

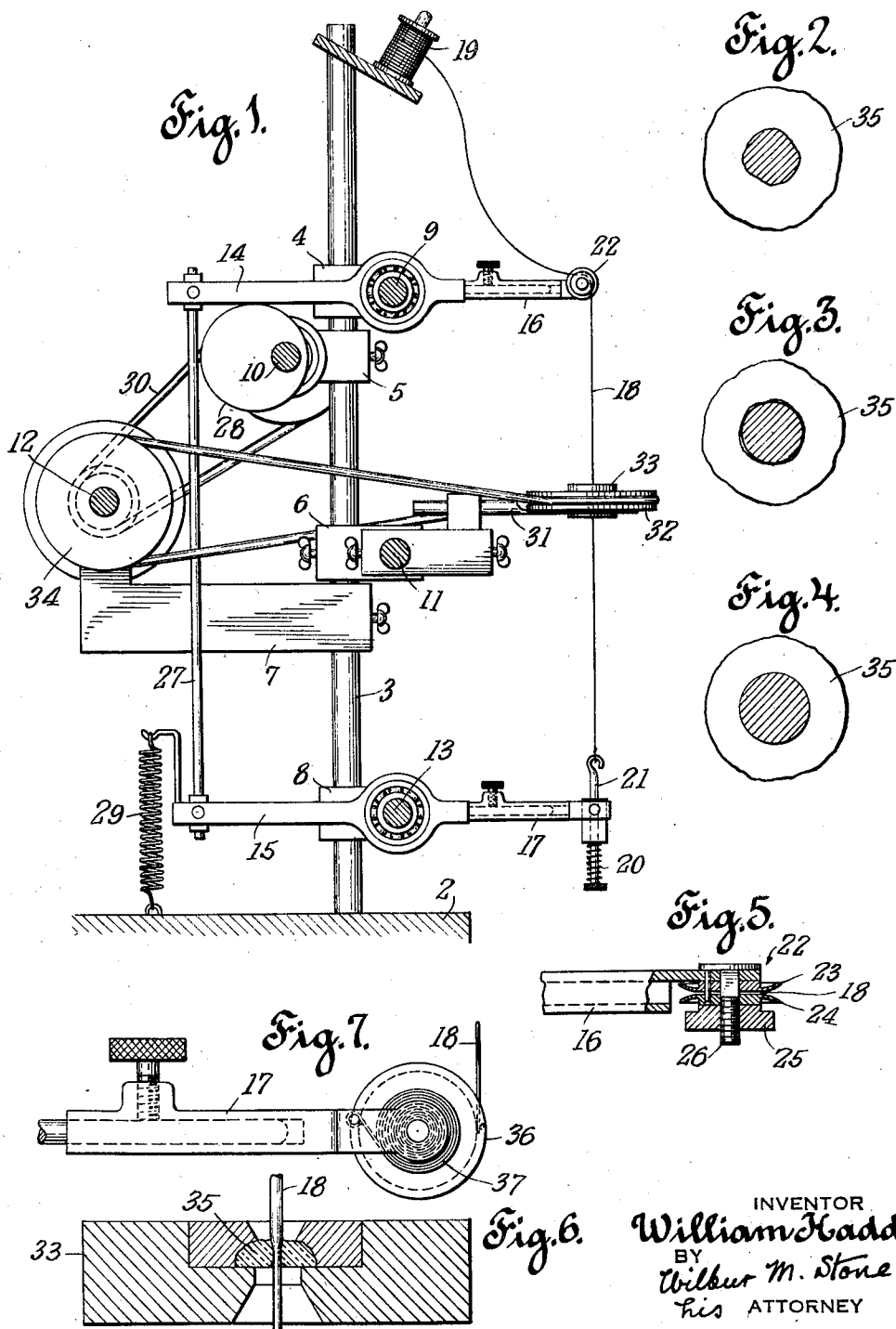
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METHOD FOR LAPPING DIES

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METHOD FOR LAPPING DIES

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This invention relates to methods for lapping dies and has for its object to provide a method whereby speed of operation and accuracy of result is obtained.

5 To these ends one means for carrying out my improved method comprises features illustrated in its present preferred embodiment in the drawing accompanying this specification wherein Figure 1 is a side elevation of a lapping machine. Figs. 2, 3 and 4 are cross-sections through the die in process of being lapped, showing successive steps in my improved method. Fig. 5 is a cross-section of the lapping wire tensioning means. Fig. 6 is a cross-section through the die and its holder and Fig. 7 is a side view illustrating a modified form of lapping wire takeup. The scale of Figs. 5 and 7 is about three times larger than that of Fig. 1. The scale of Fig. 6 is about eight times larger than Fig. 1 and the scale of Figs. 2, 3 and 4 is greatly exaggerated over that of any of the other figures.

The mechanism may be erected upon some convenient base, as 2, and supported on post 3, upstanding from said base, by adjustable brackets 4, 5, 6, 7 and 8, are transverse rods or shafts 9, 10, 11, 12 and 13 respectively. On rods 9 and 13 levers 14, 15 are mounted for oscillation. On the right hand ends of said 30 levers are removably mounted lapping wire carriers 16, 17 respectively. Lapping wire 18 may be supplied from spool 19 pivotally mounted above. Upper wire carrier 16 has at its outer, right-hand, end a tension device 22 of known character, whereby wire 18 is released in its downward movement as pulled by the tension of spring 20 acting upon sliding hook member 21 of lower wire carrier 17. Said tension device may comprise opposite 40 flaring-edged discs 23, 24, between which wire 18 passes and tension may be applied to said wire by nut 25 and screw 26.

The left hand ends of levers 14, 15 are adjustably connected by rod 27 and said levers 45 may be oscillated in unison by eccentric 28

fixed to shaft 10, bearing upon the under side of lever 14 and held to engagement therewith by pull spring 29. Eccentric 28 is driven from a small pulley on shaft 12 by belt 30. Shaft 12 may be driven from some known source of power, not shown.

The die to be lapped by wire 18 may be supported centrally within die-carrying hub 33 of pulley 32 according to known practice and said pulley is supported for rotation in arm 55 31, adjustable universally relatively to rod 11. Pulley 32 is driven from pulley 34 fixed to shaft 12.

In operation, finely powdered abrasive is supplied between the hole in the die and the 60 wire, whereby the wire is charged with the abrasive. Then, as die 35 is rotated, wire 18 is oscillated up and down through the die and, as spring 20 exerts a pull slightly in excess of the resistance of tension device 22, 65 said wire is slowly pulled downward through the die, thus presenting from time to time a fresh portion of wire in contact with the die being lapped. It will be obvious that the total amount of downward feed of wire 18 is 70 limited by the traverse of sliding hook member 21 in wire carrier 17. To provide a greater amount of wire feed, without resetting, the alternate construction of wire carrier 17 shown in Fig. 7 may be employed. 75 Therein, wire may be slowly wound onto drum 36 by the pull of coil spring 27 against the resistance of tension device 22 being slightly in excess of said resistance.

This construction is particularly applicable 80 to machines for lapping diamond dies, having holes therethrough of very small diameter. When such dies are received from the driller, the holes therethrough are usually somewhat rough and out of round, see Fig. 85 2 for instance. A lapping wire which will readily pass through such an out of round hole, will of course, touch only those portions of the wall of the hole which are of minimum radius and the tendency of lapping with such 90

a wire is that the wire slides off from the high spots into the portions of greater radius thus perpetuating the irregularities of the profile of the hole rather than correcting them.

5 By my improved practice I start with a wire of a diameter sufficient to fill the hole in the die or preferably of a diameter slightly in excess of the greatest transverse measurement of the hole in the die. Then I taper the
10 free end of the wire so that said end will pass through the hole in the die where it can be gripped and further drawn through the die. Said free end is then secured to hooked member 21.

15 The irregularly shaped hole of the die is thus entirely filled by the wire which wire takes the shape of said hole, see Fig. 2. Upon rotating the die and reciprocating the wire, said wire is reduced to approximately circular cross-section of a diameter as great as will
20 pass through the die, whereby the high portions (those of least radius) of the die are effectively engaged by said wire and abraded toward a circular contour. As this operation
25 proceeds the wire ceases to be effective because of the enlargement of the hole in the die, and the reduction of the diameter of the lapping wire. This lack of effectiveness is corrected by the downward feed of a fresh
30 portion of the wire into the die, whereby the die is again filled with wire of larger size and the work proceeds until a round hole is produced in the die, see Fig. 4.

My improved method is not only highly
35 efficient for producing dies with round holes but the operation is so expeditious as to result in the lapping of a die in much less time than by any other means or method with which I am familiar.

40 I claim:

1. That improvement in the method of lapping a die having a hole therethrough comprised in supplying to the die, a lapping wire having a diameter sufficient to fill the
45 hole in the die, drawing said wire back and forth through said die and at the same time rotating said die.

2. That improvement in the method of lapping a die having a hole therethrough comprised in supplying to the die, a lapping wire having a diameter in excess of the greatest transverse measurement of the hole through the die, drawing said wire back and forth through said die and at the same time rotating said die.
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3. That improvement in the method of lapping a die having a hole therethrough comprised in supplying to the die, a lapping wire having a diameter sufficient to fill the
60 hole in the die, drawing said wire back and forth through said die and at the same time rotating said die, unused portions of the wire being frequently fed into the die, whereby the die is supplied with wire filling the die.

65 4. That improvement in the method of lap-

ping a die having a hole therethrough comprised in supplying to the die, a lapping wire having a diameter in excess of the greatest transverse measurement of the hole through the die, drawing said wire back and forth through said die and at the same time rotating said die, unused portions of wire being frequently fed into the die, whereby the die is supplied with wire filling the die.

In witness whereof I hereby affix my signature this 2nd day of January, 1929.

WILLIAM HADDOW.

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