Dec. 18, 1934. U. S. G. SWARTZ 1,984,775

ADJUSTABLE DIE

Filed June 21, 1933

Fig. 1.

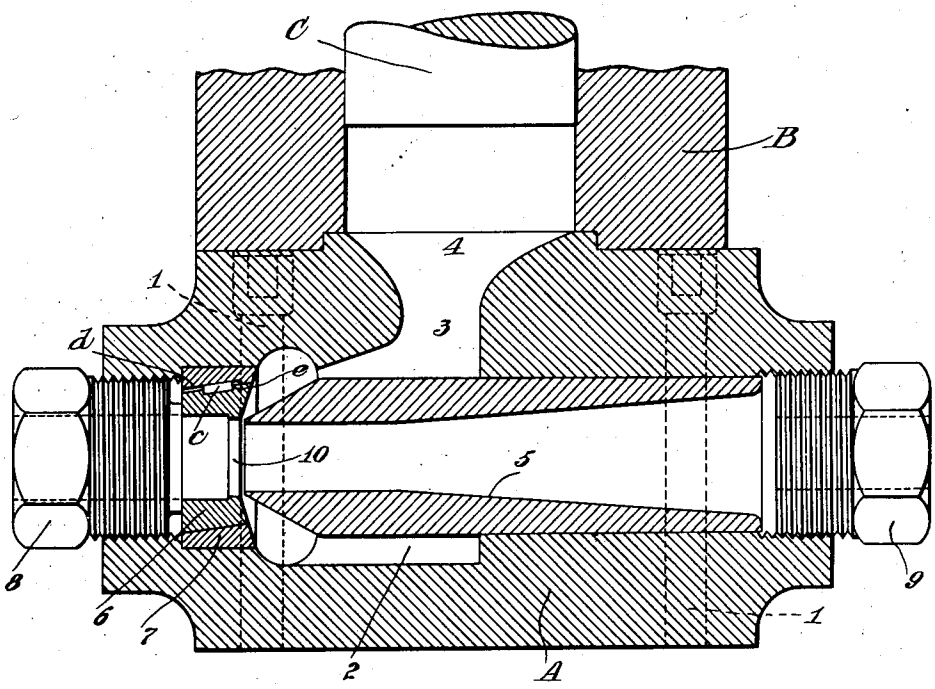


Fig. 3.

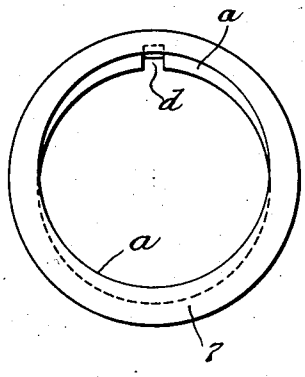


Fig. 2.

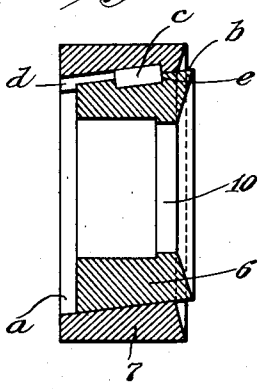
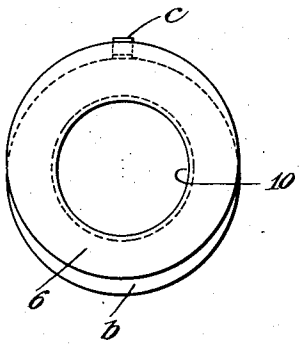


Fig. 4.



INVENTOR

Ulysses S. Grant Swartz

BY

Philipp, Sawyer & Kennedy

ATTORNEYS

Patented Dec. 18, 1934

1,984,775

UNITED STATES PATENT OFFICE

1,984,775

ADJUSTABLE DIE

Ulysses S. Grant Swartz, Pennington, N. J., assignor to John A. Roebling's Sons Company, Trenton, N. J., a corporation of New Jersey

Application June 21, 1933, Serial No. 676,787

7 Claims. (Cl. 207—17)

This invention relates to improvements in dies for extrusion presses and the like, and especially for presses for applying insulation or lead sheathing upon wire or electric cable.

In such devices the wire to be covered passes through a tubular core and a die, which are relatively spaced for the passage of the coating material therebetween. Usually the thickness of the coating has been determined by horizontal adjustment of both the core and die, respectively, the one for coarse and the other for final adjustments. In some instances, the die has also been adjusted vertically by separate adjusting means to prevent eccentric application of the coating and to equalize the flow above and below the wire or cable. This latter adjustment has not only increased the expense of the press materially by necessitating the use of a larger die block, but the adjustment is complicated and requires skill for accurate setting. It has also been proposed that the die ring be suspended or "floatingly" supported. This is even more expensive and complicated as special packing ring constructions must be used between the die ring and die block.

The principal object of the present invention is to provide an efficient, simple, and easily adjustable die, permitting the use of a materially smaller die block while securing both horizontal and vertical adjustment of the die in a convenient manner.

For a full understanding of the invention, a detailed description of a construction embodying the invention in its preferred form will now be given, in connection with the accompanying drawing forming a part of this specification, and the features forming the invention then specifically pointed out in the claims.

In the drawing:

Figure 1 is a vertical section through a die block and lead cylinder;

Figure 2 is an enlarged vertical section of the die ring and die;

Figure 3 is an end elevation of the die ring, looking to the left in Figure 2; and

Figure 4 is a similar end elevation of the die.

Referring to the drawing, A is the die block, usually rectangular in shape and formed in two sections secured together by bolts 1. The top of die block A is provided with a suitable seat for the reception of the lower end of a cylinder B, which acts as a container for the lead or other material to be extruded by movement of a plunger C downward through cylinder B.

The die block A is provided with a longitudinal bore which is enlarged intermediate its ends to form a horizontal extrusion chamber 2 connected to the interior of the cylinder B by one or more passages 3 connecting with a supply chamber 4 expanding upwardly to substantially the same size as the interior of the cylinder B. A tubular core 5 is fitted in one end of the die block bore and extends through the horizontal extrusion chamber 2 into proximity with the inner face of a die 6 carried by a die ring 7 suitably secured in a recess or enlargement formed in the bore at the opposite end of the die block, and beyond the extrusion chamber 2. The ends of the die block bore are closed, when the parts are assembled for operation, by tubular adjusting screws 8 and 9 threaded into the die block and bearing, respectively, against the outer ends of the die 6 and core 5.

In accordance with the present invention, the cylindrical die ring 7 is provided with a longitudinal bore *a*, having its axis inclined vertically to the axis of the outer periphery of the die ring, so that the bore orifice at the tubular adjusting screw 8 end of the die ring 7 is eccentric to the outer periphery of the die ring 7 with its axis below the true axis of die ring 7, while the die ring bore orifice at the end adjacent core 5 presents an opposite eccentricity with the orifice axis above the true axis of die ring 7. The die 6 is provided with a longitudinal extrusion passage 10, the axis of which is coincident with the true axis of the die ring 7, and has its outer periphery *b* formed to fit neatly within the bore *a* of die ring 7, so that the outer periphery *b* of the die 6 presents a longitudinally extending cylindrical surface inclined vertically to the axis of the die. With the die ring 7 and die 6 construction as above described, the operation of the tubular adjusting screw 8 secures movement of the die 6 on an incline providing simultaneous horizontal and vertical movement thereof. Relative rotation between the die 6 and die ring 7 may be prevented by a key *c* secured to the die 6 and a longitudinal keyway *d* in the inner periphery of the die ring 7, the keyway *d* preferably stopping short of the inner face of the die ring to provide a stop *e* for the inward movement of die 6.

In operation, the wire or cable to be covered passes through tubular adjustment screw 9, core 5, die 6, and out through tubular adjustment screw 8, the lead or other coating material being extruded thereon through the space between core 5 and die 6 under pressure of plunger C, with the thickness of the coating determined by the

relative positions of the core 5 and die 6. The core 5 is adjusted through movement of tubular adjustment screw 9 to give approximately the desired thickness of coating desired, and any slight adjustments necessary to correct the thickness of coating at the top and bottom are taken care of by adjusting the die 6 in the die ring 7 through operation of tubular adjusting screw 8.

Due to the fact that the requisite horizontal and vertical adjustments of the die 6 are relatively slight, the angle of inclination of bore *a* in die ring 7 will not be large and may advantageously be substantially eight degrees to the true axis, though this may be varied according to the particular press and its requirements.

This die can be used in any standard lead press and the die blocks in general use may be readily and cheaply fitted to use the die construction of this invention.

It will be understood that modifications may be made within the invention as defined by the claims.

What is claimed is:—

1. In an extrusion press, the combination with a die block and an adjustable core, of a die ring mounted in the die block and having a bore inclined vertically to the axis of the die ring, and an adjustable die having its exterior shaped to fit the die ring bore, whereby the die is adjusted vertically by its longitudinal movement.

2. A die comprising a die ring having a bore inclined vertically to the axis thereof, and an adjustable die having its exterior shaped to fit the die ring bore, whereby the die is adjusted vertically by its longitudinal movement.

3. A die comprising a die ring having a passage therethrough inclined vertically to the axis of the die ring, and an adjustable die having its exterior shaped to fit the die ring passage, whereby the die is adjusted vertically by its longitudinal movement.

4. In an extrusion press, the combination with a die block and an adjustable core, of a die ring fitted in said die block and having a passage therethrough inclined vertically to the axis of the die ring, and an adjustable die having its exterior shaped to fit said die ring passage whereby the die is adjusted vertically by its longitudinal movement.

5. A die comprising a die ring having a bore inclined vertically to the axis thereof, an adjustable die having its exterior shaped to fit the die ring bore, whereby the die is adjusted vertically by its longitudinal movement, and means for preventing relative rotation between the die ring and the die.

6. In an extrusion press, the combination with a die block and an adjustable core, of a die ring mounted in the die block and having a bore inclined vertically to the axis of the die ring, an adjustable die having its exterior shaped to fit the die ring bore, whereby the die is adjusted vertically by its longitudinal movement, and means for preventing relative rotation between the die ring and die.

7. An extrusion press having a die block, an adjustable core in the die block, and a die mounted in said die block and adjustable longitudinally thereof toward and from said core, the die mounting in said block having a longitudinal passage for the die with its die engaging surface inclined vertically to the axis of the die and said die having a surface shaped to fit said inclined surface, whereby a vertical adjustment of the die is secured by the longitudinal movement thereof.

ULYSSES S. GRANT SWARTZ.