Aug. 30, 1932. W. B. RANNEY 1,874,622

STAPLING MACHINE

Filed March 2, 1931 7 Sheets-Sheet 1

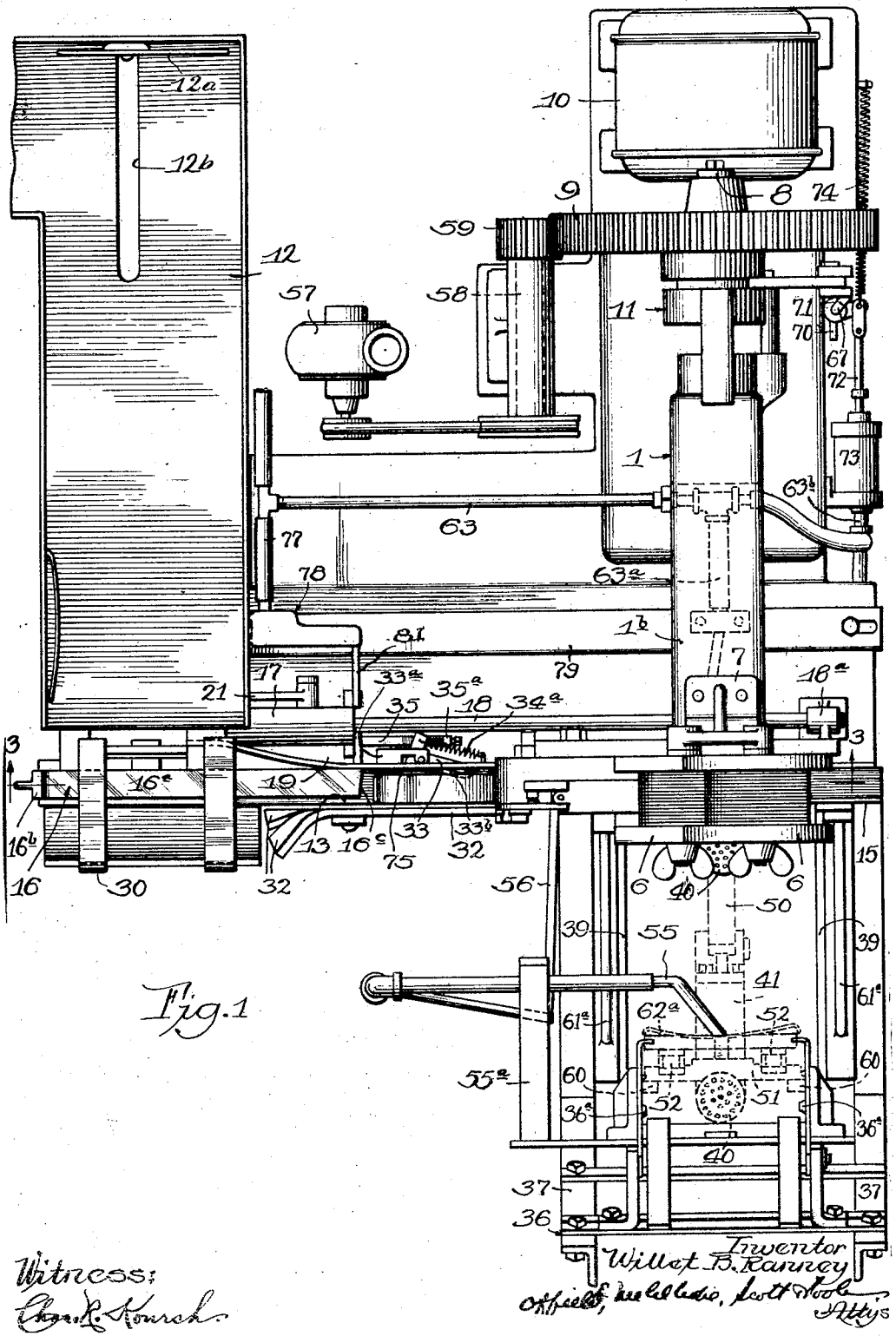


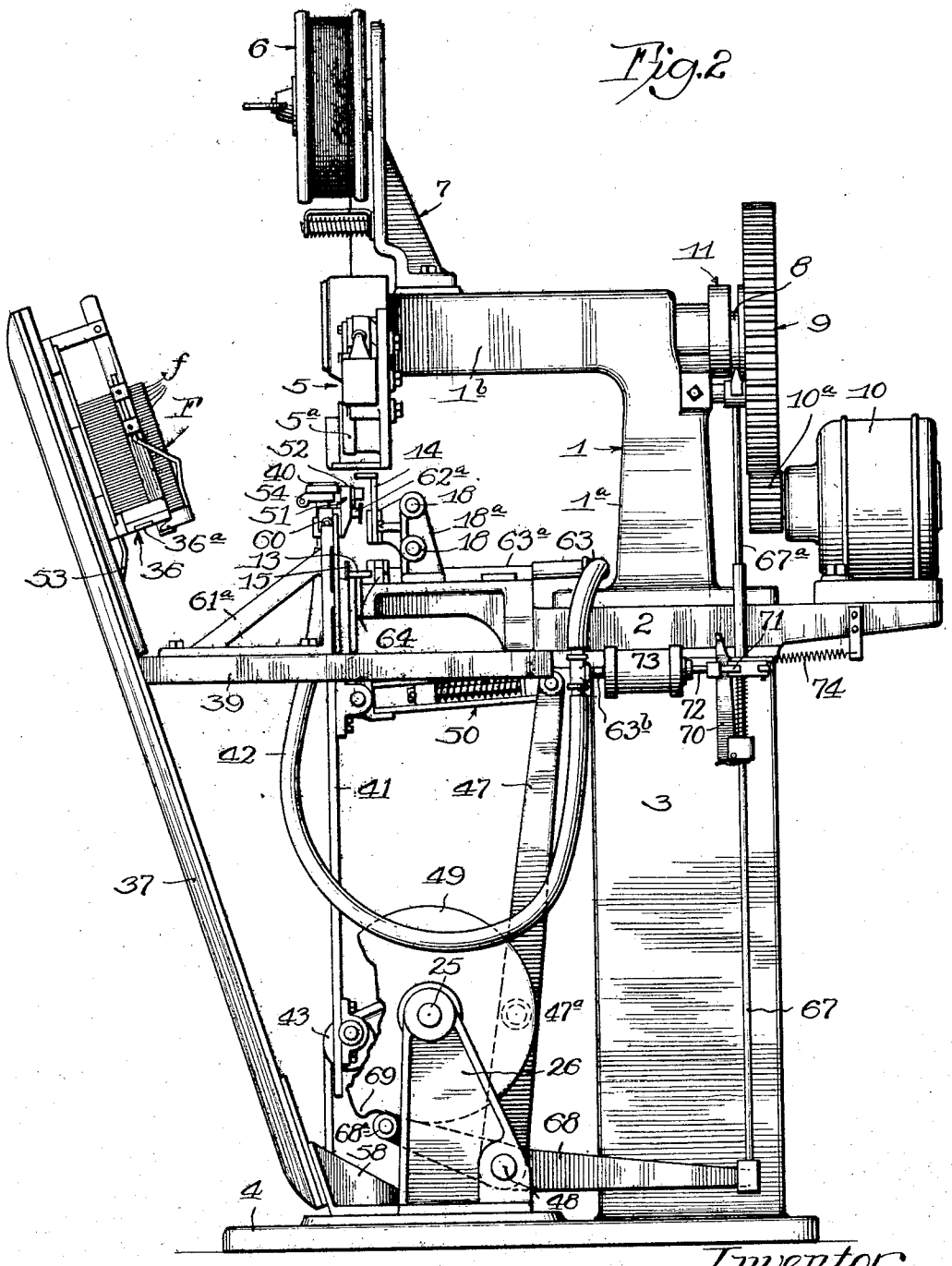
Fig. 1

Aug. 30, 1932. W. B. RANNEY 1,874,622

STAPLING MACHINE

Filed March 2, 1931 7 Sheets-Sheet 2

Fig. 2



Inventor,
Willet B. Ranney
by Reed, McCabe, Reed & Cook
Attys

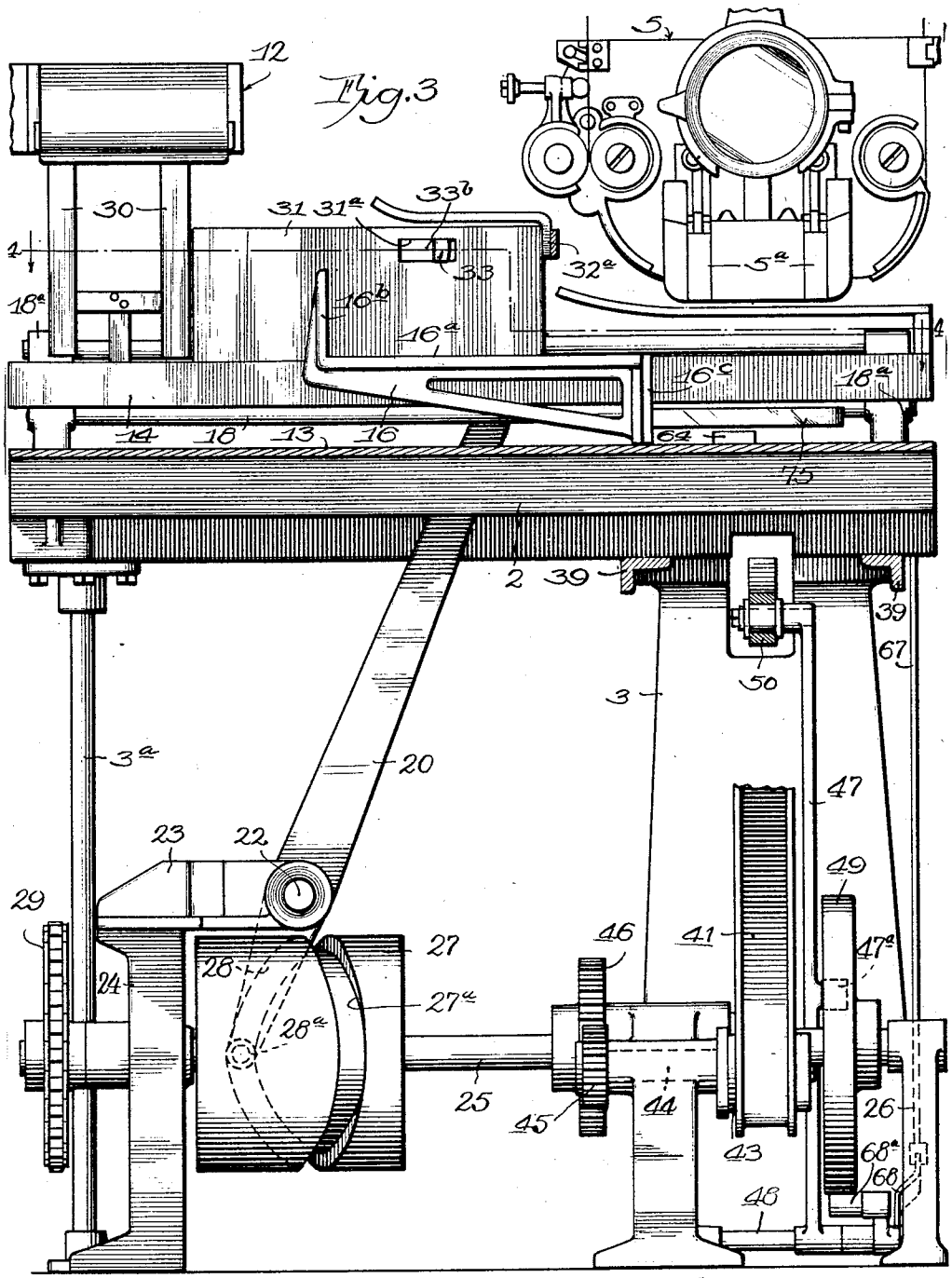
Witness:
Chas. P. Kourish.

Aug. 30, 1932. W. B. RANNEY 1,874,622

STAPLING MACHINE

Filed March 2, 1931 7 Sheets-Sheet 3

Fig. 3



Witness:
Chas. R. Komsh.

Inventor,
Willet B. Ranney,
Offield, McCobb, Rivers & Cole
Attys

Aug. 30, 1932. W. B. RANNEY 1,874,622

STAPLING MACHINE

Filed March 2, 1931 7 Sheets-Sheet 4

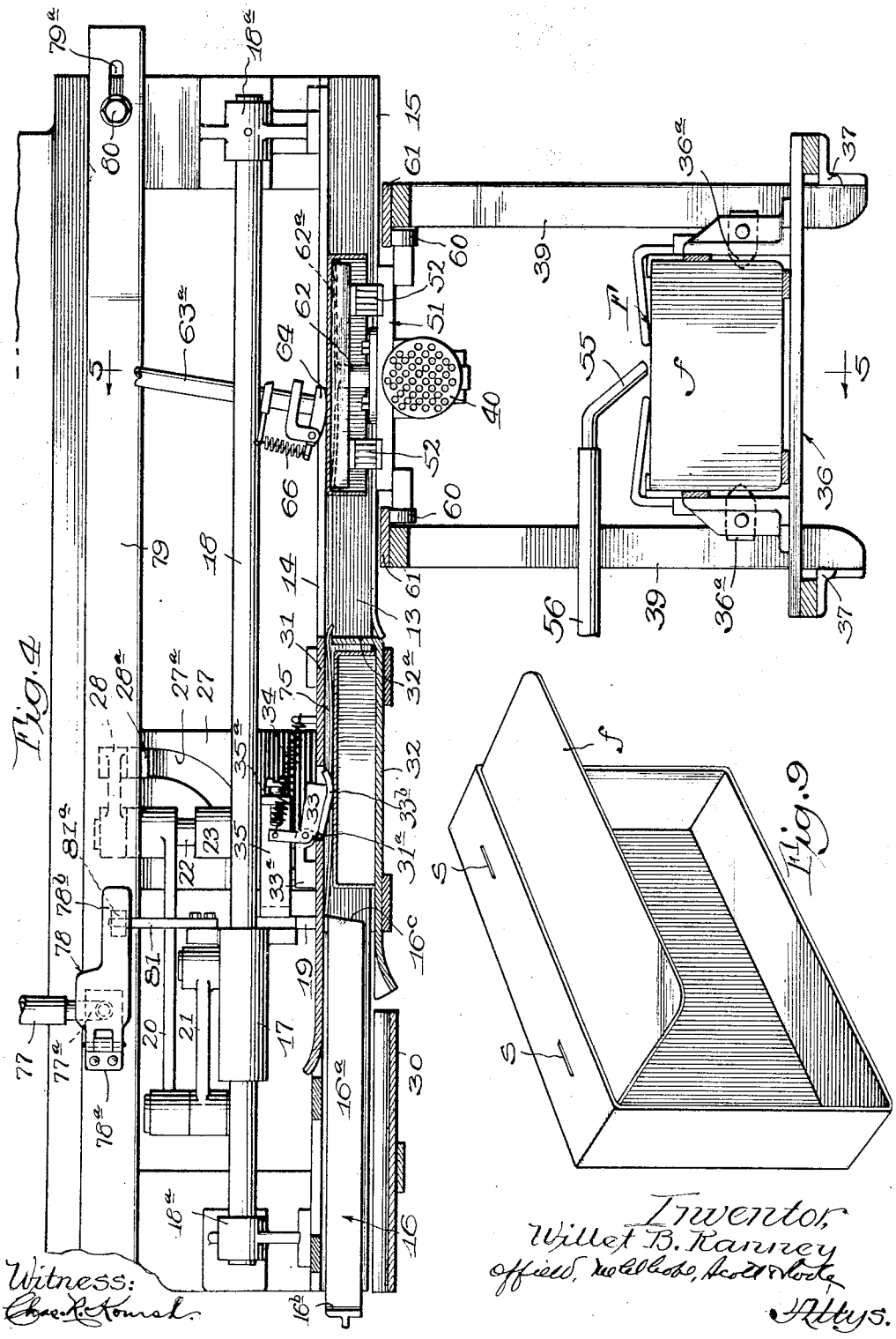


Fig. 4

Fig. 9

Witness:
Chas. K. Komal

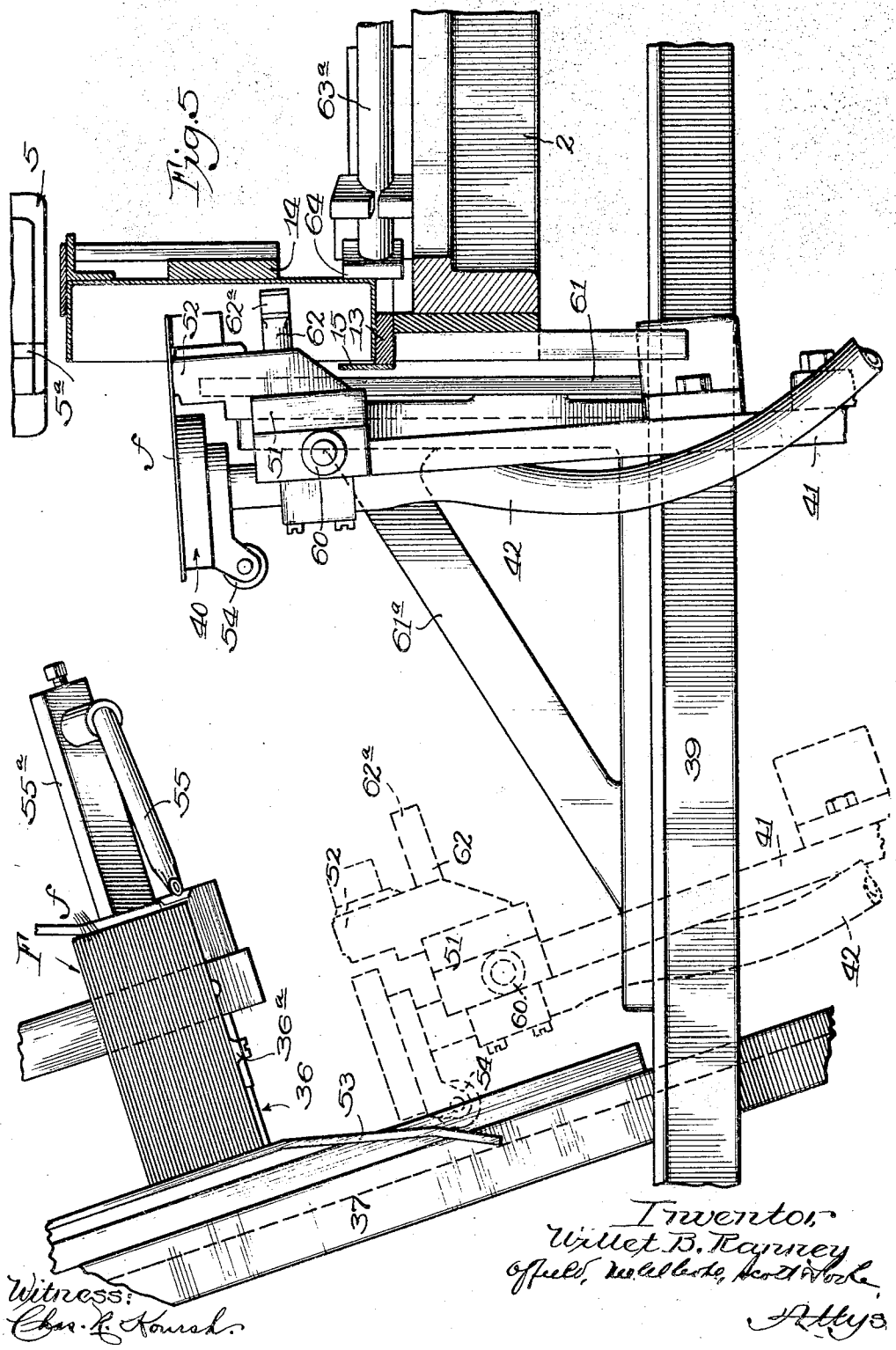
Inventor,
Willet B. Ranney
offield, Middlebrooks, Scott & Rooks
Attys.

Aug. 30, 1932. W. B. RANNEY 1,874,622

STAPLING MACHINE

Filed March 2, 1931 7 Sheets-Sheet 5

Fig. 5



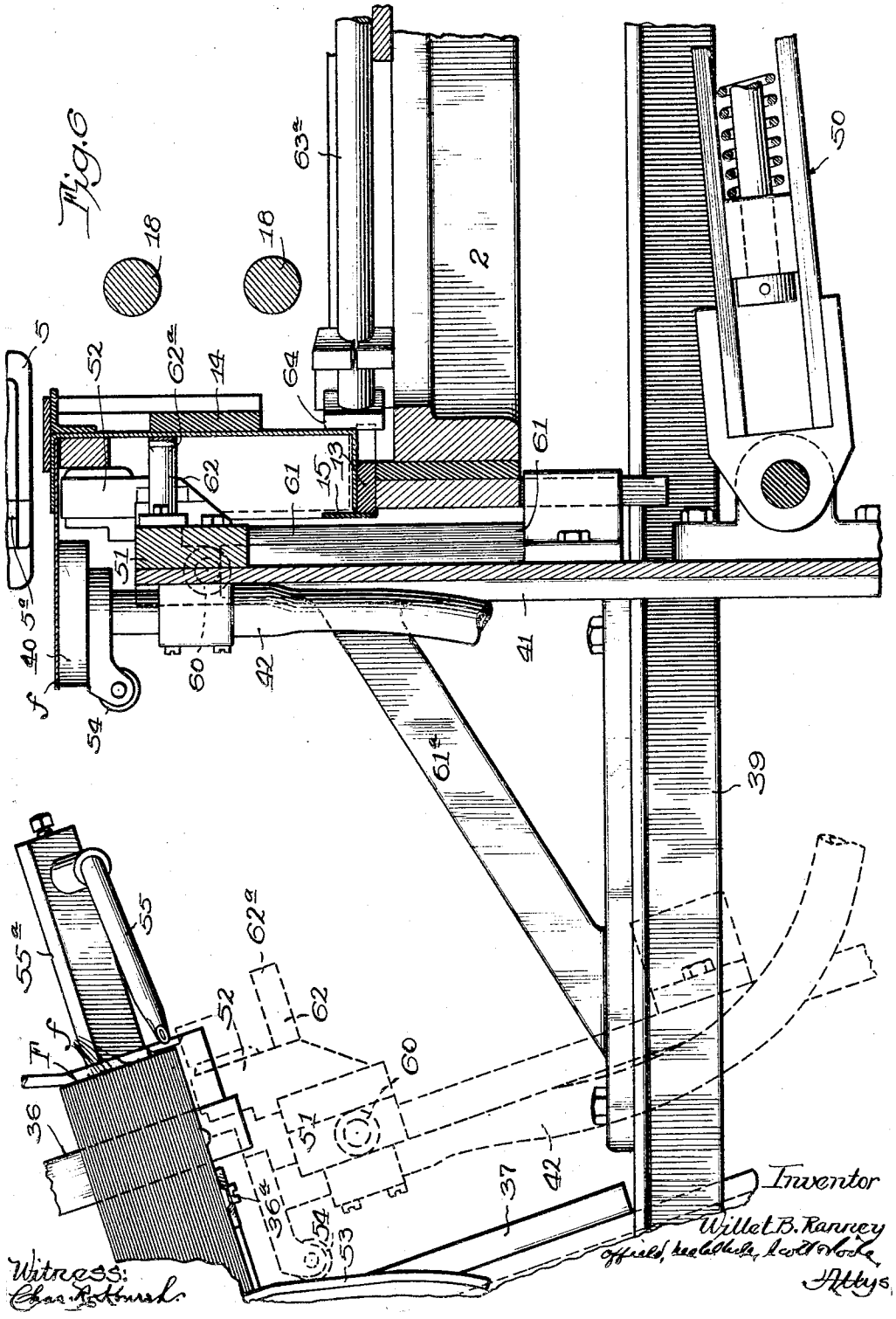
Witness:
Chas. L. Kourek.

Inventor:
Willet B. Ranney
by Fuld, Millbank, Scott & Fuld
Attys

Aug. 30, 1932. W. B. RANNEY 1,874,622

STAPLING MACHINE

Filed March 2, 1931 7 Sheets-Sheet 6



Aug. 30, 1932. W. B. RANNEY 1,874,622

STAPLING MACHINE

Filed March 2, 1931 7 Sheets-Sheet 7

Fig. 7

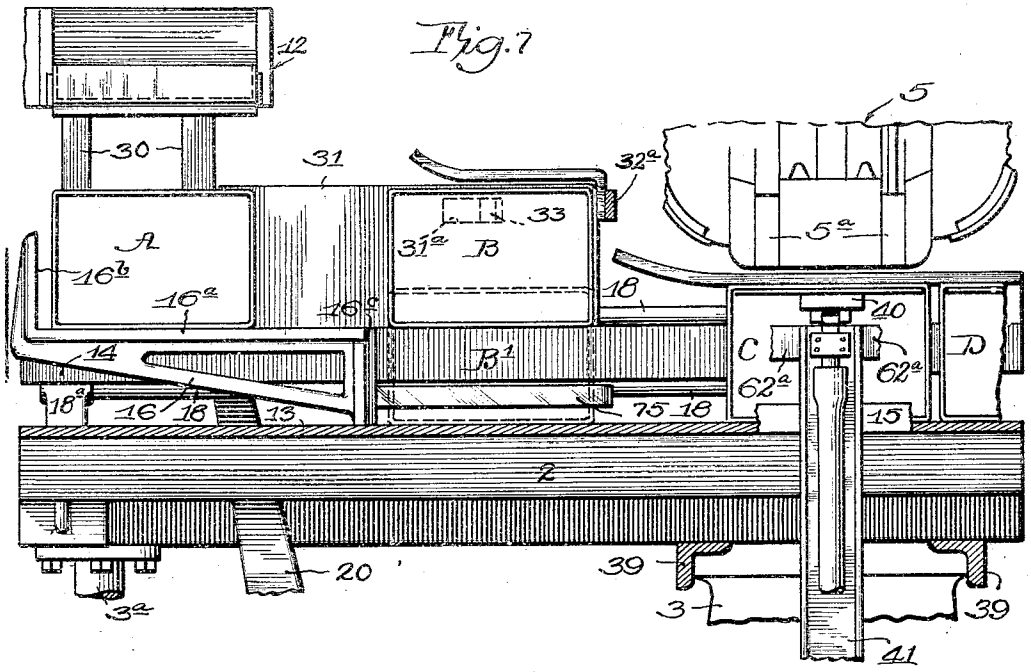
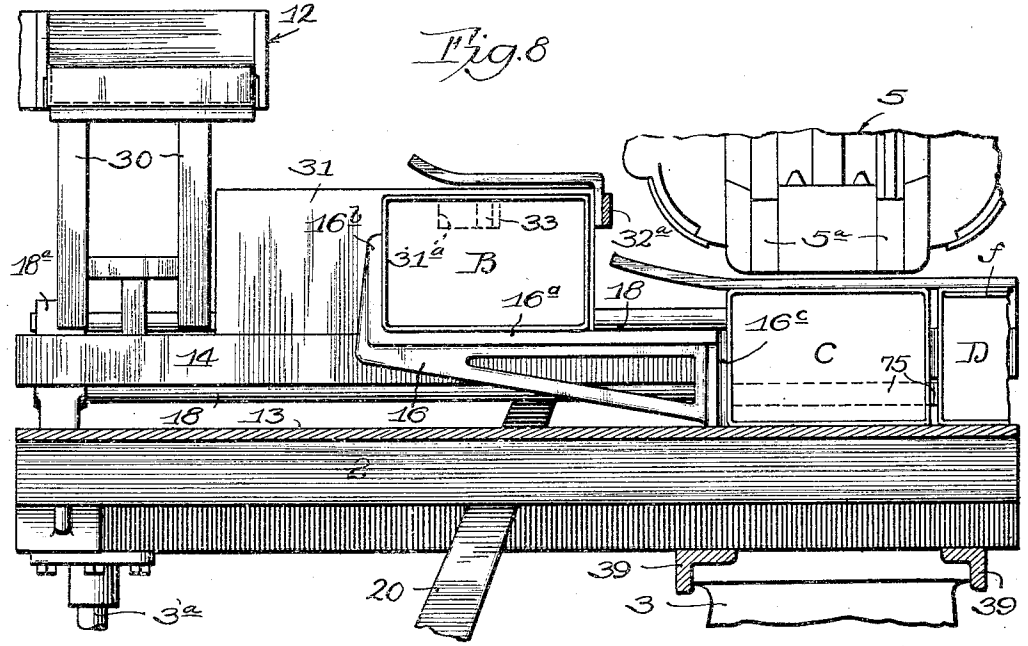


Fig. 8



Witness:
Chas. L. Tousch.

Inventor,
Willet B. Ranney,
by Dickey, McCaleb & Hoge, Atty's Hoge
Attys.

Patented Aug. 30, 1932 1,874,622

UNITED STATES PATENT OFFICE

WILLET B. RANNEY, OF CHICAGO, ILLINOIS, ASSIGNOR TO WM. WRIGLEY JR. COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

STAPLING MACHINE

Application filed March 2, 1931. Serial No. 519,346.

This invention relates to improvements in stapling machines, and more particularly to an automatic machine for assembling and fastening parts of boxes and like articles with greater efficiency and increased production than is possible with the more common hand feeding types of stapling or stitching machines, in that it eliminates the manual labor and is more rapid and continuous in its operation.

The machine of the present disclosure is one especially designed for the operation of stapling cardboard panels or cards to boxes later to be filled with packaged goods. The cards are folded over the contents during shipment, and serves as a display sign when the goods are on sale. However, the same mechanism may be utilized for other automatic stapling, stitching or fastening operations.

A preferred embodiment of the invention is disclosed in the accompanying drawings, in which:

Figure 1 is a general top plan view of the machine.

Figure 2 is a view in end elevation of the machine.

Figure 3 is a view of the machine in vertical section as taken on line 3—3 of Figure 1.

Figure 4 is an enlarged detail view in horizontal section as taken on line 4—4 of Figure 3.

Figure 5 is an enlarged detail view in vertical section as taken on line 5—5 of Figure 4 showing the positions of the card transfer member in approaching the end of its movement to and from stapling position.

Figure 6 is a view similar to Figure 5 showing the transfer member in stapling position and about to remove a card from the bottom of the stack in the magazine.

Figures 7 and 8 are diagrammatic views showing the progress of the boxes through the machine, and

Figure 9 is a perspective view of a finished box with its fly stapled in place.

Referring to the general arrangement of the machine, Figures 1, 2 and 3, the stapling or stitching mechanism is more or less standard in its design, consisting of a hollow L-shaped frame 1 supported upon a table 2 which in turn is supported upon a pedestal 3 beneath the base of the L-frame having a base plate 4 extending well forwardly beyond the stapling head 5 mounted at the end of the horizontal arm 1*b* of said frame. The stitching or stapling head 5 is of standard construction and design, and therefore will not be described in detail, other than to point out that it is preferably of the duplex type, that is, capable of driving two staples on each operation, the wire being fed from two spools 6, 6 positioned above the head and mounted on a bracket 7 fixed to the arm 1*b* of the L-frame 1 to a pair of vertically arranged staple driving members 5*a*, 5*a* operating simultaneously to cut and drive the staples downwardly through the overlapping portions of the boxes and cards as they are succesively advanced and assembled beneath the stapling head. The stapling mechanism is driven through a shaft 8 extending lengthwise of the horizontal arm 1*b* of the L-frame, and having a large gear 9 loosely mounted on the rear end thereof. This gear wheel has direct driving connection with a motor 10 mounted at the rear of the table 2 and having a pinion 10*a* meshing with said gear wheel 9. A clutch mechanism 11 is interposed between the loose gear wheel 9 and the shaft 8, and is actuated intermittently to obtain a corresponding intermittent action of the stapling mechanism as will later be described in detail.

As clearly shown in Figure 3, the table 2 is extended longitudinally and to the left of the stapling head 5, necessitating an additional support in the form of a post 3*a* beneath the extended portion thereof. Along the forward edge of the elongated table 2 is mounted the box feeding mechanism, including generally a trackway leading to and beyond the stapling head 5, and means for advancing the boxes successively along the trackway and into stapling position.

Before the cards, or flies as they are called, are stapled to the boxes, the latter are shallow open cardboard containers which preferably have been covered or coated with a surface wrapper in any standard wrapping machine. In fact, it is preferable, although not neces-

sary, to discharge the boxes from the wrapping machine to the stapling machine without an intermediate handling, by providing a wide connecting track 12 supported above the receiving end of the machine and extending rearwardly therefrom and at right angles as shown in Figure 1. Near the rear of the forwardly extending portion of the track is a reciprocating pusher blade 12*a* moving in a slot 12*b* in the bottom of the track. Thus as each box is discharged from the wrapping machine sliding endwise on its bottom, it is deposited in front of the pusher blade 13 just as it advances forwardly with a quick movement, so that without turning the box it reaches the end of the track in the transverse position shown in Figures 7 and 8.

Now, immediately below the delivery track 12 and extending along the front edge of the table 2 is a narrow upwardly facing trackway 13 extending the full length of the machine and beneath the stapling head. The track is defined between upright guide bars, the rear bar 14 being straight and extending along the rear edge of the track surface (Figure 3) and while the front guide bar 15 is relatively narrow and extends throughout the section immediately below the stapling head, there being other guide plates for directing the path of the boxes as they approach the stapling position. Moving longitudinally of the space above the trackway 13 is a reciprocating carrier 16 consisting of a light metal casting having a horizontal edge portion 16*a* forming a support for the boxes on edge and two vertical portions 16*b* and 16*c* forming pusher members at each end. The carrier is fixed to a sliding carriage 17 traveling on a pair of spaced rods 18, 18 extending the length of the table 2 and immediately to the rear of the trackway 13, and supported at their ends in brackets 18*a*, 18*a*. The carriage 17 has the form of a pair of connected sleeves having a short transverse arm 19 at its forward end connected with the adjacent end of the box carrier 16 (Figure 4).

The carriage is actuated through mechanism consisting of an upright rocking lever 20 connected at its upper end with the carriage by a short link 21, and mounted at its lower end on a stub shaft 22 journalled in a bracket 23 mounted on top of a bearing standard 24 fixed to the floor adjacent the left end of the machine (Figure 3).

A drive shaft 25 is journalled at one end in said bearing standard 24 and at its opposite end in a similar bearing standard 26, and fixed to this shaft is a cylindric cam 27 having a groove 27*a* engaged by a cam roller 28*a* at the stub shaft end of a rocker arm 28, whereby a rocking movement is imparted to the lever 20 and a reciprocating movement to the carrier 16. The shaft 25 is driven from a motor or other suitable source of power, as by a chain drive, the sprocket wheel 29 being mounted at one end of the shaft.

As already explained, the boxes are pushed to the end of the upper track 12, and on reaching this point, negotiate a downward turn which deposits them on edge upon the carrier 16 which at the instance is in its starting or retracted position opposite the end of said track 12. In this passage the boxes are guided by a pair of upright guide bars 30, 30 which extend forwardly and then curve rather sharply in a downward direction, at the same time deflecting rearwardly toward the top edge of the carrier so that each box comes to rest upon the carrier 16 on edge with its open side facing outwardly, as shown in position A, (Figure 7), the carrier immediately moving laterally toward the stapling head carrying the box to the position B, (Figure 8).

Now, immediately behind the path of the boxes in their movement on the carrier 16, and extending upwardly from the rear guide rail 14 is a rectangular plate 31 somewhat longer than the boxes, but of practically the same width. Opposite this plate are guide bars 32 forming therewith a walled space into which the boxes enter in passing from positions A to B, the bars being bent at their ends to provide stops 32*a* extending across their paths to bring the boxes to rest in position B.

Near the top edge of the rear plate 31 is a slot 31*a* through which projects one arm of a spring actuated presser foot 33 having the form of a bell-crank lever pivotally mounted on a bracket 33*a* fixed to the back of the plate at the forward end of the slot (Figure 4). One arm of the lever forms a shoe 33*b* which normally projects edgewise through the slot into the path of the boxes and held normally in that position by a spring 34 connected with the shorter arm of said lever.

Fixed to the forward end of the sliding carriage 17 is a bar 35 projecting forwardly beyond the carrier 16 which is also part of the reciprocating box feeding mechanism. The end of this bar is turned upwardly and carries an adjustable abutment screw 35*a* adapted to engage the rearwardly projecting arm of the presser foot lever 33 to swing the shoe 33*b* out of box engaging position just at the instant that the box carrier has reached the end of its return stroke (Figure 7). Thus it will be observed that as each box reaches the position B (Figure 8) at the end of the forward stroke of the carrier, it is held in that position by the presser foot forcing it against the front guide bars 32, whereupon the carrier returns to its starting position, leaving the box suspended in position B until the presser foot is released by the contact member 35*a*, whereupon it drops by gravity onto the trackway 13 to position B′, just as the next box is deposited onto the carrier in position A. The box in position B′ (Figure 7) is thus dropped in

front of the front pusher 16c of the carrier, so that as the carrier moves forwardly it simultaneously advances the preceding box from position B' to C, and the following box from position A to B. Now, position C is directly beneath the stapling head 5 in which the boxes are stationed during the stapling operation. Manifestly as each box is advanced into stapling position C, it pushes the one ahead of it out of that position into position D.

And finally on reaching the station beneath the stapling head (position C) a card or fly is assembled or applied to the box just before the stapling head drives the staples and the operation is completed (see Figure 9). The mechanism for feeding the cards or flies will now be described:

Immediately in front of the stapling head is a magazine 36 mounted at the upper end of a frame made up of angle bars 37, 37 extending forwardly and upwardly at an angle of approximately 30° to the vertical and anchored at their lower ends to a bracket 38 bolted to the forward edge of the base plate 4, and supported by a brace member 39 extending forwardly from the table 2. The magazine 36 is an open rack in which a stack F of the cards or flies *f* is placed, the stack owing to the inclination of the magazine supporting frame being also inclined so that the plane of the bottom of the stack is about 30° to the horizontal. The bottom of the magazine is open so that the lowermost card is always exposed from below, the stack being held merely by short inwardly projecting fingers 36*a* (Figure 4).

Now, moving in a path between the bottom of the magazine 36 and a position below and adjacent the stapling head 5, is a suction actuated transfer member in the form of a cylindric head 40 mounted at the upper end of a vertical bar 41 adapted to travel back and forth with a combined oscillating and endwise movement between the magazine and the stapling head. The suction head 40 is essentially a hollow cylindric member having a perforated face directed upwardly and a hose 42 connected therewith which leads to a source of reduced air pressure such as a compressor. Thus when the suction head is brought into contact with the bottom of the stack in the magazine, the suction will remove the lowermost card and transport it to and into juxtaposition with the wall of the box just as the latter reaches its station beneath the stapling head.

Now, referring to Figures 2, 3 and 5, the suction head derives its motion through the following mechanism: The vertical bar 41 which carries the suction head extends downwardly to a point just forwardly of the driven shaft 25, where it has pivotal connection with an eccentric crank pin 43 at one end of a counter-shaft 44 driven from the main shaft 25 through a pinion 45, meshing with a gear wheel 46 on said shaft 25 (Figure 3). The throw of the crank is relatively small but sufficient to impart the required endwise movement to the supporting bar 41. An oscillating or rocking movement is imparted to the bar 41 through a cam actuated rocker arm 47 pivotally mounted at its lower end on a bearing shaft 48 (Figs. 2 and 3) and carrying a cam roller 47*a* near its lower end which coacts with a plate cam 49 mounted on the shaft 25 to impart a rocking motion to said lever. The upper end of the lever is connected with the bar 41 a short distance below the suction head through the medium of a horizontal link 50 of a spring resisted extensible form.

To complete the suction feed mechanism, there is mounted at the upper end of the bar 41 just beneath the head 40 a cross bar 51 which carries a pair of anvils 52, 52, one on each side and located in alignment with the staple driving members 5*a*, 5*a* of the stapling head. These anvils are of the usual shape employed in stapling machines and serve to turn the prongs of the staples inwardly after they have been driven through the layers being stitched or bound together.

Referring now to Figures 5 and 6, the movement of the suction head as it travels toward the magazine 36 is in a general outward and downward direction until it reaches the position shown in dotted lines in Figure 5. At this point the rocking movement ceases momentarily and the endwise movement becomes effective through the crank motion, thus elevating the suction head almost in a straight line into contact with the lowermost card of the stack as shown in dotted lines in Figure 6. This upward movement of the suction head is partially assisted or directed by a guide bar 53 depending from the outer edge of the magazine and a roller 54 mounted caster-like just below the suction head 40, and positioned so that it comes into contact with the guide 53 and thus directs the suction head into contact with the bottom of the stack in the magazine, whereby the lowermost card is removed, preparatory to being carried forwardly to the stapling head.

To aid in the removal of the cards from the magazine, it is preferred to direct a stream of air from a nozzle 55 between the last few cards, thus separating them sufficiently to insure the removal of the bottom sheets by suction and against any adhesion that might prevent removal. The air nozzle is supported by a suitable bracket 55*a* mounted on the magazine, and an air supply hose 56 leads to a small auxiliary air pump 57 (Figure 1) belt driven from a counter-shaft 58 connected with the main drive shaft of the stapling head through a pinion 59 meshing with the gear wheel 9.

Now, the movement of the suction head toward the stapling head is a rocking motion which brings it first to a position directly below but spaced from the head (Figure 5) and thence moves vertically into stapling position with the marginal portion of the card *f* projecting into and lying flatwise against the inside of the upper side wall of the box, as shown in Figures 6 and 9. As a means of guiding the suction head to its position beneath the stapling head, rollers 60, 60 are mounted on the ends of the cross bar 51 which carries the anvils 52, these rollers engaging a pair of vertical guide rails 61, 61 supported by angle brackets 61*a* mounted on the magazine frame brace 39. Also to aid in holding the boxes immovable during the stapling operation, a fixture 62 is mounted centrally of the cross bar 51 and adapted to register with the central portion of the box, said fixture having laterally projecting curved spring fingers 62*a*, 62*a* adapted to bear against the bottom of the box, holding it against the back rail 14 and at the same time flexing into contact with the end walls of the box, thus centering it in stapling position should there be a slight displacement.

Now, as the several driving and actuating mechanisms are timed, the stapling operation takes place the instant after each card is brought into register with the wall of the box, two staples *s*, *s* being driven through the two thicknesses of cardboard, as shown in Figure 9, the suction head holding the card during the stapling operation, and then breaking contact as it is drawn away to start its next stroke to the magazine. In the meantime the finished box is pushed onwardly to the right to position D (Figures 7 and 8), by the next box being advanced into stapling position C.

Now, as is the usual practice in the design of automatic machines, provision is made for temporarily interrupting the action of one or more of the operating parts in the event of improper feeding of the materials, in this case it being chiefly the irregularity in the feed of the boxes to the stapling head which would cause difficulty unless guarded against. Thus means are employed for venting the suction line, which renders the head 40 incapable of removing the cards from the magazine, and at the same time actuates a trip mechanism which throws out the clutch controlling the drive to the stapling head. The suction line is a pipe 63 of which the hose 42 connected with the suction head 40 of the card transfer mechanism is one branch. This pipe 63 leads from any source of reduced air pressure over the table 2 and rearwardly of the stapling head, where a branch 63*a* extends forwardly to the box stapling station (Figuree 1, 2 and 4). The open end of this branch pipe is a vent, although normally closed or sealed by a valve member 64 projecting beneath the back rail 14 and into the path of the boxes as they reach the station beneath the stapling head. As shown in Figure 4, the valve member is held over the end of the pipe 63*a* by the pressure exerted by the boxes, and also against the tension of a spring 66 acting on the valve member. Thus should a box fail to be fed into stapling position, the suction line would be vented by the uncovering of the end of the vent pipe 63*a* by the valve member 64 actuated by the spring 66, from which it follows that no card *f* would be transferred from the magazine by the suction head during the stroke which normally would have been applied to the missing box.

Now, referring again to the drive for stapling head, the clutch mechanism 11 is of the free running type, that is, it normally allows the gear wheel 9 to turn freely on the driven shaft to the head, and intermittently drives the stapling mechanism as the clutch is thrown in and out by a vertical push rod 67 extending from the clutch to the base of the machine where it is connected with a rock lever 68 journalled intermediate its ends on the bracket 26. The forward end of the lever arm carries a cam roller 68*a* bearing against the periphery of the circular plate cam 49, the same having a projection 69 acting during each revolution to rock the lever 68 and impart an upward stroke to the push rod 67. Further details of the clutch mechanism is unnecessary as it is a type used extensively in punching, stamping and stapling machines. However, the push rod 67 is divided into sections having telescoping end portions, a pawl 70 carried by the lower section of the rod (Figure 2) normally connects the two sections of the rod, but is adapted to be released by a pivoted dog 71 operatively connected with an endwise shiftable rod 72 connected with a piston within a small cylinder 73 located just forwardly of the push rod 67 and the connecting pawl 70. The head end of the cylinder connects with another branch pipe 63*b* from the main suction pipe 63, so that under normal operating conditions the suction acts to draw the piston to the left (Figures 1 and 2), and against the tension of a coil spring 74 also connected with the piston rod and exerting a force opposing that exerted by the suction within the cylinder. Now, if the suction line should be vented by the failure of a box to be fed into the stapling station, it follows that the suction would be relieved in the cylinder, and the spring 74 would then act to move the dog 71 and thus trip the pawl 70, thus disconnecting the two sections of the push rod 67. As a result the lower section of the rod would continue to move with each oscillation of the lever 68, but the upper section would remain stationary, so that the clutch 9 will not operate to throw the stapling mechanism into ac-

tion, as long as the boxes fail to be fed beneath the stapling head.

And finally, to insure the discharge of a box from the stapling station C (Figures 7 and 8), should a vacancy occur in the position B just preceding, a long thin blade 75 is attached to the forward end of the box carrier 16 (Figure 4) so that it lies between the back rail 14 of the trackway and the boxes as they travel from position B′ to C. This blade is slightly longer than the length of the boxes and is bowed just enough so that in the absence of a box it would be free to spring outwardly toward the center of the trackway. Now, in normal operation the box in position B′ is carried forward by the carrier 16 into stapling position C, and in so doing pushes the box just stapled ahead of it into position D. But if there should be a vacancy in the feed line of boxes, it follows that if there should be no box advanced from position B′, the box in position C would remain in its position and the stapling operation would be repeated, were it not for the blade 75, which, taking the place of the absent box, would abut against the finished box in position C and move it to position D, so there would be no interruption in the progress of the box immediately ahead of the vacancy.

As the operation of the machine has been described, it is contemplated that the suction exerted on the cards *f* by the head 40 of the transfer mechanism in carrying the same from the magazine 36 to stapling position beneath the stapling head 5, is not so great as to interfere with the parting or withdrawal of the head from the cards after the stapling operation, that is, without a tendency to tear the cards from the box or bend them. Ordinarily this is the case, but it may be necessary under certain conditions to insure the separation by relieving the suction for an instant just as the stapling operation takes place, this being accomplished by venting the suction line leading to the head 40 which, as already described, consists of the base 42 connected with the pipe 63 leading to a suitable source of reduced air pressure.

Referring to Figure 1, it will be noted that the suction pipe 63 is divided into branches arranged in a T, one branch pipe 76 leading rearwardly to a source of suction, and the other, a short branch pipe 77, leading forwardly to a point just rearwardly of the reciprocating cross head 17, which actuates the box feeding pusher plate 16. As shown in greater detail in Figure 4, the end of this branch base pipe 77 terminates in a nozzle-like fitting 77*a* having an upturned vent opening. Mounted adjacent this filling is a flap valve 78 in the form of a small metal plate hinged at one end on a narrow strip or plate 79 extending lengthwise of the machine parallel with the bearing rods 18, 18, and anchored to the machine frame by means of bolts 80 passing through slots 79*a* in the ends of the plate.

The flap valve member 78 extends longitudinally of the plate 79 and has a hinge 78*a* at one end and an extension 78*b* at its opposite end. The valve member normally rests upon the fitting 77*a* and closes the vent opening.

Mounted on the cross head 17 is a trip finger 81 extending rearwardly at right angles to the direction of travel of said cross head and terminating in a roller 81*a* in line with the extension 78*a* of the flap valve so that with each stroke of the cross head 17 in one direction, namely, to the left, the trip finger 81 lifts the flap valve member and uncovers the opening in the upturned end in the fitting 77*a*, thus venting the suction in the pipe 63 and the hose 42 leading to the suction head. Now this venting of the suction line is only momentary and is timed to take place just as the stapling operation is completed, thus allowing the suction head to be withdrawn from the card just stapled, and for the obvious purpose of facilitating the parting of one from the other as the suction head 40 starts its return movement toward the magazine 36 for the next card.

Thus in the machine herein disclosed, provision has not only been made for the continuous feeding and stapling of boxes and their flies, but also in guarding against faulty operation and possible damage to the machine, by automatically interrupting the action of the essential parts, should a break occur in the continuous feed of the boxes, thus permitting such a break to be corrected without causing a jam and the possible mutilation and loss of considerable material before the machine could be stopped and the condition rectified.

Having set forth a preferred embodiment of the invention, I claim:

1. In a stapling machine, the combination with stapling mechanism of a horizontal trackway extending below said stapling mechanism, means for advancing boxes intermittently along said trackway to a station beneath said stapling mechanism, a card magazine adjacent said trackway, and a card feeding member adapted to oscillate between said magazine and the position of said boxes on said trackway beneath said stapling mechanism.

2. In a stapling machine, the combination of intermittently acting staple driving means, means for feeding boxes into stapling position, a card-holding magazine, an oscillating transfer member comprising a card engaging member having a suction head adapted to transfer the cards from the magazine to the boxes and hold the same in position during the stapling operation.

3. In a stapling machine, the combination of stapling mechanism, means for continu-

ously feeding boxes to said stapling mechanism, a card magazine, a card transfer member adapted to travel between said magazine and said stapling mechanism and including a suction activated gripper member for removing successive cards from the bottom of the magazine and positioning the same in contact with each box for stapling, said gripper member communicating with a source of reduced air pressure, and means for relieving the suction when a box fails to be presented for stapling.

4. In a stapling machine, the combination of stapling mechanism, means for continuously feeding boxes to said stapling mechanism, a card magazine, a card transfer member adapted to travel to and from said magazine, and provided with a suction activated card-gripping member operative to remove successive cards from the bottom of the magazine and position the same in contact with each box for stapling, a pipe line connecting said suction activated member with a scurce of reduced air pressure, and means for venting said line to destroy the suction when a box fails to be advanced to said stapling mechanism.

5. In a box stapling machine, the combination of intermittently acting staple driving mechanism, a trackway extending to and from said staple driving mechanism, means for feeding boxes to said trackway, a reciprocating carrier moving longitudinally of said trackway for advancing the boxes successively into stapling position, a card magazine and a suction activated member for transferring cards from said magazine to said boxes in stapling position.

6. In a box stapling machine, the combination of intermittently acting staple driving mechanism, a trackway extending to and from said staple driving mechanism, means for feeding boxes to said trackway, a reciprocating carrier moving longitudinally of said trackway for advancing the boxes successively into stapling position, a card magazine, means for transferring cards from said magazine to said boxes in stapling position, and means dependent upon the presence of a box in its stapling position for controlling the action of said card transferring member.

7. In a box stapling machine, the combination of intermittently acting staple driving mechanism, a trackway extending toward said staple driving mechanism, means for feeding boxes to said trackway, a reciprocating carrier moving longitudinally of said trackway for advancing the boxes successively into stapling position, a card magazine removed from said trackway and opposite said stapling mechanism, an oscillating carrier moving to and from said magazine and having a contact member adapted to grip the cards by adhesion, and to transfer the same to the boxes in stapling position, and means dependent upon the presence of a box in stapling position for controlling the degree of adhesion exerted by said contact member on said cards.

8. In a stapling machine, the combination of a stapling head including staple driving members, a trackway extending horizontally beneath said stapling head, means for advancing boxes to be stapled along said trackway, a card holding magazine located adjacent said stapling head, an oscillating transfer member moving to and from said magazine and transversely of the path of the boxes along said trackway, and comprising a suction head adapted to grip the cards flatwise at the bottom of the magazine and present them to the boxes in position for stapling, a pipe connecting said suction head with a source of reduced air pressure and having an intermediate vent opening and a valve for said vent opening and normally held in closed position by the contact with a box in stapling position, and a spring acting to open said valve member to vent said suction head in the absence of a box in said stapling position.

9. In a stapling machine, the combination of a stapling head including staple driving members, a trackway extending horizontally beneath said stapling head, means for advancing boxes to be stapled along said trackway including a reciprocating carrier, a card holding magazine located adjacent said stapling head, an oscillating transfer member moving to and from said magazine and transversely of the path of the boxes along said trackway, and comprising a suction head adapted to grip the cards flatwise at the bottom of the magazine and present them to the boxes in position for stapling, a pipe connecting said suction head with a source of reduced air pressure, and having a branch vent pipe terminating adjacent the station occupied by the boxes for stapling, a spring actuated valve member having a portion projecting into the path of the boxes and acting to close the vent pipe by the pressure of a box exerted thereon, and to open the vent pipe to thereby decrease the suction at said head and thus prevent the transfer of a card from said magazine in the absence of a box in position for stapling.

10. In a stapling machine, the combination of staple-driving mechanism, means for feeding boxes toward stapling position adjacent said staple driving mechanism including a reciprocating feeding member, means for feeding cards into position for stapling to said boxes comprising an oscillating suction head movable between a card supply and said stapling position, a suction pipe leading from a source of reduced air pressure to said suction head and provided with a vent, a valve normally closing said vent and a trip member carried by said reciprocating box feeding

member and operative to trip said valve and to vent said pipe after each stapling operation.

11. In a stapling machine, the combination of staple-driving mechanism, a source of power for driving said staple-driving mechanism, a clutch interposed between said source of power and said staple-driving mechanism and normally disconnecting the same, driving means for operating said clutch to effect the intermittent operation of said staple-driving mechanism, means for feeding boxes toward a stapling position adjacent said stapling mechanism, and suction actuated tripping mechanism associated with said clutch operating mechanism and operative in the event of failure of a box to be fed into stapling position to prevent the operation of said stapling mechanism.

12. In a stapling machine, the combination of stapling mechanism, a motor driving said stapling mechanism, a clutch interposed between said motor and stapling mechanism, clutch controlling mechanism including a reciprocating push rod acting to alternately release and engage said clutch to effect the intermittent action of said stapling mechanism, suction-actuated mechanism normally acting to retain said push rod in operative connection with said clutch, and means for controlling the suction-actuated mechanism comprising a vent pipe and a valve in said vent pipe located adjacent the path of said boxes and normally held in closed position by contact therewith.

13. In a stapling machine, the combination of stapling mechanism, a suction for driving said stapling mechanism, a clutch interposed between said suction and stapling mechanism, driving mechanism including a reciprocating push rod for alternately releasing and engaging said clutch to effect the intermittent action of said stapling mechanism, said push rod including a pair of telescoping sections, a pawl normally locking said sections together as a unit, a suction-actuated piston connected with said pawl and normally acting to hold it in locking position against said suction-actuated member, a spring acting on said pawl and opposing the force of the suction, and means for controlling the suction comprising a vent pipe, and a spring-actuated valve for said vent pipe located adjacent the path of said boxes and normally held in closed position by contact therewith.

Signed at Chicago, Ill., this 30th day of January, 1931.

WILLET B. RANNEY.