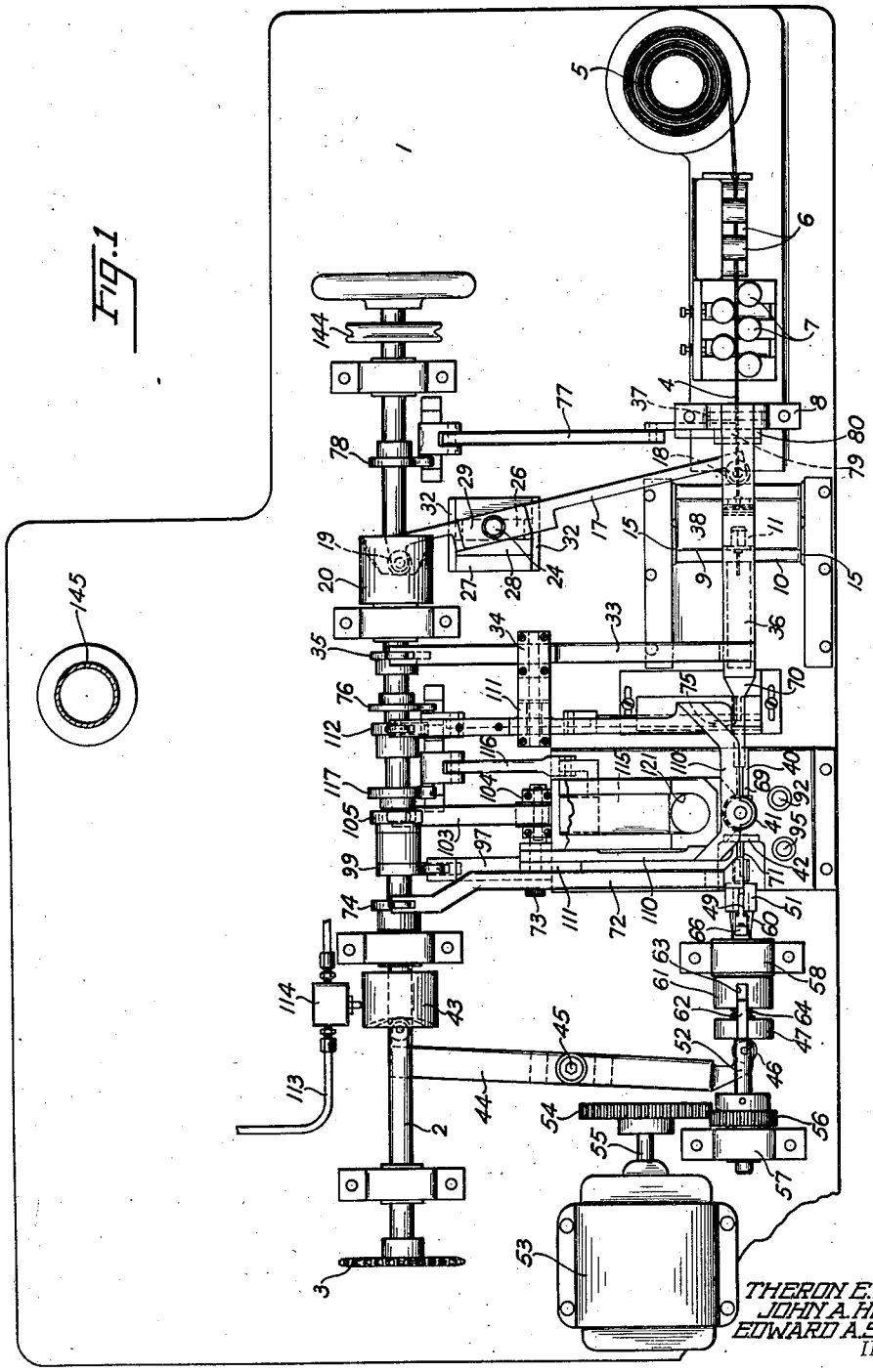
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AUTOMATIC BUTTON-PINNING MACHINE

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Fig. 1



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AUTOMATIC BUTTON-PINNING MACHINE

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Fig. 2

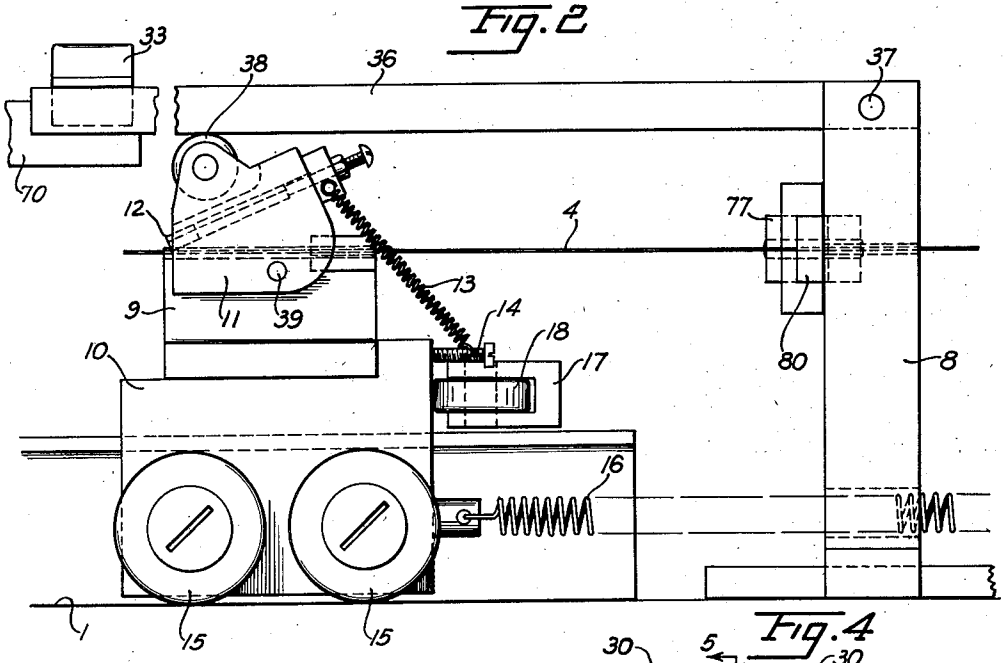


Fig. 4

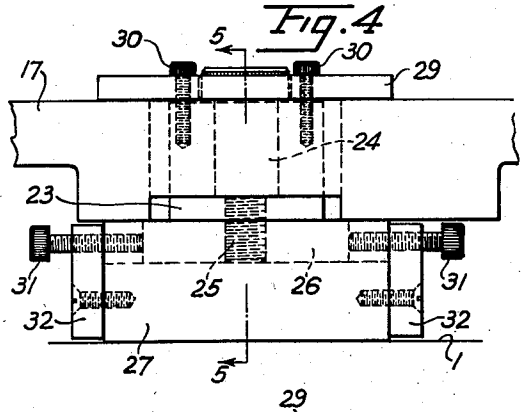


Fig. 3

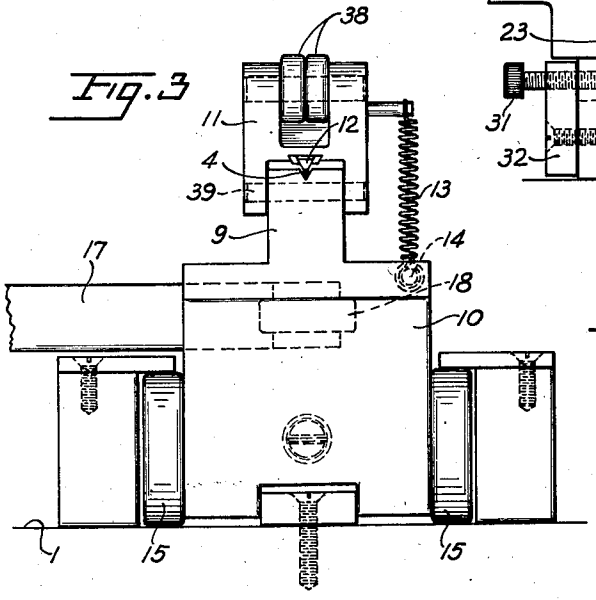
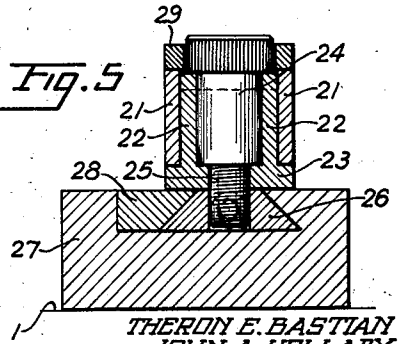


Fig. 5



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AUTOMATIC BUTTON-PINNING MACHINE

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Fig. 30

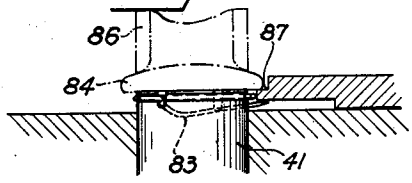


Fig. 31

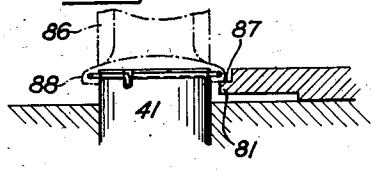


Fig. 32

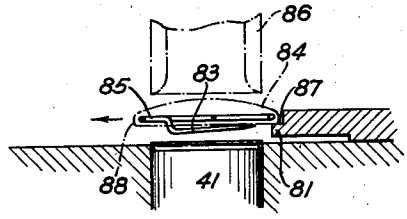


Fig. 6

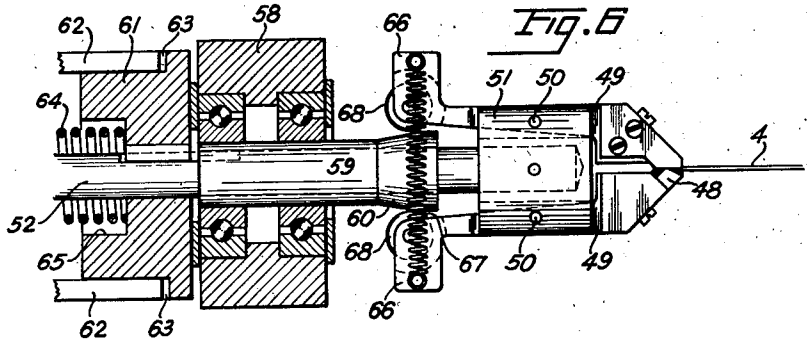


Fig. 7

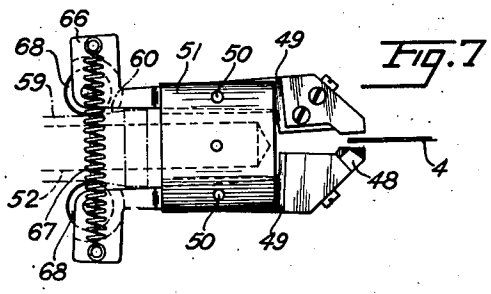


Fig. 8

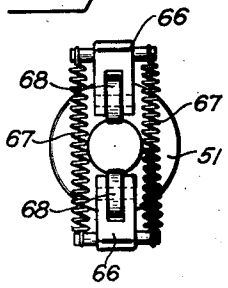
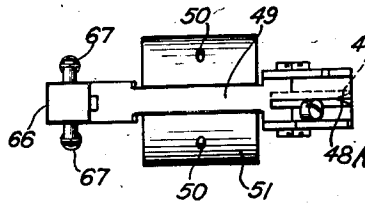


Fig. 9



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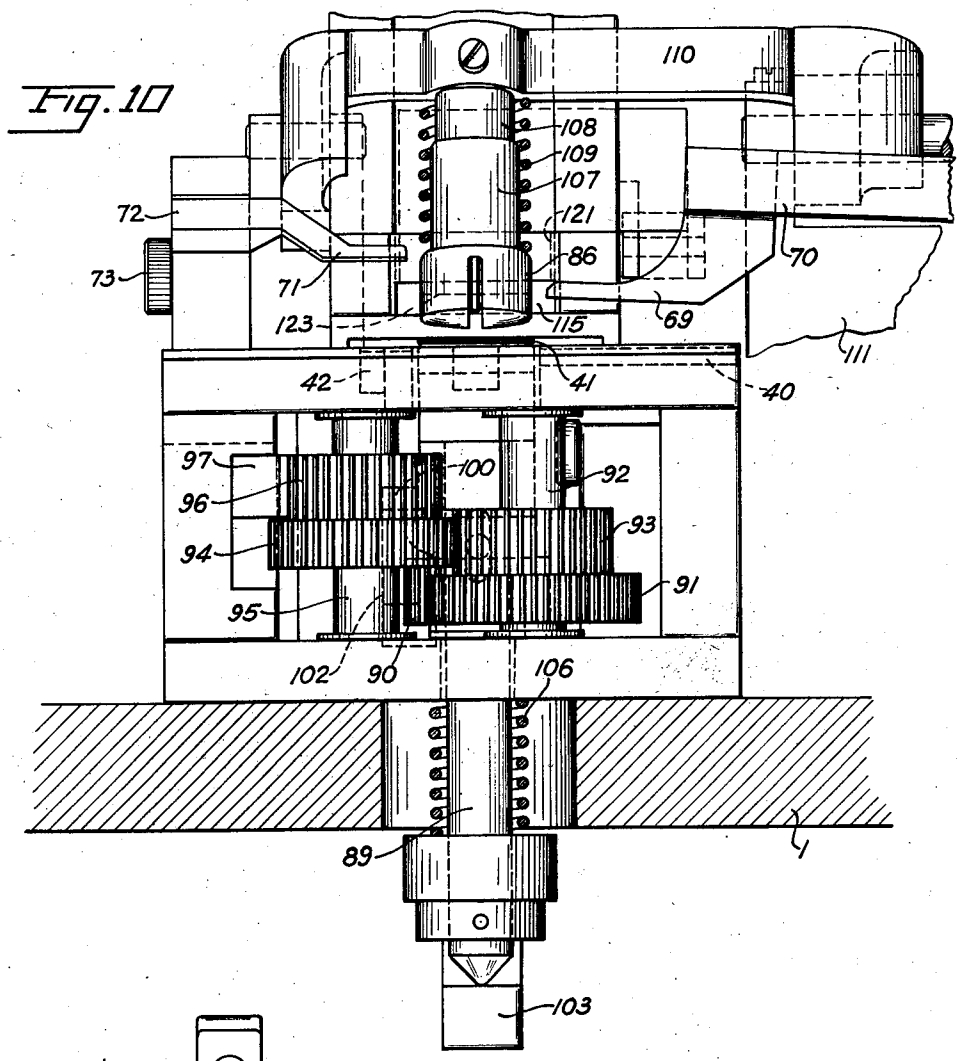
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AUTOMATIC BUTTON-PINNING MACHINE

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Fig. 10



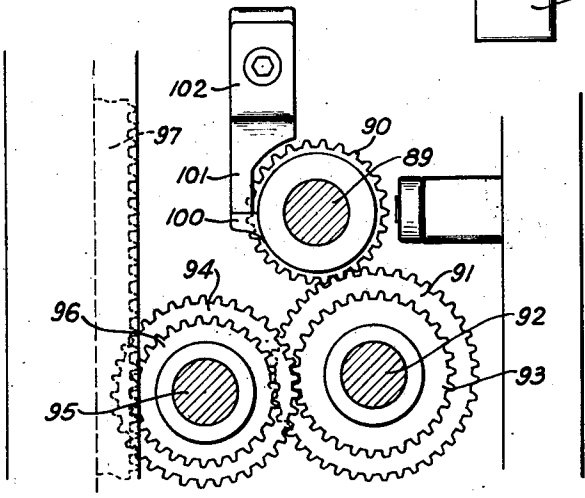


Fig. 11

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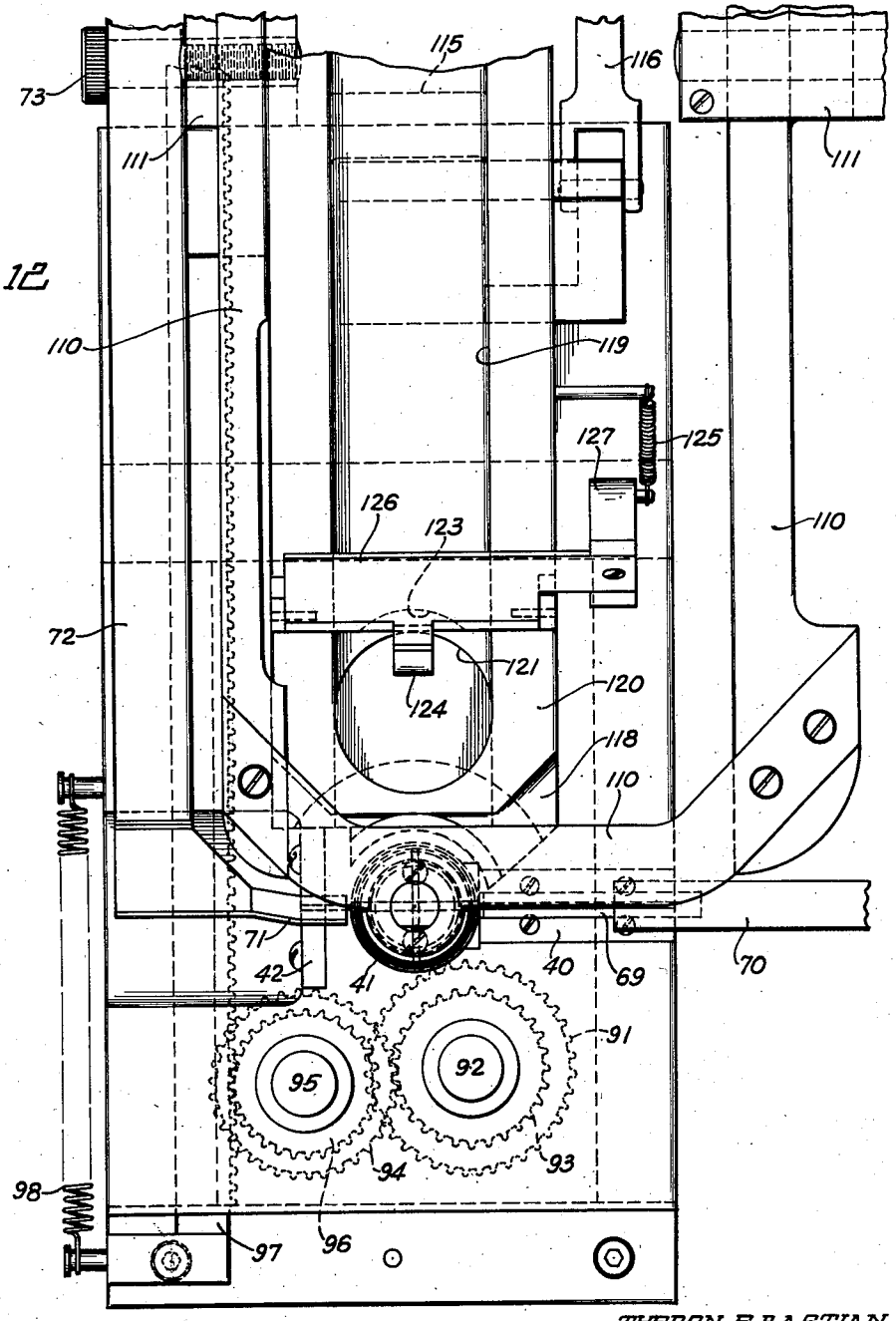
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AUTOMATIC BUTTON-PINNING MACHINE

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Fig. 12



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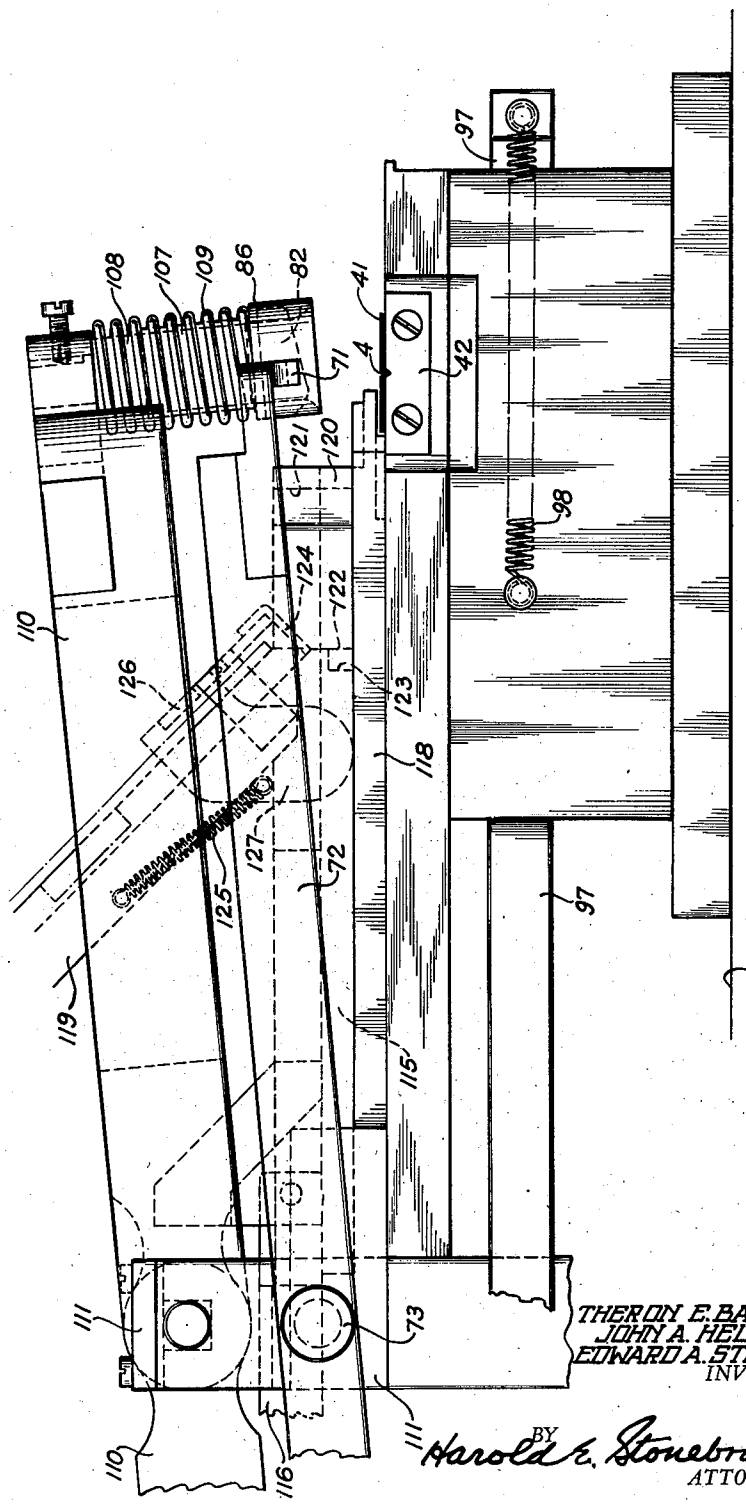
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AUTOMATIC BUTTON-PINNING MACHINE

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Fig. 13



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AUTOMATIC BUTTON-PINNING MACHINE

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Fig. 14

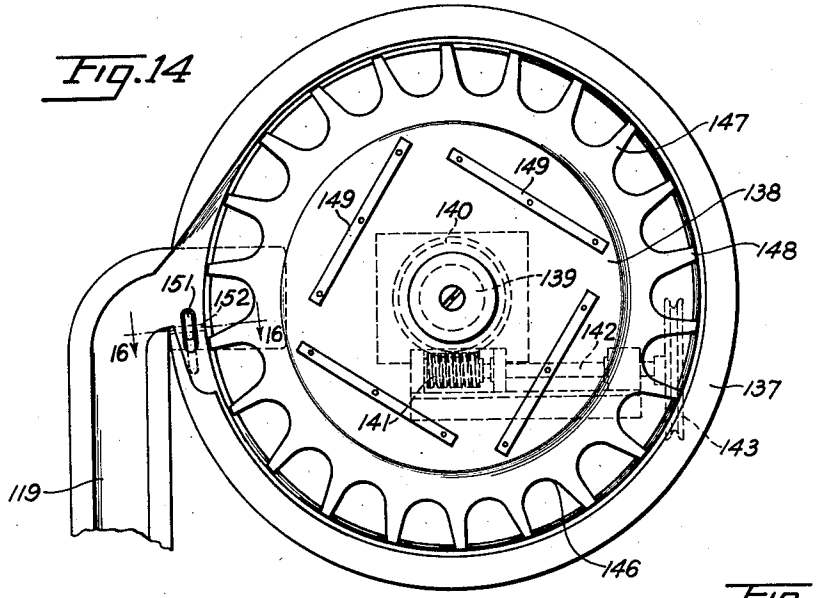
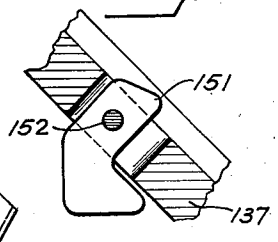


Fig. 16



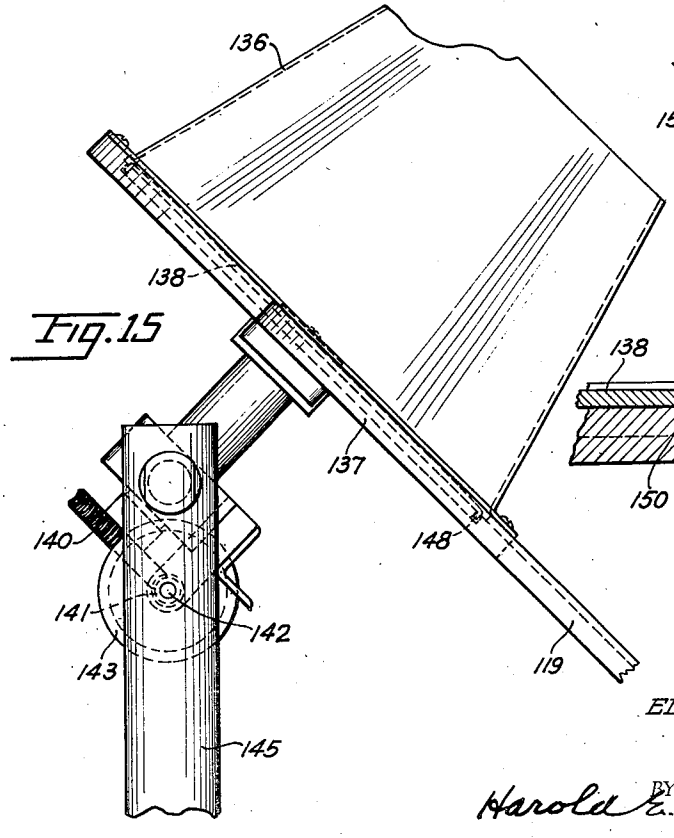
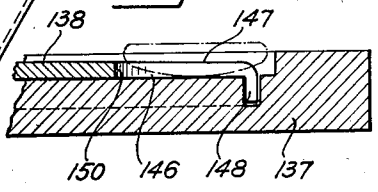


Fig. 15

Fig. 17



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Fig. 19

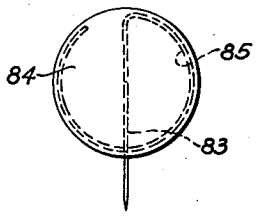


Fig. 20

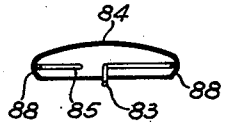


Fig. 18

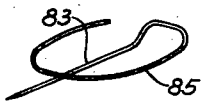


Fig. 21

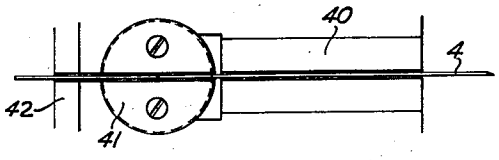


Fig. 25

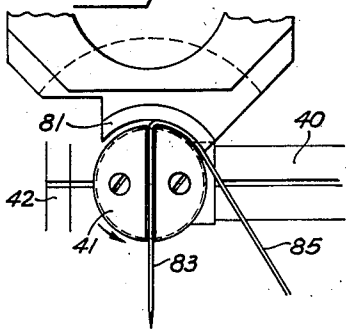


Fig. 22

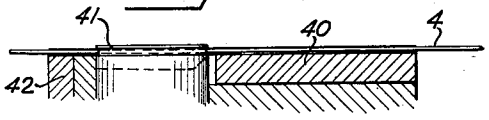


Fig. 26

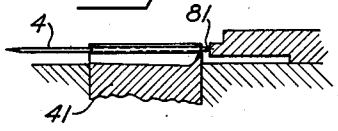


Fig. 23

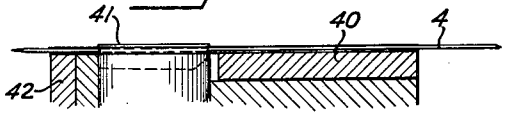


Fig. 27

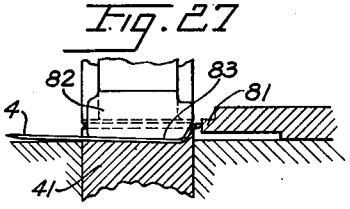


Fig. 24

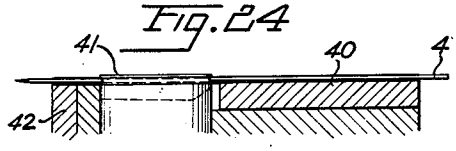


Fig. 28

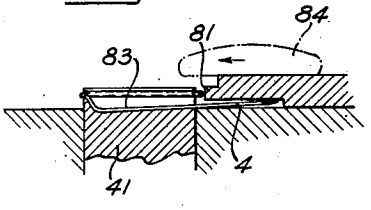
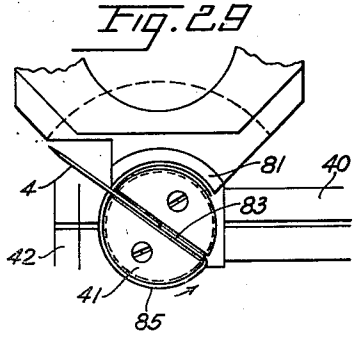


Fig. 29



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Patented Oct. 7, 1952 2,612,796

UNITED STATES PATENT OFFICE

2,612,796

AUTOMATIC BUTTON-PINNING MACHINE

Theron E. Bastian, Irondequoit, and John A. Hellaby and Edward A. Strollis, Rochester, N. Y., assignors to Bastian Bros. Co., Rochester, N. Y., a corporation of New York

Application February 17, 1950, Serial No. 144,752

13 Claims. (Cl. 79—3)

1

This invention relates to an automatic button-pinning machine and has for its purpose to afford a mechanism that feeds wire from a continuous coil or other source of supply and successively points the wire, cuts off the proper length to provide a pin, shapes the pin to afford an offset pinning portion and a semi-circular attaching portion, and inserts the attaching portion inside the flange of a conventional type button such as used for advertising, political campaigns, and other purposes, in which a wire pin is removably held within a button having a transversely curved peripheral flange that receives and holds the attaching portion of the pin.

The practice heretofore has been to pre-form the pins and attach them to the buttons by hand, or to automatically feed and attach to the buttons pre-sharpened pins feds from a hopper into a button-attaching machine, but both of these processes are comparatively slow, and it is a purpose of the invention to afford a faster and more economical procedure by reducing the labor required and incorporating all of the operations into one machine which cuts a predetermined length of wire from a coil after the wire is fed into the machine and its forward end properly pointed, following which the pin thus cut from the body of wire is automatically shaped or formed to provide the semi-circular attaching portion and offset pinning portion in the pin in such a way that the pin is properly centered with reference to the button, and thereafter attaching automatically the pin to the button.

A further object of the invention is to afford a practical and efficient mechanism in which the feeding, pointing, cutting, forming, and attaching devices are all controlled from a power or cam-shaft, together with a button-hopper and button-feeding mechanism that insures a continuous feed of buttons which are successively positioned at the point where the semi-circular attaching portion of the pin is secured within the button.

To these and other ends, the invention consists in the construction and arrangement of parts that will appear clearly from the following description when read in conjunction with the accompanying drawings, the novel features being pointed out in the claims following the specification.

In the drawings:

Fig. 1 is a plan view of a machine incorporating a preferred embodiment of the invention;

Fig. 2 is an enlarged elevation of the wire-feeding mechanism;

Fig. 3 is a view in front elevation of the structure shown in Fig. 2;

2

Fig. 4 is an enlarged detail view in side elevation of the adjustable pivotal support for the feeding gripper actuator;

Fig. 5 is a sectional view on the line 5—5 of Fig. 4 looking in the direction indicated;

Fig. 6 is an enlarged detail sectional view through the wire-pointing mechanism, showing the cutters in operative relation to the wire;

Fig. 7 is a detail view showing the cutters in position when withdrawn from the wire;

Fig. 8 is an end elevation of the structure shown in Fig. 7;

Fig. 9 is a plan view of the same;

Fig. 10 is a front elevation, partially in section, showing the wire-forming mechanism;

Fig. 11 is a horizontal sectional view of the parts illustrated in Fig. 10, showing the drive for the wire-forming post;

Fig. 12 is an enlarged plan view, partially broken away, showing the wire-forming post in initial position to receive the wire before pointing and before rotating the post;

Fig. 13 is a view in side elevation showing the button-feeding mechanism and the wire-forming mechanism;

Fig. 14 is a plan view of the button-hopper;

Fig. 15 is a side elevation of the same;

Fig. 16 is a detail sectional view on line 16—16 of Fig. 14;

Fig. 17 is a detail sectional view showing a button in inverted position in the hopper plate ready to be ejected;

Fig. 18 is a detail perspective view showing a completed pin before insertion in a button;

Fig. 19 is a detail plan view of a button with the pin inserted;

Fig. 20 is a sectional view of the same;

Fig. 21 is a diagrammatic plan view showing the wire after it is fed into the slot in the post and before pointing;

Fig. 22 is a vertical sectional view of the same;

Fig. 23 is a view similar to Fig. 22 showing the wire in the post after pointing;

Fig. 24 is a similar view after the wire has been pointed and cut;

Fig. 25 is a plan view of the post and pin after the post has been rotated through an angle of 90° from the position shown in Fig. 21;

Fig. 26 is a vertical sectional view of the same;

Fig. 27 is a view similar to Fig. 26 showing the post and pin after the offset has been formed in the pin to provide the pinning portion;

Fig. 28 is a view similar to Fig. 27 showing the pin and post after the latter has rotated through

an angle of 180° from the position shown in Fig. 27;

Fig. 29 is a plan view of the pin and post when in position to receive a button;

Fig. 30 is a vertical sectional view, showing the position of the button when being attached to the pin;

Fig. 31 is a similar view showing the position of the button and pin after the post has been turned sufficiently to secure the semi-circular attaching portion of the pin within the button, and

Fig. 32 is a similar view showing the button and pin assembled and about to be discharged from the machine.

The invention is disclosed in a practical form of machine embodying the novel characteristics and functions, although it will be understood that other mechanisms may be designed that will carry out successfully the purposes of the invention without departing from the spirit of the improvements, and the structure herein disclosed includes in general a power or cam-shaft provided with a series of cams which control the various units or mechanisms of the structure and effect a complete button-pinning operation during each rotation of the cam-shaft.

During the early part of the movement of the cam-shaft, a predetermined length of wire is fed from a reel or other source of supply to a pointing mechanism which engages and points the forward end of the wire while the latter is held fixed in a predetermined position, after which the wire is cut to afford a length from which the pin is thereafter formed by a post, in the upper surfaces of which the wire is supported during the pointing and cutting operations. Following the cutting operation, the post is elevated slightly and turned through an angle of 90° while holding the rear end of the wire to effect the initial forming operation, and when in such 90° position, the pinning portion of the wire is offset, following which the post is elevated and turned further to complete the forming or shaping of the semi-circular button-attaching portion, after which it receives a button that is automatically fed into operative relation with the semi-circular attaching portion of the pin, and by additional rotation of the post, the semi-circular attaching portion is wound into the button under its retaining flange, after which the button with the attached pin is removed by a suitable air blast, the post returned automatically to its initial position, and the cycle is complete ready for a repetition of the operations just described, buttons being automatically fed from a button-hopper to the post by mechanism operated by the cam-shaft in synchronism with the operations of the wire-feeding and pin-forming mechanisms.

Referring more particularly to the drawings in which like reference numerals refer to the same parts throughout the several views, 1 designates the base or table on which the various parts of the machine are supported, and 2 is the power shaft or cam-shaft that drives the various units of the machine and is provided with a sprocket 3 adapted to be connected to and driven from any suitable source of power. The wire, indicated at 4, is fed from a supply roll or spool 5, passing first between horizontally disposed straightening rolls 6 and thence between vertically disposed straightening rolls 7 in order to aline the wire and remove the curl resulting from being wound on the supply roll 5.

After leaving the straightening rolls 6 and 7, the wire passes through a guiding opening in the support 8, thence through a guiding opening in a block 9, which is mounted on a carriage 10 and carries the pivoted feeding gripper 11 that straddles the block 9 and has a gripping element or wedge member 12 adjustably supported thereon with its front end arranged to engage the wire as shown in Fig. 2, while 13 is a spring connected to the feeding gripper at one end and at its opposite end to a post 14 mounted on the carriage, the spring 13 acting to move the feeding gripper out of engagement with the wire when released in a manner that will be described presently.

The carriage 10 is mounted on rollers 15 that move back and forth over the bed of the machine in runways, see Fig. 3, to effect feeding of the wire at given intervals, the carriage when released being returned to initial position by a spring 16 connected at one end to the carriage and at its opposite end to a suitable fixed element on the bed of the machine. The carriage 10 and feeding gripper 11 are moved forwardly by a pivoted actuator or lever 17, see Figs. 1 and 2, provided at its forward end with an anti-friction roller 18 that engages the carriage and at its rear end with an anti-friction roller 19 that is engaged and moved by a suitably shaped cam 20 on the cam-shaft 2, the cam being formed to rock the lever 17 about a vertical axis and effect the necessary forward movement of lever 17, and permit its return movement under the impulse of spring 16 when a given amount of wire has been fed and the feeding gripper is released from the wire.

The actuator or lever 17 is supported about an adjustable pivot at a point between its ends and to permit such adjustment and enable feeding varying lengths of wire, the lever 17 includes opposite parallel vertical walls 21, see Fig. 5, that are supported adjacent to the walls 22 on a block 23 which turns on a post 24, the latter having a reduced lower end 25 that is threaded into a key 26 adjustable in a guideway of a supporting block 27 that is fastened in any suitable manner to the bed of the machine, while 28 designates a key arranged in the guideway in the block 27 in engagement with and overlying the key 26 and underlying the block 23. 29 designates a fastening plate secured by bolts 30 to the block 23 and acting to hold the lever 17 in fixed relation to the block 23.

The lever 17 and block 23 pivot on the post 24, and adjustment of the post 24 to vary the extent of movement of lever 17 and thereby the amount of wire that is fed is effected by adjusting screws 31 threaded into openings in the end plates 32 fastened to the front and rear of the aforementioned block 27, the screws 31 being adjustable to move the key 26 and with it the post 24 forwardly or backwardly to vary the pivotal point of the lever 17. Adjustment of the pivotal post 24 having been established in this fashion to determine the length of wire to be fed, the lever 17 is moved forwardly and backwardly once during each rotation of the cam-shaft 2 to effect a corresponding movement of the wire feeding gripper 11 and thus advance the predetermined length of wire.

During the forward or feeding movement of the feeding gripper 11, the latter is engaged to hold the gripping element 12 against the wire by means of a lever 33, see Figs. 1 and 2, which is pivoted to swing about a horizontal axis in a

suitable bearing 34 and operated by a cam 35 on the cam-shaft 2, the forward end of the lever 33 engaging an arm 36 that is pivoted at 37 on the support 8 and rests upon anti-friction rollers 38 carried by the feeding gripper 11 which is engaged by and rides under the arm 36 as the carriage 10 moves back and forth. During the forward or feeding movement of the carriage, the lever 33 is operated by the cam 35 to move its forward end downwardly against the arm 36, pressing the arm 36 against the anti-friction roller 38 and feeding gripper, which under the pressure of lever 33 and arm 36 engages the wire and feeds the same a distance determined by the movement of the lever 17 as already described, and at the end of the forward movement of the feeding gripper, the front end of lever 33 is released by the cam 35, pressure being removed from the arm 36 and feeding gripper, whereupon the latter is permitted to swing upwardly about its pivot 39 on the block 9 under the impulse of spring 13, so that the feeding gripper is out of engagement with the wire during return movement of the carriage. With the mechanism thus far described, the wire is fed a predetermined amount during each rotation of the cam-shaft 2 and following such advancing movement of the wire, the forward end of the wire is operated upon by cutters forming part of a pointing mechanism in order to point the advancing end of the wire, and the mechanism by which such pointing operation is effected will now be described in detail.

After the wire leaves the feeding gripper, it travels through and is supported in grooves in the top faces of a block 40, see Figs. 1, 10, 12, 13 and 21, a rotatable cylindrical post 41 that will be described more fully hereinafter, and a supporting plate 42, where the wire is retained in position by suitable hold-down devices to be described later, while the pointing mechanism operates on the forward end of the wire.

Referring to Figs. 1 and 6 to 9 inclusive, the cam-shaft 2 carries a cam 43 that operates a lever 44 suitably pivoted to swing about a vertical axis at 45 and having at its forward end an anti-friction roller 46 that engages a collar 47 to operate the pointing mechanism which includes a pair of cutters 48 formed of carboloy or other suitable hard metal and mounted on arms 49 which are pivoted at 50 to a sleeve 51. The sleeve 51 is fixed to the end of a shaft 52 which is continuously driven from an electric motor 53, see Fig. 1, through a gear 54 mounted on the motor shaft 55 and engaging a gear 56 carried by the shaft 52 which is supported in suitable bearing supports 57 and 58 and movable slightly endwise. The aforementioned collar 47 is fixed on the shaft 52 so that as the lever 44 is oscillated, the shaft 52 is moved slightly endwise, during which movement the gears 54 and 56 are always in engagement to effect continuous turning of the shaft 52 and of the cutting tools 48 mounted thereon.

As the shaft 52 is moved endwise toward the wire 4, the cutting tools are automatically moved toward each other to engage the forward end of the wire, see Fig. 7, resulting in a quick pointing of the wire by the rotating cutters, and when collar 47 is released by lever 44, it is desirable to return shaft 52 to initial position and move the cutting tools out of engagement with the wire, this being accomplished by the following structure.

Referring to Figs. 6 to 9, the stationary bearing support 58 is mounted on the bed 1 and supports a sleeve 59 that is rotatable but held against endwise movement in the bearing and has a tapered or cam portion 60, the shaft 52 being slidable endwise within the sleeve 59, while 61 designates a collar surrounding the shaft 52 mounted adjacent to the bearing 58 against which it abuts, the collar 61 being slidably keyed to the shaft 52, and 62 designates arms fixedly mounted on the collar 47, see Figs. 1 and 6, and engaging slots 63 in the collar 61 for interlocking engagement therewith. 64 is a spring surrounding the shaft 52 and nested in a recess 65 in the collar 61, the spring 64 engaging at its opposite end the collar 47 that is fixed on the shaft 52, so that when released by the lever 44, the shaft 52 is moved to the left with reference to Figs. 1 and 6, causing the cutting tools to move away from the wire 4 from the position shown in Fig. 6 to the position shown in Fig. 7, after the pointing operation is completed.

To effect this movement of the cutting tools, the pivoted arms 49 on which the cutting tools are mounted are provided with tail pieces 66 arranged oppositely and connected by springs 67. Thus as the shaft 52 is moved to the right of Fig. 7, by the action of lever 44 engaging collar 47, the anti-friction rollers 68 carried by the tail pieces 66 engage and ride outwardly on the tapered or cam portion 60 of sleeve 59, thus swinging the opposite ends of the arms 49 and the cutting tools 48 inwardly to engage the forward end of the wire 4, and since the shaft 52 is continuously rotating, the cutting tools 48 act to point the forward end of the wire during the interval that the tools are held in the position illustrated in Fig. 6, following which the front end of lever 44 moves away from collar 47, permitting spring 64 to return the shaft 52 to its initial position. As the anti-friction rollers 68 move out of engagement with the cam or tapered portion 60 of sleeve 59, the arms 49 are swung on their pivots 50 to the position shown in Fig. 7 and the cutting tools moved away from the forward end of the wire.

During the operation of pointing the forward end of the wire, the wire is held against turning or other movement by the following devices. Referring to Figs. 1, 10 and 12, 69 designates a hold-down plate which engages and holds the wire in the groove of the block 40 during the pointing operation, the hold-down plate 69 being carried by an arm 70 that is preferably mounted upon the aforementioned lever 33, see Fig. 2, so that as the lever 33 is moved downwardly, it will operate the hold-down plate 69 against the wire during the pointing operation and until the instant when the lever 33 is elevated to permit return of the feeding gripper, which takes place after the pointing operation. At the same time that the hold-down plate 69 engages the wire, a second hold-down plate 71 also engages the wire at the point where it lies in the groove in the supporting plate 42, see Figs. 10, 12 and 13, and to accomplish this the hold-down plate 71 is mounted on an arm 72 pivoted at 73, and actuated by a cam 74 on the cam-shaft 2 so as to engage and hold the wire during the pointing operation and to be elevated away from the wire thereafter.

After completion of the pointing operation and while the wire is still retained by the hold-down devices 69 and 71, it is cut at a point to provide the predetermined length required for the pinning and button-attaching portions, and this is preferably effected by a knife indicated at 75,

the knife being carried by a reciprocatory support that is operatively associated with a cam 76 on the cam-shaft 2, whereby the cam 76 operates to move the knife 75 transversely of the wire and sever the latter after the pointing operation is completed. After cutting of the wire, the hold-down devices are elevated, the feeding gripper previously described moving backward under the impulse of its spring in readiness to grip and propel the wire forwardly again during the next cycle, and during such return movement of the feeding gripper, means are provided to hold the wire against accidental return movement, such means consisting of a reciprocatory arm 77 operated by a cam 78, see Fig. 1, on the cam-shaft 2, and operable endwise to move a yieldable gripper 79 against the wire to hold the latter engaged against a stationary gripper 80 and in this manner holding the wire against movement during the return stroke of the feeding gripper and carriage 10.

Figs. 21 and 22 show the position of the wire when first fed to and resting in the groove in the top face of post 41, Fig. 23 shows the position of the wire after the pointing operation, and Fig. 24 shows the position of the wire after being pointed and cut to afford a proper length from which the pin is formed. The wire having been pointed and cut, the cut portion resting in the transverse diametrical groove in the top face of cylindrical post 41, see Fig. 24, is in position for the forming or shaping operations and the attaching of the pin to a button which will now be described in detail.

Referring to Figs. 18 to 32, when the pointed and cut wire is resting in the groove across the face of the cylindrical post 41, see Fig. 24, the post 41 is first raised slightly by mechanism that will be described presently to elevate the wire out of the grooves in the block 40 and plate 42 whereupon the post is rotated in an anti-clockwise direction through an angle of 90°, to the position shown in Fig. 25, while the other end of the wire is engaged with the adjacent surface of the ledge 81, see Figs. 25 and 26, causing the rear end of the wire to be bent around the periphery of the post against the outer surface of the latter in the manner shown in Fig. 25.

When the pin has assumed the position shown in Fig. 25, rotational movement of the post is interrupted and a die or former, indicated at 82, descends to form the offset pinning portion 83, see Fig. 27, following which the former 82 is elevated and rotation of the post is automatically resumed while a flanged button 84 with its flange facing downwardly, see Fig. 28, is fed to a position immediately over the post where it can drop down upon the pin post, and during continued rotation of the post, the pinning portion 83 passes through the space or recess provided beneath the ledge 81, see Fig. 28, to accommodate the pinning portion 83 during rotation of the post and completion of the button-attaching portion 85, and when the post is turned through an angle of approximately 230° from the position shown in Fig. 26 to the position shown in Fig. 29, the button 84 will have reached a position over the post and pin and is then held against the post during further rotation of the latter by a spring follower 86, see Fig. 30, the button 84 being retained in position over the pin and post by a ledge or wall 87 engaging its edge, see Figs. 31 and 32, until the pin-attaching portion 85 is completely wound inside the flange 88 of the button, see Fig. 32.

The completed form of the pin and its position within the button are illustrated in Figs. 18 to 20, and following the attachment of the pin to the button in the manner just described, the spring follower is elevated away from the button and any suitable air blast removes the button with its pin attached from the post and the parts are all restored to their initial positions by the time the cam-shaft has made one rotation, a cycle being thus completed during each rotation of the cam-shaft, and the various mechanisms are then in position for a repetition of the operations already described.

In order to effect the movements just described, post-elevating means and post-rotating means are provided, and to this end, the post 41 is mounted on a vertical spindle 89 that carries a pinion 90 driven by a gear 91, see Fig. 11, mounted on an arbor 92 that has fixed thereto a pinion 93 which is driven by a gear 94 fixed on an arbor 95 that carries a pinion 96 which in turn is actuated by a reciprocatory rack 97, see Fig. 13, that is returned to its initial position by a spring 98, and moved outwardly to rotate the post 41 by the cam 99 on cam-shaft 2, see Fig. 1. The post is retained in its initial position by a stop portion 100 on pinion 90, see Fig. 11, which engages a stationary stop 101 on a bracket 102 suitably attached to the frame of the machine. The mechanism just described is effective to rotate the post to the extent indicated, and cam 99 which operates rack 97 and effects rotation of the post is so designed as to move the rack 97 intermittently and to rotate the post at intervals during the forming operations in the manner already described.

In order to elevate the post intermittently, the lower end of spindle 89 is supported by a lever 103, see Fig. 10, which is pivoted in bearings 104 and operated by a cam 105 on the cam-shaft 2 so as to elevate the post in proper synchronism with its rotational movements, and 106 designates a spring, see Fig. 10, that actuates the post and spindle 89 back to initial position when released by the cam 105, the vertical movement of the post being permitted by a pin and slot connection between the post and pinion 90. With this mechanism, the post is intially raised from the position shown in Fig. 24 to the position shown in Fig. 26 and then rotated through an angle of 90° to form the pinning portion 83, see Fig. 25, following which the post remains stationary for an interval while the offset forming element 82 descends to engage the pinning portion and offset it from the pin-attaching portion 85, see Fig. 27, by forcing the pinning portion down into a recess in the slot of the post while the attaching portion 85 is retained in the perigheral groove surrounding the post adjacent to its top surface.

This is accomplished by the former 82, see Fig. 13, that is mounted upon the cylindrical yieldable follower 86, the latter being carried by a cylindrical sleeve 107 that is telescopically supported on a sleeve 108, while a spring 109 affords a yieldable pressure for the follower, the sleeve 108 being mounted on a supporting frame 110, see Figs. 10 and 13, which is pivotally supported in suitable bearings 111, see Fig. 13, and operated by a cam 112 fixed on the cam-shaft 2 and operating to move the supporting frame 110 downwardly to bring the former 82 into engagement with the pinning portion of the wire at the proper instant to offset the same.

Following this, the supporting frame 110 and

former 82 are elevated, the post is rotated further to the position indicated approximately in Fig. 29, and a button is fed to a position over the pin and post with the flange of the button facing downwardly, whereupon the supporting frame 110 is again lowered to bring the follower 86 into yieldable engagement with the button, as illustrated in Fig. 30. After the yieldable follower engages the button as in Fig. 30, the post is rotated additionally until the attaching portion 85 of the button is entirely inside the flange of the latter as shown in Figs. 19 and 20, whereupon the spring follower 86 is again elevated away from the button and the latter removed from the post by an air blast not shown and which may be located in any suitable point in proximity to the post and button, such air blast being operated from an air line 113, see Fig. 1, by the cam 43 which engages an air valve 114 to release the air pressure at the proper instant for blowing the button from the machine after the operations described above are completed.

In order to feed the buttons automatically and successively to the post 41, a button-slide or ejector 115 is provided which is connected to and reciprocated by a bar 116 that is operated by a cam 117 on the cam-shaft 2, see Figs. 1, 12 and 13, to reciprocate the button-slide at proper intervals in synchronism with the movements of the post 41. The button-slide 115 is reciprocated upon the top surface of plate 118 and within plate 120, plate 120 being provided with an aperture 121 for receiving the buttons from chute 119. The button is engaged by the forward edge 122 of slide 115 provided with a recess 123, and is carried forwardly to be positioned thereby over post 41. The button is released at the lower end of chute 119 at the proper instant by a gate 124 which is pivotally mounted on the chute 119 and held normally by a spring 125 in position to close the end of the chute. The plate 126 to which the gate 124 is secured has attached thereto a depending arm 127, see Fig. 13, that is engaged by a portion of the button-slide during forward movement thereof to rock the plate 126 and move the gate 124 away from the bottom of the chute 119 to permit a button to be discharged into aperture 121 and onto the top surface of the button-slide.

As the button-slide is moved rearwardly, gate 124 is returned by spring 125 thereby holding the buttons in the chute, the button-slide being moved under the button in the aperture 121. When the button-slide has reached the end of its rearward movement, the forward edge 122 will be clear of aperture 121, see Fig. 12, and the button will drop onto the top surface of plate 118 and be positioned in front of the button-slide as the latter is next moved forwardly for positioning another button over the post 41.

The buttons are fed to the chute 119 from a button-hopper 136, see Figs. 14 to 17 inclusive, the button-hopper including an inclined bottom 137, and mounted on said inclined bottom is a rotating button-carrier plate 138 carried by an arbor 139 extending through the bottom of the hopper and provided with a worm gear 140 at its lower end, see Figs. 14 and 15, the worm gear 140 being driven by a worm 141 on a shaft 142 that has fixed thereon a pulley 143 which is driven by a belt from pulley 144 on cam-shaft 2, see Fig. 1, the parts just described being mounted upon the post 145 supported on the bed of the machine.

In this fashion the button-carrier plate 138 is rotated continuously in the bottom of the hopper and when the latter is loaded with a supply of buttons, the button-carrier 138 carries a supply of buttons individually and in succession from a point at the bottom of the hopper upwardly to an outlet opening where they are discharged into the conveyor chute 119.

In order to accomplish this, the button-carrier plate 138 is provided with a series of peripheral button-pockets or recesses 146 separated by outwardly extending intermediate portions 147 that terminate in angular fingers or tongues 148 which engage in a circular groove or recess at the outer edge of the inclined bottom, while 149 indicates narrow plates or bars attached to the button-carrier plate and acting to agitate the buttons in the hopper as the carrier plate rotates. It is desirable that the buttons lodge in the pockets 146 with the open side of each button facing toward the carrier plate and bottom of the hopper, in which position it must be discharged into the chute 119 in order to be properly positioned on the attaching portion of the pin, and in order to accomplish this, the button-carrier plate is dished or cut away so that the inner edge of the wall defining each pocket 146, as indicated at 150, is shallow and approximately half or less than half the thickness of a button, as indicated in Fig. 17.

In consequence, if a button is located in a button-recess in inverted position, as illustrated in Fig. 17, the shoulder 150 is not high enough to retain the button due to the curvature of its outer surface, and when such button upon rotation of the carrier plate reaches the upper side of the hopper, the button will fall out of the pocket and return to the lower area of the hopper, but if the button is positioned with its open side against the bottom of the hopper, the shoulder 150 is sufficiently high to retain the flange portion of the button and carry the button from the bottom of the hopper upwardly in an anti-clockwise direction with reference to Fig. 14, thence over the top of the hopper and downwardly until it reaches the outlet opening communicating with the chute 119 where the button rolls downwardly by gravity toward the chute 119. The button is deflected into the chute by a weighted gravity dog 151, see Fig. 16, which is pivoted at 152 and normally occupies the position illustrated in Fig. 16, where it is arranged so as to engage and deflect a button from a button-pocket into the chute and thus the chute is continuously filled with a supply of buttons. If for any reason the buttons should become clogged at the outlet to the chute, the gravity dog 151 will yield and permit a button to pass the discharge chute 119 and continue on downwardly to the bottom of the hopper, thus avoiding the possibility of buttons piling up or jamming at the outlet opening.

While the invention has been described in connection with a particular structural embodiment, it is not restricted to the details herein disclosed and this application is intended to cover such modifications and departures as may come within the purposes of the improvements and the scope of the following claims.

We claim:

1. An automatic button-pinning machine comprising a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, pointing mechanism controlled by said cam-shaft acting to point the end of the wire, cutting mechanism arranged between the feeding mechanism and

pointing mechanism and controlled by said cam-shaft acting to cut the predetermined length of wire, and forming mechanism arranged between the cutting mechanism and pointing mechanism and controlled by said cam-shaft, said forming mechanism acting to form the wire with a button-engaging portion and to engage said portion inside a flange of a button, said cutting mechanism and pointing mechanism being located in proximity to and on opposite sides of the forming mechanism whereby a length of wire is engaged by the pointing mechanism, cutting mechanism, and forming mechanism respectively while in one position.

2. An automatic button-pinning machine comprising a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, rotatable pointing mechanism actuated by said cam-shaft into operative relation with the end of the wire to point the wire when in said given position, cutting mechanism arranged between the feeding mechanism and pointing mechanism and actuated by said cam-shaft acting to cut the wire, and forming mechanism arranged between the cutting mechanism and pointing mechanism and operated by said cam-shaft, said forming mechanism acting to form a button-engaging portion on the pin and to engage said portion inside a flange of a button, said cutting mechanism and pointing mechanism being located in proximity to and on opposite sides of the forming mechanism whereby a length of wire is engaged by the pointing mechanism, cutting mechanism, and forming mechanism respectively while in one position.

3. An automatic button-pinning machine comprising a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, said feeding mechanism including a reciprocatory feeding gripper and a pivoted actuator controlled by said cam-shaft and operatively associated with the feeding gripper to move the same forwardly to feed the wire, an adjustable pivot for said actuator to vary the length of wire fed, rotatable pointing mechanism operated by said cam-shaft into operative relation with the end of the wire to point the wire when in said given position, cutting mechanism arranged between the feeding mechanism and pointing mechanism and actuated by said cam-shaft to cut the wire, and forming mechanism arranged between the cutting mechanism and pointing mechanism and operated by said cam-shaft, said forming mechanism acting to form a button-engaging portion on the pin and to engage said portion inside a flange of a button, said cutting mechanism and pointing mechanism being located in proximity to and on opposite sides of the forming mechanism whereby a length of wire is engaged by the pointing mechanism, cutting mechanism, and forming mechanism respectively while in one position.

4. An automatic button-pinning machine comprising a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, said feeding mechanism including a reciprocatory feeding gripper and a pivoted actuator controlled by said cam-shaft and operatively associated with the feeding gripper to move the same forwardly to feed the wire, an arm controlled by said cam-shaft engaging said feeding gripper and operating to hold it against the wire during forward movement, rotatable pointing mechanism operated by said cam-shaft into operative relation with the end of the wire to point the wire when in said given position, cutting mechanism arranged between the feeding mechanism and pointing mechanism and operated by said cam-shaft acting to cut the wire, and forming mechanism arranged between the cutting mechanism and pointing mechanism and operated by said cam-shaft, said forming mechanism acting to form a button-engaging portion on the pin and to engage said portion inside a flange of a button, said cutting mechanism and pointing mechanism being located in proximity to and on opposite sides of the forming mechanism whereby a length of wire is engaged by the pointing mechanism, cutting mechanism, and forming mechanism respectively while in one position.

5. An automatic button-pinning machine comprising a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, said feeding mechanism including a pivoted feeding gripper, a carriage on which the feeding gripper is pivotally mounted, a pivoted actuator controlled by said cam-shaft and engaging said carriage to move the same forwardly to feed the wire, spring means connected to the carriage for returning it, an arm controlled by said cam-shaft engaging said gripper and operating to hold it against the wire during forward movement, spring means connected to the feeding gripper and operating to move it away from the wire, rotatable pointing mechanism operated by said cam-shaft into operative relation with the end of the wire to point the same when in said given position, cutting means arranged between the feeding mechanism and pointing mechanism and controlled by said cam-shaft acting thereafter to cut the wire, and forming means arranged between the cutting mechanism and pointing mechanism and controlled by said cam-shaft, said forming means acting to form a button-engaging portion on the pin and to engage said portion inside a flange on a button, said cutting mechanism and pointing mechanism being located in proximity to and on opposite sides of the forming mechanism whereby a length of wire is engaged by the pointing mechanism, cutting mechanism, and forming mechanism respectively while in one position.

6. An automatic button-pinning machine comprising a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, pointing mechanism operated by said cam-shaft into operative relation with the end of the wire to point the same when in said given position, said pointing mechanism including a continuously rotating spindle that is movable endwise, a plurality of cutters movably mounted on said spindle, means acting automatically as the spindle is moved endwise in opposite directions to shift the cutters into and out of engagement with the wire to point the wire and to release the wire respectively, means controlled by said cam-shaft acting to move said spindle endwise in one direction, spring means acting to return the spindle to a position in which the cutters are disengaged from the wire, cutting means operated by said cam-shaft acting thereafter to cut the wire, and forming mechanism controlled by said cam-shaft acting to form the pin with a button-engaging portion and to engage said portion inside a flange on a button.

7. An automatic button-pinning machine com-

prising a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, pointing mechanism operated by said cam-shaft into operative relation with the end of the wire to point the same when in said given position, said pointing mechanism including a continuously rotating spindle that is movable endwise, a plurality of cutters pivotally mounted on said spindle, cam means and spring means acting to move said cutters inwardly and outwardly respectively as the spindle is moved endwise in opposite directions to engage and point the end of the wire and to release the wire respectively, means controlled by said cam-shaft acting to move said spindle endwise in one direction, spring means acting to return the spindle to a position in which the cutters are disengaged from the wire, cutting means operated by said cam-shaft acting thereafter to cut the wire, and forming mechanism controlled by said cam-shaft acting to form the pin with a button-engaging portion and to engage said portion with a flange on a button.

8. An automatic button-pinning machine comprisig a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, pointing mechanism operated by said cam-shaft into operative relation with the end of the wire to point the same when in said given position, said pointing mechanism including a continuously rotating spindle that is movable endwise, a collar fixed on said spindle, a second collar keyed to said spindle, the collars being interlocked against relative turning, a fixed element against which the second collar abuts, spring means between said collars actuating the first mentioned collar and spindle in one direction, an arm controlled by said cam-shaft engaging said first mentioned collar and actuating the spindle in the opposite direction, a plurality of cutters pivotally mounted on said spindle, cam means and spring means acting to move said cutters inwardly and outwardly respectively as the spindle is moved in opposite directions to engage and point the end of the wire and to release the same respectively, cutting mechanism actuated by said cam-shaft acting thereafter to cut the wire, and forming mechanism controlled by said cam-shaft acting to form the pin with a button-engaging portion and to engage said portion inside a flange on a button.

9. An automatic button-pinning machine comprising a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, pointing mechanism actuated by said cam-shaft into operative relation with the forward end of the wire to point the same when in said given position, cutting means actuated by the cam-shaft acting thereafter to cut the predetermined length of wire, and forming mechanism controlled by said cam-shaft acting to form a button-engaging portion on the pin and to engage said portion inside a flange on a button, said forming mechanism including a vertically moving pin-supporting post having a diametrical recess in its upper face to receive a pin, post-elevating means controlled by said cam-shaft acting to elevate said post from initial position successively to two positions, post-rotating means controlled by said cam-shaft acting to rotate the post through an angle of 90° when in its first elevated position while holding the free end of the pin and forming a button-engaging portion, means controlled by said cam-shaft acting to form an offset pinning portion while in said first elevated position, and said post-elevating means acting thereafter to elevate the post to a second position in which it receives a button over the pin, said post-rotating means thereupon acting to turn the post additionally through an angle of approximately 190° to engage the button-engaging portion of the pin inside a flange on a button.

10. An automatic button-pinning machine comprising a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, pointing mechanism actuated by said cam-shaft into operative relation with the forward end of the wire to point the same when in said given position, cutting mechanism actuated by the cam-shaft acting thereafter to cut the predetermined length of wire, and forming mechanism controlled by said cam-shaft acting to form a button-engaging portion on the pin and to engage said portion inside a flange on a button, said forming mechanism including a vertically moving cylindrical pin-supporting post having a diametrical recess in its upper face to receive the pin, elevating means controlled by said cam-shaft acting to elevate said post from its initial position successively to two positions, means controlled by said cam-shaft acting to form an offset pinning portion while in said first elevated position, post-rotating means controlled by said cam-shaft acting to rotate the post while in said two elevated positions, and a curved forming wall arranged adjacent and parallel to the side of said post in juxtarelation thereto and acting to bend the free end of the pin around the post as the latter rotates.

11. An automatic button-pinning machine comprising a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, pointing mechanism actuated by said cam-shaft into operative relation with the forward end of the wire to point the same when in said given position, cutting mechanism actuated by the cam-shaft acting thereafter to cut the predetermined length of wire, and forming mechanism controlled by said cam-shaft acting to form a button-engaging portion on the pin and to engage said portion inside a flange on a button, said forming mechanism including a vertically moving cylindrical pin-supporting post having a diametrical recess in its upepr face to receive the pin and a peripheral groove intersecting said recess adjacent to said upper face to receive the free end of the pin as it is bent around the post during rotation of the latter, elevating means controlled by said cam-shaft acting to elevate the post from its initial position successively to two positions, post-rotating means controlled by said cam-shaft acting to rotate the post through 90° when in its first elevated position and through a further angle of approximately 190° when in its second elevated position, a curved forming wall arranged parallel to the side of said post in juxtarelation thereto and acting to bend the free end of the pin around the post in said groove as the post rotates when in its first elevated position, button-feeding means controlled by said cam-shaft and acting to feed a button to said post, and a guide wall parallel to the side of the post above said forming wall and spaced therefrom horizontally and acting to maintain a button in proper relation to the post while the latter is rotating in its second elevated position.

12. An automatic button-pinning machine comprising a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, pointing mechanism actuated by said cam-shaft into operative relation with the forward end of the wire to point the same when in said given position, cutting mechanism actuated by the cam-shaft acting thereafter to cut the predetermined length of wire, and forming mechanism controlled by said cam-shaft acting to form a button-engaging portion on the pin and to engage said portion inside a flange on a button, said forming mechanism including a vertically moving pin-supporting cylindrical post having a diametrical recess in its upper face to receive the pin, elevating means controlled by said cam-shaft acting to elevate said post from its initial position successively to two positions, post-rotating means controlled by said cam-shaft acting to rotate the post through an angle of 90° when in its first elevated position, a stationary form which engages and bends the free end of the pin around the post during said rotation, said post-rotating means acting to rotate the post further while in said second elevated position, button-feeding mechanism operated by said cam-shaft acting to feed a button to said post, and means controlled by said cam-shaft acting to hold a button against said post whereby the button-engaging portion of the pin is engaged inside the flange of the button during said last mentioned rotation.

13. An automatic button-pinning machine comprising a cam-shaft, feeding mechanism operated by said cam-shaft acting to feed a predetermined length of wire to a given position, pointing mechanism actuated by said cam-shaft into operative relation with the forward end of the wire to point the same when in said given position, cutting mechanism actuated by the cam-shaft acting thereafter to cut the predetermined length of wire, and forming mechanism controlled by said cam-shaft acting to form a button-engaging portion on the pin and to engage said portion inside a flange on a button,

said forming mechanism including a vertically moving pin-supporting cylindrical post having a diametrical recess in its upper face to receive the pin, elevating means controlled by said cam-shaft acting to elevate said post from its initial position successively to two positions, post-rotating means controlled by said cam-shaft acting to rotate the post through an angle of 90° when in its first elevated position, said post-rotating means acting to rotate the post while in said second elevated position, button-feeding mechanism controlled by said cam-shaft and acting to feed a button to said post, means controlled by said cam-shaft acting to hold a button against said post whereby the button-engaging portion of the pin is engaged with a flange on the button during said last mentioned rotation, a forming wall parallel to and spaced from the side of the post and acting to engage and bend the free end of the pin around the post as the latter rotates in its first elevated position, and a button-positioning curved wall offset horizontally and vertically from said forming wall and acting to engage the edge of a button and position it in relation to the post, said forming wall having a recess therebeneath to receive the free end of the pin as the post rotates.

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