Aug. 14, 1945. D. V. STELLIN 2,382,267

INTERCHANGEABLE PUNCH AND DIE AND RETAINER FOR SAME

Original Filed March 6, 1944

FIG. 1.

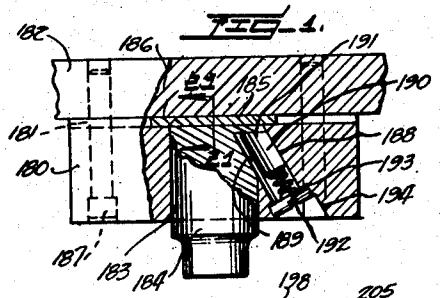
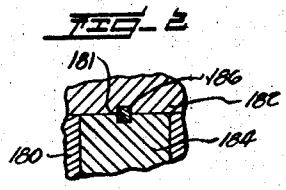


FIG. 2.



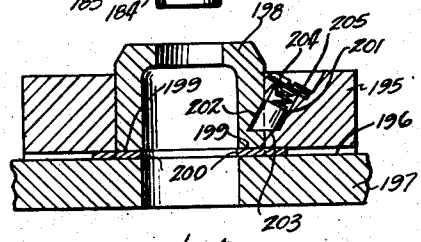


FIG. 4.

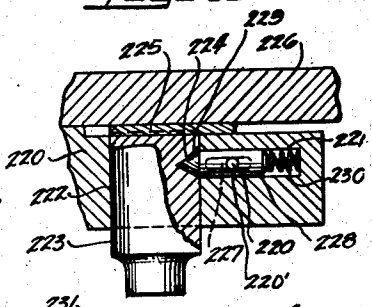
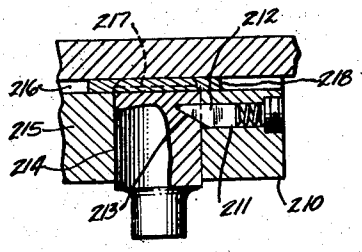
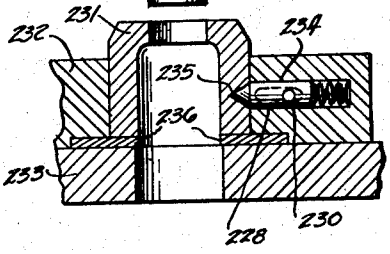


FIG. 3.





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UNITED STATES PATENT OFFICE

2,382,267

INTERCHANGEABLE PUNCH AND DIE AND RETAINER FOR SAME

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Original application March 6, 1944, Serial No. 525,233, now Patent No. 2,364,401, dated December 5, 1944. Divided and this application June 28, 1944, Serial No. 542,481

8 Claims. (Cl. 164—118)

The present invention pertains to novel interchangeable punches and dies and particularly to devices for accurately locating and retaining the punches and dies. This application is a division of my co-pending application, Serial No. 525,233, filed March 6, 1944, which has resulted in Patent No. 2,364,401 of December 5, 1944.

The principal object of the invention is to provide such retaining and locating means for punches and dies that are intricate and not necessarily round. Hitherto it has been the practice to interchange round punches and dies requiring no particular accuracy in being located. Obviously the means employed in that connection would not be suitable for non-round or intricate parts.

Another object of the invention is to provide interchangeability of the character described by simple means requiring comparatively little time in making a change. This object of the invention is of great importance in urgent production, as in war work, and in mass production where a given rate of output must be maintained in order to yield a profit. The loss of time incident to changing of punches and dies for any reason, such as breakage or need of sharpening, is substantial. A reduction of this loss by use of the present invention results in an important economy in the over-all operation.

The invention embodies, more specifically, a device for holding the severing member in its cavity, in conjunction with locating means for properly alining the member in its cavity and preventing it from slipping rotatively. The holder is in the form of a pin, preferably spring-pressed, entering the severing member from the retainer, and the locating means consists of a key received in registering keyways in the retainer and in the inner end of the severing member.

In one embodiment of the invention, the holding member is disposed angularly to the axis of the severing member and has one end disposed at the face of the retainer. In this position the holder is easily and conveniently accessible for removal of the severing member.

In another embodiment, where the holder is perpendicular to the axis of the tool and spring-pressed, it has a novel arrangement for effecting its retraction on changing the tool. The holder has a small radial hole registering with a slot formed through the retainer to one of its outer surfaces. The holder is retracted by inserting a nail or wire through the slot and into the hole, the slot accommodating the movement of the nail or wire axially of the holder. With this construction the backing spring may seat against the bottom of a blind hole in the retainer rather than against a screw plug fitted in the retainer.

Other forms of the invention provide the locator or key in various positions in the retainer body. In one case the locator is positioned between the upper and lower surfaces of the body; in another case between the inner surface of the body and the press plate. The invention also embodies various forms of keying means as well as several forms of locking devices therefor, such as holding clips and spring retainers.

The invention is fully disclosed by way of example in the following description and in the accompanying drawing in which

Figure 1 is a vertical section of a punch and die with another form of locator;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a section of another modification; and

Figure 4 is a vertical section of a punch and die according to another modification.

Reference to these views will now be made by use of like characters which are employed to designate corresponding parts throughout.

In the construction shown in Figure 1, the retainer 180 likewise has a key slot 181 in its surface immediately adjacent to the plate 182. This keyway is, however, similar on both sides of the punch-receiving recess 183. The inner end of the punch 184 mounted in the recess has a keyway 185 receiving key 186 mounted in the keyway 181. The key is mounted before securing the retainer 180 to the plate 182 and is secured on tightening the bolts 187.

A diagonal hole 188 is drilled in the retainer 180, and the punch 184 is formed with a notch 189 shaped as a continuation of the hole. In the hole is mounted a cylindrical holder 190 having a bevelled end 191 that partially enters the notch 189. The holder is advanced by a coil spring 192 which is tensioned by a flat screw 193 threaded into an enlargement 194 of the hole 188.

In the corresponding construction for the die, the retainer 195 is formed with a similar keyway 196 in the surface adjacent to the plate 197. The die 198 is hollow and is formed at its inner edge with opposed keyways 199 adapted to receive keys 200 projected therein from the keyways 196. The die is hollow and the keys are not permitted to enter the cavity, in order to leave a clear opening for the slugs.

The retainer is formed with a diagonal hole 201 directed towards the die which is formed

with a notch 202 as an extension of the drill hole. A cylindrical bevelled holder 203 is inserted into the hole and into the notch 202 and is backed by a coil spring 204 which in turn is tensioned by a flat screw 205. In order to remove either the punch or the die, the screw is retracted, whereupon the holder may readily be withdrawn.

In the modification shown in Figure 3, the retainer 210 has a square hole 211 to receive the bevelled locator 212, the bevelled end of which enters a notch 213 in the punch 214. The retainer 215 and the punch are formed with alined keyways 216 and 217 respectively for receiving the locking key 218.

Another construction of holder is shown in Figure 4. In this case the retainer 220 has a radial hole 221 drilled from the punch receiving cavity 222. The punch 223 has a conical recess 224 registering with the hole 221. The punch is held against rotation by a key 225 adjacent to the plate 226 in the manner previously described. The retainer has a slot 227 extending from its wall to the hole 221. In the hole is mounted a holder in the form of a cylindrical member 228 having a pointed end 229 entering the notch 224. The holder is inserted from the cavity 222 against a tensioned spring 230. The holder has a small hole 220 at the slot 227, which may be reached by a wire or other suitable object passed through the slot to withdraw the holder for permitting insertion or withdrawal of the punch.

The die 231 is held in like manner in its retainer 232 and against its plate 233 by a holder assembly similar to that just described and designated generally by the numeral 234. The die has a conical notch 235 to receive the holding pin as previously described. The keys 236 entering the die do not obstruct the cavity therein.

Various forms of locators, locating keys, etc., may be interchanged from one embodiment to another to suit requirements, wherever permitted by the construction involved.

Although specific embodiments of the invention have been illustrated and described, it will be understood that various alterations in the details of construction may be made without departing from the scope of the invention as indicated by the appended claims.

What I claim is:

1. In a punch or die assembly a retainer, a severing member in said retainer and having a portion projecting therefrom, said member having a recess in its lateral wall and inward of said portion, said retainer having a similar recess alined with the first recess, a holding member receivable in both recesses, said severing member and retainer being formed with registering keyways, the keyway in said severing member being formed across the extremity thereof within said retainer and having its bottom in a plane perpendicular to the axis of said severing member, and a key inserted in said keyways.

2. In a punch or die assembly, a retainer, a severing member in said retainer and having a portion projecting therefrom, said member having a recess in its lateral wall and inward of said portion, said retainer having a similar recess alined with the first recess, said recesses being disposed at an acute angle to the axis of said member, a holding member receivable in both recesses, said severing member and retainer being formed with registering keyways, the keyway in said severing member being formed across the extremity thereof within said retainer and having its bottom in a plane perpendicular to the axis of said severing member, and a key inserted in said keyways.

3. In a punch or die assembly, a retainer, a severing member in said retainer and having a portion projecting therefrom, said member having a recess in its lateral wall and inward of said portion, said retainer having a similar recess alined with the first recess, said recesses being disposed at an acute angle to the axis of said member, the second recess being exposed at the face of said retainer, a holding member receivable in both recesses, said severing member and retainer being formed with registering keyways, the keyway in said severing member being formed across the extremity thereof within said retainer and having its bottom in a plane perpendicular to the axis of said severing member, and a key inserted in said keyways.

4. In a punch or die assembly a retainer, a severing member in said retainer and having a portion projecting therefrom, said member having a recess in its lateral wall and inward of said portion, said retainer having a similar recess alined with the first recess, a holding member receivable in both recesses, said holding member having a radial hole, said retainer having a slot registering with said hole and extending lengthwise of said holding member and also to a surface of said retainer.

5. In a punch or die assembly a retainer, a severing member in said retainer and having a portion projecting therefrom, said member having a recess in its lateral wall and inward of said portion, said retainer having a similar recess alined with the first recess, a holding member receivable in both recesses, said holding member having a radial hole, said retainer having a slot registering with said hole and extending lengthwise of said holding member and also to a surface of said retainer, and means for preventing rotating of said member in said retainer.

6. In a punch or die assembly a retainer, a severing member in said retainer and having a portion projecting therefrom, said member having a recess in its lateral wall and inward of said portion, said retainer having a similar recess alined with the first recess, a holding member receivable in both recesses, said holding member having a radial hole, said retainer having a slot registering with said hole and extending lengthwise of said holding member and also to a surface of said retainer, and a spring in the second recess and forcing said holding member towards the first recess.

7. In a punch or die assembly a retainer, a severing member in said retainer and having a portion projecting therefrom, said member having a recess in its lateral wall and inward of said portion, said retainer having a similar recess alined with the first recess, a holding member receivable in both recesses, said holding member having a radial hole, said retainer having a slot registering with said hole and extending lengthwise of said holding member and also to a surface of said retainer, and a spring in the second recess and forcing said holding member towards the first recess, and means for preventing rotating of said member in said retainer.

8. In a punch or die assembly a retainer, a severing member in said retainer and having a portion projecting therefrom, said member having a

recess in its lateral wall and inward of said portion, said retainer having a similar recess alined with the first recess, a holding member receivable in both recesses, said holding member having a radial hole, said retainer having a slot registering with said hole and extending lengthwise of said holding member and also to a surface of said retainer, and a spring in the second recess and forcing said holding member towards the first recess, the inner end of said severing member and the adjacent surface of said retainer being formed with registering keyways, and a key inserted in said keyways.

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