No. 693,978. Patented Feb. 25, 1902.

W. D. MIDDLEBROOK.

MACHINE FOR STICKING SAFETY PINS.

(Application filed May 25, 1898.)

(No Model.) 7 Sheets—Sheet 1.

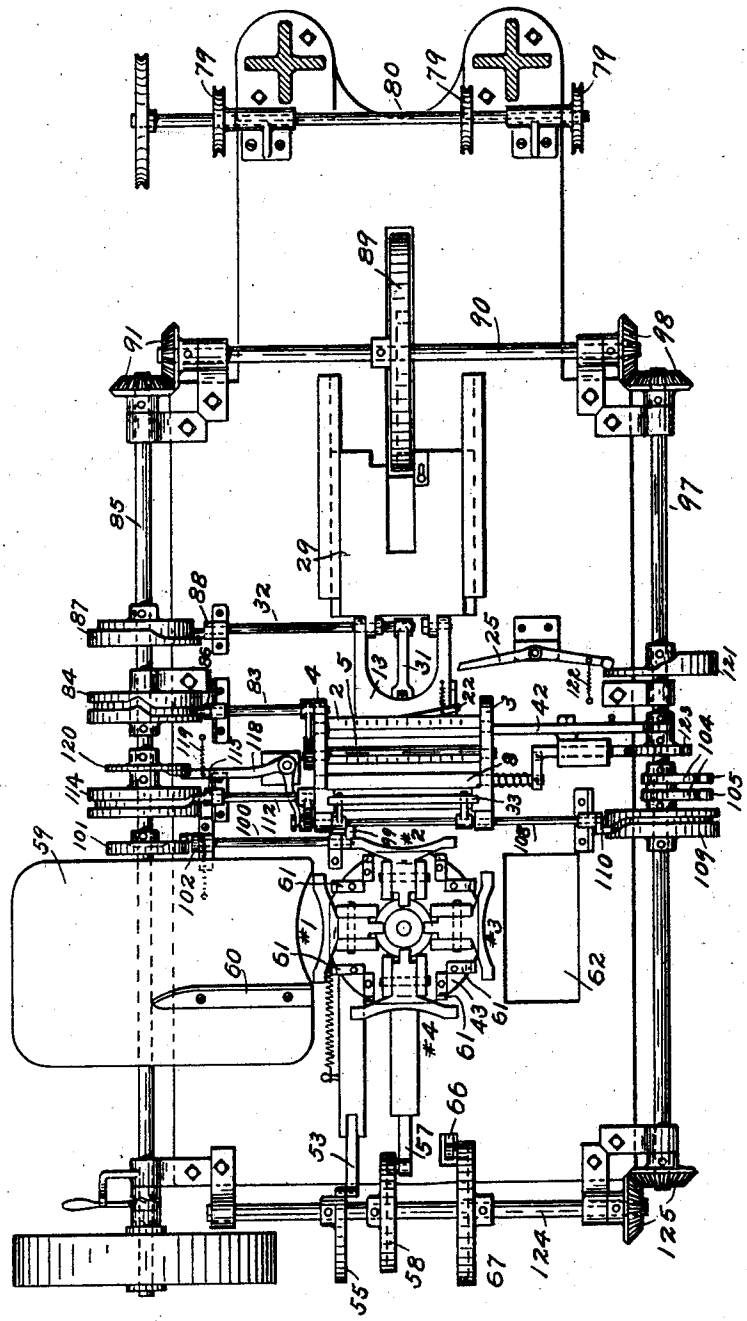


FIG. 1.

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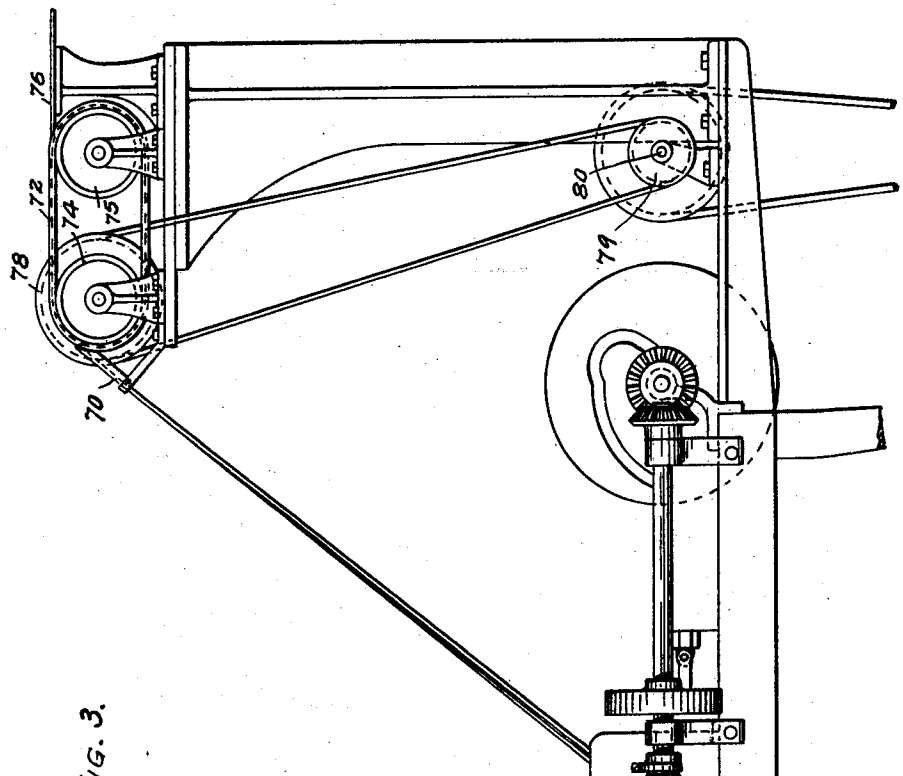


FIG. 2.

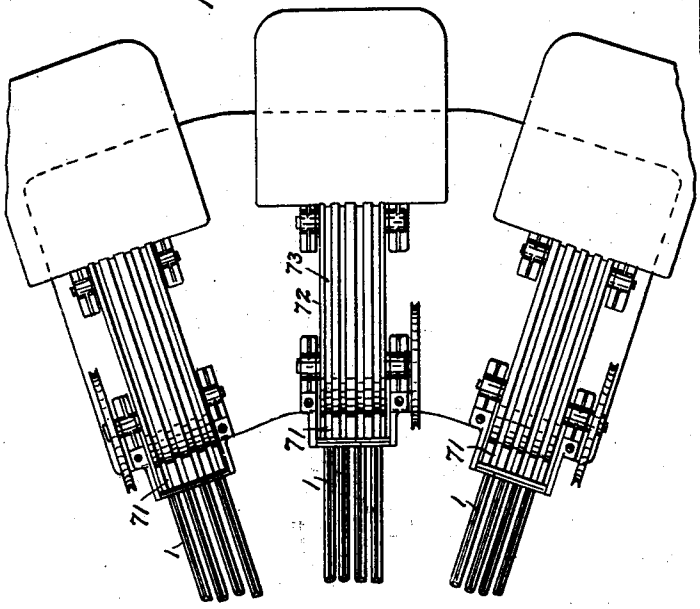


FIG. 3.

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(No Model.) 7 Sheets—Sheet 3.

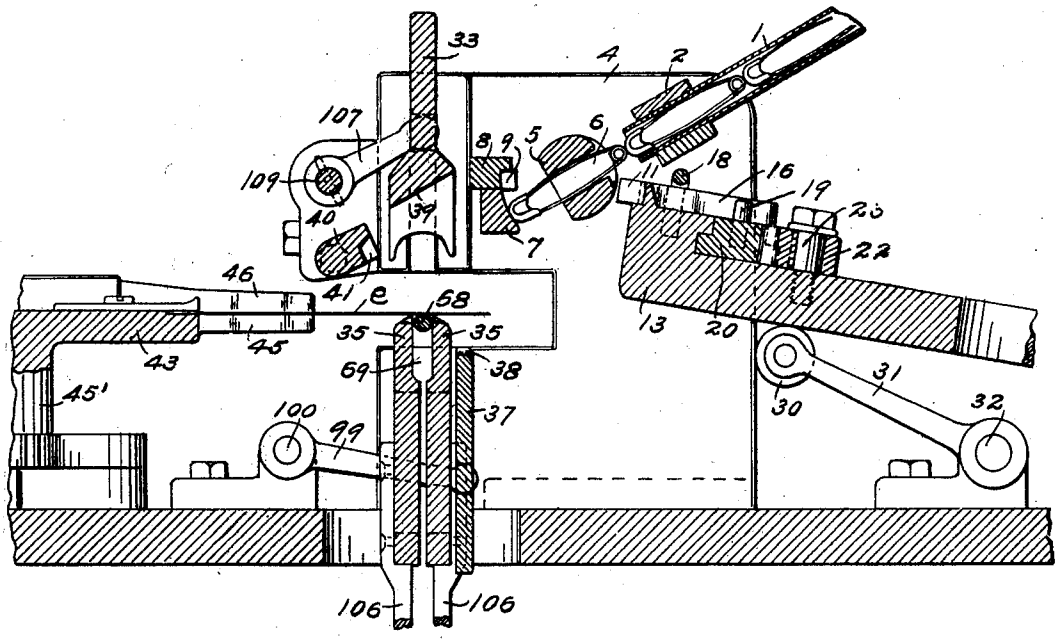


FIG. 4.

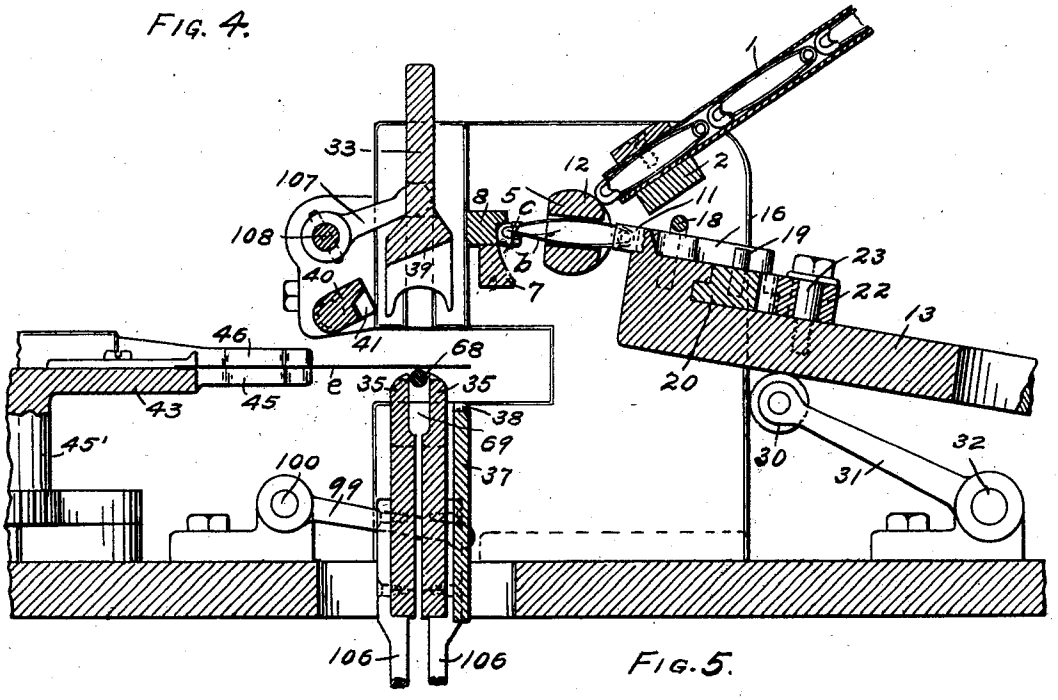


FIG. 5.

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MACHINE FOR STICKING SAFETY PINS.

(Application filed May 25, 1898.)

(No Model.) 7 Sheets—Sheet 4.

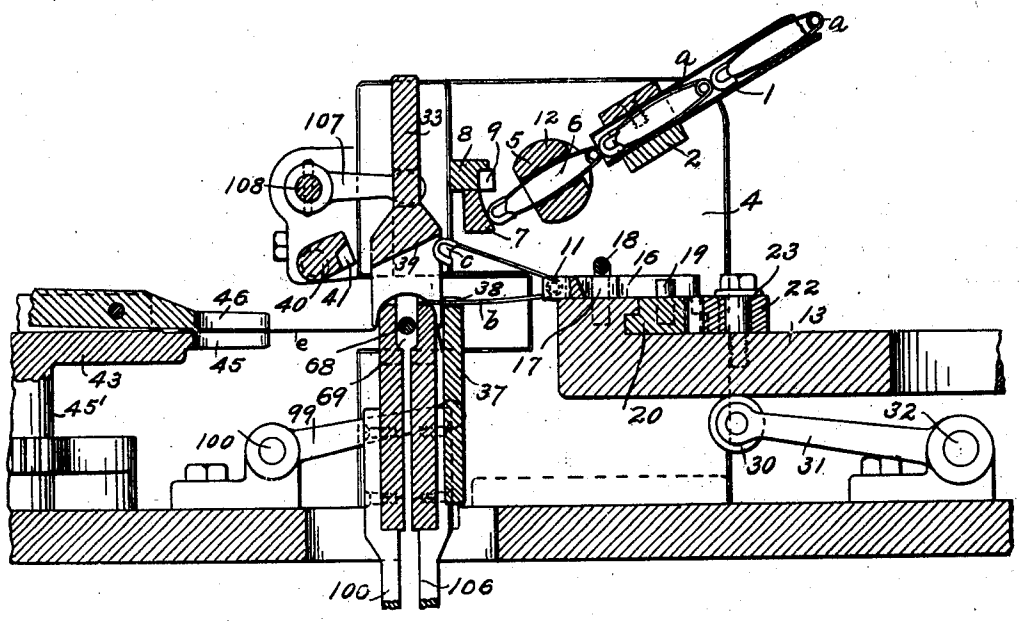


FIG. 6.

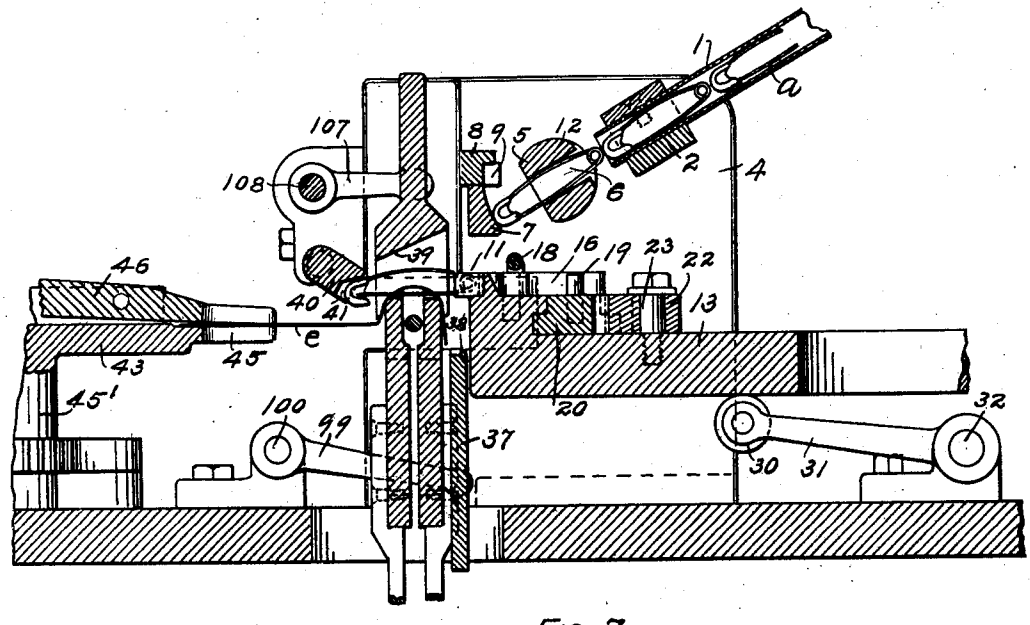


FIG. 7.

WITNESSES,

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MACHINE FOR STICKING SAFETY PINS.

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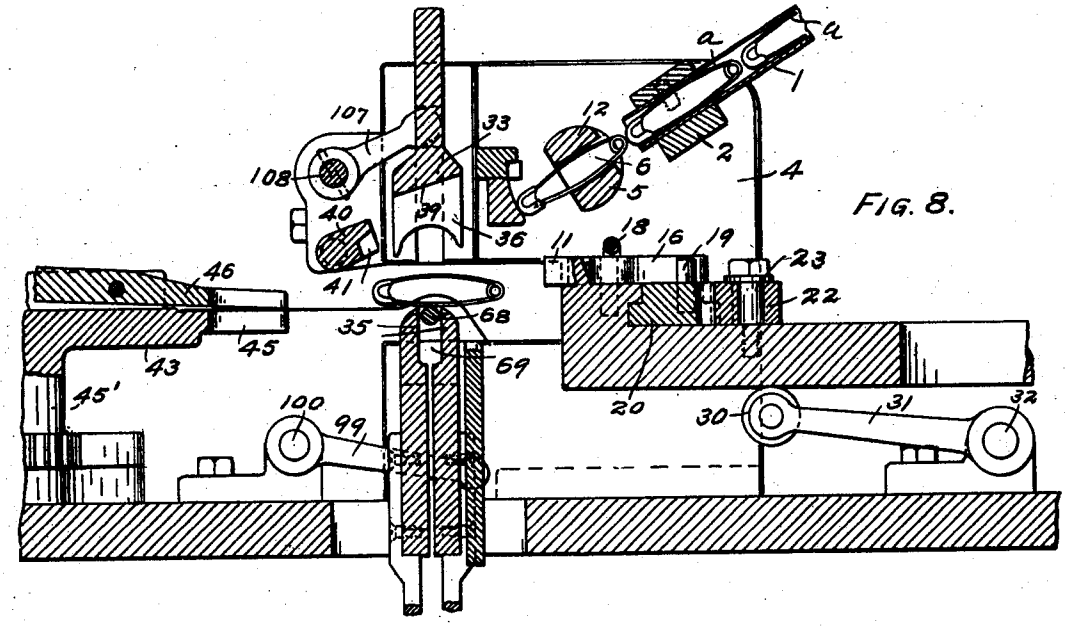


FIG. 8.

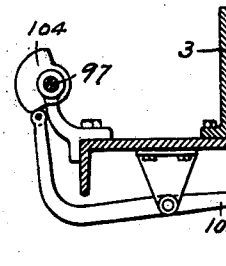


FIG. 11.

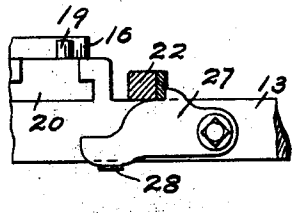


FIG. 10.

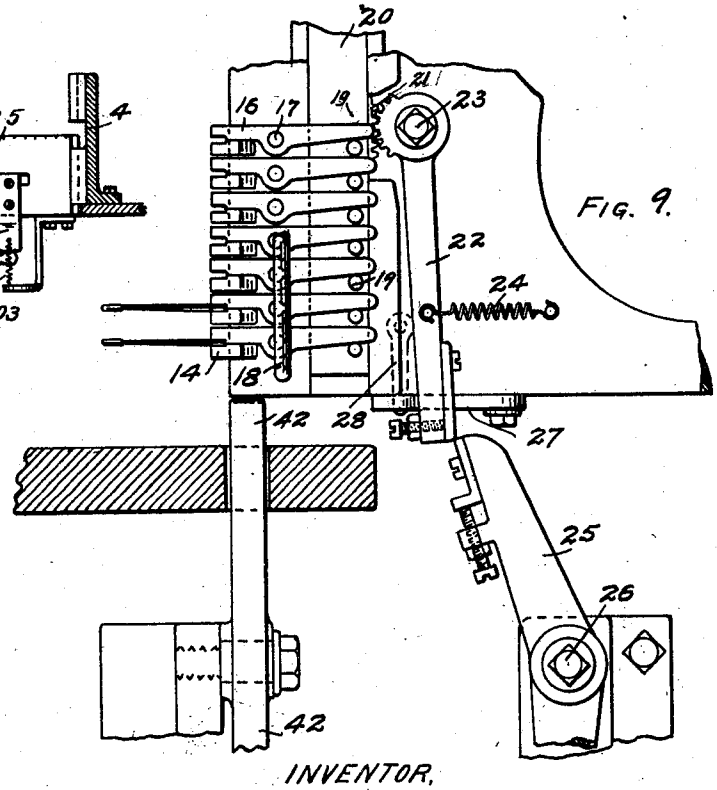


FIG. 9.

WITNESSES,

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MACHINE FOR STICKING SAFETY PINS.

(Application filed May 25, 1898.)

(No Model.) 7 Sheets—Sheet 6.

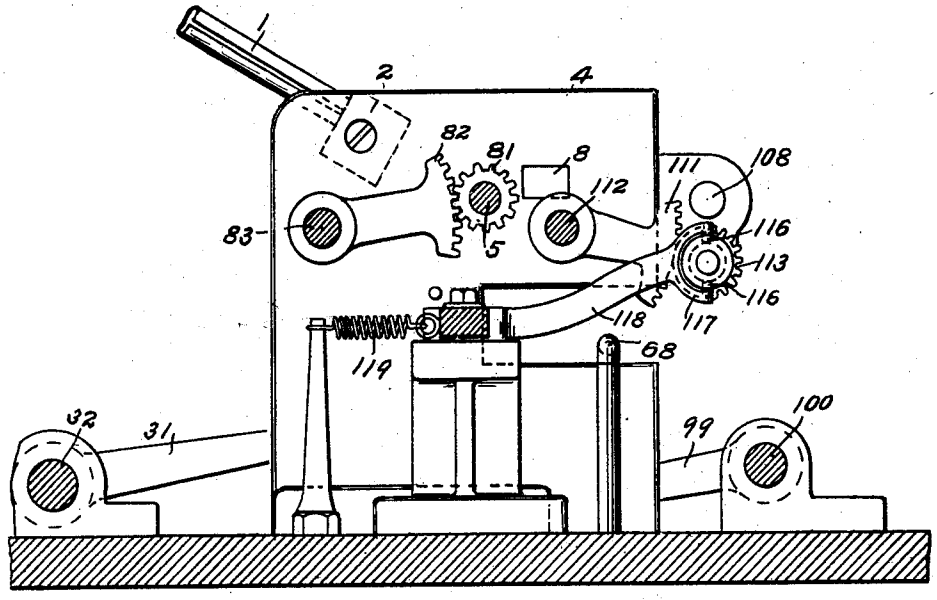
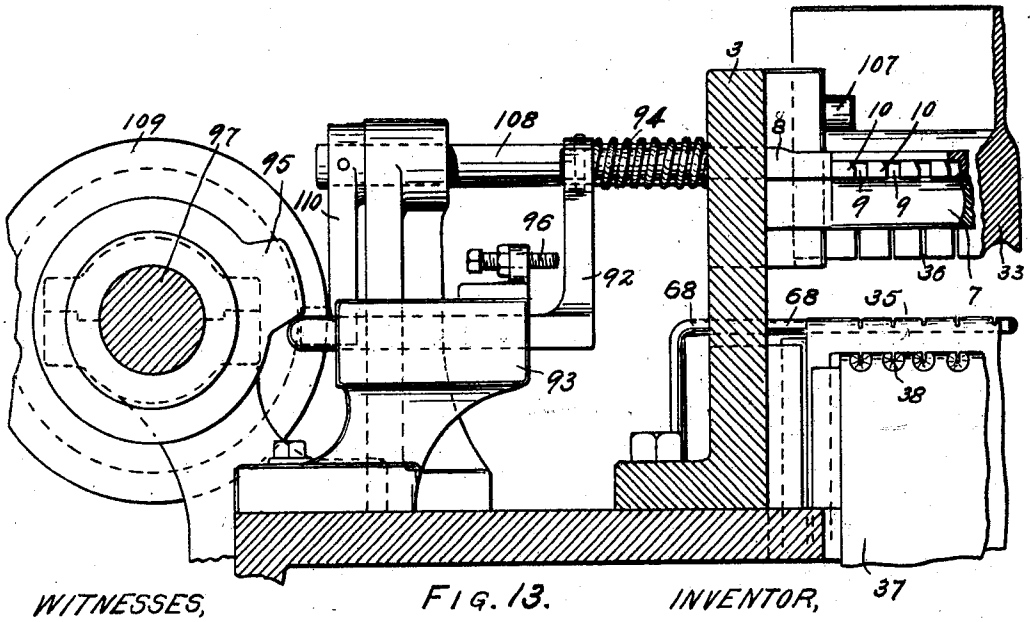


FIG. 12.



WITNESSES, FIG. 13. INVENTOR,

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MACHINE FOR STICKING SAFETY PINS.

(Application filed May 25, 1898.)

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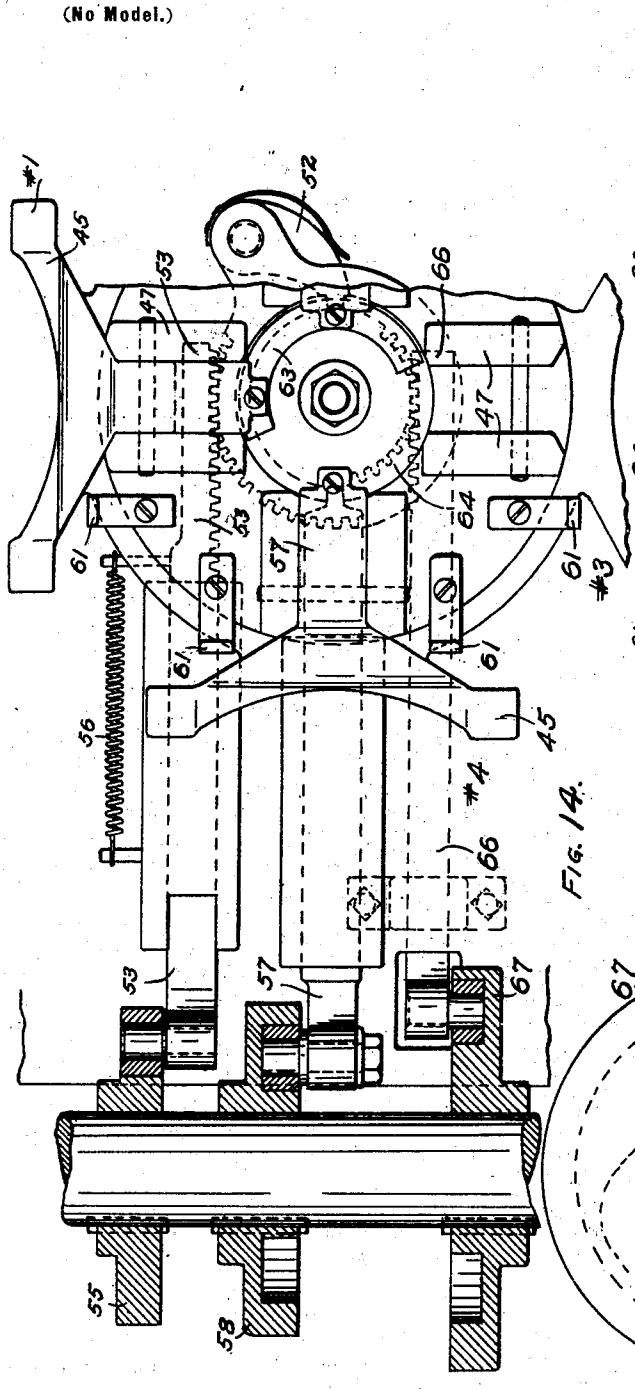


FIG. 14.

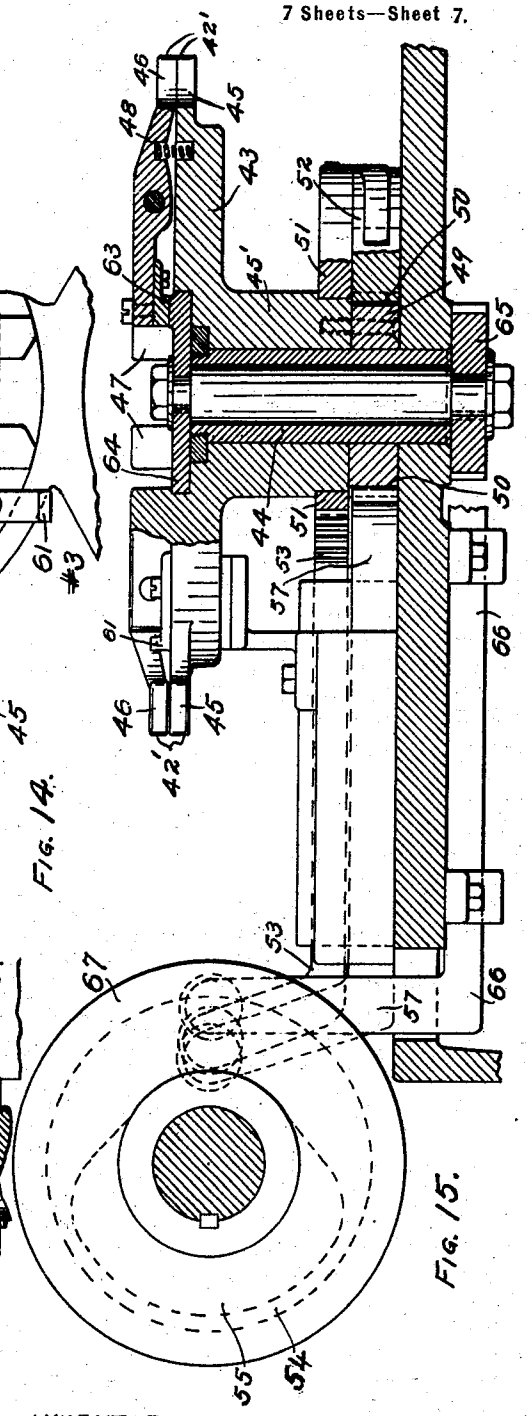


FIG. 15.

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UNITED STATES PATENT OFFICE.

WILLIAM D. MIDDLEBROOK, OF WATERBURY, CONNECTICUT, ASSIGNOR TO OAKVILLE COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

MACHINE FOR STICKING SAFETY-PINS.

SPECIFICATION forming part of Letters Patent No. 693,978, dated February 25, 1902.

Application filed May 25, 1898. Serial No. 681,680. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. MIDDLEBROOK, of Waterbury, New Haven county, and State of Connecticut, have invented certain new and useful Improvements in Machines for Sticking Safety-Pins; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full, clear, and exact description thereof.

It is the customary practice in sticking safety-pins upon cards or sheets of paper to crimp the paper or card between grooved crimpers and to open the pins, thrust the points through the crimped card, and then close the pins, these operations being performed by hand and the pins being successively stuck upon the card. When the desired number of pins, usually twelve, have thus been applied to the card, the crimpers are opened, the filled card removed, and a new card introduced between the crimpers.

It is the object of the present invention to provide simple and efficient means for automatically effecting any or all of the operations performed in sticking safety-pins upon cards, paper, or other suitable material.

A further object of the invention is to provide means for feeding the cards, paper, or other material to the crimpers and for delivering the filled card.

In order to increase the speed with which the card may be filled, it is preferred to use a machine which may simultaneously stick a plurality of pins upon the material. With such a machine any desired number of pins may be stuck while a single cycle of operations is being performed. It will be understood, however, that the various features of invention may, if desired, be embodied in a machine in which a single pin is stuck during each cycle of operations, and in such case the pins may be successively stuck upon the material.

In the machine illustrated all the features of invention are embodied in their preferred form. In said machine the pins are automatically opened, the points of the pins thrust through the crimped material, and the pins closed. The cards upon which the pins are to be stuck are also automatically inserted between the crimpers and the filled cards delivered.

The invention consists of the features and combinations set forth in the claims, and it will be understood that in said claims the terms, means, and mechanism are not intended to be limited to the specific means shown and described, but are intended to cover, broadly, any means for effecting the functions set forth without regard to the special construction of such means.

Referring to the drawings, Figure 1 is a plan view of a machine embodying the present improvements, said machine being adapted to simultaneously stick twelve pins. Fig. 2 is a side elevation. Fig. 3 is a partial plan view. Figs. 4 to 8, inclusive, are sectional views showing the parts in different positions. Figs. 9 and 10 are detail views showing the means for operating the grippers. Fig. 11 is a detail showing the means for operating the male crimpers. Figs. 12 and 13 are elevations showing details, and Figs. 14 and 15 are detail views of the card-feeding mechanism.

Referring to Figs. 3 to 8, inclusive, the pins *a* are supplied to the sticking devices by twelve tubes or chutes 1, having their lower ends secured in a bar 2, which is supported between two standards 3 4, Fig. 1, mounted on the base-plate of the machine. These chutes or tubes form magazines for holding a number of pins. A bar or cylinder 5 is journaled in the standards 3 4 in front of the chutes 1 and is provided with a series of slots 6, extending therethrough, which slots are normally in line with the chutes 1. In front of the cylinder 5 is a stop-bar 7, the face of which is preferably curved concentric with the cylinder 5. An opener-bar 8 is mounted to slide laterally just above the stop-bar 7 and is provided with a series of recesses 9 for receiving the ends of the pins. The pins *a* are arranged in the chutes with their points *b* extending forward and with their point side downward. The pins slide down the chutes and through the slots 6 in the cylinder 5 and are arrested by the stop-bar 7, Fig. 4. The cylinder 5 is rocked to separate a series of

pins from the pins in the chutes and to deliver said pins to the devices for thrusting the points of the pins through the material. The rocking of the cylinder carries the catch ends of the pins into the recesses 9 in the opener-bar, and the ends of the pins are arrested by engagement with the ends of said recesses. As the cylinder 5 continues to move after the ends of the pins have been arrested the side of the slot 9 forces the points *b* of the pin away from the catches *c*, Fig. 5. The opener-bar now moves laterally, and the sides 10 of the recesses 9, Fig. 13, engage the catches and move them out of line with the points *b*. The sides 10 are preferably cut away at the top, so that they will not move the end of the pin bodily to one side, but will engage the catches only and twist said catches out of line with the points. The movement of the cylinder 5 which carries the front ends of the pins into engagement with the opener-bar carries the rear ends into position to be seized by a series of grippers 11, which form the means for thrusting the pins through the material upon which they are to be stuck. As the cylinder 5 moves to carry the slots 6 out of line with the chutes 1 the pins in the ends of the chutes 1 ride on the surface 12 of the cylinder, which forms a stop for holding said pins in the chutes until the cylinder is moved back to bring the slots 6 into line with the chutes, when the end pins pass through the slots and are arrested by stop-bar 7. The pins are withdrawn from the cylinder 5 and are thrust through the material by a series of grippers 11, mounted on a reciprocating carrier 13. A series of lugs 14, Fig. 9, on the carrier 13 form the stationary jaws of the grippers, and the movable jaws are formed by a series of levers 16, mounted on pins 17 and held thereon by a transverse rod 18. The ends of the levers 16 lie between a series of pins 19 on a transverse slide 20, guided in suitable guides in the carrier 13. The slide 20 is provided with a short rack 21, which is engaged by gear-teeth formed on a lever 22, pivoted at 23 to carrier 13. A spring 24 acts to move the lever 22 in a direction to open the gripper. The lever 22 is moved to close the grippers at the proper time by a lever 25, pivoted at 26, which lever is rocked by means to be described and engages the end of lever 22. The grippers are held closed by means of a latch 27, Fig. 10, pivoted to the side of the carrier 13 and forced upward by a spring 28. The carrier 13 is pivoted to a reciprocating slide 29, Fig. 1, and is supported upon a roller 30 in the end of an arm 31, secured to the rock-shaft 32, said shaft being rocked by means to be described to give the carrier the proper vertical movements. When the cylinder 5 turns, the rear ends of the pins are carried between the jaws of the grippers 11, which at this time stand in the position shown in Figs. 4, 5, and 9. The lever 25 is now rocked and by engagement with lever 22 closes the grippers upon the ends of the pins, and the latch 27 engages the lever 22 and holds said grippers closed. The carrier 13 now moves rearwardly to withdraw the pins from the slots 6. As the catches have been moved out of line with the points by the opener-bar, the pins leave the cylinder 5 in an open condition, the points assuming a horizontal position and the back side of the pin springing up into an inclined position. (See Fig. 6.) The carrier now drops down to bring the points of the pins into line with the crimp in the material upon which they are to be stuck and then moves forward to thrust the points of the pin through the material. The material upon which the pins are to be stuck is held while the points of the pins are thrust therethrough between a female crimper 33 and male crimpers 35. The male crimpers are provided with a series of slots across their upper edges for the passage of the points of the pins, and the female crimper is provided with slots 36 for the passage of the pins. In order to insure the entrance of the points of the pins into the slots of the male crimpers, it is preferred to use a guide-plate 37, which is brought up in front of the crimpers after the material has been crimped, Fig. 6. This guide-plate is provided with a series of guide-slots 38, which are brought into line with the crimper-slots. The guide-slots 38 are conical at their entrance end, so that should any of the pin-points be slightly out of alinement they will still enter said slots and be guided to the proper place in the material. After the pins have been thrust through the material the guide-plate 37 moves down, so that it will not interfere with the removal of the filled card or the insertion and crimping of a new card. The ends 39 of the slots 36 are inclined and form cam-surfaces for forcing the catch *c* toward the point *b* as the pins are thrust through the material. The catches of the pins are projected beyond the crimper 33 and underlie a closing-bar 40, arranged in front of the crimpers. This bar 40 is provided with a series of recesses 41, and as said bar is rocked and moved laterally the ends of said recesses engage the ends of the pins and carry the catches downwardly, while the sides of the recesses carry the catches laterally. After the catches are carried beyond the points of the pins the closing-bar moves laterally in an opposite direction and carries the catches under the points, so that the points will engage the catches when the crimpers move back to release the material. As the crimpers move back the grippers are opened through the action of a lever 42, which at this time overlies the end of catch 27 and is rocked, by means to be described, to force the catch downward and release the lever 22. The gripper-carrier now moves backward and upward to bring the grippers into position to receive a new set of pins, the filled card is removed, and a new card inserted.

The material may be inserted between the crimpers and the filled card removed by hand,

if desired; but it is preferred to combine with the sticking mechanism means for feeding the material and delivering the filled cards, and one simple form of such a means is shown in the drawings. As shown, the material is fed to the crimping devices in the form of cards *e* by means of a series of grippers, which are intermittently moved to bring a new card between the crimpers and to deliver the filled card. The grippers 42′, four in number, are mounted on a disk 43, provided with a hub 45′, which is mounted to rotate on a hollow stud 44, secured to the base-plate of the machine. The stationary jaws 45 of the grippers are formed integral with the disk 43, and the movable jaws 46 are pivoted between lugs 47 on said disk. Springs 48 are interposed between the gripper-jaws and tend to hold said jaws open. A disk 49 is secured to the lower end of the hub 45′ and is provided with four notches 50. A pawl-carrying disk 51 is loosely mounted on the hub 45′ above the disk 49 and carries a spring-pressed pawl 52, adapted to engage the notches 50. The pawl-disk 51 is oscillated by means of a rack-bar 53, engaging teeth formed on said disk. The rack-bar carries a roll 54 at its end, which is held against a cam 55 by a spring 56. The gripper-carrier is locked in position after each forward movement by a bolt 57, which engages one of the notches 50. The bolt is withdrawn and advanced at the proper times by a cam 58. The cards are fed to the grippers from a table 59, provided with a side guide 60. Front stops 61 are mounted on the gripper-carrier to determine the position of the card in the grippers. The card, which is placed in the gripper in front of the table, is held by the gripper until it reaches the opposite side of the machine, or until the carrier has made a half-revolution, when the gripper is opened and the card drops through an opening 62 in the base-plate. The grippers are closed and released by a cam-surface 63 on the upper face of a disk 64. The disk 64 is secured to the end of a short shaft journaled in the stud 44 and having a pinion 65 secured to its lower end. The pinion 65 is engaged by a rack 66, which is reciprocated at the proper times by a cam 67. The cam-surface 63 extends half-way around the disk 64 and always underlies the movable jaw of the gripper holding the card which is between the crimpers. Supposing the parts to be in the position shown in Fig. 14, the gripper No. 1 in front of the feed-table will be closed, and the forward movement of the gripper-carrier will be about to begin. As the gripper-carrier moves forward gripper No. 1 carries a new card between the crimpers and gripper No. 2 carries the card to which the pins have just been applied over the opening 62. At the same time the disk 63 is moved in the same direction with the gripper-carrier, so that when gripper No. 2 reaches its position over the opening 62 the cam-surface 64 will still hold said gripper closed, and when gripper No. 4 reaches the position in front of the feed-table said gripper will remain open. The disk 63 remains in this position long enough for a card to be inserted in gripper No. 4, and then the disk 63 is moved back into the position shown in Fig. 14, thus allowing gripper No. 2 to open and drop the filled card and closing gripper No. 4. Thus at each forward movement of the gripper-carrier a filled card is removed and delivered and a new card inserted between the crimpers. In order to support the filled card as it is being carried from between the crimpers, a transverse rod 68 is mounted between the crimpers and the male crimpers are recessed at 69 to straddle said rod. Since one edge of the card to be crimped is held by the grippers and the material to form the loop or crimp must be drawn from the other edge, it is preferred to form the male crimper in two sections and to operate the sections successively, the section nearer the gripper being operated slightly in advance of the other section.

The pins may be deposited in the tubes 1 by hand or by any suitable means, and in Figs. 2 and 3 is illustrated one form of means for supplying pins to said tubes. As shown in said figures, the tubes 1 are twisted between their lower and upper ends, so that the pins rest upon their sides as they enter the ends of the tubes. The upper ends of the tubes are supported on guide-plates 70, which are provided with guide-grooves 71, with which the mouths of said tubes register. The guide-plates 70 have their upper ends in close proximity to traveling bands 72, which are provided with grooves 73 for receiving and carrying forward the pins. The bands 72 run over drums 74 and 75, and tables 76 are located over the drums 75 flush with the upper stretches of the bands. The pins are slid off of the tables 75 into the grooves 73 and are carried forward and delivered over the guide-plates 70 into the tubes 1. The bands 72 may be continuously driven by belts passing over pulleys 78 on the shafts of drums 74 and pulleys 79 on a shaft 80.

The means for giving the various parts the movements referred to will now be described.

The cylinder 5 is journaled in the standards 3 and 4 and has one end projecting beyond the stand 4, Fig. 12. A pinion 81 is secured to the end of cylinder 5 and is engaged by a segment 82 on a rock-shaft 83. The rock-shaft is rocked by means of a cam 84 on the driving-shaft 85, Fig. 1, which cam engages a roll on the end of an arm 86, secured to the end of said rock-shaft.

The rock-shaft 32 for raising and lowering the gripper-carrier is operated by a cam 87 on shaft 85, which engages the end of an arm 88, secured to shaft 32. The slide 29 is reciprocated by a cam-groove formed in a disk 89, which groove is engaged by a roll secured to the slide. The disk 89 is secured to a shaft 90, connected to shaft 85 by bevel-gears 91.

The opener-bar 8 is guided in the standards

3 and 4, Figs. 1 and 13, and has one end extending beyond the standard 3. This end of the opener-bar is secured to the end of an L-shaped slide 92, guided in a bracket 93, secured to the base-plate. A spring 94 surrounds the bar 8 between the standard 3 and the arm 92 and holds said bar in its normal position. The bar is moved laterally against the tension of the spring by a cam 95, which engages the end of arm 92. A stop 96 determines the normal position of the opener-bar. The cam 95 is secured to a shaft 97, driven from the shaft 90 through gears 98. The guide-plate 37 is guided in ways formed in the standards 3 and 4 and is operated by an arm 99, the end of which engages a recess in said plate. The arm 99 is secured to a rock-shaft 100, which is operated by a cam 101, secured to the shaft 85 and engaging the end of an arm 102, secured to shaft 100, Fig. 1.

The male crimpers are guided in the standards 3 and 4, Fig. 11, and are held in their lower position by springs 103. The crimpers are moved upward to crimp the material by cams 104 on the shaft 97, which engage the outer ends of levers 105, the inner ends of which bear against arms 106, depending from the crimpers. The female crimper is reciprocated by means of arms 107, secured to a rock-shaft 108 and engaging recesses in said crimper. The shaft 108 is rocked by a cam 109 on shaft 97, which cam engages the end of an arm 110, secured to shaft 108.

The closer-bar is rocked by means of a segment 111, Figs. 1 and 12, secured to a rock-shaft 112, which segment engages a pinion 113 on the end of said bar. The shaft 112 is rocked by a cam 114 on shaft 85, which cam engages the end of an arm 115, secured to shaft 112. A collar 116 is secured to the end of the closer-bar outside the pinion 113 and is provided with an annular groove. The groove is engaged by pins 116 on the ends of a yoke 117, formed in the end of a bell-crank lever 118. The bell-crank lever 118 is rocked in one direction to move the closer-bar laterally by a spring 119, and in the other direction by a cam 120, secured to the shaft 85 and engaging the end of said lever.

The lever 25 is operated to close the grippers 11 by a cam 121 on the shaft 97, said lever being held against said cam by a spring 122. The lever 42 is operated to release the grippers by a cam 123 on shaft 97.

The cams 55, 58, and 67 for operating the card-feeding mechanism are secured to a shaft 124, driven from the shaft 97 by gears 125.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a machine for sticking safety-pins, the combination of mechanism for sticking safety-pins, and means for presenting the material upon which the pins are to be stuck to said mechanism.

2. In a machine for sticking safety-pins, the combination of mechanism for sticking safety-pins, and means for presenting the material upon which the pins are to be stuck to said mechanism and delivering the filled material.

3. In a machine for sticking safety-pins, the combination of mechanism for sticking safety-pins, means for delivering pins thereto, and means for presenting the material upon which the pins are to be stuck to said mechanism and delivering the filled material.

4. In a machine for sticking safety-pins, the combination of crimpers, means for feeding the material to said crimpers, means for thrusting the points of one or more pins through the material, and means for closing the pins.

5. In a machine for sticking safety-pins, the combination of crimpers, means for feeding the material to said crimpers, means for opening the pins, thrusting said pins through the material, and closing said pins.

6. In a machine for sticking safety-pins, the combination of crimpers, means for feeding the material to said crimpers, means for feeding the pins, means for opening the pins, thrusting said pins through the material, and closing said pins.

7. In a machine for sticking safety-pins, the combination of means for moving the point of a pin away from the catch and means for moving the catch laterally.

8. In a machine for sticking safety-pins, the combination of a rotary bar provided with one or more slots for holding pins, and means for arresting the movement of the ends of the pins.

9. In a machine for sticking safety-pins, the combination of a rotary bar provided with one or more slots for holding pins, an opener-bar for engaging the ends of the pins, and means for moving one of said bars laterally.

10. In a machine for sticking safety-pins, the combination of a rotary bar provided with one or more slots for holding pins, an opener-bar for engaging the ends of the pins, means for moving the opener-bar laterally, and means for withdrawing the pins from said slots.

11. In a machine for sticking safety-pins, the combination of a bar having one or more slots extending therethrough, a stop in front of said bar, a laterally-moving opener-bar for engaging the ends of the pins, and means for withdrawing the pins from said slots.

12. The combination with a magazine for the pins, of a separator provided with a slot to register with the mouth of the magazine, a stop on said separator for retaining the pins in the magazine, and means for reciprocating said separator.

13. In a machine for sticking safety-pins, the combination of one or more chutes, a bar having one or more slots registering with said chutes, one or more reciprocating grippers, and means for rocking said bar to carry the rear ends of the pins into said grippers.

14. In a machine for sticking safety-pins, the combination of one or more reciprocating grippers, means for delivering the pins to said grippers, and opening said pins.

15. In a machine for sticking safety-pins, the combination of one or more reciprocating grippers, means for delivering the pins to said grippers, means for opening the pins, crimpers, and means for closing the pins.

16. In a machine for sticking safety-pins, the combination with crimpers, of one or more grippers for thrusting the pins through the material.

17. In a machine for sticking safety-pins, the combination with crimpers, of one or more grippers for thrusting the pins through the material, and means for closing the pins.

18. In a machine for sticking safety-pins, the combination of one or more grippers, for thrusting the points of the pins through the material, and one or more cam-surfaces for forcing the catch of the pins toward the point.

19. In a machine for sticking safety-pins, the combination of one or more grippers for thrusting the points of the pins through the material, and one or more cam-surfaces for forcing the catch of the pins toward the point, and means for moving the catch laterally.

20. In a machine for sticking safety-pins, the combination of crimpers, means for thrusting the points of the pins through the material, and one or more conical guides for guiding the points to said material.

21. In a machine for sticking safety-pins, the combination of crimpers, one or more reciprocating grippers for thrusting the points of the pins through the material, and one or more conical guides for guiding the points to said material.

22. In a machine for sticking safety-pins, the combination of a female crimper, a male crimper provided with one or more grooves for the passage of the pin-points, and a reciprocating guide-plate provided with one or more guides for directing the points to said grooves.

23. The combination with means for feeding the material, of male and female crimpers, one of said crimpers being formed in two sections, and means for operating said sections successively.

24. In a machine for sticking safety-pins, the combination of means for thrusting the points of the pins through the material, a pivoted closing-bar for engaging the catch of the pins, and means for rocking said bar and moving said bar laterally.

25. In a machine for sticking safety-pins, the combination of means for thrusting the points of the pins through the material, a closing-bar provided with one or more recesses for receiving the catches of the pins, and means for rocking said bar and moving said bar laterally.

26. The combination, in a machine of the character described, of reciprocating gripper-jaws to grasp the pin and insert its point in the card or paper and a presser and means to actuate the same to close the pin.

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Witnesses:
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