W. KRUTZSCH.
Punching-Machine.

No. 206,026. Patented July 16, 1878.

Fig. 1.

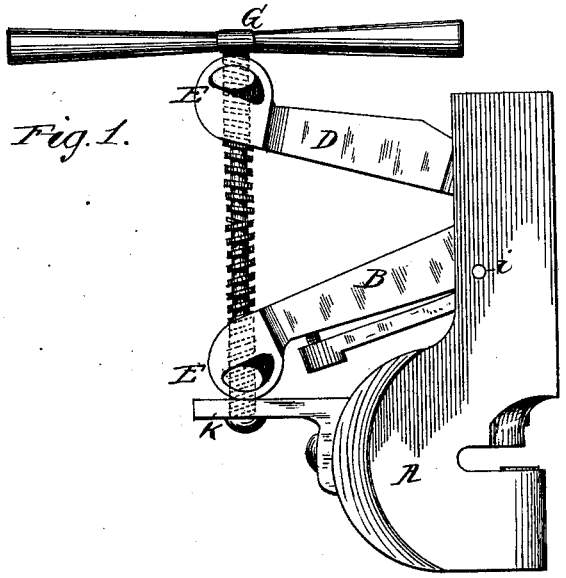


Fig. 2.

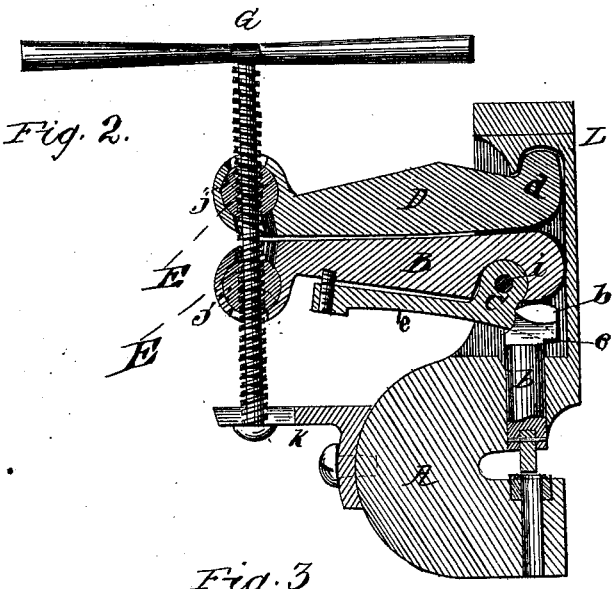
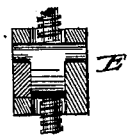


Fig. 3



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UNITED STATES PATENT OFFICE.

WILLIAM KRUTZSCH, OF DAYTON, OHIO, ASSIGNOR TO GEORGE R. HOGLEN AND FRANK M. HOGLEN, OF SAME PLACE.

IMPROVEMENT IN PUNCHING-MACHINES.

Specification forming part of Letters Patent No. **206,026**, dated July 16, 1878; application filed April 23, 1878.

To all whom it may concern:

Be it known that I, WILLIAM KRUTZSCH, of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Hand and Power Punching-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of punching machines or presses which are operated by hand, but may be adapted to be operated by steam or other power; and its object is simplicity and cheapness, to be easily operated, to be made less liable to get out of repair than the ordinary machine, and to overcome many objections to which the old ones are subject; and it consists in so uniting the bearing parts of the machine that the strain incident to the pressure of the punch going through the iron or metal is directly transferred between the head of the frame and the iron to be punched.

It also consists in the construction of the frame and the arrangement of the cams with their operating mechanism, as will hereinafter more fully appear.

In many of the old methods the levers work on trunnions or pins running through the sides of the frame and the cam ends of the levers. These pins often give way, and the holes in the cam-heads soon become oblong, then loose, and finally give way altogether, when the machine becomes out of order, by which much valuable time and labor are lost. Again, the said pins cannot withstand the great pressure to which punching-presses are sometimes subjected—say, when punching steel and other very hard and solid material.

Referring to the drawings, Figure 1 represents a side elevation, showing the punch up and the levers open. In this position it is evident that the bearings of all the parts are in a direct line from the point of the punch to the bearing in the die in the head of the frame; and I will particularly point out the great advantage of this position.

It is obvious that the greatest pressure is at the time when the punch commences to go through the metal, for then the metal is thicker than at any other portion of the stroke of the punch, and therefore requires greater pressure; and just at this point the levers or cams have their greatest power, for the reason that they are nearer their fulcrums then than at any other time, and therefore less strain, and accordingly less liable to give way under the pressure, the whole or nearly the whole pressure being transferred to the head or upper bearing, requiring only a small pin to keep them in position.

Fig. 2 shows a vertical longitudinal section through the center of the machine. In this figure the punch is shown down. As will be seen, the line of pressure would be to one side of the vertical line through the punch, and consequently the same pressure could not be exerted as if on a direct line, in proportion to the size of the machine; but this variance of line is necessary for the relief of the punch from the iron, so as to withdraw it for its next stroke.

It may be remarked that the right and left hand screws and ball or swivel joints are nearly of the ordinary construction, some difference being in the swivel-joint E, as shown in detail in Fig. 3.

The frame A is shown as made of one piece; but it may be made in one or more pieces, as preferred. It will also be seen that the frame is provided with an elongated recess, in which the cam-heads work. In the upper end of this recess is secured a die or liner, L, curved out to conform to the upward-projecting cam-head *d*. This die is made of steel, or any hard substance, or chilled iron. The whole pressure of the punch comes in contact with this die L, and when worn it is capable of being replaced.

The punch bar or plunger is provided on its upper end with a cam-shaped head, *b*, and on each side of this head is a rabbet or slot, *e*, for the purpose of receiving a forked lever, *c*, by which the punch-plunger is withdrawn. This fork *c* is loose in the rabbet, so that it does not interfere when the plunger is going down, and only acts when raising the plunger.

There is an upper rounded projection on le-

ver C, which works into a corresponding recess in the main cam-lever B, and through this projection runs a pin, *i*, and also through the sides of the frame A. The office of this pin is to keep the main levers and forked lever in place.

The lever C is provided at its outer end with an adjusting-screw, by which more or less draw is given to the punch-plunger. Upon the outer or back end of levers B and D are provided recesses *j*, in which ball-joints are formed. Into these recesses are put swivels E, and through which right and left hand screws operate for the working of the punch. Holes run both ways through the bosses at the end of the cam-levers B and D, both of which are oval in shape, allowing easy motion for the swivel-bearings and for the screws.

A bracket, K, is provided for the reception of the lower end of the right and left hand screw. The end of the bracket is provided with an open fork, so that when the pin *i* is withdrawn the levers B, D, and C may all be removed together. This bracket K is secured to the body of the punch A.

Thus it will be seen that a very simple, easily-worked and easily-constructed machine is provided.

The punch is secured in the ordinary way, and a lower die, upon which the iron to be punched rests, is also secured by any well-known method.

It is evident that when the extremities of the arms recede the punch is withdrawn from the iron, and when they are closing together they are then pressing down upon the substance to be punched.

The lever and cam movement may be applied to shearing and cutting machines.

I am aware that cam-levers operated by right and left hand screws have been heretofore in use; but their construction is not like mine, and I therefore do not claim such; but

What I do claim, and desire to secure by Letters Patent, is—

1. The combination, in a punching-machine, of the frame A, provided with bracket K, cam-levers B and D, the punch-plunger *b*, and the die L, having a smooth working-surface, all constructed and operating as herein set forth.

2. The combination of the frame A and levers B, D, and C with the swivel-joints *j* and E and the bracket K and operating-screw G, constructed and arranged as specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WILLIAM KRUTZSCH.

Witnesses:
JOHN A. SHAUCK,
GEO. W. HOGLEN.