Aug. 15, 1933. W. VON CONTA 1,922,608

SAFETY PIN CARDING MACHINE

Filed Oct. 7, 1930 4 Sheets-Sheet 1

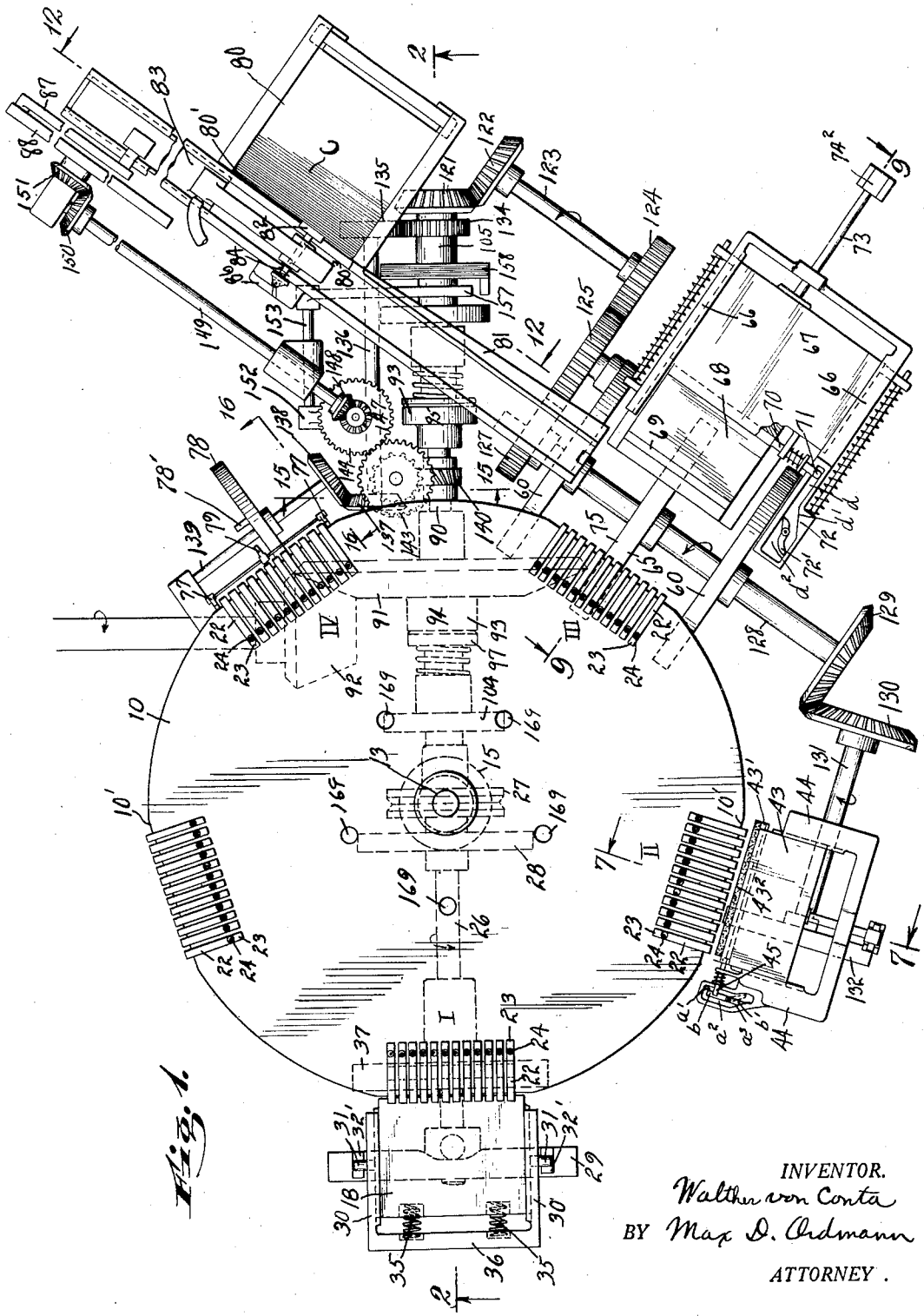


Fig. 1.

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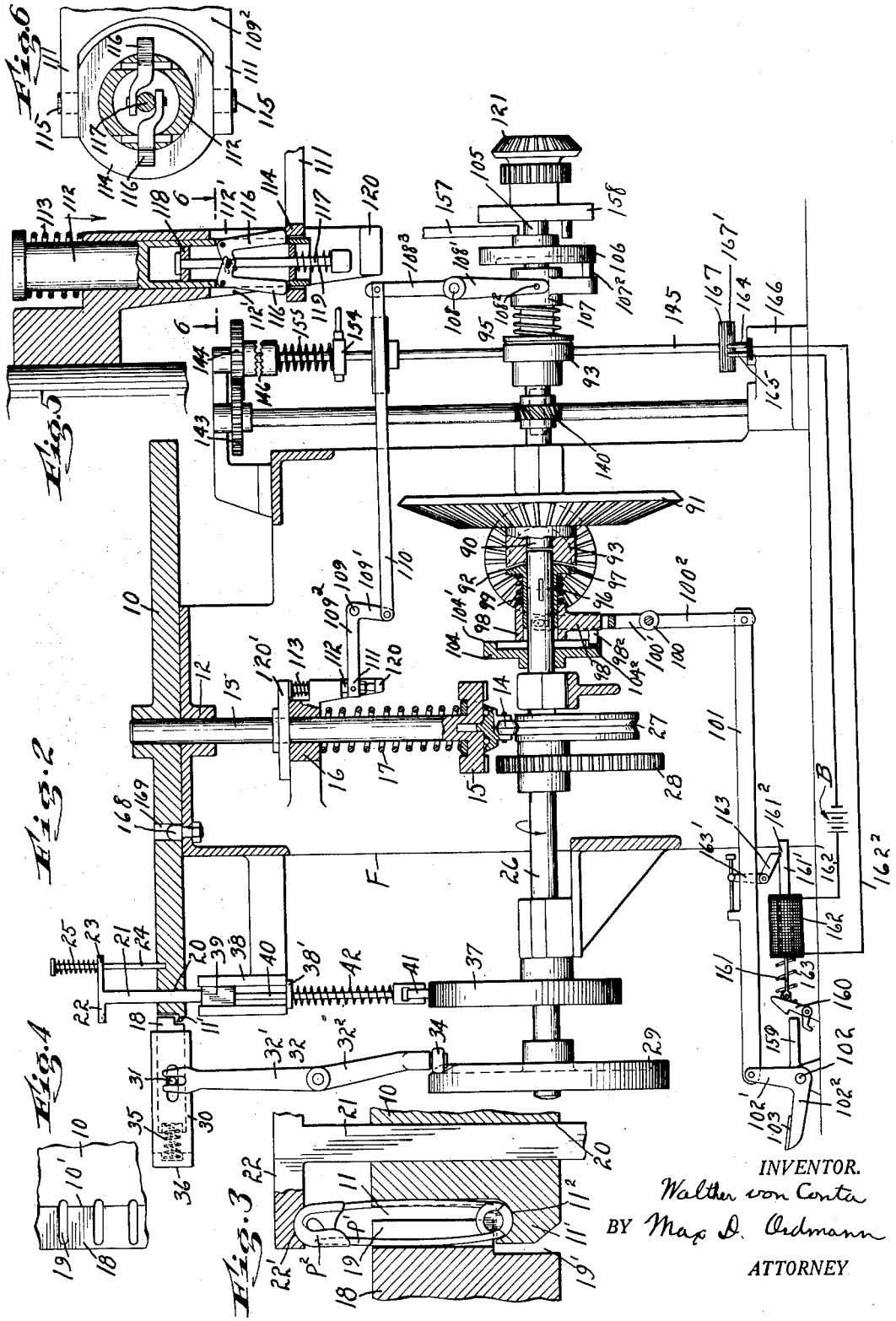


Fig. 6

Fig. 5

Fig. 2

Fig. 4

Fig. 3

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SAFETY PIN CARDING MACHINE

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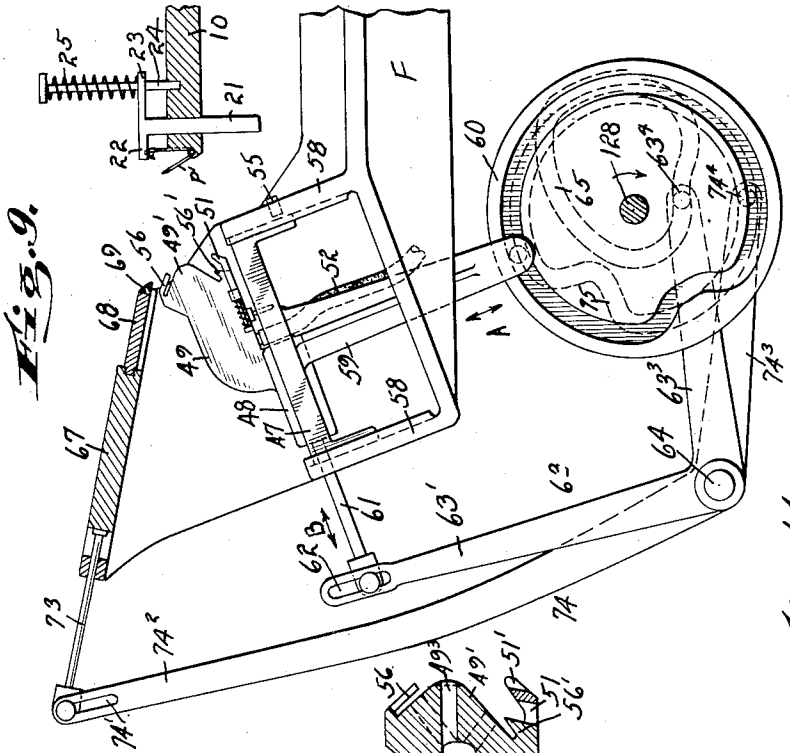


Fig. 9.

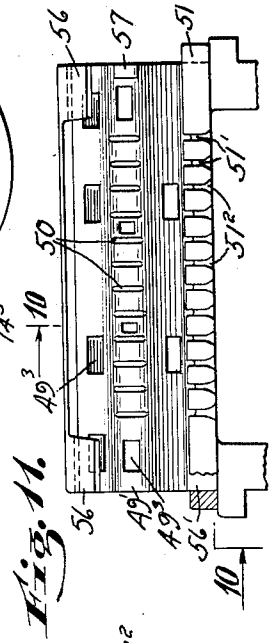


Fig. 11.

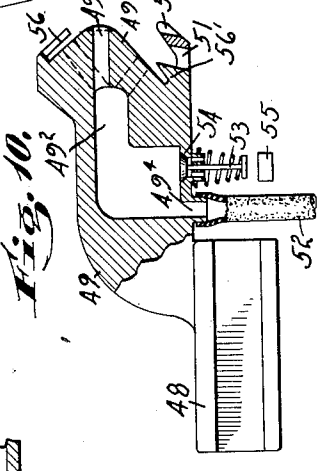


Fig. 10.

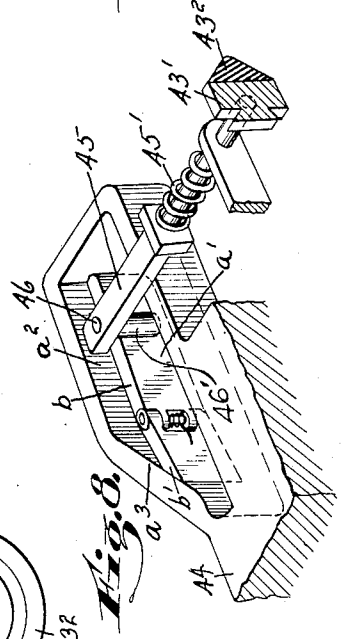


Fig. 8.

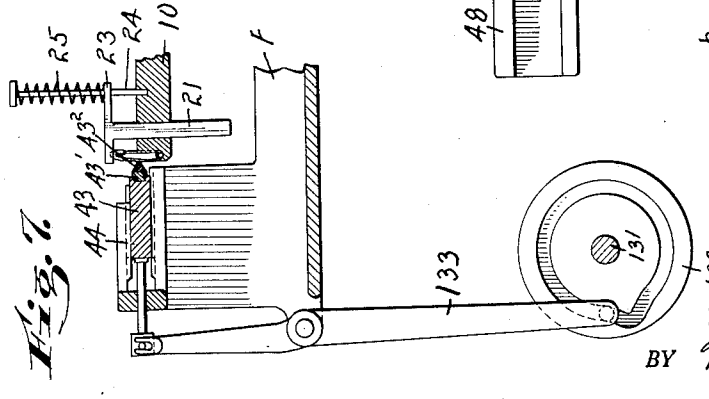


Fig. 7.

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SAFETY PIN CARDING MACHINE

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Fig. 12.

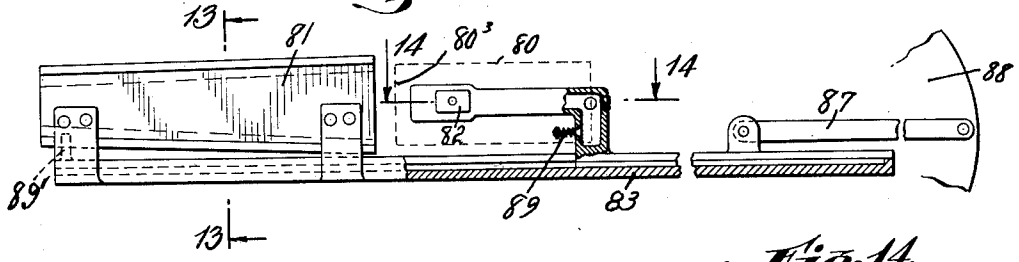


Fig. 13.

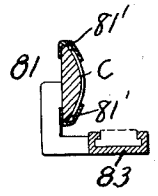


Fig. 14.

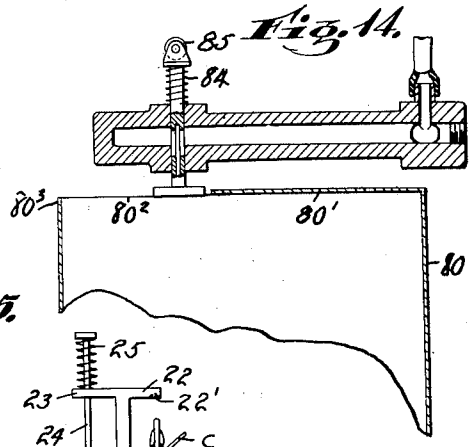


Fig. 15.

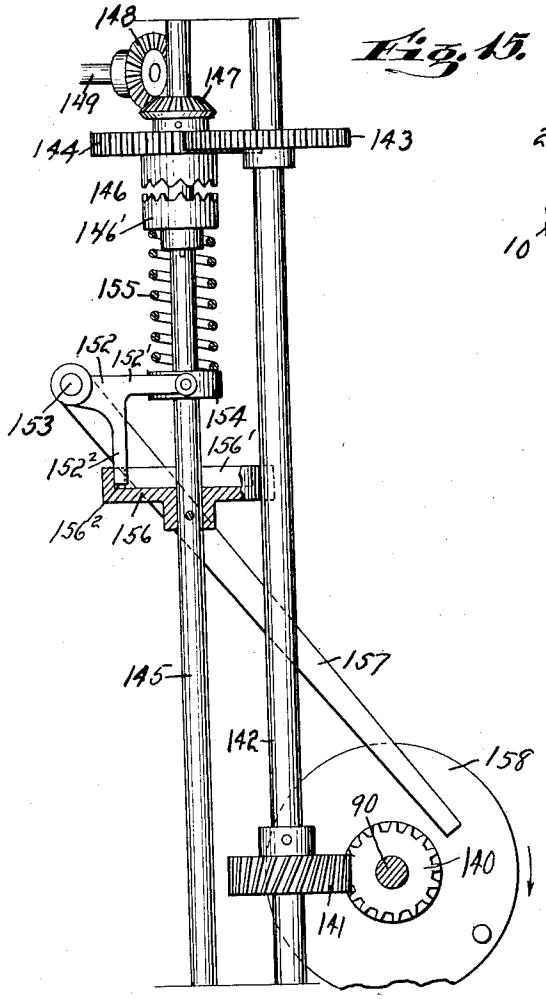
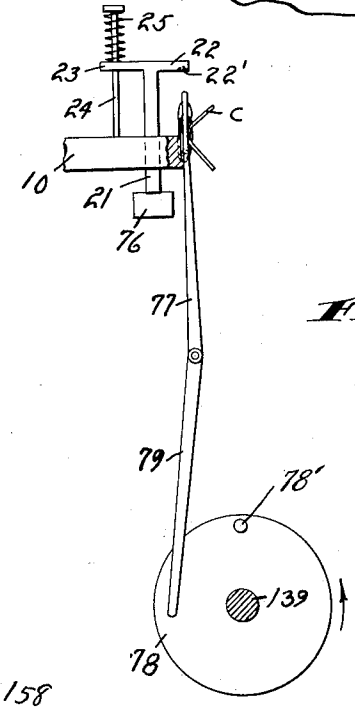


Fig. 16.



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UNITED STATES PATENT OFFICE

1,922,608

SAFETY PIN CARDING MACHINE

Walther von Conta, Brooklyn, New York

Application October 7, 1930. Serial No. 487,073

8 Claims. (Cl. 163—8)

The present invention relates to a machine for carding safety pins or the like.

It has been common practice in preparing safety pins for the market to mount the same in convenient numbers such as dozens or the like on suitable cards. The safety pins as they come from the manufactory are usually closed and the method of mounting such pins upon said cards has been a manual one which involved the operation of first opening the pin, mounting the latter on said card and then closing the said pin again. This procedure of course has been a time consuming one, adding to the cost of the manufacture of said pins. I am aware that there have been previous attempts to develop a machine which would accomplish the above indicated manual operations. However, to the present time no satisfactory machine for so doing has been perfected.

One of the primary objects of the present invention is the provision of a machine wherein the closed pins coming from said manufactory may be directly inserted into a new machine, automatically opened therein, mounted on the cards and closed again and then removed in carded condition from said machine.

A further object is the provision of a machine wherein the above described operations may be carried on with a minimum expenditure of time.

Still another object is the provision of a machine wherein simultaneously the requisite number of pins may be mounted on respective cards.

A further object is the provision of a machine using a step by step sequence of operation whereby, if necessary, the individual steps above enumerated may be controlled by the operator.

A further object is the provision of a machine provided with intermittent drive mechanism so devised that at each step of the intermittent drive the sequence of steps above enumerated occurs in chronological order at the respective operational positions of said machine.

Still another object is the provision of novel means in the said machine whereby the cards may be fed to the mounting position and likewise removed from the latter without being damaged.

Yet another object is the provision of novel control means for causing the enumerated sequence of steps to occur.

And still another object is the provision of a machine in as simplified a form as possible whereby the cost of manufacture is reduced to minimum and stoppage periods due to the failure of parts or the like is likewise reduced to a minimum or entirely eliminated.

With the above and many other objects in view, which will be apparent from the following disclosure, my invention comprises the novel combination, arrangement and construction of elements to be hereinafter more fully described and shown in the accompanying drawings and defined in the appended claims.

In the accompanying drawings which form part of this specification and in which similar reference characters denote corresponding parts:—

Fig. 1 is a diagrammatic top plan view showing the general lay-out of my machine;

Fig. 2 is a section along line 2—2 of Fig. 1 showing also a part of the drive mechanism;

Fig. 3 is a sectional detail showing the pin mounting mechanism.

Fig. 4 is a partial top plan view of the portion of the pin mounting mechanism formed or mounted on the rotary table;

Fig. 5 is a sectional detail of one of the drive control means;

Fig. 6 is a section along line 6—6 of Fig. 5 seen in the direction of the arrows;

Fig. 7 is a section along line 7—7 of Fig. 1 showing in detail the pin opening mechanism;

Fig. 8 is a perspective detail of the one of the cam guides of said pin opening mechanism;

Fig. 9 is a section along line 9—9 of Fig. 1 showing in detail the mechanism for mounting the cards to the pins and also for closing said pins after said cards have been mounted thereto;

Fig. 10 is a sectional detail along line 10—10 of Fig. 11 of the card mounter seen in the direction of the arrows;

Fig. 11 is a front view of said card mounter;

Fig. 12 is a partial sectional view along line 12—12 of Fig. 1 seen in the direction of the arrows;

Fig. 13 is a section along line 13—13 of Fig. 12;

Fig. 14 is a section along line 14—14 of Fig. 12;

Fig. 15 is a partial sectional view showing in detail the control for the card feeding mechanism and is a section along line 15—15 of Fig. 1; and

Fig. 16 is a sectional detail along line 16—16 of Fig. 1 showing the card remover mechanism.

Referring now to the mechanism shown in the drawings 10 denotes a horizontally mounted table circular in form, and provided with a plurality of equispaced segments, shown in the present instance as five in number, though any convenient number of four or more may be employed. The said segments are formed with straight edges 10' along the circumference of said table. Each of the straight circumferential edges 10' has a cut-away portion 11 having at its bottom the shoulder 11' provided with curved recesses 11^2, the latter forming rests wherein the rounded spring ends of the pins may rest. Projecting downwardly from the center of the table through a suitable bearing 12 on the frame F of the machine is a shaft 13 to which is mounted at its lower end a cam roller 14. Also fixedly mounted to said shaft above the said roller is a gear 15 for a purpose hereinafter to be described. A second bearing 16 on the machine frame is arranged intermediate

the ends of said shaft 13 in which the latter is also rotatably borne. Mounted about said shaft and between the lower edge of the bearing 16 and the top face of gear 15 is a compression spring 17 which tends to continuously urge said shaft 13 downwardly into the lowermost slidable position.

In the position marked I in Fig. 1 of the drawings, I provide a horizontally slidable member 18 which is adapted to cooperate successively with the respective straight edges 10' of the table as the latter is rotated. The said member has a front edge corresponding in length to that of said straight edges 10' and formed along said edge are a plurality of transverse grooves 19 so admeasured as to permit pins to be mounted therein and having a depth equal to or slightly greater than that of the depth of the cut away portion 11 of said table. Along the bottom of said grooved edge the slidable member 18 is cut away as at 19' so that the shoulder 11' of said table 10 may project therein when said member 18 is in operative position. When the latter is in operative position, i. e., when the grooved portion of the edge thereof projects into the cut away portion 11 the operator may insert closed safety pins in the respective grooves 19 with their heads up and the spring ends of the latter rest in the curved recesses 11^2 in shoulder 11'. This affords convenient means of properly arranging the pins on the table 10. Now then, in order to retain the said pins on said table after they have been arranged the following means are provided. Slidably mounted through suitable openings 20 in the table 10 are a plurality of plunger members 21 each of which is provided at its upper end with a laterally extending arm 22, which is in vertical alignment with one of said curved recesses 11^2. Formed near the free ends of said arms in the lower faces thereof are rounded indentations 22'. Projecting laterally from each of said plungers 21 in opposite direction to the arms 22 are second arm members 23 which slidably engage vertical guide posts 24 which later are mounted to the table top. Suitably mounted on the said posts 24 are spring means 25 which continuously tend to urge arms 23 and consequently arms 22 and the plunger 21 into their lowermost vertical slidable positions. When the said arms 22 are in said lowermost positions the heads of the respective pins become engaged in the indentations 22' whereby the pins are rigidly held between said shoulder and the arms 22. When so engaged it is possible to remove the slidable member 18 without disturbing the pins and the latter are now mounted to the table 10. After the pins are so mounted on the table the table must be moved or rotated to the next position marked II in Fig. 1. Before this can occur the slidable member 18 must have been moved backward so that the table is cleared and the table 10 must have been moved upwardly. In order to accomplish the above indicated sequence of steps I employ the following drive mechanism.

A shaft 26 extending parallelly to the direction of reciprocal motion of the member 18 and suitably journaled in bearings attached to the frame of the machine is provided. Mounted on the said shaft intermediate its ends and directly in vertical alignment with the roller 14 and adapted to cooperate therewith is a cam 27. The shape of the cam will be hereinafter described it sufficing for the present to state that the function of the same is to move the table 10 up and down during certain predetermined periods. Also fixedly mounted to said shaft 26 in eccentric manner is a gear 28 which latter is adapted to mesh with gear 15 only while table 10 is in its uppermost position thereby imparting a partial rotation to the latter sufficient to bring it to the next succeeding operative position, e. g. from position I to position II in Fig. 1. Likewise mounted to said shaft 26 is a second cam 29 for imparting reciprocal motion to the slidable member 18 in a manner to be hereinafter described.

The member 18 which may be of a thickness approximately equal to the thickness of the table 10 is slidably engaged between two parallelly mounted rails 30 which latter are suitably supported from the frame of the machine. Also projecting from each of the lateral edges of said member 18 and adapted to extend between and through the guide rails are pin members 32. Pivotally supported below said table member preferably centrally located with respect to the lateral edges of said table member and on the frame of the machine is a double armed lever 32, the upper of whose arms is divided into two fork branches 32' which branch out and extend upwardly along the outer edges of said two rails 31 and engage the respective pin members 32. The other arm 32^2 of said lever projects downwardly and at its free end is provided with a cam roller 34 which latter is adapted to engage the cam 29. Means for continuously urging the member 18 forwardly against the table 10 is provided and may also in the present instance comprise a spring or springs 35 mounted at the rear of member 18 and engaging a cross bar 36. Thus by suitable rotation of cam 29 reciprocal motion of table member 18' may be obtained.

A third cam member 37 is mounted on shaft 26 between the two aforementioned cams 27 and 29 and this cam is employed for operation of the pin clamping members 22. Mounted in a slide 38 to the frame above the cam 37 is a cross bar 39 so admeasured in length as to engage all the plungers 21 and provided with a plunger 40 the lower end of the latter having a cam roller 41 which latter is adapted to engage the surface of cam 37. A plate 38' attached to the slide 38 is provided through which the plunger 40 slides and a suitable spring means 42 serves to continuously urge the roller 41 of said plunger against said cam 37. The cross bar 39 is so situated that when the pin mounting mechanism is directly opposite the starting position I the plungers 21 thereof will be in vertical alignment with the former so that when the table is lowered and the plunger 40 is actuated by its cam 37 the plungers 21 will be moved upwardly to their uppermost position so that the operator may freely insert the pins into the respective grooves 19 in member 18 when the latter abuts on the straight edges 10' of said table 10.

After the pins have been mounted to the table the latter is rotated in a manner to be presently described, carrying the pins to the position marked II in Fig. 1 whereat the pins are adapted to be opened. The means for opening the pins at position II may comprise the following mechanism:—

Provided at said position II is a horizontal slidable carriage 43 which latter is adapted to slide in suitably arranged guides 44. The front end of said carriage is provided with a laterally slidable portion 43' which has over its entire front edge a resilient strip 43^2 made of rubber or any other suitable material which may taper to a pointed edge as shown if desired. This resilient

edge is adapted when the carriage is slid forwardly to engage the free arms P' of the pins held in the table 10. The motion which must be imparted to said edge is as follows:—

It must be moved forwardly until pin arms P' of the pins are pushed clear of their respective locking heads P^2. Thereafter the edge must be displaced laterally and then moved rearwardly in displaced lateral position permitting the pin arms to come free from the heads and thereby opening the said pins. After the pins have been opened the edge must be returned to its initial position. Suitable cam means to be presently described serves to reciprocate the carriage to produce the forward and backward movement of said edge. In order to obtain the lateral motion of said edge one of the guide rails 44 is provided at its end with a cam means having a shape which is as follows:—

The said cam means comprises two straight grooves a' and a^2 parallel to the reciprocatory direction of motion of the carriage 43 and separated by a wall b said wall however, being shorter than the length of either of said grooves so that they communicate with each other both at their front and rear ends. The rear end of said groove a^2 tapers at a^3 to rejoin groove a'. Pivotally mounted to the rear end of wall b is a wall section b' which is spring actuated and prevents entry into slot a^2 except through its forward end.

The lateral slidable portion 43' of the carriage member 43 has projecting from one of its sides an arm 45 to which is mounted a pin member 46 which may have a cam roller 46' formed thereon which latter is adapted to move in the grooves a' and a^2. Suitable spring means 45' tends to continuously urge said roller 46' toward the far side of said groove edges. It will readily be seen that the requisite motion of edge 43^2 is obtained, for when the carriage 43 is moved forwardly edge 43^2 engages the pin arms P' of the pins while roller 46' is in slot a' and continues to move forwardly until said pin arms are clear of locking head P^2 at which time roller 46' will clear the forward end of wall b and spring 45' will laterally shift member 43' causing the pin arms P' which are still in engagement with edge 43^2 to clear the heads P^2. The roller 46' at the same time enters groove a^2. Then when carriage 43 is moved backward, said member 43^2 moves backward while still in laterally displaced position until the pin arms P' are in front of heads P^2 and then roller 46' engages in the slanting portion a^3 of groove a^2 and moves past hinged wall b^2 back into groove a' to its original position and at the same time member 43^2 comes clear of pin ends P'. The pins are now open. From position II the table may be rotated as will be described until the opened pins carried by it will be brought into the position marked III in Fig. 1 whereat the cards are to be mounted onto said opened pins and there after the cards have been mounted the pins are closed. The card mounting mechanism comprises as shown in Figs. 9, 10 and 11 the following:—

Slidably mounted between two rails 47 in grooves is a slidable plate member 48 which is adapted to be moved to and from the table 10. Formed at the forward end of said plate member 48 is the card mounter 49. The front curved face 49' of the latter is formed with a plurality of equispaced transverse grooves 50 so as to guide the open pins arms P' during the card mounting operation.

Resiliently mounted along the lower edge of said face 49' is a pin guide member 51 which has a plurality of transverse grooves 51' in alignment with grooves 50 and whose lower ends are flared as at 51^2 so as to guide the open pin ends P' into said grooves 50 and facilitate the mounting of the cards on said pins.

The interior of the card mounter 49 is formed with a plurality of passageways 49^2 which terminate in the open ends 49^3 along the surface of the curved face 49'. The other ends of said passageway converge to a common outlet 49^4 to which latter may be attached a suction line 52 connected to a suction pump (not shown). A suitable control valve 53 closes an auxiliary opening 54 to the outlet 49^4. When the valve 53 is opened by having its free end abut a suitable stop 55 the air stream is drawn in through opening 54 and suction action existing at the openings of the passageways 49^2 is released. The curved edge 49' is provided at its two upper corners with hanging lips 56 and along its entire bottom edge with a lip 56' and also with a stop member 57 near one edge whereby the pin mounting cards pushed into the curved edge 49' may be accurately positioned for a purpose to be presently described.

The guide rails 47 themselves are displaceable in a direction at right angles to the motion of the member 48 in suitable guide rails 58 which latter are suitably attached to the frame F of the machine.

The guide rails 47 are suitably attached to one or more downwardly projecting arms 59 which latter project through suitable openings in the frame mounting. The free end of said arms is provided with a cam roller which engages a suitable cam or cams 60 which serves to reciprocate said arm and consequently said rails 47 in the direction of the arrows A of Fig. 9. Adapted to engage the rear end of slidable member 48 is an arm 61, the free end of which pivotally engages in a slot 62 in one arm 63' of a double armed lever 63 suitably pivoted as at 64. The other arm 63^3 has provided at its free end a cam roller 63^4 which engages in a suitable cam 65 mounted on the same shaft as said cam 60 and said cam 65 serves to reciprocate member 48 in the direction of the arrow B of Fig. 9. It will be seen therefore that motion imparted to the card mounter 49 is a rectangular one for the sequence of operation of motions imparted to the said member is first to move it forwardly by sliding member 48 then downwardly by means of the moving guide rails 47, then rearwardly by again moving slidable member 48 and then upwardly by again moving guide rails 47. In the cycle of motion just described in the following operations occur:

On the forward motion of slidable member 48 the card mounter 49, on whose face 49' a card has been previously mounted as will be presently described, is moved forwardly directly over the open pin arms P'. On the second motion which is the downward one the pins enter the guide grooves 51 through their flanged lower ends, thence through the punched holes in the curved cards held on said mounter 49. When the rails 47 reach their lowermost position the valves 53 is opened by striking the abutment 55 so that the card is now only loosely held on mounter 49. Thereafter intermediate the downward motion of mounter 49 and the second rearward motion of the latter a pin closer to be presently described must come into operation. After the

pins are closed the card mounter 49 is moved rearwardly as previously described and then moved upwardly returning to its initial position. However, before the said card mounter moves rearwardly, the means for opening the valve 53 in order to release the suction action from the card held in said mounter 49 is actuated as above described.

The pin closure means above mentioned is also cam controlled and may comprise the following:

Slidably mounted in suitable guide members 66 is a member 67 to the front end of which is mounted a laterally slidable member 68 and which latter has mounted at its front edge a resilient strip 69 or other suitable material for engagement with the open pin arms P'. This strip 69 must move forwardly to engage the pin arms P' after the card has been mounted thereon and before the card mounter 49 has been withdrawn. The motion which the strip 69 must follow in the closing operation is as follows:—

After engaging the pin arm P' and before the latter reaches the head P^2, the pin arm P' must be displaced laterally and then moved forwardly until it is well behind the catch of the head and then moved laterally in the opposite direction until the pin is directly in line with the catch mechanism and then the member 69 must move rearwardly permitting the pin to be caught by said head. The lateral motion is produced in a manner similar to the manner in which the pin opener is moved laterally by provision of a pin member 70 projecting laterally from one of the side edges of member 68 and provided at its free end with a cam roller 71 which latter engages in a cam groove 72 formed in one of the guide members 66. The said groove has a doubled armed lever 72' pivotally mounted therein and tends by means (not shown) to continuously maintain the oblique position shown in Fig. 1. The groove is divided into the straight portion *d* parallel to the direction of reciprocal motion of member 67, the oblique portion *d'* and the third portion d^2 and the cam roller 71 moves in the said grooves in the order named thereby causing the strip 69 to execute the requisite pin closing motion, when the member 67 is moved in its guide members 66. In order to impart the requisite reciprocal motion to member 67 the latter has projecting from its rear edge an arm 73 which pivotally engages a slot 74' in an arm 74^2 of a double armed lever 74 which may also be pivoted on shaft 64. The second arm 74^3 is provided at its free end with a cam roller 74^4 which engages a cam 75 mounted on the same shaft as cams 60 and 65.

After card mounter 49 has cleared the table 10 and the card has been mounted on said pins and the latter closed the said table is again rotated to the next succeeding position wherein the card mounted pins are removed from said table. This is the position marked IV in Fig. 1. In this position guide 76 fixedly mounted to the frame is provided on which the plungers 21 are adapted to rest when the table 10 is lowered into position IV whereby the members 22 will be raised, releasing the heads of the pins from the indentations 22'. Suitably mounted to the frame of the machine in pivoted manner are two levers 77 which project upwardly and are adapted when table 10 is in its lowered position to lie between the table edge 10' and the back face of the cards. A suitable cam 78 controlled in the manner to be described is adapted to actuate an arm 79 which is connected to both arms 77 and serves to intermittently actuate the latter arms to strike off the card mounted pins from the table 10 when said pins have been released by the members 22.

A suitable chute (not shown) may be provided at this position IV into which the card mounted pins may fall, to carry the latter to suitable packing position.

The card feeding mechanism which is used to feed cards to the card holder 49 may comprise a container 80 in which the cards C are held and which are urged toward the outlet end of the container by any suitable means of well known type such as spring or weight operated pushers. The top of said holder is provided with a partial cover 80' to prevent the cards from being pushed out therethrough. Adjacent the uncovered portion 80^2 of the holder and in proximity to the edge 80^3 of said container but arranged slightly higher than the latter and adapted to bridge the gap between said edge 80^3 and the side of the curved face 49' of card mounter 49 when the latter is in its normal position is a shaper 81 which starts at said edge 80^3 as a flat surface and gradually changes its curvature in progressively increasing degree until at its other end its curvature is equal to the curvature of surface 49' whereby a flat card from said container upon being slid along said surface gradually becomes increasingly curved so that when it emerges from said shaper it may be directly slid onto said surface 49' which at this instant is in direct alignment with the outlet opening of said shaper. To guide said card along said shaper suitable tracks 81' are formed about said shaper surface which permit only one card at a time to be drawn along the latter.

The means for sliding the cards from holder 80 over said shaper and onto said surface 49' may comprise a slidable suction head 82 guided on a track 83. The said head is displaceable laterally away from the cards in the container and is provided with spring means 84 or other suitable means for continuously urging it away from said cards in said holder 80. A suitable cam roller 85 at the free end of said head is adapted to ride on a cam surface 86 whereby said head is urged towards said cards in the holder when it is directly over the uncovered portion 80^2 of said holder whereby the top card of the pack in said holder is gripped by said head. As soon as the head is moved in the direction of shaper 81 the roller 85 rides off cam 86 causing the head to be displaced and to carry with it the top card which is slid out from the pack over the shaper and onto the surface 49'. The reciprocal movement of head 82 may be controlled by a crank arm 87 which latter is pivotally mounted to a rotatable plate 88 driven in turn in a manner to be presently described. The suction action through head 82 may be released when the latter has mounted a card on surface 49' by a suitable valve 89 which strikes a fixed arm 89' at this time. Suitable means (not shown) of well known construction may be provided for keeping this valve open until the head returns to normal position.

Having now described the requisite sequence of operation and apparatus used with the various steps it becomes incumbent to describe the driving mechanism for accomplishing the sequence of operations of the various mechanisms.

A suitable main driving shaft 90 is provided which may be driven through a gear 91 from a power source represented by gear 92. The ends

of shaft 90 are each provided with a disk 93 respectively which form parts of friction clutches 94 and 95 and each at its front face has a friction surface.

Slidably mounted on one end of shaft 26 on a bushing 96 is a friction head 97 adapted to engage the corresponding friction surface of disk 93 and is adapted when so engaged to transmit the rotary motion of shaft 90 to shaft 26. Slidably and rotatably mounted over said bushing 96 is a collar 98 which has a projecting wing 98′ which latter is formed with a laterally extending pin member 98^2 for a purpose to be presently described. A suitable compression spring 99 is mounted on said bushing between head 97 and collar 98. To slide said collar 98 and consequently said head 97 into frictional engagement with said friction disk 93 one arm 100′ of a double armed lever suitably pivoted as at 100 may engage said collar 98. The other arm 100^2 is connected by a bar 101 to an arm 102′ of a double armed lever pivoted to the frame F as at 102. The other arm 102^2 of said lever may be formed at its end as a foot pedal 103 or with any other type of operating handle. Depression of said pedal causes the clutch head to engage said friction disk and thereby permits transmission of power to shaft 26.

It is necessary that the motion transmitted to shaft 26 be just a single revolution each time the foot pedal 103 is actuated and to accomplish this the following expedient is employed.

Fixedly mounted on the shaft 26 adjacent the rear end of collar 98 is a cam 104 which merely comprises a disk on the face 104′ of which there is provided a depression 104^2. The pin 98^2 on callar wing 98′ is adapted to rest in said depression 104^2 and when it is therein the friction head 97 does not engage disk 93. As soon as the pedal 103 is actuated as previously described, the head 97 engages said disk 93 and the said pin 98^2 clears the depression 104^2, and as soon as the said shaft 26 rotates the pin can no longer engage in the depression but must ride along the surface 104′ which is flat until the depression again registers with said pin which only occurs at the end of a complete revolution whereupon the pin reengages the said depression and permits the friction head 97 to disengage disk 93. To cause further rotation the operating pedal 103 must again be depressed.

The shape of the cams 27, 29 and 37 must be such and they must be so timed relative to each other on shaft 26 that when rotation is imparted to said shaft, first, plunger 40 is lowered by cam 37 so that the pins are engaged between arms 22 and shoulder 11′. Immediately thereafter cam 29 must actuate slidable member 18 and move it away from table 10 and so retain it until the end of the revolution. Immediately after cam 29 has acted, cam 27 must raise table 10 and keep it in raised position until gear 28 meshes with gear 15 and rotates said table to carry the mounted pins from station I to station II at which moment the table will again be lowered to normal position. At this same time, cam 29 will have reciprocated member 18 into normal position again and cam 37 will have raised plunger 41 to operate the next succeeding group of plungers 21. The exact form of said cams is mechanical detail which does not form part of this invention.

Having now described the drive mechanism at the first position we pass to the driving mechanism which operates the devices in the other three positions. Suitably mounted in alignment with shaft 26 and 90 at the other end of the latter is a shaft 105 which has formed at its end adjacent the shaft 90 the clutch mechanism 95 identical with the clutch mechanism 94, and controlled in the same manner to produce a single revolution by a cam 106 which engages a pin 107^2 on a collar 107 which is identical with collar 98. One arm 108′ of a double armed lever is pivoted as at 108 and is pivotally connected to the collar 107 as at 108^2. A double armed lever pivotally mounted to the frame as at 109 is also provided and the arm 109′ thereof pivotally engages an operating bar 110 which at its other end engages arm 108^3 of said first named double armed lever. The other arm 109^2 of said second named lever is formed at its free end with a fork 111. Slidably mounted in the bearing 16 is a plunger 112 which is continuously urged upwardly by a spring 113. Slidably mounted on said plunger and adapted to lie between the fork arms 111 is a collar 114 provided with oppositely arranged pivot pins 115 which suitably engage the fork arms 111. The lower end of said plunger 112 is hollowed out interiorly and provided along the side edges with slots 112′. Pivotally mounted in each of said slots is an L shaped arm 116 one arm of which extends longitudinally in the direction of its respective slot and the other arm of which extends inwardly into said hollowed out portion of said plunger and the free ends of the inwardly extending arm, by a pin and slot connection, engage a plunger 117, which latter is slidably mounted in suitable bearing 118 for longitudinal sliding in said hollowed out portion of said plunger. The said plunger 117 extends beyond the lower end of the plunger 112 and suitable spring means 119 tends to continuously urge the said plunger into its lowermost position. In this latter position the L shaped arms which are parallel to their respective slots 112′ protrude beyond the surface of said plunger so that when the latter is moved downwardly the said arms engage the collar 114 and consequently force arm 109^2 downwardly. A suitable abutment 120 attached to the machine frame in the path of the end of said plunger 117 is provided and as the said plunger 112 moves downwardly the lower end of plunger 117 will come in contact with the abutment 120 and be forced upwardly relative to the plunger 112, thereby causing the said arms 116 to be rotated inwardly and permitting the collar 114 to slide upwardly over the plunger 112. The upper end of plunger 112 is actuated by a suitable collar 120′ attached to shaft 13 so that when the table is lowered the above sequence of steps occurs. It will thus be seen that when the table is lowered, when the latter almost reaches the lowermost position the arm 112 is actuated causing the lever 109^2 to be pushed downwardly consequently causing the lever 108 to be rotated so that the friction clutch 95 is actuated and the pin 107^2 is pushed out of indentation in cam 106 whereby the shaft 105 is rotated just one complete revolution.

Keyed on said shaft 105 is a bevel gear 121 which is coupled by another bevel gear 122 to a shaft 123 on which latter is mounted the gear 124 which meshes with a rotatable gear 125 which latter meshes with a gear 127 mounted on shaft 128 on which cams 60, 65 and 75 are mounted. A bevel gear 129 is mounted on shaft 128 and meshes with a bevel gear 120 on a shaft 131 on which the cam 132 is which imparts through the double armed lever 133 the reciprocal motion to member 43. Also keyed to shaft 105 is a gear 134 which meshes with a gear 135 mounted on a shaft 136

which latter has keyed thereto bevel gear 138 which latter is mounted on shaft 139 on which cam 78 is mounted.

In order to drive the card feeding mechanism I provide a gear 140 mounted on shaft 90 meshing in turn with gear 141 mounted on a shaft 142 which is suitably supported. The shaft 142 has fixedly mounted thereto a second gear 143 which latter meshes with a gear 144 which is rotatably mounted on a shaft 145. Said gear 144 is adapted to impart rotation to shaft 145 through a suitable clutch 146, which is controlled in a manner to be described. Shaft 145 also has fixedly mounted thereto bevel gear 147 which meshes with bevel gear 148 fixedly mounted on shaft 149 which also has fixedly mounted thereto a bevel gear 150 which latter meshes with a bevel gear 151 fixedly mounted to the shaft which carries plate 88. If therefore the clutch 146 is thrown "in" the plate 88 and consequently the said feeder is actuated.

The control means for operating the clutch 146 comprises a double armed lever 152 fixedly mounted to a rotatably borne shaft 153. One arm 152′ of said lever pivotally engages a collar 154 slidable on shaft 145 which latter through spring means 155 is adapted to actuate the slidable engaging portion 146′ of said clutch 146. The other arm 152^2 engages in a cam which comprises a circular disk 156 having an annular ring 156′ projecting therefrom which is provided with a slot 156^2 in which latter said arm 152^2 normally rests when the clutch is "out" as shown in Fig. 15. This cam arrangement serves the same purpose as cam 106 to limit the rotation of shaft 145 to a single one.

Fixedly mounted to shaft 153 is a lever arm 157 which is adapted to be actuated by a cam 158 mounted on shaft 105 and which in simplest form may comprise a laterally extending pin 159 mounted on said cam 158 which trips arm 157 once for each revolution of said cam thereby actuating clutch 146. When arm 156 is tripped arm 152^2 is rotated out of slot 156^2 and retained out of the latter until shaft 145 completes a revolution whereupon said arm 152^2 reengages in said slot and said clutch automatically is thrown "out". The tripping of arm 157 is timed to occur at the end of a complete revolution of shaft 105.

It is seen that for each three revolutions of the main shaft 90 a complete cycle of operations is carried out at the four operating positions of the table. In order to prevent confusion it is necessary that means be provided which will prevent the operator from actuating pedal 103 until the completion of the revolution of shafts 26, 105 and 145. One means of accomplishing this may be the following:

Connected to arm 102′ is a laterally projecting arm 159 which may be engaged by a pivoted catch member 160. Pivotally engaging said catch as at 160 is a solenoid plunger 161 which extends through a solenoid 162 and is adapted to be drawn into the latter when said coil is actuated. Said plunger is continuously urged forwardly by a spring 163 to cause said catch member 160 to engage arm 159. An extension 161′ extends rearwardly from said solenoid and is formed with a notch 162′ in which a pawl 163 may engage. Said pawl is actuated by a lever arm 163′ connected to bar 101. Said pawl is adapted to engage said notch and normally retain catch member 160 out of engagement with arm 159. When the pedal 103 is actuated, said pawl is tripped permitting catch 160 to be urged into operative position. Thereafter pedal 103 cannot be again depressed until catch 160 is released by actuation of solenoid 162. The leads 162′ and 162^2 therefrom lead respectively to the one terminal of a power source as a battery B and to a stationary contact 164. The other terminal of battery B leads a second stationary contact 165. Both said contacts may be insulatively mounted on the bearing 166 which supports shaft 145. Mounted on said shaft 145 is a disk or wheel 167 which has insulatively mounted thereon a bridging contact 167′ which latter is adapted once during each revolution of said shaft 145 to bridge the contacts 164 and 165 thereby completing the electric circuit of the solenoid 162 and drawing catch member 160 into inoperative position. The said contact 167′ is so mounted on disk 167 as to complete said circuit near the end of the revolution of shaft 145 and then open the circuit of said solenoid again. Thereby little current is used for operation of solenoid 162.

The shape of the cams 60, 65 and 75 must be such and they must be so mounted relative to each other on the shaft 128 that in a single revolution of said shaft, first of all cam 65 moves the card mounter 19 forwardly, and then cam 60 moves it downwardly to mount the card on the open pins. Then cam 75 actuates the pin closer mechanism reciprocating it once. Thereafter cam 65 moves said card mounter rearwardly and then cam 60 moves said mounter upwardly into its original position. The exact shape of said cams is mere mechanical design.

Cam 78 must actuate the ejector arms once during each revolution of shaft 139 and may comprise a pin 78′ projecting laterally from the cam face 78 which strikes arms 79 once each for revolution of said shaft.

Cam 132 must reciprocate the pin open member 43 once during a single revolution, and may have a shape approximately that shown in Fig. 7. Its exact shape too is mere mechanical design.

My machine operates as follows:—

Assume that the operator has inserted pins at station I and that there are pins held at stations II, III and IV. In station II the pins will be opened, in station III they will have cards mounted thereon and station IV will be empty. When the operator presses the pedal 103 shaft 26 becomes coupled to the main shaft 90 which is continuously running. Cam 37 moves down and causes the pins to be gripped by arms 22. The cam 29 moves member 18 clear of table 10 and cam 27 raises the latter and gear 28 meshes with gear 15 and rotates the pins in the respective stations to the next succeeding one, and then table 10 is lowered by cam 27 to original position and member 18 is moved again into engagement with table 10 and plunger 40 is again raised by cam 37. At the same time shaft 105 has been coupled to shaft 90 while 26 has become uncoupled therefrom. Coupling of shaft 105 through the previously described gearing arrangements sets into operation the pin opening mechanism in position II, the card mounting mechanism and pin closing mechanism in position III and the ejecting mechanism in position IV. Upon completion of the single revolution of shaft 105, the card feeding driving mechanism is tripped by cam 158 and the latter completes feeding of a fresh card to mounter 149 in a single revolution of shaft 145 whereupon pedal 103 is released so that the operator may repeat the triple sequence of rotary motions started by depression of said pedal.

To insure accurate stopping of the table at each station, pin 168 on the frame F may be provided which engages a hole 169 in the table 10, each

time the latter is lowered. There are five such holes in said table one for each edge 10' of said table.

It is obvious that my invention may be varied in many ways without departing from the spirit thereof and I do not wish to be limited to the details shown and described.

What I claim is:—

1. In a machine for carding safety pins, a movable table having along its circumference a plurality of bearings to bear safety pins in vertical position with the spring arms thereof extending in front of said table, means for holding said safety pins in operative position, said means comprising a horizontally movable member capable of engaging said spring arms, movable means opposite one of said bearings for opening the spring arms of said safety pins and positioning them in front of their locking heads, movable means in front of another of said bearings for mounting a card over said open spring arms including means for reengaging said spring arms with their locking heads, and means in front of a still other bearing for removing the carded pins from said table.

2. In a machine for carding safety pins as per claim 1, in which said table is rotated step by step so as to bring the vertically mounted safety pins successively opposite and in cooperation with said safety pins opening means, said card mounting means and said safety pin removing means.

3. In a machine for carding safety pins as per claim 1, in which said means for opening said spring arms comprise a reciprocatory member having a laterally movable portion adapted to engage said spring arms when said disengaging means is moved against said safety pins.

4. In a machine for carding safety pins as per claim 1, in which the means for mounting a card on said safety pins comprises a member reciprocatory in two directions and a card holder mounted on said member adapted to receive a card.

5. In a machine for carding safety pins as per claim 1, in which said card mounting means comprises a reciprocatory member having a laterally movable edge adapted to engage said opened spring arms and close the same when said member is reciprocated.

6. In a machine for carding safety pins, as per claim 1, in which a card feeding means is provided, comprising a card container, a reciprocatory gripper adapted to move said card from said container to said card mounting means, and means intermediate said container and said card mounting means for shaping said cards so as to be pierced by said open spring arms of said safety pins.

7. In a machine for carding safety pins as per claim 1, in which said card mounting means comprises a member capable of reciprocatory motion in two directions, a card holder mounted on said member and adapted to receive said card, said holder having a curved surface on which said card is held and suction means for holding said card thereon until the latter is mounted on said open spring arms.

8. In a machine for carding safety pins as per claim 1, in which the card mounting means comprises means for shaping the cards prior to their being mounted on the open arms of said pins, said card shaping means comprising a guide member having successively increasing curvatures.

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