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Striper for Punch-Machines.

1,149,226.


To all whom it may concern:

Be it known that I, FREDERICK A. STEVENSON, residing at Detroit, Wayne county, Michigan, and being a citizen of the United States, have invented certain new and useful improvements in Strippers for Punch-Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof will occur to persons skilled in the art.

In said drawings, Figure 1 is a front elevation of a multiple punch with strippers forming the subject-matter of this invention applied thereto. Fig. 2 is a horizontal section along the line 2—2 of Fig. 1. Fig. 3 is a vertical transverse section along the line 3—3 of Fig. 1. Fig. 4 is a plan view of a stripper hook hereinafter described, and Fig. 5 is a section thereof taken on line 5—5 of Fig. 4.

My present invention relates to strippers for punching machines, and has for one of its principal purposes the application of a device of this character which is capable of being locked in its work-holding position during the punching operations, and until the stripping of the work from the punches has been accomplished during the return or upward stroke of said punches. Furthermore, the design is such as to provide an initial "kick" as the punches are about to be withdrawn from the work, thus overcoming whatever friction is present between the sides of the newly made holes and the convex surface of the punches which produce them, which, of course, tightly fit within such holes. The prompt, positive and automatic release of the stripper after the punching and stripping operations have been performed, and its immediate return to its initial position, thus facilitating the quick extraction of the work operated upon and the insertion of new work, is also another highly desirable end attained in the invention described herein. Hence it is possible to feed work into the punch, have it held firmly in place, operated upon, a quick 55 and clean cut removal of the punches after service insured, and a positive and speedy removal of the stripper when it has performed its functions. Moreover, the construction of this device is simple and rugged 60 with a minimized opportunity for getting out of order.

In said drawings, Fig. 1 indicates the body frame of a multiple punch and 2 a die block secured thereto by means of bolts 3, passing through said die block and having their heads positioned in ordinary T-slots 4.

Positioned above the die block 2, is a punch block 5, fastened by means of bolts 6 to the slide 11, said bolts passing through the punch block, a backing plate 7 for the punch stems 8 of the punches 9, and T-slots 10 in the slide 11, all as is customary in punching machines.

Dies 12 for the punches 9 are so seated 75 in die block 2 as to receive their respective punches when the latter are carried down by the slide 11.

The drawings illustrate the positions of the parts just after the slide has caused the 80 punches to travel downwardly and perforate the work, which, in this case, is shown to be a sheet of commercially rolled plate 18. Before the downward stroke of the slide 11 and of the punches 9, the plate 13 was slid 85 into the space between the top of the die block 2 and the underside of the stripper 14, said plate contacting with positioning pins 15 and resting on top of the die block properly located to be operated upon. In Fig. 2 the plate 13 is shown in heavy dotted lines to more readily distinguish it, and the punches 9 are seen to be distributed so as to produce holes at desired points throughout its area. Any other arrangement of the 95 punches and their dies can, of course, be made to suit the requirements of the work in hand.

The various figures show the plate 13 as having been perforated, the punches having passed through apertures in the stripper 14 which is holding the work in place and is itself locked in position.

The stripper is of sufficient weight to
maintain the work in its proper position, but to guard against displacement of said stripper it is locked to the body of the punch through the medium of stripper hooks 16, the lower hook ends 17 of which, during the punching operations, occupy pockets 18, which are formed by recesses in that part of the punch body 1 upon which the die block 2 rests, in proximity to the four corners of said die block, and by those parts of the die block 2 which overhang the recesses in the punch body. After the perforating of the plate 13 and the stripping of it from the punches, the stripper hooks 16 are caused to disengage themselves from the underside of the die block 2, and to withdraw from the pockets 18, permitting stripper 14 to be lifted by reason of the upward travel of the slide 11. The stripper hooks are in the form of bell crank levers, possessing short arms 19 that are perpendicular to the long arms which carry hook ends 17. The undersurfaces of the short arms 19 contain arcuated bearing bosses 20 against which at certain times bear the upper surfaces of the heads 21 of stripper bolts 22, as will be hereinafter more fully set forth. Short arms 19 also contain holes 28 of peculiar formation through which pass the stripper bolts 22. These holes are of that shape which would be generated by rocking a cylinder on its base in a straight line from a vertical position to an inclined one. The aperture thus produced permits the rotation of each stripper hook 16 about its pivotal point, which, in the case of the aperture having the form of an ordinary cylindrical hole, would be prevented by the stripper bolt 22 passing through the short arm 19. In any of the inclined positions assumed by the short arms 19 the curved outlines of protuberances 20 present uniform contacting points for the heads 21 of the stripper bolts, whenever the latter are caused to engage the short arms 19.

Deflects 24 project inwardly and slightly upwardly from the top of stripper hooks 16. They are intended to limit the outward movement of the stripper hooks as they are being disengaged from the locking position, and also to cause the short arms 19 of the stripper hooks to virtually become rigid extensions from the stripper 14, whereby the latter may be lifted to its uppermost position when the stripper bolt heads 21 are in engagement with the protuberances 20 on the underside of the short arms 19, and the stripper bolts 22 are being carried upwardly by the slide 11.

Stripper hooks 16 are provided at their upper ends with pivot holes 25, whereby they are suspended from pivot pins 26, the latter passing also through and being supported by lugs 27 projecting from each corner of the stripper 14. Nuts are applied to the threaded ends of the pivot pins 26, but are not tightened sufficiently to interfere with hinge action between the lugs 27 and the stripper hooks 16. Stripper bolts 22, extending through the short arms 19, are secured by nuts to brackets 28, which in turn are bolted to the slide 11.

The operation of the stripper mechanism in conjunction with the multiple punch is as follows: The punches 9 and their dies 12, 75 located, respectively, in the punch block 5 and die block 2, having been set into place in the punch machine, a plate 13 to be perforated is inserted from the front of the machine in the space above the die block 2 and under the stripper 14, being properly located by the positioning pins 15. By means not shown but well known in the art, the slide 11 is caused to move downwardly, carrying with it the punches 9. At the beginning of the downward stroke of the slide 11, the bearing bosses 20 rest upon the upper surface of the stripper bolt heads 21. Gravity causes the stripper 14 to assume the lowest position that detents 24 and the sides A 90 of holes 28 in the short arms 19 will permit. The inclined positions of said short arms at this time cause the long arms with hook ends 17 to project outwardly far enough for them to clear the die block 2 and body 1 in their downward travel. This position is indicated at a in dash lines. When the lower surface of the stripper 14 reaches the upper surface of the plate 13, the stripper holds the plate firmly in place and the pivot pins 26 become stationary pivotal points about which the stripper hooks swing inwardly until the stripper hook ends 17 occupy the pockets 18 in the body 1, and are hooked under the die block 2. If any of the stripper hooks 16 stick, so that the preponderance of weight, which is distributed outwardly from their pivotal points, fails to cause them to swing into the pockets 18, the continued downward movement of the slide 11, and therefore, the stripper bolts 22 will result in the stripper bolt heads 21 striking the long arms of such stripper hooks 16, automatically forcing them into the locking position, i.e., into said pockets 18. This continued downward movement of the slide 11 also carries the punches 9 through apertures in stripper 14, the plate 13 and into the dies 12. The return or upward stroke of the slide 11 now begins and upon the upward movement of the punches 9 there is a tendency for the plate 13 to rise with said punches, due to the friction between the punches and the walls of the holes they have created. Any such lifting action on the part of the plate will be abruptly arrested by the tops of the stripper hook ends 17 encountering the under side of the die block 2, thus bringing whatever slight upward movement there may be of the stripper 14 to a jolting stop. The
punches meantime continue their upward travel without pause, and the "kick" given member of the stripper hooks 16 is stopped by the detents 24 coming into engagement with the upper surfaces of the stripper 14. This position of the parts is shown in dotted and 20 erated tal 130 erttires therein for the passage of said punches therethrough, attachment members 35 R

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meantime continue their upward travel of stripper bolts 22, creating a turning movement in short arms 19 about pivot pins 26. The stripper hook ends 17 move outwardly from their pockets 15 until the rotary movement of the stripper hooks 16 is stopped by the detents 24 coming into engagement with the upper surfaces of the stripper 14. This position of the parts is shown in dot and dash lines at b, and said parts are held in the same relationship as the stripper 14 and the stripper hooks 16 are carried by the stripper bolt heads 21 to the dash line position shown at a, which is the starting point and, hence, the cycle of operations is completed, and after the plate 13 is removed, another such plate may be inserted and operated upon in the same manner.

What I claim is:

1. In a punching machine having a die-carrying die block and a punch carried by a reciprocatory slide, a lockable stripper, apertures therein for the passage of said punches therethrough, attachment members on said stripper and position-changing and supporting means connected to said attachment members, said supporting means being adapted to be actuated by said slide.

2. In a multiple punch having a die-carrying die block and punches carried by a reciprocatory slide, a lockable stripper perforated for the passage of said punches, integral lugs on said stripper, and means carried by said lugs adapted in one position to lock said stripper in a work-holding position.

3. In a multiple punch having a die-carrying die block and punches carried by a reciprocatory slide, a lockable stripper perforated for the passage of said punches, integral lugs on said stripper, hook pivoted to said lugs and adapted in one position to engage said die block to lock said stripper in a work-holding position, and to impart a punch-freeing kick to the work through said stripper.

4. In a multiple punch having a die block and a reciprocatory punch-carrying slide, a lockable stripper, integral lugs thereon, a plurality of stripper hooks pivotally attached to said lugs, each hook comprising a locking member, an unlocking member and a throw-limiting device coacting in certain positions to connect said stripper to supporting and position-changing means.

5. In a multiple punch having a die-block and a reciprocatory punch-carrying slide, a lockable stripper, integral lugs thereon, and a plurality of stripper hooks pivotally attached to said lugs, each hook comprising a locking arm with a hooked end adapted to engage said die block, an unlocking arm and a stripper-engaging detent, co-acting at times with said unlocking arm to hold said stripper in suspension.

6. In a multiple punch having a die block and a reciprocatory punch-carrying slide, a lockable stripper, a plurality of stripper hooks pivotally connected to said stripper, each hook comprising a stripper-engaging detent, a locking arm and an unlocking arm, integral lugs thereon, and means carried by said lugs adapted in one position to engage said die block to lock said stripper thereto, and to impart a punch-freeing kick through said stripper to said work, and a plurality of headed stripper bolts normally holding said stripper in suspension, but adapted to be actuated by the movement in one direction of said slide to lower said stripper and to force said stripper hooks into locking positions, and upon a reversal of such movement to unlock said stripper hooks and to return said stripper to its normal position.

7. In a multiple punch having a die-carrying die block secured to a body frame and punches carried by a reciprocatory slide, a lockable stripper apertured for the passage of said punches therethrough, a plurality of stripper hooks, supporting means therefor carried by said stripper, each stripper hook being adapted in one position to engage said die block to lock said stripper thereto, and to impart a punch-freeing kick through said stripper to said work, and a plurality of headed stripper bolts normally holding said stripper in suspension, but adapted to be actuated by the movement in one direction of said slide to lower said stripper and to force said stripper hooks into locking positions, and upon a reversal of such movement to unlock said stripper hooks and to return said stripper to its normal position.
to said die block during punching and stripping operations and to cause said work to be stripped from said punches by imparting a kick to said stripper, and means carried by said slide for rotating said stripper hooks to unlock said stripper from said die block and to raise it from said work.

10. In a multiple punch having a die-carrying die block secured to a body frame, and punches carried by a reciprocatory slide, a lockable stripper normally held in suspension from supporting means attached to said slide, said stripper being adapted to descend with said slide and to come to rest upon and to hold a piece of work, locking means carried by said stripper adapted to lock the latter to said die-block during punching and stripping operations, said supporting means upon the ascent of said slide and after said operations actuating said locking means to release said stripper from said die block and to raise it to its normal upper position.

11. In a multiple punch having a die-carrying die block secured to a body frame and punches carried by a reciprocatory slide, a lockable stripper apertured for the passage of said punches therethrough, a plurality of integral lugs thereon, a stripper hook pivotally affixed to each lug, each stripper hook comprising a long arm with a hook end, an integral short arm angularly disposed thereto and having an aperture therein and actuated bearing bosses, and an integral stripper-engaging detent, a plurality of headed stripper bolts, each secured to said slide and passing through one of said short arm apertures, whereby said stripper is normally suspended from the heads of said stripper bolts through said short arms and stripper detents of said stripper hooks, said hooked long arms being held in a disengaging position but adapted upon the descent of said slide, stripper and stripper bolts to swing their hook ends under said die block to lock said stripper thereto.

12. In a multiple punch having a die-carrying die block secured to a body frame and punches carried by a reciprocatory slide, a lockable stripper apertured for the passage of said punches therethrough, a plurality of integral lugs thereon, a stripper hook pivotally affixed to each lug, each stripper hook comprising a long arm with a hook end, an integral short arm angularly disposed thereto and having an aperture therein and an integral stripper-engaging detent, a plurality of headed stripper bolts, each secured to said slide and passing through one of said short arm apertures, whereby said stripper is normally held in suspension, and upon the descent of said slide rests upon and holds work in place, said hooked long arms swinging beneath said die block to lock said stripper thereto and upon the ascent of said slide said stripper hooks being caused to impart a punch-freeing kick through said stripper to said work, the heads of said stripper bolts engaging said bearing bosses to cause the disengagement of said stripper hooks and die block and through the agency of said short arms and detents to return said stripper to its normal position.

13. In a multiple punch having a die-carrying die block secured to a body frame and punches carried by a reciprocatory slide, a lockable stripper adapted to retain work in place upon said die block, a plurality of integral lugs on said stripper, a stripper hook pivotally secured to each lug, said stripper hooks being adapted to lock said stripper to said die block during punching and stripping operations, each stripper hook comprising a long hook arm, a stripper engaging detent and an integral short arm angularly disposed thereto and having an aperture therein, said aperture being of a form to permit the automatic adjustment without disengagement of said stripper-hook short arm and a stripper bolt passing therethrough, each stripper bolt being suspended from said slide and adapted to engage its respective short arm and rotate the same to unlock said stripper hook from said die block, and to return said stripper to its upper position.

14. In combination in a punching machine, a movable member, a punch carried thereby, a stationary die-carrying member, a stripper interposed between both members and means for carrying said stripper into and out of a work-holding position and in the latter position locking it to said stationary member.

15. In combination in a punching machine, a suitably mounted die-carrying die-block, a reciprocatory punch-carrying slide, a stripper perforated for punch-passage, stripper-carrying means secured to said slide and means adapted at times to cause said stripper-carrying means and stripper to move synchronously and at other times to lock said stripper to said die-block.

16. In combination in a punching machine, a stationary die-block, a punch-carrying slide, a stripper perforated for punch-passage, stripper-carrying means movably with said slide and devices adapted to clutch said stripper and its carrying means during part of the movements of the latter and to release therebetween and a locking of said stripper to said die-block during the release interval.

17. In combination in a punching machine, a stationary die-block, a punch-carrying reciprocatory slide, stripper-carrying means depending therefrom, a stripper and devices carried by said stripper adapted to cause said stripper-carrying means to lower the stripper to retain work by its weight
and also to release the stripper from said stripper-carrying means and to lock it in its work-retaining position.

18. In combination in a punching machine, a stationary die-block, a punch-carrying reciprocatory slide, stripper-carrying means depending therefrom, a stripper and devices carried by said stripper adapted to cause said stripper-carrying means to lower the stripper to retain work by its weight and also to release the stripper from said stripper-carrying means and to lock it in its work-retaining position, said stripper-carrying means being adapted to force said devices into stripper-locking positions.

19. In combination in a punching machine, a die-block secured to a frame, a punch-carrying reciprocatory slide, stripper-carrying means depending therefrom, a stripper and locking devices pivotally mounted on said stripper, each comprising a member for locking said stripper to the die-block and other members inoperatively connecting said stripper and its carrying-means while the stripper and die-block are in locked relation and rigidly connecting them at other times to move said stripper.

20. In combination in a punching machine, a stationary die-block, a punch-carrying slide, stripper-carrying members depending therefrom, a stripper and devices pivotally mounted on said stripper each comprising a member adapted to lock the stripper to said die-block and other members for releasing and locking together said strippers and its carrying members when said stripper is locked or released from said die-block, respectively, one of the latter members having an aperture therein for the passage of one of said carrying-members, said aperture having a form permitting the device containing it to turn.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

FREDERICK A. STEVENSON.

Witnesses:
ELIOT W. STUDER,
ARNOLD L. PIPPER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."