

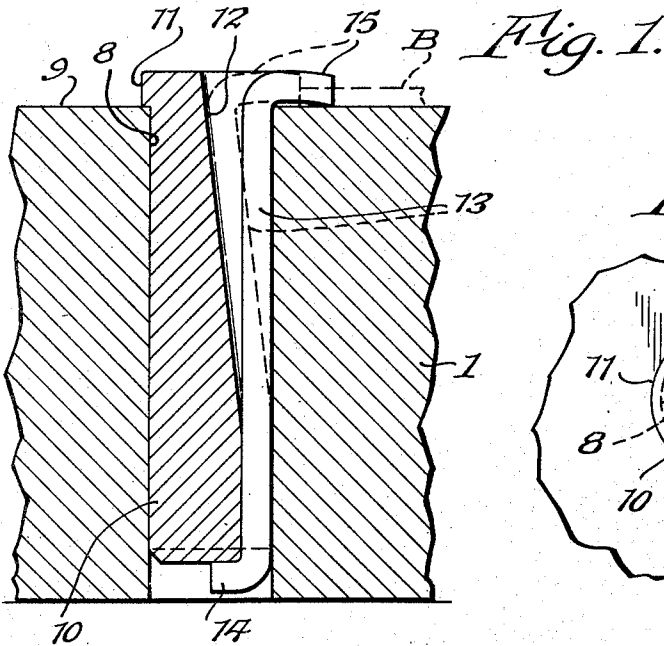
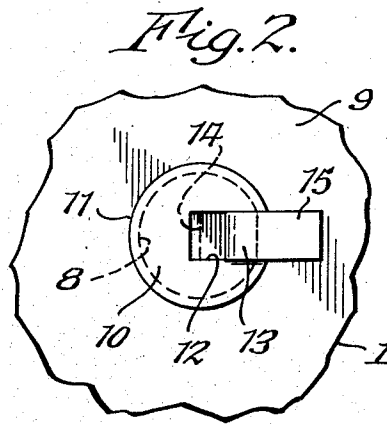
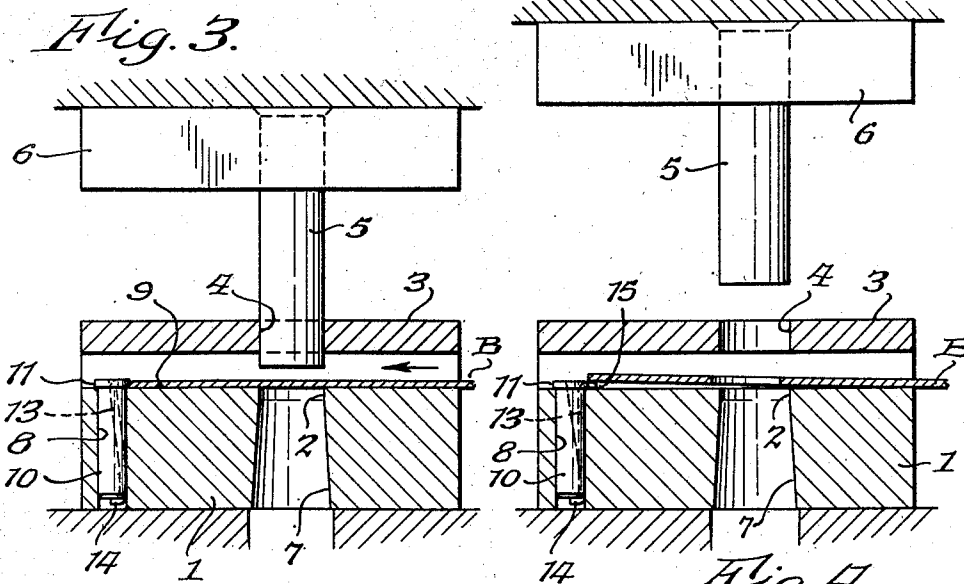
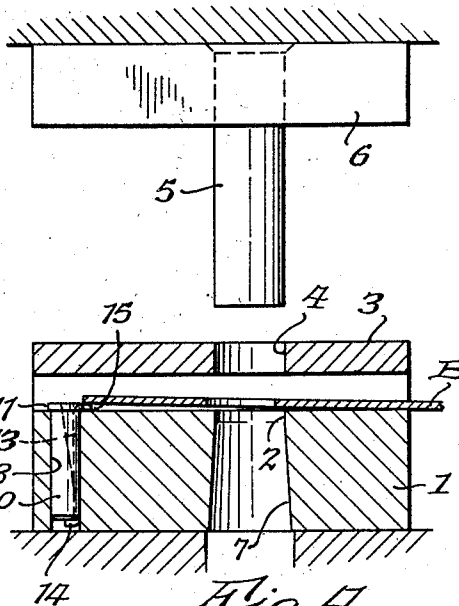
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TOOL

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TOOL

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This invention relates to automatic stops for positioning a blank or piece of stock in successive positions or stations as it is fed progressively through a punch assembly where it is perforated.

An object of the invention is to provide an improved stop which may be applied to existing types of punch assemblies or apparatus; which will effectively position the stock for action thereon by the punch, and which automatically releases the stock for successive progressions of the stock; which will be fully automatic in action; which will be relatively simple, practical, efficient and inexpensive; which requires no attention in use; and which does not require substantial changes in existing punch presses.

Various other objects and advantages will be apparent from the following description of one embodiment of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawing:

Fig. 1 is a sectional elevation through the die base of a punch device, in which is incorporated an automatic stop constructed in accordance with this invention;

Fig. 2 is a plan of the same;

Fig. 3 is a sectional elevation, on a smaller scale, of the punch having this improved stop incorporated therein, and illustrating one position of the stop; and

Fig. 4 is a similar view, at the end of a punching operation with the stop in another of its positions in which the stock or blank is released for further progression.

In the illustrated embodiment of the invention and referring first to Fig. 3 in which a simple punch press is illustrated, the stop is shown as applied to the die base 1 having in its upper face a female die or aperture 2 over which a piece of stock or blank B is moved in progression. Disposed on the die base so as to extend somewhat above the blank B is a stripper member 3 having therein an aperture 4 through which reciprocates a punch element 5 carried by die head 6. The die base 1 has a passage 7 aligned with the die aperture 2 through which the slugs or punchings may drop after punching operations. This is a typical punch and it may have any suitable construction.

In the die base 1 is a recess 8 which extends downwardly from the upper face 9 of the die base over which the stock B moves, and this passage 8 preferably extends fully between the top and bottom faces of base 1 as shown in Fig. 1.

Referring now to Fig. 1, there is disposed in

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this passage 8 a pin 10 which may be conveniently referred to as a stop pin, with a head or lateral flange 11 at its upper or outer end which limits the extent of movement of the pin 10 downwardly in the passage or recess 8. This pin 10 also has longitudinally thereof, a slot 12 which, at the lower end for a substantial distance, has uniform depth, and then becomes progressively deeper toward the upper end of pin 10 and opens through the upper end of the pin. The slot 12, however, preferably extends for the full length of the pin.

Disposed in the slot 12 is a resilient member 13 which substantially fills the shallower depth of the slot 12 adjacent the lower end of the slot, and this member 13, at its lower end, is flanged laterally at 14 beneath the lower end of the pin 10 so as to limit the upward movement of the member 13 in the slot 12. This member 13 extends to the top of the pin 10 and beyond the face 9 this member 13 is flanged laterally as at 15, which would be away from the pin 10, so as to overlie the upper face 9 of the die base 1, as shown in full lines in Fig. 1. This flanged end 15 preferably has a convex upper surface which, at its highest point, extends to or slightly above the upper end face of the head 11. The member 13 is preferably straight between the flanged ends 14 and 15, so that it normally has the straight position shown in Fig. 1 with the lower end part of the member 13 snugly wedged against the wall of the passage 8, which aids in holding the pin 10 in position in the die base.

The member 13 is, however, free to flex at its upper end into the progressively deeper slot 12 into the position shown by dash lines in Fig. 1, in which flexed position it abuts against the bottom of the tapered part of slot 12. Since member 13 is resilient, it will, when released, automatically return to the full line position shown in Fig. 1 in which the end of the flange extends outwardly of the slot and beyond the head 11 over and upon the upper face 9 of the die base 1.

In use, the blank or stock B (see Fig. 3) is fed over the upper face 9 of the die base 1 beneath the punch 5 until the advanced edge thereof engages the flanged end 15 in the stop pin 10. This blank B is under continuous feeding pressure, and when it engages the flanged end 15, it flexes the member 13 into the dotted line position shown in Figs. 1 and 3, and the advance of the blank or stop B is stopped. The die head 6 is then caused to descend, during which the punch element 5 descends through the aperture 4 in the stripper member 3, and engages the blank B and punches an aperture therein. When the die head 6 is ele-

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vated, the punch element 5 will be elevated, and the blank B, which adheres to the punch element 5, will move upwardly with the element 5 until it engages the stripper plate or member 3. This stripper prevents the blank from further following the punch element 5, and thus strips the blank from the punch element, whereupon the blank then falls into the position shown in Fig. 4 and rests upon the top of the flange 15.

When the blank B was elevated with the punch element 5 following the punching operation, as shown in Fig. 3, the advance edge released the flanged end 15 of member 13, and the latter then sprung outwardly into the full line position shown in Figs. 1 and 4, in which the end 15 is nearer the punch element than it was before. Then when the blank B was released from the punch element 5 by the stripper 3 and fell, its forward edge portion was in a position to fall upon the top of the flange 15 instead of against its edge. The feeding pressure on the blank B then moves the blank forwardly automatically until an aperture punched by the punch element 5 becomes aligned with the upper end of the pin 10 and telescopes therewith, following which an edge of the aperture will engage against the side edge of flange 15 and flex member 13 from the full line position of Fig. 1 into the dash line position of that figure. The punch then descends and punches another aperture in the blank, and then when the blank is again lifted with the punch element, it releases the flanged end 15, so that the operation just described will be repeated, and there will be another advance of the stock.

From this it will be observed that the operation is fully automatic, and there are no moving parts which are likely to need adjustment or get out of order, and the cost of such a punch stop is extremely small. It is particularly useful where one desires to have the stop disposed close to the die parts, yet the overall dimensions of the punch device need not be increased. This provides an especially simple and practical automatic stop.

It will be understood that various changes in the details, materials and arrangements of parts, which have been herein described and illustrated in order to explain the nature of the invention may be made by those skilled in the art within the principle and scope of the invention, as expressed in the appended claims.

I claim:

1. An automatic stop for stock in perforation punching apparatus which comprises a die base for mounting a female die, a die head for mounting a male die and movable towards and from said base, a stripper disposed above said base, a stop immovably carried by said base and extending slightly upwardly from the upper face of said base into the path of stock moving along said face, beneath said stripper, said stop having a notch in that side of its extending part towards which the stock moves, a member disposed in said notch and yieldingly urged to extend sideways of the stop out of said notch and over the top of said base but pushable into said notch by engagement therewith of an advancing edge of said stock, as the advancing movement of stock is limited, the lifting of the male die lifting the perforated stock above said stop until stopped by said stripper, whereby as the stock is lifted, said member springs beneath the stock to hold it above said stop and enable further advance of said stock released by the stripper and falling upon said member until a perforation in the stock drops over said stop and an edge of said perfora-

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tion engages said member and pushes it back into said notch.

2. An automatic stop for stock in perforation punching apparatus which comprises a die base for mounting a female die, a die head for mounting a male die and movable towards and from said base, a stripper disposed above said base, said base having a recess in its face across which the stock moves, a pin disposed in said recess, extending outwardly from said face, and having a longitudinally extending notch therein, with its outer end part becoming progressively deeper towards its outer end, a spring element in and extending along said notch and anchored at its inner end between the pin and a wall of said recess, and having its outer end section flexible in said notch in a direction radially of the pin, and when free, urged toward the recess wall, said pin extending outwardly at least to the outer end face of said pin and flanged sidewise over said face beyond said pin, whereby engagement of an edge of said stock with said flanged end will flex said member further into said notch and then when the stock is lifted with the male die above the pin, said flanged end will spring below said stock and enable further advance of the stock.

3. An automatic stop for limiting movement of stock in a punch of the type having a die base with a recess in its top, a stripper member, and a punch element, which comprises a pin having a shank of a size to fit said recess, a head at its outer end to abut said die base top, and a slot running lengthwise thereof and through said head, said slot at the headed end portion being deeper than the outer end portion, a spring element disposed in and filling said other end portion and extending along said headed end of the slot to said head and terminating in a lateral flange that extends outwardly of the slot beyond the side edge of said head and extends in a direction lengthwise of the slot at least approximately to the end face of the head, whereby when said pin is disposed in said recess and an edge of the stock engages edgewise of the flange, it will flex the flanged end of said element in said headed end portion of the slot, and when the stock, following a punching operation, is lifted until released by the stripper member, the flanged end of the spring element will spring beneath the stock and guide it over the headed end of the pin until another edge of the stock engages and flexes the flanged end of said element into the pin.

4. An automatic stop for limiting movement of stock in a punch of the type having a die base with a recess in its top, a stripper member, and a punch element, which comprises a pin having a shank of a size to fit said recess, a head at its outer end to abut said die base top, and a slot running lengthwise thereof and through said head, said slot at the headed end portion being deeper than the outer end portion, a spring element with oppositely extending, parallel end flanges having its shank disposed in said slot with one flanged end hooked over the unheaded end of said pin and its other flanged end extending edgewise of said head and beyond its edge, but movable into the head as the element is flexed in said deeper slot portion by engagement therewith by an edge of the stock movable over said die top, whereby when the stock is lifted with the punch element until released by the stripper member, the stock will drop upon the outer face of said other flanged end that was released by the stock and be guided thereby past said pin

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until another edge of the stock engages and flexes said element.

5. An automatic stop for stock in perforation punching apparatus, which comprises a die base for mounting a female die, a die head for mounting a male die and movable towards and from said base, a stripper disposed above said base and through which said male die passes, a stop fixedly carried by said base and extending slightly above the upper face of said base into the path of stock moving along said face, beneath said stripper, said stop having a slot in that side of its upwardly extending part towards which the stock moves, a member disposed in said slot projecting upwardly as high as said stop and resiliently urged sidewise of the stop to project a part of the member that is as high as said stop towards an advancing edge of said stock, and out of said slot, but pushable back into said stop by the pressure thereon of an edge of the advancing stock and which limits the advance of the stock, the lifting of the male die, after a perforating operation, lifting the stock adhering to the male die above said stop and member, enabling said member to spring out sidewise of the head beneath the stock, whereby when the stock falls, following its stripping from the male die, it rests upon the member and may move over said stop forward until another edge of the stock engages said member and pushes it back into said slot.

6. An automatic stop for stock in perforation punching apparatus, which comprises a die base for mounting a female die, a die head for mounting a male die and movable towards and from said base, a stripper disposed above said base and through which said male die passes, a stop fixedly carried by said base and extending slightly above the upper face of said base into the path of stock moving along said face, beneath said stripper, said stop having a slot in that side of its upwardly extending part towards which the stock moves, and also extending in a direction lengthwise of the stop, an elongated member fixedly secured at its lower end in said slot, extending to the top end thereof and then flanged laterally towards an advancing edge of the stock, the upper end part of said slot being deeper in a direction crosswise of the length of the stop

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than the corresponding dimensions of said member in which the upper end of said member may move horizontally by flexing of the member, to project said flanged end to different distances sidewise of said stop towards an advancing edge of said stock, the resiliency of said member urging its outer end in a direction of project said flanged part towards the advancing edge of the stock, the flanged part having an elevation at least equal to the upper end of said stop.

7. An automatic stop for stock in perforation punching apparatus, which comprises a die base for mounting a female die, a die head for mounting a male die and movable towards and from said base, a stripper disposed above said base and through which said male die passes, a flexible resilient member fixedly supported within said base in an upright position and having its lower end anchored immovably and its upper part extending above said base and free to flex, said base having an opening in its upper face through which the upper end of said member projects and in which it flexes back and forth towards and from an advancing edge of stock on said base beneath said stripper, said member extending above said base but terminating below said stripper by a distance greater than the thickness of said stock, whereby when an edge of said advancing stock engages a side of said upper end of the member it will flex it in the same direction until stopped thereby, and when the stock is lifted with the male die after a perforation it will move above the level of the upper end of said member to release it, and the latter will then spring back towards the next advancing edge of the stock so that when the stock is stripped by the stripper from the male die it will fall on the upper end of said member and be free to advance until another edge engages the member and flexes it.

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