

June 12, 1923.

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E. F. A. C. LEPPER

APPARATUS FOR CUTTING DIAMONDS

Filed Jan. 8, 1921

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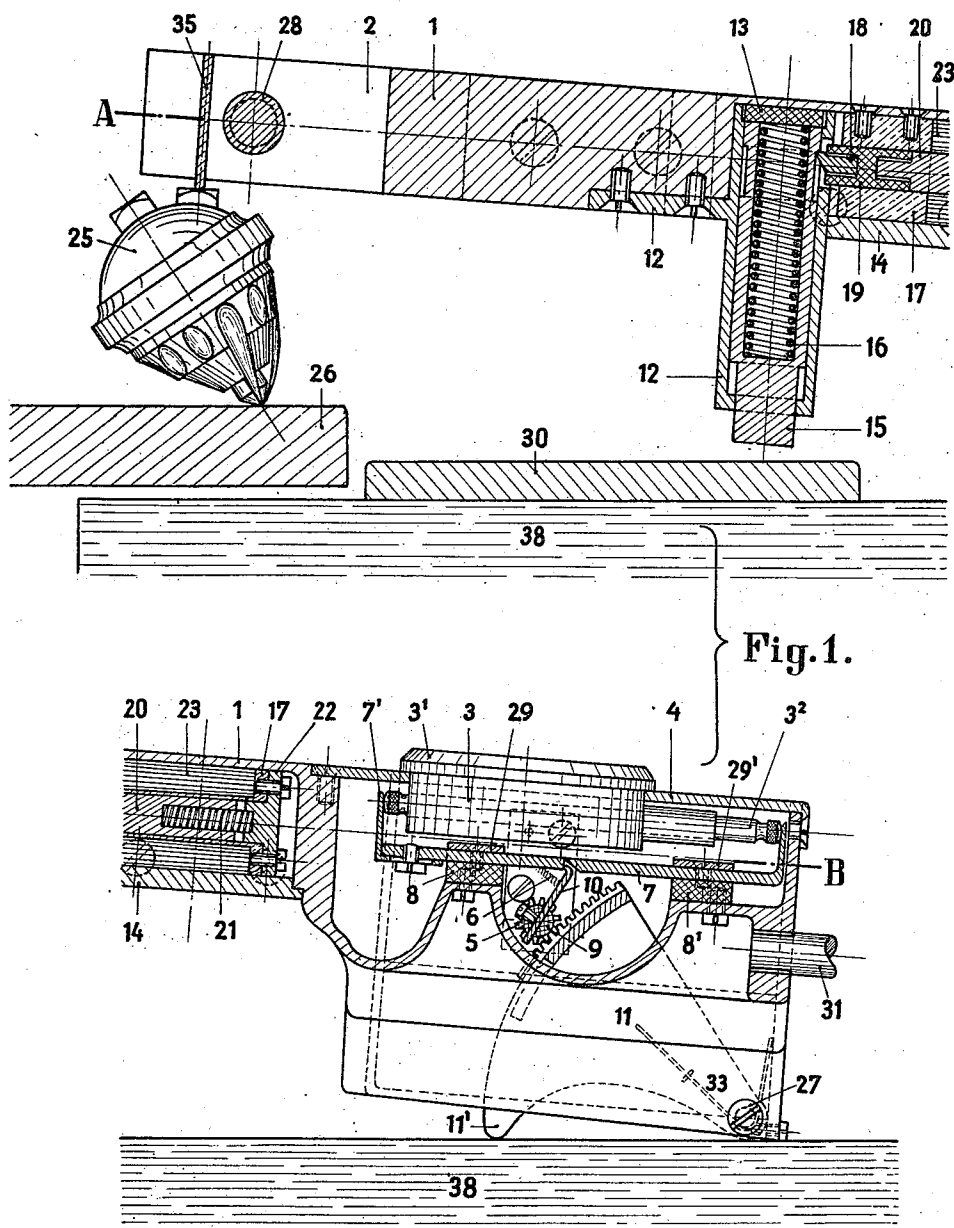


Fig. 1.

Inventor:

E. F. A. C. Lepper:

by

W. C. Evans
Attorney

June 12, 1923.

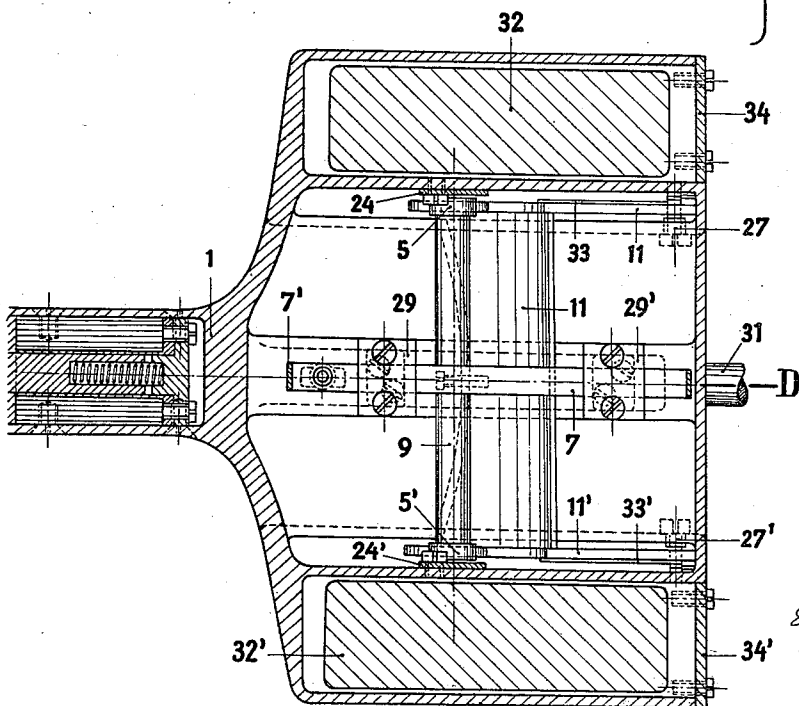
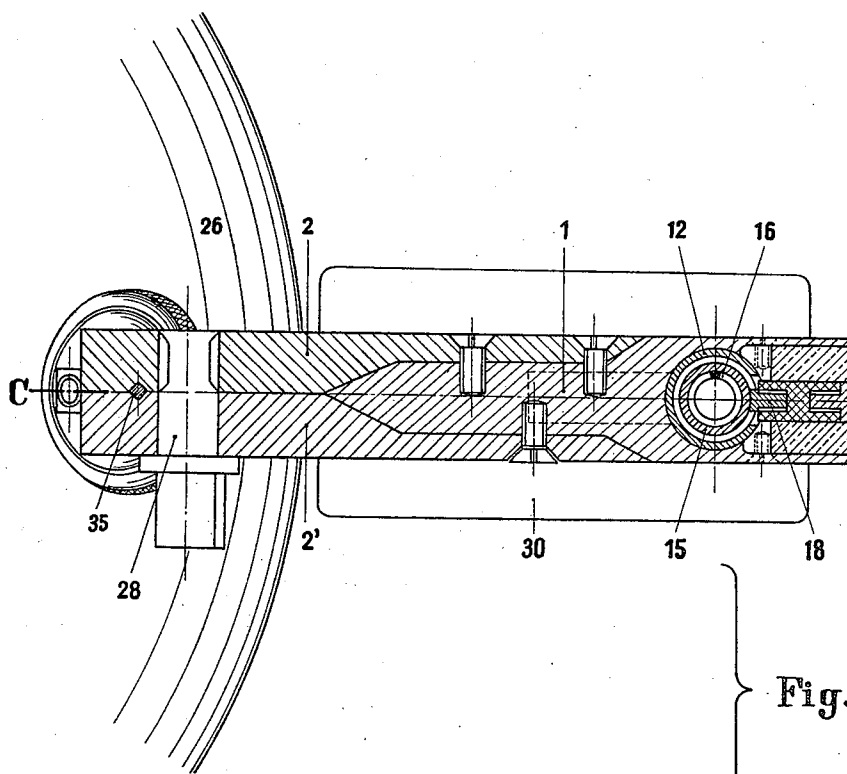
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E. F. A. C. LEPPER

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4 Sheets-Sheet 2



Inventor:

E. F. A. C. Lepper.

by

W. E. Evans

Attorney

June 12, 1923.

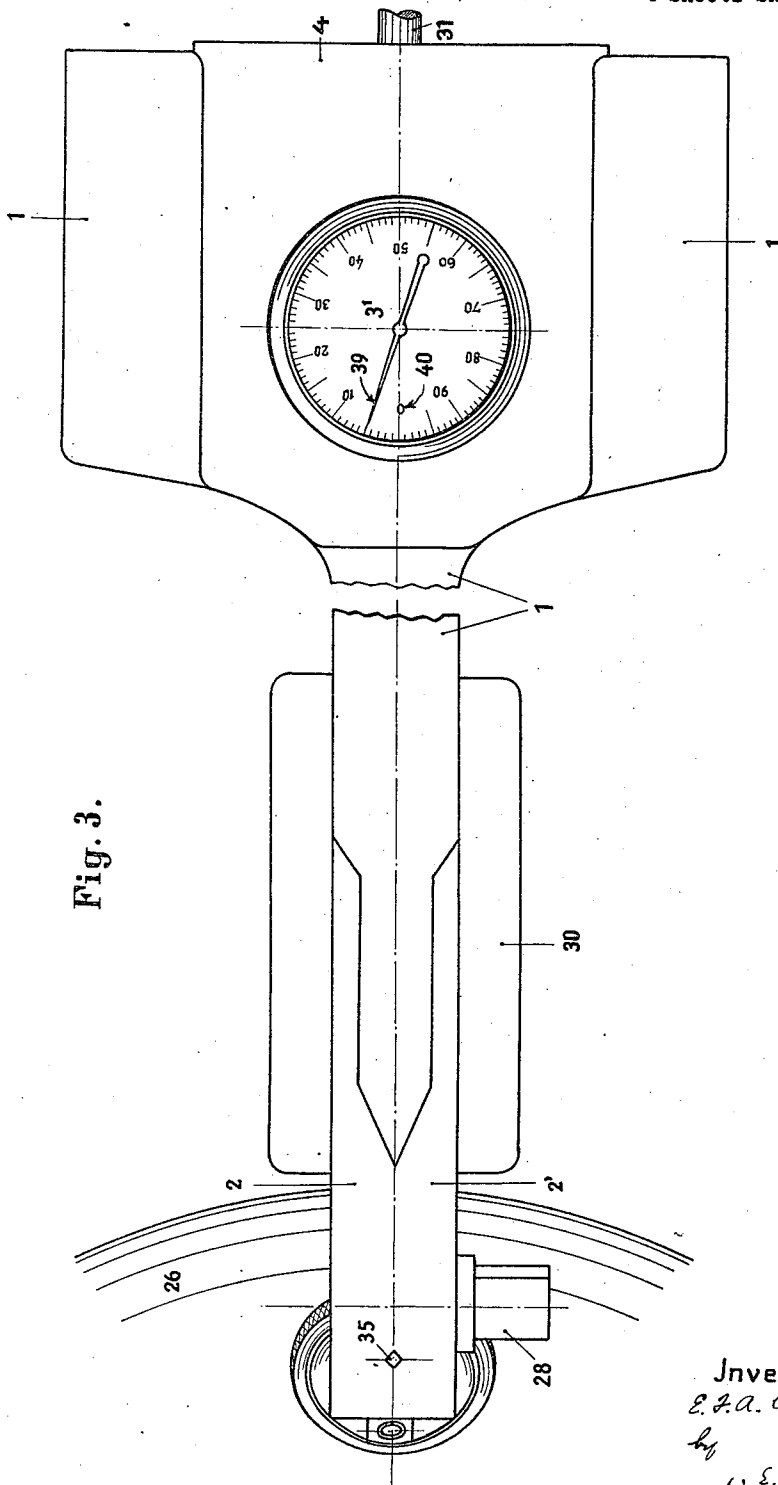
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E. F. A. C. LEPERRE

APPARATUS FOR CUTTING DIAMONDS

Filed Jan. 8, 1921

4 Sheets-Sheet 3



Inventor:
E. F. A. C. Leperre.
by
W. S. Evans
Attorney

June 12, 1923.

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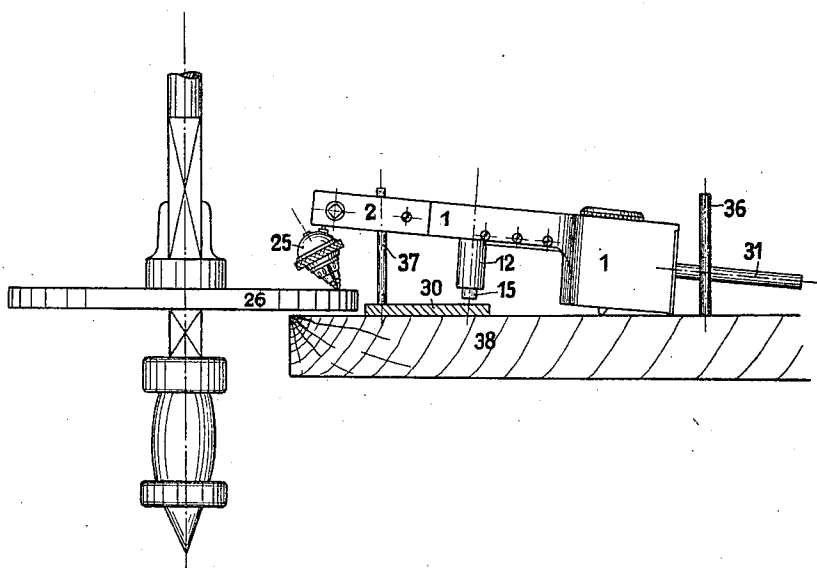
E. F. A. C. LEPPERRE

APPARATUS FOR CUTTING DIAMONDS

Filed Jan. 8, 1921

4 Sheets-Sheet 4

Fig. 4.



Inventor:
E. F. A. C. Lepperre
by
W. E. Spang
Attorney

UNITED STATES PATENT OFFICE.

EMILE FERDINAND ADELIN CHARLES LEPPERRE, OF ANTWERP, BELGIUM.

APPARATUS FOR CUTTING DIAMONDS.

Application filed January 8, 1921. Serial No. 436,008.

To all whom it may concern:

Be it known that I, EMILE FERDINAND ADELIN CHARLES LEPPERRE, a subject of the King of Belgium, residing at 46 rue du Champ, Berchem, Antwerp, Belgium, have invented certain new and useful Improvements Relating to Apparatus for Cutting Diamonds, of which the following is a specification.

The present invention has for its object to facilitate the work of the lapidary, and consists of an apparatus supporting the diamond carrier, which apparatus is capable of being employed with ordinary diamond cutters' grindstones.

The invention has for its object automatically to separate the diamond from the stone at a desired moment and continuously to indicate the degree of progress of the cut. The exterior form of the apparatus does not necessarily vary from that which is actually employed by the lapidary.

The upward movement, that is to say the separation of the diamond from the grindstone is effected by the thrust of the lower end of a piston carried by the apparatus supporting the diamond carrier, the thrust being applied upon a plate fixed upon the work table near the grinding wheel. The said piston is released at the desired moment by electro-magnetic means in which the current from a battery issues through the needle of a dial indicator which controls the movement of the apparatus during the cutting operation.

In order to render as clear as possible the explanations which follow, the apparatus supporting the diamond carrier and provided with the automatic means for lifting the diamond clear of the stone is represented by way of example in the accompanying drawing in which—

Fig. 1 is a sectional elevation of an apparatus provided according to the invention, the view being taken on the line C—D of Fig. 2.

Fig. 2 is a section on the line A—B of Fig. 1.

Fig. 3 is a plan view corresponding to Figs. 1 and 2, while

Fig. 4 is a view on a smaller scale of the whole apparatus.

The apparatus comprises an arm 1 advantageously of aluminum upon which is mounted the iron jaws 2 forming the front end of the apparatus. The holder 25 which carries the stone to be cut is supported by a rod 35 which is gripped between the jaws 2 by means of a screwed pin 28.

The rear part of the apparatus is hollow and receives the controlling mechanism of an indicator 3 whose dial has mounted upon it a transparent cover plate 4 which closes the hollow receptacle of which the rear part of the apparatus is formed. The indicator 3 comprises a dial 3¹ upon which a needle forming a point of contact 39 turns. At ϕ on the dial is provided a second point of contact 40. The needle is controlled by a push bar 3² which is disposed between two parts of a slide 7 and is controlled by the latter. One of the parts of the slide 7 consists of a regulable part 7¹ which permits of taking up the play between the push bar 3² and the slide 7. The slide 7 travels in two guides 8 and 8¹ formed respectively by the covers 29 and 29¹. In the slide 7 is formed a groove in which a controlling lever 10 is received and which lever is integrally provided upon the spindle 9 carrying two toothed wheels 5 and 5¹. The controlling lever 10 is provided with a spiral spring 6 by which contact is maintained between the lever 10 and the slide 7. The toothed wheels 5 and 5¹ engage in the toothed sectors 11 and 11¹ which are carried in the apparatus towards its base and at its rear end by the pivot pins 27 and 27¹. The mounting plates for the ends of the spindle 9 are represented at 24 and 24¹. The toothed sectors pivoting at the radial centre rest at their lower end 11¹ upon the work table 38 and are provided with re-acting springs 33.

The points of contact 39 and 40 are connected electrically with a solenoid 23 in which is mounted a movable core 20 which is disposed under the action of a spiral spring 21 of copper which contacts with an iron ring 22. The core 20 is extended by a copper piece 19 which in its turn carries a

pawl 18 provided advantageously of steel. The chamber containing the solenoid is closed by a base plate 14. The copper piece 19 connecting the pawl 18 to the core 20 slides in the massive extension 17 of the bobbin of the solenoid 23.

The pawl 18 retains a piston 15 disposed under the action of a spiral spring 16, the whole being disposed within a sleeve 12 closed by a cover 13. The piston carries upon its circumference at a determined height a recess in which engages the pawl 18 for maintaining the piston at a certain distance from the plate 30 which is placed upon the work table 38.

Batteries 32 and 32¹ are provided in the lateral spaces at the rear of the apparatus, these spaces being closed by closing plates 34.

The apparatus carries a lengthening rod 31; when the stone to be cut lies upon the grindstone 26 the apparatus is held in place by means of holding rods 36 and 37 which are fixed on the work table.

As will be clearly understood from the drawing and from the construction described, the separation of the apparatus from the work table or more exactly the degree of the angle formed between them, is controlled by the indicator 3 through the toothed sectors 11 which are applied upon the table and which control the gears 5 which by means of the lever 10 and the slide 7 cause the needle of the indicator 3 to turn. When this needle indicates *o*, contact is established between the points 39 and 40 and the circuit of the batteries 32 and 32¹ passing through the solenoid 23 is closed. Thus the core 20 is attracted towards the iron ring 22 thus withdrawing the pawl 18; the piston 15 being liberated it is forced by the spring 16 downwardly and takes its position upon the plate 30, the apparatus under the second pressure being lifted and the diamond uplifted from the stone.

To remove from the diamond a determined thickness the indicator 3 is set by turning the dial until the needle indicates the determined thickness. For example to remove a thickness of 0.3 mm. the dial is turned until the needle indicates 30, supposing the dial to indicate to 1/100th of a millimetre; in cutting, the needle approaches the point of contact at *o* and when the stone has been ground away to the extent of 0.3 mm. the contact is established and the apparatus is raised as hereinbefore described.

I claim:

1. Apparatus for supporting precious stones for grinding in a grinding machine and for automatically lifting the carrier for the precious stone on the required extent of grinding having been effected, comprising a bar adapted to be freely supported at one end and at the other to support the said carrier in position over the grind-stone,

mechanism mounted upon the said bar and operable on the variation of its inclination as the grinding of the precious stone proceeds, and means for lifting the end of the said bar supporting the said carrier on a determined inclination being reached, substantially as described.

2. Apparatus for supporting precious stones for grinding in a grinding machine and for automatically lifting the carrier for the precious stone on the required extent of grinding having been effected, comprising a bar adapted to be freely supported at one end and at the other to support the said carrier in position over the grind-stone, mechanism mounted upon the said bar and operable on the variation of its inclination as the grinding of the precious stone proceeds, means for lifting the end of the said bar supporting the said carrier on a determined inclination being reached, and means for maintaining the said freely supported bar against the effect of movement of the grinding stone, substantially as described.

3. Apparatus for supporting precious stones for grinding in a grinding machine and for automatically lifting the carrier for the precious stone on the required extent of grinding having been effected, comprising a bar adapted to be freely supported at one end and at the other to support the said carrier in position over the grind stone, mechanism mounted upon the bar and operable on the variation of its inclination as the grinding of the precious stone proceeds, said mechanism comprising a movable indicator traversing a dial, the indicator and dial being provided with contacts connected within an electric circuit, and means for lifting the end of the said bar supporting the said carrier on a determined inclination being reached, substantially as described.

4. Apparatus for supporting precious stones for grinding in a grinding machine and for automatically lifting the carrier for the precious stone on the required extent of grinding having been effected, comprising a bar adapted to be freely supported at one end and at the other to support the said carrier in position over the grind-stone, mechanism mounted upon the said bar and operable on the variation of its inclination as the grinding of the precious stone proceeds, and means comprising a spring operated piston for lifting the end of the bar supporting the said carrier on a determined inclination of the said bar being attained, substantially as described.

5. Apparatus for supporting precious stones for grinding in a grinding machine and for automatically lifting the carrier for the precious stone on the required extent of grinding having been effected, comprising a bar adapted to be freely supported at one

end and at the other to support the said carrier in position over the grind-stone, mechanism mounted on the said bar operable on the variation of its inclination as the grinding of the precious stone proceeds, comprising a sliding bar and slide, means for the release of the said slide on a determined inclination of the bar being attained, means for closing the electric circuit, and means for lifting the end of the said bar supporting the said carrier on a determined inclination being reached, substantially as described. 10

EMILE LEPPERRE.