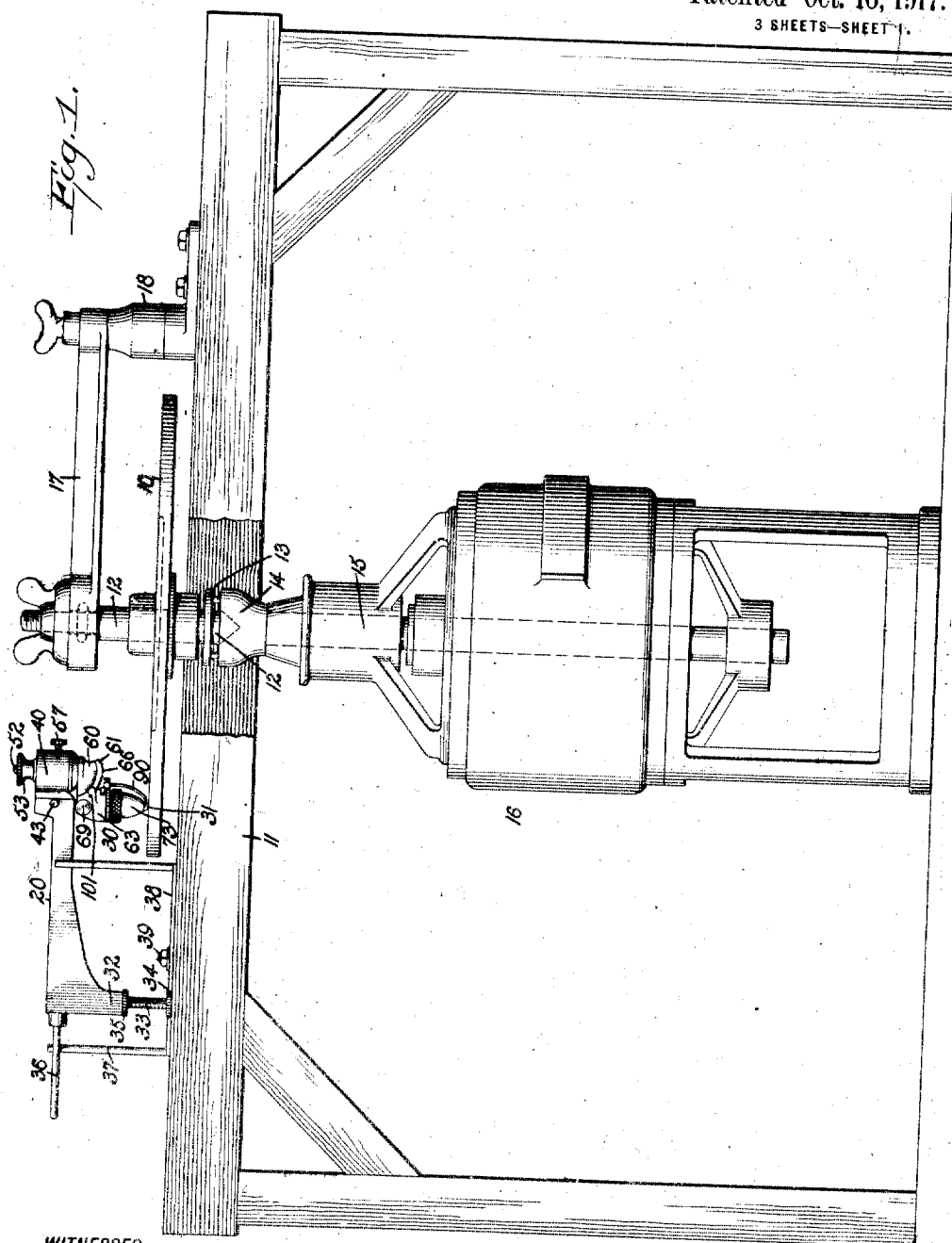


H. DE VRIES & W. A. DONALDSON.
 APPARATUS FOR GRINDING OR POLISHING PRECIOUS STONES.
 APPLICATION FILED APR. 25, 1917.

1,243,491.

Patented Oct. 16, 1917.

3 SHEETS—SHEET 1.



WITNESSES

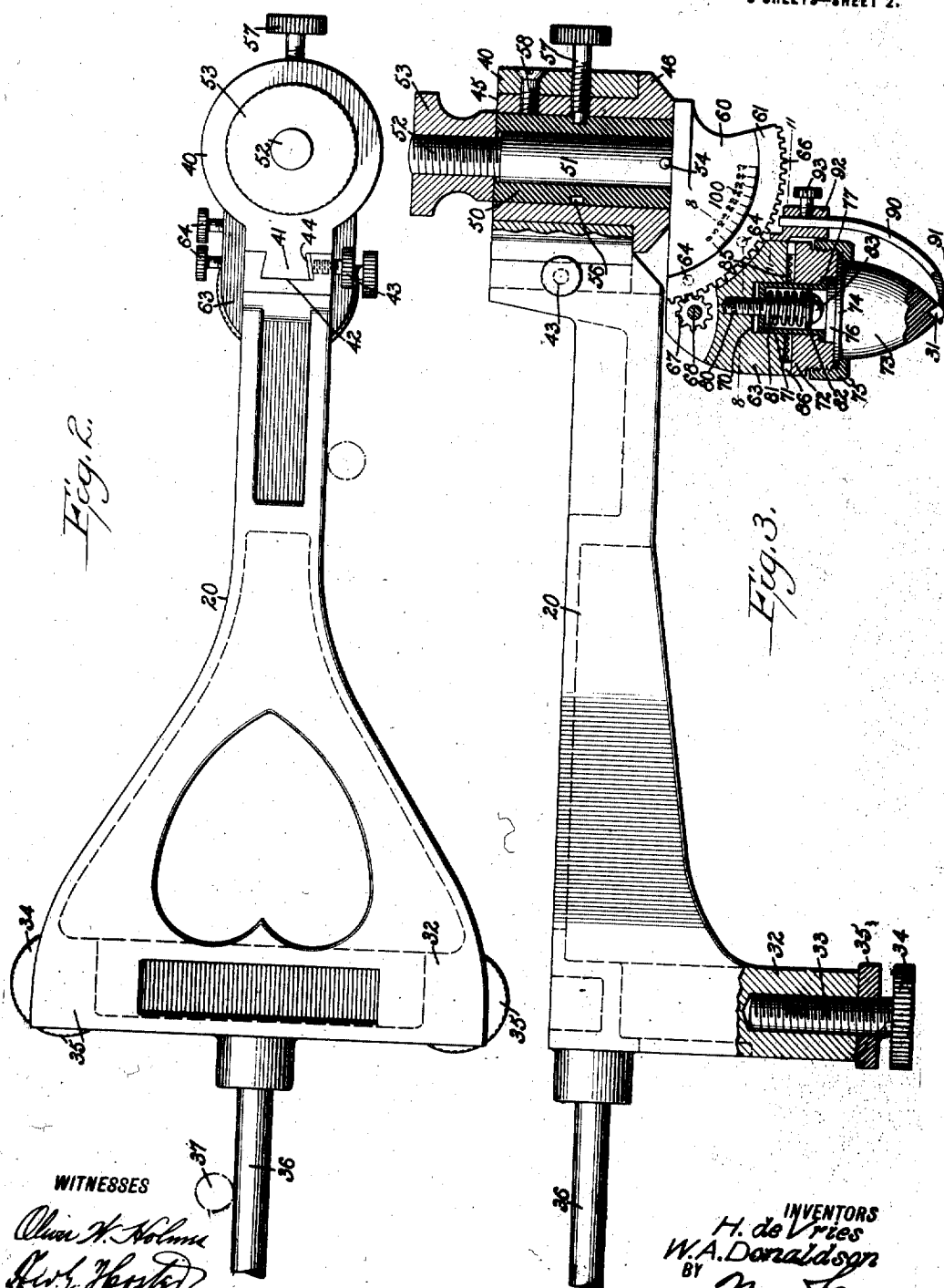
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Fig. 5.

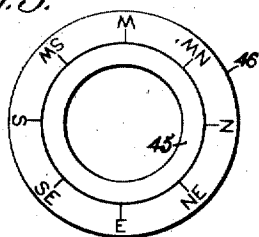
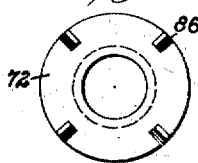


Fig. 9.



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Fig. 6.

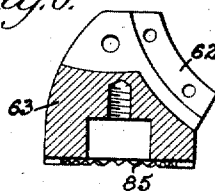


Fig. 7

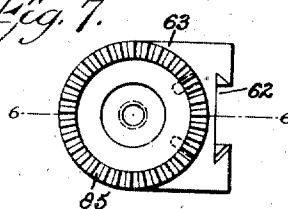


Fig. 8.

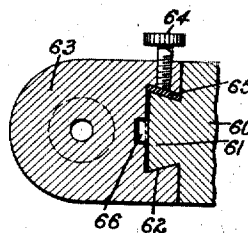


Fig. 10.

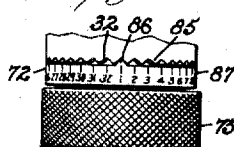


Fig. 12.

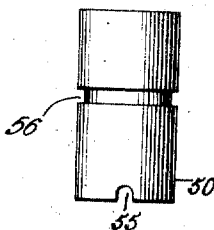
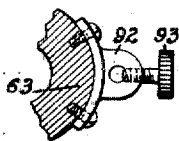


Fig. 11.



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UNITED STATES PATENT OFFICE.

HARRY DE VRIES, OF NEWARK, NEW JERSEY, AND WILLIAM A. DONALDSON, OF
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APPARATUS FOR GRINDING OR POLISHING PRECIOUS STONES.

1,243,491.

Specification of Letters Patent.

Patented Oct. 16, 1917.

Application filed April 25, 1917. Serial No. 164,394.

To all whom it may concern:

Be it known that I, HARRY DE VRIES, a subject of the Queen of the Netherlands, and a resident of Newark, in the county of Essex and State of New Jersey, and WILLIAM ARTHUR DONALDSON, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Apparatus for Grinding or Polishing Precious Stones, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved apparatus for grinding or polishing diamonds and other precious stones, and arranged to enable the workman to correctly set the dop with a view to grind or polish the facets of the precious stone both as to number and the desired angle.

In order to produce the desired result, use is made of a dop-holding device, and means for adjusting said dop-holding device in an arc with the center of the stone held by the dop-holding device located outside of the arc. Use is also made of a spindle, a sector held on the lower end of the spindle and having its center in the axis of the spindle above the sector, a carrier adjustably held on the said sector and extending outward therefrom, a dop holder rotatably mounted on the said carrier and a dop held on the said carrier and adapted to carry the precious stone to be ground or polished.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the apparatus for grinding or polishing precious stones, part of the table being shown broken out;

Fig. 2 is an enlarged plan view of the frame carrying the dop-holding device;

Fig. 3 is a sectional side elevation of the same with a portion of the frame shown in elevation;

Fig. 4 is an enlarged front elevation of the same;

Fig. 5 is an inverted plan view of the bearing for the sector spindle;

Fig. 6 is a sectional side elevation of the carrier of the dop-holding device, the section being on the line 6—6 of Fig. 7;

Fig. 7 is an inverted plan view of the same;

Fig. 8 is a sectional plan view of the carrier in position on the sector, the section being on the line 8—8 of Fig. 3;

Fig. 9 is a plan view of the dop holder;

Fig. 10 is a side elevation of the dop holder and part of the carrier;

Fig. 11 is a sectional plan view of a portion of the carrier with the bracket for holding the stone support; and

Fig. 12 is a side elevation of the bushing for the spindle.

The lap 10 is arranged a short distance above a table 11 and its vertically disposed shaft 12 is connected by a suitable coupling 13 with the head 14 of a motor shaft 15 of a motor 16 of any approved construction, preferably, however, of the electric type, so that the lap 10 is directly run from the motor whenever the latter is started. The upper end of the lap shaft 12 is journaled in an arm 17 mounted on a bracket 18 attached to the table 11 at one side thereof, as plainly shown in Fig. 1. On the other side of the table 11 is held a frame 20 supporting a dop-holding device 30 carrying the precious stone 31 to be ground or polished on the upper surface of the lap 10. The frame 20 is provided at its rear end with depending posts 32 in each of which screws a screw 33 provided at its lower end with a head 34 resting on the top of the table 11, it being understood that by adjusting the screws 33 the frame 20 can be raised or lowered to locate the precious stone 31 in proper relation to the lap 10. A lock nut 35 screws on the screw 33 against the under side of the corresponding post 32 to securely lock the screw 33 in place after the desired adjustment has been made. The frame 20 is provided at its rear end with the usual horizontally disposed rod 36 held against lateral displacement by abutting against a vertical pin 37 rising from a plate 38 adjustably secured by a bolt or other fastening means 39 to the top of the table 11. The forward end of the plate 38 is provided with an upwardly extending pin 37^a engaging the frame 20 at the side opposite the one at which the pin 37 engages the rod 36, thus holding the frame against displacement in an opposite direction.

The frame 20 is provided with a detachable head 40 provided with a vertically dis-

posed dovetail tongue 41 engaging a similarly constructed dovetail groove 42 formed in the forward end of the frame 20. A set screw 43 screws in the frame 20 against a liner 44 abutting against one side of the tongue 41 to securely fasten the head 40 in position on the forward end of the frame 20. In the head 40 is mounted a bearing 45 provided at its lower end with an annular flange 46, the under side of which is beveled and provided with a graduation (see Figs. 4 and 5) corresponding to the points of a compass. In the bearing 45 is arranged a bushing 50 engaged by a spindle 51 provided at its upper end with a threaded portion 52 on which screws a nut 53 resting on the top of the bushing 50, and the spindle 51 is provided at its lower end with a pin 54 engaging a notch 55 formed in the bushing 50 so that the spindle and bushing turn together. The bushing 50 is provided with an annular groove 56 into which projects the inner end of a screw 57 screwing in the head 40 and the bearing 45, as plainly indicated in Fig. 3. By this arrangement the bushing 50 is held against upward or downward movement in the bearing 45. A set screw 58 screws in the head 40 and the bearing 45 against the bushing 50 to lock the latter in place after the desired adjustment of the spindle 51 has been made.

On the lower end of the spindle 51 is secured or formed the web 60 of a sector 61, preferably in the form of a dovetail tongue, engaged by a dovetail groove 62 formed on a carrier 63 forming part of the dop-holding device 30. One or two set screws 64 screw in the carrier 63 against a liner 65 abutting against one side of the sector 61 (see Fig. 8) to securely hold the carrier 63 in the desired adjusted position on the sector 61. The sector 60 is provided on its peripheral face with a segmental gear wheel 66 in mesh with a pinion 67 secured on a shaft 68 extending transversely and journaled in the carrier 63. The front end of the shaft 68 is provided with a head 69 adapted to be taken hold of by the operator for turning the pinion 67 to slide the carrier 63 around on the sector 61 according to the direction in which the shaft 68 is turned at the time, it being, however, understood that during this adjusting movement of the carrier 63 on the sector 61 the said screws 64 are loosened. On the under side of the carrier 63 is arranged a recess 70 into which fits a pivot 71 in the form of an inverted cup projecting centrally from a dop holder 72 carrying the dop 73 in which the precious stone 31 is mounted in the usual manner. The dop 73 is of conical shape and the precious stone 31 is mounted in the apex of the dop and the base of the latter is provided with a flange 74 abutting against the under side of the dop holder 72 and secured

thereto by a coupling nut 75 engaging the flange 74 and screwing on the dop holder 72. The base of the dop 73 is provided with a reduced portion 76 abutting against a flange 77 formed on the under side or open end of the cup-shaped pivot 71 to hold the said pivot securely in position in the dop holder 72.

In order to hold the dop holder 72 yielding in position on the carrier 63 use is made of a screw 80 extending in the pivot 71 and passing through the closed end thereof to screw in the carrier 63, as plainly indicated in Fig. 3. The spring 81 is arranged within the pivot 71 and is coiled around the portion of the screw 80 extending within the said pivot 71. The lower end of the spring 81 rests on a washer 82 held on the head 83 of the screw 80, and the upper end of the said spring 81 abuts against the under side of the closed end of the pivot 71. The opposed faces of the carrier 63 and the dop holder 72 are provided with teeth 85 and 86, respectively, of which the teeth 85 are preferably thirty-two in number while the teeth 86 in mesh with the teeth 85 are preferably four in number (see Fig. 9) and are disposed equal distances apart. The peripheral face of the dop holder 72 is provided with an annular graduation 87 having thirty-two marks spaced equal distances apart and numbered consecutively beginning at one of the teeth 86, as plainly shown in Fig. 10. It is understood that this graduation 87 serves to aid the operator to adjust the dop holder 72, the dop 73 and the precious stones 31 to set the stone in proper relation to the lap and to the number of facets. It is understood that the dop holder 72 can be readily turned on the carrier 63 owing to the yielding connection by the use of the spring 81 and the pivot 71, and at the same time the dop holder 72 is securely locked in the adjusted position by its teeth 86 engaging the corresponding teeth 85 on the carrier 63. It is further understood that the spring 81 readily yields on turning the dop holder 72 to allow the teeth 86 to glide over the teeth 85 until the desired position is reached.

In order to properly support the stone 31 in the dop holder 73, use is made of the usual rod 90 provided with a claw 91 engaging the projecting end of the precious stone 31 held in the dop 73, as plainly indicated in Figs. 3 and 4. The rod 90 is held adjustably in an up and down direction in a bracket 92 attached to the carrier 63, and the rod is fastened in the adjusted position by a set screw 93 screwing in the bracket 92 and against the rod 90, as plainly shown in Fig. 3.

In order to indicate the exact angular position of the facets of the stone 31 relative to the face of the lap 10, use is made of a

degree scale 100 marked on the web 60 of the sector 61, and a pointing mark 101 is marked on the face of the carrier 63 (see Fig. 1) to register with any one of the degree marks on imparting a sliding movement to the carrier 63 on the sector 61, as above mentioned. When the several parts are in the position shown in Figs. 1 and 3 then the mark 101 is opposite zero of the graduation 100 and the axis of the dop 73 is vertical and parallel with the axis of the spindle 51 and in which spindle axis the center of the sector 61 is located. On sliding the carrier 63 downward and forward on the sector 61 the position of the stone relative to the lap 10 is correspondingly changed the corresponding degree indicating the angle of a facet relative to the face of the lap. Thus by the arrangement described the operator can quickly and accurately set the dop with a view to correctly hold the stone 31 in position relative to the lap 10.

It will be noticed that by making the head 40 detachable on the frame 20, the dop holding device can be readily detached from the frame whenever it is desired to do so.

It will also be noticed that by making the spindle 51 carrying the sector 61 and the dop-holding device 72 turnable in the head 40, it is evident that the stone 31 can be moved in contact with different portions of the face of the lap 10 to allow of utilizing the entire face of the lap for grinding purposes.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:—

1. In an apparatus for grinding or polishing precious stones, a frame, a vertically disposed spindle held on the said frame and provided at its lower end with a sector, the center of which is located in the axis of the spindle above the sector, a carrier slidably mounted on the peripheral face of the said sector, a rotatably and yieldingly mounted dop holder on the said carrier, and a dop removably held in the said dop holder.

2. In an apparatus for grinding and polishing precious stones, a vertical spindle having a sector at its lower end, a carrier adjustably mounted on the sector, a rotatably and yieldingly mounted dop holder on the carrier, and means for locking the dop holder in position.

3. In an apparatus for grinding and polishing precious stones, a vertical spindle having a sector on its lower end, a carrier adjustably mounted on the sector, and a rotatably and yieldingly mounted dop holder on the carrier, the faces of the carrier and dop holder having interengaging teeth.

4. In an apparatus for grinding or polishing precious stones, a dop provided with a base flange, a dop holder provided with a clamping nut engaging the said flange to fasten the dop in place on the holder, the top of the holder being provided with teeth, a carrier provided at the under side with teeth adapted to be engaged by the teeth of the said dop holder, an inverted cup held centrally on the said dop holder and mounted to turn in said carrier, a pivot held on the said carrier and extending into the said cup, and a spring held on the said pivot and bearing against the said cup.

5. In an apparatus for grinding and polishing precious stones, a carrier having a recess, an inverted cup carried by the holder and extending into the recess of the carrier, a pivot extending through the cup into the carrier and a spring on the pivot and bearing against the cup, and means for preventing the dop holder from turning.

6. In an apparatus for grinding and polishing precious stones, a carrier having teeth on its lower face and provided with a recess in said face, a dop holder having teeth on its upper face engaging the teeth of the carrier, an inverted cup carried by the holder and extending into the recess of the carrier, a pivot extending through the cup into the carrier, and a spring on the pivot and bearing on the cup.

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