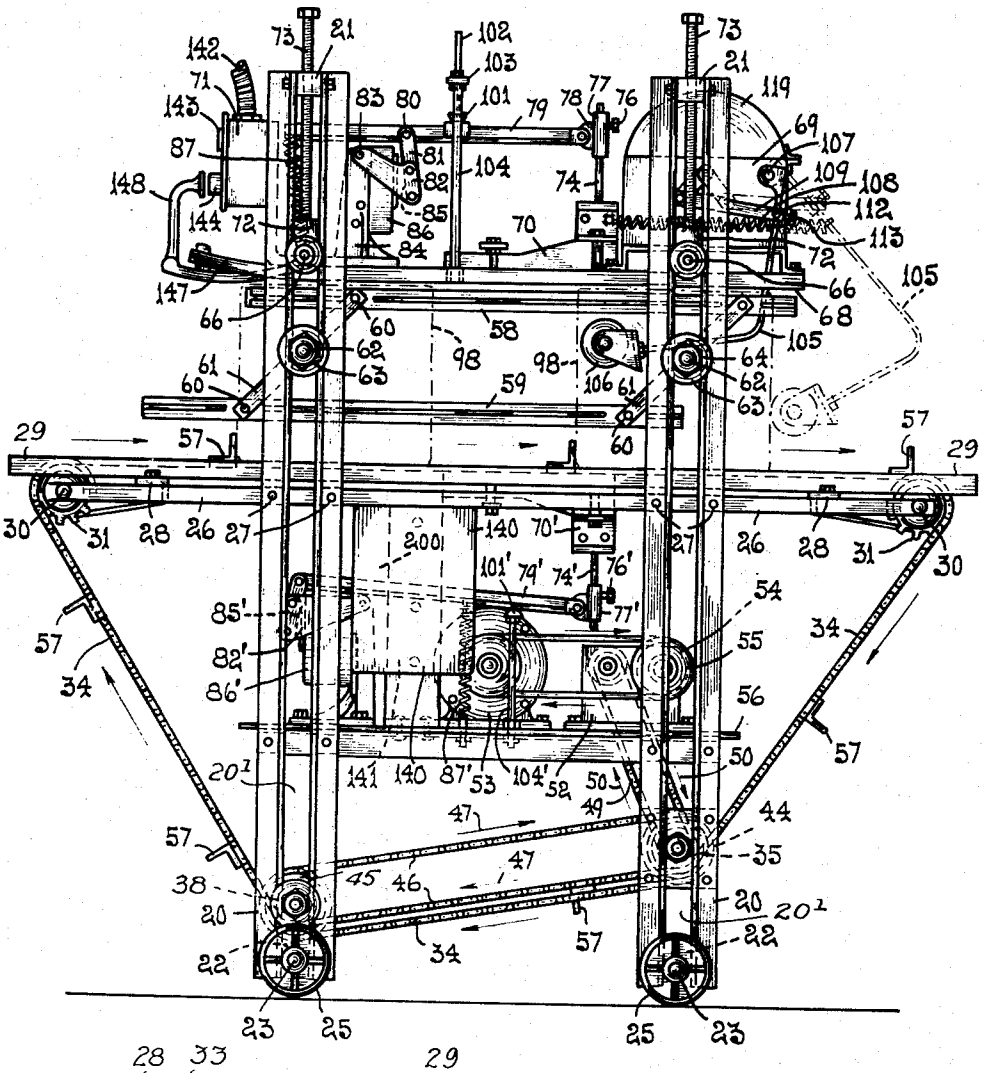
Jan. 7, 1941. S. G. ECKLUND 2,228,134

PACKAGE SEALING MACHINE

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Fig. 1.



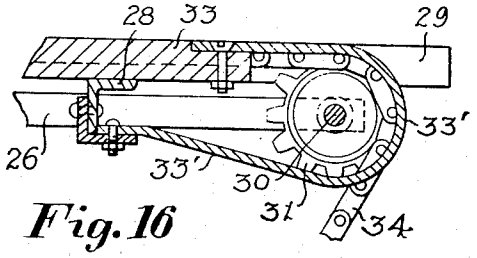


Fig. 16

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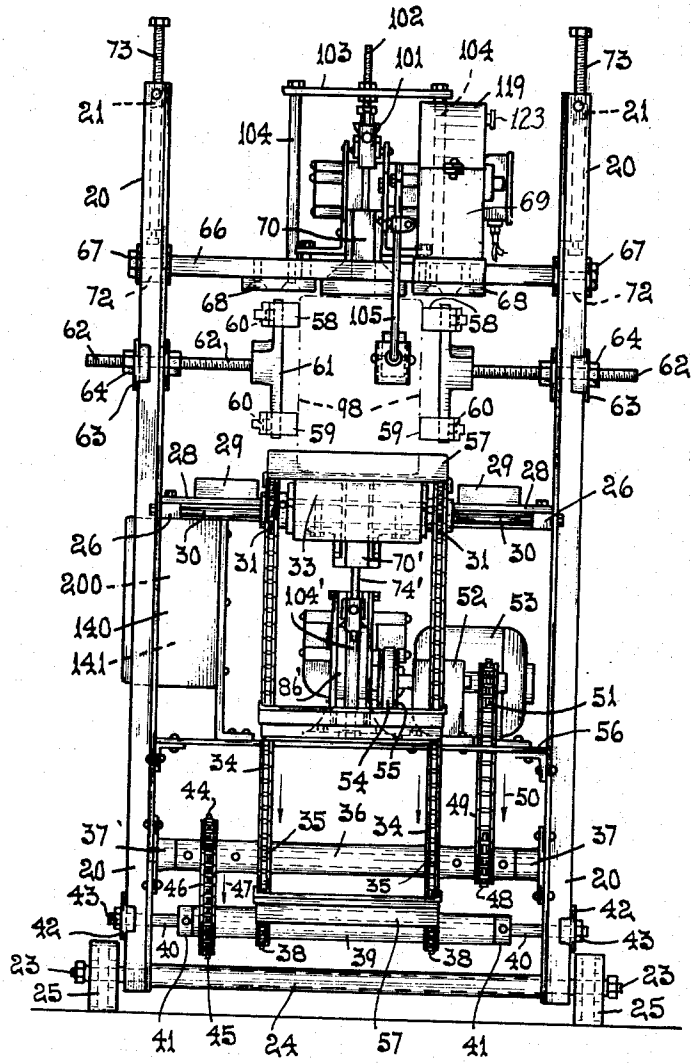
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PACKAGE SEALING MACHINE

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Fig.2.



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PACKAGE SEALING MACHINE

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Fig. 3.

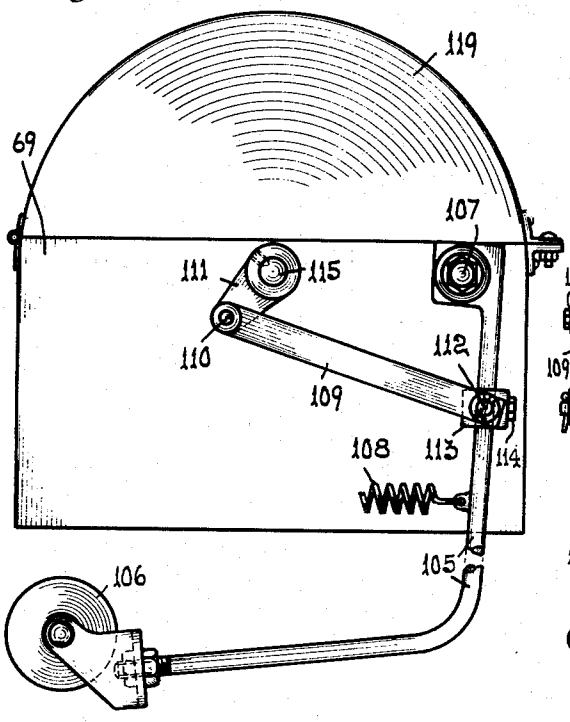


Fig. 4.

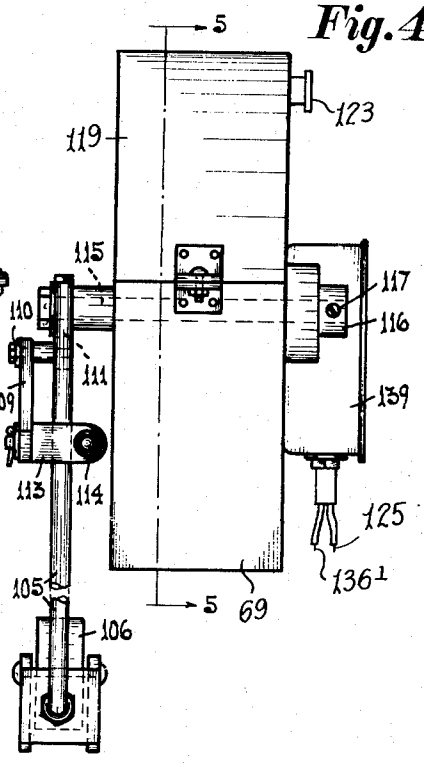


Fig. 5.

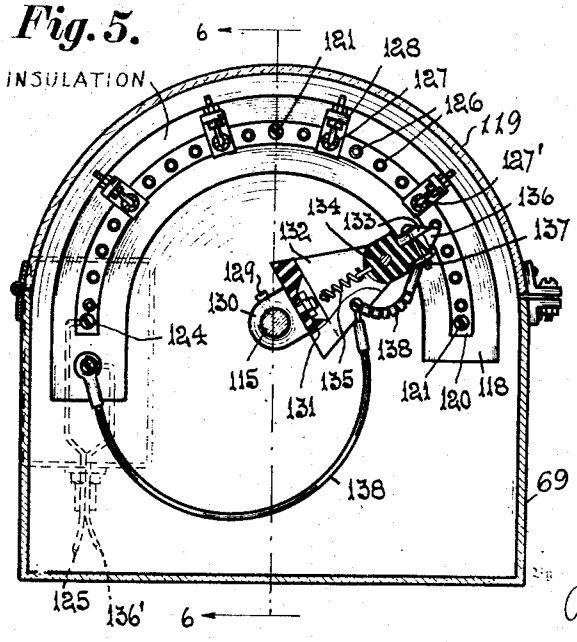
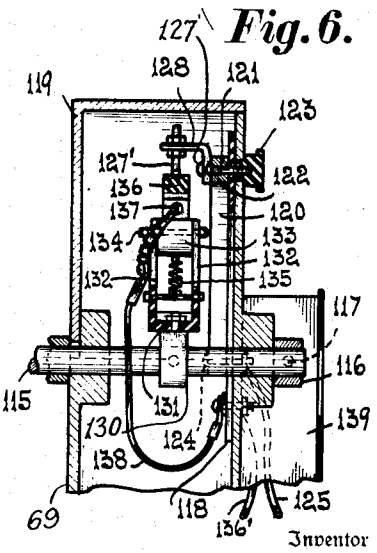


Fig. 6.



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Jan. 7, 1941. S. G. ECKLUND 2,228,134

PACKAGE SEALING MACHINE

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Fig. 7.

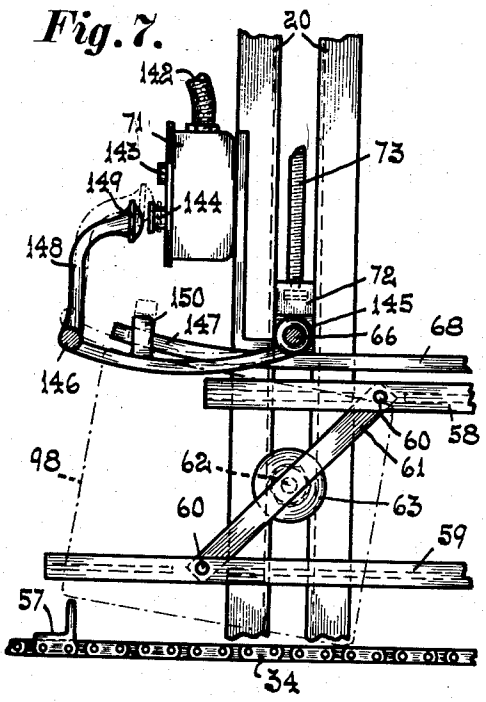


Fig. 8.

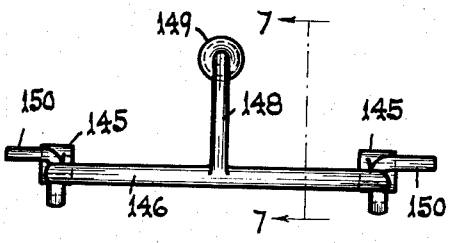
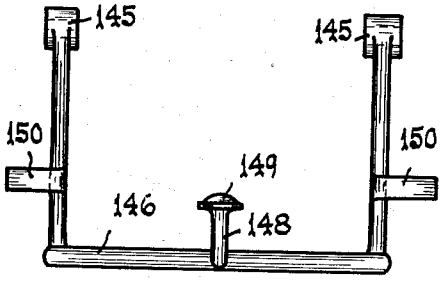


Fig. 9.



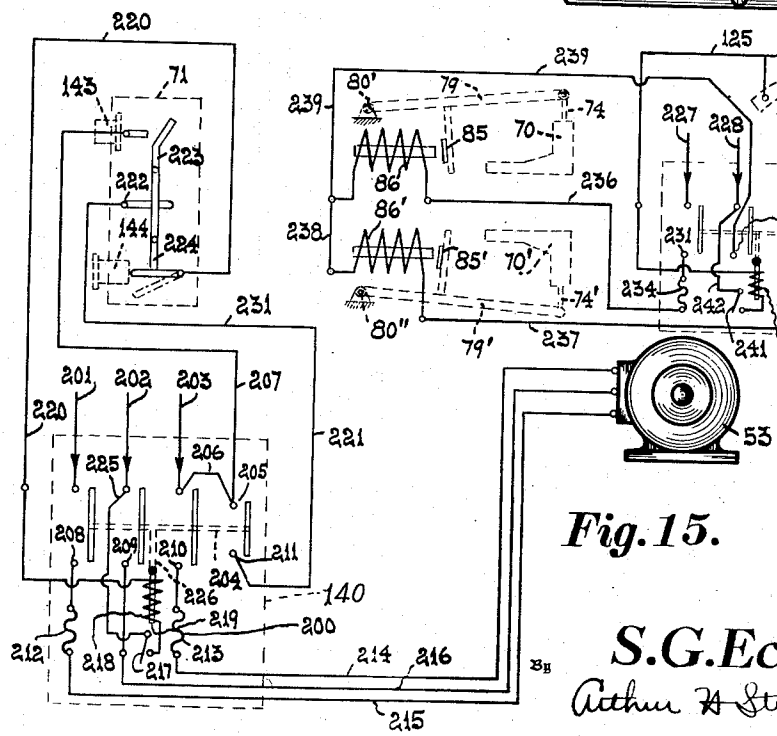


Fig. 10.

Fig. 15.

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PACKAGE SEALING MACHINE

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Fig.11

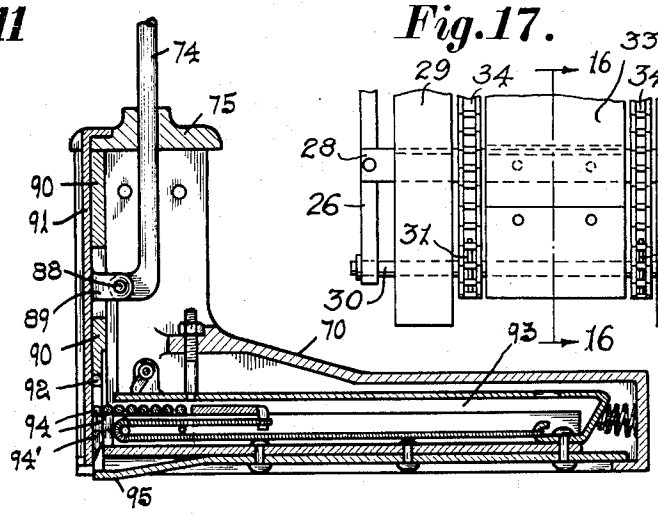


Fig.17.

Fig.12.

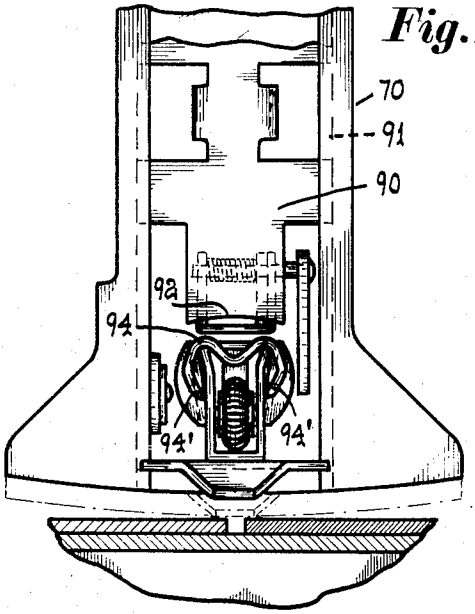


Fig.13.

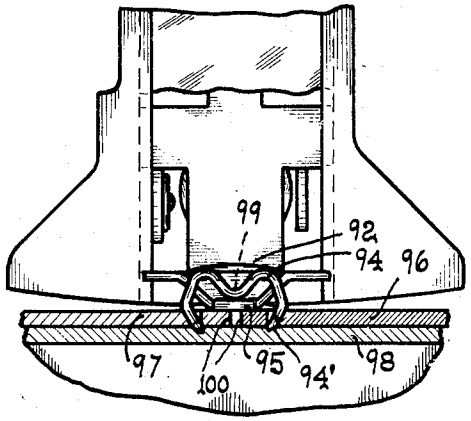
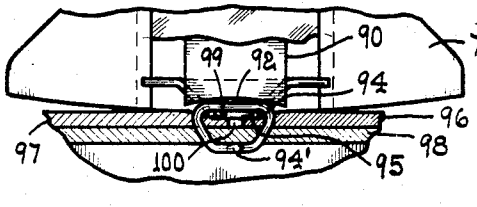


Fig.14.



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UNITED STATES PATENT OFFICE

2,228,134

PACKAGE SEALING MACHINE

Sixten G. Ecklund, Omaha, Nebr.

Application October 8, 1937, Serial No. 167,939

10 Claims. (Cl. 1—13)

This invention relates to means for rigidly sealing merchandise of any description, including canned and packaged goods within cardboard and straw board cartons and the like, preparatory to storage or shipment of the sealed cases, said invention relating more particularly to stapling machines for driving staples into packages and simultaneously clinching the ends of the staples to the flaps of cartons with the ends of the staples disposed inwardly of the carton material.

A further object of the invention is to provide mechanism for the above stated purposes which is adapted to seal the flaps of straw board cases and the like together more rapidly, economically and ornately than heretofore.

Another object of the invention is to provide means for causing cartons to travel through a staple applying mechanism, the latter being so arranged that a predetermined number of staples become affixed in preselected positions across and between the flaps of cartons and in a preselected quantity as may be desired.

A still further object of the invention is to provide safety means automatically operative for cooperation with a stapling mechanism for stopping the actuation of said mechanism at times when, resultant from inadvertence, accident or mistake, packages or cartons become misapplied to the mechanism by the operator.

A further object of the invention is to provide means for applying staples simultaneously to both the top and bottom flaps of a carton filled with merchandise for completely sealing the carton.

A still further object of the invention is to provide a mechanism for the above stated purpose which is comparatively compact and economical in the use of staples and adapted to be readily transported to different locations within a warehouse where sealing and packaging of merchandise is desired.

Other and further objects and advantages of the invention will be understood from the following detailed description thereof.

In the drawings:

Figure 1 is a detail side elevation of a stapling machine embodying the present invention.

Figure 2 is an end view thereof.

Figure 3 is a detail side elevation of a commutator switch housing and actuating arm employed.

Figure 4 is an end elevation of the housing and arm shown in Figure 3.

Figure 5 is a longitudinal vertical section of the commutator, the view being taken on line 5—5 of Figure 4.

Figure 6 is a transverse vertical section of a fragment of said commutator, the view being taken on line 6—6 of Figure 5.

Figure 7 is a fragmentary side elevation of a safety mechanism stopping device employed.

Figure 8 is an end view of an operating lever employed with said safety device.

Figure 9 is a top view of the lever shown in Figure 8.

Figure 10 is a diagrammatic illustration of certain electrical circuits for the commutator shown in Figures 5 and 6.

Figure 11 is a longitudinal vertical section of a staple magazine.

Figure 12 is a face view of a fragment of said magazine, and depicting the form, in plan, of the staples employed prior to the application thereof to carton flaps.

Figure 13 is a view similar to Figure 12 and showing a staple being inserted through the flaps of a carton.

Figure 14 illustrates the form a staple is caused to assume for clinching the flaps of a carton together.

Figure 15 is a diagrammatic illustration of certain electrical circuits employed in connection with a driving motor and a safety cut out switch mechanism.

Figure 16 is a longitudinal section of a fragment of an end of a platform and adjunct parts, the view being taken on line 16—16 of Figure 17, and

Figure 17 is a top plan view of a fragment of an end of a platform and adjunct parts shown in Figure 1.

As heretofore practiced in the art various manually actuated stapling machines have been employed which are not adapted to provide a complete clinch to a staple nor drive the same in desired positions whereby the flaps of cartons have been loosely sealed. This procedure not only provides an unattractive appearance to the cartons but also permits the contents thereof to become shaken about within such cartons and to the detriment of the appearance of the merchandise. Such machines use an unnecessary quantity of staples, and it is a further object of the invention to obviate the undesirable practices of the prior art.

Referring now to the drawings for a more particular description, 20 indicates four vertically disposed legs. Each leg is preferably formed of two pieces of angle iron, said pieces being dis-

posed side by side and spaced apart by means of the spacing blocks 21 at the tops of the legs and similar spacing blocks 22 at the bottom thereof whereby an elongated slot is provided in each leg between the angle-irons thereof, the said blocks and irons being secured together by means of suitable bolts, welding, or the like. Shafts 23 are journalled through oppositely disposed pairs of the lower blocks 22, respective pairs of legs being spaced apart by means of pipes 24 provided on the shafts 23. Wheels 25 are carried on the outer ends of the shafts 23 for facilitating transportation of the machine to selected locations about a warehouse for stapling and packaging operations.

Approximately midway between the ends of the legs 20 horizontally disposed platform members or bars 26 are secured by any suitable means such as the rivets 27 to respective legs. Extending between the bars 26, as best shown in Figure 2, transverse frame members or bars 28 are secured to the members 26 for supporting the elongated platforms 29 which are spaced apart and the upper surfaces thereof are on an approximate level with each other and of certain later described sprocket conveyor chains.

Extending between the oppositely disposed ends of the bars 26 stationary supporting shafts 30 are provided for the sprocket wheels 31, the latter being idly mounted for turning movements on said shafts. The sprocket wheels 31 are disposed between the platform members 29 and at each side of a medial platform 33 (Figs. 16 and 17), the latter preferably having terminal ends which are arcuate in cross section, as shown in Figure 16, and of the same diameter as the sprocket wheels 31 in order that the later described lugs 57 of the conveyor chains 34 may pass over the arcuate ends of the middle platform. The arcuate ends also provide a safety factor for preventing an operator from engaging his fingers between the moving lugs of the conveyor chains 34, and stationary portions of the mechanism such as the adjacent shafts 30.

The oppositely disposed sprocket conveyor chains 34 extend over their sprocket wheels 31 and their driver sprockets 35 which are carried on a driver sleeve shaft 36, the latter being provided with either a shaft therethrough or with stub axles mounted in sockets 37, the latter, as best shown in Figure 2, being respectively riveted to adjacent legs 20. The sprocket chains 34 also travel over rear sprocket wheels 38 which are mounted on a hollow shaft 39, as shown in Figure 2. A supporting shaft 40 extends through the hollow shaft 39 and is provided with thrust collars 41 for positioning the hollow shaft 39 longitudinally of its mounting 40, the latter extending through adjustable holding-plates 42 which are secured by means of the threadedly mounted lock nuts 43 to respective legs 20. The shaft 40 extends through the slots 20' of the legs 20 and is vertically adjustable therein, at desired times, for serving as a chain tightening device for providing taut chains as may be desired. The sleeve shafts 36 and 39 are each provided with further sprocket wheels 44 and 45, respectively, mounted thereon and a chain 46 extends between wheels 44 and 45, said chain traveling in the direction of the arrows 47 for driving the rear lower sleeve shaft 39, said chain 46 being driven by the sleeve shaft 36 and the latter being driven by a sprocket 48 secured to the sleeve shaft 36.

The sprocket 48 is driven by a chain 49, which is driven in the direction of the arrows 50, extending over a driven sprocket 51, the shaft for which extends outwardly of a transmission reduction gear housing 52 for reducing the speed of a driving motor 53 which is preferably employed. The motor has a belt 54 in engagement at all times with its pulley for driving a pulley 55, the latter being secured on a shaft which extends outwardly through said transmission housing 52.

The transmission housing 52 and motor 53 are rigidly secured to a platform 56 which is mounted on angle irons, the latter being secured to the legs 20 by any suitable means.

Secured to their ends to and between the oppositely disposed like sprocket conveyor chains 34, transversely disposed angle iron lugs 57 are provided, said lugs 57 preferably being equidistantly spaced apart and of a length substantially equal the distance between the platform members 29, as shown in Figure 2, said lugs 57 and chains 34 being driven in the direction of the arrows.

The angle iron lugs 57 are provided with upstanding portions which are adapted to have engagement against a vertically disposed rear wall of a box or carton for causing the latter to be conveyed through the machine. In instances where the cartons are of narrow width, the cartons slide on the middle platform 33 and in instances where the cases or cartons are of greater width than the platform 33 (Fig. 17), such cases slide upon the platforms 29 and in all instances adjustable means may be employed for preventing movements of the cartons transversely of the conveyor chains 34. This adjustable means may include upper guide rails 58 and lower guide rails 59 which are disposed at each side of the line of travel of said cases for bearing against the side walls thereof and preventing transverse movements of the cases for causing certain ends thereof to engage against a later described roller for actuating a commutator. The rear ends of the guide rails 58 and 59 are turned outwardly and divergently with respect to each other for facilitating guiding the boxes or cartons entering the machine between said rails, and are also disposed and maintained at all times at a true right angle with respect to the moving lugs 57 carried by the chains 34, whereby during operation of the mechanism the boxes or cartons are thereby forced to assume and maintain a true right angular shape at all times during passage thereof through the mechanism. It will be understood that after the staples have been applied to the cartons as later described, since the walls of said cartons are maintained absolutely at a right angle with respect to each other at the time the staples are driven, the cartons are thereby forced to maintain a useable rectangular appearance after said staples are driven. The rails 58 and 59 (see Fig. 7) are pivotally mounted upon swingable links 61, said links being adapted to be swung manually in a vertical direction for drawing the guide rails 58 and 59 toward or away from each other for accommodating cartons of different heights.

The links 61 are secured to their threaded shafts 62, said threads extending through the keeper plates or washers 63 and the slots provided between the angle iron leg members 20. The shafts have locking nuts 64 at each side of said legs 20 which, as shown in Figure 2, are provided with lugs for engaging the legs 20 at times when the lock nuts 64 are rotated for positioning the guide rails 58 selectively with respect

to the line of travel of cases through the machine. By this arrangement, the oppositely disposed edges of the flaps of said cases are caused, by the adjustment of the guide rails 58 away from or towards each other, to travel medially of the platform 33 and in alinement with later described driven staples, whereby each free end of each staple spans over oppositely disposed flaps of a case and may be driven through said flaps and clinched, as later described.

Above the oppositely disposed swingable guide rails 58 and extending through the slots of the legs 20, vertically adjustable platform supports bars 66 are provided having suitable washers and lock nuts 67 at their outer ends which are adapted to engage against said legs for positioning the supports 66 at selected distances above the endless conveyor sprocket chains 34, the lugs 57 thereof and the middle platform 33. The supports 66 (Fig. 7) carry upper platforms 68 which have smooth lower surfaces adapted to bear against the upper surfaces of cartons passing through the machine and to be vertically adjusted by the nuts and plates 67 carried on the bars 66. Upon the platforms 68 (Figs. 1 and 2) are mounted a commutator housing 69, a magazine 70 (see Fig. 11) for staples and a safety control switch housing 71 (see Figs. 1 and 7.)

The platform supports 66 extend through guide blocks 72 which are slidably mounted between the angle irons of the legs 20 whereby at times when the lock nuts 67 are loosened the operator may raise or lower said blocks 72 and the mechanism carried or supported thereby, by rotating the threaded shafts 73, the lower ends of which are swivelly secured to said blocks and threadably extend through the leg blocks 21 at the top of each leg 20 whereby the bottom surface of the platform 68 may be suitably positioned closely adjacent to the upper surface of the cartons or cases moving through the machine.

There is a stapling mechanism housing 70' located below the platform bars 26 and the mechanism within the housings 70 and 70' being alike, the mechanism 70' being up-side-down with respect to the mechanism within the housing 70, said stapling mechanism within the housings 70 and 70' being simultaneous and alike in operation but one thereof will be minutely described.

The housing 70 (Fig. 11) is provided with a push-pull rod 74 disposed vertically through the upper end plate 75 of the housing 70, said plate providing a bearing for the rod 74.

As shown in Figure 1, a set screw 76 is adapted to adjustably secure the rod 74 to a clip 77 through which the screw 76 is threaded for attaching the push-pull rod 74 to a lever 79 for governing the length of the stroke of the push-pull rod 74, and the clip 77 is provided with an ear 78 to which the outer end of the operating lever 79 is pivotally secured, as shown in Figure 1.

The lever 79 is pivotally mounted by means of a rod 80 to and between oppositely disposed like legs 81 of a bell crank assembly 82. As thus described the lever 79 is adapted to have teeter-totter movements on its pivotal rod 80, the latter being carried by said legs 81. The other legs of the bell crank assembly are pivotally attached as at 83 to the support 84. The bell crank assembly includes an armature plate 85 which is drawn towards the electro-magnet within the housing 86 at times when a circuit is closed through said electro-magnet. It must be borne in mind that the movement of the armature plate towards said magnet is very slight. A spring 87 is secured to the free end of the lever 79 and to the platform 68. As shown in Figure 1, the parts are in a normal or neutral position, said parts further including an adjustable detent 101 which is carried on a threaded rod 102.

When a circuit is closed through the electro-magnet the armature plate 85 (Figs. 1 and 10) is drawn towards the magnet, said plate together with the bell crank assembly having a slight pivotal movement on the pivots 83, the movement being very slight. The armature plate 85 upon being drawn towards the magnet causes a slight downward movement of the legs 81 and a corresponding downward movement of the lever 79 away from the detent 101. The spring 87 urges the lever 79 towards the detent 101 at all times. When said circuit is closed the legs 81 of the bell crank assembly, the pivotal point 80 and the lever 79 as a whole move downwardly away from the detent 101 causing a corresponding movement to be imparted to the push-pull rod 74.

When the circuit through the magnet is open and the armature plate 85 released from the influence of the magnet the spring 87 pulling downwardly upon its end of the lever 79, causes the push-pull rod to be raised upwardly until the lever 79 strikes the detent 101, the latter at this time functioning as a fulcrum whereby the spring 87 causes the legs 81 of the bell crank assembly to move away from the magnet together with the armature plate 85, the latter moving away from the core of the magnet but a very slight distance.

As shown in Figure 11, the lower end of the push-pull rod 74 is attached by means of a pin 88 to a lug 89 carried by a vertically disposed reciprocal hammer plate 90, the latter being mounted in guide slots 91 provided on the inner walls of the housing 70. As shown in Figures 12 and 11, the hammer plate 90 is in a normal raised position, its lower end 92 being above an elongated staple magazine 93. The staples 94 within the magazine 93 are guided by the latter in a horizontal direction in a manner whereby the staples are presented under the lower end 92 of the hammer plate one at a time. The stapling mechanism further includes an anvil 95 having an end which extends below the lower end 92 of the hammer plate 90 and beyond the guide slots 91.

A staple 94 before being ejected from the magazine and clinched to the flaps of a box is of the configuration, in plan, as shown in Figure 12. The lower end 92 of the hammer plate 90 is concaved and adjunct parts are so arranged that at times when the hammer plate descends, the then free ends 94' of the staple 94 are caused to be driven downwardly through the oppositely disposed flaps 96 and 97 of the carton 98. During the completion of the downward stroke of the hammer-plate, the medial portion 99 of the staple is caused to strike against the anvil 95, as shown in Figure 13, whereby the further downward movement of the staple causes said free ends thereof to move towards and past each other and close said free ends together through the flaps and carton material, as shown in Figure 14. The oppositely disposed edges 100 of the flaps 96 and 97 are caused to be accurately positioned at this time with respect to descending staples by means of the heretofore described guide rails 58 and 59.

That end of the lever arm 79 which is at-

tached to the push-pull rod 74 is limited in its upward movement by means of a detent 101 carried on a threaded rod 102. The rod 102 is secured to a horizontally and transversely disposed bar 103 which is carried upon standards 104, one each of the latter being disposed at each end of the bar 103 and secured to the stationary platform 68 of the machine. The rod 102 is provided with nuts disposed at each side of the bar 103 whereby the stop detent 101 is vertically adjustable for governing the length of the upward return movement of the lever arm 79.

Cartons are represented in Figures 1 and 2 by means of the dotted line outline 98 thereof, and commutator means are provided for causing staples to be driven at selectively spaced apart intervals of time or distances along the oppositely disposed edges 100 (Figs. 13 and 14) of the flaps of a carton. The commutator means includes an actuating arm 105 which extends downwardly from the commutator housing 69, and the free lower end of said arm is provided with an anti-friction roller 106 which also facilitates passage of the arm over the upper angular edges of the cartons or boxes.

The arm 105 is pivotally mounted, as at 107, to a side wall of the commutator housing 69 for vertical swinging movement, and a spring 108 is secured to said arm and any suitable stationary portion of the mechanism, as shown in Figure 1, for returning the arm and the roller 106 thereof to a normal position towards and against oncoming cartons moving through the machine.

A connecting link 109, as best shown in Figures 3 and 4, is pivotally secured, as at 110, to a crank-throw 111, said link being pivotally secured, as at 112, to a clip 113 which is adjustable upon the arm 105, said clip having a bifurcated end through which is disposed a clamping bolt 114 whereby the clip 113 may be adjusted longitudinally of the arm 105 for governing the length of motion of the crank-throw 111.

The crank-throw 111 is suitably secured to a shaft 115 journalled through the walls of the commutator housing 69, as best shown in Figure 6, and provided with a thrust collar 116 secured thereto by means of a set screw 117.

A plate of insulation 118 is disposed against a stationary wall of the commutator housing 69, the latter having a removable cover cap 119.

A brass bus-bar 120 which is preferably of semi-circular shape in plan, as shown in Figure 5, is secured against the insulation 118 and mechanically secured to the stationary wall of the commutator housing by means of screws 121 bushings 122 and nuts 123 formed of insulating material.

A screw 124, like the screw 121 above mentioned is provided at one end of the bus-bar and functions as a binding post for securing an electric wire 125 in electrical communication therewith and with the bus-bar 120, said wire 125 being in electrical communication with a source of electrical energy at times, as later described.

The bus-bar 120 is provided with a plurality of spaced apart threaded recesses 126 which are adapted to receive machine screws 127 for securing L-shaped arms 128 thereto and in selected recesses 126. The arms 128 carry adjustable contact screws 127.

The arms 128 together with the bus-bar 120 as well as the contact screws 127' carried by the arms 128 are formed of conductive material and, as best shown in Figure 5, the free ends of the screws 127' are radially disposed with respect to the shaft 115 of the crank throw 111, and adapted at times to contact with a circuit maker and breaker for opening and closing an electrical circuit for actuating the coils of the heretofore mentioned magnets 86 and 86' for causing the push-pull rods 74 and 74' of the stapling mechanisms to be reciprocated for driving staples into cartons passing through the machine.

Rigidly secured by means of a set screw 129 to the shaft 115, a lug 130 is provided which, as best shown in Figure 6, is secured to a block of insulation 131 by any suitable means.

Oppositely disposed supports 132 extend from said block 131 and a swingable brush head electrode or contact 133 is pivotally mounted therebetween on a pin 134.

The pivotally mounted brush head 133 is provided with an expanded spring 135 for returning the head to a normal radial position as shown in Figure 5.

The head 133 is formed of brass adapted to contact with and close a circuit through the screws 127' carried by the L-shaped arms on the bus bar at times when the brush head is moved in a counter-clock-wise direction. When the brush head is moved in a clock-wise direction, the circuit is opened by means of a block of insulation 136 carried on said head which has an upper end of inverted V-shape extending beyond the contact or brush 133, as shown in Figure 5. The brush 133 is secured to the insulation 136 by means of a screw 137 forming a terminal for a connecting wire 138.

As shown in Figure 6, the spring 135 is of an expanding type and mounted between the oppositely disposed like supports 132 as is also the brush and insulation assembly 133—136. The brush assembly is pivotally mounted between the supports 133 whereby the outer head of the brush can swing in either direction. One half of the head is insulation and the other half brass. Now when the supports 132 are swung in one direction the head of the brush becomes knocked in the opposite direction whereby the spring 135 as to the outer end thereof becomes moved past "a dead center" and releasably holds the outer end of the head in said "knocked" direction and prevents the same from flopping around. As soon as the supports 132 are moved in a direction opposite to the first mentioned direction the head of the brush becomes knocked in a corresponding opposite direction; whereupon the outer end of the expanding spring 135 holds the said head from flopping around.

The binding-post-screw 137 is employed for securing the insulation 136 to the brush head and said binding post 137 is in communication with a wire 138 which extends to the binding screw 124, the latter extending through the wall of the housing 69. The screw 124 is suitably insulated from the housing 69 and in electrical communication with a wire 136', the latter in conjunction with the wire 125 extending to a later described magnetic switch within the housing 140 thereof whereby, at times, as governed by said switch and the commutator, a circuit is closed through the wires 15, 136', the brush head 133 and the screws 127' and 124 of the bus-bar for driving staples. It will be noted that at times when the contact screws 127' of the L-shaped arms 128 are placed a greater or less distance apart with

respect to each other that staples are correspondingly driven, as later described.

The wires 125 and 136' extend from the outlet box 139 shown in Figure 6, to the magnetic switch housing 140 shown in Figures 1 and 2, and within which are two magnetic switches indicated diagrammatically at 141 in Figure 10 and at 200 in Figure 15 and shown in dotted lines in Figure 1. The construction of the magnetic switches preferably employed is conventional and well known and believed to require no particularly minute description herein, being substantially like those manufactured by the General Electric Company at Schenectady, New York, and described in U. S. Patents Nos. 1,696,615; 1,742,109; 1,839,095 and 1,842,958.

At times when the circuit is closed through the wires 125, and 136', the bus-bar 120 and the brush head 133, a circuit is thereby closed through the electrodes of the magnetic switch 141 for actuating the coils of the electro-magnets 86 and 86' for drawing the armature plates 85 and 85' towards the cores of the electro-magnets 86 and 86' and thus causing the push-pull rods 74 and 74' of the respective stapling mechanisms to become correspondingly simultaneously actuated.

The circuit through the wires 125 and 136' shown in Figure 6 governs the opening and closing of the circuit through the magnetic switch 141 within the housing 140 from the source of supply of electrical energy to the magnetic switch.

The wires for conveying electrical energy from a source of supply thereof to the motor 53 are provided, preferably, with a safety cut-out switch, said wires not being illustrated as connected to said motor in Figures 1 or 2. These wires lead from the safety switch housing 71 to said motor 53 through a conduit 142, the latter being in communication with the switch housing 71, as shown in Figures 1 and 7, whereby at times when the switch button 143 is pressed inwardly of the housing, a circuit is closed for actuating the driving motor 53 and adjunct parts, and at times when the switch button 144 is pressed, the power circuit thereby becomes opened for stopping the motor and mechanism driven thereby.

Means are provided for opening said circuit by pressing the button 144 automatically at times when cartons to be stapled become misapplied to the conveyor belt or the like, said means preferably including bosses 145 which are pivotally mounted for vertical swinging movements on the rear platform supporting bar 66, said bar preferably being round in cross section for permitting said movements.

These bosses 145 are secured to the ends of a substantially C-shaped lever 146 which extends rearwardly of the rear legs 20 and rearwardly of the upturned shoes 147, said shoes being formed on the rear ends of the platform members 68.

As best shown in Figure 7, the lever 146 is provided with an upstanding arm 148, the terminal end 149 of which is adapted to abut against and press the switch button 144 upon upward rocking movement of the lever 146. The legs of the C-shaped lever 146 are provided with detents 150 which are adapted to strike against an adjacent shoe 147 and limit a downward movement of the lever 146.

When a carton such as the carton 98 is misapplied to the conveyor, as shown in Figure 7, such as by resting the bottom of the carton upon the top of a lug 57 and when the conveyor chain 34 causes the carton to travel under the safety switch housing 71 for entering the machine during stapling operations, the top of such misapplied carton comes in contact with the lever 146, thereby raising said lever and the arm 148 thereof, thereby causing the end 149 of said arm to engage against the switch button 144 for opening said power circuit as heretofore mentioned, whereby the actuation of the entire mechanism is stopped until such time as the misapplied carton is manually disposed properly in position between the guide rails 58 and 59.

The duplicate staple driving mechanism positioned below the platforms 29 and 33 includes a housing 70', push-pull rod 74', set screw 76', clip 77', lever 79', bell-crank-lever 82', electromagnet 86', detent 101' mounted on standards 104', said parts being mounted on the motor supporting platform 56, the lower stapling magazine or housing 70' being disposed in vertical alinement with the upper staple housing 70 whereby staples may be driven and clinched into the bottom flaps of a carton simultaneously with like staples driven into the top flaps of the same carton.

Preferably, the driving motor 53 is of three phase type, as shown in Figure 15, and referring first to said figure, the magnetic switch for said motor is indicated generally by the reference character 200.

Preferably the power service wires deliver 220 volts, three phase, 60 cycle current to the switch 200 through the service wires 201, 202 and 203 which lead into the housing 140 of the magnetic switches 141 and 200, said wires not being illustrated in the drawings with the exception of the diagrammatic illustration thereof in Figure 15. The magnetic switch 200 further includes a switch bar 204 having four contacts which at times are in electrical communication with the energy supply wires 201, 202 and 203 and an electrode 205 which is in electrical communication at all times with the wire 203 through a conductor 206. The electrode 205 has a wire 207 in communication therewith at all times, said wire 207 leading to the switch housing 71, the latter being represented by dotted lines in Figure 15 and full lines in Figure 7.

The switch bar 204 is adapted to close electrical circuits through and with the service wires 201, 202, 203 and the electrode 205 through the oppositely disposed electrodes 208, 209, 210 and 211, respectively, and the electrode 208 is in electrical communication with a resistance unit 212. A similar unit 213 is in electrical communication with the electrode 210, said resistance units 212 and 213 being employed to prevent injury to the windings of the motor 53. The units 213 and 212 are respectively connected to the motor 53 through the wires 214 and 215. A wire 216 leads directly from the electrode 209 to the motor 53.

When the capacity of the motor 53 is approximated, the units 212 and 213 cause a normally closed switch 217 to open, said switch 217 when closed being in communication with a solenoid 218 which encircles a movable core 219, the latter being secured to the switch lever 226 of the switch bar 204 for a mechanical actuation of said bar.

A wire 220 extends from the solenoid 218 to the heretofore mentioned housing 71 and a wire 221 extends from the electrode 211 to said hous-

ing and is permanently connected to an electrode 222 therewithin. The wire 207 is in communication with the switch button 143 shown in Figure 7, said button being diagrammatically illustrated in Figure 15, and the wire 220 which extends from the solenoid 218 leads to the switch button 144, and at times when the button 144 is pressed inwardly of the housing 71, a circuit is opened for stopping the actuation of the motor 53 thereby.

The mechanism within the switch housing 71 further includes a bar electrode 223 having an arm which is in electrical communication at all times with the electrode 222, said bar 223 being adapted at times to establish an electrical communication between the electrode 222 and the switch button 143, the electrode carried by the latter being so arranged that at times when the button 143 is pressed inwardly of the housing 71, a circuit is closed thereby for starting operation of the motor 53 at which time the button 143 may be released. The mechanism within the housing 71 further includes a second bar electrode 224 which normally is in communication with the electrodes carried by the switch button 144, the circuit through the members 144 and 224 being normally closed and adapted to be opened at times when the button 144 is pressed inwardly of the switch housing 71 by means of the lever 146, as heretofore described, said circuit being open between the bar electrode 224 and the wire 220.

In operation the motor starter button 143 is pressed inwardly of the housing 71 for energizing the solenoid 218 through the wire 220 which is thereby placed in electrical communication with the wire 207 through the bar electrodes 223 and 224.

The wire 207 is at all times in communication with the service wire 203 through the wire 206 and the wire 220 is in electrical communication with the wire 202 through the coil 218 and the normally closed switch 216 and a wire 225.

When the switch button 143 is depressed, the solenoid 218 moves the core 219, the latter being mechanically fastened to the switch lever 226 whereby said switch lever closes circuits through the switch bar 204 between the service wires 201, 202 and 203, the electrode 205 and the oppositely disposed electrodes 208, 209, 210 and 211, respectively, whereby actuation of the motor 53 is consummated. Upon the instantaneous start of said motor 53, the switch button 143 is then released by means of a spring, not shown, which pushes said button 143 outwardly of the housing 71 where it remains during operation of the mechanism and the motor 53 and until such time as the motor 53 is stopped, whereupon the button 143 may be again depressed to start the motor again.

When passage of cartons through the mechanism is obstructed, such as when said packages become misapplied to the lugs 57 of the conveyor chains 34, as shown in Figure 7, the elevated end of such carton strikes the safety lever 146, and causes the button 144 to move inwardly of the housing 71 whereby the circuits to the motor 53 become opened for stopping the mechanism and motor, said circuits becoming opened since the electrical energy is thereby removed from the coil 218 which permits the core 219 and the switch lever 226 to fall, by gravity, downwardly for opening said circuits until such times as the latter is re-established or closed by the switch 143.

The magnetic switch 141 for the commutator is preferably of the same construction as the motor switch 200, and referring particularly to Figure 10, current is supplied to the magnetic switch 141 through the wires 227, 228 and 229 which may be in communication, respectively, with the power wires 201, 202 and 203 shown in Figure 15.

The switch bar 230 is adapted to connect the wires 227, 228 and 229 with the oppositely disposed electrodes 231, 232 and 233 at times when the switch bar 230 is actuated for the same. The electrodes 231 and 233 are respectively in communication with resistance units 234 and 235.

From the resistance unit 234 a wire 236 extends to an end of the upper electro-magnetic coil 86 and similarly a wire 237 extends from the resistance unit 235 to the lower coil 86'.

When the cores within the coils 86 and 86' are electrically energized, said cores, respectively, draw the armature plates 85 and 85', respectively carried by the arms 79 and 79', towards said cores whereby the stapling mechanisms within the staple housings 70 and 70' are thereby actuated as heretofore described, through the levers 79 and 79' and the contact plates 85 and 85' of said levers, said levers being actuated simultaneously, both being governed by the same commutator.

As shown in Figure 10, ends of the coils 86 and 86' are in electrical communication with each other through a wire 238 and a wire 239 extends from the wire 238 to the electrode 232.

The heretofore described commutator bus-bar 120 is in communication with the heretofore described wire 125 which leads to a solenoid 240, the latter in construction and operation being similar to the heretofore described solenoid 218, shown in Figure 15. As shown in Figures 5, 6 and 10, the contact screws 127' are in communication with the wire 125 and bus-bar 120 of the commutator.

The coil 240 is in communication with a normally closed switch 241 which is similar in operation to the heretofore described switch 217, shown in Figure 15, and is also in communication through a wire 242 with the power wire 228. The switch 241 is adapted to open the circuit between the wire 228 and the coil 240 at times when the resistance units 234 and 235 cause the same, said times being when an overload occurs in the circuit of the coils 86 and 86' through the wires 236 and 237.

From the power wire 229 which enters the magnetic switch housing 140, electrical communication is established through the heretofore described wires 138 and 136' with the brush head 133 and a circuit is closed through said wire and the successive contacts 127' of the bus-bar 120 at times when the brush head 133 is moved in a counter-clock-wise direction, as heretofore described; said circuit through the brush head and the contacts 127' being closed through the wire 125 and the coil 240 and the normally closed switch 241. The circuit is opened during said counter-clock-wise movement of the brush head 133 past the successive contact screws 127' of the bus-bar 120 and instantaneously when said successive circuits are closed through the coils 86 and 86' the lever arms 79 and 79' are caused to move towards each other for ejecting and clinching staples into the flaps of the cartons, as heretofore described.

During the return movement of the brush head 133 in a clock-wise direction, circuits for the coils 86 and 86' remain open, the block of insulation 136 carried by the brush head 133 solely contacting the screws 127' during said movement.

The magnetic switch 141 is preferably employed since the current through the coil 240 is considerably weaker than the current passed through the coils 86 and 86' and if said magnetic switch 141 is dispensed with, the power circuit is then extended directly to the swingable brush head 133 and the wire 125. However, when the power circuit is so extended sparks are generated at times when the brush head strikes the contact screws 127', said sparks burning said contacts and causing them to wear rapidly and to disrupt the proper timing of driven staples. It will thus be seen that the magnetic switch 141 is of economical advantage.

Assuming that a package 98 is in the correct position with respect to the conveyor 34 and engages a lug 57 at its lower end, the top of the package will pass beneath the circuit breaking member 146 and the forward end of the package will engage against the roller 106. The upper edge of the package will engage the upper platform 68 during the entire movement of the package 98 through the stapling mechanism. When the forward wall of the package 98 contacts with the roller 106, the lever 105 is rocked forwardly and upwardly, which rocking movement effects counter-clock-wise turning of the contact or wiper 133 (see Fig. 5). There are as many fixed contacts 127' as there are staples to be applied to the package 98 so that at each engagement of the wiper 133 with a contact 127, the stapling head 90 will be lowered by rocking of the lever 79. The contacts 127' are spaced apart on the arcuate bar 121 a distance equal to the desired spacing of the staples to be applied to the package 98. After the package 98 has passed the stapling means 70, the rock arm 105 will be returned to its normal position shown in full lines in Figure 1 by the spring 108.

It will be apparent from the foregoing that any desired number of staples may be applied to opposite sides of the package during the movement of the package through the machine and that the operation is a continuous operation so that packages may be fed into one end of the machine in an unstapled condition and removed from the other end of the machine in a stapled condition.

It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and sub-combinations. This is contemplated by and is within the scope of my claims. It is further obvious that various changes may be made in details within the scope of my claims, without departing from the spirit of my invention. It is, therefore, to be understood that my invention is not to be limited to the specific details shown and described.

What is claimed is:

1. A package stapling means comprising a frame, means for moving a package through said frame, a pair of stapling members carried by said frame in a position to engage opposite sides of the package during the movement of the package through the frame and to pass staples simultaneously through oppositely disposed sides of the package and to clinch the staples in place, and a single controlling means for said pair of stapling members.

2. A package stapling means comprising a frame, means for moving a package through said frame, a pair of stapling members carried by said frame in a position to engage opposite sides of the package during the movement of the package through the frame and to pass staples simultaneously through oppositely disposed sides of the package and to clinch the staples in place, an operating member for each stapling member, and a single controlling means for said operating members.

3. A package stapling means comprising a frame, means for moving a package through said frame, a stapling means carried by said frame in a position for engagement with a package moving through said frame, means operable under movement of the package to actuate said stapling means, and means carried by said frame and operatively connected to said first means to render said first means inoperative when a package is misapplied to said first means.

4. A package stapling means comprising a frame, a conveyor carried by said frame, operating means for said conveyor, a stapling means carried by said frame in a position for engagement with a package moving through said frame, means connected to said stapling means and operable by movement of a package on said conveyor to actuate said stapling means, and means carried by said frame and operatively connected to said operating means to render said operating means ineffective when a package has been misapplied to said conveyor.

5. A package stapling means comprising a frame, a conveyor carried by said frame, operating means for said conveyor, a pair of opposed stapling members carried by said frame in a position for engagement with a package moving through said frame, operating means for said stapling members, a single controlling means for said operating means for said stapling members disposed in a position for engagement with a package moving through said frame, and means carried by said frame and operatively connected to said first operating means to render said first operating means ineffective when a package has been misapplied to said conveyor.

6. A package stapling means comprising a frame, a conveyor carried by said frame, operating means for said conveyor, a stapling member carried by said frame in a position for engagement with a package moving through said frame, electrical operating means for said stapling member, controlling means for said electrical operating means carried by said frame in a position for actuation by a package disposed on said conveyor, and guide means for guiding a package through said frame.

7. A package stapling means comprising a frame, a conveyor carried by said frame, operating means for said conveyor, a platform disposed above said conveyor, means adjustably supporting said platform relative to said conveyor, a stapling member carried by said platform, operating means for said stapling member, and means connected to said latter operating means carried by said platform and engageable with a package on said conveyor to actuate said latter operating means.

8. A package stapling means comprising a frame, a conveyor carried by said frame, operating means for said conveyor, a platform disposed above said conveyor, means adjustably supporting said platform relative to said conveyor, a stapling member carried by said platform, operating means for said stapling member, means connected to said latter operating means carried by said platform and engageable with a package on said conveyor to actuate said latter operating means, and means connected to said first named

operating means disposed on said platform and engageable with a misapplied package on said conveyor to thereby stop said conveyor.

9. A package stapling means comprising a frame, a conveyor carried by said frame, operating means for said conveyor, a platform disposed above said conveyor, means adjustably supporting said platform relative to said conveyor, a stapling member carried by said platform, a second stapling member carried by said frame in opposed relation to said first stapling member, individual operating means for said stapling members, a single control means carried by said platform and connected to the operating means for said stapling members, said control means being disposed with a portion thereof disposed in the path of the movement of a package along said conveyor, and means carried by said platform connected to said first operating means and engageable with a package misapplied to said conveyor whereby to render said first operating means ineffective.

10. A commutator for a package stapling machine comprising a bus-bar having a plurality of spaced apart openings, a plurality of contacts adapted to be selectively placed in said openings, a yieldable brush head electrode having a conducting portion and an insulated portion, means including an arm actuated by a package moving through the machine for causing said electrode to move along the bus-bar in opposite directions, and expanded spring means for maintaining the conducting portion of the electrode in contact with the contacts as the electrode moves in one direction and for maintaining the insulated portion of the electrode in contact with the contacts as the electrode moves in an opposite direction.

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