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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Punch and Die Holder

I, GERRARD GASTON FRANS SMEETS, a Canadian citizen, of 140 Cornwall Heights, Brampton, Ontario, Canada, do hereby declare the invention for which I pray that a Patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to self-contained punching units and more particularly to composite punch and die holders adapted for seating on the bolster-plate of a punch-press in a position such that a punch held in the holder will be actuated by the stroke of the punch-press ram to pierce a workpiece overlying the die of the holder.

The invention is particularly concerned with the means for seating the self-contained punch and die holder on a work table which may not be a perfect plane surface but wherein punch and die alignment must be accurately maintained in spite of bolster-plate irregularities.

Self-contained punch and die holders are known in the art and a common one is the C-type as, for instance, shown in United States patent No. 2265331 — Wales. A further self-contained type is illustrated by British patent No. 946,736 — Smeets.

The punch and die holders illustrated by the above mentioned United States and British patents suffer from a common defect in that if the press bolster plate upon which they are mounted is not substantially flat the pressure of the mounting bolt as well as the pressure exerted during the punching stroke will cause twisting or bending of the holder with the possible consequence of serious misalignment of the punch and die.

It is therefore the principal object of this invention to provide a self-contained punch and die holder unit which is substantially not subject to the misalignment disadvantages mentioned above when the holder is secured on a bolster-plate which is not substantially flat.

According to the present invention this defect may be overcome in a self-contained punching unit by providing a die supporting portion, an upper arm adapted for supporting a punch in alignment with a die supported in the die supporting portion of the unit, a mounting foot having one end thereof integral with and forming part of said die portion, the said foot extending from said portion to facilitate mounting of the unit on the bolster-plate of a machine press and wherein the upper arm is directly mechanically connected to the die supporting portion of the unit and substantially immune to twisting or bending of the part of the mounting foot extending beyond the die supporting portion. Twisting of the lower mounting foot remote from the location at which the upper member is secured to the mounting foot does not produce any misalignment of the punch and die members.

In order that the invention will be more clearly understood, reference will now be made to the figures of the drawing in which:—

Figure 1 shows a punch and die holder of the prior art;

Figure 2 shows a first embodiment of the invention relating to a holder of the C-type; and

Figure 3 shows a further embodiment relating to a holder which resiliently supports the punch assembly.

Similar or equivalent parts of the three holders of the drawing are similarly designated.

Referring now to figure 1, a self-contained C-type punch and die holder is shown having a base comprised by a die supporting portion 1 and an extending portion 2 which acts as a mounting foot and which is secured to the bolster-plate 8 by means of bolts. A die member 5 is accommodated in the portion 1 of the mounting foot 2. At the right hand end of foot 2 a rising member 3 is integrally secured thereto and carries a further integral punch-supporting arm member 4 which extends over foot 2 to position a punch 6 and

its stripping spring 7 in working position with respect to die 5.

If the bolster-plate 8 upon which the holder is mounted is substantially flat the misalignment of the punch and die will be produced only by the twisting of members 3 and 4 and will be due to the relatively small pressure of the stripper spring 7 acting thereon during forced movement of the punch by the ram prior to actual piercing of the work-piece by the punch.

If the bolster-plate 8 is not substantially flat then a twisting or bending movement, resulting from the pressure of the mounting bolts 9, will produce further misalignment of the punch and die prior to actual punching. This defect may be substantially eliminated according to the present invention by providing a foot as shown in figures 2 and 3 wherein the portion of the mounting foot which holds the die 5 also directly supports the members 3 and 4 which in turn support the punch assembly 6, 7.

Referring now to figure 2, the die supporting portion 1 of a foot member 2 has secured thereto in essence a C-type holder extending out over foot member 2. The C-type holder portion is essentially the same as shown in figure 1. Mounting foot member 2, however, is only connected to member 3 through the medium of portion 1, and, as a consequence of the construction, twisting and bending of foot member 2 beyond portion 1 and due to uneven bolster-plate surface is transmitted equally to die member 5, punch holding arm 4 and punch assembly 6, 7, to produce substantially no misalignment of the punch and die members. It will be realised that if the bolster-plate is not perfectly flat or even beneath portion 1 any misalignment caused by the twisting of this short piece of the mounting foot, i.e. that enclosed by the dotted lines and arrows, would be very minor and produce substantially no misalignment.

Figure 3 shows a modification of the self-contained holder wherein the upper support

arm 4 is composed of a number of overlying resilient members which support the die 6 in the manner as described in British patent 946,736 — Smeets. It should be realised that in all cases described a punch guide may be employed in conjunction with punch 6 and this will generally be the case.

It will be realised that serious misalignment caused by the prior art construction of C-type holders and other similar holders when bolted and used in conjunction with an uneven bolster-plate can now be obviated by using a holder according to the present invention.

Other variations of the invention which do not depart from the scope thereof as defined in the appended claims will occur to those skilled in the art and it should be noted that the specific examples described herein are for the purpose of illustrating the principle of the invention and should not be considered as limiting thereto.

WHAT I CLAIM IS:—

1. In a self-contained punching unit, a die supporting portion, an upper arm adapted for supporting a punch in alignment with a die supported in the die supporting portion of the unit, a mounting foot having one end thereof integral with and forming part of said die supporting portion, the said foot extending from said portion to facilitate mounting of the unit on the bolster-plate of a machine press and wherein the upper arm is directly mechanically connected to the die supporting portion of the unit and substantially immune to twisting or bending of the part of the mounting foot extending beyond the die supporting portion.

2. A self-contained punching unit, substantially as hereinbefore described with reference to Figures 2 and 3 of the accompanying drawings.

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its stripping spring 7 in working position with respect to die 5.

5 If the bolster-plate 8 upon which the holder is mounted is substantially flat the misalignment of the punch and die will be produced only by the twisting of members 3 and 4 and will be due to the relatively small pressure of the stripper spring 7 acting thereon during forced movement of the punch by the ram 10 prior to actual piercing of the work-piece by the punch.

15 If the bolster-plate 8 is not substantially flat then a twisting or bending movement, resulting from the pressure of the mounting bolts 9, will produce further misalignment of the punch and die prior to actual punching. This defect may be substantially eliminated according to the present invention by providing a foot as shown in figures 2 and 3 wherein the portion 20 of the mounting foot which holds the die 5 also directly supports the members 3 and 4 which in turn support the punch assembly 6, 7.

25 Referring now to figure 2, the die supporting portion 1 of a foot member 2 has secured thereto in essence a C-type holder extending out over foot member 2. The C-type holder portion is essentially the same as shown in figure 1. Mounting foot member 2, however, 30 is only connected to member 3 through the medium of portion 1, and, as a consequence of the construction, twisting and bending of foot member 2 beyond portion 1 and due to uneven bolster-plate surface is transmitted 35 equally to die member 5, punch holding arm 4 and punch assembly 6, 7, to produce substantially no misalignment of the punch and die members. It will be realised that if the bolster-plate is not perfectly flat or even beneath portion 1 any misalignment caused by 40 the twisting of this short piece of the mounting foot, i.e. that enclosed by the dotted lines and arrows, would be very minor and produce substantially no misalignment.

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55 It will be realised that serious misalignment caused by the prior art construction of C-type holders and other similar holders when bolted and used in conjunction with an uneven bolster-plate can now be obviated by using a holder according to the present invention.

60 Other variations of the invention which do not depart from the scope thereof as defined in the appended claims will occur to those skilled in the art and it should be noted that the specific examples described herein are for the purpose of illustrating the principle of the 65 invention and should not be considered as limiting thereto.

WHAT I CLAIM IS:—

1. In a self-contained punching unit, a die supporting portion, an upper arm adapted for 70 supporting a punch in alignment with a die supported in the die supporting portion of the unit, a mounting foot having one end thereof integral with and forming part of said die supporting portion, the said foot extending from 75 said portion to facilitate mounting of the unit on the bolster-plate of a machine press and wherein the upper arm is directly mechanically connected to the die supporting portion of the unit and substantially immune to twisting or 80 bending of the part of the mounting foot extending beyond the die supporting portion.

2. A self-contained punching unit, substantially as hereinbefore described with reference 85 to Figures 2 and 3 of the accompanying drawings.

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