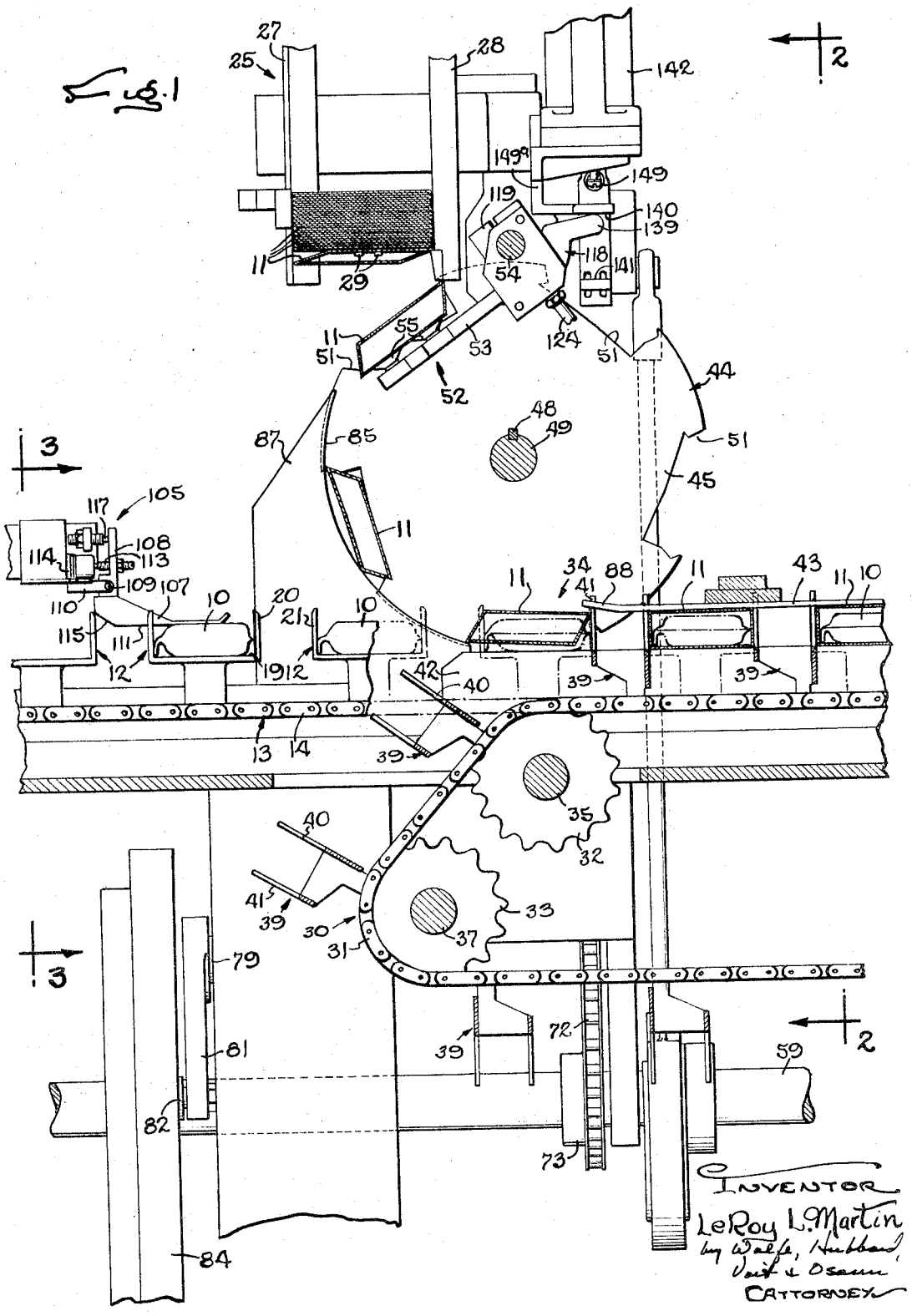
Jan. 31, 1967 LE ROY L. MARTIN 3,300,946

CARTONING MACHINE

Filed Oct. 14, 1963 5 Sheets-Sheet 1

Fig. 1



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Jan. 31, 1967 LE ROY L. MARTIN 3,300,946

CARTONING MACHINE

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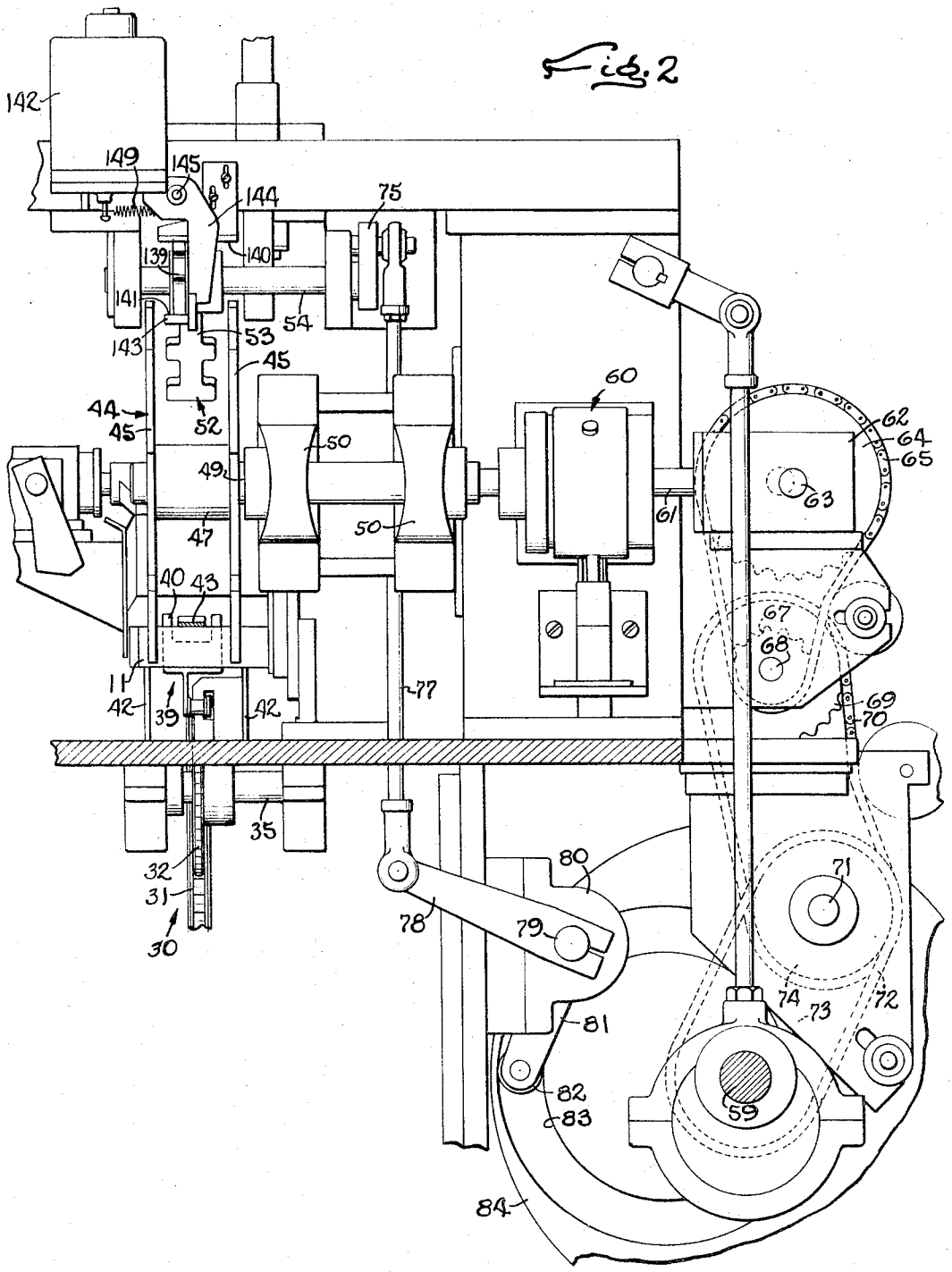
Fig. 2



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CARTONING MACHINE

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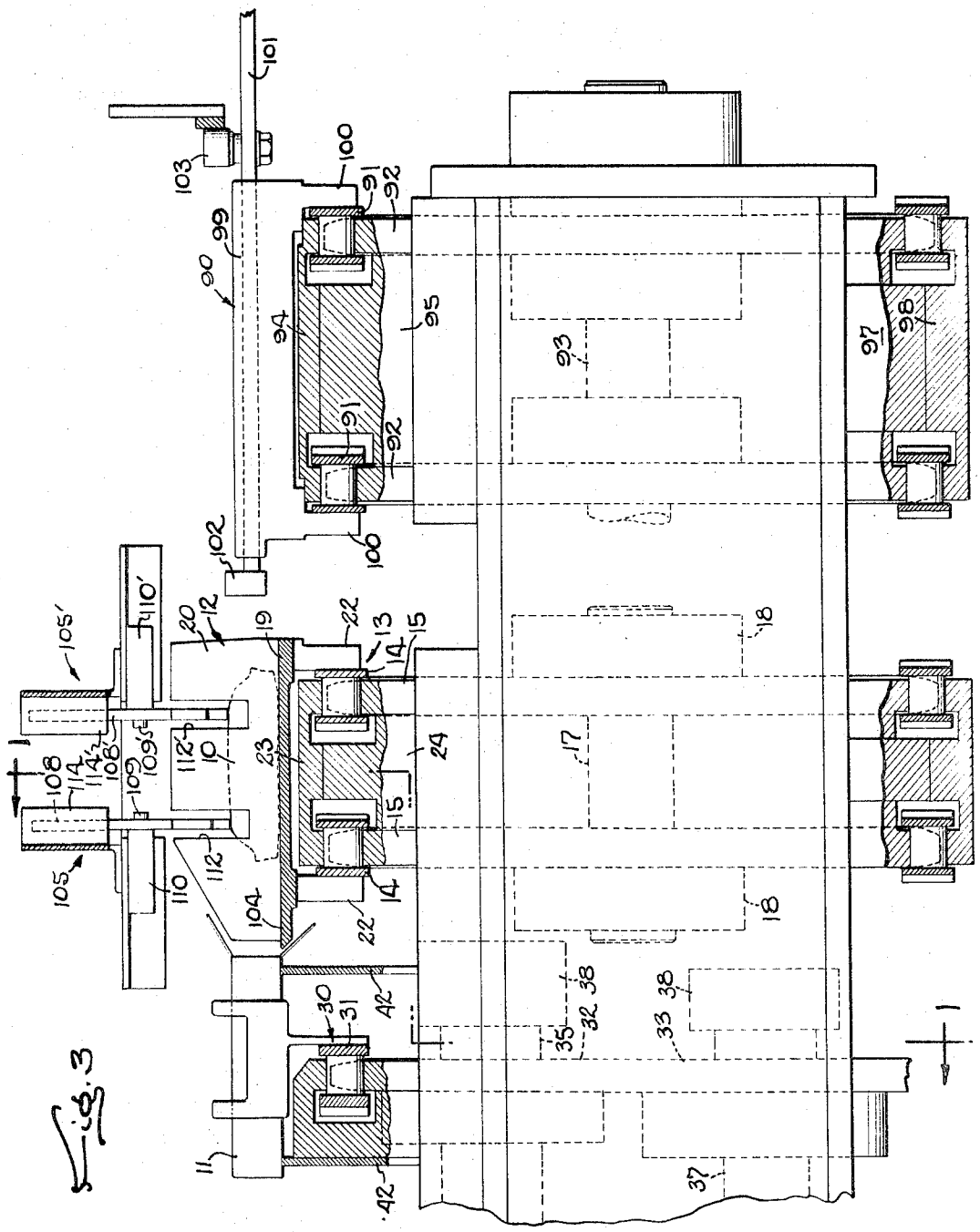

Fig. 3

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CARTONING MACHINE

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Fig. 4

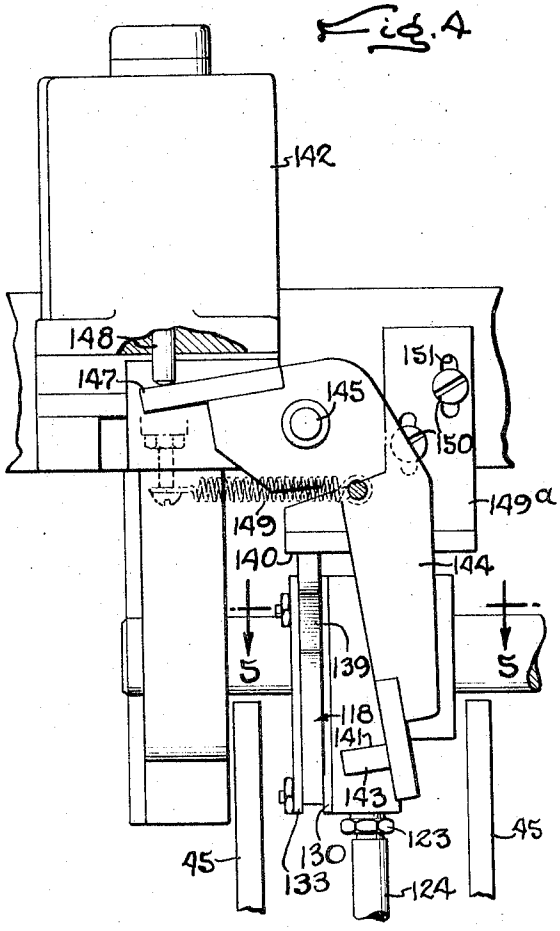

Fig. 5

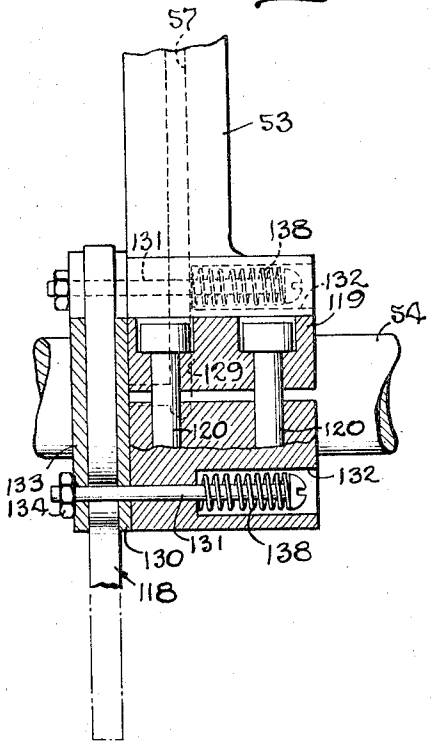

Fig. 6

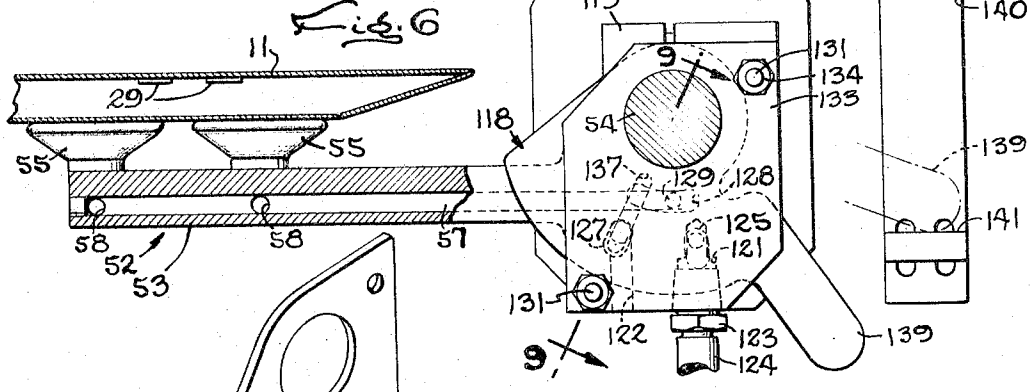

Fig. 7

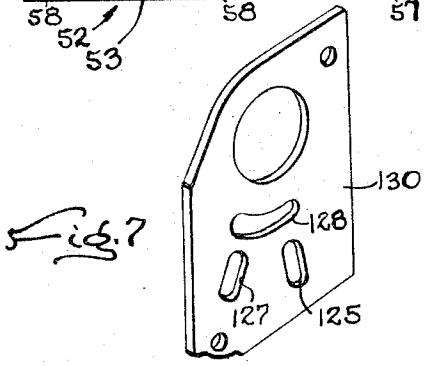

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Fig. 8

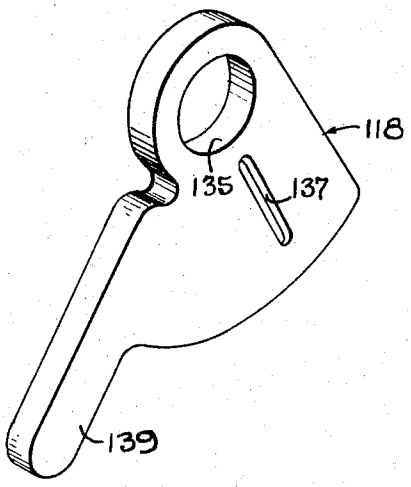


Fig. 9

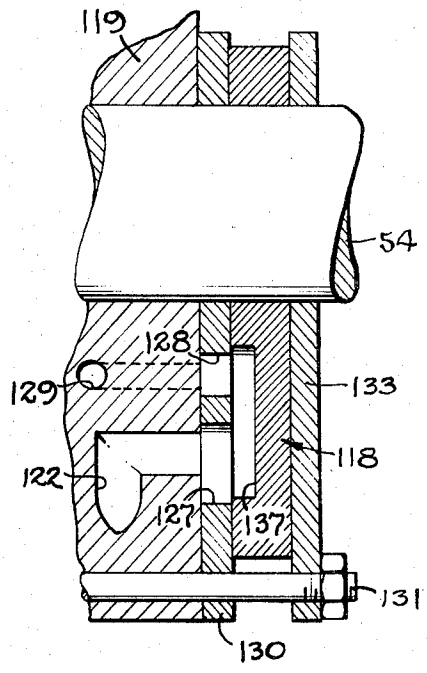
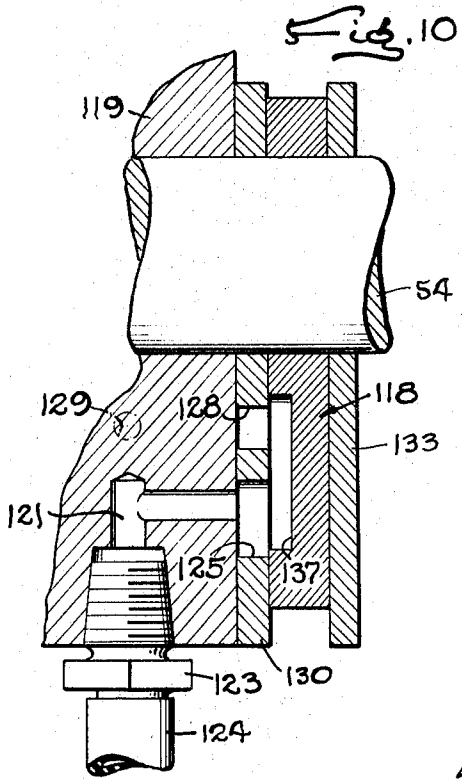


Fig. 10



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United States Patent Office 3,300,946 Patented Jan. 31, 1967

3,300,946

CARTONING MACHINE

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Filed Oct. 14, 1963, Ser. No. 315,983
5 Claims. (Cl. 53—73)

The invention relates generally to automatic packaging machines in which two carriers are disposed side by side with a row of bags to be cartoned evenly spaced along one of the carriers and alined with a row of empty but open cartons on the other carrier in position to receive bags pushed laterally off the first carrier and into the cartons. In such machines, the bags are formed, filled, closed and delivered one by one to the bag carrier, and the cartons are transferred one by one to the carton carrier from a magazine.

The general object of the present invention is to provide novel and relatively simple mechanism for taking corrective action in response to the detected absence of an article from one of the rows thereby to prevent the shipping of empty cartons or the delivery to the end of the carton carrier of uncartoned bags.

In the illustrative machine, the absence of bags from the row on the bag carrier is sensed and the corrective action is applied to the transfer mechanism for loading cartons onto the carton carrier. One form of such transfer mechanism includes an arm pivoted on the machine frame for movement toward and away from the carton magazine through loading and return strokes and having a plurality of suction cups at its free end engageable with the terminal carton in the magazine to grip the carton and pull it from the magazine during the return stroke as the first step in the transfer of cartons to the carton carrier.

A more detailed object of the invention is to provide novel control mechanism for deactivating this transfer mechanism in response to signals from a sensing device indicating the absence of a bag in a sensed position in the row on the bag carrier so that the transfer mechanism skips the corresponding carton on the carton carrier.

Another object is to utilize the same system for sensing and indicating a particular condition of the bags and rejecting bags where the condition is unsatisfactory.

The invention also resides in the unique construction and operation of the control mechanism itself.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

FIGURE 1 is a fragmentary cross-sectional view of a machine embodying the novel features of the present invention taken in a vertical plane adjacent one side of the machine and substantially along the line 1—1 of FIG. 3.

FIG. 2 is a fragmentary cross-sectional view taken along the line 2—2 of FIG. 1.

FIG. 3 is an enlarged fragmentary view taken along the lines 3—3 of FIG. 1 with some parts removed for clarity of illustration.

FIG. 4 is an enlarged fragmentary view of a portion of FIG. 2 with parts in moved positions and partially broken away.

FIG. 5 is a fragmentary sectional view taken along the line 5—5 of FIG. 4.

FIG. 6 is a view taken from the left side of FIG. 5 with parts broken away and shown in section.

FIG. 7 is a perspective view of a part of the control mechanism.

FIG. 8 is a perspective view of the valve plate.

FIG. 9 is an enlarged fragmentary cross-sectional view taken substantially along the line 9—9 of FIG. 6.

FIG. 10 is a view similar to FIG. 9 with the parts in moved positions.

As shown in the drawings for purposes of illustration, the invention is embodied in a continuous motion machine for loading articles such as bags 10 into cartons 11 and subsequently closing and sealing the cartons in preparation for shipment. The bags are formed, filled and closed on a portion of the machine that forms no part of the present invention and, accordingly, is not shown herein, and are loaded into buckets 12 equally spaced along a continuously moving carrier 13 (FIGS. 1 and 3).

The latter comprises a pair of endless chains 14 disposed in spaced vertical planes and trained around pairs of horizontally spaced sprocket wheels 15 (FIG. 3) fast on shafts 17 journaled in bearings 18 on the machine frame, one sprocket of each pair being shown in FIG. 3. Each bucket on the carrier is of generally U-shaped front-to-rear cross-section formed by a bottom wall 19 and upright leading and trailing sidewalls 20 and 21, the bucket being fastened to the links of the chains by laterally spaced lugs 22 depending from the bottom and connected to the chains as shown in FIG. 3. Grooved rails 23 and 24 mounted on the frame and disposed above and below the chain cooperate to define guide grooves for bracing the chains. With this arrangement, the buckets project upwardly when on the upper runs of the chains which, therefore, define the path followed by the bags through the machine.

As shown in FIG. 1, the cartons 11 are stored in collapsed condition in an upright magazine 25 supported on the frame well above the level of the bag carrier 13 and formed by two upright angle bars 27 engaging the corners of the stack on one side thereof with at least one bar 28 on the other side of the stack holding the stack against the angle bars. Fingers 29 project from the remaining sides of the magazine under the ends of the top panel of the terminal carton in the stack to hold the cartons releasably in the stack in a manner well known to those skilled in the art. The cartons are transferred one by one from the magazine to a carton carrier 30 (FIGS. 1 and 3) level with the bag carrier 13 and extending alongside the downstream end of the latter with each bag 10 on the bag carrier alined with a carton 11 on the carton carrier in condition for eventual loading into the aligned carton.

Herein, the carton carrier 30 is formed by a single endless chain 31 disposed in a vertical plane and trained around a single sprocket wheel (not shown) at the right end (FIG. 1) and around vertically spaced sprocket wheels 32 and 33 at the other end, the left end as viewed in FIG. 1, with the upper sprocket 32 offset slightly to the right to lead the chain along an upwardly inclined path to a carton transfer station 34 and then along a horizontal path level with the bag carrier. The sprockets 32 and 33 are fast on shafts 35 and 37 journaled in bearings 38 on the frame.

Evenly spaced along the chain 31 are a plurality of dividers 39 each supporting two fingers 40, 41 which, when on the upper run of the chain, project upwardly and cooperate with the fingers on adjacent dividers to form a series of pockets alined with the open ends of the buckets 12 on the bag carrier 13 and corresponding in width to the erected width of the cartons 11. Spaced below the tops of the divider fingers and offset on opposite sides of the chain are two elongated rails 42, the tops of which engage the cartons as shown in FIGS. 1 and 3 and slidably support the cartons as the latter are pushed along the rails in the carrier pockets. Beyond the

carton transfer station, an elongated top plate **43** holds the cartons in the pockets and on the rails.

Journaled on the machine frame beneath the magazine **25** and above the end of the carton carrier **30** is an arcuate loading carrier in the form of a transfer wheel **44** rotatable counterclockwise (FIG. 1) about a horizontal transverse axis with the carton carrier generally tangent to the underside of the wheel at the transfer station **34**. Herein, the wheel comprises two side by side discs **45** (see FIG. 2) axially spaced apart by a hub **47** keyed at **48** to a supporting shaft **49** journaled in spaced bearings **50** on the frame. The peripheral edges of the discs are formed with specially shaped radially opening notches **51** for receiving and holding partially erected cartons as the wheel turns to carry the cartons to the transfer station **34** where successive cartons are fed into successive pockets in the carton carrier **30**.

To transfer cartons **11** from the magazine **25** to the transfer wheel **44**, a loader **52** is mounted on the frame for movement back and forth between the lower end of the magazine and the periphery of the wheel and is operable to grip the terminal carton in the stack, pull the carton out of the stack and toward the wheel, and seat the carton in one of the peripheral notches **51** in the wheel. In this instance, the loader includes an elongated arm **53** pivoted on a horizontal shaft **54** adjacent the lower end of the magazine and offset to one side thereof with the free end portion of the arm extending under the magazine. A gripping element herein comprising four suction cups **55** is mounted on the free end portion of the arm in position to engage the underside of the stack when the arm is generally horizontal and swing downwardly with the arm, counterclockwise in FIG. 1. At the lower end of the arm's downward stroke, the cups pass between the two wheel discs **45** and seat a carton in one of the notches.

Vacuum is applied to the cups **55** and released at the appropriate time through a conduit **57** (FIGS. 5 and 6) extending through the arm and communicating with each of the cups through branch conduits **58**. When the arm reaches the upper end of its return stroke and engages the underside of the stack, vacuum is applied to the conduit **57** and the cups grip the terminal carton. Then, as the carton is seated in the wheel notch, the conduit is vented to release the carton.

Of course, the arm **53** is oscillated back and forth in timed relation with the rotation of the wheel **44** to seat a carton in each wheel notch **51**, and the carriers **13** and **30** are driven continuously at speeds selected to present a pocket on the carton carrier to the transfer station **34** as each wheel notch reaches the transfer station. Thus, each notch in the wheel receives a carton in a position corresponding to a bag position on the carrier **13** and a carton position on the carrier **30**. Herein, each of the machine elements is driven in timed relation with the others by a common drive shaft **59** (FIGS. 1 and 2) journaled on the machine frame below the carriers **13** and **30** and generally paralleling the carriers, the shaft being rotated continuously by a suitable motor (not shown). Chain and sprocket wheel connections (not shown) between the main shaft and the sprocket shafts drive the carriers, and the wheel shaft **49** is driven through a clutch **60** by a drive train including a shaft **61** (FIG. 2), meshing bevel gears enclosed in a box **62** and fast on the ends of the shaft **61** and a perpendicular stubshaft **63**, and a sprocket wheel **64** on the stubshaft driven by an endless chain **65** trained around a sprocket **67** mounted on a horizontal shaft **68**. Also mounted on the shaft **68** is a larger sprocket **69** rotated by a chain **70** which is driven by another sprocket on a supporting shaft **71**, and this shaft is rotated by an endless chain **72** trained around sprocket wheels **73** and **74** on the main shaft **59** and on the shaft **71**.

To oscillate the loader arm **53** continuously back and forth through high speed loading and return strokes, a radial crank arm **75** (FIG. 2) is fast at one end on the loader shaft **54** and pivotally connected at the other end to the upper end of an elongated upright link **77**. The lower end of the link is pivoted on the free end of a generally horizontal crank arm **78** fast on a horizontal pivot shaft **79** journaled in bearings **80** on the lower portion of the frame, and another crank arm **81** projects generally downwardly from the pivot shaft and carries a follower roller **82** which rides in an annular groove **83** (FIG. 2) in one face of a disc **84** fast on and rotating with the main shaft **59**. The groove **84** eccentrically encircles the shaft **59** to swing the roller **82** back and forth as the disc **84** rotates thereby reciprocating the link **77** endwise up and down and oscillating the shaft **54** and loader arm **53** about the shaft axis. The loader arm swings through one full cycle for each revolution of the shaft **59** while the wheel makes one revolution for each five revolutions of the shaft so that a carton **11** is seated in each of the five wheel notches **51**.

With the foregoing general arrangement, the cartons seated in the wheel notches by the loader arm **53** are carried counterclockwise around the wheel to the transfer station **34**, being held positively in the notches during part of the arc by the arcuate side **85** (FIG. 1) of a holding plate **87**. At the transfer station, each carton is fed into a pocket in the carton carrier **30** by suitable means such as a pick-off element **88** which herein comprises the left-hand end portion of the cover plate **43** for the carton carrier and projects in between the wheel discs **45** to engage the inner side of each carton and utilize the motion of the wheel to force the cartons out of the wheel notches and into the next pocket in the carrier. The erection of each carton is completed as the leading finger **40** of the trailing divider **39** swings into a vertical position parallel to the trailing finger **41** of the leading divider to square the carton between the dividers.

Then with erected cartons **11** in the pockets alined with the bags **10** in the buckets **12**, the bags and cartons are carried to the carton loading station where the bags are transferred into the cartons by loading rams (FIG. 3) supported on a ram carrier **90** for movement transversely of the three carriers through the bag buckets toward the carton pockets. As shown in FIG. 3, the ram carrier herein is formed by two endless chains **91** disposed in spaced vertical planes and wound around horizontally spaced pairs of sprocket wheels **92** on horizontal shafts **93** journaled in bearings on the frame, both runs of each of the chains being guided and braced between grooved guide rails **94**, **95**, **97** and **98**.

Fast on the chains **91** and disposed above the latter when on the upper runs thereof are a series of equally spaced ram holders **99** alined with the buckets and each including a body formed with a pair of lugs **100** depending from the body and fast on links of the respective chains and with an elongated laterally opening groove in which the ram arms **101** are slidably supported. On the end of each ram arm adjacent the bag carrier **13** is a block **102** movable through the alined bag bucket **12** to engage the bag therein as the ram arm is extended toward the carrier **30**.

The rams are actuated in a well-known manner by a cam (not shown) inclined across the top of the ram carrier **90** and positioned in a horizontal plane to engage follower rollers **103** on the tops of rams approaching the loading station. The cam and the follower rollers coact to extend each ram at the appropriate time, and a second, reversely inclined cam (not shown) is provided to retract the rams. Thus, each bag is slid out of the associated bucket and into the alined carton, being guided into the carton by a lip **104** (FIG. 3) projecting toward the carton carrier from one side of the bucket bottom **19**.

It will be seen that the transfer mechanism generally described above and including the loader **52** and the wheel **44** positively erects the cartons and positions the cartons to receive the bags, and each motion and transfer is completed smoothly and at high speed. For example, the machine may form, fill and close bags at rates as high as

300 per minute, and load the bags into cartons for shipping, the flaps of the cartons being glued and folded closed by automatic mechanism (not shown) beyond the loading station. During high-speed operation, it is not unusual for the bag-forming machine to skip a bag for one reason or another, with the result that empty buckets 12 occasionally pass through the transfer and loading stations as shown on the left in FIG. 1. Thus, if a carton is positioned in the carton carrier pocket alined with the empty bucket, this carton will pass on through the machine and could be sealed, stacked and eventually shipped empty. The importance of preventing this should be obvious.

The present invention contemplates the provision of novel and relatively simple control mechanism for preventing the transfer of cartons 11 to the carton carrier pockets that will be alined with empty buckets 12 on the bag carrier 13 so that the machine automatically skips a carton pocket in response to the presence of an empty bag bucket. To these ends, a device 105 (FIGS. 1 and 3) is provided for sensing the absence of bags in the row of bags approaching the carton transfer station 34 and producing signals indicating the empty buckets, and means responsive to such signals is provided for deactivating the wheel loader 52 during the loading stroke that normally would initiate the transfer of a carton to the pocket to be alined with the empty bucket.

In the present instance, the sensing device 105 includes an L-shaped feeler (see FIG. 1) having a generally horizontal leg 107 and a vertical leg 108, the feeler being pivoted at 109 on a bracket 110 above the bag carrier 13 for rocking about a horizontal axis perpendicular to the bag carrier. The underside 111 of the arm 107 normally rests on top of the bags on the carrier and is long enough to span the normal gap between two adjacent bags so as to be held horizontal by the bags. Notches 112 in the leading and trailing walls of the buckets permit the feeler to project downwardly far enough to engage the bags.

In the normal condition of the feeler 105, an abutment 113 on the vertical arm 108 engages the actuator of a switch 114 and holds the switch open. In the absence of a bag from the row, however, the horizontal arm 107 drops into the longer gap and thus rocks the vertical arm clockwise away from the switch and permits the switch to close thereby producing a signal that a bag has been skipped. The next bag in the row engages the inclined rearwardly facing edge 115 of the feeler and cams the feeler back to the horizontal position to reopen the signal switch. A stop 117 on the switch bracket limits counterclockwise rocking of the feeler and thereby permits the application of excessive pressure against the switch operator.

While the deactivation of the loader 52 in response to these signals may be accomplished in various ways such as by preventing the arm 53 from executing a return stroke and a loading stroke after the preceding carton 11 is seated in the wheel 44, the preferred form shown herein simply deactivates the gripping element by preventing the normal application of vacuum to the suction cups 55. With this arrangement, relatively complex clutching arrangements and the like are eliminated and the arm 53 moves through its full cycle in the normal manner, engaging the terminal carton in the stack but without gripping the carton, and then executes an idle loading stroke as the next wheel notch 45 passes the loader.

Generally stated, the vacuum control mechanism includes a valve member 118 movable back and forth between two positions relative to the arm 53 and operable in one position to activate the suction cups 55 by applying vacuum to the conduit 57 and in the other position to vent the conduit and deactivate the cups, the movement between these positions normally being controlled in accordance with the arm movements. Additional control mechanism is provided, however, for overriding the normal control and maintaining the venting of the cups during a selected loading stroke of the arm in response to signals from the switch 114.

The details of the control mechanism are shown in FIGS. 4 through 10. The arm 53 projects radially from a split hub 119 clamped around the shaft 54 by screws 120 (FIG. 5), and two conduits 121 and 122 formed in the hub open through the underside of the hub as viewed in FIG. 6. One conduit 121 is connected by a fitting 123 to a flexible hose 124 communicating with a vacuum pump (not shown) while the other conduit 122 simply opens out of the hub. The inner ends of these conduits open axially of the shaft 54 through angularly spaced ports 125 and 127 formed in the end of the hub and radially spaced equal distances from the shaft axis. A third port 128 spaced inwardly from the ports 125 and 127 opens through the end of the hub and communicates through a branch 129 (FIG. 5) with the arm conduit 57 communicating with the vacuum cups 55. Thus, by alternately connecting the ports 125 and 127 to the port 128, the suction cups are alternately activated and deactivated.

Herein, these three ports are formed in a flat plate 130 (see FIG. 7) telescoped onto the shaft 54 and held in a fixed position against the left end (FIG. 5) of the hub by two bolts 131 having heads disposed in bores 132 opening through the right end of the hub with the shanks of the bolts projecting to the left through the bottoms of the bores, the hub, the plate 130, and an outer cover plate 133. Nuts 134 threaded onto the outer ends of the bolts hold the plates on the hub. The valve member 118 takes the form of a third plate (see FIG. 8) having a hole 135 for telescoping over the shaft 54 with a shallow groove 137 in one side face of the plate extending radially of the hub 119 and the shaft when the valve plate is telescoped onto the shaft. This plate is disposed between the inner and outer plates 130 and 133 with the groove 137 opening toward the inner plate.

As will be seen in FIGS. 6 and 7, the port 128 is in the form of an elongated arcuate slot and the groove 137 is long enough to overlap the slot at its inner end and one of the ports 125, 127 at its outer end thereby forming a passage in continuous communication with the conduit 57 and operable to establish communication between the conduit and one of the ports 125, 127 depending on the angular position of the valve plate. In one angular position (FIG. 10) the groove connects the ports 125 and 128 to evacuate the conduit 57 through the conduit 121. In another angular position (FIG. 9) it connects the ports 127 and 128 to vent the conduit 57 through the conduit 122.

The valve plate 118 is releasably connected to the inner plate 130 so as to be movable relative to the inner plate to the two alternate positions. Herein, the releasable connection is formed by the two bolts 131 which are urged to the right (FIG. 5) by two springs 138 coiled around the bolt shanks and compressed between the bolt heads and the bottoms of the bores 132 thereby to clamp the valve plate frictionally between the inner and outer plates. Thus, the valve plate normally oscillates about the shaft axis with the arm 53, the hub 119, and the plates 130 and 133.

To shift the valve plate back and forth at the appropriate times, a lug 139 (FIGS. 1, 4 and 6) is formed on one side of the plate to project outwardly beyond the outer plate 133, and stops 140 and 141 are spaced above and below the lug to engage the latter as it swings upwardly and downwardly. The lower stop 141 is positioned to engage the lug as it swings downwardly, clockwise as viewed in FIG. 6, during the return stroke of the arm 53 and before the arm completes its stroke so that the stop immobilizes the valve plate with the lug in the dotted-line position (FIG. 6) during the remainder of the return stroke. It will be seen that the continued motion of the inner plate with the arm shifts the ports 125 and 127 relative to the groove 137 until the vacuum port 125 is alined with and communicates with the groove and thus with the vacuum cups 55.

As the arm 53 swings counterclockwise back through its loading stroke with the cups gripping a carton, the valve plate 118 turns with the inner plate 130 until the lug 139 engages the upper stop 140, this occuring well before the arm completes the loading stroke so that the continued counterclockwise turning of the inner plate shifts the vent port 127 into alinement with the groove 137 and thereby releases the vacuum. Each stop engages the valve plate when the arm is spaced angularly from the end of its stroke an arcuate distance corresponding to the angular spacing of the ports 125, 127 so that the respective port communicates with the groove 137 at or close to the end of the stroke, thereby applying the suction when the cups are approaching or in contact with a carton and releasing the suction as soon as the carton is seated in the wheel notch 51.

The signal from the switch 114 indicating a skipped bag 10 is utilized in an extremely simple manner to override the normal vacuum control and cause the skipping of a corresponding carton 11. The switch when closed, energizes a solenoid 142 (FIGS. 2 and 4) which moves the lower stop 141 out of the path of the descending lug 139 so that no relative motion occurs to apply vacuum to the cups 55 during the following loading stroke of the arm 53.

For this purpose, the lower stop 141 is formed by the upper face of a normally horizontal block 143 projecting laterally from an upright crank arm 144 pivoted on the frame on a pin 145 above the lower stop for back and forth rocking in a plane parallel to the plane of the valve plate 118. A second crank arm 147 rigid with the upright arm 144 projects horizontally to the left and beneath the solenoid, the movable rod 148 of which engages the top of the arm 147 and is movable downwardly when the solenoid is energized. A coiled tension spring 149 urges the crank clockwise and holds the arm 147 against the solenoid rod. Downward movement of the rod rocks the crank counterclockwise to the position shown in FIG. 4 so that the lug 139 misses the stop 141 during its downward stroke.

Accordingly, the arm 53 executes its return stroke idly, returning the lug 139 to its upper position (FIG. 1) before the switch 114 is opened by the next bag 10 on the bag carrier 13. Then, during the next return stroke of the arm, the lug engages the stop and the normal operation of the machine continues. The upper stop 140 is mounted in a fixed position on an L-shaped plate 149a (FIGS. 4 and 6) positioned on the frame by screws 150 projecting through vertical slots 151 in the bracket. When the screws are loose, the bracket may be slid up or down for precise selection of the movement of engagement between the lug 139 and the stop 140.

It will be seen that the loader 52 transfers cartons to the notches 51 when the latter are two positions from the transfer station 34. Similarly, the feeler 105 senses the absence of bags from the carrier 13 when the empty bucket 12 is two positions from the transfer station thereby to produce a signal at the appropriate time. Thus, when the feeler signals the approach of the empty bucket shown on the left in FIG. 1, the loading arm 53 skips the wheel notch 51 shown on the upper right-hand side of the wheel in FIG. 1, this being the notch that would have fed a carton into the pocket alined with the empty bucket after the latter passes through the transfer station.

In the present instance, this system also is used for an additional purpose, namely, sensing when the quantity of the product in a bag 10 is not evenly distributed in the bag, and rejecting such unevenly filled bags. For this purpose, the feeler 105 is offset to one side from the centers of the bags on the bag carrier 13 and a second, identical feeler 105' (See FIG. 3) is mounted beside the first to ride adjacent the other ends of the bags, corresponding parts of the two feelers being indicated by corresponding primed reference numbers. The two switches 114 and 114' are connected in parallel so that closure of one switch or both switches energizes the solenoid 142.

Thus, when the bulk of the material in a bag is concentrated near one end of the bag, the feeler riding on the other end will drop, closing its switch and deactivating the loader 52 to skip the carton corresponding to that bag. As a result, no carton is presented to receive the uneven bag which eventually is removed from the machine either by an attendant or by suitable automatic means.

I claim as my invention:

1. In a cartoning machine including first and second carriers mounted on a frame to hold rows of equally spaced and alined articles and cartons respectively, and advance said rows along side by side paths through a carton loading station, the combination of, a magazine for holding a stack of collapsed cartons and releasing the terminal carton in said stack for transfer to said second carrier; mechanism on said frame for transferring cartons from said magazine to said second carrier at a transfer station along said paths in advance of said loading station while erecting the cartons, said transfer mechanism including an arm movable toward and away from said terminal carton through loading and return strokes, and at least one suction element on said arm engageable with the terminal carton when the arm is near the beginning of each loading stroke; a valve movable back and forth between first and second positions relative to said arm and operable in said first position to apply vacuum to said cup and in said second position to vent the cup; control mechanism for alternating said member between said positions in timed relation with the arm motion to apply vacuum to said element near the beginning of each loading stroke and release the vacuum near the end of each return stroke whereby the element grips the terminal carton, pulls the same away from the stack and releases the carton; a device in advance of said transfer station for sensing the absence of articles from the row on said first carrier and producing signals indicating the absence of articles in sensed positions in said row; and additional control mechanism actuated by said signals and operable when actuated to maintain said valve in said second position during a selected loading stroke.

2. In a packaging machine, the combination of, a frame, an arm pivoted on said frame for back and forth swinging about a fixed axis through loading and return strokes of predetermined length, at least one suction element mounted on free end portion of arm, a conduit in said arm communicating at one end with said suction element and at the other end with an inlet port in said arm, means defining vacuum and vent ports movable with said arm and spaced radially from said axis and angularly a predetermined distance from each other, a valve member having a passage in continuous communication with said inlet port and movable relative to said arm between two positions in which said passage also communicates alternately with the other two ports, a releasable connection between said arm and said valve member for holding the latter releasably in a fixed position relative to said arm whereby the valve member turns about said arm axis, first and second stops on said frame along the path of said valve member for engaging the member when the arm is said predetermined distance from the end of each of said strokes and immobilizing the member during the remainder of the stroke thereby to turn the member realtive to said arm from one of said positions to the other, said first stop being positioned to engage said valve member adjacent the end of each return stroke of the arm and swing said passage to said vacuum port, and selectively operable mechanism for moving said first stop out of the path of said valve mechanism to prevent activation of said suction element during selected strokes of the arm.

3. In a packaging machine, the combination of, a frame, an arm pivoted on said frame for back and forth swinging about a fixed axis and through a predetermined

arc, a suction element mounted on the free end portion of said arm, a conduit in said arm communicating at one end with said suction element and at the other end with an inlet port adjacent said axis, means defining first and second ports on said arm spaced radially from said axis and angularly from each other by a second arc less than said predetermined arc, said first port communicating with a source of vacuum and said second port with the atmosphere, a valve member mounted for back and forth movement relative to said arm between alternate positions and operable during such movement to alternately establish communication between said inlet port and said first and second ports thereby to activate and deactivate said suction element, mechanism for swinging said arm alternately back and forth through said predetermined arc, a releasable connection between said arm and said valve member normally swinging said member with said arm, first and second stops positioned on said frame along the path of said valve member to engage the latter intermediate the ends of each of said strokes to immobilize said member and shift the same through said second arc relative to the arm as the latter completes the stroke, said first stop engaging said valve member during the return strokes to activate said suction element and said second stop engaging the valve member during the loading strokes to deactivate the element, said first stop being mounted on said frame for movement into and out of the path of said valve member, and selectively operable control mechanism for moving said first stop out of the path of said valve member to prevent activation of said suction element during selected loading strokes.

4. In a packaging machine, the combination of, a frame, a loader member mounted on said frame for back and forth movement along a predetermined path through loading and return strokes, a suction element mounted on and movable with said member, a conduit in said member communicating with said suction element and with an inlet port opening out of said member, means defining first and second ports on said member spaced longitudinally of said path, said first port communicating with a source of vacuum and said second port with the atmosphere, a valve member movable back and forth relative to said loading member between alternate positions and operable during such movement to connect said inlet port alternately with said first and second ports thereby to activate and deactivate said suction element, mechanism for reciprocating said loader member back and forth,

means on said frame for moving said valve member back and forth between said alternate positions in timed relation with the reciprocation of said loader member to activate said suction element at the end of each return stroke and deactivate the element at the end of each loading stroke, and selectively operable control mechanism for interrupting the normal movement of said valve member relative to said loader member and preventing the activation of said suction element during selected loading strokes.

5. In a packaging machine, the combination of, a frame, a magazine on said frame for holding a stack of collapsed cartons and releasing the terminal cartons one by one for erection and transfer to a carton carrier, an arm pivoted on said frame for swinging of the free end portion of said arm toward and away from the terminal carton in said stack through loading and return strokes, at least one suction element on said free end portion engageable with said terminal carton at the end of each return stroke, a first conduit on said frame for communicating with a source of vacuum, a second conduit carried by said arm and communicating with said suction element, a valve movable back and forth between first and second positions, said valve establishing communication between said conduits in said first position and venting said second conduit in said second position, mechanism for operating said valve in timed relation with the movements of said arm to move the valve into said first position as the element engages said terminal carton whereby the element grips the carton and pulls the same from said magazine during the next return stroke, and to move the valve into said second position adjacent the end of said return stroke thereby to vent said element and release the carton, and selectively operable control mechanism for preventing the movement of said valve into said first position at the end of selected return strokes thereby to skip a selected carton.

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