H. BLOUNT.

MECHANISM FOR LAPPING DIAMOND DIES.

APPLICATION FILED APR. 6, 1920.

1,428,209.

Patented Sept. 5, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

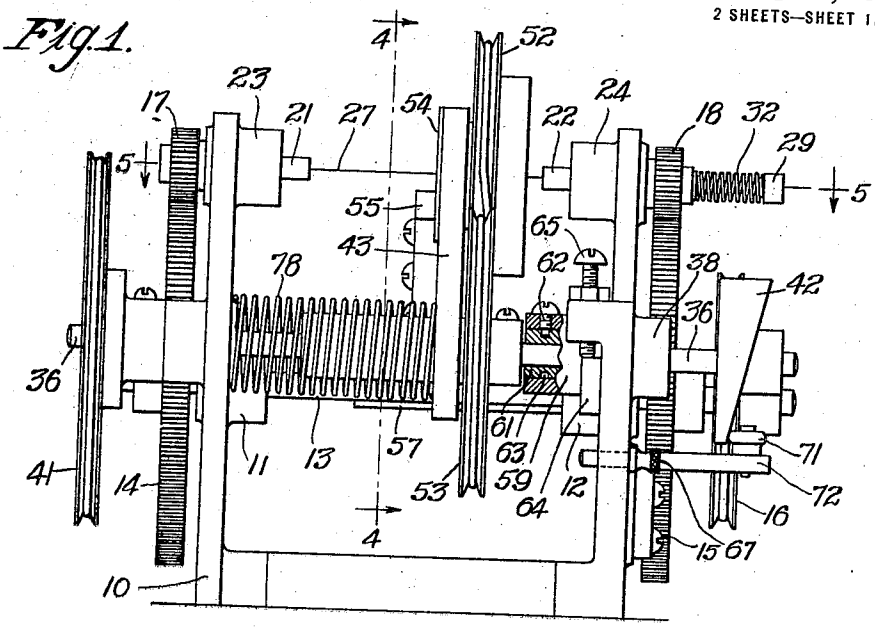
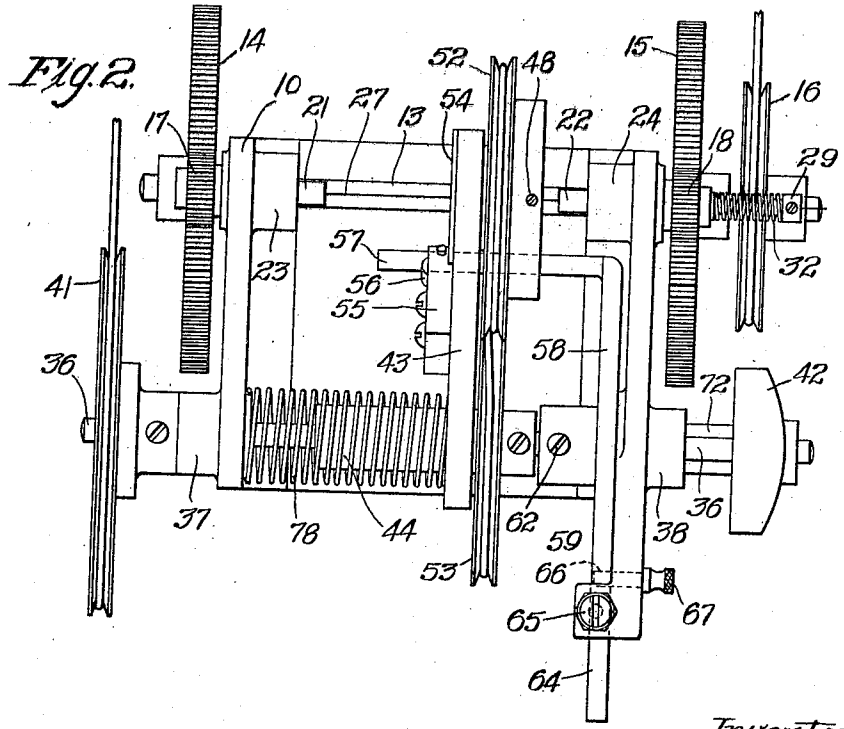


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

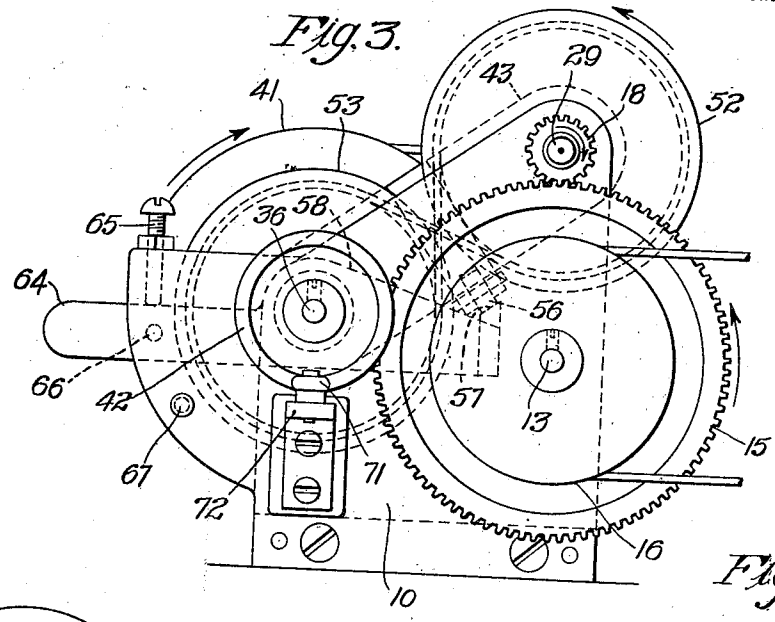


Fig. 6.

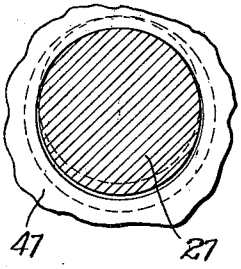


Fig. 4

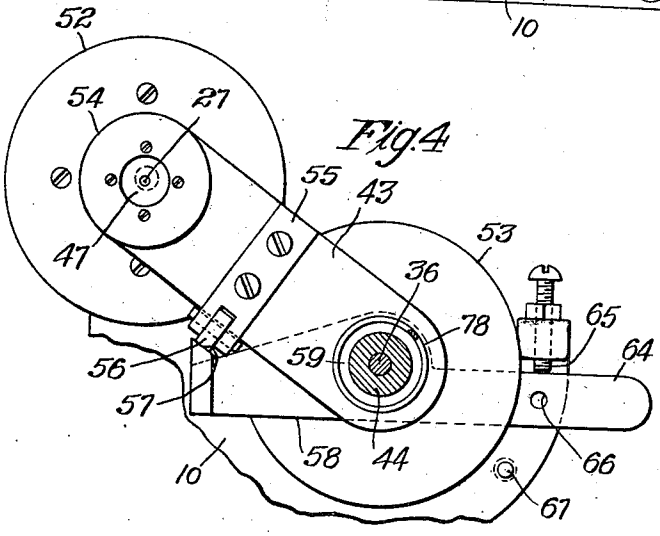
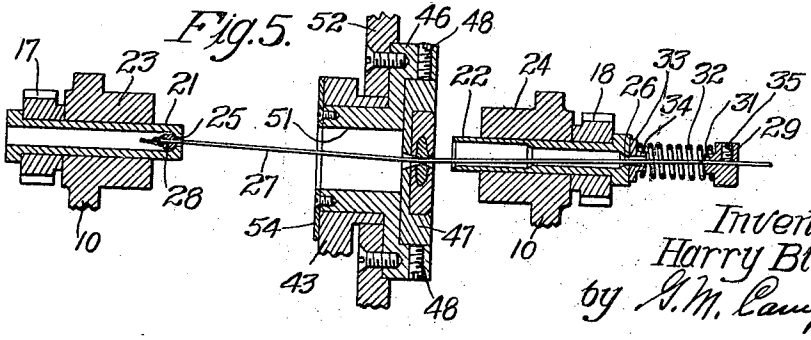


Fig. 5.



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UNITED STATES PATENT OFFICE.

HARRY BLOUNT, OF OAK PARK, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

MECHANISM FOR LAPPING DIAMOND DIES.

Application filed April 6, 1920. Serial No. 371,713.

To all whom it may concern:

Be it known that I, HARRY BLOUNT, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mechanism for Lapping Diamond Dies, of which the following is a full, clear, concise, and exact description.

This invention relates to mechanism for lapping diamond dies for use in wire drawing operations. The object of the invention is to provide a mechanism whereby this lapping operation may be performed efficiently and rapidly.

In accordance with the general features of this invention, provision is made for applying a lateral pressure between a lapping member and the die to be lapped whereby the lapping operation may be speeded up. In the specific embodiment of this invention the holder for the die which is to be lapped is pivotally supported upon a rotatable and reciprocal shaft in such a manner that it may be laterally adjusted with respect to the lapping member which is supported at both ends. Means are provided for adjusting the tension of the lapping member and for equalizing the torsional stress.

Fig. 1 is a front elevation of the complete machine with a section broken away;

Fig. 2 is a plan view thereof;

Fig. 3 is an end view looking from the right hand side of Fig. 1;

Fig. 4 is a fragmentary vertical section taken on the line 4—4 of Fig. 1;

Fig. 5 is an enlarged fragmentary longitudinal section taken on the line 5—5 of Fig. 1, and

Fig. 6 is a greatly enlarged cross-sectional view of the lap shown in relation to the opening in the die at the beginning of a lapping operation, the broken lines showing the size of the opening in the die and position of the lap at the end of an operation.

As shown in the drawings, the operating parts of the machine are supported on a U-shaped frame 10 provided with bearings 11 and 12 which support a shaft 13. The shaft 13 projects through side arms of the frame 10 and has secured thereto on the projecting ends thereof gears 14 and 15. That end of the shaft which carries the gear 15 also carries a driving pulley 16 or any suitable means for driving the shaft 13 from a suitable source of power (not shown). The gears 14 and 15 mesh with pinions 17 and 18 suitably secured to lap supports 21 and 22 which are supported by bearings 23 and 24 in the frame 10 directly above the shaft 13. The lap supports 21 and 22 comprise sleeve like members open at both ends, one end of each being provided with restricted openings 25 and 26 respectively. A lap 27 in the form of music wire carries at one end a block or head 28 which freely passes into the opening in the lap support 21 and against a wall formed by the restricted opening 25. The lap 27 passes through a die holder, hereinafter to be described, into the opening in the lap support 22 and through the restricted opening 26 therein. By driving each lap support at each end of the lap through gears 14 and 15 and pinions 17 and 18 the lap is revolved without causing any torsional strain thereon. The lap also projects outside of the lap support 21 and carries at its end an adjusting block 29 provided with a shouldered portion 31 which supports a compression spring 32. Bearing against the outside end of the lap support 22 is a second block 33 provided with a shouldered portion 34 which receives the opposite end of the spring 32. The purpose of the spring 32 and the adjusting block 29 is to provide means for putting a suitable tension on the lap 27. This is done by compressing the spring 32 by moving the block 29 against it and then turning a set screw 35 located in the block 29 against the lap 27.

A second driving shaft 36 is rotatably and slidably mounted in the frame 10 in bearings 37 and 38 and projects through the side arms thereof. To one end of the shaft 36 is secured a driving pulley 41 or any suitable means for driving it from a suitable source of power (not shown), and upon the opposite end thereof a cam 42. Intermediate the side arms of the frame and rotatable on the shaft 36 is an arm 43 provided with a bearing 44. In a bearing in the end of the arm 43 a chuck 46 is rotatably secured which has secured concentric with its axis a die holder 47 held in place by

a plurality of set screws 48—48. The chuck 46 is provided with an extended sleeve-like portion 51 which rotates freely inside the bearing in the arm 43. Secured to the chuck 46 is a pulley 52 which is driven by a belt from a pulley 53 secured to the drive shaft 36. A disk 54 secured to the chuck 46 secures it and the arm 43 in their relative positions. Secured to a side face of the arm 43 intermediate its ends is a plate 55 carrying a roller 56 which rolls upon an adjustably inclined track 57 which is secured to an arm 58 pivoted on the shaft 36. The arm 58 is provided with a bearing 59 into which extends a bushing 61 secured in the bearing 38. A point on the screw 62 in the bearing 59 projects into a circular groove 63 in the bushing 61 thereby locking the arm 58 from longitudinal movement, but allowing a movement about the shaft 36. The arm 58 is provided with a handle portion 64 which bears against an adjusting screw 65 carried on the frame 10. By varying the adjustment of the screw 65 against the handle 64 the die can be made to bear on the lap with varying pressures. When removing or inserting a die holder, the handle portion 64 is depressed to a position where an opening 66 therein is in line with a locking pin 67 which is then inserted in the opening 66. This movement of the handle 64 raises the other end of the arm 43 upward through the engagement of the roller 56 and the track 57, thereby allowing the removal or insertion of a die holder. One end of a compression spring 78 abutting against the side arm of the frame 10 and its other end against the arm 43 and surrounding the shaft 36 and the bearing 44 of the arm 43 maintains the face of the cam 42 always in contact with a roller 71 mounted on a bracket 72 secured to the frame 10.

The speed of rotation of the die holder can be controlled by varying the diameters of the pulleys 52 and 53. As shown in the drawings, the lap is revolved at high speed relative to the speed of rotation of the die, and also in the opposite direction. The revolving of both the lap and the die holds the lapping compound which is applied to the lap or in the die opening, thereby preventing it from being thrown by centrifugal force to the outside of the die holder with the consequent wastage thereof and its frequent replenishing.

In the lapping of diamond dies by the use of this invention from one size to the next size or to greater sizes, which dies are used particularly for drawing wire to certain sizes, a lap is used which is a trifle smaller in diameter than the size of the die to be lapped. This is clearly illustrated in Fig. 6.

After mounting the die holder in the end of the arm 43 the pin 67 is withdrawn from the opening 66 in the arm 43 which is then allowed to turn about the shaft 36 until the opening in the die is concentric with the axis of the lap holders 21 and 22. The lap 27 is then threaded through the openings in the lap holders and tension is put on it by compressing the spring 32 and setting the adjustable block 29 thereafter. By turning the screw 65 upward the die is allowed to bear on the lap and when the desired pressure thereon is attained the screw 65 is set against the handle 64. Power is then applied to the shafts 13 and 36, and as the shaft 36 revolves, it is reciprocated back and forth due to the cam 42 riding against the roller 71, thereby carrying the die, which is also revolving, through the belt connecting the pulleys 52 and 53 back and forth over the lap. The lap at the same time is revolving at high speed compared to the speed of rotation of the die and in the opposite direction through the gears 14 and 15 secured to the shaft 13 and the pinions 17 and 18 secured to the lap supports 21 and 22.

The lap being supported at both ends and with means provided for applying a suitable pressure on the lap, the opening in the die can be enlarged in much less time than by the use of old methods. Also the reciprocation of the die along the lap prevents the wearing of it in one short place, the wear being distributed evenly along the length of reciprocation and at the same time the lapping medium is carried into the lapping position by the die moving along the lap.

What is claimed is:

1. In a machine for lapping a wire drawing die, a rotatable die holder, a rotatable lapping member, and means for applying lateral pressure between the die and the lapping member.

2. In a mechanism for lapping a wire drawing die, a die holder, a die lapping member, means for giving the lapping member and the die holder a combined rotating and reciprocating motion relative to each other, said reciprocal member moving in a fixed plane and parallel to the axis of the rotatable member, and means for applying a lateral pressure between the die and the lapping member.

3. In a mechanism for lapping a wire drawing die, a rotatable die holder, mechanism for reciprocating and rotating said die holder, a rotatable lapping member supported at both ends, and means for moving the die holder laterally of the lapping member to cause a lateral pressure between the lapping member and the die.

4. In a mechanism for lapping a wire drawing die, a die holder, a rotatable and reciprocating shaft upon which the die holder is pivotally supported for reciprocation, means for transmitting rotatable motion from the shaft to the die holder, a lap-

ping member supported at both ends and extending through the die holder, and adjustable supporting means for the die holder for determining its lateral position with respect to the lapping member.

5. In a mechanism for lapping a wire drawing die, a rotatable die holder, a rotatable lapping member supported at both ends and extending through the die holder, means for adjusting the tension of the lapping member, and means for controlling the lateral pressure between the lapping member and a die in the die holder.

6. In a mechanism for lapping a wire drawing die, a die holder, a flexible lapping member supported at both ends, and means for rotating both ends of said lapping member at the same speed thereby preventing torsional strain thereon.

In witness whereof, I hereunto subscribe my name this 23rd day of March A. D., 1920.

HARRY BLOUNT.