler strips F successively through the slot 62 there are provided a plurality of feeder discs 64 projecting through slots 66 in the end plate 48 of the magazine and provided on their peripheries with pointed teeth 68 adapted to engage in the innermost filler pad F'. The discs 64 are fixedly mounted on a shaft 70 extending transversely of the end plate 48, the shaft 70 being rotatably mounted on the frame 10. Mounted on a sleeve 72 adjacent one end of the shaft 70 (see Fig. 3) and free to rotate on said shaft, is a gear 74 meshing with a rack 76 formed on the upper part of a pull rod 78, said rack being mounted for vertical reciprocation in a slide 80 connected to the frame 10. Also fixed to the sleeve 72 and rotatable therewith is a ratchet 82. Fixed to the shaft 70 adjacent the ratchet 82 is a disc 84 having pivoted thereon a pawl 86 adapted to engage the ratchet 82 and held in engagement therewith by a spring 88.

By means of the connections just described, the shaft 70 and attached feeder discs 64 are rotated in the pad feeding (or counter-clockwise) direction in Fig. 3 when the rack 76 is drawn down in the slide 80, through the gear 74, ratchet 82, pawl 86 and disc 84. However, when the rack 76 is raised in the slide 80, shaft 70 and discs 64 are not rotated, ratchet 82 and pawl 86 permitting the sleeve 72 to rotate idly on the shaft 70 when the gear 74 is rotated in the clockwise direction in Fig. 3.

As shown in Figs. 1 and 2, the lower end of the pull rod 78, which carries the rack 76 at its upper end, is pivotally connected to a lever 88 on a rock shaft 89 rotatably mounted in the frame 10. A second lever 90 on the shaft 89 is pivotally connected to a link 91 which in turn is pivoted on one arm 92 of a bell crank lever 94 pivotally mounted on a stub shaft 95. A spring 96 connected to the link 91 and the frame 10 holds the parts in the position shown in Fig. 2 in which the rack 76 is in its uppermost position in the slide 80.

Rack 76 is operated through the connections just described by means of a cam 98 on the main crank disc 33 of the machine, said cam being adapted to engage an arm 100 of the bell crank lever 94 on each rotation of the disc 33. When the cam 98 engages arm 100, bell crank lever 94 is rotated to raise link 90, thus rotating the shaft 89 to force lever 88 and pull rod 78 downwardly, thus drawing rack 76 downward in slide 80, the rack in turn operating shaft 70 and feeder discs 64 to force a filler pad downward through the slot 62 as previously described. As the cam 98 rides off the arm 100, spring 96 returns the rack and its operating parts to the position shown in Fig. 2.

As a filler pad is forced downwardly through the slot 62 by the discs 64 it enters into the bight between a pair of guide and feed rolls 102 and 104 rotatably mounted on the frame 10 between the slots 62 and 40 and with their axes parallel to said slots. Roll 104 is continuously driven at high speed as by suitable sprocket wheel and chain connections to the main shaft 32 of the machine. As shown in Figs. 1 and 2, these connections comprise sprocket 106 on roll 104, connected by chain 108 to sprocket 110 on shaft 112 operated by sprocket 114 and chain 116 from sprocket 118 on shaft 32, these connections being

such as to rotate the roll 104 at many times the R. P. M. of the crank disc 33. Rolls 102 and 104 are so located with reference to the magazine 42 that each filler strip forced downward through the slot 62 by the feeder discs 64 enters into driven engagement between the rolls 102 and 104 before the discs 64 cease their driving engagement therewith, roll 104, which is operated at about the same speed as the discs 64, thereupon taking over the pad driving operation as the upper edge of the pad passes the discs 64 and completing the ejection of the pad from the magazine, at the same time driving it through the slot 40 into the space between the stack of cans B' and the sides of the plates 12 of the magazine 11.

To assure proper entry of the pads through the slot 40 into said space, guiding bars 120 (see Fig. 2) are attached to the end plate 48 of the magazine, extending from said plate to the slot 40. To provide space for guide bars 120 to pass roll 104 the latter is divided into sections mounted on the same shaft and separated by sufficient space to afford clearance for guide bars 120. The lower ends of said guide bars are slightly inclined with reference to the axis of said roll, so that the filler pad is driven against the lower end of said guide bars and thereby directed through the slot 40 at a slight forward angle to assure clearance between the lower edge of the pad and the sides of the plates 12. The filler strip is driven against the bottom of the funnel 16 in the position indicated in full lines in Fig. 2, then topples over against the side of one of the plates 12 in the position indicated in dotted lines in said figure, in which position it is engaged successively by the cans in the stack A, raised to vertical position and forced into the carton in position between the stacks A and B' which form the top and bottom layers of the carton respectively, as shown in Figs. 2 and 4.

It will be obvious that the filler pad cannot be entered through the slot 40 until after the outer ends of the plungers 22 of the ejector have been retracted into the can magazine 11 from the stack of cans B which have been deposited in the position B' of Fig. 2. Consequently the pad ejection movement of the discs 64 is started at about the time the ejector 20 starts its retractive stroke, as will be evident from the position of the cam 98 on the crank disc 33.

It will also be evident that insertion of the filler pad must be completed before the plungers 22 have advanced far enough on the next forward stroke to push the outer ends of the cans in stack A out of the magazine 11. As the time required for a complete reciprocation of the ejector 20 is usually about two seconds, if the ejector is not stopped between reciprocations, the time permitted for inserting of the filler pad is very short, less than two seconds, and, since the pads are rather light, there is insufficient time for safe reliance on gravity alone to convey the pads through the slot 40 after ejection from the magazine. Consequently the ejector end of the pad magazine is preferably disposed as close above the slot 40 as is feasible without interfering with access to the funnel 16 and means, such as the feed rolls 102 and 104, is provided for driving the pads through the slot 40 at a considerably higher speed than that developed by a mere gravity fall, said means maintaining positive driving and positioning control over the pad after it enters through the slot 40 and until it approaches the bottom of the funnel 16.

While I have illustrated the invention in con-

junction with a well known type of carton packing machine now in general use, it will be understood that I do not intend the invention to be limited thereto. It will also be understood that the invention is not limited to the specific form and arrangement of parts in the filler pad inserting mechanism as shown and described herein, but that various changes may be made therein without departing from the spirit and scope of the invention.

I claim:

1. In a packaging machine, an unobstructed delivery frame, a magazine for forming a pair of stacks of articles adjacent an end of said delivery frame, an ejector, means for reciprocating said ejector forwardly and rearwardly relative to the magazine to deliver, on each forward stroke, the front one of said stacks through the delivery frame into a carton held thereon and to position the other of said stacks in the delivery frame for delivery into a carton on the next forward stroke, said magazine and said delivery frame having a passageway therebetween for a filler pad, a filler pad magazine having a discharge end adjacent said passageway, means positioned above and below said discharging end for positively discharging a filler pad from the pad magazine toward said passageway and for positively feeding said pad through said passageway across said end of the delivery frame in position for delivery through the frame into a carton by the front stack of articles advanced by the ejector, and means for operating said last mentioned means in timed relation with the ejector operating means.

2. In a packaging machine, an unobstructed delivery frame, a magazine for forming a pair of stacks of articles adjacent an end of said delivery frame, an ejector, means for reciprocating said ejector forwardly and rearwardly relative to the magazine to deliver, on each forward stroke, the front one of said stacks through the delivery frame into a carton held thereon and to position the other of said stacks in the delivery frame for delivery into a carton on the next forward stroke, said magazine and said delivery frame having a passageway therebetween for a filler pad, and means operative prior to each delivery of articles into the delivery frame by the ejector to insert a filler pad through said passageway between the stack of articles in the delivery frame and the front stack of articles delivered from the magazine by the ejector, said means including a magazine for a supply of filler pads having a discharge end disposed adjacent said passageway, a slot at said end of the filler pad magazine affording edgewise passage for a filler pad therethrough, means to positively discharge a filler pad edgewise through said slot toward said passageway, means to positively feed said pad through said passageway across said end of the delivery frame, and means for operating said filler pad discharging and feeding means in timed relation with said ejector operating means.

3. In a packaging machine, an unobstructed delivery frame, a magazine for forming a pair of stacks of articles adjacent an end of said delivery frame, an ejector, means for reciprocating said ejector forwardly and rearwardly relative to the magazine to deliver, on each forward stroke, the front one of said stacks through the delivery frame into a carton held thereon and to position the other of said stacks in the delivery frame for delivery into a carton on the next forward stroke, said magazine and said delivery frame having a

passageway therebetween for a filler pad, and means operative prior to each delivery of articles into the delivery frame by the ejector to insert a filler pad through said passageway between the stack of articles in the delivery frame and the front stack of articles delivered from the magazine by the ejector, said means including a magazine for a supply of filler pads having a discharge end disposed adjacent said passageway, a slot at said end of the filler pad magazine aligned with said passageway and affording passage for a filler pad edgewise therethrough, a pair of feed rolls disposed between said slot and

passageway and constructed and arranged for feeding engagement with opposite side faces of a filler pad, means for positively discharging a filler pad from the magazine edgewise through said slot between said rolls, means operating said filler pad discharging means in timed relation with said ejector operating means, and means operating said rolls in timed relation with said ejector operating means to feed said filler pad through said passageway across said end of the delivery frame.

DAVID KEMBLE WOOD.