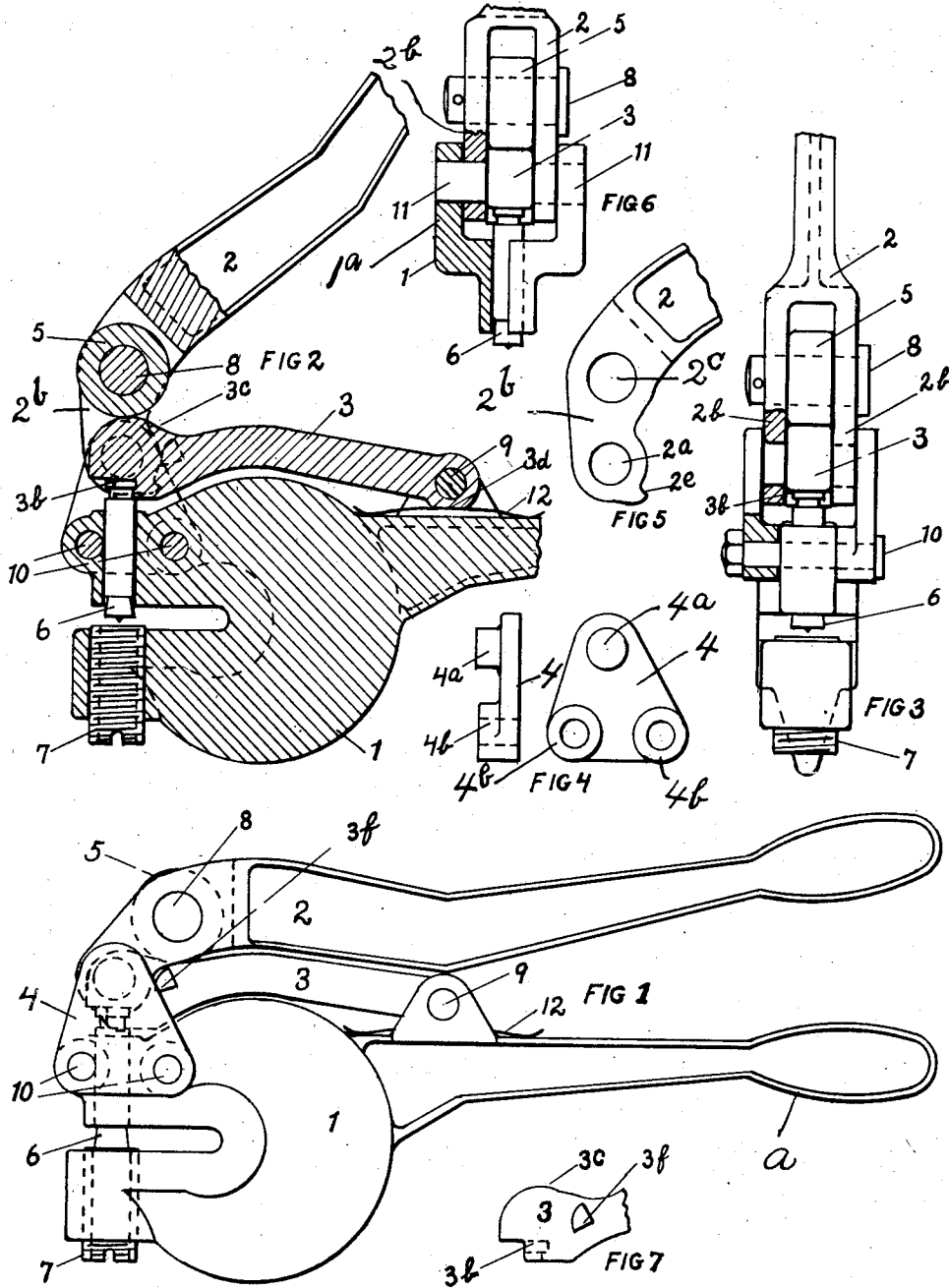


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METAL WORKING PUNCH.
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Patented Sept. 10, 1912.



WITNESSES:

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METAL-WORKING PUNCH.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ARTHUR L. GODDARD, citizen of the United States, and resident of Rockford, county of Winnebago, Illinois, have invented certain new and useful Improvements in Metal-Working Punches, of which the following is a specification.

This invention comprises certain improvements in punches, more particularly intended to be used in punching sheet metal, and is intended to provide a construction and arrangement by which a highly efficient punch may be secured in which the strains are so distributed as to minimize the danger of breaking the punch when used on relatively heavy work.

Other features of the invention will be more particularly explained in this specification and set forth in the claims forming part thereof.

In the drawings—Figure 1 illustrates a side elevation of a complete punch constructed according to my invention. Fig. 2 is a vertical central section of the operating parts of the same. Fig. 3 is a front elevation, portions being shown in section. Fig. 4 is a detail view in elevation of the side plates forming the fulcrum for the power lever. Fig. 5 is a detail view of the front end of the power lever. Fig. 6 is a front elevation partly in section of a modified form of the construction; and Fig. 7 is a detail view of the forward end of the punch-engaging arm.

In the practice of my invention according to the form herein shown, I provide a main frame 1, formed with parallel horizontal jaws to receive the work and with a rearward extension 1^a, in the form of a handle, to facilitate the manipulation of the device. In the lower jaw of the frame 1 is adjustably mounted the die 7, and in the upper jaw is mounted the vertically movable punch 6, the head of which is engaged by an undercut fork 3^b formed at the front end of the punch-operating arm 3. This arm 3 is pivoted upon the fulcral pin 9, carried by lugs formed on the frame and the rear portion of the arm 3 is flattened, as shown at 3^a, to engage a spring 12 which serves to hold the punch arm from dropping away from the frame 1 in case the device should be inverted when the power arm is thrown forward. In the absence of some such contrivance it will be possible for the punch arm to swing away and permit the punch to drop entirely out of

the frame 1, thus causing inconvenience and annoyance.

The power lever 2 is, in the preferred form, provided with two parallel forks 2^b at its front end, in which are formed transverse holes 2^a 2^c.

In the preferred form of the invention shown in Figs. 1 to 5, I employ side plates or fulcrum plates 4, preferably formed adjacent to their lower edge with two hollow bosses 4^b which engage the outside faces of the upper jaw portion and are rigidly secured thereto by bolts or pins 10. These plates are provided near their upper ends with solid fulcral bosses or studs 4^a arranged to pass into the perforations 2^a formed in the jaws 2^b of the forked portion of the power lever 2, and which serve as a fulcral axis or bearing about which the lever 2 swings when operated. Through the perforations 2^c in the upper end of the forks 2^b is passed a transverse pin 8 which forms a bearing and support for a hardened steel roller 5. The upper face of the forward portion of the arm 3 is formed with a proper eccentric or cam face 3^c to be engaged by the periphery of the roller 5 as the lever 2 is swung down in a clockwise direction. The forked portions of the lever 2 at their extreme lower ends are provided with hook-like projections 2^e adapted to engage projecting bosses or studs 3^f on the lateral faces of the arm 3 when the lever 2 is swung upward in a contra-clockwise direction in order to positively lift the arm 3 and the punch 6 so as to strip the punch from the work. It will be seen that the pivotal roller 5 has a pivotal or turning movement on its sustaining pin 8 and a rolling contact with the cam face 3^c of the punch arm 3, thus minimizing friction and loss of power.

By the arrangement and construction shown, the stress and strains on the various parts of the punch are distributed in the same vertical plane so as to completely avoid any lateral thrust or torsion.

In Fig. 6 I have shown a modified form of the invention, in which the frame 1 is carried upward to form forked arms 1^a to provide a support for the transverse fulcral pins 11 which are passed through oppositely disposed holes in said arms and also through the holes 2^a in the lower end of the forks 2^b of the power lever 2. In other respects the construction is the same as already noted.

What I claim is:—

1. In a metal-working punch the combination of a frame to hold the die and guide the punch, a reciprocating punch mounted to slide in said frame, a lever connected to the punch and pivoted to the frame, a power lever also pivoted to the frame to swing about a fixed fulcrum so as to bring pressure upon the punch-engaging arm, a roller carried by said power arm to engage a cam surface formed on the punch arm with a rolling engagement, substantially as described.

2. In a metal-working punch the combination of a frame to hold the die and guide the punch, an arm pivoted to the frame and having engagement with the punch to move the same vertically in both directions, a power arm also pivoted on fixed bearings in the main frame, and a roller interposed between the power arm and the punch-engaging arm to form a rolling contact between the power lever and the punch arm in order to operate the punch when the power lever is depressed, substantially as described.

3. In a metal-working punch the combination of the frame constructed to hold the die and guide the punch, an arm pivoted thereto and having engagement with the punch to move it to and fro, a power arm fulcrumed in the vertical plane coinciding with the movement of the punch, an anti-friction roller interposed between the power lever and the punch arm journaled upon the power lever and having a rolling engagement with an eccentric portion of the punch arm in order to depress the punch, substantially as described.

4. A metal-working punch embracing in its construction the frame for holding the die and guiding the punch, a swinging arm pivoted to said frame and having engagement with said punch to raise and to depress the same, a power lever fulcrumed to said frame and provided adjacent to its fulcrum with forked arms, a roller pivotally mounted between said forked arms to have engagement with the top of the punch arm, the forked arms being provided with projections adjacent to the fulcrum adapted to engage projections arranged on the outside faces of the punch arm in order to lift said punch arm and punch when the power lever is swung in the reverse direction, substantially as described.

5. In a metal-working punch the combination of a main frame for holding the die and guiding the punch, a punch-engaging arm pivoted thereon to move the punch to and fro, yielding means for limiting the movement of the punch arm away from the frame, and a power lever fulcrumed to said frame so as to engage the punch arm and operate the punch thereby, substantially as described.

6. In a metal-working punch the combination of the frame for holding the die and guiding the punch, a punch-engaging arm pivoted thereto, a spring engaging said punch arm to limit its movement away from the frame, and an actuating lever fulcrumed to the frame and having swinging engagement with said punch arm to depress the same, substantially as described.

7. In a metal-working punch the combination of the frame for holding the die and guiding the punch, a punch-engaging arm pivoted thereto, a spring engaging said punch-engaging arm to oppose a yielding resistance to its moving away from the frame, a power lever fulcrumed to said frame and having an anti-friction engagement with the punch arm to force the punch through the work, and form a positive engagement with the punch arm to strip the punch from the work on the reverse movement, substantially as described.

8. A metal-working punch embracing in its construction, a frame for holding the die and guiding the punch, side plates provided with bosses for engaging the opposite sides of said frame on either side of the punch, a punch-engaging arm pivoted to said side frame and having its forward end disposed between said side plates, said side plates being formed at their upper ends with inwardly projecting studs, and a power lever whose fulcral end is forked and perforated so as to engage said inwardly projecting studs, and an anti-friction roller carried by said forked lever between the forks to engage the upper face of said punch-engaging arm to depress the punch, substantially as described.

In witness whereof, I have subscribed the above specification.

ARTHUR L. GODDARD.

In the presence of—

FLORA JACKSON,
JAMES G. TETLOW.