

H. C. JONES.
MULTIPLE PUNCHING MACHINE.

No. 566,185.

Patented Aug. 18, 1896.

FIG. 1.

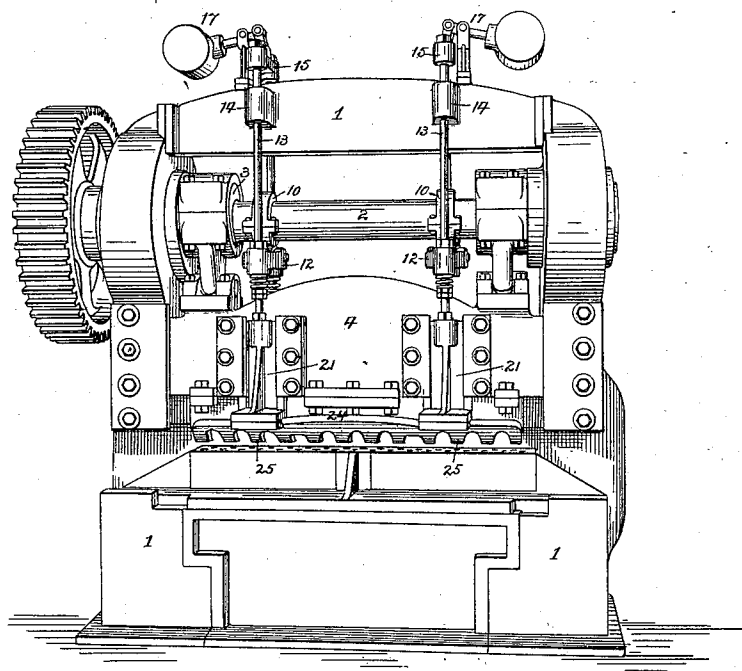


FIG. 4.

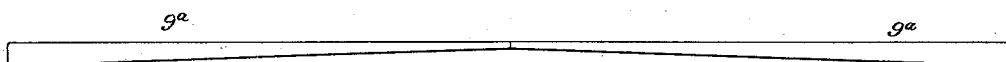


FIG. 3.

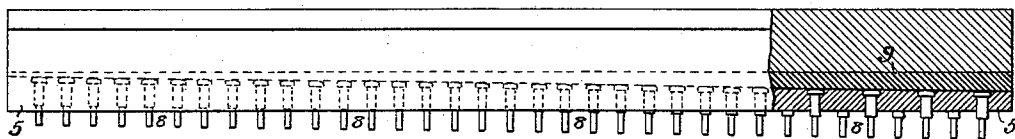
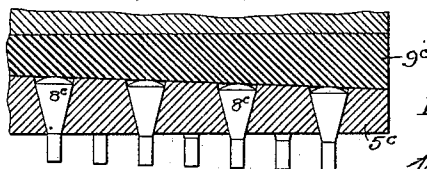


FIG. 7.



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FIG. 2.

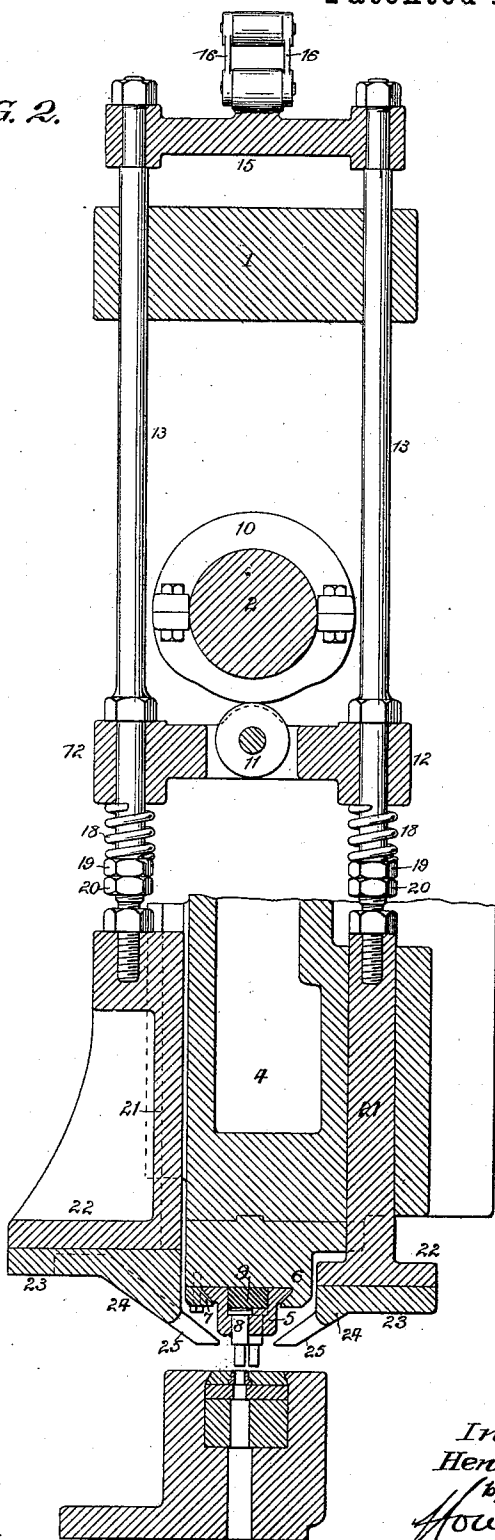


FIG. 5.

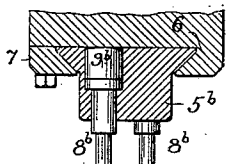


FIG. 6.

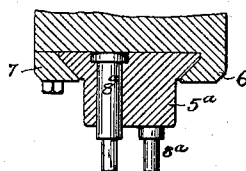
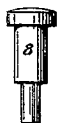


FIG. 3^a.



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UNITED STATES PATENT OFFICE.

HENRY C. JONES, OF WILMINGTON, DELAWARE, ASSIGNOR TO THE HILLES
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MULTIPLE PUNCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 566,185, dated August 18, 1896.

Application filed December 3, 1895. Serial No. 570,925. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. JONES, a citizen of the United States, and a resident of Wilmington, Delaware, have invented certain Improvements in Multiple Punching-Machines, of which the following is a specification.

One object of my invention is to so construct a multiple punch as to provide for the successive action of the punches without the necessity of making the punches themselves of different lengths, a further object being to provide effective stripping mechanism for clearing the plate from the punches as the latter rise. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of a multiple punching-press constructed in accordance with my invention. Fig. 2 is a transverse section of part of the same on an enlarged scale. Fig. 3 is a side view, partly in section, of the punch-bar and its punches. Fig. 3^a is an enlarged view of one of said punches, and Figs. 4, 5, 6, and 7 are views illustrating modifications of the invention.

The fixed frame 1 of the machine has bearings for a shaft 2, provided with the usual eccentrics 3, whereby a vertical reciprocating motion is imparted to the sliding cross-head 4, the latter being suitably guided at its ends in vertical ways on the fixed frame of the machine.

The punch-bar 5, Fig. 2, is adapted to undercut ribs 6 and 7 on the under side of the sliding cross-head 4, the rib 7 being by preference detachable, or at least capable of being loosened, so as to permit of the withdrawal of the punch-bar 5. In the back of the punch-bar 5 is formed a groove tapering from one end of the bar to the other, the openings in the punch-bar for the reception of the punches 8 communicating at their upper ends with this groove, which is adapted for the reception of a tapering or wedge-shaped locking and bearing bar 9, preferably of hardened steel similar to the punches. Each opening for the reception of a punch is enlarged in diameter at its inner end, and each punch consists of the lower or punching portion of contracted diameter, a stem of larger diameter above the same, and a head preferably rounded on the top, as shown in Fig. 3^a, the

stem fitting snugly in the lower portion of the opening in the punch-bar and the head fitting into the enlarged upper end of the opening, the rounded top of the head bearing against the under side of the tapering bar 9. By this means all of the punches employed can be made exactly alike, and yet, when applied to the punch-bar, will project therefrom to a greater and greater extent from one end of the punch-bar to the other, so as to provide for a progressive or successive punching action, only a few of the punches being subjected to strain at one time, so that the machine can be operated with a minimum of power.

By using punches all of which are exactly alike changes can be quickly made when any of the punches are broken, as there is no necessity of selecting from a number of punches of different lengths one of the proper length to replace that which has been broken away. The bar 9, however, provides a rigid bearing for the punches and firmly locks them in place in the punch-bar.

On the shaft 2 are cams 10, which act upon antifriction-rollers 11, carried by cross-heads 12, as shown in Fig. 2, these cross-heads being carried by vertical rods 13, which are guided in lugs 14 on the upper cross-bar of the fixed frame of the machine, and at their upper ends are secured to cross-heads 15, the latter being connected by links 16 to counterweighted levers 17, which tend to raise the cross-heads and maintain the antifriction-rollers 11 constantly in contact with the cams 10.

The lower cross-head 12 is not rigidly connected to its rods 13, but can, under certain conditions, slide downwardly thereon, said cross-head being supported upon coiled springs 18, interposed between the cross-head and adjusting-nuts 19, adapted to threaded portions of the rods 13 and secured in position after adjustment by means of lock-nuts 20.

The lower ends of the rods 13 on each side of the machine are secured to slides 21, suitably guided on the sliding cross-head 4, and each of these slides has at the lower end a flange 22, to which is secured a flange 23 upon the stripper bar or plate 24, the latter having inwardly and downwardly projecting fingers 25, which project inward as closely as possible to the punches.

When the punches are acting to form the holes in the plate, the stripper-bars occupy the elevated position shown in Fig. 2; but just before the punches rise said stripper-bars are depressed by the action of the cams 10, so as to bear firmly upon the plate and prevent the same from being lifted with the punches as the latter are withdrawn. The stripper-bars are so disposed in respect to the cams 10 that when depressed by the latter they will clamp the thinnest plate which is likely to be subjected to the action of the machine, and when thicker or heavier plates are being punched the cross-head 12 will, after the stripper-fingers come into contact with the plate, continue to move downward and will compress the springs 18, the latter being stiff enough to insure the proper holding of the plate down upon the punching-bed when the punches are being withdrawn.

Although I prefer, in carrying out my invention, to use a single tapered bar 9 in connection with the punch-bar and its punches, my invention is not limited thereto, as more than one of such tapered bars may be used, if desired. For instance, there may be two bars tapered in opposite directions and adapted to be introduced from opposite ends of the punch-bar, as shown, for instance, at 9^a in Fig. 4, or a special plug, such, for instance, as shown at 9^b in Fig. 5, may serve as the backing for each punch-bar, these plugs being of varying lengths. On the other hand, the tapered locking and bearing bar or bars may in some cases be dispensed with altogether, the punches 8^a being such as to extend completely through to the inner face of the punch-bar 5^a, as shown in Fig. 6, for instance, the back of said punch-bar and the seat therefor on the under side of the cross-head 4 being tapered, so as to effect the desired differential projection of the punches from the lower face of the punch-bar.

Although the form of punch shown in Figs. 1 to 6 is preferred, it is not absolutely essential to the proper carrying out of my invention, as punches having tapered stems or shanks, such, for instance, as shown at 8^c in Fig. 7, may take the place of the abruptly-shouldered punches, the openings in the punch-bar 5^c being correspondingly tapered for the reception of these punches. In all cases, however, the punch-supporting portions of the bar, whether tapered or abrupt, occupy different relations to a common horizontal line, so that there will be a corresponding different relation of the punches in order to insure the desired progressive or successive action of the latter. This difference of relation need not, however, extend to individual punches. For instance, two, three, or more adjoining punches may occupy the same relation to the common horizontal line and may act simultaneously, the wedge-bar in this case being properly stepped instead of presenting a continuous inclined face.

Having thus described my invention, I

claim and desire to secure by Letters Patent—

1. A multiple punch in which a series of punches of the same length are combined with a punch bar or carrier having punch-receiving openings or sockets with punch-supporting portions for preventing the dropping of the punches from the bar, but permitting the removal of the same rearwardly, and a backing for said punches presenting punch-bearings which occupy different relations to a common horizontal line, whereby successive or progressive action of the punches is effected, substantially as specified.

2. A multiple punch in which a series of punches of the same length are combined with a punch bar or carrier, having punch-receiving openings or sockets with punch-supporting portions for preventing the dropping of the punches from the bar, but permitting the removal of the same rearwardly, and means interposed between the punches and the slide which carries the punch-bar and serving to provide bearings for said punches occupying different relations to a common horizontal line, substantially as specified.

3. A multiple punch in which a series of punches of the same length are combined with a punch bar or carrier having punch-receiving openings or sockets, with punch-supporting portions for preventing the dropping of the punches from the bar, but permitting the removal of the same rearwardly, and one or more wedge-bars forming a bearing for the heads of the punches, said bearing being inclined in respect to the horizontal, substantially as specified.

4. The combination of the reciprocating cross-head and its punches, a stripper-slide guided so as to move vertically in the frame of the machine, a rod projecting upwardly from said slide, a cross-head mounted on said rod and having its upper bearing against a shoulder thereon, a spring interposed between the under side of said cross-head and a nut on the rod, and a cam acting on the cross-head to depress the same, substantially as specified.

5. The combination of the sliding cross-head and its punches, a stripper-slide mounted so as to move vertically in the frame of the machine, a rod projecting upward from said slide, means for exerting a constant upward tension upon said rod, a cross-head mounted on the rod and having its upper bearing against a shoulder thereon, a spring interposed between the under side of said cross-head and a nut on the rod, and a cam for depressing said cross-head, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY C. JONES.

Witnesses:

JOS. H. KLEIN,
FRANK BECHTOLD.