

E. LOESSER.  
 APPARATUS FOR GRINDING AND POLISHING PRECIOUS STONES.  
 APPLICATION FILED FEB. 14, 1913.

1,094,914.

Patented Apr. 28, 1914.

2 SHEETS—SHEET 1.

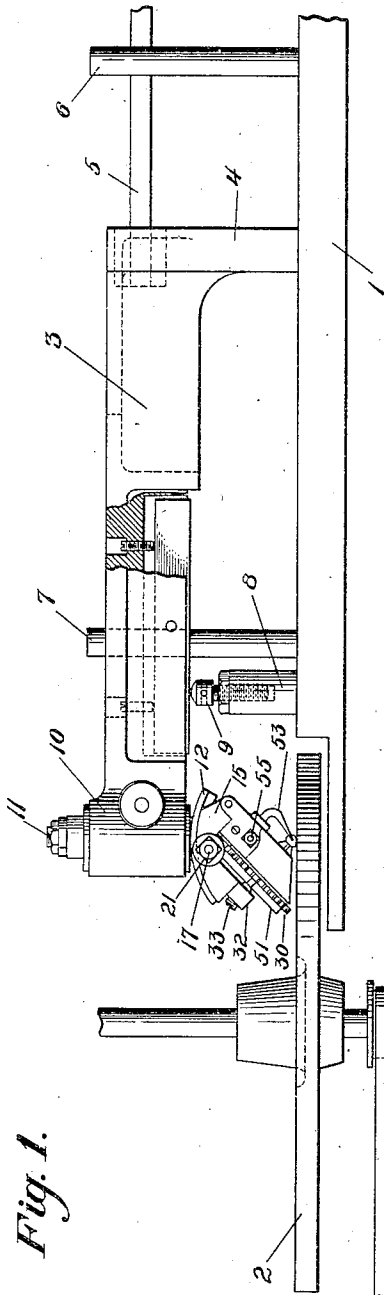


Fig. 1.

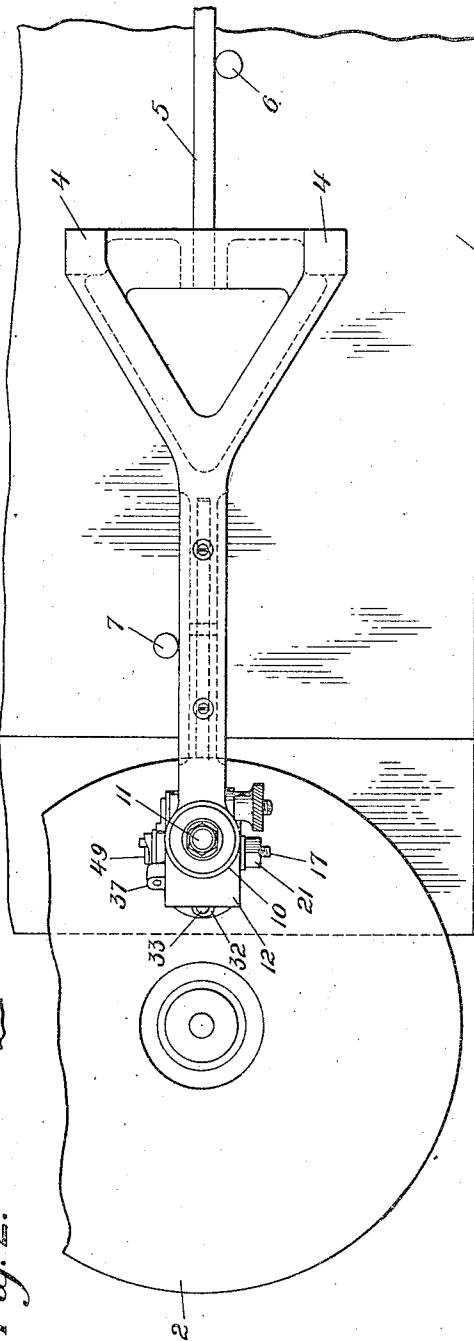


Fig. 2.

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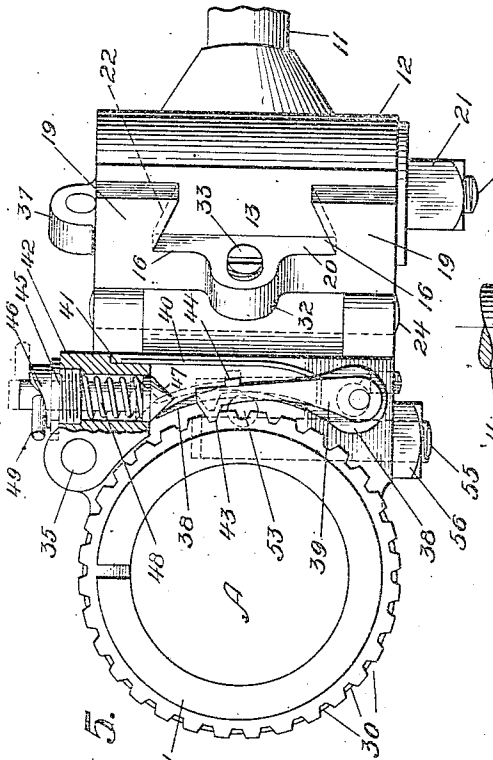


Fig. 5.

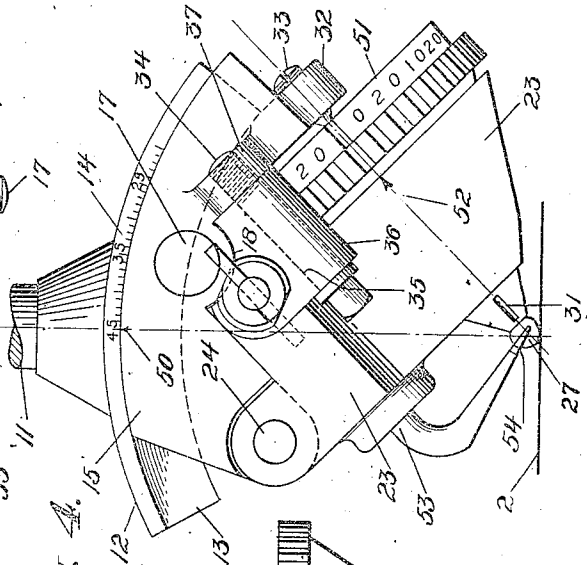


Fig. 4.

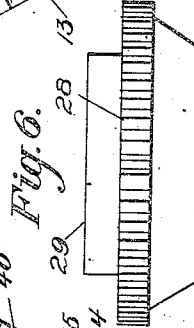


Fig. 6.

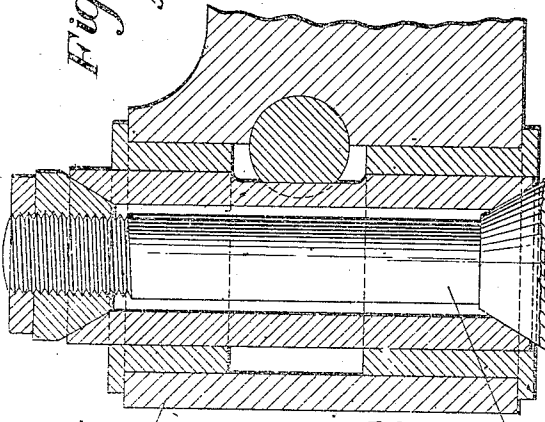


Fig. 3.

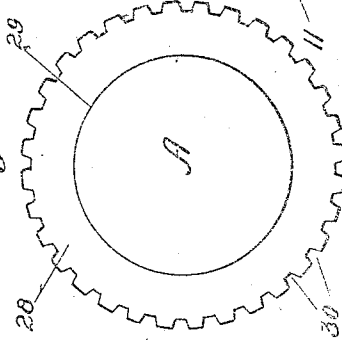
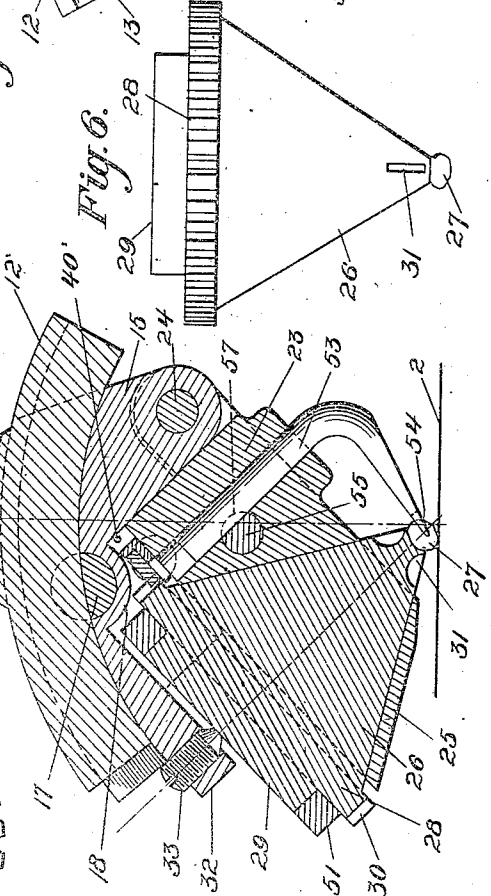


Fig. 7.



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# UNITED STATES PATENT OFFICE.

ERNEST LOESSER, OF GLEN RIDGE, NEW JERSEY, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO NEW DIAMOND POLISHING TOOL COMPANY OF AMERICA, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## APPARATUS FOR GRINDING AND POLISHING PRECIOUS STONES.

1,094,914.

Specification of Letters Patent.

Patented Apr. 28, 1914.

Application filed February 14, 1913. Serial No. 748,325.

*To all whom it may concern:*

Be it known that I, ERNEST LOESSER, a citizen of the United States of America, residing in Glen Ridge, county of Essex, State of New Jersey, have invented a certain new and useful Improvement in Apparatus for Grinding and Polishing Precious Stones, of which the following is a specification.

In apparatus constructed in accordance with this invention there is a dop holder adapted to be carried in an ordinary hand stock or tongue that stands upon the table of the machine when the stone is being ground upon the lap. This dop holder, has a dop receptacle open at top and bottom and interiorly a seat adapted to receive a dop in the end of which the stone to be ground is set, and at its head a circle of recesses. By preference, the dop receptacle has a conical dop seat and the dop is of corresponding shape so as to fit accurately and be rotatable on said seat. The recesses afford a means of adjustment by rotation and the angle of the dop holder, and consequently of the contained dop, is also made adjustable. In practice the dop is formed, by a molding operation, of metal of suitable composition in the apex end of which the stone to be polished is set by the casting operation and the upper end or head of the dop produced by the same casting operation is formed with a projecting circular flange in which at one operation, by means of a suitable cutting tool, equally spaced recesses are cut.

In the accompanying drawings, which show this invention in a form which experience has demonstrated it to be practical and efficient,—Figure 1 is a side elevation: Fig. 2, a plan view: Fig. 3, a vertical section on an enlarged scale: Fig. 4, a side elevation: Fig. 5, a plan view showing the dop holder opened to receive a dop: Fig. 6, a side elevation of a dop with a stone in the apex end: and Fig. 7, a plan view of the dop.

1 indicates a portion of the table of a diamond polishing machine and 2, the ordinary lap.

3 is the removable stock or tongue at the outer end of which are two posts 4, 4, that rest upon the table and a horizontally project-

ing rod 5 that is held against lateral displacement by a pin 6 extending up vertically from the table. Adjacent the lap there is another pin 7 fixed vertically in the table and serving to support the frame against displacement in opposite direction. Also, adjacent the lap there is a post having an adjustable screw head 9 that forms a stop which, as is generally understood, limits the descent of the inner end of the frame 3 and so limits the grinding action of the lap upon a stone. The part of the frame overlying the lap is formed with a head having a vertical bore in which is secured, in the manner shown or otherwise, a spindle 11. This spindle is circumferentially adjustable and its axis is vertical to the horizontal plane in which the polishing face of the lap rotates. On the lower end of the spindle is an arc piece 12 having formed in its under face an arc-shaped dove-tail way 13 and on one of its side edges an appropriate scale 14.

The dop holder is carried adjustably upon the arc member 12, 13. The dop holder comprises a curved portion 15 that is circumferentially formed with a dove-tail way 16 corresponding to and fitting upon the dove-tail way 13 upon which it is adjustable and upon which it may be rigidly fixed when adjusted. The manner of setting or locking the arc-shaped member 15 of the dop holder upon the spindle head 12, 13 may assume a variety of forms. In the present instance the locking means is in the form of a bolt 17 that occupies a bore formed in a circular boss 18 and in the under-cut sides of the way of the member 15. Intermediate its ends the bolt is cut away so as to be flush with the curved face of the floor 20 of the dove-tail way in the dop holding member 15. To one end of the bolt is applied a nut 21 and the shoulder at the other end is cut away to fit the under-cut side 22 of the rib forming the way 13 of the part 12. When the nut is screwed up there is an accompanying end-wise movement of the bolt that results in clamping the member 15 firmly in any position in which it may be set. The other member or half 23 of the dop holder is hinged to one end of the part 15 by a

hinge-pin 24. The outer portion of part 23 is formed with a conical dop seat or receptacle 25 in which fits the correspondingly shaped dop 26, the apex end of which projects beyond the seat and has secured therein a gem 27. The head of the dop has cast with it an annular flange 28 and above it a table 29. By the aid of an appropriate cutting tool equally spaced recesses 30 may be cut in the flange. The number of such recesses will, of course, depend on the series of facets to be produced upon the stone. In the case of diamonds an appropriate number of recesses is thirty-two. In the sides of the dop at the apex end are recesses 31, there being four such, equally spaced, that afford opportunity for inspection of the upper portion of the gem adjacent the girdle. On the end of dop holder part 15 there is formed a projection 32 that has in it a tapped aperture, the axis of which is co-incident with the axis of the conical dop seat, and in this aperture is a clamp screw 33 with a pointed end by manipulation of which pressure may be exerted upon the dop in line with its axis to seat it and hold it accurately in the dop seat. The dop holder 15, 23, is held firmly closed by a screw bolt 34 passing freely through an aperture 35 in an enlargement 36 at one side of the part 23 and screwing into a threaded co-incident aperture in an enlargement 37 on the part 15. The dop is thus held firmly although susceptible, under suitable stress, of partial rotation in the holder.

It will be seen from Figs. 3 and 4 that the axis of the dop is forty-five degrees from the vertical axis of spindle 11. The stone is located at the angle or point of intersection of such two axes and such point is the center of the arc in which the dop holder is adjustable upon the head of the spindle 11. In all adjustments the stone is there held at the center of such arc of adjustment, *i. e.* it is always intersected by the axis of the spindle. The recesses 30 constitute means by which different regulated or determined increments of rotation may be given to the dop to meet the requirements respecting the facets to be formed upon the gem. A means for freeing the dop for such rotation and then positively locking it is highly desirable if not essential and such means may be as follows. Hinged upon the face of the part 23 to the rear or inside of the dop seat is a lever 38 and also upon the same axis a locking pawl 39. A plate or wire spring 40 is attached to the pawl and at the other end is held in a recess 41 in the face of a projection 42 on the member 23. The detent pawl is formed with a nose 43 adapted to engage the recesses 30. The lever 38 extends beyond the end of the pawl into operative engagement with a plunger

cam and has formed on its upper edge a lip or hook 44 that overlies the upper edge of the pawl.

The plunger cam is constructed as follows. In the projection 42 is a bore, the axis of which is at right angles to the axis of the dop seat. It is enlarged and threaded at its outer end and receives a threaded bushing 45, having exteriorly a circular cam 46. Passing through this bushing is a spindle having a conical head 47 that operates upon the end of the lever 38. Between the head and the bushing a coiled reaction spring 48 surrounds the spindle and on the latter, outside of or beyond the bushing, is a transverse pin 49. When the spindle is rotated by means of the pin 49 the latter rides up on the cam way 46 and the conical head of the spindle is withdrawn permitting the spring to lift the pawl 39 and with it the lever 38 thereby withdrawing the pawl from one of the recesses in the head of the dop. When, however, the pin 49 passes the high point of the cam, spring 48 moves the headed spindle inwardly and forces the lever and with it the pawl toward the dop to positively engage a recess therein.

On the upper member 15 there is an index point 50 that cooperates with the scale 14 on the arcuate head 12 of the spindle 11, which latter is rotatably adjustable. This affords a guide for accurate adjustment of the dop with respect to presentation of the gem to the lap in the required or most advantageous relation thereto. Surrounding the table 29 of the dop, there is a separate ring 51 shown as a split ring frictionally embracing the table. On this ring there is an arrangement of numbers or other indicia respectively disposed opposite recesses in the flange of the dop head. In the present instance, these indicia are shown as a series of numbers. On the side of the part 23 of the dop holder there is an index point 52 which stands immediately opposite a recess 30. This affords a means for accurately determining the position of the stone with respect to the initial and subsequent cuts of the lap.

Different stones require different handling to produce the best results because stones vary in grain and shape. The various adjustments above referred to enable an expert to determine the setting of the stone in the dop and thereafter examine it and adjust the dop in the holder and the latter to the lap in such way that the first and therefore the succeeding consecutive cuts will be made to the best advantage for any particular stone.

On the face of the table 29 of the dop there is placed an identifying number or a series of numbers or a particular relation of numbers or other characters that serve to indicate the particular lot of stones from which that in the dop has been taken. The drawings show this identifying character as indi-

cated in an arbitrary way by the letter A. This identifying mark may be conveniently impressed into the face of the table of the dop by means of a suitable die.

5 In diamond grinding and polishing apparatus means of supporting that part of the stone projecting beyond the dop have been employed. Such a device is shown in the drawing. It comprises a rod 53 having a gem supporting foot at right angles thereto. This foot is flattened and may be bifurcated at the end to form a claw 54 that embraces the sides of the stone. It may, however, be flat and engage the bottom of the stone. Both forms are well known. The rod 53 is seated in a bore in the dop holder part 23 in rear of the dop seat and parallel with the axis thereof and the rod is secured in adjusted position or released to disengage the claw from the stone by means of a clamp rod 55 seated in a transverse bore in the part 23 and having a clamp nut 56 upon its threaded projecting end. This rod is formed with a circular transverse recess 57 in which rod 53 lies. When nut 56 is loosened, the rod 53 is loose in its socket and may be adjusted or withdrawn. When, however, the nut is tightened up, endwise stress on rod 55 clamps the rod 53 in position.

30 I claim:

1. Diamond grinding and polishing apparatus comprising a dop holder, a dop therein rotatably adjustable and whose axis is at an angle to a vertical line and means for adjusting the holder in an arc of which the stone in the dop is the center or substantially so.

2. Diamond grinding and polishing apparatus comprising a dop holder, a dop therein rotatably adjustable and whose axis is at an angle to a vertical line, means for adjusting the holder in an arc of which the stone in the dop is the center or substantially so and means for adjusting the holder about a vertical axis that passes through the stone in the dop.

3. Diamond grinding and polishing apparatus comprising a dop holder, a dop therein rotatably adjustable and whose axis is at an angle to a vertical line and means for adjusting the holder in a vertical plane in an arc of which the stone in the dop is the center or substantially so.

4. Diamond grinding and polishing apparatus comprising a dop holder having a conical seat open at both ends and the axis of which is at an angle to a vertical line, a conical dop seated in such seat and projecting therefrom at its apex end, a circular series of recesses in the head of the dop, locking and releasing means cooperating with said recesses and means for adjusting the dop holder and dop in an arc of which the center is the point of intersection of lines coincident with the conical sides of the dop.

5. Diamond grinding and polishing apparatus comprising the combination of a vertical rotatably adjustable spindle, an arc shaped way carried at the lower end thereof, a dop holder the axis of which is disposed at an angle that intersects the axis of the spindle which point of intersection is the center of the arc-shaped guide way or substantially so.

6. Diamond grinding and polishing apparatus comprising the combination of a vertical rotatably adjustable spindle, an arc-shaped way carried at the lower end thereof, a dop holder having a conical or tapered dop seat the axis of which is disposed at an angle that intersects the axis of the spindle which point of intersection is the center of the arc-shaped guide way or substantially so.

7. Diamond grinding and polishing apparatus comprising the combination of a vertical rotatably adjustable spindle, an arc-shaped way carried at the lower end thereof, a dop holder having a conical or tapered dop seat the axis of which is disposed at an angle that intersects the axis of the spindle which point of intersection is the center of the arc-shaped guide way or substantially so, a dop having a corresponding tapered formation to fit said seat and means whereby the dop may be rotatably adjusted in the seat.

8. Diamond grinding and polishing apparatus comprising a rotatably adjustable dop in the apex end of which the stone is placed, a separate ring held at the head of the dop and having thereon characters affording indications of the manner in which the dop is to be rotatably adjusted, a dop holder in which said dop is seated whose axis is at an angle to a vertical line and which is provided with means for locking and releasing the dop for adjustment and means for adjusting the holder in a vertical plane in an arc.

9. Diamond grinding and polishing apparatus comprising a rotatably adjustable dop in the apex end of which the stone is placed, a separate ring held at the head of the dop and having thereon characters affording indications of the manner in which the dop is to be rotatably adjusted, a dop holder in which said dop is seated whose axis is at an angle to a vertical line and which is provided with means for locking and releasing the dop for adjustment, means for adjusting the holder in a vertical plane in an arc and means for adjusting the holder about a vertical axis the center of which is the point of intersection of said axis and the axis of the dop.

10. Diamond grinding and polishing apparatus comprising a dop holder having a main body part and a part hinged thereto, the hinged part having in it a dop seat whose axis is disposed at an angle to a ver-

tical line, means whereby when the two parts are closed one against the other the dop is held in said seat, said main body part being formed with an arc-shaped way, and  
5 a dop holder support having a corresponding arc-shaped way upon which the main body part of the holder is adjustable.

In testimony whereof, I have hereunto subscribed my name.

ERNEST LOESSER.

Witnesses:

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H. DE MOYA.