Sept. 2, 1930. J. L. KOMAR 1,774,833

POWER PUNCH

Filed Feb. 26, 1927

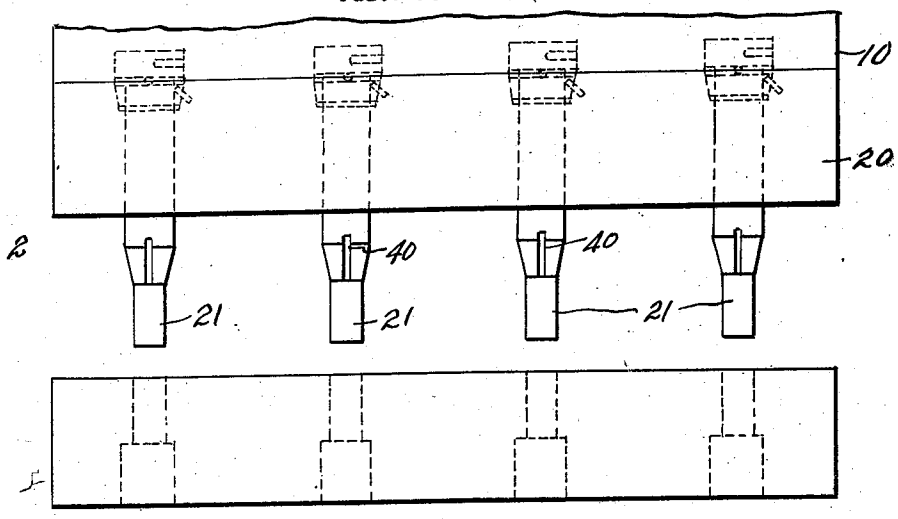


Fig. 1

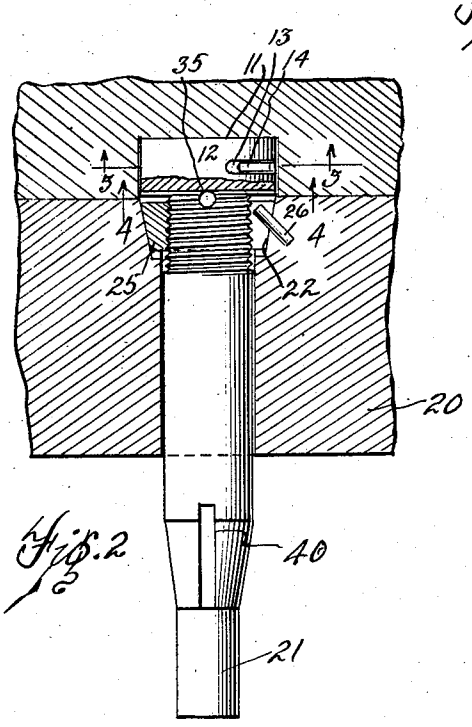


Fig. 2

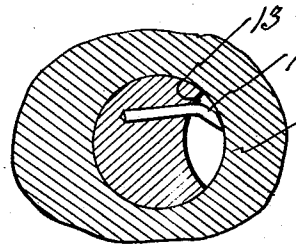


Fig. 3

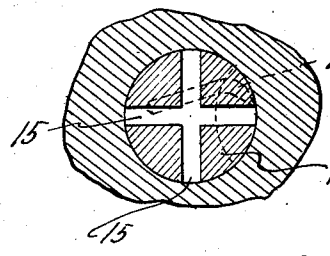


Fig. 4

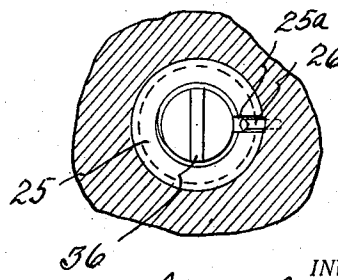


Fig. 5

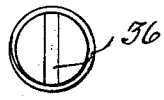


Fig. 6

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Patented Sept. 2, 1930 1,774,833

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POWER PUNCH

Application filed February 26, 1927. Serial No. 171,299.

The present invention relates to improvements in punches, particularly power punches for perforating metal.

Heretofore in punch presses it has been customary to mount the punches in the bottom face of the press plunger by securing to the integral under surface of the plunger a pair of plates, the under one of which is provided with holes countersunk at the upper end to a slight depth and to place in these holes the punches provided with heads fitting into the countersinks. The plates are then bolted together and to the under face of the plunger proper. In such constructions, whenever a punch breaks or needs to be replaced for any reason, it is necessary to remove the two plates and punches in order that one or more may be changed.

Among the objects of the present invention is to overcome this difficulty and provide a punch mounting which will permit changing a punch without dismantling the press.

Another object is such a mounting that positively locks the punch in place yet permits its quick removal and replacement when necessary.

Other objects will readily appear to those skilled in the art upon reference to the following description and accompanying drawing in which:—

Fig. 1 is an elevation of a portion of a punch press and die plate involving the present invention;

Fig. 2 is an enlarged section through the punch holder and pad showing a punch;

Fig. 3 is a section on line 3—3 of Fig. 2;

Fig. 4 is a view taken on line 4—4 of Fig. 2;

Fig. 5 is a top view of the punch and bushing;

Fig. 6 is a top view of the punch.

In the drawings a punch holder adapted to be secured to the plunger of a punch press is shown at 10. In ordinary construction this is a plain flat plate, but in the present construction it will be provided with cylindrical recesses 11 in which are to be located plugs 12 of hardened steel themselves each provided with a recess 13 in its cylindrical face and drilled in the bottom of the recess 13 for the reception of an angular locking pin 14. This pin is preferably of piano wire or other hardened steel and sharpened at one end. The pin hole is preferably drilled at an angle to the diameter as shown in Fig. 3 and the pin is bent slightly to prevent its turning in the hole. The under side of plug 12 is cross grooved diametrically as at 15 as shown in Fig. 4 for a purpose to be described.

The punch pad 20 in which the punches 21 are mounted differs from the usual pad in being countersunk at the upper ends of the punch holes with a tapering countersink 22 and in this is adapted to fit a tapered split bushing 25 threaded internally to receive the threaded upper end of punch 21. This bushing 25 will be prevented from turning in its seat by a pin 26 placed in a suitable drilled hole in the plate 20 and extending into the split 25^a of bushing 25.

With the two plates 10 and 20 bolted together and to the press plunger, punches 21 may be screwed up into bushings 25 and against pressure plugs 12, the bushings being held against turning by pins 26. However, without means to fix the punches positively in place the latter are apt to work loose and therefore means is provided to lock the punches in place. This means is preferably one that permits removal of the punch when desired and in the form shown consists of a frangible element such as wire 35, the grooves 15 and a coacting groove 36 in the upper end of punch 21. The latter groove 36 is preferably rectangular and of a depth somewhat less than the diameter of wire 35 but greater than the radius thereof. Its width should be slightly less than the wire diameter. The grooves 15 are preferably curved in section on about the radius of the wire.

Wire 35 is placed in groove 36 and the punch 21 inserted in its opening and screwed into bushing 25, when the upper end of the punch approaches plug 12, the slight clearance above the latter permits it to lift enough and the friction in socket 11 holds it from turning sufficiently to allow the wire to move into one of the grooves 15. The plug 12 is then rotated with the punch 21 until the

latter cannot be moved any further. This squeezes the wire 35 into grooves 15 and 36 and thereby locks the punch and plug together and the thus formed unit cannot turn in the reverse direction because of the locking pin 14.

In order to remove the punch from its setting, sufficient torque is applied to shear wire 35. The punch may then be readily removed and the sheared upper portion of the wire drops out. On account of this function, it is obvious that the wire 35 should be comparatively soft.

In order to facilitate the setting and removal of the punches, it is preferred to mill short grooves 40 in the latter so that a suitable wrench (not shown) may be applied thereto.

In the drawing 50 indicates a conventional die-plate adapted to co-operate with the punches 21.

Having now described the invention and the preferred form of embodiment thereof it is to be understood that the said invention is to be limited not to the specific details herein set forth and illustrated but only by the scope of the claims which follow.

I claim:—

1. In a punch press, a punch holder provided in its lower side with an inserted cylindrical rotatable pressure receiving plug, means to prevent rotation of said plug in one direction, a punch pad provided with a punch receiving opening adapted to align with said plug when said holder and pad are secured together, said opening being countersunk at its upper end, an internally threaded bushing in said countersink, a threaded punch adapted to screw into said bushing, and means to connect the punch and plug.

2. In a punch press, a punch holder provided in its lower side with an inserted cylindrical rotatable pressure receiving plug, means to prevent rotation of said plug in one direction, a punch pad provided with a punch receiving opening adapted to align with said plug when said holder and pad are secured together, said opening having a tapering countersink at its upper end, a correspondingly tapering internally threaded bushing in said countersink, a threaded punch adapted to screw into said bushing and means to connect the punch and plug.

3. In a punch press, a punch holder provided in its lower side with an inserted cylindrical rotatable pressure receiving plug, means to prevent rotation of said plug in one direction, a punch pad provided with a punch receiving opening adapted to align with said plug when said holder and pad are secured together, said opening being countersunk at its upper end, an internally threaded bushing in said countersink, a threaded punch adapted to screw into said bushing and means to connect the punch and plug, said connecting means comprising diametrical grooves in the upper surface of said punch, diametrical grooves in the lower face of said plug and a short piece of comparatively soft wire of such size as to form a connecting tongue for the opposed grooves.

4. In a punch press, a punch holder provided in its lower side with an inserted cylindrical rotatable pressure receiving plug, means to prevent rotation of said plug in one direction, a punch pad provided with a punch receiving opening adapted to align with said plug when said holder and pad are secured together, said opening having a tapering countersink at its upper end, a correspondingly tapering internally threaded bushing in said countersink, a threaded punch adapted to screw into said bushing and means to connect the punch and plug, said connecting means comprising diametrical grooves in the upper surfaces of said punch, diametrical grooves in the lower face of said plug and a short piece of comparatively soft wire of such size as to form a connecting tongue for the opposed grooves.

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