Oct. 17, 1933. H. N. TODT 1,931,095

DIE HOLDER

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Fig. 1.

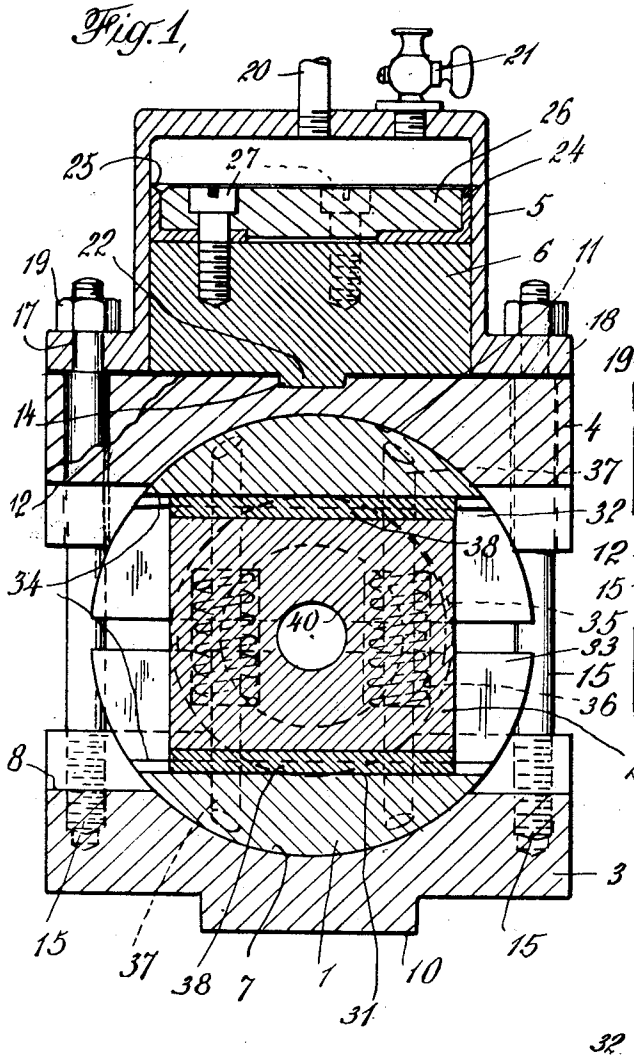


Fig. 2.

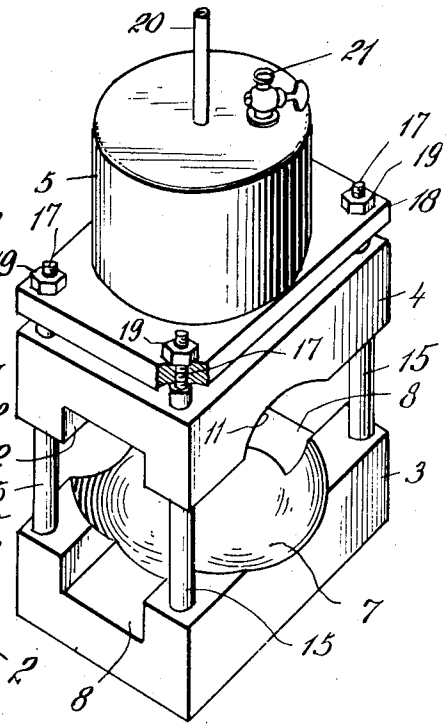
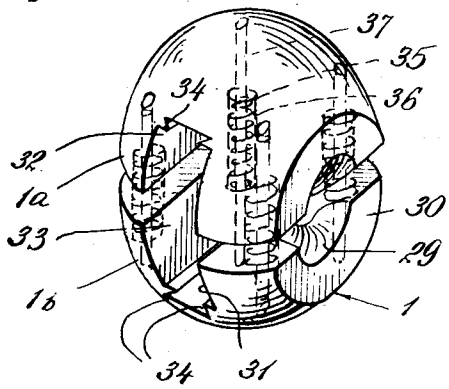


Fig. 3.



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DIE HOLDER

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5 Claims. (Cl. 205—25)

This invention relates to a die-holding mechanism and more especially to a holder for use with rod or wire drawing dies. The object of the invention is to provide a die-holding mechanism which affords quick and easy adjustability of the inclination of the die aperture with respect to the direction of travel of the stock entering the die.

This object is attained according to the invention by swivelly seating a die holding block intermediate a pair of bearing plates which are compressible to clamp the block therebetween and rigidly hold it in adjusted position. The block is made of uniform curvature at its ends which snugly seat within correspondingly shaped depressions in the bearing plates, although preferably the block will be of generally spherical shape and embraced between the bearing plates in the manner of a ball and socket so as to be capable of universal adjustment.

A further feature of the invention resides in the provision of fluid actuated means for compressing the bearing plates to clamp the die-carrying block in position. More specifically these means comprise a piston working within a cylinder and operatively connected to one of the bearing plates, so that operation of the clamp is controlled by the admission of fluid to the cylinder and its release therefrom.

The invention will be better understood from the detail description which follows of a preferred embodiment, taken in connection with the annexed drawing in which: Figure 1 is a vertical section through the completely assembled die-holding mechanism; Figure 2 is a perspective showing of the lower and upper bearing plates and the fluid cylinder; and Figure 3 is a perspective view of the die-holding block.

The preferred form of die-holding mechanism embodying the invention, as shown by Figure 1, consists of six major parts, namely: a die-holding block 1, a wire or rod drawing die 2 receivable within a slot in the block 1, a lower bearing plate 3, and an upper bearing plate 4, engaging respectively the bottom and top of the die-holding block, and a cylinder 5 containing a piston 6 connected to the upper bearing plate 4. These parts will be described in greater detail.

The lower bearing plate 3 comprises a rectangular metal slab having a circular concave spherical seat 7 centrally located in its upper face and intersecting the sides of the plate as best shown in Figure 2. A channel 8 extends lengthwise of the plate and passes diametrically through the seat, the depth of this channel being somewhat less than the depth of the depression forming the seat. The bottom or plane face of the bearing plate 3 is provided with a lug 10 adapted to be received in a complementary shaped recess formed in a bench upon which the die-holding mechanism is supported during its operation. The upper bearing plate 4 is in every material respect similar to the lower bearing plate 3, having a spherical seat 11, corresponding to the seat 7, centrally located thereon and opening to its sides and a longitudinally extending channel 12, corresponding to the channel 8, intersecting the seat 11 at diametrically opposite points. The upper bearing plate 4 differs from the lower bearing plate 3 in that, instead of being provided on its plane face with a lug corresponding to the lug 10 of the bottom bearing plate, there is centrally formed therein a recess 14 as shown in Figure 1. The lower bearing plate near its corners is tapped to receive four posts 15 which are screwed therein and which extend vertically up and through slightly oversize openings provided in the corresponding four corners of the upper bearing plate 4. By virtue of this construction the upper bearing plate 4 is slidable toward and away from the lower bearing plate 3, but is held separated from the lower bearing plate by the die-holding block 1 which is stationed between the bearing plates.

The posts 15 have at their upper ends reduced portions 17 forming shoulders located a short distance from their ends. A cap plate 18 is fitted over these reduced portions and is clamped against the shoulders by nuts 19 threaded upon the ends of the posts. The cap plate 18 is thus rigidly supported upon the posts in fixed relation to the lower bearing plate 3.

Integrally formed upon the cap plate 18 is the cylinder 5, the bore of this cylinder, at its lower end, being extended through the cap plate. The top of the cylinder is closed but is connected with a fluid inlet pipe 20 communicating with the interior of the cylinder and provided with an exhaust cock 21 for releasing pressure from the cylinder. The piston 6 is rigidly united with the upper bearing plate 4 by means of a boss 22 located on the lower face of the piston which boss is drive-fitted into the recess 14 of the bearing plate. The piston is reciprocable within the cylinder 5 and in its movement carries with it the upper bearing plate 4 which slides upon the posts 15. In order to maintain compression within the cylinder, on the top of the piston is mounted a piston cup 24, comprising a disc-like member having a circumferential flange extending up-

ward from one of its faces in the form of a ring which slides within the bore of the cylinder and forms a fluid-tight seal with the cylinder wall. Filling the inside of this cup and having its exposed surface flush with the upper edge of the flange 25 is a follower 26. The follower and piston cup are secured to the top of the cylinder by means of screws 27 passing down through openings in the follower and piston cup and threaded within tapped openings in the piston, the heads of the screws being counter-sunk so that their upper ends lie flush with the upper surface of the follower.

The die-holder block will now be described. This block, as best illustrated in Figure 3, is of generally spherical shape interrupted by two flat faces 30 lying within parallel planes upon opposite sides of the sphere. Extending completely through the block and connecting the centers of these flat circular faces 30 is a tapered passage 29 providing clearance for the passage of stock through the block. The block 1 is split along a plane intersecting the center of the stock-clearance passage so as to form two superposed sections 1*a* and 1*b*, these sections being the counterpart of each other. The juxtaposed faces of the sections 1*a* and 1*b* are recessed so as to form a channel 31 in the lower face and a corresponding channel 32 in the upper face, the two channels in combination constituting a slot 33 extending through the block midway between and in parallelism with the flat faces 30. The bottoms of the channels 31 and 32 may be formed with groove 34, although this is not essential.

The two sections are urged apart by a series of four springs 35 interposed between the sections, these springs being seated within cylindrical sockets 36 opening to the adjacent faces of the sections. In order to prevent relative transverse shifting movement between the sections, guide pins 37, rigidly secured in recesses formed in the upper section 1*a*, extend down within the convolutions of the springs 35 and have their lower ends slidably received in slightly oversize openings in the lower section 1*b*. Movement of the sections toward and from each other must therefore take place in a straight line.

Adapted to be inserted within the slot 33 of the die-holding block is a wire drawing die 2 of conventional form as shown in Figure 1, this die fitting loosely within the slot and shims or wedges 38 being employed to take up excessive clearance. The slot in the die-holding block is made large enough to take the largest size die and when a smaller die is used, filler plates or shims being inserted in the keyways to hold the die firmly in position. Of course the groove 34, if employed at all, need not be undercut but may be any shape in cross-section.

As will be apparent from the description which has gone before, the mechanism will rest upon a bench with the lug 10 on the bottom of bearing plate 3 fitting within a corresponding shaped recess in the bench, and the die 2 being held within the slot 33 of the die-holding block 1, as for example by means of wedges or sheaves as before stated. While pressure is released from the cylinder 5, the spherical die-holding block is loosely retained between the lower and upper bearing plates 3 and 4, although free to swivel within its seats 7 and 11.

Due to variations in the material being drawn or in the die used to reduce the material, it is often necessary to adjust the die so that its face is not "square" or at a perfect right angle to the axis of the entering stock. In order to adjust the axis of the wire-drawing aperture in the die at the required inclination, a few light taps are imparted to the die block to shift it upon its seats. When correct adjustment has been attained, pressure is admitted to the cylinder 5 by opening a valve, not shown, in the inlet pipe 20 which forces the piston 6 down and with it the upper bearing plate 4 which slides upon the posts 15, thus clamping the die-holding block firmly between the lower and upper bearing plates 3 and 4. This clamping pressure, by reason of the yieldable assembly of the die holding block, is transmitted through the sections to the die so that it also is rigidly held against movement.

The mechanism described provides for a quick, easy and accurate means for adjusting the drawing die within the limits ordinarily required, and for changing dies; or, in the case of multiple-aperture dies, for changing from one aperture of a die to another. The sections of the holder may be mounted on the die carrier arm of an inverted wire block or applied to any type of wire block or draw-bench.

I claim:

1. A die-holding mechanism comprising a block, bearing plates engaging opposite ends of the block, means for moving said bearing plates toward each other to rigidly clamp the block therebetween, said block being split upon a plane intermediate its ends dividing it into two superposed sections, said sections having recesses formed in their juxtaposed faces constituting a slot extending transversely of the block, the bottom of said slot being provided with a groove and a die receivable within said slot.

2. In a die holding mechanism, a block split intermediate its ends to divide it into two superposed sections, grooves intersecting the two juxtaposed faces of the sections so as to define a slot extending transversely of the block, said block having a stock-clearance passage intersecting said slot at right angles thereto, resilient means interposed between said sections and tending to hold them spread apart, a die receivable in said slot having an aperture aligned with the stock clearance passage, and means between the die and the slot whereby to hold the die in place.

3. In a die-holding mechanism, a split block having a slot extending transversely therethrough, a die receivable within said slot, said block having stock clearance passage adjacent said die to establish passage therethrough, bearing plates in gripped engagement with the split block, and fluid pressure means for causing said bearing plates to grip said split block.

4. A die-holding mechanism comprising a spherically curved block split to form two sections having a slot therethrough, a die insertable in said slot, two spherically curved bearing plates adapted to receive the split block, and springs interposed between the block sections to hold them apart.

5. A die-holding mechanism comprising a spherically curved block split to form two sections having a slot therethrough, a die insertable in said slot, springs interposed between the block sections to hold them apart, two spherically curved bearing plates adapted to receive the split block, and fluid pressure means for holding the bearing plates in engagement with the split block.

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