

Oct. 2, 1956

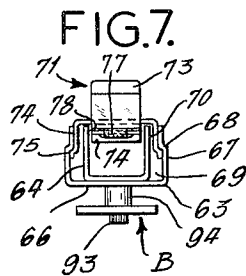
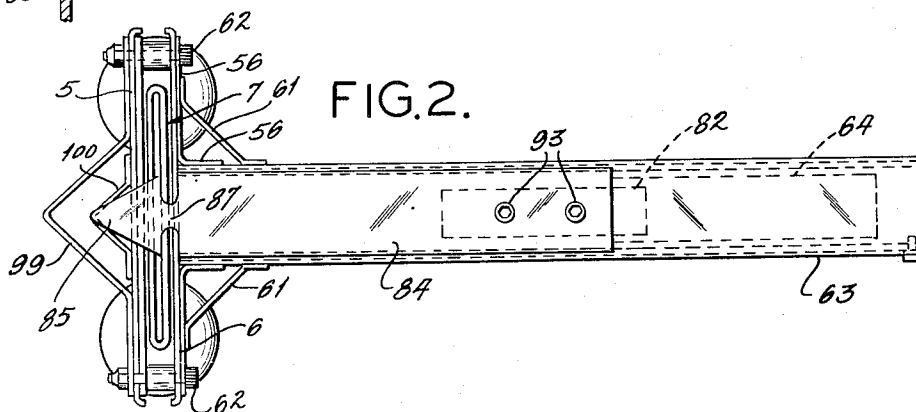
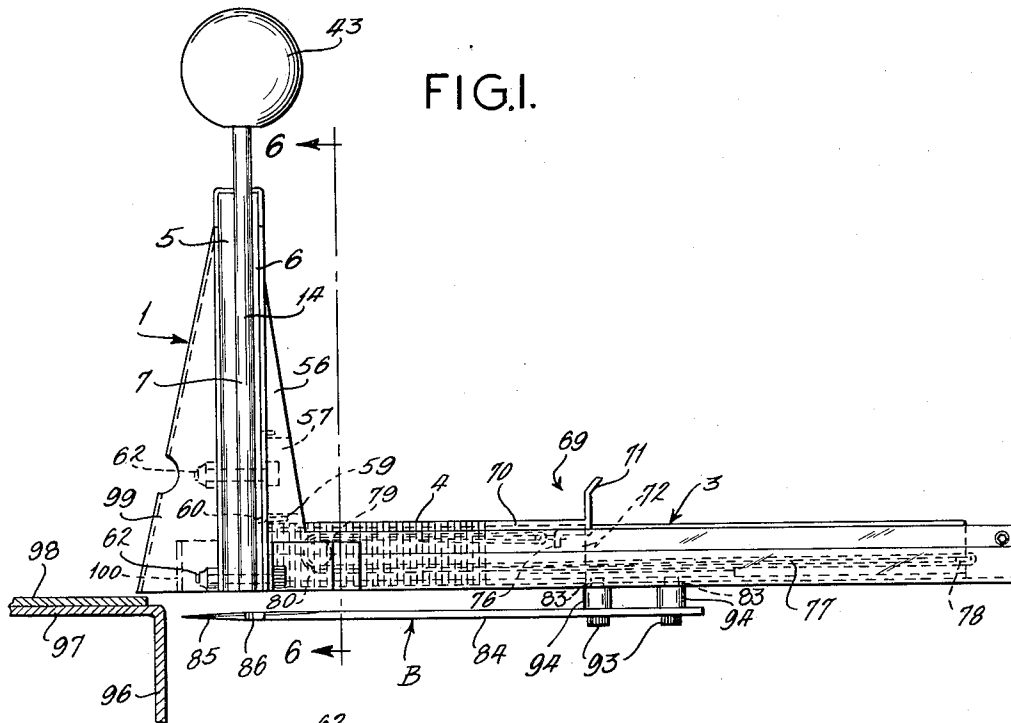
W. SCHAFFROTH

2,764,758

STAPLING MACHINE WITH REMOVABLE FLAP LIFTER BLADE

Filed Dec. 10, 1953

3 Sheets-Sheet 1



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STAPLING MACHINE WITH REMOVABLE FLAP LIFTER BLADE

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FIG. 3.

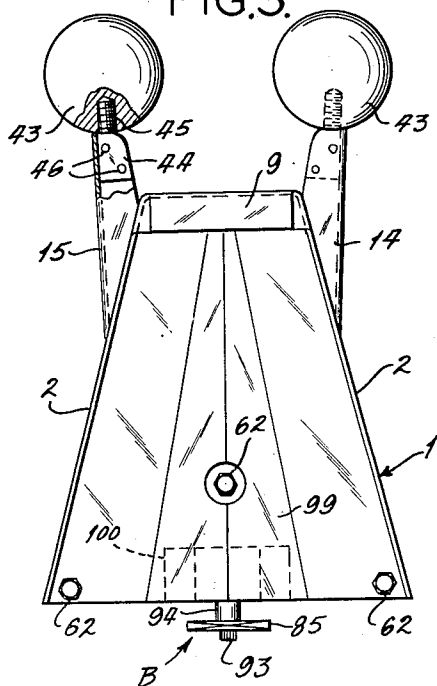


FIG. 5.

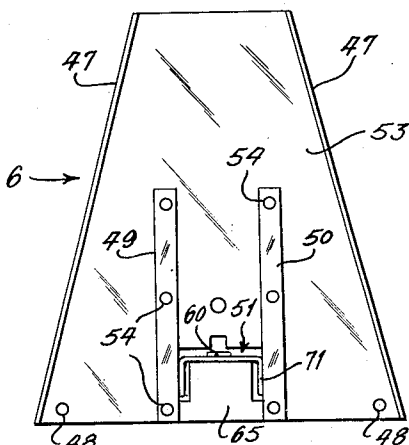


FIG. 6.

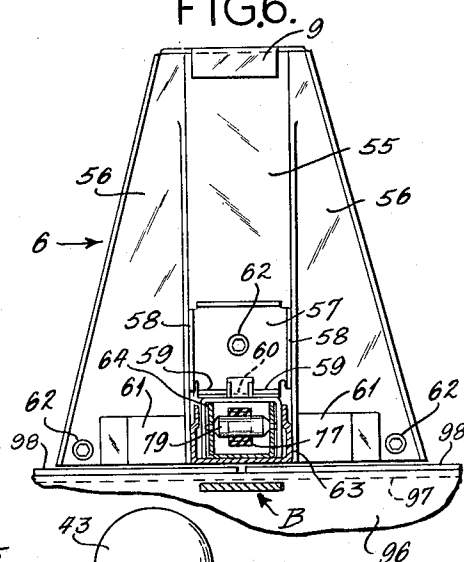
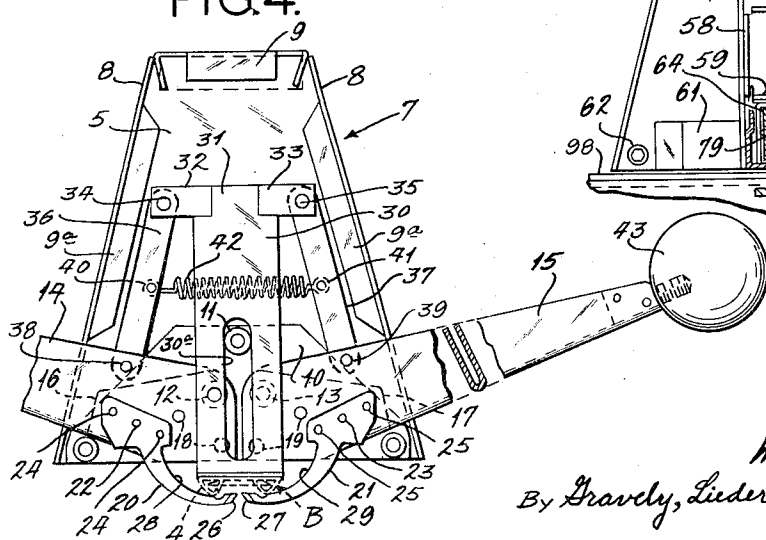


FIG. 4.



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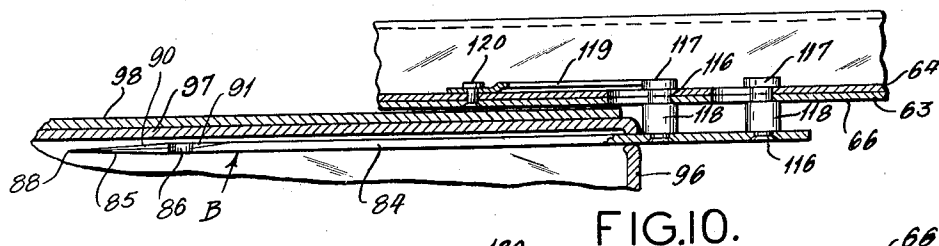
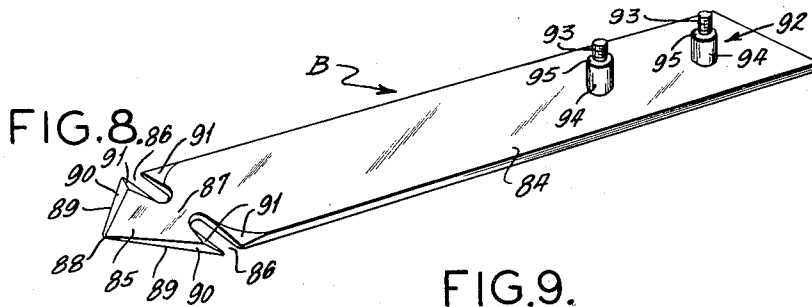


FIG. 11.

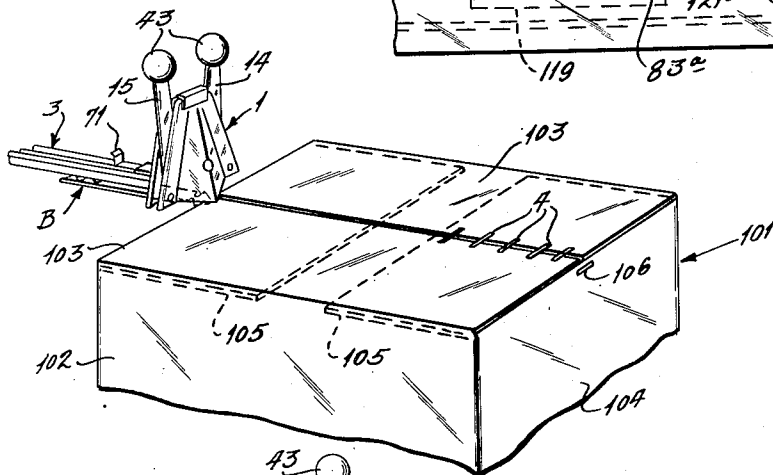
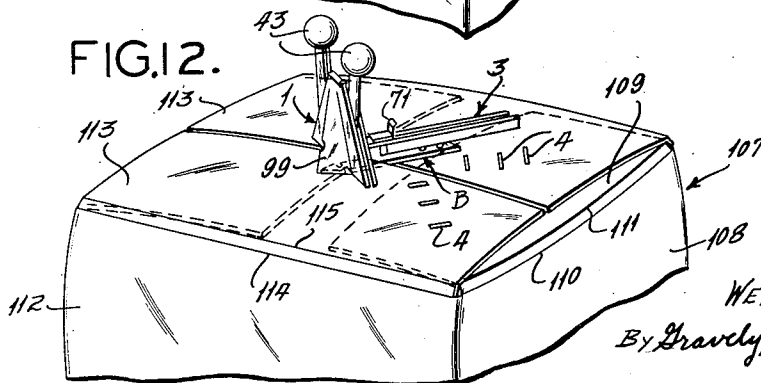


FIG. 12.



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2,764,758

STAPLING MACHINE WITH REMOVABLE FLAP LIFTER BLADE

Werner Schafroth, Carson, Nev.

Application December 10, 1953, Serial No. 397,433

6 Claims. (Cl. 1—120)

This invention relates to stapling machines in general, and particularly to those of the type which are used to secure the flaps or ends of closed cartons or containers where stationary anvils cannot be used and where movable anvils are used for penetrating the material and clinching the staples. The invention also relates to a stapling machine having a movable anvil for penetrating the box material and means therebelow for holding a subjacent flap or piece of material against the outer piece of material so that said anvil pierces two thicknesses of material which are to be secured together by staples.

This invention represents a practical improvement over the stapling machines shown in Schafroth patents, No. 2,080,634 dated May 18, 1937; No. 2,234,808 dated March 4, 1941; No. 2,469,054 and No. 2,469,055 dated May 3, 1949; and No. 2,470,727 dated May 17, 1949. This invention represents an improvement over and contains subject matter in common with my copending application, Serial No. 340,443 filed March 5, 1953 entitled "Stapling Machine." This invention also represents a practical improvement in the magazine which feeds staples one after the other to the staple driving and clinching means.

Stapling machines of the type described in my copending application, Serial No. 340,443, are used for packing all sorts of items which may or may not fill the entire box. These items include manufactured goods of all sorts, meat, flowers, perishables, fragile items, etc.

Such perishables as lettuce, oranges, etc., are now being packed in half-slotted paperboard boxes instead of wooden boxes. In order to close these half-slotted paperboard boxes, which are being used in increasing numbers by the industry, a staple must be driven through the outside layer of material and then through a subjacent layer, which is usually an end cover flap which is turned inwardly before the side cover flaps, before said staple is clinched into holding position. Good results are obtained when the paperboard boxes are fully packed and are in a dry state so that the inner flaps contact the contents of the box and the outer flaps lie directly against said inner flaps.

However, it frequently happens that these boxes are packed in the field while it is damp or raining, and in addition, the products being packed, especially lettuce, might be wet and add further moisture to the paperboard box. In addition, the products are not of uniform size as in the case of manufactured articles with the result that it frequently becomes necessary to close boxes which are extremely wet or which are not completely filled, or both. In either case, the inner flaps of said boxes tend to sag or fall away from the outer material to which they are to be secured by staples. When this happens, a staple penetrates only one thickness of material and the subjacent flaps are not secured to the outer panels. When this happens, an operator usually presses the stapling machine against the box with great pressure, sometimes damaging the contents, but with little chance of pressing

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sufficiently hard enough to effect driving a staple through two thicknesses of material.

One of the principal objects of the present invention is to provide an improved stapling machine and one which is provided with a flap lifting blade for holding a wet or sagging inner flap upwardly against the inner surface of an outside flap so that a staple can be driven through both thicknesses of material and then clinched. Another object is to provide means which insure that two flaps will be maintained in juxtaposed position during a stapling operation performed by a machine having piercing anvils, which means can be removed if desired when stapling under ideal conditions.

Another object is to provide a new and improved magazine for feeding staples to the driving means, said magazine not requiring a separate hold-down bar over said staples. Another object is to provide improved means at the point where the staples pass from the magazine to the casing and driving means to ensure better operation.

Another object of the present invention is to provide a stapling machine which eliminates many of the parts heretofore used in stapling machines, thereby eliminating the wear and breakage which occur in said parts, and which at the same time operates more efficiently.

Another object is to provide a stapling machine which is relatively simple and cheap to make, which contains less parts which are subject to wear, which requires less repair and replacement parts, and which is positive acting at all times.

These and other objects and advantages will become apparent hereinafter.

The invention is embodied in a stapling machine of the piercing and retractable anvil type having a flap lifting blade therebelow for holding an inner flap of a box against the inner surface of an outer flap or member during a stapling operation.

The invention also consists in the parts and in the arrangement and combination of parts herein described and claimed. In the accompanying drawings, which form part of this specification and wherein like numerals refer to like parts wherever they occur:

Fig. 1 is a side elevational view of a stapling machine embodying the present invention, the flap lifting blade being attached and the handles being in their raised position, said machine shown about to pierce the upper portion of the end wall of a box so that the flap lifting blade will hold the inner flap of said box in proper position for the stapling operation,

Fig. 2 is a bottom view of the machine shown in Fig. 1, Fig. 3 is a front view thereof,

Fig. 4 is an elevational view of the rear face of the front housing after said front housing has been removed from the stapling machine, said handle members being shown in their operative position,

Fig. 5 is an elevational view of the front face of the rear housing after the front housing has been removed,

Fig. 6 is a vertical cross sectional view taken along the line 6—6 of Fig. 1,

Fig. 7 is a rear end view of the magazine,

Fig. 8 is a top perspective view of the flap lifting blade after it has been removed from the stapling machine,

Fig. 9 is a fragmentary side elevational view, partly in cross section, of a suitable bayonet type means for removably securing the flap lifting blade to the stapling machine,

Fig. 10 is a fragmentary bottom view of the magazine with the flap lifting blade removed,

Fig. 11 is a perspective view of one of the types of cardboard boxes used for packing perishables, said box having a single score along the top margin of the side and end walls, and

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Fig. 12 is a perspective view of another type of cardboard box used for packing perishables, said box being provided with a double score to provide for slight adjustment in the volumetric capacity of said box.

Referring now to the drawings in detail, it will be seen that the embodiment of the invention which has been illustrated comprises an upstanding casing 1 having sloping side edges 2, although said casing may be of any suitable shape, and a magazine 3 which extends rearwardly of said casing 1 and automatically feeds staples 4 to said casing 1.

The casing 1 comprises a front housing 5 and a rear housing 6 with stapling means 7 therebetween. The front housing 5 is provided with side flanges 8, a spacer member 9 in the upper portion thereof, side members 9a, a lower marginal spacer member 10, a central guide pin 11, and two handle pins 12 and 13. The handle pins 12 and 13 provide a pivotal mounting for the handles 14 and 15 which are of U-shaped cross-section having handle inserts 16 and 17 in the lower portions thereof. The handle inserts 16 and 17 are held in position by means of insert pins 18 and 19 and the handle pins 12 and 13. Anvils 20 and 21 are secured to said handles 14 and 15 by means of anvil screws 22 and 23 and anvil pins 24 and 25. The anvils 20 and 21 are provided with piercing ends 26 and 27 and inner or clinching surfaces 28 and 29.

A driving blade 30 is provided in the plane of and between said anvils 20 and 21 and is adapted to move vertically upon operation of said handles 14 and 15. The driving blade 30 is provided with a vertical slot 30a into which the guide pin 11 extends. The upper portion of said driving blade 30 is secured to a yoke 31 having bifurcated laterally extending ends 32 and 33 which hold yoke pins 34 and 35 on which links 36 and 37 are pivotally mounted. The lower ends of the links 36 and 37 are pivotally mounted in said handles 14 and 15 on lower link pins 38 and 39 at a point upwardly from said handle pins 12 and 13 and substantially on a line between said anvils 20 and 21 and said yoke pins 34 and 35 when the parts are in their operating position. The links 36 and 37 are provided with spring pins 40 and 41 which hold a coil spring 42.

The upper ends of the handles 14 and 15 are provided with ball handles or knobs 43 secured thereto by means of a handle insert 44 having a threaded knob screw 45, said insert 44 being held in position within the U-shaped handles 14 and 15 by handle pins 46.

The rear housing 6 is provided with side flanges 47, holes 48 in the lower portion thereof, two parallel upstanding guides 49 and 50 for guiding the driving blade 30 during its vertical upward and downward movement, and a U-shaped opening 51 corresponding in shape to the staples 4 which are received from the magazine 3. As shown in Fig. 5, the guides 49 and 50 are secured to the front face 53 of said rear housing 6 by means of guide pins 54. The rear face 55 of the rear housing 6, as best shown in Fig. 6, is provided with flanged strengthening members 56 of suitable shape with a staple guide 57 therebetween. The staple guide 57 is provided with side flanges 58, two rearwardly and slightly upwardly extending lower flanges 59 and a forwardly extending flange 60. The strengthening members 56 are suitably secured to the rear face 55 to which are also secured rear braces 61. Three removable screws 62 hold the front housing 5 and the rear housing 6 together with the hereinbefore described stapling parts therebetween. To remove the front housing 5 from the rear housing 6, only the three screws 62 need be removed.

The magazine 3 comprises a U-shaped outer channel 63 having an inner channel 64 secured therein in parallel relation thereto, said inner channel 64 having an open forward portion which is closed by a wear plate 65 positioned in the plane of the rear housing 6 and flush with the front face 53. The U-shaped outer channel

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63 has a bottom 66 and two upstanding sides 67, each provided with a ledge or projection 68 thereby dividing the U-shaped outer channel 63 into a relatively wide lower portion 69 and a narrower upper portion 70. No hold-down bar or other means over said staples is required if flanges 59 and 60 are provided to keep the staples in proper orientation prior to their passing through the U-shaped opening 51.

A pusher 71 is slidably mounted in said magazine 3 and comprises a top portion 72 having a pusher handle 73 thereon and two downwardly extending sides 74, each having a projection 75 thereon which fits beneath the ledge 68 of said outer channel 63. The pusher 71 has a tab 76 extending downwardly for receiving one end of a feed rubber band 77, the opposite end of which is held in position by a pin 78 secured to the rear portion of the inner channel 64. A roller 79 is rotatably mounted in the forward portion of said inner channel 64 about which said rubber band 77 is reënt. Holes 80 are provided in the inner channel member 64 for initially receiving said roller 79.

A reinforcing plate 82 is provided adjacent to the bottoms of the inner and outer channel members which are provided with threaded holes 83 for receiving a flap lifter blade B which is removably secured to said staple machine. The blade B, as best shown in Fig. 8, which is relatively flat, comprises a body portion 84 separated from a piercer 85 at the forward end thereof by a pair of slots 86 with a neck portion 87 therebetween thereby forming a portion of reduced width in the blade B. The slots 86 are positioned to receive the anvils 20 and 21 when said anvils are in their clinching position. The piercer 85 is provided with a point 88 and two angularly positioned edges 89 having bevels 90 thereabove. Bevels 91 are also provided on the rear of said piercer 85 and on the front of said body 84. The body 84 is provided with two securing means 92 each comprising a bolt 93, a spacer 94, and a retaining ring 95 to prevent said spacer 94 from falling from said bolt 93 when said blade B is removed from the staple machine. The spacers 94 may be of any desired length, but are preferably slightly greater in length than two thicknesses of the material which is to be stapled, as best shown in Fig. 1, wherein a fragmentary portion of a box is shown, said box having an end wall 96, an inner flap 97, and an outer flap 98.

The piercer 85 extends forwardly of the plane of the handles 14 and 15, and the front housing 5 is therefore provided with a nose 99 and an inner nose 100 which protect the operator from accidentally injuring himself with the sharp piercer 85 when the machine is not in operation, and which act as guides and holders when the machine is being used to staple flaps together.

In order to operate the stapling machine, staples 4 are first inserted into the magazine 3 by moving the pusher 75 to the extreme rear of the magazine 3 against the action of the rubber band 79. The projections 75 on the sides 74 of the pusher 71 prevent the pusher from tilting or lifting upwardly since said projections 75 abut against the ledges 68 on the outer channel 63.

With the stapling machine loaded, it may be used either with or without the removably secured flap lifter blade B. When used without said blade B, the stapling machine is placed over the carton or container to be fastened by grasping the ball handles 43 with both hands which are then forced outwardly and downwardly. This forces the handles 14 and 15 outwardly and downwardly thereby causing said driving blade 30 to move downwardly and drive a staple 4 through the material and causing the piercing ends 26 and 27 of the anvils 20 and 21 to pierce the material. Continued movement of the handles causes the clinching surfaces 28 and 29 of the anvils 20 and 21 to engage the lower ends of the staple 4 and bend them into the fastening position shown in the Fig. 4. In particular, as the handles 14 and 15 are pivoted about their respective handle pins 12 and 13, the lower link pins

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38 and 39 move outwardly and downwardly thereby causing the yoke 31 and the driving blade 30 to move downwardly. The driving blade 30 is guided by the guides 49 and 50 and contacts the upper surface of a staple 4 which has been forced through the opening 51 in said rear housing 6 by the pusher 71. Continued movement of the handles 14 and 15 causes said driving blade 30 to force the staple 4 through the single or double thickness of material and causes the ends of the anvils 20 and 21 to pierce the material and then rebend the ends of the staple 4. The handles 14 and 15 are then brought together with the help of the coil spring 42 thereby retracting the anvils from the material, and moving the driving blade 30 upwardly thereby uncovering the opening 51 and allowing the pusher 71 to feed another staple 4 through the opening 51. The next stapling operation is performed in the same manner by placing the stapling machine over the material to be fastened and pushing the handles 14 and 15 outwardly and downwardly thereby automatically holding the stapling machine in position throughout the stapling operation.

In the inoperative position, the upward movement of the handles 14 and 15 is limited when the inner edges of said handles abut against the bifurcated ends 32 and 33 of said yoke 31. In the operative position, as shown in Fig. 4, the downward movement is limited by the material and the staple in most instances and by the rearwardly extending portions of the lower link pins 38 and 39 abutting against the sloping edges of the lower spacer member 10 in the remaining instances.

With this construction, the slightest movement of the handles 14 and 15 causes an instantaneous and positive movement of the anvils 20 and 21 with great mechanical advantage regardless of whether the parts are new or worn. The anvils 20 and 21 are so shaped and positioned on the handles 14 and 15 that they first pierce the material by moving substantially downwardly and then move toward each other thereby bending or clinching the end portions of the staples and producing the smallest puncture possible in the material, while the driving blade 30 is simultaneously moving downwardly. Because of the relative positions of the hands of the operator with respect to the anvils and handles, the driving blade, and the links, the operator directly and positively causes said anvils to pierce the material and bend the ends of the staple with great mechanical advantage while at the same time automatically causing said machine to remain in the proper position with respect to the material to be fastened.

When stapling boxes of perishables in the field under circumstances where the boxes are wet or are not fully packed with the result that the inner flaps of the boxes sag, it is desirable to attach the flap lifter blade B. This is done merely by screwing the bolts 93 into the threaded holes 83 in the bottom of the magazine 3.

The staple machine can then be used as best shown in Figs. 11 and 12 wherein two types of boxes normally used for packing perishables are shown. Fig. 11 shows a half slotted carton 101 having side walls 102 with outer cover flaps 103 thereon and end walls 104 with inner cover flaps 105 thereon. The right portion of said carton has been stapled, leaving a slot 106 formed by the blade B which was inserted to keep the inner cover flap 105 upwardly against the outer cover flaps 103. The staple machine is shown in Fig. 11 with the blade B thereof about ready to pierce the upper portion of the end wall not shown to keep the left inner cover flap 105 upwardly in the position shown during the stapling operation. Obviously, this machine can be used to staple full slotted cartons or any other types of paperboard or fibreboard cartons.

Fig. 12 shows another type of carton commonly used. This carton 107 has end walls 108 with inner cover flaps 109 foldably connected thereto by means of scores 110, said inner cover flaps 109 having a second score 111 parallel to and spaced about one inch from said score 110.

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The side walls 112 have outer cover flaps 113 foldably connected thereto by means of a score 114, said outer flaps 113 having a second score 115 parallel to and spaced about one inch from said score 114. The purpose of the second scores 111 and 115 is to provide for volumetric adjustment of the carton to accommodate perishables which vary in size. In Fig. 12, the machine is shown with the forward portion of the blade B under one outer cover flap 113 and one inner cover flap 109 while the rear portion of said blade B extends over the opposite outer cover flap 113. In this position, a diagonal row of staples can be driven between the inner and outer cover flaps thereby securely closing said container.

The blade B can be used only in combination with a staple machine which has a movable anvil which is capable of closing a carton or box from the top. The ordinary hinged type anvil present on most staple machines is unsuitable for present purposes since the anvil therein must be properly aligned at all times to receive and clinch the staples and since such an anvil cannot be inserted beneath the inner flaps of a closed carton.

Figs. 9 and 10 show a modified means for removably securing the flap lifting blade B to the stapling machine, said means comprising a suitable bayonet type joint. With such means, the blade B is provided with two studs 116 each having a head 117 thereon which retains spacers 118 on the studs 116 when the blade B is not attached. Referring to Fig. 9, the bottom of the inner channel member 64 is provided with a locking spring 119 secured thereto by a rivet 120. The holes 83a in said channel members have enlarged forward portions 121 adapted to receive the heads 117 of the studs 116 and elongated rear portions 122 into which said studs 116 can be pushed to secure said blade B to the stapling machine. The heads 117 are maintained in their rearmost position by the locking spring 119, which is raised initially when the heads 117 are inserted through the enlarged portions 121. Fig. 9 shows the blade B after it has pierced the end wall 96 of a carton so as to hold an inner flap 97 upwardly against an outer flap 98 to which it will be stapled. Obviously, other modified means can be used if desired to removably secure the blade B to the stapling machine.

This invention is intended to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

What I claim is:

1. A stapling machine having retractable anvils therein for stapling closed containers having outer and inner panels with staples, and means removably secured beneath said stapling machine for piercing a container wall and maintaining said outer and inner panels in juxtaposed relation during a stapling operation, said means being adapted to pierce an angularly positioned panel to maintain said outer and inner panels in juxtaposed relation, said means being free from contact by said staples and anvils.

2. A stapling machine for clinching a staple from the same side from which it is driven for stapling containers having outer and inner panels which have been folded into closed position, said stapling machine having a casing with retractable anvils therein and rearwardly extending means for feeding staples to said casing, and longitudinal means secured beneath said rearwardly extending means in spaced relation thereto for maintaining said outer and inner flaps in juxtaposed relation during a stapling operation, said longitudinal means being free from contact by said staples and anvils.

3. A stapling machine for clinching a staple from the same side from which it is driven, said stapling machine comprising a casing, anvils retractably mounted in said machine and positioned to extend downwardly beyond said casing when said stapling machine is actuated to drive a staple, and a blade removably secured to said

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machine, said blade mounted below said casing in spaced relation thereto for maintaining the inner flap of a box in a lifted position during a stapling operation, said blade being free from contact by said anvils and staple.

4. A stapling machine for clinching a staple from the same side from which it is driven, said stapling machine comprising a casing having retractable anvils therein, said anvils extending downwardly beyond said casing when said stapling machine is actuated to drive a staple, said casing having means extending rearwardly therefrom, a flap lifting blade attached to said means in spaced parallel relation thereto, said blade having a piercer at the forward end and a body portion rearwardly thereof, said body portion being secured at the rear thereof to said means and being free from contact by said anvils and staple.

5. A stapling machine for clinching a staple from the same side from which it is driven, said stapling machine comprising a casing and means extending rearwardly therefrom, said casing having retractable anvils therein which extend beyond said casing when said machine is actuated, and a flap lifting blade secured to said rearwardly extending means in spaced parallel relation thereto, said blade being spaced from said means and casing a distance not less than twice the thickness of the material being stapled, said blade having a piercer portion extending forwardly of the plane of said anvils, said blade having a portion of reduced width directly beneath said anvils and an elongated body portion secured at the rear portion thereof to said rearwardly extending means.

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6. A stapling machine for clinching a staple from the same side from which it is driven, said stapling machine comprising a casing and a magazine extending therefrom, said casing having retractable anvils therein which extend beyond said casing when said machine is actuated, and a relatively thin flap lifting blade removably secured to said magazine in spaced parallel relation thereto, said blade being spaced from said magazine and casing a distance not less than twice the thickness of the material being stapled, said blade having a piercer portion extending forwardly of the plane of said anvils, said blade having a portion of reduced width directly beneath said anvils and an elongated body portion secured only at the rear portion thereof to said magazine at a point on said magazine rearwardly and remotely spaced from said anvils thereby forming a relatively long throat portion.

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