March 24, 1942. C. V. LUGINBILL ET AL 2,277,338

DRAWING DIE

Filed April 8, 1940

Fig. 1.

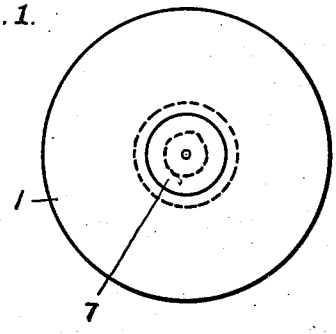


Fig. 5.

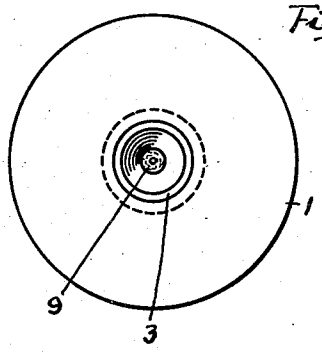


Fig. 2.

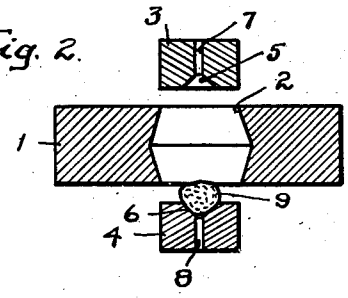


Fig. 4.

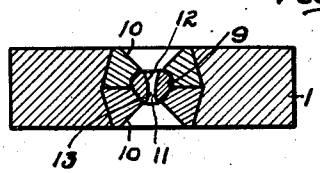
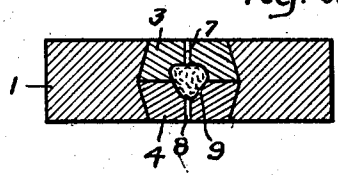


Fig. 3.



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DRAWING DIE

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Fort Wayne, Ind.

Application April 8, 1940, Serial No. 328,434

2 Claims. (Cl. 205—29)

The invention relates to drawing dies wherein a body of suitable material is mounted in a support and an opening drilled through it to receive the material to be drawn, such as wire.

Various methods have been proposed for producing dies of this character. Generally the drawing body is a diamond and it is mounted in a setting of metal that is heated to soften it and pressure is applied to cause the metal to grip the stone. It is essential to a practical and efficient die that the diamond shall be rigidly anchored against loosening in its setting and that ample reinforcement for the diamond shall be provided by the setting to prevent or minimize the danger of fracture of the stone by the strain placed on it when drawing the wire through it. It is also important that in mounting the diamond in its setting the pressure placed upon it shall be uniform on all sides of the stone to avoid unequal strain on it. It is also desirable to dissipate, as much as possible, the heat generated by the wire drawing movement in order that the life of the apertured body may be prolonged. When the metal is heated to soften it the diamond is heated at the same time. At a certain degree of temperature the diamond gives off carbon monoxide gas which heretofore can escape only through the metal, with the result that the stone is injured at times when the gas fails to escape.

The object of the invention is to provide a die wherein the former advantages are obtained and the disadvantages avoided.

Another object is to provide a die wherein the diamond is firmly supported in an enclosing metallic body that is rigidly locked in a support.

Another object is to provide an enclosing body for the diamond having such reinforcing protective thickness as to avoid strain on the stone during the embedding process and during the use of the die.

Other objects and advantages will appear hereinafter.

The invention is illustrated in the accompanying drawing in which—

Figure 1 is a plan view illustrating an early step in the manufacture of the die.

Fig. 2 is a vertical cross-section of the same step.

Fig. 3 is a vertical cross-section of the die after the completing of the embedding step.

Fig. 4 is a vertical cross-section of the finished die and

Fig. 5 is a plan view view of the same.

Referring to the illustrative embodiment of the invention, 1 designates a holding band or disk having an opening 2 therein that tapers outwardly in opposite directions from approximately its middle point so that the wall of the opening forms an obtuse angle. Two cylindrical metal plugs 3, 4 have the recesses 5, 6 respectively formed in their opposed faces which are adapted to receive the diamond 9 and having the vents 7, 8 that communicate with the said recesses and the opposite side of the plugs respectively. The plugs are insertible into the opening 2, the fit at the entrances to the opening being close. The plugs are formed of metal that will soften when heated, such as bronze, "Monel metal," etc.

When the plugs with the diamond between them are installed in the band their opposite ends project from the band. The unit is heated to the proper temperature, the carbon monoxide gas from the diamond escaping through the vents 7, 8, and the band is placed in a press and pressure is applied to the plugs to force them together and expand both of them laterally so as to rigidly engage the wall of the opening 2 and completely envelop the diamond and anchor it therein. The exposed faces of the plugs are later made flush with the faces of the band and the tapered cavities 10 are formed in the plugs to expose the diamond and the usual hole 11 is drilled through the diamond through which the wire is drawn in operation.

Since the diamond is initially supported in the cavities 5, 6 in the plugs 3, 4, a very large amount of its surface contacts the walls of those cavities so that when pressure is applied the stone is placed under practically a uniform strain and the danger of its fracture under said pressure is practically eliminated. Also, because of the lateral expansion of the plugs relatively thick protective walls are formed about the sides of the diamond and the danger of its fracture, when the die is in use, is greatly minimized. The metal also tends to dissipate the heat generated by the wire drawing operation. The diamond is fixed in place and will not loosen in use.

Since the metal that anchors the diamond is locked in the band against movement out of said band in either direction, the die may be reversed should the wire drawing part 12 of the opening 11 in the diamond be or become rough or a flaw found therein. In this case the opposite part 13 of said opening would then be shaped for wire drawing and the die put into use. Hence a great saving in drawing dies is gained by this reversible feature.

What we claim is:

1. A drawing die comprising a support having an opening therein which tapers outwardly in opposite directions from approximately the middle thereof, two opposed plugs within the opening and having recesses in the opposed faces thereof, and a drawing member engaged in both recesses, said plugs being adapted to soften when heated to a selected temperature and to expand laterally under pressure to entirely fill said opening and rigidly lock the drawing member in the support against dislodgment irrespective of the wire drawing direction.

2. A drawing die comprising a support having an opening therein which tapers outwardly in opposite directions from approximately the middle thereof, two opposed plugs within the opening and having recesses in the opposed faces thereof and having vents leading from said recesses to the opposite faces of said plugs respectively, and a drawing member engaged in both recesses, said plugs being adapted to soften when heated to a selected temperature and to expand laterally under pressure to entirely fill said opening and rigidly lock the drawing member in the support against dislodgment irrespective of the wire drawing direction.

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