May 31, 1927. 1,630,775

H. P. ARKEMA

APPARATUS FOR TREATING DIES

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Fig. 1.

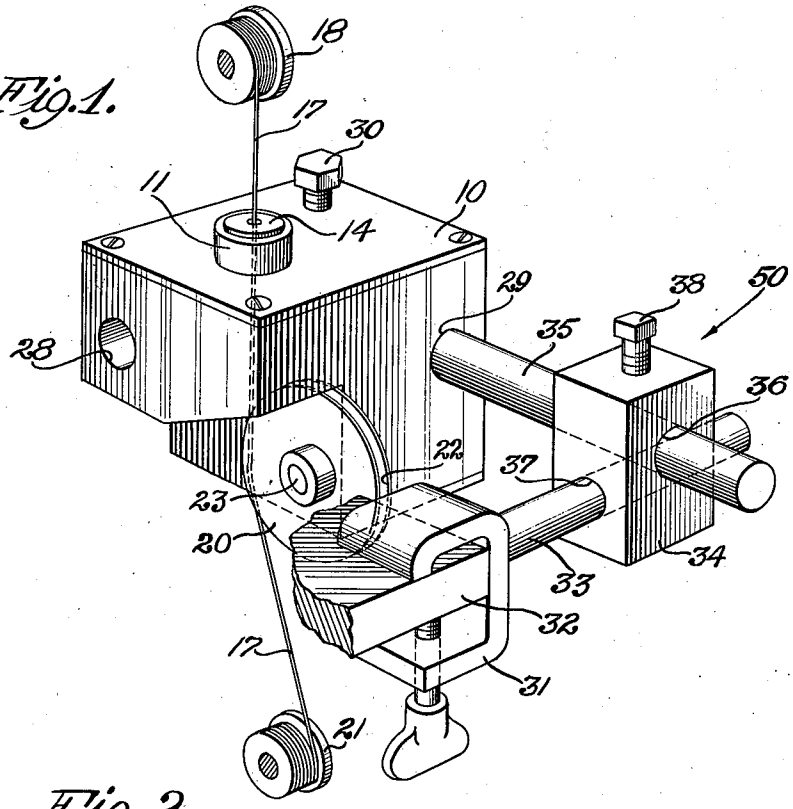

Fig. 2.

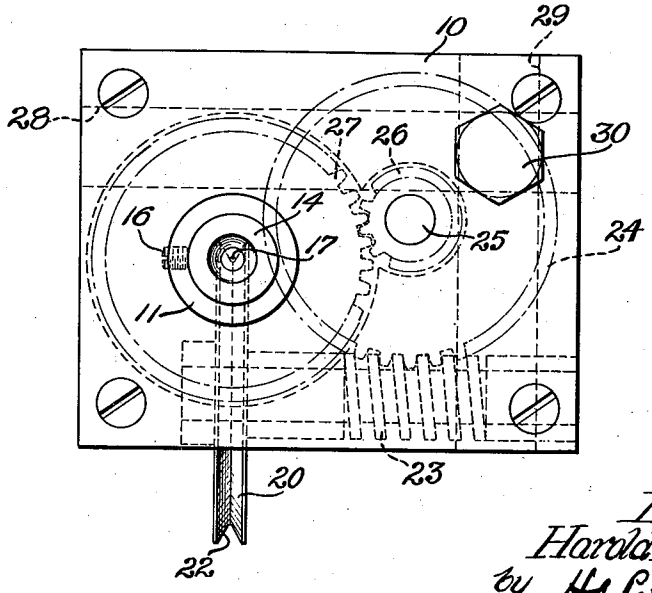

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Fig. 3.

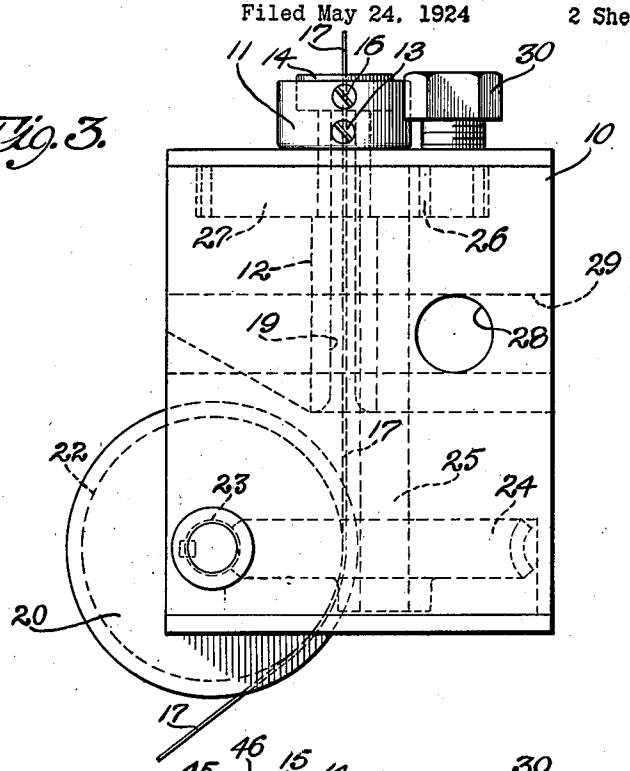

Fig. 4.

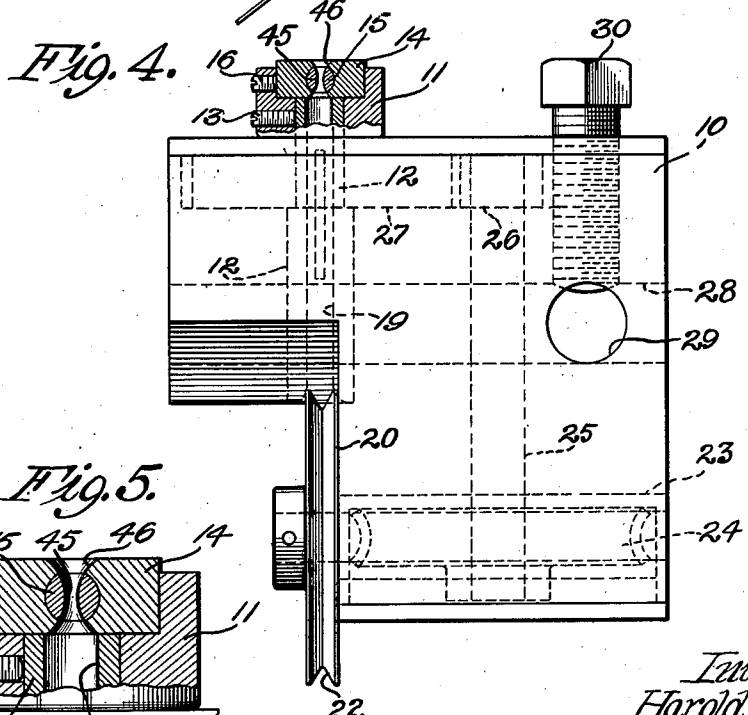

Fig. 5.

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UNITED STATES PATENT OFFICE.

HAROLD PETER ARKEMA, OF CHICAGO, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

APPARATUS FOR TREATING DIES.

Application filed May 24, 1924. Serial No. 715,665.

This invention relates to an apparatus for treating dies, and more particularly to an apparatus for polishing and breaking in diamond dies.

The object of this invention is to provide an improved apparatus for polishing and breaking in diamond dies.

In accordance with the general features of the invention, there is provided a wire supply, a die holder, a take-up reel for drawing a wire from the supply through a die secured in the die holder and means actuated by the wire passing therethrough for rotating the die holder.

Another feature of this invention is the provision of means whereby the die may be rotated in planes at various angles to the axis of the wire passing therethrough.

Other objects and advantages of the invention will more fully appear from the following detailed description taken in connection with the accompanying drawings which illustrate one embodiment thereof and in which,

Fig. 1 is a perspective view of a structure embodying the features of the invention,

Fig. 2 is a plan view of the structure shown in Fig. 1,

Fig. 3 is a side elevation of the structure shown in Fig. 2,

Fig. 4 is a front view partly in section of the structure shown in Fig. 2, and

Fig. 5 is an enlarged detail view of a diamond die and die holder.

It is believed that the improved method for polishing and breaking in dies will be readily understood from the following detailed description of an apparatus by which it may be performed.

Referring now to the drawings in detail in which like reference numerals designate similar parts throughout the several views, 10 denotes a housing or casing which may be of any suitable construction. Positioned on top of the housing 10 is a die holder 11 which is secured by a small screw 13 to a hollow shaft 12 journaled in the housing 10. A die 14, to be treated, having a diamond 15 (Fig. 4), is mounted in the die holder 11 and retained therein by a small screw 16.

A wire 17 is drawn from a supply source 18 (Fig. 1) through the orifice of the die 14 and central bore 19 of shaft 12, to a pulley 20 having a groove 22, by a take-up reel 21, actuated by any suitable means (not shown).

It will be noted that the groove 22 of the pulley 20 is in alignment with the central bore 19 of the shaft 12 and the orifice of the die 14.

The pulley 20 is splined to the end of a worm 23 located in the lower part of housing 10 which meshes with a worm gear 24 secured to one end of shaft 25. Keyed to the other end of shaft 25 is a small pinion 26 which meshes with a gear 27 secured to shaft 12. Contact with the wire 17 causes pulley 20 to rotate which, through worm 23, gear 24, shaft 25, pinion 26 and gear 27, causes the shaft 12 and the die holder 11, secured thereto, to revolve.

Passing through the housing 10 is an aperture 28 which is parallel to the worm 23, and disposed at right angles thereto, is a similar aperture 29 which likewise passes through the housing 10. Suitably located in the upper part of the housing 10 is a set screw 30 which is threaded therein and is adapted to be projected into the intersection of the two apertures 28 and 29.

Associated with the polishing and breaking in structure is a clamping fixture, denoted generally by the reference character 50, which consists of a clamp 31 (Fig. 1), secured to a bench 32, having a shaft 33 formed thereon and on which is rotatably mounted a block 34. Disposed at right angles to the shaft 33 and likewise rotatably mounted in the block 34 is a shaft 35. The shaft 35 passes through an aperture 36 formed in the block 34 and the shaft 33 passes through an aperture 37 formed in the block 34. Each of the apertures has a larger diameter than the associated shaft providing clearance therefor and the apertures are so arranged that the shafts contact with each other within the block 34. A set screw 38, threaded into the block 34 is adapted to frictionally engage the shaft 33 with sufficient pressure so that the shafts 33 and 35 are interlocked and thereby prevented from rotating. The end of shaft 35 is shown inserted into aperture 29 but it is to be understood that it is adapted to be inserted into either of the apertures 28 or 29 and to be retained therein by the set screw 30. It will be noted that by loosening the screw 38 the polishing structure may be turned on either or both of the shafts 33 and 35 thereby resulting in the tilting of the die 14.

The abrasive or polishing action of the

wire 17, as it is drawn through the die 14 over the surface of the orifice thereof (Figs. 4 and 5) results in a relatively uniform polish or finish being applied to the die 14 in a minimum amount of time. Then too, by tilting the polishing and breaking in structure, that is turning it on the shafts 33 and 35, which results in tilting the die 14, not only does the wire 17 passing therethrough polish the land 45 of the die 14 but it also polishes the approach 46 thereof (Fig. 5).

The advantage of polishing and breaking in dies in accordance with the present invention is readily apparent in that due to rotating the die the surface of the orifice of the die is given a fine finish and a much more uniform polish than heretofore. Furthermore, the angle of the plane in which the die 14 revolves with respect to the axis of the wire 17 passing therethrough may be varied by the clamping fixture 50, the operation of which is obvious from the above detailed description, which enables the adjustment of the plane of the approach 46 until it is parallel to the axis of the wire 17 and thereby permitting said approach 46 to be subjected to the abrasive or polishing action of the wire. This is a very important feature in dies, particularly wire drawing diamond dies, because if the approach of the die is not uniformly polished and finished the wire being drawn will be scarred and will not take the required finish and polish.

What is claimed is:

1. In an apparatus for treating dies, means for passing a wire through the orifice of a die and simultaneously rotating the die subjecting the die to the polishing action of the said wire, and means controlled by the wire passing therethrough for controlling the rotation of the said die.

2. In an apparatus for treating dies, a die holder in which a die to be treated is secured, means for drawing a strand therethrough, and means actuated by the strand passing therethrough for rotating the said die holder.

3. In an apparatus for treating dies, a die holder in which a die to be treated is secured, and means for drawing a wire through the orifice thereof subjecting the land and the approach of the die to the polishing action of the said wire, and rotating the die in planes at various angles to the axis of the said wire, the power for rotating and polishing the die being supplied by the said wire passing therethrough.

4. In an apparatus for treating dies, a supply source, a die holder in which a die to be treated is secured, a power driven take-up reel for drawing a wire through the orifice of said die subjecting both the land and the approach of the die to the polishing action of the said wire, and means actuated by the wire passing therethrough for rotating the die and die holder.

5. In an apparatus for treating dies, a supply source, a die holder in which a die to be treated is secured, a power driven take-up reel for drawing a wire from the supply source through the orifice of the said die subjecting both the land and the approach of the die to the abrasive action of the said wire, means actuated by the wire passing therethrough for rotating the die, and means for tilting the die in planes at various angles to the axis of the said wire.

6. In an apparatus for treating dies, a die holder for holding a die to be treated, means for drawing a strand through the orifice of the die, a pulley engaged by the strand, and means operated thereby for rotating the die.

7. In an apparatus for treating dies, a die holder for holding a die to be treated, means for drawing a strand through the orifice of the die, a pulley engaged by the strand, means operated thereby for rotating the die, and means for changing the plane in which the die rotates to subject different portions of the wall of the orifice in the die to the polishing action of the strand.

In witness whereof, I hereunto subscribe my name this 12th day of May A. D., 1924.

HAROLD PETER ARKEMA.