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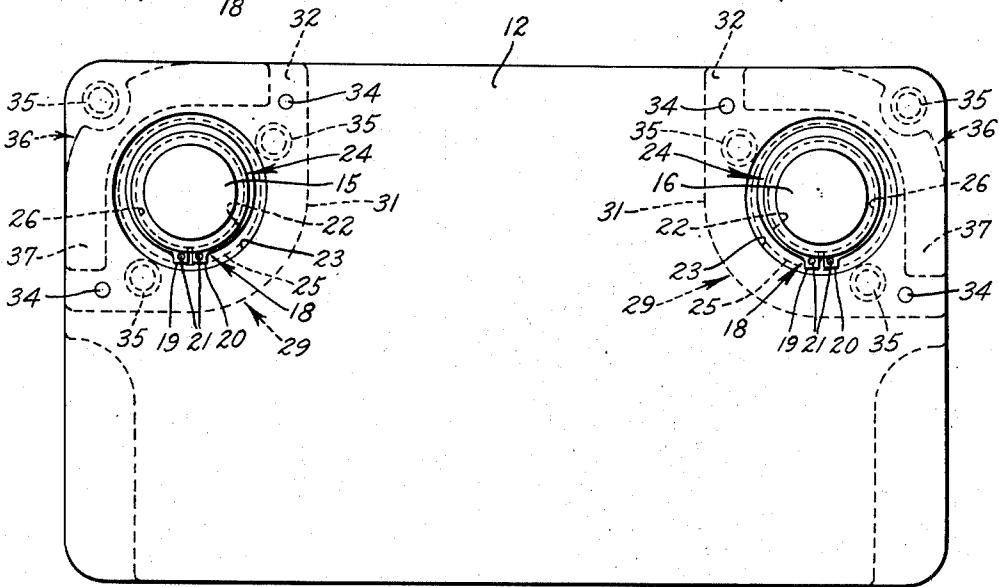
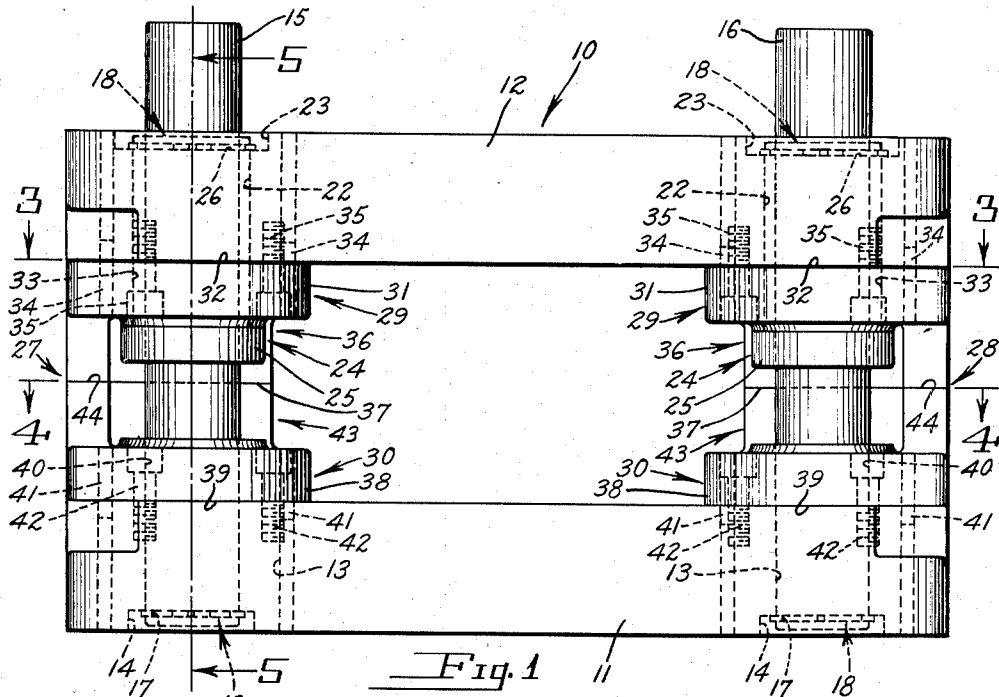
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2,627,313

SAFETY DEVICE FOR DIE-SETS

Filed Oct. 12, 1950

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

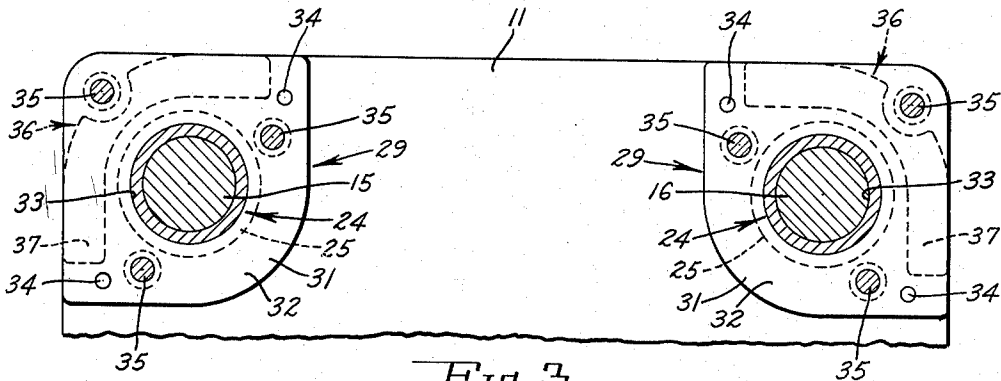


Fig. 3

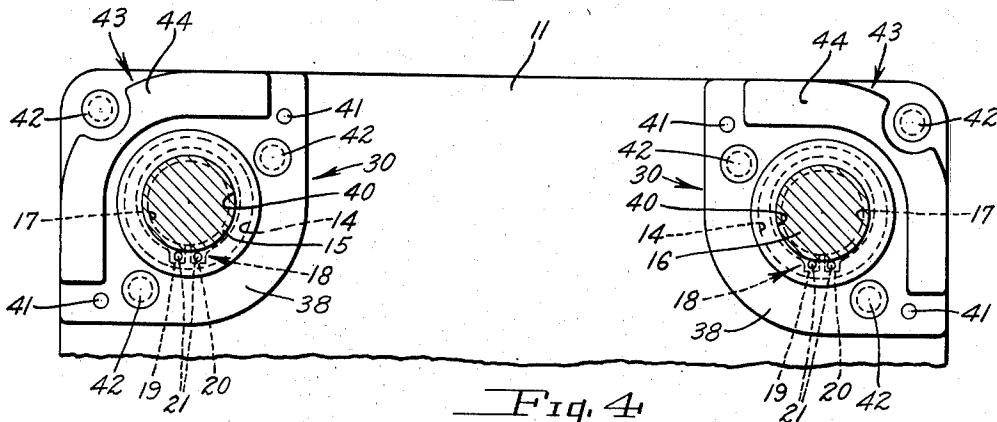


Fig. 4

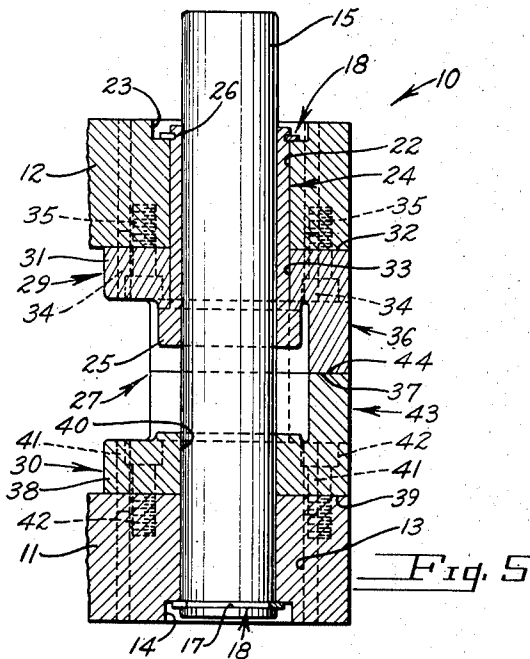


Fig. 5

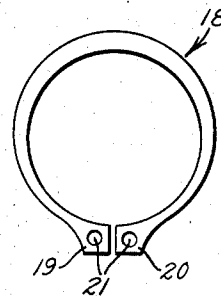


Fig. 6

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SAFETY DEVICE FOR DIE-SETS

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This invention relates to new and useful improvements in die-sets and has relation to certain features of construction.

An object of the invention is to provide a die-set including accurate means for positively limiting the approach of the punch holder toward the bed.

Another object is to provide in a die-set a simple and reliable means for removably mounting a guide bushing in a punch holder.

Another object is to provide in a die-set a simple and reliable means for removably securing the guide pins in the 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 drawings 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 claims.

In the drawings:

Fig. 1 is a front elevational view showing a die-set made in accordance with the invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is a horizontal sectional view taken along the plane of the line 3—3 of Fig. 1;

Fig. 4 is a similar view but taken along the plane of the line 4—4 of Fig. 1;

Fig. 5 is a vertical sectional view taken along the plane of the line 5—5 of Fig. 1; and

Fig. 6 is a plan view of a locking ring employed for securing the removal bushing and the removable guide pin to the punch holder and bed, respectively.

Referring in detail to the drawings, at 10 is generally indicated a die-set constructed in accordance with the invention and comprising a bed 11 and a punch holder 12. In the present disclosure, the invention is illustrated as incorporated in a die-set employing but two guide pins although it will be understood as the description proceeds that the invention is equally applicable to die-sets of the type employing more than two guide pins.

The bed 11 is shown as having a pair of openings 13 extending therethrough and which openings at their lower end enter annular recesses 14. Guide pins 15 and 16 are mounted by the bed plate 11. The lower end portions of the guide pins extend through the passages or openings 13 and the relative diameters of the openings and pins are such that the pins have a

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tight fit. Then the lower end portions of the pins immediately within the recesses 14 have annular grooves 17 formed therein.

Separate spring rings 18 are located in the recesses 14 and partially enter the annular grooves 17 whereby to prevent withdrawal of the pins or outward movement of the pins through the bed 11. One of the rings 18 is shown alone in Fig. 6 and it is noted that the same is made up of substantially flat spring stock having outwardly disposed radial enlargements 19 and 20 at its ends and which enlargements are shown as provided with perforations 21.

A suitable tool, such as a pointed plier-type tool, may have its ends inserted into the perforations 21 and may be used to expand the split ring by forcing its end portions 19 and 20 from one another. Then the ring is passed over the lower end of the pin 15 or 16 until it is aligned with the groove 17 therein whereupon the tool is released or manipulated to bring the ring ends 19 and 20 toward one another so that the ring springs partially into the groove 17. In this condition, the ring overlaps the bottom wall of the recess 14 whereby the pin is secured in place.

Somewhat similarly, the punch holder 12 has openings 22 therethrough and which openings at their upper ends terminate in recesses 23 opening through the upper surface of the punch holder. Having a snug fit in each of the openings 22 are bushings 24 of an internal diameter to slidably receive the guide pins 15 and 16. At their inner ends, the bushings 24 are of enlarged diameter having head-like portions 25 and then at their outer ends within the recesses 23, the bushings are provided with annular grooves 26. Additional split rings 18 are received in the recesses 23 and partially enter the grooves 26 in the bushings and overlap the bottom walls of the recesses 23 (as in Fig. 5) whereby the bushings are secured in place.

With the described construction, it will be seen that the guide pins and the bushings are removably mounted in the bed and punch holder, respectively, of the die-set. To remove the bushing or the pin, the ring 18 securing the element is expanded to remove the ring from the groove of the element, and in fact, to clear the element and then the ring may be lifted out of place so it is no longer securing the element. Expansion of the ring may be through the use of a plier-type tool as mentioned above or the use of a screw driver or the like entered into the split between the enlarged end portions 19 and 20 of the ring. In any event, the securing rings are exposed

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through the open outer ends of the recesses 14 and 23, respectively, for removal or for application.

Associated with each of the guide pins of the die-set is a positively acting stop means for limiting movement of the punch holder toward the bed of the die-set. Such means is particularly useful when form dies are being used as the means constitutes a positive stop, in an accurate location, preventing any possibility of excessive movement of the punch holder toward the bed. In the present embodiment, the means acting as stated will prevent crushing of the hands of an operator or the like which accidentally or thoughtlessly may be between the punch holder and bed and the means also serves as a block or shield occupying certain space to prevent inserting of the hands or fingers of an operator. Also distortion to the surfaces immediately surrounding the guide pins is prevented in the event of dropping of the punch holder upon the bed, or of dropping the punch holder while it is removed from the bed.

The stop means associated with the respective guide pins, as mentioned, are all alike and a detailed description of one applies to both and thus the same reference characters have been applied to the parts. Generally, in the present disclosure, the stop means associated with guide pin 15 is designated 27 and the stop means associated with the guide pin 16 is designated 28.

Each stop means comprises an upper part 29 secured to the punch holder 12 and a lower part 30 secured to the bed 11. Part 29 comprises a plate-like portion 31 having a flat upper surface 32 disposed against the underside of the punch holder 12. This portion 31 has an opening 33 therethrough and through which the bushing 24 passes and in which the said bushing has a snug fit. Thus, in making the assembly, the part 29 is first positioned. Then the bushing is slipped through the part and secured in place with the head 25 of the bushing overlying the underside of that portion of the plate-like part 31 immediately about the bushing.

When mounting the part on the punch holder, the part is located by the dowels 34 and is then fastened in place by the machine screws 35. In addition to the plate-like portion 31, part 29 includes a generally L-shaped wall portion 36 depending from the plate-like portion 31 and extending about two sides of the associated guide pin in laterally spaced relation thereto. The lower face or edge 37 of the L-shaped wall portion 36 is machined off whereby it is flat and whereby the portion is accurate as to length.

With the described construction it will be clear that the bushing 24 may be removed without detaching the part 29 from the punch holder. However, it is also pointed out that since the part is located by the dowels 34 the part may be removed and when reapplied will occupy its same position. This is of significance since at times it may be necessary to remove the parts for the purpose of grinding off their ends 37.

Stop device part 30 also includes a plate-like portion 38 having a flat underside 39. Portion 38 has an opening 40 therethrough and through which a guide pin passes and the part has its flat surface 39 against the upper surface portion of the bed 11 about the guide pin. Part 30 is located by dowels 41 and is secured in place by machine screws 42.

In addition to the plate-like portion 38, the part 30 includes an upstanding L-shaped wall

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portion 43 having a flat machined upper end 44 located in aligned opposed relation to the flat machined lower end surface 37 of the L-shaped portion 36 of part 29. Thus, the L-shaped wall portion 43 of part 30 extends about two sides of the associated guide pin in laterally spaced relation thereto. Clearly, the parts 29 and 30 of stop device 27, together with the corresponding parts of stop device 28, close the corner portions of the die-set reducing the exposed areas into which the fingers or a hand might be inserted.

The present stop device is particularly useful in a die-set wherein form dies are being used. The stop device positively limits movements of the punch holder toward the bed of the die-set and as the punch holder is moved towards the die-set it is brought to a positive stop by the engagement of the flat machined lower edge surfaces 37 of the parts 29 with the flat machined upper edge surfaces 44 of the parts 30. As the wall portions 36 and 43 are laterally spaced from the guide pin, the surfaces of the bearing head 25 and the plate-like portion 38 immediately surrounding the guide pin are protected from distortion such as might result from impact when the punch holder is dropped upon the bed. As the end surface of the wall portion 36 is below the bearing head 25, the latter is also protected from impact when the punch holder is removed from the guide pins of the bed.

The parts 29 and 30 are of identical construction with the exception that the opening through the part 29 is of slightly larger diameter whereby to accommodate the bushing 24. Since the bushing 24 is removable as above described, it will be seen that the parts 29 and 30 of the stop devices may be removed from the punch holder and bed whereby to give better access to the tools for grinding or the like. In addition, the stop devices are manufactured in various lengths for use with various dies. Devices of substantially the proper length then have the ends of their L-shaped wall portions ground to provide the exact length desired whereby they are of the proper length and positively stop movement of the punch holder toward the bed of the die-set at exactly the proper point.

Additionally, these stop devices may have their end surfaces 37 and 44 ground off to have the devices of the proper size as a die wears. The stop means of the invention is positive and accurate and does not involve the adjustment of any screws or the like. Additionally, as suggested above, the L-shaped wall portions guard the corners of the die-set and this is a safety feature as well as the absence of any adjustable screws or the like which the operator may attempt to adjust and in doing so have his hand crushed.

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

1. In a die-set, a horizontal bed and a horizontal punch holder above said bed, a pair of vertically disposed guide pins mounted by said bed and along which said punch holder may move toward and from said bed, a positive stop device associated with each of said guide pins including a pair of parts of which one is on said punch holder and the other on said bed, said parts including oppositely extending vertically aligned wall portions laterally spaced from the pin associated therewith and having opposing end surfaces lying in parallel horizontal planes for contact one with the other as said punch holder is moved toward said bed to positively limit said

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movement and support said punch holder in vertically spaced relation to said bed, and means removably securing said parts to said punch holder and bed respectively.

2. The invention as defined in claim 1, further characterized in that said wall portions are of L-shape in horizontal cross-section and are disposed laterally outwardly of the guide pin associated therewith.

3. In a die-set, a horizontal bed and a horizontal punch holder above said bed, a pair of vertically disposed guide pins mounted by said bed and along which said punch holder may move toward and from said bed, a positive stop device associated with each of said guide pins including a pair of parts each comprising a plate-like portion having an opening which receives the guide pin associated therewith, the plate-like portion of one part being disposed against the under side of the punch holder and the plate-like portion of the other part being disposed against the upper side of the bed, means removably securing said plate-like portions to said punch holder and bed respectively, a vertical wall portion on each of said plate-like portions in laterally spaced relation to said associated guide pin, said wall portions being disposed in vertically aligned and opposed relation one to the other and having opposed end surfaces lying in parallel horizontal planes for contact one with the other as said punch holder is moved toward said bed to positively limit said movement and support said punch holder in vertically spaced relation to said bed.

4. In a die-set, a horizontal bed and a horizontal punch holder above said bed, a pair of vertically disposed guide pins mounted by said bed, a pair of bushings mounted by said punch holder and extending therethrough and respectively slidable along said guide pins toward and from said bed, a positive stop device associated with each of said guide pins including a pair of

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parts each comprising a plate-like portion having an opening which receives the guide pin associated therewith, the plate-like portion of one part being disposed against the under side of the punch holder and the plate-like portion of the other part being disposed against the upper side of the bed, means removably securing said plate-like portions to said punch holder and bed respectively, said bushings being respectively engaged through said openings of said plate-like portions of said parts mounted on said punch holder and each having a laterally extended head portion overlying the under side of said plate-like portion, a vertical wall portion on each of said plate-like portions in laterally spaced relation to said associated guide pin, said wall portions being disposed in vertically aligned and opposed relation one to the other and having opposed end surfaces lying in parallel horizontal planes for contact one with the other as said punch holder is moved toward said bed to positively limit said movement and support said punch holder in vertically spaced relation to said bed, the end surface of said part connected to said punch holder being at a greater vertical distance from the under side of said punch holder than said head of said bushing, and means removably securing said bushings to said punch holder whereby said parts secured to said punch holder are removable therefrom on removal of said bushings.

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