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C. E. MACBETH.
PUNCH OR SHEARS.
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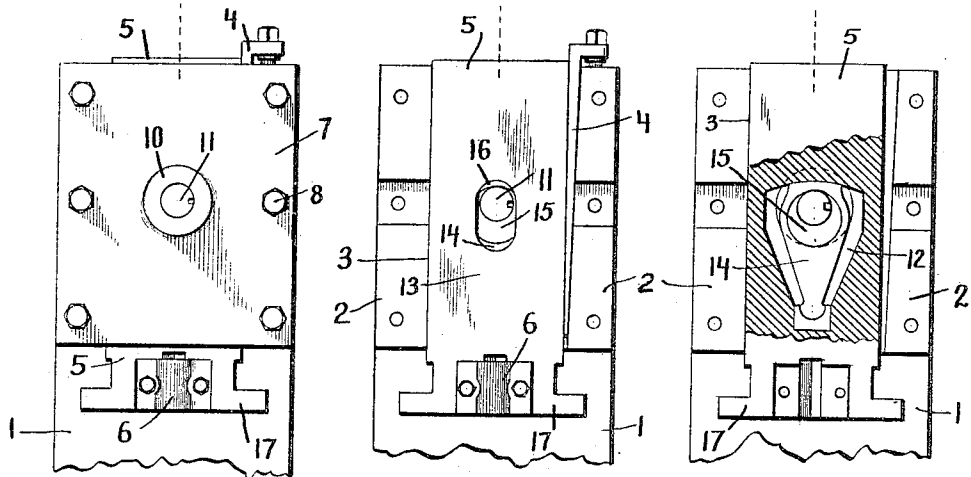


Fig. 1.

Fig. 2.

Fig. 3.

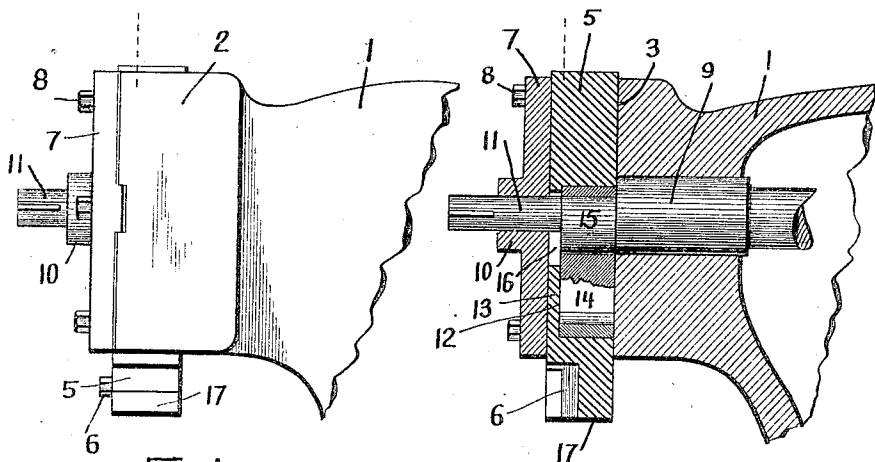


Fig. 4.

Fig. 5.

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PUNCH OR SHEARS.

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To all whom it may concern:

Be it known that I, CHARLES E. MACBETH, a citizen of the United States, residing in Hamilton, Butler county, Ohio, (post-office address corner Fourth and High streets, Hamilton, Ohio,) have invented certain new and useful Improvements in Punches or Shears, of which the following is a specification.

This invention, relating to improvements in punching or shearing machines of that class involving a reciprocating tool-carrying ram actuated by an eccentric, will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a front elevation of the ram-guide portion of a punch or shear embodying my improvement; Fig. 2, a similar view with the face-plate of the ram-guide removed; Fig. 3, a similar view with the face-plate of the ram-guide removed and with the ram appearing partly in vertical section, the gib and tool-clamp being omitted; Fig. 4, a side elevation of parts appearing in Fig. 1, and Fig. 5 a vertical section of the parts in the vertical plane of the axis of the cam-shaft.

In the drawings, 1 indicates the ram-guide part of the body of a punching or shearing machine of that class employing a reciprocating ram actuated by a cam; 2, jaws projecting forwardly from the body and forming the side walls of the ram-guide; 3, the ram-guide formed between the jaws 2, the body portion between the jaws forming the rear wall of the ram-guide; 4, the gib, shown as of wedge type for adjusting the width of the ram-guide to compensate for wear; 5, the ram fitted to slide in the ram-guide; 6, a tool-socket and clamp arranged at the base of the ram and adapted to hold the punching-tool; 7, a face-plate secured firmly to the front face of jaws 2 and bridging between those jaws to unite them in front of the ram and form the front wall of the ram-guide; 8, the bolts securing the face-plate to the jaws; 9, the cam-shaft journaled in the body to the rear of the ram-guide at right angles to the plane of its rear wall; 10, a bearing formed in the face-plate, its axial line being coincident with that of the cam-shaft; 11, a prolongation of the cam-shaft forward of the ram, journaled in the bearing 10 and extending forwardly for the reception of a capstan

head or wheel to serve in turning the cam-shaft by hand; 12, a rearwardly-open recess in the ram, the cam-shaft extending freely through this recess; 13, the front wall of this recess in the ram; 14, the pitman, disposed within the recess 13 and having its lower end in downwardly-thrusting engagement with the floor of that recess and having its upper end in sliding and upwardly-thrusting engagement with the roof of the recess, the intermediate portion of this pitman surrounding the cam-shaft where it passes through the recess 13, this pitman being loosely confined between the rear wall of the ram-guide and the front wall of the recess of the ram; 15, the eccentric upon the cam-shaft, secured to or formed upon that portion of the cam-shaft passing through the recess in the ram, the pitman being journaled upon the eccentric; 16, a vertical slot in the front wall 13 of the ram where the forward prolongation of the cam-shaft passes out of the recess of the ram on its way to the bearing in the face-plate, and 17 the base of the ram adapted to have punching or shearing tools secured to it to be actuated by the ram.

Tools may be secured to the ram by being bolted to the base 17, direct or through the medium of a suitable tool-holder, or the socket and clamp arrangement 6 may be employed where preferable. When a shear-blade is secured to the ram under the usual conditions of working with a diagonal shearing edge, the strain of the work begins at a point near one end of the blade and as the shearing progresses proceeds along toward the other end of the blade. The result is that, looking at Fig. 3, an enormous strain is first imposed at, say, the right-hand side of the base of the ram, this strain acting lever-like on the ram and putting its right-hand edge under compression and its left-hand edge under tension. During the course of the cut the strain shifts to the left until finally the conditions are reversed, the right-hand edge of the ram coming under tension, while the left-hand edge comes under compression. This action, involving very severe working strains, tends to produce disordering wear of the ram in its guide and tends to and often does break rams. The gib 4 provides for taking up the wear, and in the present construction the front wall 13 of the recess in the ram bridges the recess and uni-

fies the side edges, so that the ram is substantially freed from liability to distortion or breakage under the strains referred to. The strains which have been referred to tend also to separate the jaws 2 and produce breaking strains upon the ram-guide; but in the present construction the front of the guideway is bridged and the jaws substantially united by the face-plate. The bearing 10 in the face-plate, in conjunction with the bearing in the rear wall of the ram-guide, produces a pair of bearings straddling the ram and the pitman, the cam-shaft thus having bearings satisfactorily close to each end of the eccentric, security against bending of the cam-shaft being thus enhanced. Vertical and horizontal strains are thus compensated for to a superior degree and enhanced provision made against distortions or breakage of the fixed or moving parts, increased accuracy of functional movement, as well as safety and long life of machine, being enhanced.

I claim as my invention—

In a punch or shear machine, the combina-

tion, substantially as set forth, of a body 25 provided with jaws forming a ram-guide between them, a face-plate rigidly secured to the faces of the jaws and forming the front wall of the ram-guide and provided with a bearing, a cam-shaft crossing the ram-guide 30 and journaled in said bearing and in a bearing in the body to the rear of the ram-guide, an eccentric upon the cam-shaft between the front and rear walls of the ram-guide, a ram fitting the ram-guide and having a rear- 35 wardly-open recess surrounding the eccentric and having a slot in the front wall of the recess where said wall is traversed by the cam-shaft, and a pitman disposed within said recess and loosely confined between the wall 40 of the recess and the rear wall of the ram-guide and having articulate connection with the ram and eccentric.

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