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REMOVABLE GUIDE PIN

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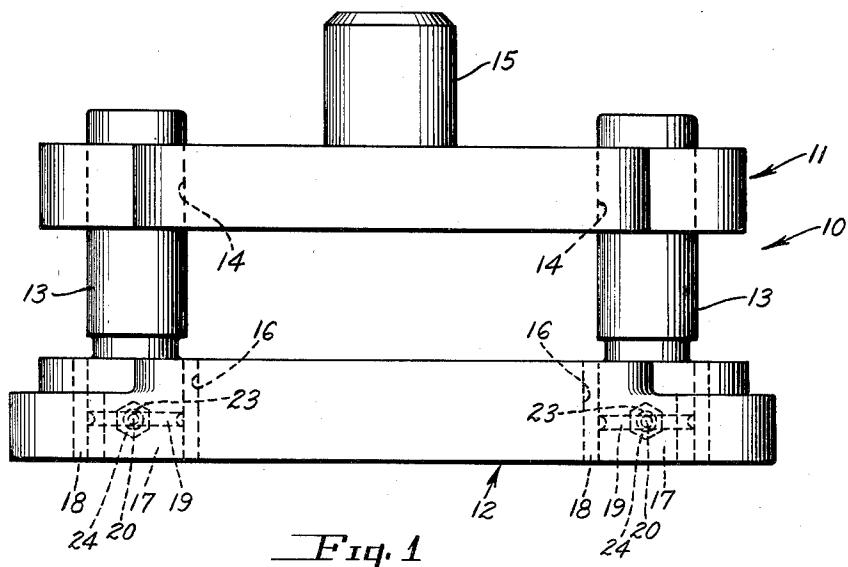


Fig. 1

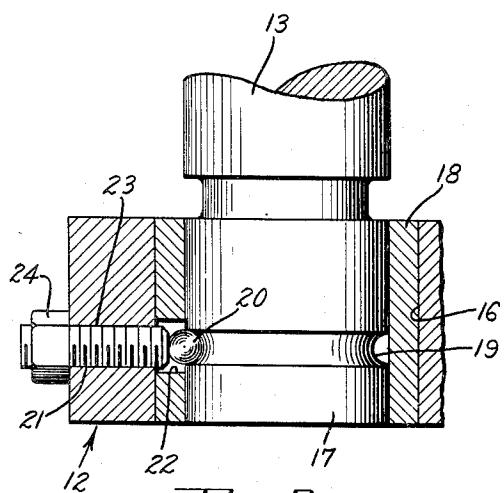


Fig. 2

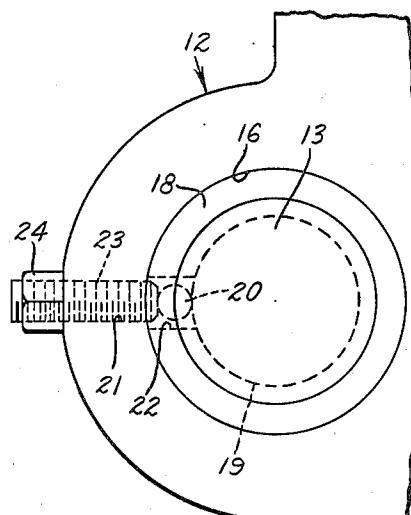


Fig. 3

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REMOVABLE GUIDE PIN

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1 Claim. (Cl. 287—20)

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This invention relates to new and useful improvements in die sets and has particular relation to a guide pin and the removable mounting thereof in the bed of a die set.

An object of the invention is to provide for use in a die set a die bed having an opening therein of a diameter in excess of the diameter of a guide pin, a bushing having a press or other tight fit in said opening, a guide pin the inner end of which has a snug fit in said bushing and wherein said bushing and said guide pin or at least the inner end of the latter are hardened whereby repeated insertions and removals of said guide pin into and out of said bushing may be made without wear of the opening in the die bed and will result in a minimum of wear on the bushing and pin.

Another object is to provide a structure as above set forth including means for mechanically locking the inner end of the guide pin in the bushing and thus in the die bed.

Other objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawing wherein a satisfactory embodiment of the invention is shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claim.

In the drawing:

Fig. 1 is a front elevational view of a die set in which the mounting of the guide pins in the base is in accordance with the present invention;

Fig. 2 is a sectional view on an enlarged scale showing in detail the mounting of the inner end of one guide pin in the bed of a die set; and

Fig. 3 is a top plan view, on the scale of Fig. 2, of one portion of the die bed and showing a guide pin mounted therein in accordance with the present invention.

Heretofore, it has been proposed to provide die sets with removable guide pins. These guide pins are hardened to avoid wear as the punch holder is moved on them while the bed of the die set is not hardened. Therefore, repeated insertion and removal of the guide pins into and from the die bed results in enlargement of the guide pin receiving holes in the die bed. This is due to the fact that the die bed is of relatively soft metal as compared with that of the pins. As a result of this wear in the die bed, the guide pins are not thereafter properly held and do

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not occupy exactly vertical positions and are subject to lateral movements and tilting with respect to the die bed.

The present invention provides means whereby a die set may be equipped with removable guide pins carried by the die bed and yet wherein repeated insertion of the pins into and removal of the pins from the die bed results in no wear in the die bed and in extremely little, if any, wear in the other parts of the set. Thus, with the present construction, guide pins may be repeatedly inserted into and repeatedly removed from a die bed and yet on the next insertion will fit snugly in the openings provided for them and will not be subjected to casual movement relative to the die bed.

Referring in detail to the drawing, at 10 is generally indicated a die set including a punch holder 11 and a bed 12, the latter in accordance with the invention carrying guide pins 13 arranged at right angles to its inner face. Punch holder 11 is provided with openings 14 through which the pins 13 extend and the pins being received in the openings 14 serve to guide movements of the punch holder relative to the bed 12. For convenience, punch holder 11 is provided with a shank 15, as is usual in the art.

The guide pins 13 are removably received in the bed 12. As above suggested, this bed is not of hard metal. However, the bed is provided with cylindrical holes 16 of considerably greater diameter than the diameter of the inner end portions 17 of the guide pins 13. In the holes 16 are arranged bushings 18. These bushings are hardened and have press fits in the holes 16. Thus, the bushings form hardened liners for said holes and having pressed fits therein, are securely held in place in the die bed.

The pins 13 are hardened and their inner end portions 17 are received with snug fits in the cylindrical bushings 18. Intermediate the ends of their received end portions 17, the pins 13 are each provided with a half round groove 19 which is circular or which extends entirely about the pins. When the guide pins are in place, hardened metal balls 20 are partially received in the grooves 19 and such balls are inserted through openings 21 entering through the forward edge of the die bed and openings 22 through the bushings and aligned with the openings 21.

These openings are radial with respect to the pins 13 and the opening 21 is, for at least a portion of its length, threaded. Through such openings, there are threaded cup point set screws 23, the inner or cup point ends of which are

against and support the balls 20 in positions best illustrated in Fig. 2. Check nuts 24 may be provided on the outer portions of the set screws 23 for locking them in adjusted positions.

With the guide pins held in place by the hardened metal balls, as illustrated in the drawings, it will be clear that the guide pins are mechanically locked to the die bed 12. When, for any reason, the guide pins are to be removed, the check nuts 24 are eased off and the set screws are then backed off with respect to the balls 20 whereby the latter may move outwardly of the grooves 19 and the pins 13 thereafter removed from the cylindrical holes through the cylindrical bushings 18. Any work having been done, the pins may be reinserted or new pins may have their inner ends inserted into the bushings and thereafter the pins are locked in place with the balls 20 and set screws 23, as will be understood.

Since the pins are inserted in and removed from the bushings, it will be clear that there will be no wear with respect to the cylindrical holes 16 through the die bed and that regardless of the number of insertions and removals of the pins, such holes will remain true. Since both the bushings and the guide pins are hardened, little if any wear will take place between these parts and thus even after long periods of use not only will the bushings retain their press fit in the holes 16, but the inner ends of the pins will yet have snug fits in the cylindrical passages through the bushings.

Having thus set forth the nature of my invention, what I claim is:

In combination, an elongated guide pin having a hardened inner end portion having an end surface and a cylindrical surface adjacent said end surface, a soft metal body having a guide

pin receiving hole therethrough receiving the inner end portion of said guide pin, said hole being oversize with respect to the inner end portion of said guide pin, a hardened bushing in 5 and having a tight fit in said hole and extending for the length thereof through said body and having an internal cylindrical surface axially unobstructed throughout its length of a diameter to snugly receive the inner cylindrical end portion 10 of said guide pin by axial insertion therein, said inner end portion of the guide pin having a groove axially spaced from said end surface and presenting vertically spaced shoulders, said body and bushing having aligned holes there- 15 through laterally aligned with said groove, and retaining means laterally movable in said holes from a released position outwardly of said internal surface of the bushing to a pin retaining position inwardly of said internal surface to en- 20 gage within said groove between said shoulders to thereby axially retain said pin in the angular position of its insertion in said bushing.

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