

Sept. 28, 1937.

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2,094,341

DIE SET

Filed Nov. 23, 1936

Fig. 1.

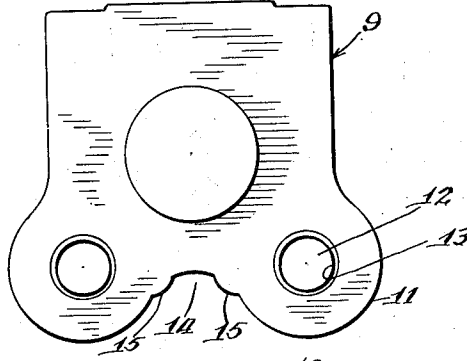
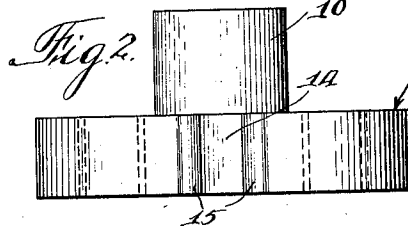
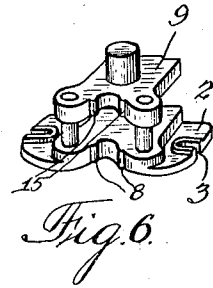


Fig. 3.

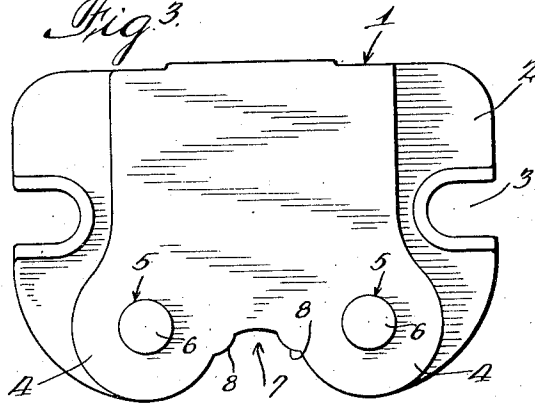
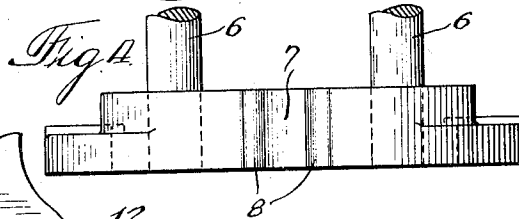
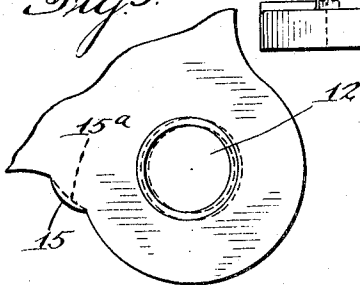


Fig. 5.



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UNITED STATES PATENT OFFICE

2,094,341

DIE SET

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Application November 23, 1936, Serial No. 112,263

9 Claims. (Cl. 164-118)

This invention relates to die sets having the usual leader pins associated therewith whereby the punch head and die shoe are maintained in accurate alignment when in use. The invention is particularly directed to a die set construction whereby the leader pin holes in either the die shoe or the punch holder or both may be accurately aligned with the holes in the associated members.

Extreme accuracy is required in the manufacture of die sets, particularly in the alignment of the leader pin mounting holes with the holes through which the leader pins telescope whereby the punch and die used in connection therewith may always be maintained in accurate alignment.

In the manufacture of die sets, the leader pin holes in both the punch holder and die shoe are carefully finished and located as accurately as possible to the same spaced dimension whereby when the leader pins are mounted in one of the members they will telescope freely in the holes in the other member. Although extreme care is used in spacing the holes during the process of manufacture, the relative spacing in the two members sometimes varies a few thousandths of an inch. This variation is small; however, it is sufficient to cause the leader pins to bind and to prevent accurate operation of the die set when in use. Heretofore it has been necessary to rebore the holes when they were out of alignment in order that accuracy might be obtained. The present invention is particularly directed to a means and method whereby when there is a slight difference of dimension between the holes in one member and the spacing of the holes of the other member, the material around the holes in the member having the shortest dimension therebetween may be moved bodily without injury to the member itself and without distorting the holes or disturbing the accuracy of their parallel alignment.

Further objects will be apparent from the specification and the appended claims.

In the drawing,

Figure 1 is a top view of a punch holder and illustrates one embodiment of the invention.

Fig. 2 is a front elevation of the punch holder illustrated in Fig. 1.

Fig. 3 is a top view of a die shoe for use in connection with the punch holder illustrated in Figs. 1 and 2.

Fig. 4 is a front elevation of the die shoe illustrated in Fig. 3.

Fig. 5 is a fragmentary top view of a portion

of a punch holder illustrated in Fig. 1 and illustrates the method of moving the leader pin hole laterally.

Fig. 6 is a perspective view of the assembled die set.

Referring to the drawing in detail, the embodiment illustrated comprises a die shoe 1 preferably a comparatively thin member formed of semi-steel with accurately finished parallel top and bottom sides. These die shoes are provided with laterally extending portions 2 somewhat thinner than the body of the die shoe and provided with slots 3 whereby the shoe may be secured to the table of a punch press. The shoes are provided with forwardly extending circular portions 4, each having a hole 5 therein in which are supported and rigidly secured suitable leader pins 6. It is important that these leader pins should be parallel and accurately spaced to a predetermined dimension. The front marginal contour of the die shoe is provided with a depression 7 between the portions 4 and terminating adjacent a vertical plane through the axes of the leader pins 6. This depression is formed by a continuation of the circular contour of the portions 4. Oppositely disposed arcuate ribs 8 are provided on the edge of the die shoe and adjacent the bottom of the depression 7. Each of these ribs is adjacent its respective leader pin 6.

A punch holder 9 is provided with a shank 10 whereby it may be secured in a punch press, and a body portion having accurately finished top and bottom surfaces. The punch holder is also provided with outwardly extending portions 11 which are provided with leader pin guide holes 12 in parallel alignment and intended to be accurately spaced to the same dimension as the leader pins 6 whereby the leader pins may be easily telescoped therethrough and maintain the parts in alignment.

The leader pin holes 12 are preferably provided with hardened bushings 13 through which the leader pins 6 are arranged to telescope. The punch holder is similar in contour to the die shoe and is also provided with a marginal depression 14 between the portions 11 and substantially identical in contour with that of the die shoe. The depression is also provided with oppositely disposed ribs 15 which are in the same relative position relative to the leader pin holes 12 as the ribs 8 with respect to the leader pin holes 5 in the die shoe.

Fig. 5 illustrates the method of moving the leader pin holes laterally by peening the ribs 8 or 15 as required.

In practicing the invention, the die shoe and punch holder are first completed and the leader pin holes are bored as accurately as possible to a desired spacing and alignment. If it is found that the dimension between the holes in one of the members is slightly less than the dimension between the holes in the other member, one or both of the ribs 8 or 15 of the member having the shortest dimension are peened slightly and the rib is depressed as indicated by the dotted lines 15a in Fig. 5. This peening of the rib moves the hole 12 or 5, as the case may be, laterally a desired amount to bring it into alignment with the hole in the cooperating member, and this may be accomplished without disturbing the parallel alignment of the holes or of the leader pins therein. It will be apparent that this peening operation may be performed on either member and any one of the ribs of any member may be peened to produce the desired result. It will also be apparent that the holes 5 or 12 will only be moved laterally, as the heavy main body of the member prevents movement in any other direction. Heretofore it has been necessary to re-bore holes which were out of alignment, and this has been a very expensive process and requires extreme accuracy. The present invention accomplishes the re-alignment without machine work of any kind, and materially reduces the cost of production of die sets.

Modifications may be made without departing from the spirit of the invention, and it is desired therefore that the invention be limited only by the prior art and the scope of the appended claims.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. A die set comprising the usual punch holder and die shoe, each having outwardly extending spaced portions having axially aligned openings therein for the usual leader pins, and oppositely disposed projecting surfaces on the inner surfaces of said portions between said leader pin openings whereby said openings may be spread by peening said projecting surfaces.

2. A die set comprising the usual punch holder and die shoe, each having outwardly extending spaced portions having aligned openings therein for the usual leader pins, and oppositely disposed projecting surfaces on the inner surfaces of said portions between said leader pin openings whereby said openings may be spread by peening said projecting surfaces, said projecting surfaces being comparatively narrow and substantially parallel with said leader pin openings.

3. A die set comprising the usual punch holder and die shoe, each having outwardly extending

spaced portions having aligned openings therein for the usual leader pins, and oppositely disposed marginal projecting surfaces on the inner surfaces of said portions between said leader pin openings whereby said openings may be spread by peening said projecting surfaces, said projecting surfaces comprising comparatively narrow ribs arcuate in cross section, and substantially parallel with said leader pin openings.

4. A die set comprising a die holder and a die shoe having aligned leader pin holes therein adjacent one edge of said set, the edge contour of said holder and of said shoe forming a depression between said holes terminating adjacent the longitudinal axial plane of said holes, and oppositely disposed spaced ribs in said depression whereby the peening of a rib will move the adjacent hole outwardly.

5. In a die set, the combination with a punch holder member and cooperating die shoe member having aligned leader pin holes therein, of a comparatively narrow marginal projection on at least one of said members adjacent one of said leader pin holes and arranged to enable said hole to be moved laterally by peening said projection.

6. In a die set, the combination with a punch holder member and cooperating die shoe member having aligned leader pin holes therein, of a comparatively narrow marginal rib on at least one of said members and parallel with an adjacent leader pin hole whereby said hole may be moved laterally by peening said rib.

7. A die set member comprising a comparatively thin body portion having spaced leader pin holes adjacent the edge thereof, the contour of said edge forming a depression between said leader pin holes terminating adjacent a transverse axial plane through said holes, a rib in said depression adjacent each hole and parallel therewith, said contour and said ribs being arranged to enable said holes to be moved outwardly in said axial plane by peening the adjacent rib while maintaining the parallel alignment of the holes.

8. In a die set body member, a substantially circular outwardly extending leader pin receiving portion having a substantially coaxial leader pin hole therein, a rib on said member adjacent the junction of said circular portion with said body whereby said leader pin portion may be bodily moved laterally by peening said rib.

9. In a die set body member, an outwardly extending portion having a hole therein to receive a leader pin, a projection on said member adjacent the junction of said portion with said body whereby said leader pin receiving portion and hole therein may be moved laterally by peening said projection.

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