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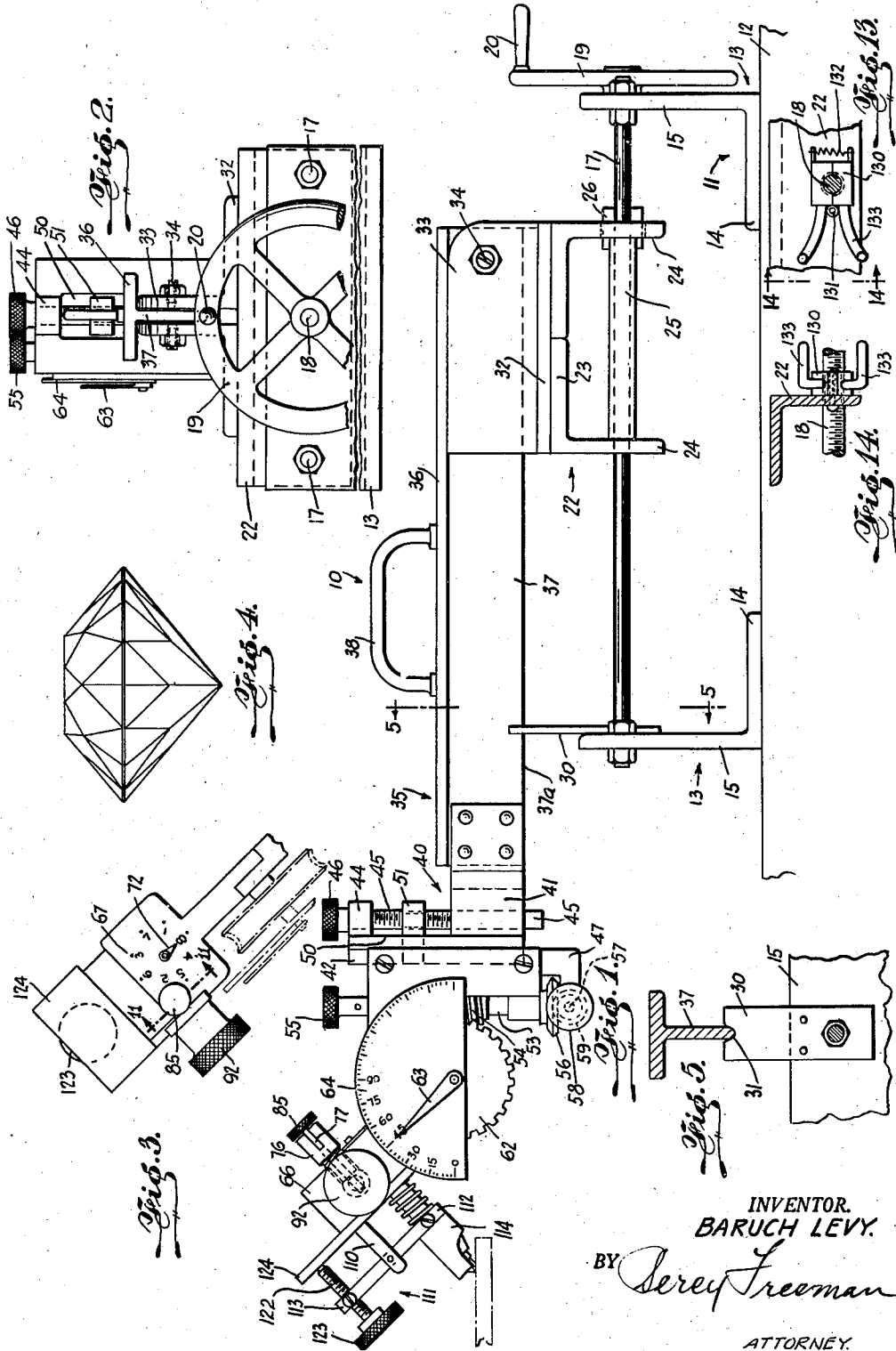
B. LEVY

2,388,751

DIAMOND POLISHING DEVICE

Filed May 12, 1944

2 Sheets-Sheet 1



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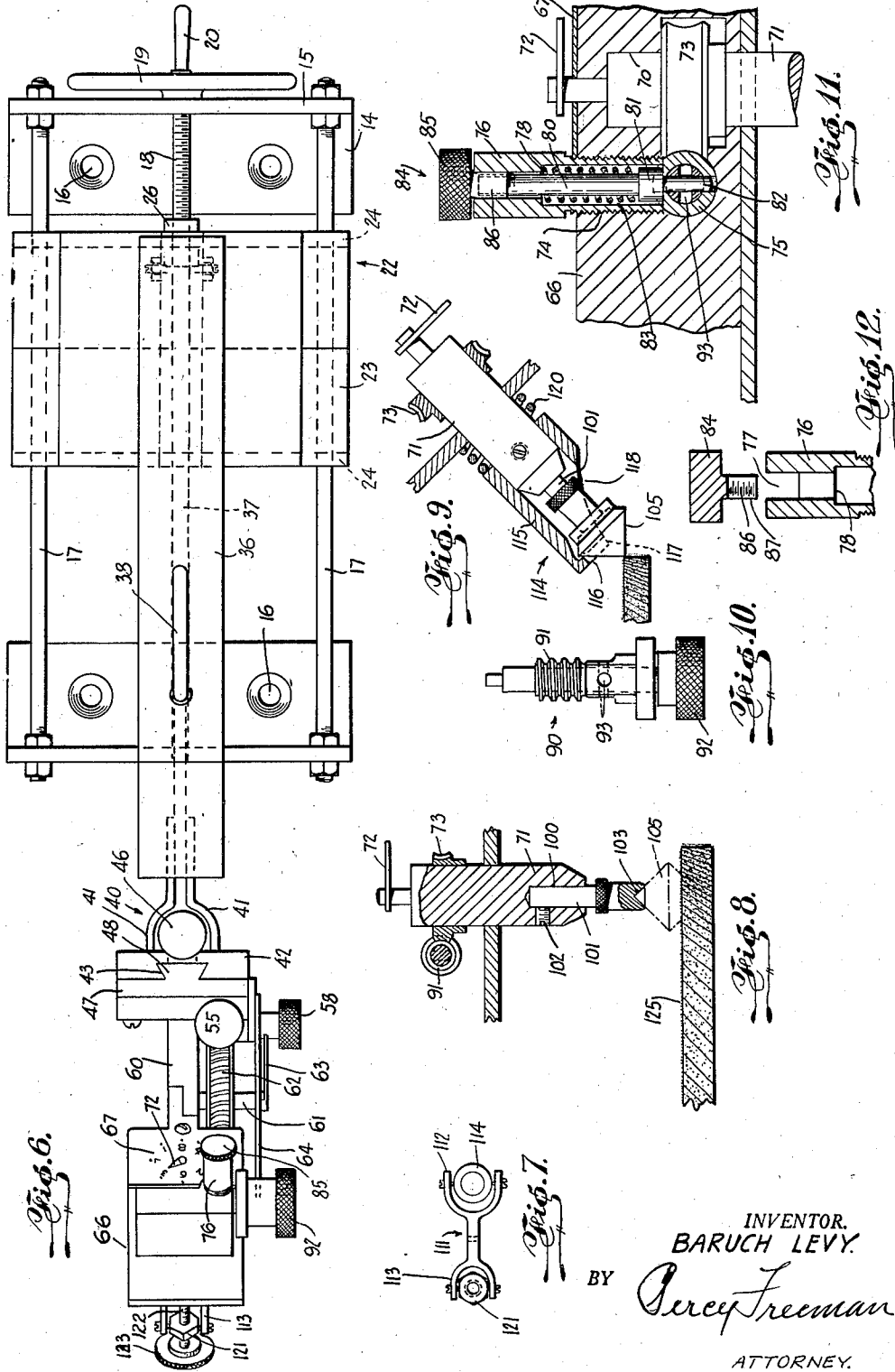
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2 Sheets-Sheet 2



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DIAMOND POLISHING DEVICE

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3 Claims. (Cl. 51—229)

This invention relates to diamond cutting and polishing machines.

An object of this invention is to provide a machine of the character described comprising a base adapted to be fixed to a table, a support slidably mounted thereon, an arm pivoted to the support, a slide adjustable on the arm vertically, a lever pivoted to said slide and adjustable angularly thereon about a horizontal axis, and a diamond on said lever adjustable about its own axis, whereby a diamond held by the diamond holder may be brought to any desired position for cutting or polishing facets thereon.

Another object of this invention is to provide means to regulate the axial rotation of the diamond holder and for measuring the degree of rotation, and for locking the diamond holder at predetermined angularly spaced positions.

Yet another object of this invention is to provide in a machine of the character described a diamond holder comprising a stem having means to center the diamond, and a clamp surrounding the stem and having cutaway portions, and portions adapted to engage a diamond pressed thereagainst by the stem, spring means being provided to normally release the clamp, and screw threaded means being provided to move the clamp in a position for clamping the diamond against the stem.

Another object of this invention is to provide in a machine of the character described a base provided with a longitudinal screw, a support slidably mounted on the base and provided with a pair of half-nuts engaging the screw whereby rotation of the screw will move the support longitudinally of the base for fine adjustment, and said half-nuts being movable out of engagement with respect to the screw to permit rough adjustment of the support relative to the base.

Another object of this invention is to provide a sturdy and compact machine of the character described which shall be relatively inexpensive to manufacture, easy to manipulate and adjust, and which shall yet be practical and efficient to a high degree.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawings, in which is

shown various possible illustrative embodiments of this invention—

Fig. 1 is a front elevational view of a machine embodying the invention.

Fig. 2 is an end view thereof.

Fig. 3 is a top plan view of the diamond holder and lever supporting the stem.

Fig. 4 is a side elevational view of the diamond having facets which may be cut or polished with the machine embodying the invention.

Fig. 5 is a cross-sectional view taken on line 5—5 of Fig. 1.

Fig. 6 is a top plan view of the machine shown in Fig. 1.

Fig. 7 is a top plan view of the lever controlling the clamp for the diamond holder.

Fig. 8 is an elevational cross-sectional view of a diamond holder without the clamp, illustrating the method of polishing or cutting the table of the diamond on an abrasive wheel.

Fig. 9 is an elevational cross-sectional view of the diamond holder showing a diamond clamped in the holder.

Fig. 10 is a side elevational view of the screw for adjusting the diamond holder about its axis.

Fig. 11 is a cross-sectional view taken on line 11—11 of Fig. 3.

Fig. 12 is a cross-sectional detail of the part shown in Fig. 11.

Fig. 13 is an elevational transverse cross-sectional view of the screw on the base for adjusting the support longitudinally and showing a pair of half-nuts to permit quick rough adjustment of the support relative to the base.

Fig. 14 is a cross-sectional view taken on line 14—14 of Fig. 13.

Referring now in detail to the drawings, 10 designates a diamond cutting or polishing machine of the character described. The same comprises a base 11 which may be bolted or otherwise secured to a table or other support 12. The base 11 comprises a pair of parallel angle-shaped members 13 each having a horizontal wall 14 and a vertical wall 15. The horizontal walls have openings 16 for attachment to the support. The vertical walls 15 are interconnected by a pair of parallel horizontal rods or bolts 17.

Journalled on and between the walls 15 is a horizontal screw 18. Fixed to one end of the screw is a hand wheel 19 provided with a handle 20. Slidably mounted on base 11 is a support 22. Said support comprises a channel-shaped member 23 having parallel vertical front and rear walls 24 interconnected by sleeves 25 through which the rods 17 pass. On one of the walls 24

is a nut 26 receiving the threads of screw 18. It will be noted that rotation of wheel 19 will cause support 22 to slidably move on the base.

Fixed to one of the walls 15 is an upwardly extending stop member 30, formed with a central notch 31 at its upper end for the purpose hereinafter appearing. Fixed to the channel-shaped member 23 are angles 32 provided with upstanding parallel flanges 33 carrying horizontal pivot pins 34. Supported between the pivot pins 34 is an arm 35. Said arm 35 may be generally of T-shaped cross-section having a top wall 36 and a vertical rib or web 37. Rib 37 is received within the flanges 33 and has pivoted openings through which the pivot 34 passes. The bottom edge 37a of rib 37 is adapted to rest in notch 31 of stop 30 for maintaining arm 35 in horizontal position. On top wall 36 is a handle 38 to permit the arm to be lifted upwardly for the purpose hereinafter appearing.

Fixed to one end of arm 35 is a bracket 40. Bracket 40 comprises a pair of similar bracket arms 41 attached to opposite sides of web 37. Fixed to the bracket arms 41 is a grooved vertical member 42 having a vertical dovetailed slot or groove 43. At the upper end of member 42 is a collar 44. Journalled in said collar 44 is a vertical screw 45 having a knurled knob 46 at its upper end. Slidably mounted on member 42 is a slide 47 having a dovetailed projection 48 received in the groove 43. Extending from slide 47 through a slot 50 in member 42 is a lug 51 formed with a screw-threaded opening receiving the threads of screw 45. It will now be understood that as knob 46 is turned, slide 47 will be moved up or down depending on the direction of rotation of said knob.

Journalled on member 47 is a vertical worm shaft 53 carrying a worm 54. At the upper end of the worm shaft 53 is a knurled knob 55 for rotating said shaft. At the lower end of said shaft is a bevel gear 56. Also journalled on slide 47 is a horizontal shaft 57 provided with a knob 58 at its outer end and carrying a bevel gear 59 meshing with bevel gear 56. Thus shaft 56 can be rotated either by knob 55 or knob 58.

Slide 47 is provided with an extension 60 carrying a horizontal shaft 61 on which is mounted a worm wheel 62 meshing with worm 54. On shaft 51 is a pointer 63 adapted to cooperate with a substantially semi-circular scale 64 fixed to slide 47. Fixed to shaft 61 is an arm 66 adapted to rotate with worm wheel 62. On top of member 66 is an annular scale 67 for the purpose hereinafter appearing.

Member 66 is formed with a through opening 70 in which is mounted a shaft 71 (Fig. 11). At the upper end of the shaft 71 is a pointer 72 adapted to cooperate with the scale 67. On shaft 70 is a worm wheel 73. Member 66 is formed with a screw-threaded opening 74 and with a through opening 75 disposed at right angles thereto and communicating therewith.

Screwed within the opening 74 is a sleeve 76 formed with a transverse slot 77 at its upper end. Tube or sleeve 76 is formed with an internal shoulder 78. With said tube is a pin 80 having screw threads at its upper end. Pin 80 is formed with an enlarged collar 81 above the lower reduced end 82 thereof. Interposed between collar 81 and shoulder 78 is a coil compression spring 83. Screwed to the upper end of pin 80 is a knob 84. Knob 84 has a knurled portion 85 at its upper end and is formed with a transverse central web 86. The web 86 is formed with a central threaded

opening 87 to be screwed to the threaded upper end portion of pin 80. Thus the pin 80 is first pressed upwardly above the tube 76, member 84 is screwed thereto, and then the web 86 is permitted to enter the slot 77.

The lower end 82 of pin 80 projects into opening 75. Within opening 75 is a member 90. Member 90 has a worm portion 91 meshing with the worm wheel 73. At its upper end, member 90 has a knob 92. Said member furthermore is formed with transverse through openings 93 adapted to receive selectively the lower end 82 of pin 80. Said member 90 is rotatably mounted in opening 75. Upon lifting up member 84 pin 80 is withdrawn from engagement with member 90. Member 90 may then be rotated for rotating shaft 71. The pointer 72 shows the angular position of shaft 71. It will be noted that each time member 84 is raised handle 92 can be turned a little and then the pin 80 is released permitting knob 92 to rotate one-quarter turn until pin 82 is again projected into opening 93. Thus the operator can control rotation of shaft 71 through predetermined equal angles whereby to facilitate grinding, polishing or cutting facets at equal angles around a diamond as will appear hereinafter.

Shaft 71 is formed at its lower end with a socket 100. Inserted into the socket is one end of a stem 101 which may be held in place by a set screw 102, on the shaft. Stem 101 is thus replaceable and stems of various shape and size may be used, each being provided with a differently shaped centering socket 103 to fit the shape of the diamond. In Fig. 9 one shape centering socket is shown, and in Fig. 8 another shape centering socket is illustrated. The diamond 105 is centered within the socket 103.

Means is provided to clamp the diamond against the stem 101. To this end member 66 is provided with a fulcrum member 110 to which is pivoted a lever 111. At one end of lever 111 is a bifurcated arm 112 and at the other end of said lever is a bifurcated arm 113. Bifurcated arms 112 straddle a clamp cup or sleeve 114. Cup 114 comprises a cylindrical portion 115 telescoped on the lower end of shaft 71. Said member 114 is provided with an end wall 116 formed with a central cutout 117. One side of cylindrical wall 115 as well as part of the bottom wall 116 is cut away as at 118 to expose part of the stem and diamond. The bottom wall 116 engages the underside of the diamond and serves as a stop to press the same against the stem 101.

Interposed between sleeve 115 and member 66 is a coil compression spring 120 which normally biases end wall 116 away from the stem to release the diamond.

Means is provided, however, to press end wall 116 against the diamond. To this end the bifurcated arms 113 support a nut 121. Screwed to said nut is a screw stem 122 carrying a knob 123 at one end. Screw 122 presses against the underside of a wall 124 attached to member 66. Rotation of knob 123 in one direction will serve to rotate lever 111 in a clockwise direction looking at Fig. 1 of the drawings, to press the lower end wall 116 of member 114 against the diamond, thus clamping the diamond against the stem. It will be noted that shaft 71 can be rotated for turning the diamond while member 114 remains stationary. It will now be understood that the diamond while clamped can be rotated to various angles for polishing or cutting various surfaces thereof on the grinding or abrasive wheels 125. Further-

more, arm 35 can be lifted up so that the operator can inspect the diamond.

Adjustments which can be obtained are as follows:

The support 22 can be adjusted to the left or right by turning the wheel 19.

The slide 47 can be moved vertically up or down by turning knob 46.

Member 66 can be rotated about a horizontal axis by either turning knob 55 or knob 58.

The shaft 71 may be rotated about its axis by turning knob 92.

The angle of member 66 is designated by scale 64 and pointer 63.

The angle of the diamond with respect to its own axis is designated by pointer 72 of scale 67.

The support 22 may be adjusted for fine adjustment by turning wheel 19.

Means may be provided for permitting rough adjustment of the support 22 relative to the base 11. The structure for carrying out such adjustment is illustrated in Figs. 13 and 14. In said figures there is shown a longitudinal screw 18 and the support 22. Engaging opposite sides of said screw are a pair of half-nuts 130 pivoted together as at 131. The half-nuts are biased together by interconnecting tensioning spring 132. Attached to the half-nuts are handles 133. When the handles are pressed together the half-nuts separate and permit the support 22 to be pushed to the right or left. Upon releasing the half-nuts they will engage screw 18 so that rotation of the handle 19 will finely adjust the position of support 22.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a diamond cutting machine, a member formed with an opening, a shaft rotatably mounted in the opening, a stem fixed to said shaft, means to rotate said shaft about its axis, a

non-rotatable clamp slidably mounted on said shaft and adapted to press a diamond within said clamp against said stem, said clamp comprising a cylindrical wall and an end wall, said end wall being formed with a central opening, said end wall and cylindrical wall being formed with a cut-away portion, said end wall being adapted to engage the underside of a diamond to press the diamond against the stem, said stem being provided with a centering socket adapted to receive a portion of said diamond, a lever pivoted to said member and having an arm engaging said clamp, said lever having a second arm supporting a nut, and a screw screwed to said nut and engaging said member for rotating said lever for moving the clamp relative to the shaft.

2. In a diamond cutting machine, a member formed with an opening, a shaft rotatably mounted in the opening, a stem fixed to said shaft, means to rotate said shaft about its axis, a non-rotatable clamp slidably mounted on said shaft and adapted to press a diamond within said clamp against said stem, said clamp comprising a cylindrical wall and an end wall, said end wall being formed with a central opening, said end wall and cylindrical wall being formed with a cutaway portion, said end wall being adapted to engage the underside of a diamond to press the diamond against the stem, said stem being provided with a centering socket adapted to receive a portion of said diamond, a lever pivoted to said member and having an arm engaging said clamp, said lever having a second arm supporting a nut, and a screw screwed to said nut and engaging said member for rotating said lever for moving the clamp relative to the shaft, and means to bias the clamp away from said member to move the end wall of said clamp away from the stem for releasing a clamped diamond for rotation.

3. In a diamond cutting machine, a base, a screw on said base, a handle on the screw for rotating the same, a support slidably mounted on the base screwed thereto, means on the support engaging the screw on the base, an arm pivoted to said support, said arm having an outwardly extending web, and a stop on said base formed with a notch to receive said web, and a diamond holder mounted on said arm, said screw-threaded means on the support comprising a pair of separable half-nuts engaging the screw on said base.

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