(No Model.) 3 Sheets—Sheet 1.

J. MATHISON.

BUTTON SETTING MACHINE.

No. 493,634. Patented Mar. 21, 1893.

FIG. 1.

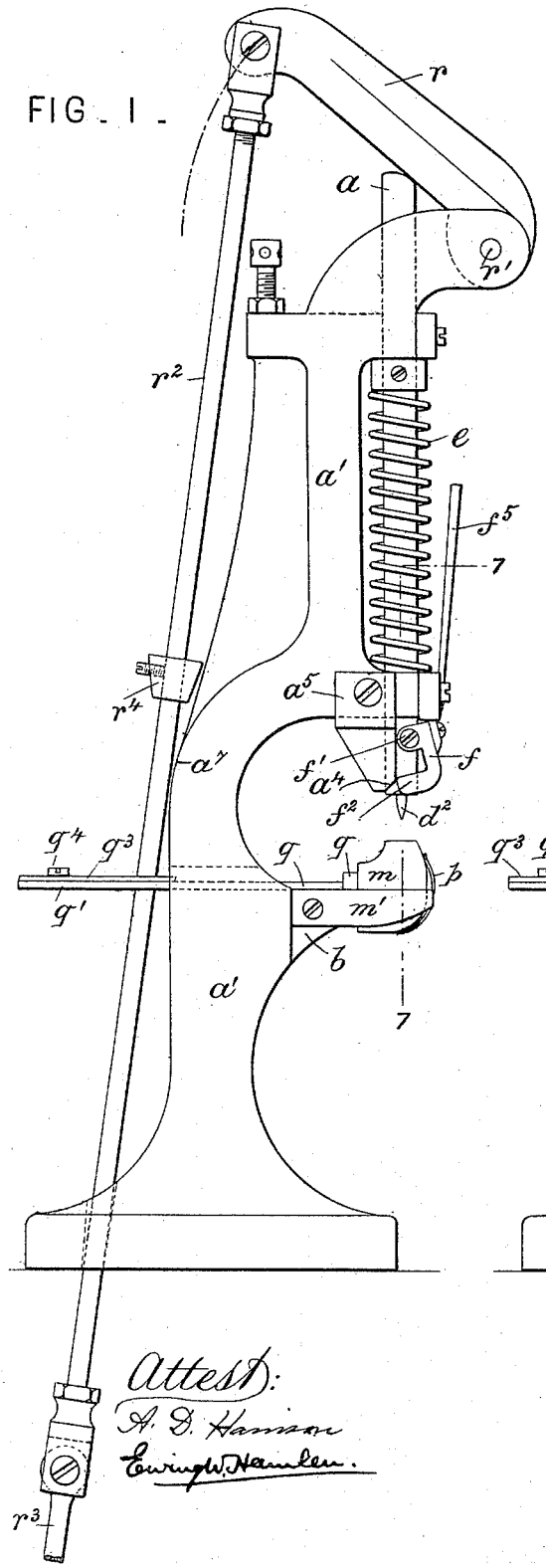
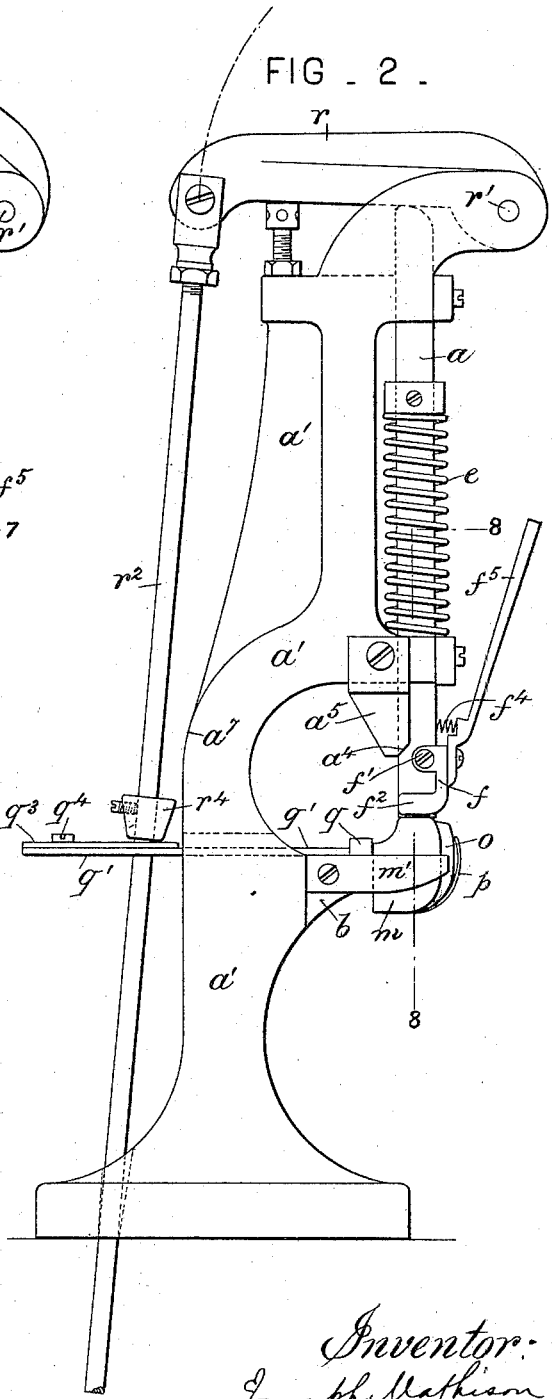


FIG. 2.



Attest:
A. D. Harrison
Ewing W. Hamlen.

Inventor:
Joseph Mathison
by Wright Brown Quinby
Attys.

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J. MATHISON.

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FIG. 3.

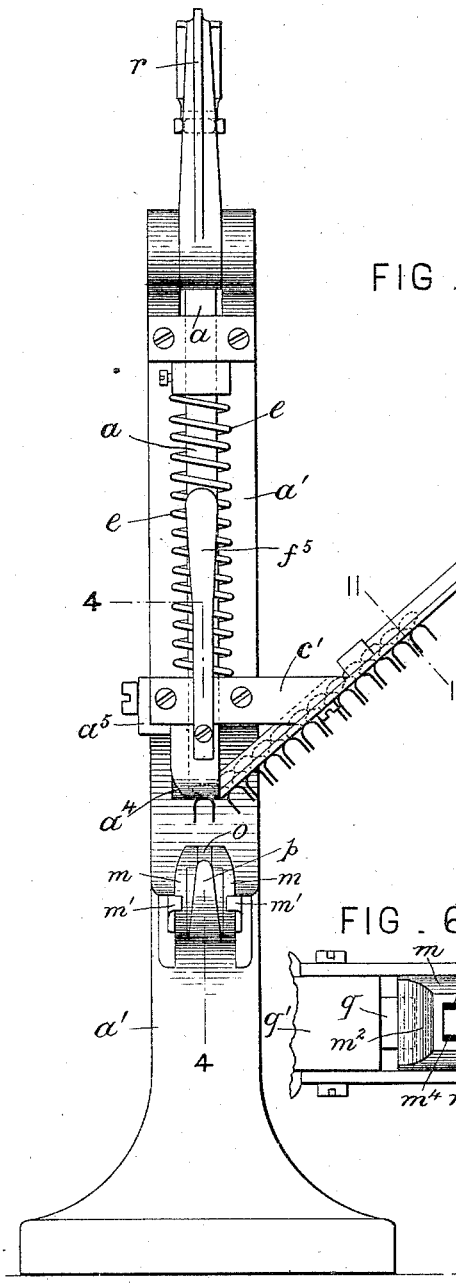


FIG. 4.

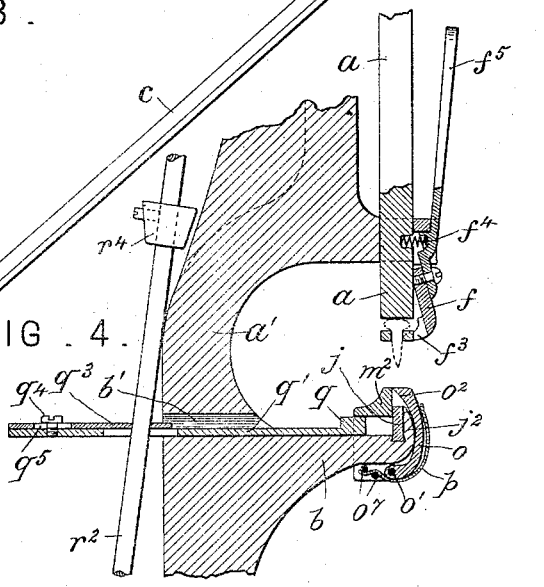
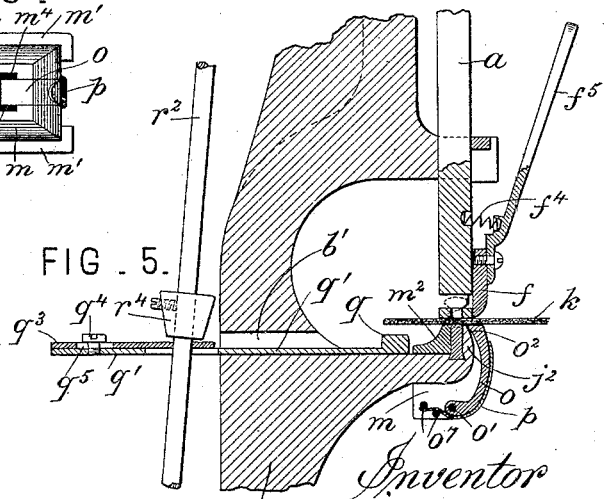


FIG. 6.

FIG. 5.



Attest:
A. D. Harrison
Ewing W. Hamlen.

Inventor
Joseph Mathison
by Wright Brown Quinby & Otty
Attys.

(No Model.) 3 Sheets—Sheet 3.

J. MATHISON.

BUTTON SETTING MACHINE.

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FIG. 7.

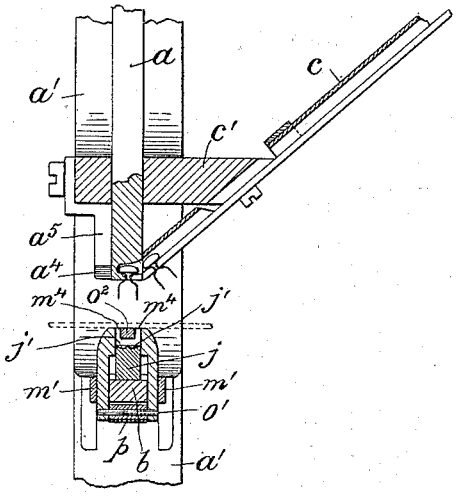


FIG. 8.

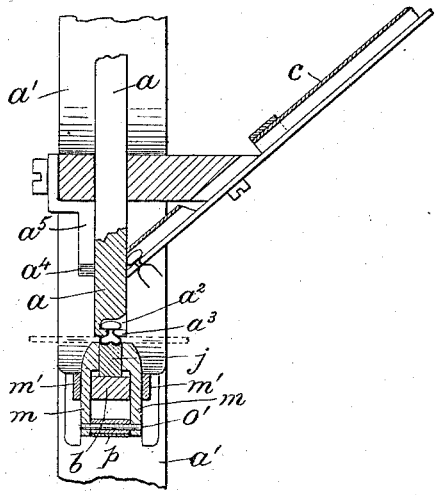


FIG. 9.

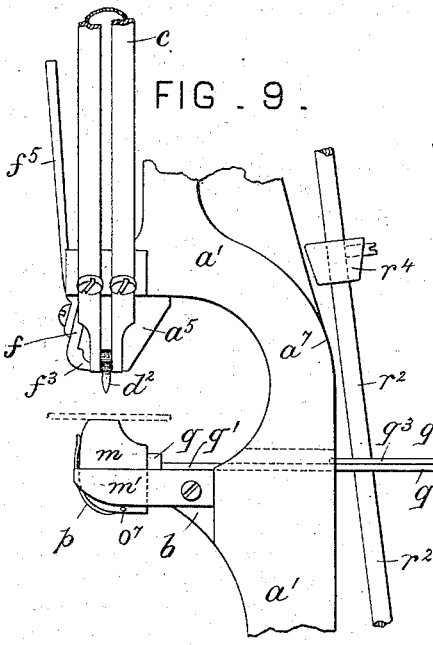


FIG. 10.

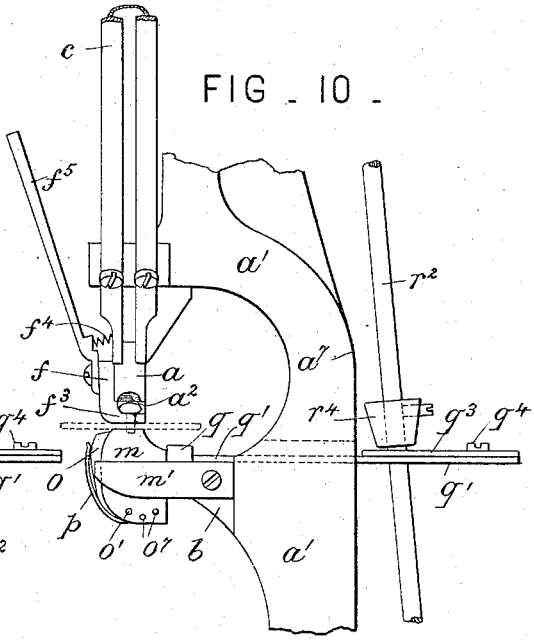
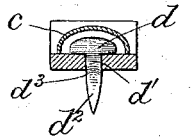


FIG. 11.



Attest:
A. D. Harrison.
Ewing W. Hamler.

Inventor
Joseph Mathison
by Wright Brown Quinby
Attys

UNITED STATES PATENT OFFICE.

JOSEPH MATHISON, OF SOMERVILLE, MASSACHUSETTS.

BUTTON-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 493,634, dated March 21, 1893.

Application filed July 31, 1891. Serial No. 401,285. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH MATHISON, of Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Setting Metal Buttons, of which the following is a specification.

This invention has for its object to provide a machine for forcing through a piece of leather or like material the prongs of a peculiar button invented by me, and clinching or turning said prongs inwardly on the inner side of said piece. The said button is made of a single piece of sheet-metal, and comprises a rounded head, a shank made in two parts, formed by bending and shaping two arms formed integral with the head and at opposite sides thereof, and prongs formed on the said arms and projecting downwardly from the shank, said prongs standing parallel with each other before the attachment of the button.

The invention consists in the several improvements hereinafter described relating to a machine for grasping the shank of the button, forcing the prongs thereof through the material to which the button is to be attached, and turning or clinching the prongs at the under side of said piece of material, all of which I will now proceed to describe.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of my improved machine, the jaws which co-operate in setting the button being opened or separated. Fig. 2 represents a similar view showing the jaws closed. Fig. 3 represents a front elevation of the machine in the condition represented in Fig. 1. Fig. 4 represents a section on line 4 4 of Fig. 3. Fig. 5 represents a section similar to Fig. 4, showing the movable jaw depressed. Fig. 6 represents a top view of the casing that normally covers the clinching die. Fig. 7 represents a section on line 7 7 of Fig. 1. Fig. 8 represents a section on line 8 8 of Fig. 2. Fig. 9 represents a side view opposite the side shown in Fig. 1. Fig. 10 represents a side view opposite the side shown in Fig. 2. Fig. 11 represents a section on line 11 11 of Fig. 3.

The same letters of reference indicate the same parts in all the figures.

In the drawings: a represents a slide or plunger which is fitted to move vertically in guides in the standard a', the latter being adapted to be attached to a bench or other suitable support. The lower end of the plunger a is provided with a horizontal slot or pocket a^2, which is formed to receive from an inclined chute c, hereinafter described, the head of the metallic button of peculiar construction. In the portion of the plunger a which constitues the bottom of the pocket a^2 is formed a slot a^3 which receives the prongs of said button, said prongs projecting downwardly through the slot a^3 below the lower end of the plunger a.

The button which my improved tool is intended to set or attach is composed of a rounded head d, a shank composed of two sides d' d' formed integral with the head and bent under the same, and parallel prongs d^2 d^2 formed on the shank sides d', but offset from the latter by shoulders d^3 d^3.

The chute c is formed in cross-section as shown in Fig. 11, so that its passage receives the heads of the buttons and supports the under sides of said heads, the prongs of the buttons projecting downwardly through the slot in the button chute. The chute is affixed to a bracket c' which is formed on or attached to the standard a'.

e represents a spring which is arranged to normally elevate the plunger a to the position shown in Figs. 1, 3, 4 and 7, in which position the head-receiving pocket a^2 in the plunger coincides with the lower end of the chute c, and receives the head of the lowest button, which enters said pocket by gravitation upon the elevation of the plunger to the position last described. When the plunger is depressed to force the prongs of the button through the piece to which the buttons are to be attached, and to clinch said prongs, as hereinafter described, the said plunger, adjoining the lower end of the chute, forms a wall which prevents the buttons in the chute from sliding downward, so that no button can escape from the chute excepting when the plunger is elevated.

f represents an arm which is pivoted at f' to the plunger a, and is provided at one edge of its lower end with a finger f^2 and at the opposite edge of said end with a latch or gate f^3.

f^4 represents a spring which is arranged to normally hold the arm f in the position shown

in Figs. 2 and 5, the finger f^2 being thus caused to project across one side of the plunger so as to be acted on by an incline a^4, Fig. 2, formed on an ear or bracket a^5 affixed to the standard a', said incline being arranged to force the arm f outwardly to the position shown in Figs. 1 and 4 when the plunger is elevated by the spring e. The gate f^3 at the opposite edge of the arm from the finger f^2 is arranged to project across the outer end of the shank-receiving slot a^3 in the plunger when the arm f is pressed inwardly by the spring f^4, and thus prevent the escape of the button shank from said slot while the button is being carried downwardly by the depression of the plunger a. The arm f is provided with a handle f^5 whereby said arm may be displaced or forced outwardly by the operator.

b represents an arm which is formed on the standard a' and projects outwardly under the lower end of the plunger a. The arm b is provided with a clinching die j, as shown clearly in Figs. 7 and 8. Said die is a block projecting upwardly from the arm b, and is provided in its upper face with concavities j' j', formed and arranged to come in contact with the ends of the prongs of the button when the plunger is depressed, said concavities curling the ends of the prongs inwardly, and causing them to gradually turn upward against the under side of the piece to which the button is attached by the tool. When the plunger is elevated as shown in Figs. 1 and 4 the clinching die j is covered by a casing which comprises two side pieces m m adapted to slide vertically between guides m' m' affixed to the arm b, and a swinging arm o which is pivoted at o' to the side pieces m m, and is formed so that its upper end, when in its normal position, projects over the clinching die j, said arm o having an inclined inner side o^2, which is arranged to slide upon and be displaced by a cam or curved projection j^2 on the clinching die j. The arm o is pressed inwardly by a spring p bearing against its outer side, said spring, when the plunger a is raised, holding the upper end of the arm o over the upper end of the die j, as shown in Fig. 4. When the arm o is in the position shown in Figs. 1 and 4, its upper end is flush with the upper edges of the side pieces m m, and the upper ends of said parts collectively form a flat bed or support for the piece k; the side pieces m m being provided with slots m^4 m^4, Fig. 6, in its opposite sides arranged to coincide with and receive the prongs of the button, said slots being directly over the outer ends of the concavities j' of the clinching die, as shown in Fig. 7. The side pieces m m are provided with a projection m^3, which, when the plunger a is elevated, is supported by a movable stop or block q which is adapted to slide upon the arm b, and when moved forward under the projection m^3, supports the casing composed of the side pieces m m and arm o so that they cannot move independently of the arm b; but when said stop is moved to the position shown in Figs. 2 and 5 it is withdrawn from under the projection m^3, and makes said casing free to be depressed independently of the arm b, as presently described. When the casing is supported by the stop q, as shown in Fig. 1, and the plunger is being depressed, the casing constitutes an unyielding support for the piece k, so that the button prongs, projecting downwardly from the plunger a, will be readily forced through the piece k by the downward movement of the plunger. After the prongs have passed through the piece k, and have entered the slots m^4, m^4, the stop q is withdrawn to the position shown in Figs. 2 and 5, the withdrawal being preferably by the automatic means hereinafter described, so that the casing, composed of the side pieces m m and arm o, at once becomes yielding, and is caused to yield upon the pressure of the upper end of said casing against the piece k, the latter being now in contact with the under side of the plunger a. The result of the yielding movement of said casing is to depress the upper ends of the side pieces m m below the upper end of the clinching die j, and at the same time cause the inclined inner side o^2 of the arm o to move outwardly by riding down the cam j^2 on the clinching die, as shown in Fig. 5, the upper end of the clinching die being thus uncovered so that the prongs of the button are free to turn inwardly on the clinching die against the under side of the piece k.

It will be seen that the casing, when rigidly supported in position above the clinching die, insures the passage of the prongs of the button through the material without bending or crippling said prongs, there being nothing directly opposing the points of the prongs under the material, so that they pass freely into the slots m^4 m^4 and complete their entrance into the material before they come in contact with the clinching block. It will also be seen that the sides of the slots m^4 m^4 when the casing is in its elevated position, guide the prongs in their downward movement, so that they are not liable to be displaced in any direction until their points meet the clinching die.

The block o is normally pressed inwardly to the position shown in Figs. 1 and 4, by means of a spring p, one end of which is engaged with studs o^7 o^7 secured to the side pieces m m, the other end bearing on the outer side of the arm o near its upper end. When the arm o is displaced, as shown in Fig. 5, the pressure of the spring p tends to restore said arm to the position shown in Fig. 4, and in so doing causes the casing of which it forms a part to move upwardly by the sliding of the inclined inner side of the arm o upon the cam j^2 of the clinching die; so that when the plunger is raised the casing rises automatically to its elevated position over the clinching die.

The stop q is formed on a slide q' which is movable on the arm b, an orifice b' being formed through the standard a' for the passage of said slide through said standard.

The slide q' is moved automatically to make the stop q alternately operative and inoperative by the means which I will next describe.

r represents a lever pivoted at r' to ears formed on the upper end of the standard a'. The under side of said lever bears on the upper end of the plunger a, and said lever is raised by the plunger, as shown in Fig. 1.

r^2 represents a rod pivotally connected to the outer end of the lever r, and extending downwardly through an opening in the base of the standard a' to a point below said standard, where it is connected by a rod r^3, or other suitable connecting device, with a treadle, not shown, arranged to be depressed by the operator. The depression of the treadle causes the rod r^2 to pull downwardly the lever r, as shown in Fig. 2, thus depressing the plunger a and forcing the prongs of the button through the piece k. The downward movement of the rod r^2 causes a beveled or tapered collar r^4 affixed to said rod to strike a projection a^7 on the standard a', said projection causing the rod r^2 to move laterally while it is descending. The rod r^2 passes through an orifice formed to receive it in a plate q^3 affixed to the slide q', said orifice closely fitting the rod, so that the lateral movement of the rod causes a longitudinal movement of the slide q' in the direction required to withdraw the stop q from the position shown in Figs. 1 and 4 to that shown in Figs. 2 and 5, thus depriving the casing which covers the clinching die of its support. The plate q^3 is detachably secured to the slide q' by means of screw q^4 engaged with said slide and passing through a slot q^5, Fig. 4, in the plate q^3, said slot enabling the plate q^3 to be adjusted lengthwise of the slide, so that any desired changes in the position of the stop q may be effected.

The operation of the machine is as follows: The plunger a being elevated, and having received the button from the chute c, the operator, by depressing the treadle, depresses the rod r^2, lever r and plunger a. The depression of the plunger separates the pocket a^2 from the chute, as already stated, and carries the button downwardly and forces its prongs through the piece k, the arm f swinging inwardly during the depression of the plunger and causing its gate f^3 to prevent the displacement of the button during its downward movement. The stop q remains in position to support the casing that covers the clinching die until the prongs of the button have penetrated the piece k and have commenced to curl inwardly upon the clinching die. At this point the collar r^4 on the rod r^2 strikes the projection a^7 and displaces the stop q, so that the casing yields and permits the plunger to force the piece k and the button prongs closely down upon the clinching die, thus causing the prongs to be turned upwardly against the under side of said piece, the points of the prongs being turned upwardly into the piece. This completes the attachment of the button to the piece k. The operator then releases the treadle, whereupon the spring e raises the plunger a, the lever r and the rod r^2, said parts resuming the position shown in Fig. 1, the upward movement of the plunger causing the arm f to swing outwardly and displace the gate f^3. The plunger a may be considered as a jaw, since it co-operates with the clinching die in exerting the pressure which inserts and clinches the prongs; the clinching die opposing the pressure exerted by the plunger.

I do not limit myself to the details of mechanism here shown and described, and may vary and modify the same without departing from the spirit of my invention.

I claim—

1. In a machine for setting pronged buttons, the combination of a prong-clinching die, a plunger movable toward and from said die, and provided in its side with a head-receiving pocket and in its lower end with a shank-receiving slot, an inclined chute arranged to deliver a button to said pocket when the plunger is elevated, the lower end of the chute abutting against the side of the plunger, and having no other obstruction to the passage of a button than the wall of the plunger, a spring-closed gate which normally projects across and closes the shank-receiving slot of the plunger, and means whereby said gate is opened when the pocket of the plunger is in position to receive a button, as set forth.

2. In a machine for setting pronged buttons, the combination of a prong-clinching die, a plunger movable toward and from said die, and provided with a head-receiving pocket and with a prong-receiving slot, an inclined chute arranged to deliver a button to said pocket when the plunger is raised, the lower end of the chute abutting against the side of the plunger, and having no other obstruction to the passage of a button than the wall of the plunger, an arm pivoted to said plunger and provided with a gate which normally projects across the shank-receiving slot therein and with a finger arranged to be acted on to displace the arm and gate, a spring whereby the said gate is normally held in its operative position, and a fixed incline arranged to act on said finger to displace the gate when the plunger is raised, as set forth.

3. The combination with a button-holding plunger, of a prong-clinching die opposing said plunger, a movable casing which normally covers said die and is provided with prong-receiving slots over the die, and a stop movable into and out of the path of movement of the casing, and adapted to lock said casing and prevent its yielding movement, said stop, when displaced, permitting the casing to yield and expose the clinching die, as set forth.

4. The combination with a button-holding plunger, of an opposing prong-clinching die, a movable casing which normally covers said die and is provided with prong-receiving slots

over the die, a stop movable into and out of the path of movement of the casing, and adapted to lock the casing and prevent its yielding movement, devices for depressing the plunger, and a connection between the plunger-depressing devices and the stop, whereby the stop is displaced from its operative position when the plunger is being depressed, and returned to its operative position when the plunger is being raised, as set forth.

5. In a machine for setting pronged buttons, the combination of a supporting standard or frame, a prong-clinching die affixed thereto, a vertically movable casing supported by said frame and normally covering said die, said casing comprising side pieces at opposite sides of the die and a swinging arm which is yieldingly held between said side pieces with its upper end over the die, a spring-raised plunger movable toward and from said die in guides on the standard, said plunger being formed to hold a pronged button and present the prongs thereof to the die, devices, including a vertically movable rod, whereby said plunger may be depressed, means for giving said rod a lateral movement when it is being moved lengthwise, and a sliding stop engaged with said rod and arranged to support or lock the said casing when the rod is elevated, said stop being moved as described by the lateral movements of the rod, whereby it is made alternately operative and inoperative, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 22d day of July, A. D. 1891.

JOSEPH MATHISON.

Witnesses:
C. F. BROWN,
EWING W. HAMLEN.