No. 611,989. Patented Oct. 4, 1898.

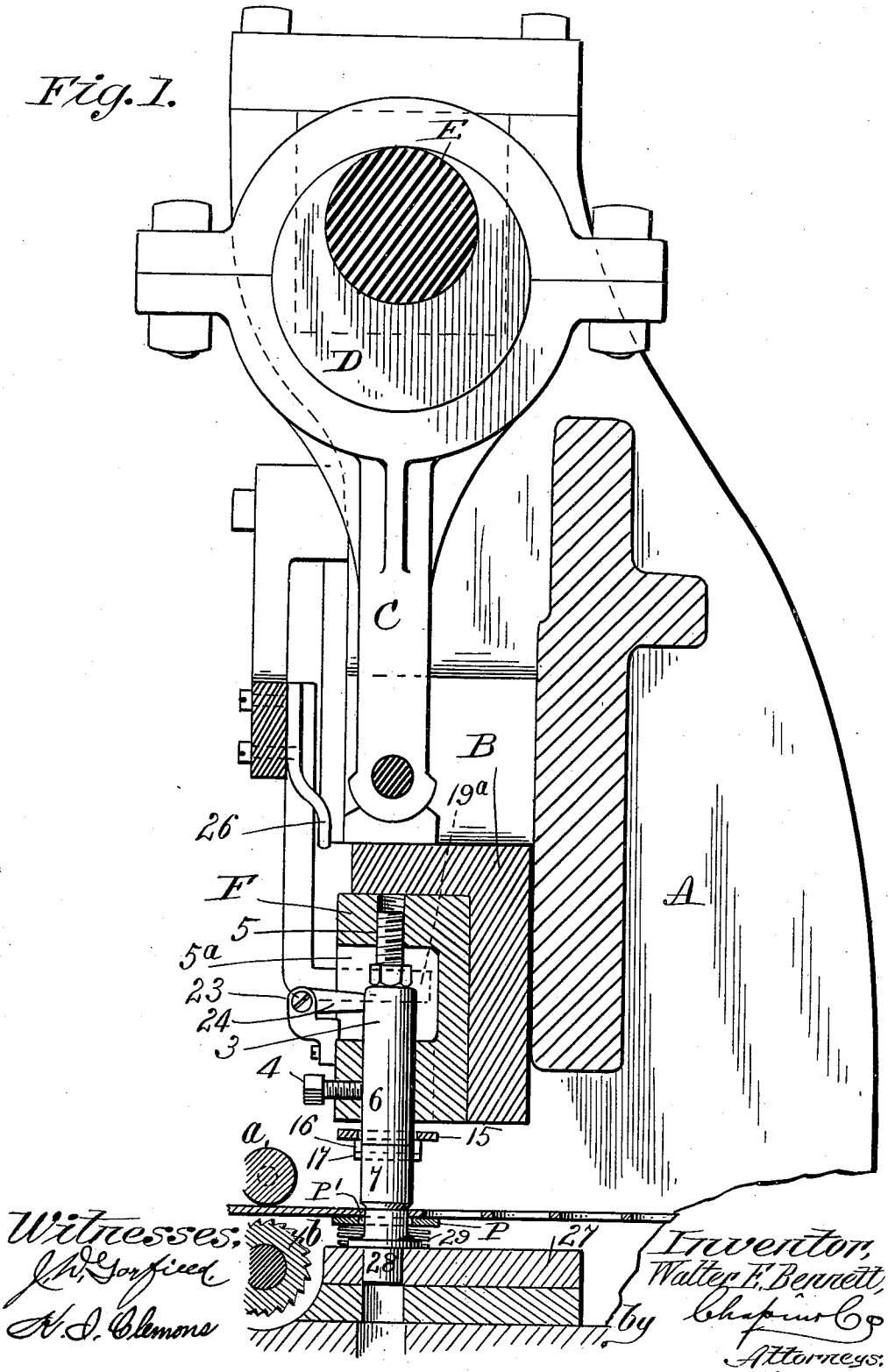
W. E. BENNETT.

BUTTON PUNCHING MACHINE.

(No Model.) (Application filed Dec. 30, 1897.)

5 Sheets—Sheet 1.

Fig. 1.



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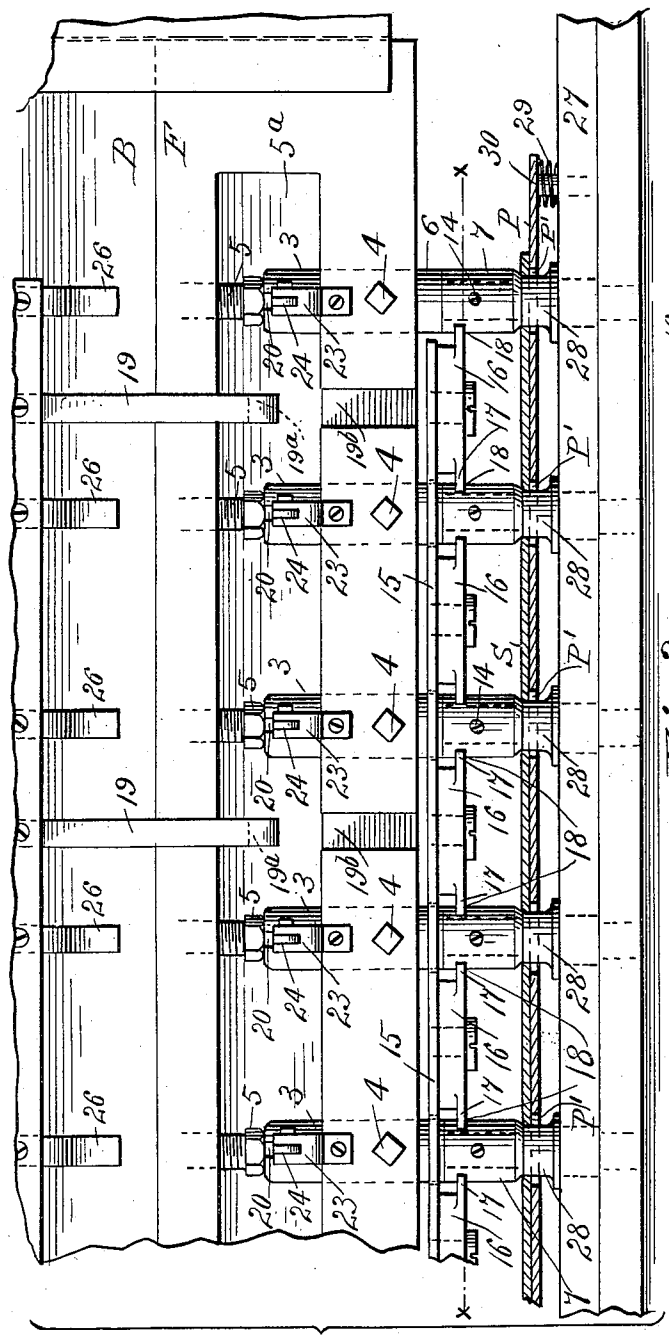


Fig. 3.

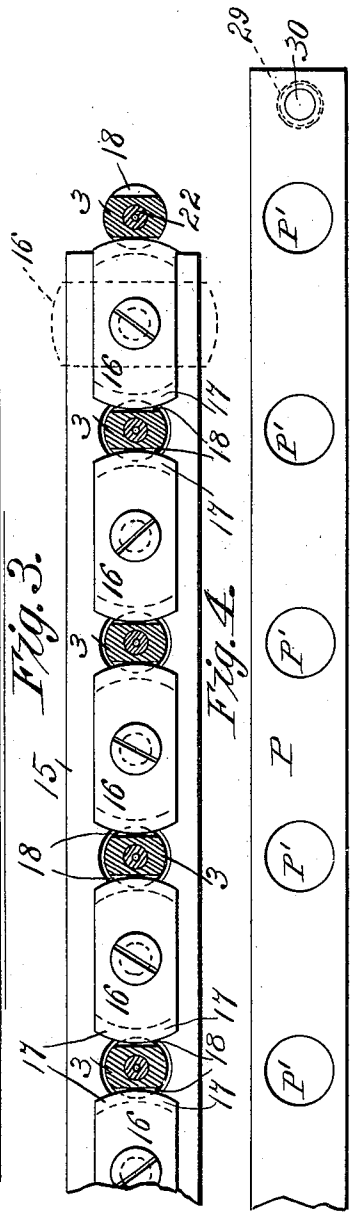


Fig. 4.

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Fig. 2.

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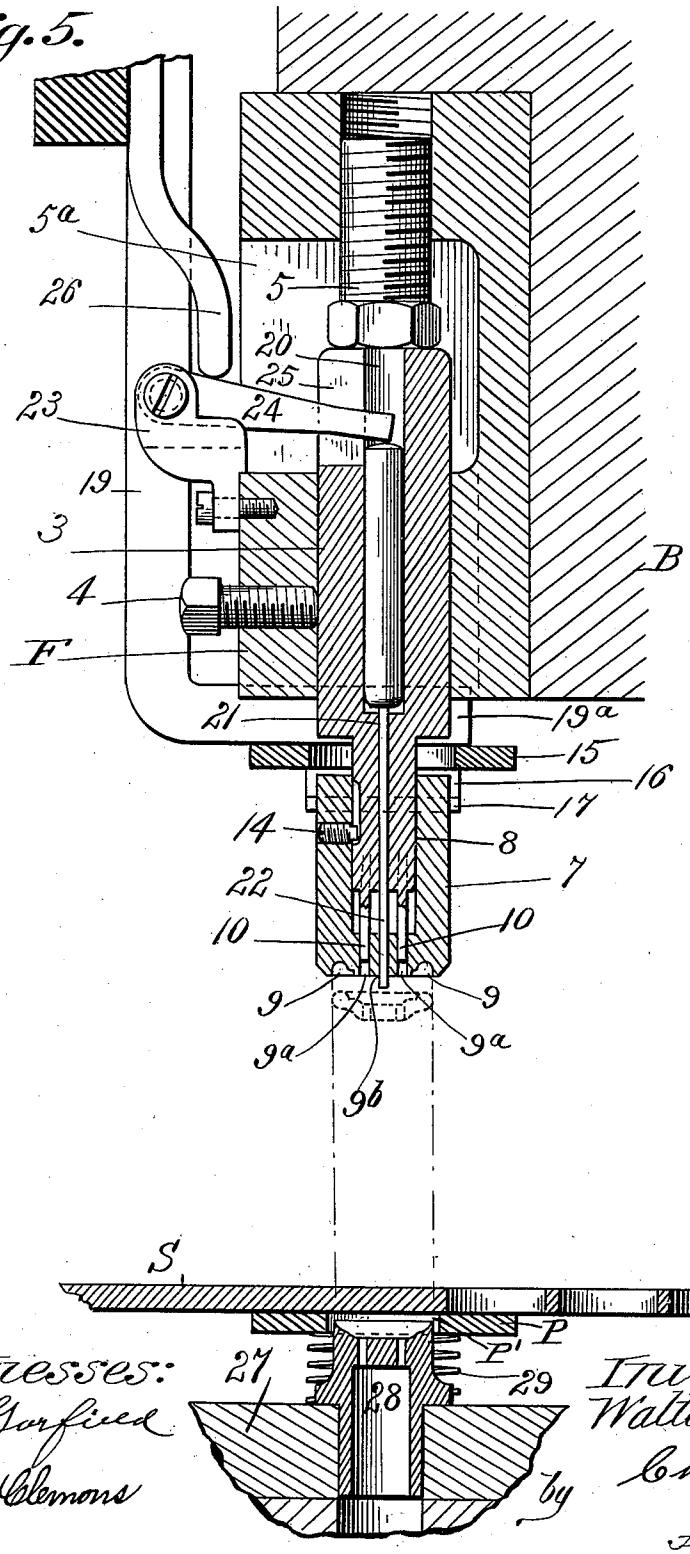
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Fig. 5.



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Fig. 6.

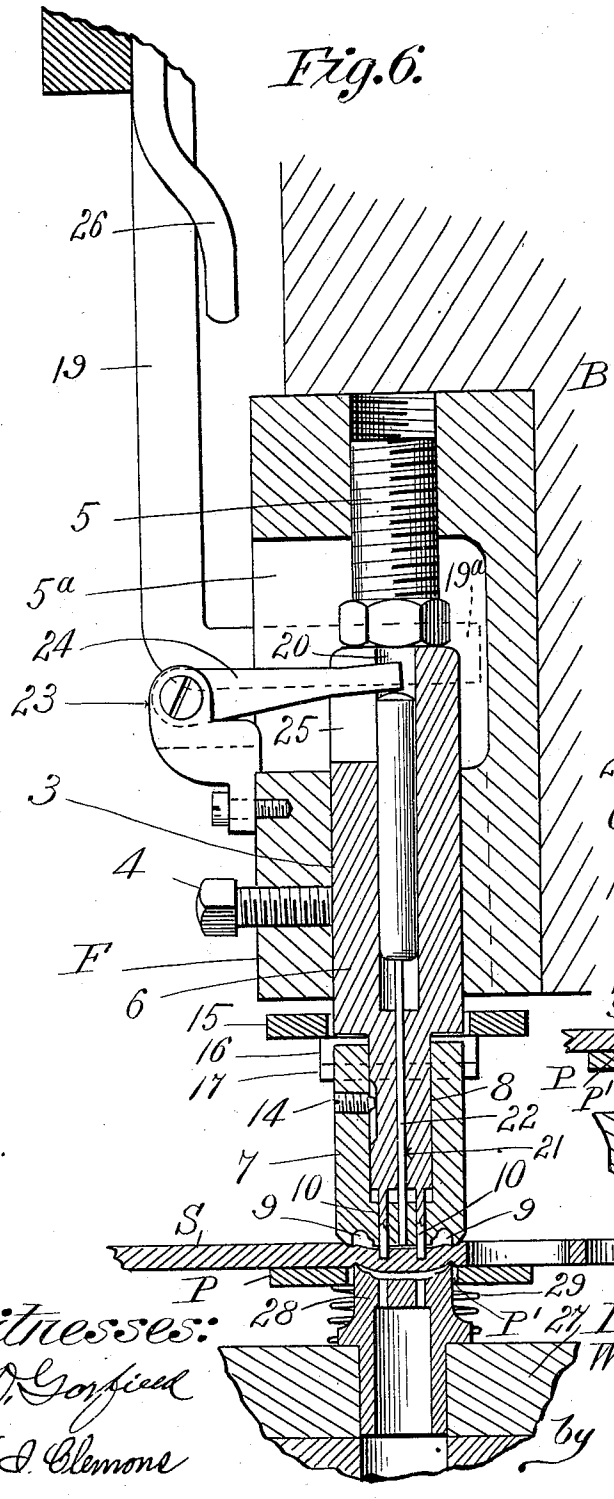
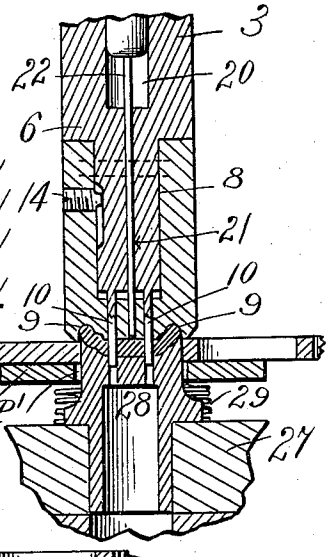


Fig. 7.



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Fig. 8.

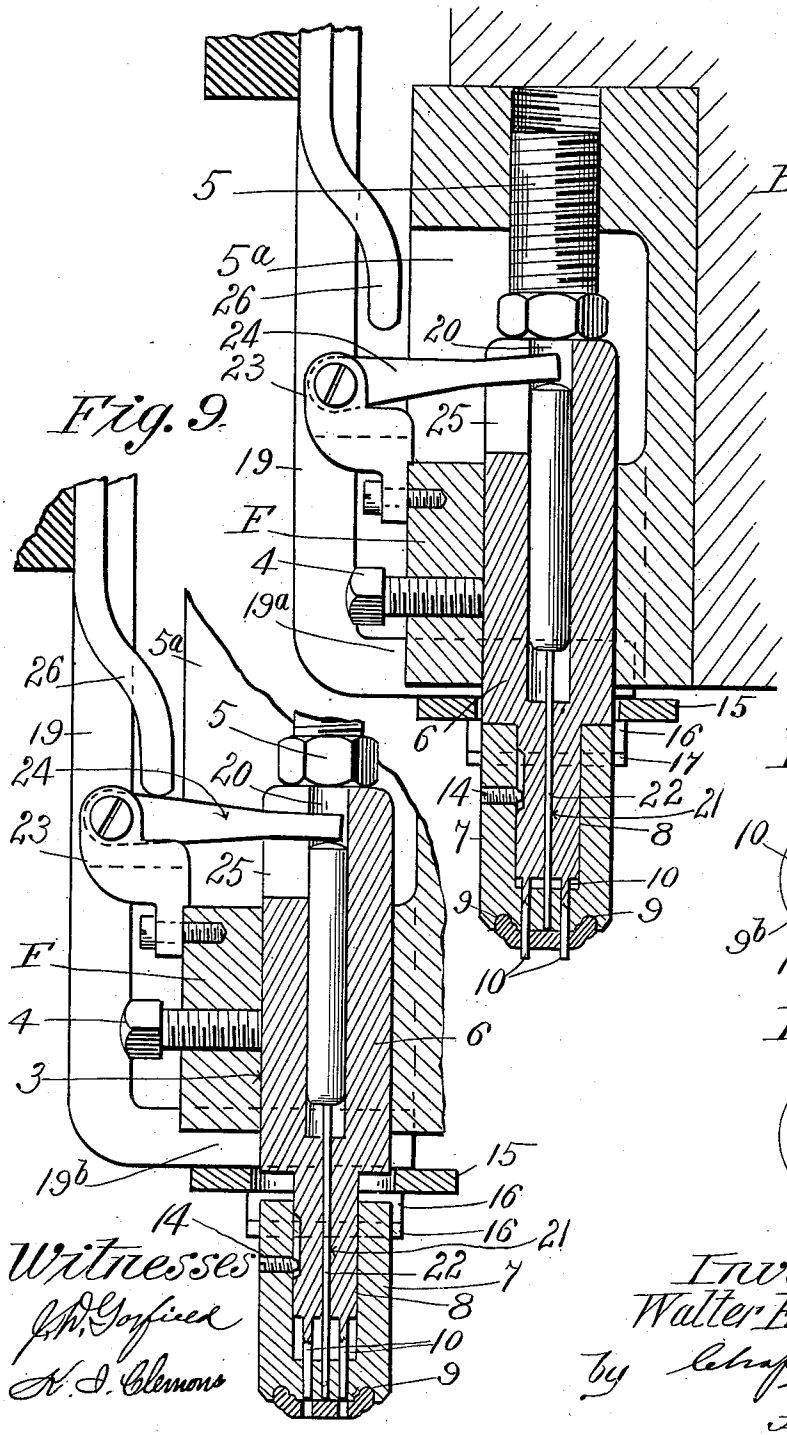


Fig. 9.

Fig. 10.

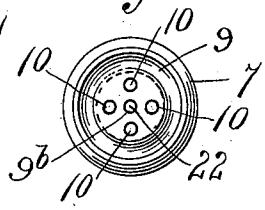
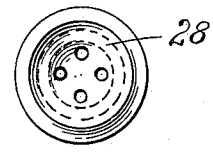


Fig. 11.



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UNITED STATES PATENT OFFICE.

WALTER E. BENNETT, OF PORTSMOUTH, NEW HAMPSHIRE, ASSIGNOR TO THE MORLEY BUTTON MANUFACTURING COMPANY, OF SAME PLACE.

BUTTON-PUNCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 611,989, dated October 4, 1898.

Application filed December 30, 1897. Serial No. 664,616. (No model.)

To all whom it may concern:

Be it known that I, WALTER E. BENNETT, a citizen of the United States of America, residing at Portsmouth, in the county of Rockingham and State of New Hampshire, have invented new and useful Improvements in Punches, of which the following is a specification.

This invention relates to the construction of punches employed in the manufacture of flat buttons and similar articles from compressible material, and has special reference to punches having compound movements; and the object of the invention is to produce a punch and means for operating it singly or in gangs, whereby buttons and similar articles can be cut out of the stock, formed, and perforated at one operation and the finished article moved by the punch to a position from which it can be conveyed away therefrom; and the invention consists in the construction of the parts as hereinafter fully described, and pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a sectional side elevation of the upper part of a punch-press, showing one of my improved punches applied thereto, said punch being shown resting on a die on the bed-plate after the cutting out and formation of a button. Fig. 2 is a front elevation of a part of the press shown in Fig. 1, showing a plurality of punches therein arranged to operate simultaneously. Fig. 3 is an inverted sectional plan view taken on line *x x*, Fig. 2. Fig. 4 is a plan view of a stripping-plate for the dies on the bed of the press. Fig. 5 is an enlarged sectional elevation of the parts shown in Fig. 1, but showing the punch at the end of its upward movement. Figs. 6, 7, 8, and 9 are sectional elevations showing the parts of the punch in the various positions they occupy from the beginning of the operation, Fig. 6, to the time the finished button is forced off from the end of the punch, as shown in Fig. 5. Fig. 10 is a view of the end of the punch, and Fig. 11 is a view of the die against which said punch operates.

In the drawings, A, Fig. 1, represents the frame of the press to which the punches forming the subject of this application are applied.

B is a sliding head in said press, and C connecting-rods by means of which said sliding head is given reciprocating vertical movements by means of the eccentric D, with which said connecting-rods C engage, said eccentrics being located on a shaft E in the top of the press in the usual manner, suitable driving means (not shown) for said shaft being provided. Feeding devices for passing the stock intermittently under the punches are indicated by the feed-rolls *a* and *b*, Fig. 1. Any suitable means for intermittently rotating said rolls may be employed—such, for example, as are shown in my United States Letters Patent, dated October 30, 1894, No. 528,502. In said sliding head B is supported in any convenient manner the punch-block F, in which the punches 3 are secured by set-screws 4, means for the fine adjustment of the said punches 3 longitudinally being provided by the screw 5, against which the end of the punch in the punch-block F abuts, said punch-block having a longitudinal groove 5^a therein to give access to said adjusting-screw 5 and to permit the operation of other parts, to be described.

The punch proper, 3, consists of two parts, the body 6 thereof being that part entering the punch-block F and rigidly secured therein, as stated, and the other part 7 thereof, which has a longitudinal movement on the lower end of said body 6. To receive said part 7 the body 6 of the punch is turned down at 8 for a distance somewhat less than the length of the part 7, and the latter is bored out to fit closely said turned-down end 8. Exteriorly the part 7 is of the same diameter as the body 6 of the punch, and being longer, as stated, than the turned-down end 8 of said body a solid end on the part 7 is provided, in which is formed the annular depression 9, whose exterior edge operates against the cutting edge of the die, and through said solid end holes 9^a are made, through which the perforating-punches 10 pass, and a clearing-plunger 22, to be described farther on, passes through a perforation 9^b in the center of said solid end. Such ornamentation as it is desired to stamp on the face of the button is also cut in the end of the said part 7. The solid end of the latter is made of sufficient thickness to afford a proper support for the

said perforating-punches 10, which fit closely the said holes 9^a, provided for them therein.

A short vertical slot is made in the turned-down end 8 of the body of the punch, and a screw 14 in the wall of the part 7 of the punch 3 enters said slot and prevents the possible rotation of said part 7, which would cause the perforating-punches 10 to bind in their movements through the end of said part.

The perforating-punches 10 are made of suitably-tempered pieces inserted in holes in the end of the turned-down end 8 of the punch-body 6 and are held therein by friction only, they being made of a "driving fit." The drawings show these punches 10 apparently integral with the body of the punch when they appear in section; but the section-lines are so applied only because the said punches are of too small a diameter to do otherwise conveniently.

Means for imparting longitudinal movement at the proper time to the part 7 of the punch relative to the fixed body part 6 thereof consists when more than one punch is used in the press of a plate 15, (long enough to embrace all of the punches,) which has openings therethrough so spaced that when the said plate 15 is in its proper position under the punch-block F, as shown in the drawings, the said punches will be found substantially concentric with said openings. The latter are made a little larger than the diameter of the punches, and between said openings there are bolted to the under side of said plate 15 the blocks 16, Figs. 2 and 3, which have lips 17 projecting from the ends thereof contiguous to the punches, which lips engage slots 18 in the part 7 thereof, which slots are cut in the periphery of said parts in positions parallel with said plate 15. The latter extends only to a point sufficiently beyond the next to the last punch at each end of a series, as shown in Fig. 2, to permit the last block 16 to be screwed thereto, as each block engages two of the lower parts 7 of the punches. By means of this construction all of the lower parts 7 of the punches may be made to move in unison by moving the plate 15. Referring to said Fig. 2, it is seen that the upper end of the part 7 of the punch 3 bears on the shoulder on the body 6 of the punch, formed by turning down the aforesaid part 8 thereof, and that the plate 15 is then separated somewhat from the lower surface of the punch-block, this being the position of the parts from the moment of cutting out a blank from the stock (which is indicated by S) until the punch returns to the position shown in Fig. 8, bringing a completely-formed and perforated button or similar article with it. The means employed for causing the said part 7 of the punch 3 to move downward, sliding on the downturned portion 8 of the punch from the position shown in Fig. 8 of the drawings to that shown in Fig. 5, consist of one or more arms 19, (the number depending on the length of the plate 15,) secured to the frame of the machine and having their ends 19^a turned in toward the sliding head B in such position that said ends will come to a bearing on said plate 15 when the said head in its upward movement has reached a position indicated in Fig. 8. To permit the downward movement of the punch-block F without interfering with the ends 19^a of said arms 19, slots 19^b in said punch-block are provided, through which the ends of said stationary arms 19 pass when said punch-block moves downward. The continued movement of the sliding head B upward from the position shown in Fig. 8 causes the body of the punch to move relative to its lower movable part 7, which is held stationary by the engagement of the plate 15 with said arms 19, which, as stated, are secured to a fixed part of the machine. Therefore said perforating-punches 10 are withdrawn into the solid end of the part 7 of the punch from the position in Fig. 8 to the position shown in Fig. 5 and leave the button-blank adhering to the face of the punch by reason of the great pressure under which the button was formed between the punch and die, which forces the stock S, of which it is made, into the forms cut in the end of the punch. As the punch arrives at the position shown in Fig. 9, which is nearly up to the limit of its movement, the button-blank is positively forced away from the end of the part 7 of the punch, as follows: The body of the punch is bored out from the upper end thereof down to a point nearly to the shoulder formed by turning down the part 8, forming a cylindrical cavity 20 centrally therein, and a small hole 21 is then made from that point down through the center of said downturned portion 8 of the punch to receive the small clearing-plunger 22, the body of which lies in the said cavity 20. On the forward edge of the punch-block F is secured a small casting 23, in which a lever 24 is pivotally supported by one end in a position substantially opposite the center of the punch, and the free end of said lever, passing through a vertical slot 25, cut in the upper edge of the body 6 of the punch, and communicating with the cylindrical cavity 20 therein, rests on the upper end of the body of the clearing-plunger 22. Said plunger is in the position shown in Fig. 5 of the drawings when the punch starts downward to cut out and form a button, and the end of said clearing-plunger, coming in contact with the surface of the stock S, retires within the punch, as seen in Fig. 7, its end still resting on the stock and the lever 24 still in contact with the upper end thereof until the punch returns to the position indicated in Fig. 9. At this point the said levers 24 come in contact near their pivoted ends with the end of a rigid arm 26, secured to a fixed part of the frame, and the continued upward movement of the punch-block F operates to force said clearing-plunger 22 by the operation of the lever 24 thereon, as described, down through the hole

provided therefor in the end of the part 7 of said punch, thus forcing the button or other stamped article off from the end thereof, and any suitable means may be provided for directing said detached article into a proper receptacle.

The completion of the upward movement of the sliding head B leaves the parts of the punch and the devices which operate the same and the devices coöperating with it in the position shown in Fig. 5 ready for the beginning of the next downward stroke, as described.

Supported in a suitable die-plate 27 are the dies 28, axially inclined with the punches 3, the outer edges of which dies are formed into a suitable upturned sharpened edge for cutting out the blank from the said stock S, forced down thereagainst by the downward stroke of the punch, and perforations are made through said dies coinciding with the perforating-punches 10, into which said punches enter and against the peripheries of which they cut when forced through the stock. A suitable configuration for the back of the button is made in the end of said dies 28, one of which is shown in plan view in Fig. 11.

In the downward stroke of the sliding head B, carrying the punch-block F, the clearing-plungers 22 first strike the stock S and retire within the punches. Then the parts 7 of the punches come in contact with the stock and come to a rest thereon while the perforating-punches 10 pass down therethrough. This operation thus far is shown partially completed in Fig. 6. Just before the perforating-punches 10 pass completely through the stock S the part 7 of the punch 3 comes to a bearing on the shoulder of the body of the punch, formed by turning down the part 8 thereof, and partly compressing said stock and cutting out the blank forces the bottom thereof down against the surface of the die 28, whereby the under side of said blank is held in contact with said die, when the perforating-punches 10 pass through the back of said blank and through the perforations in the die, thus making a clean-cut perforation.

The movement of the perforating-punches 10 and both of the parts 6 and 7 of the punch 3 have been made as one piece after the contact of the said part 7 with the shoulder on the other part 6, as stated, and by the time the said perforating-punches 10 have passed through the stock S the button-blank has been compressed into its final form and completely severed from the stock, as seen in Fig. 7, and said punch parts then begin their upward stroke (still as one piece) until they arrive at the position shown in Fig. 8, when, through the action of the ends of the arms 19 against the said plate 15, the parts 7 of the punches 3 are made to operate to withdraw the perforating-punches 10, and then the action of the rigid arm 26 on the lever 24 operates the clearing-plunger 22 to disengage the button from the end of the punch 3, and the movements are repeated.

While the description herein has been practically confined to a gang of punches, any single punch of the number shown may be operated by the same mechanism without any change in the parts, except that the plate 15 would be shortened to embrace the single punch only.

As the stock S when moved by the feeding devices between each stroke of the punches must move in a plane above the tops of the dies 28 and as each stroke of the punches depresses that part of said stock being operated on below the tops of said punches a stripper or clearing-plate is provided to force said sheet of stock up off from said dies after the punches retire on their upward stroke, and said stripper or clearing-plate consists of a plate P. (Shown in plan in Fig. 4 and in section in Figs. 2, 5, 6, and 7.) Said plate is made with perforations P′ therein, somewhat larger in diameter than the diameter of the dies 28 and so spaced that when said plate is placed over said dies the latter will be substantially concentric with said openings. Said plate P is supported on springs 29 at each end thereof, encircling a guide-pin 30, fixed in said plate, and entering the die-plate 27, in which they have a free vertical movement. The normal position of the said plates is that shown in Fig. 5, in which it is seen that the upper surface thereof is slightly above the top of the die 28. This plate thus acts as a support for the stock S, on which it may be moved by the feed-rolls *a b*, and after the descent of the punches to operate on said stock has carried the latter down below the top of the dies, as shown in Figs. 1, 2, and 7, said springs 29 operate to force said stock back again to the position shown in Fig. 5.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A punch for cutting out, forming, and perforating flat buttons and analogous articles, said punch comprising two parts, one immovably secured in a support and the other movable relative to said first-named part; means for imparting reciprocating movements to said punch and for imparting movement to one of said parts of the punch relative to the other; perforating-punches on one of the parts of said punch, a clearing-plunger in said punch, means for periodically moving said plunger in a direction opposite to the direction of movement of that part of said punch in which it is supported, substantially as described.

2. A punch for cutting out, forming, and perforating flat buttons and analogous articles, said punch comprising two parts, one immovably secured in a support and the other movable relative to said first-named part; means for imparting reciprocating movements to said punch, and for imparting movement to one of said parts of the punch rela-

tive to the other; perforating-punches on one of the parts of said punch, a clearing-plunger in said punch, means for periodically moving said plunger in a direction opposite to the direction of movement of that part of said punch in which it is supported, a die, a clearing-plate therefor, and holes in said die for receiving the ends of said perforating-punches, substantially as set forth.

3. A punch for cutting out, forming, and perforating flat buttons and analogous articles, comprising a fixed body part, a part vertically movable on and secured to the operative extremity of said body part, a member engaging and moving with said movable part and projecting beyond the periphery thereof, means for imparting reciprocatory vertical movements to said punch parts, a fixed arm projecting across the line of movement of the member engaging said movable part of the punch, perforating-punches on the fixed part of the punch, and operating through the end of the movable part thereof, a die between which and the movable part of said punch said buttons are cut out and formed, and perforations in said die for receiving the ends of said perforating-punches, substantially as described.

4. A punch for cutting out, forming, and perforating flat buttons and analogous articles comprising a fixed body part, a longitudinal perforation centrally therethrough, a clearing-plunger therein, and perforating-punches secured in the operative end of said punch; a movable part having a vertical sliding movement on said operative extremity of said body part, said movable part having a solid end and perforations therein for said clearing-plunger and perforating-punches, means for sliding said movable part on said body part which consist of a lateral projection on the said movable part, and a fixed arm with which said projection engages when the punch is moved in one direction; means for periodically moving said clearing-plunger in a direction contrary to the movement of the fixed punch part, a die against which said punch operates to cut out and form a button, perforations in said die for receiving the ends of said perforating-punches, and means for imparting vertical movements to said punch parts, substantially as set forth.

5. A punch for cutting out, forming, and perforating flat buttons and analogous articles, having a fixed body part and a movable part having a solid end, on the end of said body part, perforating-punches on said body part passing through perforations in the end of said movable part, means for periodically moving said movable part relative to the fixed part of said punch, a longitudinal perforation centrally through said body part of the punch, a clearing-plunger therein whose lower end passes through the end of said movable part, and means for periodically moving said clearing-plunger endwise consisting of a lever supported near and moving with the punch and bearing by one end on the said plunger, and a fixed arm for engaging said lever upon the movement of the body of the punch in one direction whereby said clearing-plunger is moved in the opposite direction, and means for supporting and reciprocally moving said punch parts, substantially as described.

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