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WIRE DRAWING APPARATUS

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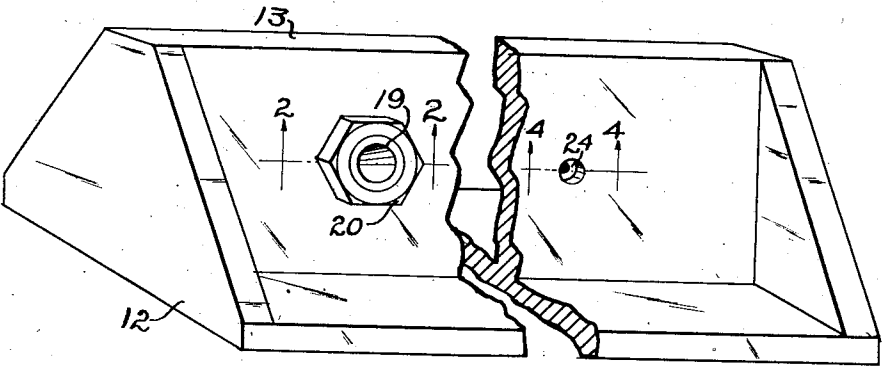


FIG. 1

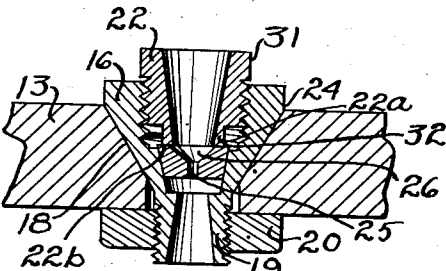


FIG. 2

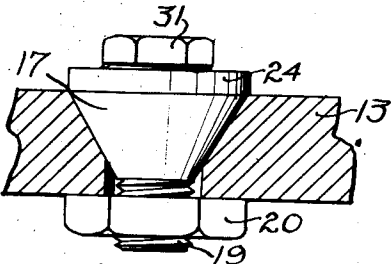


FIG. 3

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WIRE-DRAWING APPARATUS.

Application filed November 9, 1925. Serial No. 67,774.

This invention relates to wire drawing apparatus and more particularly to wire drawing dies and holders therefor.

The general object of our invention is to provide a die and a holder therefor, arranged in a novel manner whereby the die proper will embody a minimum amount of steel in its construction and be of such shape that it may be economically produced and when in use function efficiently.

A more specific object of our invention is the provision of a die holder construction which may be very rapidly taken apart to permit the insertion of a die therein and whereby the accurate positioning of the die will become a mere incident to the reassembling of the parts comprising the die holder.

Further objects of our invention will hereinafter become apparent from the following description referring to accompanying drawings, illustrating various forms thereof. The essential characteristics are summarized in the claims.

In the drawings, Fig. 1 is a perspective view of a wire drawing bench fixture adapted to support our novel wire drawing die and holder and showing two forms of die holder mounted thereon; Fig. 2 is a cross-sectional view taken substantially along the line 2-2 of Figure 1; Fig. 3 is a cross-sectional view similar to Fig. 2.

It is the present day practice to form wire drawing dies by drilling and reaming a plurality of holes in steel bars, the bars being hardened and tempered and the holes then formed to gauge. These bars are positioned in suitable fixtures, or holders and as each opening becomes worn, the operator or wire drawer has recourse to an adjacent opening in the bar. When all of the openings have been worn larger than the desired gauge, the bar is annealed and the openings are reamed and burnished to a larger size and the bar again hardened and tempered. However, it frequently occurs that such bars develop cracks, thus necessitating the discarding of the bar after a considerable amount of skilled labor has been expended thereon.

Our invention contemplates the use of a small die having a single opening which we prefer to call a button die and which is extremely simple in shape. The proportioning of the die is such that the diameter thereof is considerably greater than its thickness, whereby it may be first produced

on an automatic screw machine and thereafter hardened and tempered in an automatic furnace. To make such a die shape practical we provide a novel bench holder for supporting the die in a firm rigid manner to prevent the fracturing thereof when in use. In the event any one particular die becomes impaired during the hardening and tempering processes it can be discarded thus involving the waste of only a minimum of steel and skilled labor.

In Fig. 1 we show a bench fixture 12 of any convenient shape to embody a vertically extending wall 13, comprising a metallic slab of sufficient thickness to properly support a die and die holder, as will be hereinafter set forth. Two forms of die holder adaptable to receive a button die of a simple economical shape are shown in position on the fixture. In the form of holder shown in Figure 2 the wall 13 of the fixture 12 is suitably bored to have a coniform opening to receive a bushing or sleeve 16, having a coniform surface 17 complementary to the coniform surface 18 of the fixture bore. The sleeve 16 may be of sufficient length to extend through the wall 13 of the fixture with a small end 19 thereof suitably threaded to engage a lock nut 20 which serves to firmly wedge the sleeve 16 in fixed position in the bore of the fixture 13. The sleeve 16 has a large end thereof suitably bored and threaded to receive a hollow die clamping nut 22 of a particular form and the intermediate portion of the bore thereof is formed with a slight taper to receive a button die 24. The button die has a coniform surface complementary to the tapered surface of the sleeve whereby it may be firmly wedged in the sleeve. The die embodies just sufficient metal to withstand the wire drawing strains and is of a shape which is conducive to economical hardening and tempering and we find that these characteristics are properly represented when the button die 24 is of a diameter, which is substantially equal to twice the thickness thereof. This proportioning of the die gives a considerable uniform section of metal annularly about the gauging bore 25 thereof. The button die may also have a counter-sunk lead or throat 26 extending to the bore 25 to facilitate the drawing or gauging action upon the wire being drawn therefrom, or, as will be hereinafter set forth this throat may be formed in a separate member.

The die clamping nut or thimble 22 has the inner end thereof provided with an annular end portion 22^a which is of less diameter than the diameter of the button die whereby slight variations in the die dimension will not interfere with the proper clamping action of the nut 22. In other words the shape of the inner end of the clamping nut 22 is such that it may extend into the die receiving tapered bore of the sleeve 16, if a die of slightly smaller diameter should be used. The button die 25 as will be noted in Figures 2 and 4 is formed to have a flat end surface 32 to afford an accurate contact with the corresponding flat surface 22^b, formed on the inner end of the clamping nut 22 whereby a uniform pressure may be exerted upon the die.

An advantage to be found in the use of the sleeve 16 is due to the fact that a die holding fixture, such as the fixture 12, is subject to considerable wear and particularly the threads formed thereon for the dies have to be replaced a number of times in the course of one day's use. The sleeve 16 can be readily replaced when the nut clamping threads thereof become worn without necessitating the discarding of the entire fixture.

It is to be understood that it is not our purpose to provide a die which may be compressed to such an extent as to cause a contraction of the gauge opening, when the latter becomes worn, but to accurately compress the die and prevent the formation of fractures therein when in use and to prevent strain or unequal stressing so that it will not subsequently crack in a rehardening operation.

It will be apparent from the foregoing description of our invention that we embody in a wire drawing apparatus, a wire drawing die of extremely simple form and which form is conducive to the obtaining of economy in the manufacture thereof, and furthermore, by providing a novel holder, such die may be quickly attached to and removed from the wire drawing apparatus without necessitating an unusual expenditure of time and caution on the part of the operator to obtain an accurate positioning and uniform clamping of the die member.

It will also be apparent that in the event there is a defect in the steel comprising the

die proper, there will be a minimum waste of both labor and material when such defective die is discarded. This characteristic is quite important when considering the present day practice of discarding a multiple die when one of the bores thereof develops a fracture. Finally by confining the die bore to a die of steel of minimum dimensions, of definite relationship, it is possible to obtain a more uniform temper in a large number of dies.

Having thus described our invention, we claim:

1. In a device of the character described, the combination of a support, a holder mounted in the support in the form of a sleeve having a tapered exterior occupying a tapered opening of the support and having a threaded portion projecting beyond the support, a nut screwed onto said threaded portion to clamp the holder in the support, said holder having a die cavity, a button die in said cavity, the holder having an enlarged recess beyond the cavity internally threaded, and a nut screwed into such internal thread and bearing against the end of the button die.

2. In a device of the character described, the combination of a support, a holder mounted in the support in the form of a sleeve occupying an opening of the support and having a threaded portion projecting beyond the support, a nut screwed onto said threaded portion to clamp the holder in the support, said holder having a die cavity and adjoining the cavity an internally threaded recess, a button die in said cavity, the periphery of the button die being conical and the cavity having a cooperating conical surface, there being a space within the cavity beyond the smaller end of the button die, and a hollow nut screwed into the internal thread of the recess and having an annular portion of less external diameter than the largest diameter of the die, said annular portion abutting the end of the die and forcing it into tight engagement with the holder.

In testimony whereof, we hereunto affix our signatures.

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