

Sept. 25, 1962

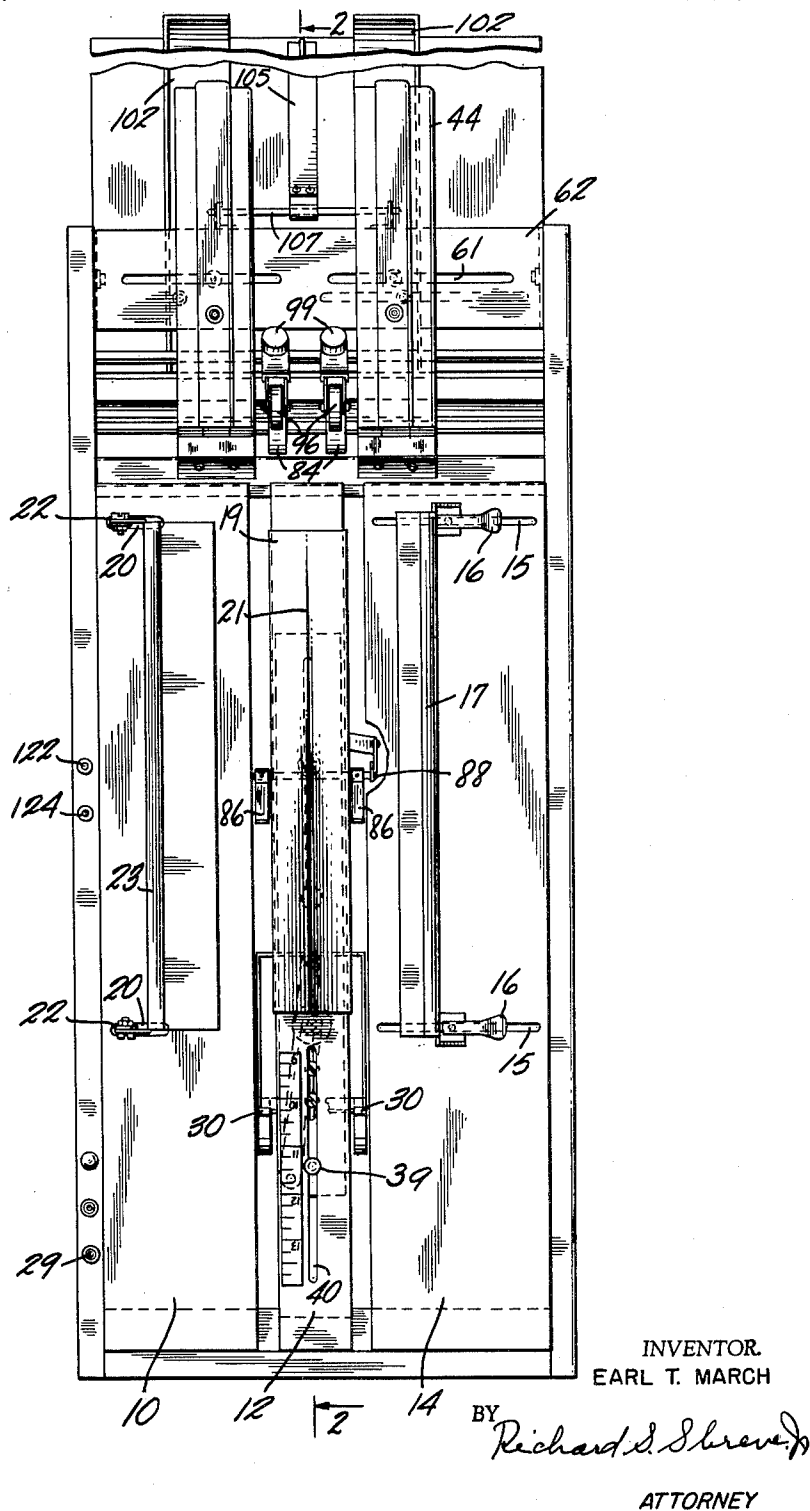
E. T. MARCH

3,055,009

JOGGER STAPLER

Filed July 12, 1961

7 Sheets-Sheet 1



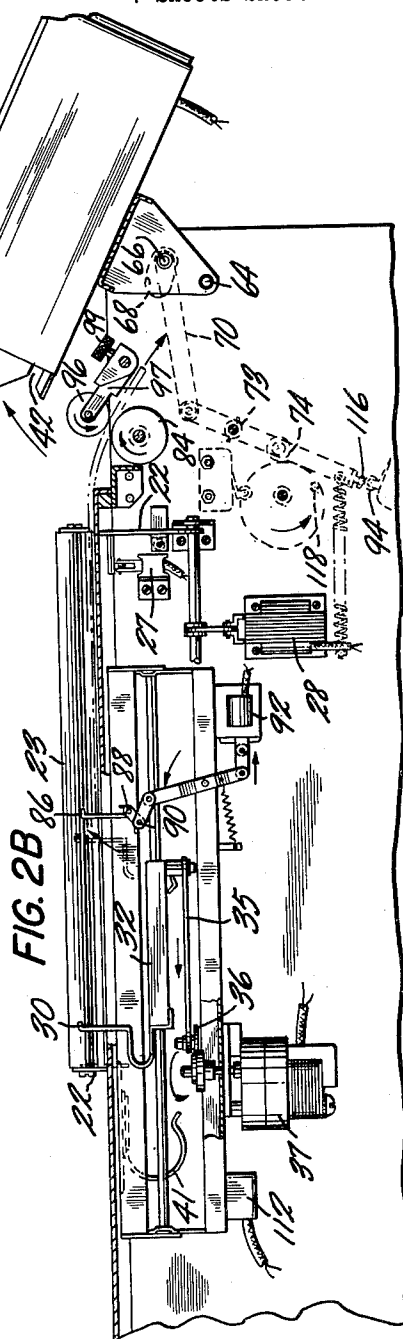
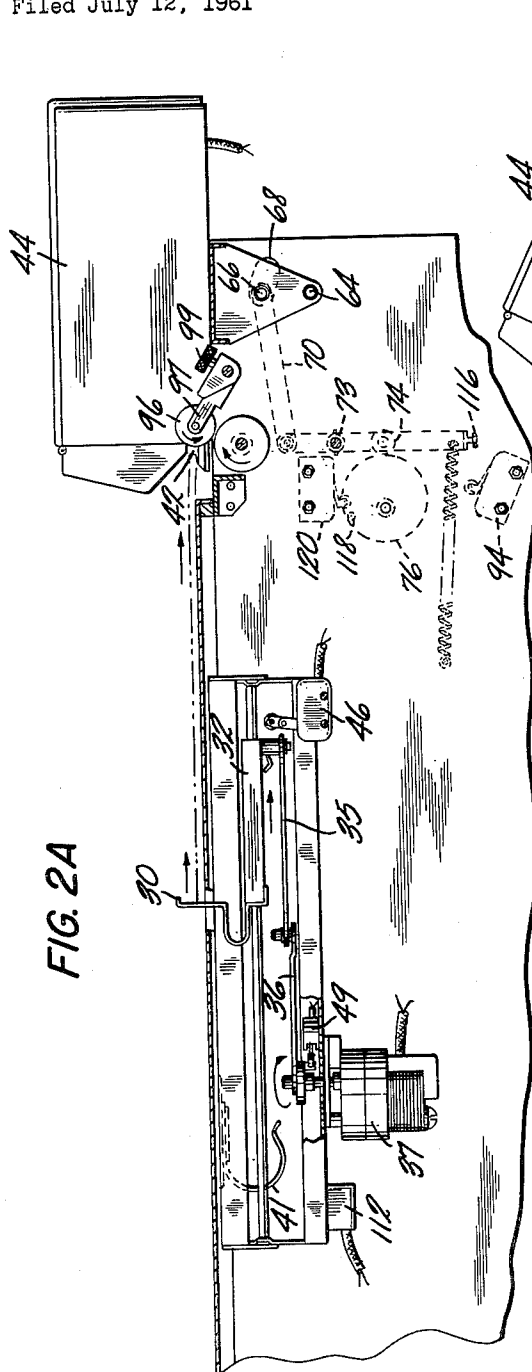
Sept. 25, 1962

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Filed July 12, 1961

7 Sheets-Sheet 3



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Filed July 12, 1961

7 Sheets-Sheet 4

FIG. 3

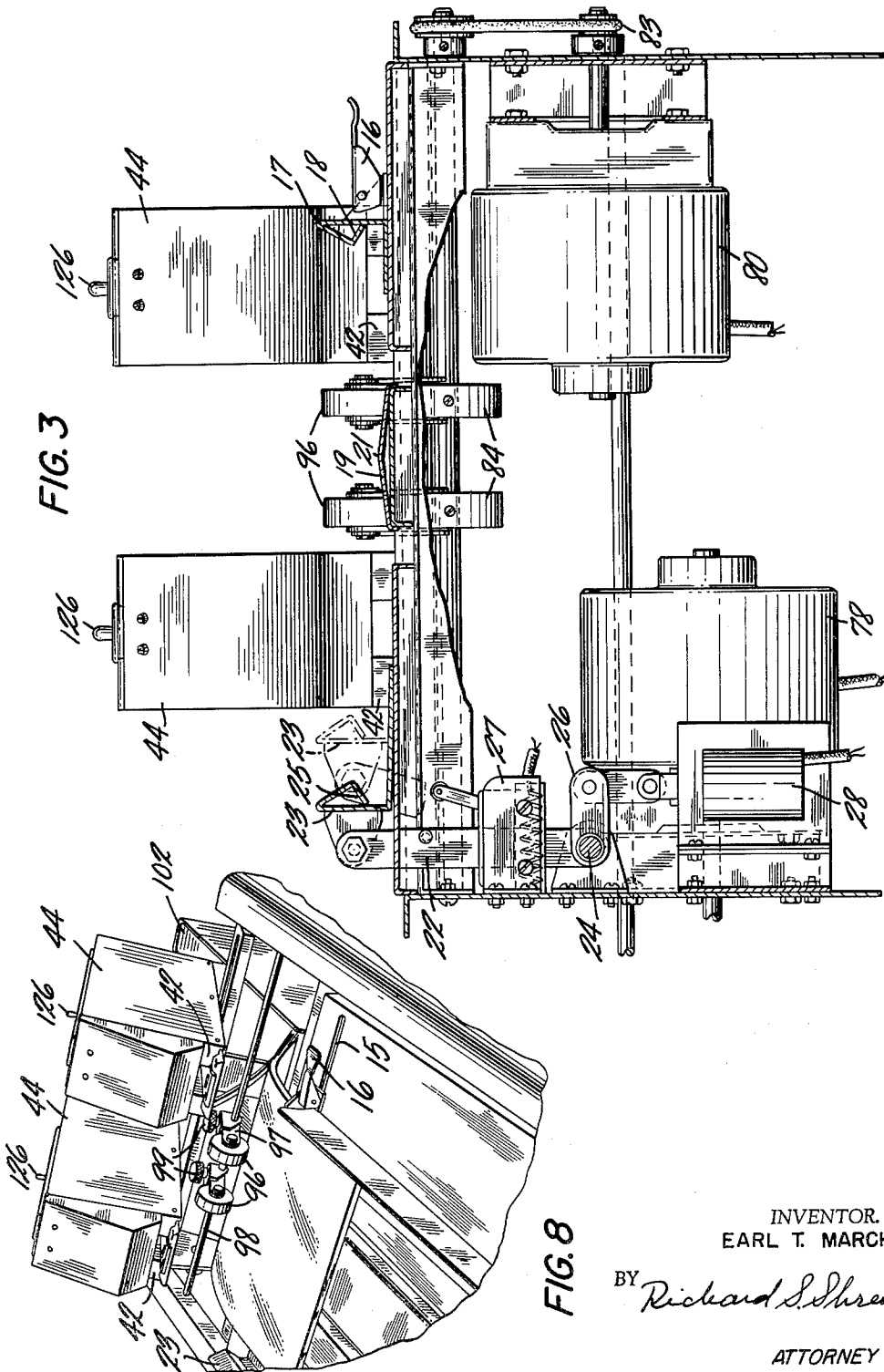


FIG. 8

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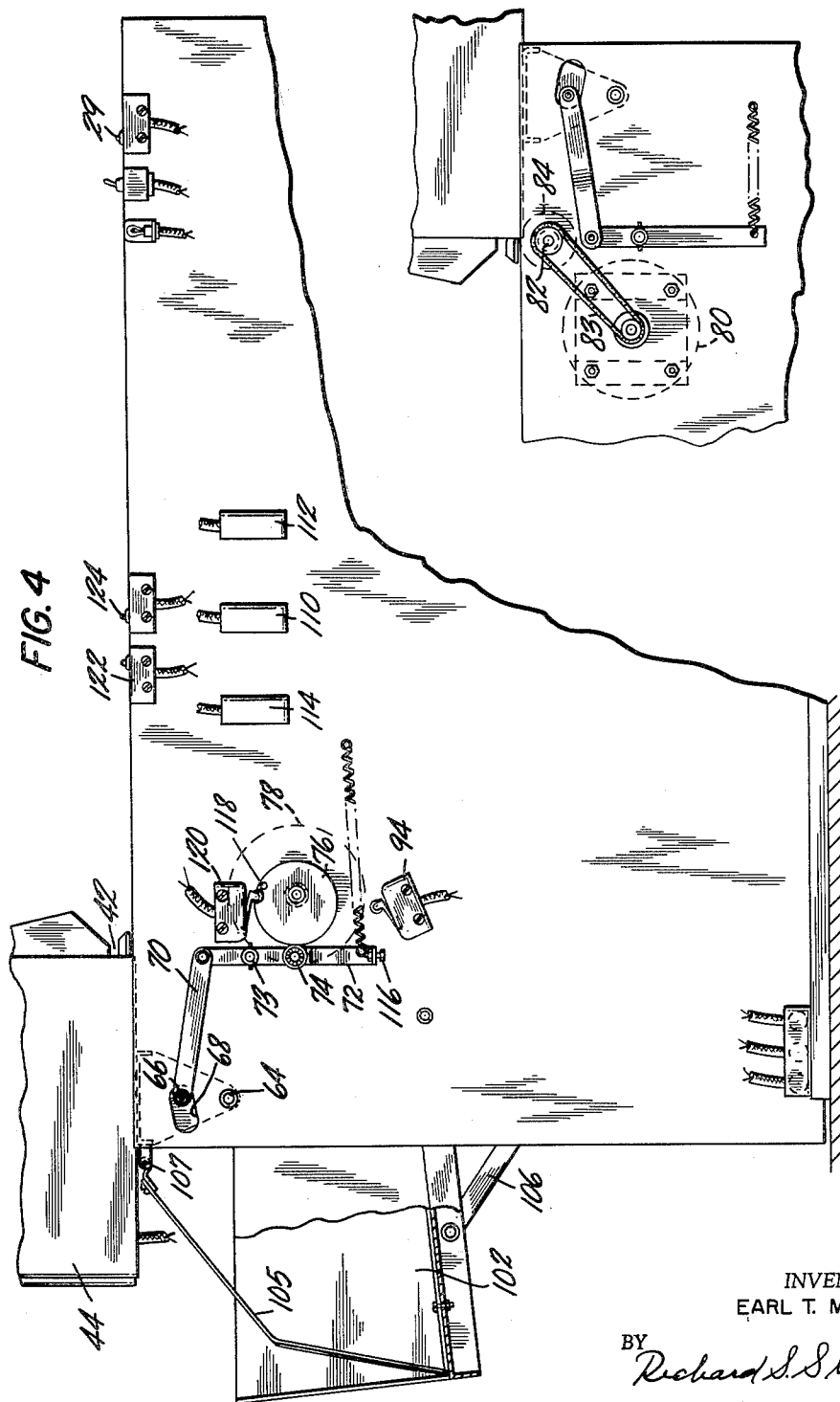
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Filed July 12, 1961

7 Sheets-Sheet 5



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3,055,009

Filed July 12, 1961

7 Sheets-Sheet 6

FIG. 6

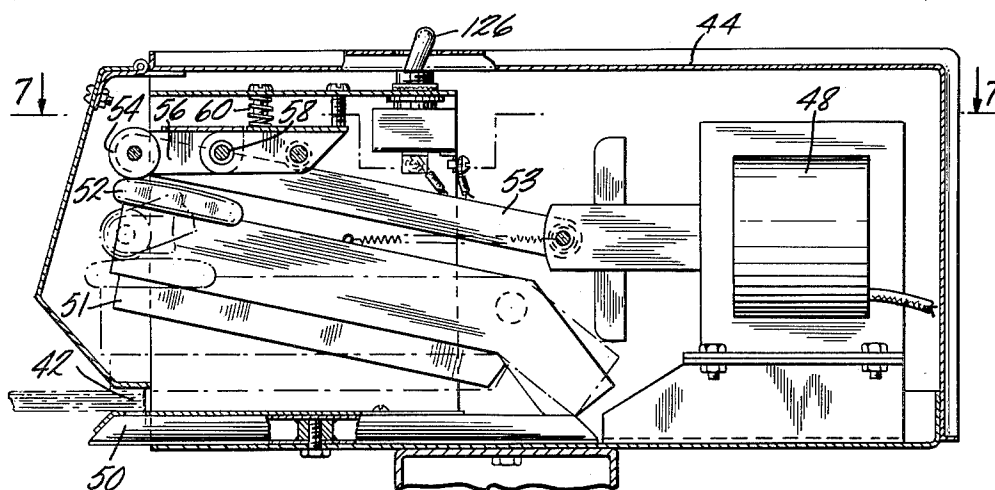
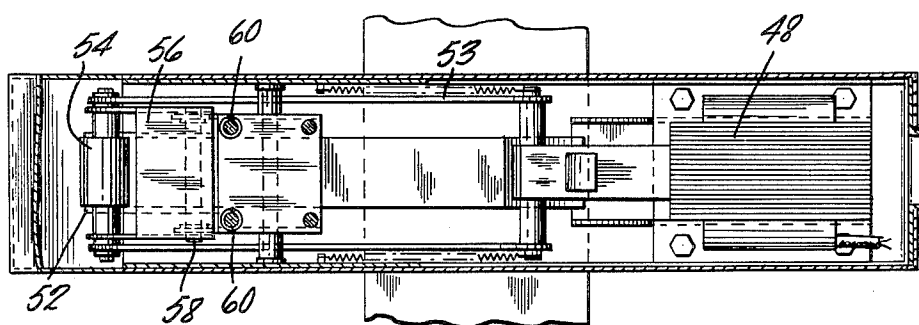


FIG. 7



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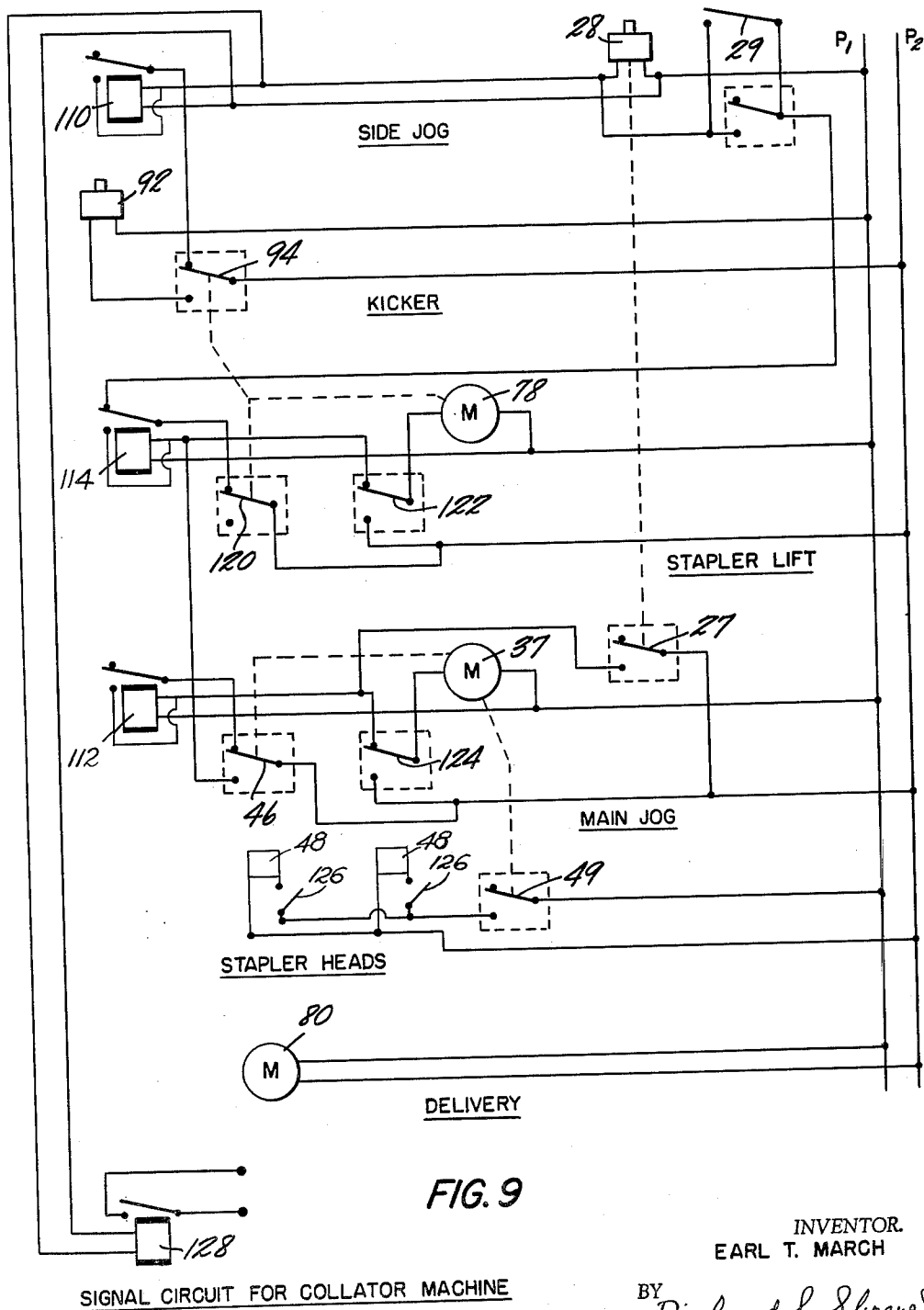
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Filed July 12, 1961

7 Sheets-Sheet 7



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3,055,009

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Filed July 12, 1961, Ser. No. 123,583

10 Claims. (Cl. 1-106)

This invention relates to jogger staplers, and more particularly to machines of this character for aligning groups of sheets and fastening them together, by stapling, stitching, or adhesion to form pamphlets or the like.

There are automatic machines for collating, jogging, stapling and delivering such pamphlets, but the cost of such machines is prohibitive, unless an enormous number of pamphlets are to be produced. However, there are inexpensive collating machines, such as shown in Patents 2,399,584 and 2,646,279.

It is therefore the main object of the present invention to provide an inexpensive aligning and fastening machine to which sheets taken by hand from such collating machine may be fed, and have the sheets aligned and fastened thereby.

Another object is to provide an aligning and fastening machine in which the completion of each step in the operation triggers or actuates a succeeding step, so that no step will operate until the preceding step is completed.

There are automatic stapling machines in which the head of the stapler is completely separated from the anvil to permit the stapled sheets to pass therebetween for delivery. This is an expensive expedient, and it is therefore another object of the present invention to move the stapler bodily to permit the stapled sheets to be delivered under the stapler anvil.

In the drawings:

FIG. 1 is a plan view of the machine according to the preferred embodiment of the present invention;

FIG. 2 is a vertical longitudinal section taken along the line 2-2 of FIG. 1, showing the parts in starting position;

FIG. 2a is a similar view showing the parts at the completion of the jogging and pushing operations;

FIG. 2b is a similar view showing the parts at the completion of the kicker, stapler tilting, and delivery operations;

FIG. 3 is a vertical transverse section taken along the line 3-3 of FIG. 2;

FIG. 4 is a side elevation showing the stapler tilting cam;

FIG. 5 is a partial side elevation showing the delivery roller drive;

FIG. 6 is a vertical section through the stapler drive mechanism;

FIG. 7 is a horizontal section taken along line 7-7 of FIG. 6;

FIG. 8 is a perspective view of the stapler throat in tilted delivery position; and

FIG. 9 is a wiring diagram of the circuitry for controlling successive steps of the operation of the machine.

As shown in FIG. 1, the machine comprises a box-like sheet metal frame having flat top panels 10, 12 and 14 forming a table to receive the sheets delivered by hand from a collator.

The panel 14 has transverse slots 15 receiving adjustable clamps 16 for supporting a relatively stationary side guide 17 which, as shown in FIG. 3, comprises a vertical flange bent down and then in to form a hold down stop 18.

The panel 10 has transverse slots 20 in which travel arms 22 supporting a side jogger 23, which is of the same flanged construction forming a hold down stop 25. The arms 22 are rigid with a rock shaft 24 journaled below the panel 10, the rocker arm 26 of which is actu-

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ated by a solenoid 28 controlled by a starter switch 29 (FIG. 4).

The center panel 12 has a ridged cover 19 having a central longitudinal peak 21, which when the unaligned sheets are placed thereon, causes them to bow or arc upward, giving them longitudinal rigidity.

When the starter switch 29 is closed, the arms 22 propel the side jogger 23 transversely of the table toward the side guide 17, carrying the sheets thereagainst into transverse alignment. At the end of the inward travel, one of the arms 22 engages a switch 27 which controls a pusher mechanism.

The top panels are spaced apart to leave slots in which travel pushers 30 extending up therethrough from a carriage 32 slidable on tracks 34 mounted below the panels. The carriage 32 is reciprocated on the tracks 34 by a link 35 pivoted to a crank 36 driven by a motor 37 controlled by the arm 22 of the side jogger.

A brake 41 controls the return movement of the carriage 32. The brake, tracks and motor are carried by a longitudinally adjustable frame 38 slidably mounted below the panels, and held in adjusted position by a set screw 39 extending upward through a slot 40 in the panel 12.

The pushers 30 propel the sheets along the channel under the stops 18 and 25 into longitudinal alignment against a stop 42 formed by the front of a housing 44 containing a fastening device such as a stapler, at the end of the forward stroke, the pusher carriage engages a stop switch 46 which de-energizes the motor 37, and the crank 36 engages a switch 49 which energizes a solenoid 48 (FIG. 6) for driving the stapler mechanism.

As shown in FIG. 6, the housing 44 contains a conventional hand stapler having an anvil 50 with an operating lever terminating in a stapler head 51 and having an operating knob 52. The stapler is actuated by the solenoid 48 which pulls a long link 53 having a roller 54 journaled at the far end and connected by a toggle link 56 to a floating pivot 58. This causes the roller 54 to push down the front end of the stapler knob 52 and slide rearwardly therealong as it goes down. This toggle action gives a steadily increasing pressure instead of a quick jolt, with infinite leverage at the moment of clenching. The floating pivot 58 has an adjustable spring 60 which allows for different thicknesses to be stapled, compressing the spring when larger numbers of sheets are stapled.

As shown in FIG. 4, the stapler casings 44 are adjustably mounted in slots 61 (FIG. 1) on brackets 62 pivoted on a rock shaft 64. Pins 66 on the brackets pass through slots 68 in the sides of the machine, and are connected by links 70 to levers 72 pivoted on a cross rod 73. One of the levers 72 has a follower 74 engaging a cam or eccentric 76 driven by a motor 78. This rocking draws the stapler jaws away from the stapled sheets, and also raises the front end of the stapler anvil 50 out of the way of the stapled sheets.

As shown in FIG. 5, a belt 83 from a motor 80 continuously drives a shaft 82 for delivery rollers 84. As shown in FIG. 8, jockey rollers 96 coact with the delivery rollers to form a nip. The jockey rollers are carried by spring pressed arms 97 slidable along a cross rod 98. The screws 99 adjust the spring pressure of the jockey rollers and also the position of the arms 97 along the cross rod 98.

The stapled sheets released by rocking the stapler housing are forwarded to the delivery rollers by a kicker mechanism which, as shown in FIG. 2, comprises a pair of kickers 86 rigid with a rock shaft 88 journaled below the top panels. The kickers 86 normally extend rearwardly from the rock shaft and lie below the top panels. The rocker arm 90 of the shaft 88 is actuated by a sole-

noid 92 energized by the switch 94 (FIG. 4) tripped by the contactor 116.

The delivery rollers 84 (FIG. 2) deposit the stapled sheets in a receiving bin 102 pivoted on a cross rod 104 at the rear of the machine below the stapler casings 44. The bin 102 is swung up into receiving position and there held in place by a pivoted notched supporting rod 106. A deflector 105 pivoted on a rod 107 at the rear of the bracket 62 prevents the delivered sheets from escaping the bin.

Referring to FIG. 9, when the starting switch 29 is closed, relay 110 is energized, through the normally closed side of switch 120, switch 27 being open at this time. Relay 110 in turn, energizes solenoid 28 to drive the side jogger 23. The arm 22 of the side jogger trips switch 27 which starts the pusher motor 37 which drives crank 36 to propel the pusher carriage. Near the end of the pusher stroke, the crank 36 actuates switch 49 which energizes the stapler solenoid 48.

Shortly thereafter, switch 46 is engaged by a trip on the pusher carriage. Switch 46 is double acting. When pusher motor has completed about a half revolution, switch 46 is thrown from normally closed position to break the circuit to main pusher relay 112 which cuts the current to pusher motor 37. However, the carriage completes its return stroke under its own momentum, stopped by spring brake 41.

At the same time, the switch 46 is moved to close the normally open part of the circuit momentarily. That energizes relay 114 which starts motor 78 which drives cam or eccentric 76. When the cam 76 engages the follower 74, it rocks the shaft on which the stapler casings 44 are pivoted.

Upon completion of approximately one revolution of the cam 76, pin 118 in passing contacts the lever of switch 120, breaking the circuit to relay 114 which cuts the current to motor 78. Motor 78 is self braking and coasts to carry the pin 118 past the switch 120.

At the end of the up travel of the rocking of the stapler, contactor 116 on the lower end of lever 72 engages switch 94 which by breaking its normally closed circuit, breaks the current to relay 110, thereby releasing side jogger 23. At the same time, through closure of its normally open circuit, it energizes solenoid 92 which causes kickers 86 to rotate up and contact the sheets and drive them into the delivery rollers.

Finally, the motor 78 continuing to turn, pin 118 on cam 76 contacts switch 120 thereby breaking the circuit to motor 78 at which time, the stapler heads are back to normal position and the cycle is completed.

A manual switch 122 is provided to energize the stapler lift motor 78 without activating the relay 114. By this, the stapler heads can be raised and stopped in raised position for loading purposes.

A manual switch 124 energizes main pusher motor 37 independently of the relay 112 to position the pusher carriage forward for adjusting to the paper size.

Switches 126 in FIG. 6 enable either stapler head to be energized while the other is cut off.

Relay 128 is for the purpose of energizing the collator when the present machine is energized, as a safety device to avoid short circuit. Contacts of relay 28 are electrically isolated from the electric circuit of the jogger stapler, and therefore may be used to close the electric circuit of a collator or other device, without danger of a feed-back causing a short circuit in either machine.

What is claimed is:

1. In a machine for aligning a group of sheets and fastening them together, a support having a sheet receiving surface, a fastening device having a head and an anvil therebelow with a throat therebetween aligned with said surface, a linkage having a floating pivot and a roller engaging said head, a pusher engaging the rear edges of said sheets, means for moving said pusher to slide said sheets along said surface through said throat onto said

anvil, and means actuated by the completion of such pusher stroke for pulling said linkage to cause said roller to push said head down toward said anvil.

2. In a machine for aligning a group of sheets and fastening them together, a fastening device having a throat, means for aligning said sheets and moving them into said throat, means for actuating said fastening device, means for moving said throat out of the way of the fastened sheets, and means for moving said fastened sheets along said cleared way.

3. In a machine for aligning a group of sheets and fastening them together, a support having a sheet receiving surface, a fastening device having a throat aligned with said surface, means for sliding said sheets along said surface into said throat, means for actuating said fastening device, means for mounting said fastening device for pivoting about an axis transverse to the path of the sheets, means for rocking said fastening device to move said throat above the path of the sheets, and means for moving said fastened sheets further along said path below said throat.

4. In a machine for aligning a group of sheets and fastening them together, a support having a sheet receiving surface, a fastening device having a throat aligned with said surface, means for sliding said sheets along said surface into said throat, means actuated by the arrival of said sheets into said throat for actuating said fastening device, means actuated by the completion of the fastening operation for moving said throat above said fastened sheets, and means for moving the fastened sheets off of said surface to pass below said throat.

5. In a machine for aligning a group of sheets and fastening them together, a support having a sheet receiving surface, a fastening device having a throat aligned with said surface, a pusher engaging the rear edges of said sheets, means for moving said pusher to slide said sheets along said surface into said throat, means actuated by the completion of such pusher stroke for actuating said fastening device, delivery rollers having a nip positioned to receive said fastened sheets, means actuated by the completion of the fastening stroke for moving said throat clear of the path of said fastened sheets, and a kicker actuated by the completion of said throat removal for driving said fastened sheets into the nip of said rollers.

6. Machine as claimed in claim 5, in combination with jockey rollers coacting with said delivery rollers to form said nip and carried by spring pressed arms pivoted on a cross rod and adjustable therealong.

7. In a machine for aligning a group of sheets and fastening them together, a support having a sheet receiving surface with a longitudinal slot therein, a fastening device having a throat aligned with said surface, a pusher in said slot engaging the rear edges of said sheets, means for moving said pusher to slide said sheets along said surface into said throat, means for moving said throat clear of the path of the fastened sheets, and a kicker operating in said slot for driving said fastened sheets along said path.

8. Sheet feeding means comprising a support having a sheet receiving surface with a longitudinal slot therein, sheet guiding means above said surface parallel to said slot, a longitudinally slidable carriage below said surface, a pusher extending up from said carriage through said slot engaging the rear edges of said sheets, a motor drive for said carriage, means for energizing said motor drive for a forward stroke, means for de-energizing said motor drive near the end of said forward stroke to permit return thereof under its own momentum, and a brake for the end of said return stroke.

9. Stapler drive mechanism comprising a puller link having a roller journaled therein engaging the stapler knob, a toggle link having at one end a floating pivot and the other end connected to said roller, and means for pulling said roller journaled puller link to cause said toggle link to bear against said floating pivot and thrust

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against the journal of said roller to push down the front end of the stapler knob and slide rearwardly therealong as it goes down to exert a steady pressure on the stapler knob.

10. In a machine for aligning a group of sheets and fastening them together, a support having a sheet receiving surface, a fastening device having a throat aligned with said surface, means for sliding said sheets along said surface into said throat, means for actuating said fastening device, a rock shaft for mounting said fastening device for pivoting about an axis transverse to the path of said sheets, means for rocking said fastening device to move said throat above the path of said sheets, comprising a

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cam having a follower, means actuated by said follower for rocking said shaft, a motor for driving said cam, means for energizing said motor, and means actuated by said cam for de-energizing said motor upon completion of approximately one revolution of said cam.

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