April 22, 1969 R. W. BAILEY 3,439,456

FACETING MACHINE

Filed Jan. 21, 1966 Sheet 1 of 2

FIG. 1

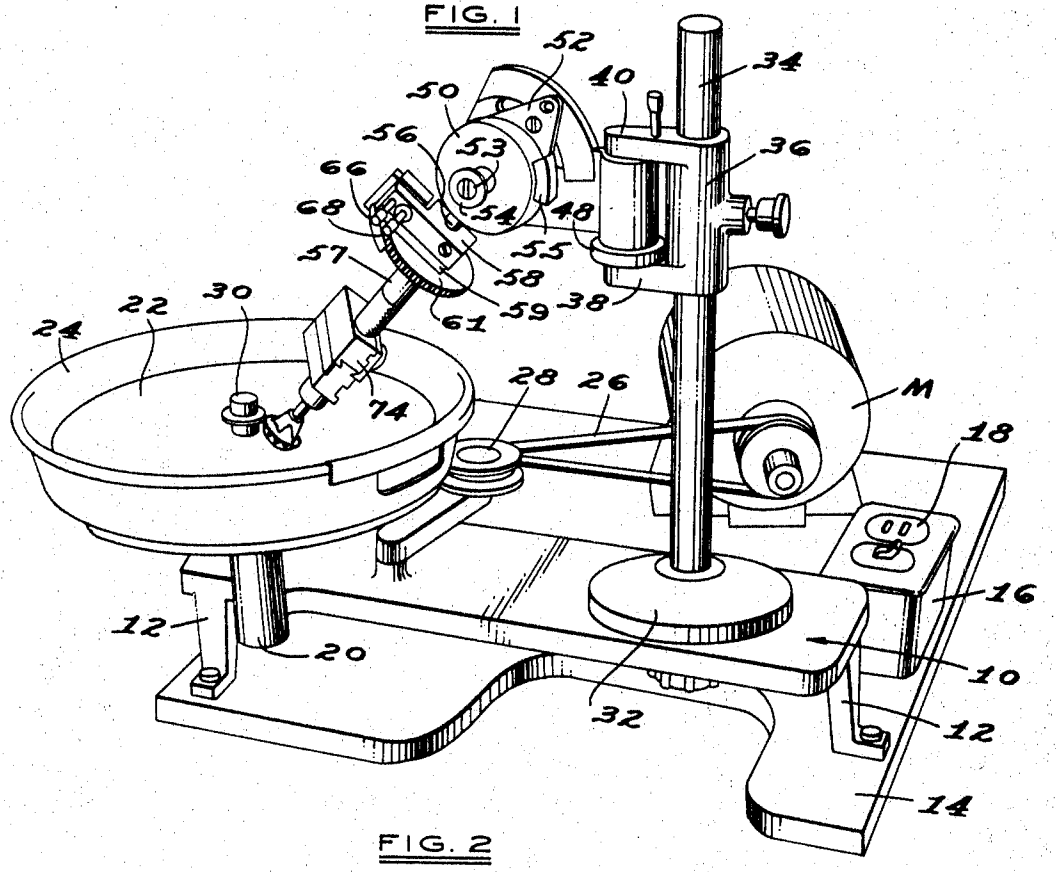


FIG. 2

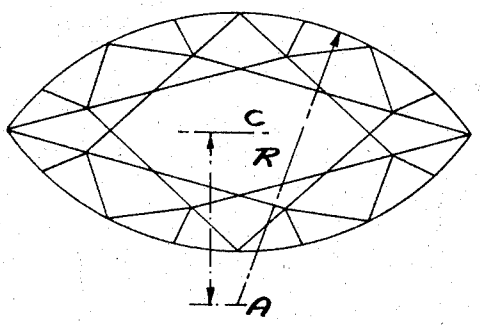
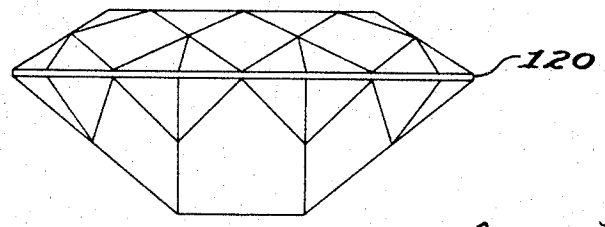


FIG. 3



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FIG. 4

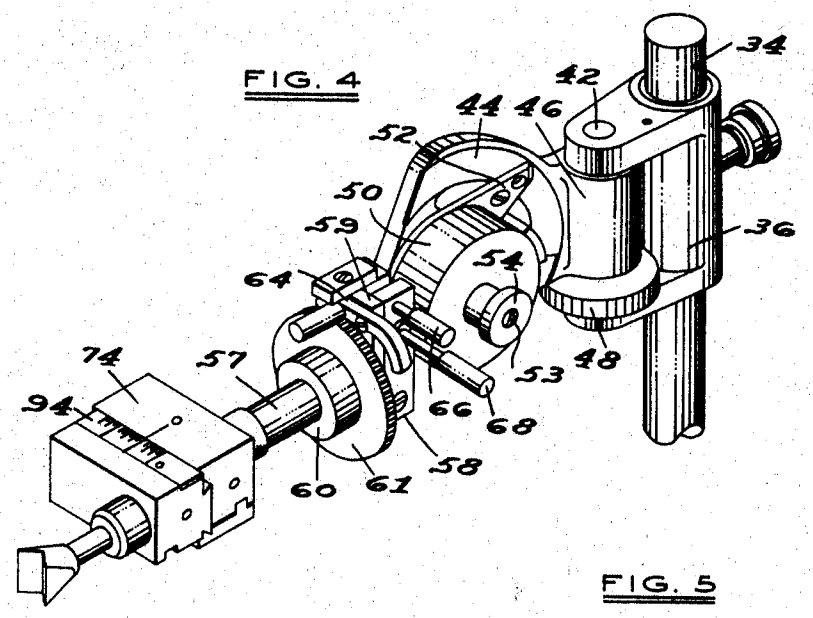


FIG. 5

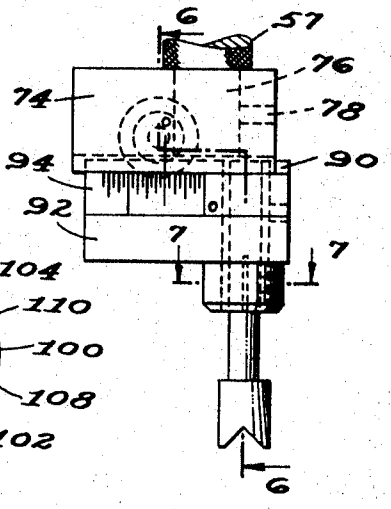


FIG. 6

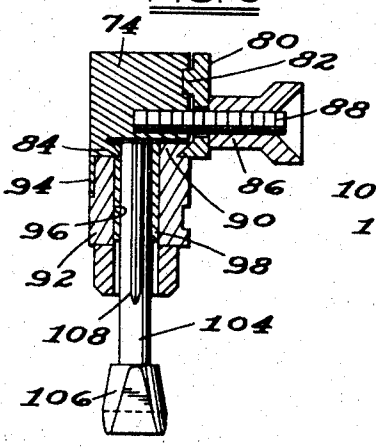
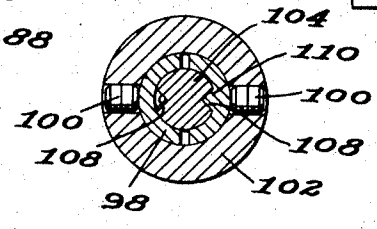


FIG. 7



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United States Patent Office 3,439,456
Patented Apr. 22, 1969

3,439,456

FACETING MACHINE

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Filed Jan. 21, 1966, Ser. No. 522,204
Int. Cl. B24b 7/00, 9/00, 19/00
U.S. Cl. 51—125 6 Claims

ABSTRACT OF THE DISCLOSURE

A combination stone mount and abrasive surface for cutting facets on gems and more particularly for processing a gem in an oval or marquise shape which includes a pivoted dop holding spindle mounted on a mast for disposition at an angle to a grinding surface and means on the spindle for shifting the axis of the dop relative to the axis of the spindle wherein an oval movement can be obtained at the holding end of the dop to achieve the desired shape and facet positioning.

This invention relates to a faceting machine for gem stones. In the forming of facets on semiprecious and precious stones, historically the facets have been applied by hand grinding or cutting which requires great skill. In recent years, it has become more common to utilize a machine for holding the gem stones so that the facets may be cut in a more precise manner and by persons who may have less training than that required for the hand cutting. In this connection, a machine with a rotating lapping or grinding wheel is provided with a standard adjacent the wheel for supporting a holding device which permits the stone to be applied to the flat surface of the wheel. This method has worked well for round gem stones, but the problem of cutting irregular shape gem stones of the marquise or oval type has still required the hand operation.

It is an object of the present invention to provide a device which permits precision cutting of the oval type gem stone with adequate adjustment to permit suitable flexibility in the design sought.

In the machine of the present invention, the gem stone is mounted on a spindle adapted to turn on a horizontal and vertical axis and can also be shifted transversely of the main spindle axis to obtain the desired position for the oval faceting.

It is a further object of the invention to provide a relatively simple but versatile attachment for a stone cutting apparatus which permits the adaptation to oval gem stones.

Other objects and features of the invention and the principles of operation of the device will be found in the following description and claims.

Drawings accompanying the disclosure and the various views thereof may be briefly described as:

FIGURE 1, a perspective view of the assembled gem cutting apparatus.

FIGURE 2, a top view of a so-called oval or marquise type of stone showing one design of desired faceting.

FIGURE 3, a side view of the stone of FIGURE 2.

FIGURE 4, an enlarged perspective view of the gem holding arm.

FIGURE 5, a side elevation of the distal end of the gem holding arm.

FIGURE 6, a sectional view of the structure taken on line 6—6 of FIGURE 5.

FIGURE 7, a sectional view taken on line 7—7 of FIGURE 5.

Referring to the drawings:

The machine consists of a cast base plate **10** mounted by foot portions **12** on a baseboard **14** on which is also

mounted a motor M having a control switch box **16** with a suitable outlet socket **18** for a light. On the plate **10** is mounted a vertical bearing housing **20** for containing a precision bronze bearing for suitably mounting a turntable carrying an abrasion or polishing wheel **22** which is surrounded by a suitable pan guard **24**. A suitable belt **26** and pulley system **28** is utilized for driving the shaft **30** of the turntable. Supported adjustably on the plate **10** is a mast base **32** supporting a mast **34**. On the mast is mounted a yoke assembly **36** having spaced horizontal arms **38** and **40** between which is a shaft **42** (FIGURE 4) pivotally mounting a bearing socket **46** of a vertical protractor plate **44**. This protractor plate is provided for mounting the gem spindle assembly for holding the gem dop.

A microadjustment nut **48** at the bottom of the shaft **42** provides a fine vertical adjustment for the protractor plate which is preferably graduated through a predetermined segment in degrees from each end, that is, to the left and right of a zero point respectively at each end (not shown). On the protractor plate **44** is pivotally mounted on a horizontal axis a circular block **50** having a pointer plate **52** to cooperate wtih the markings on the protractor plate. The pointer plate **52** is adjustably positionable on the protractor plate and the circular block **50** is pivotally mounted on the plate **44** by a screw shaft **53** and a friction nut **54**. On the perimeter of block **50** is a segmental stop block **55** which stops against the pointer plate **52**. Extending radially from the circular block **50** is a spindle shaft **56** which transfixes and mounts a rectangular block **58** transversely thereto. A second block **59** is similarly mounted on spindle shaft **56** and related thereto in a manner to be explained.

Telescopically mounted on spindle shaft **56** is a hollow mount tube **57** carrying a collar **60** and index plate **61** which is preferably suitably graduated and provided with a predetermined number of teeth. Shaft **56** and tube **57** are axially related by a suitable detent and groove (not shown). These index plates can be available, for example, with 32, 60, 64, 72, 80 and 96 teeth. The plates control the rotative position of the tube **57** on the spindle shaft **56**, there being a spring biased trigger latch **64** on block **59** for controlling the position of the plate **61**. Microadjusting screws **66** and **68** are provided for accurate control of the block **59** relative to plate **58**.

All of the above structure is standard in connection with the mounting of a dop or a spindle shaft for the faceting of round gems. Extending downwardly from the index plate **61** is the mount tube **57** which inserts into and rigidly mounts, transversely thereof, a rectangular mounting block **74** extending to the left of the tube **57** as shown in FIGURE 5. In other words, there is an off center mount, the tube **57** having a projection **76** extending into block **74** and locked by a lock screw **78**.

On one side of mounting block **74** is a side plate **80** which has a rib **82** located in a groove in block **74** and forming a dovetail groove in cooperation with a rib extension **84** on the bottom of the block **74**. The plate **80** is retained and clamped on block **74** by a clamping nut **86** on screw **88**. This permits the holding of a dovetail on interlock slide rib **90** on a second transverse collet block **92**, the collet block **92** carrying a graduated plate **94** at the top edge thereof to permit close positioning and adjustment with relation to mounting block **74**. At one end of collet block **92** perpendicular to the axial axis thereof and parallel to the spindle tube **57** and spindle shaft **56** is a socket recess **96** which contains a split collet sleeve **98** which can be opened and closed by small set screws **100** (FIGURE 7) in a collar **102** at the bottom of the block **92**. This recess is adapted to receive the shank **104** of a dop or gem holder **106**. Small keyways **108** are pro-

vided in each side of the dop shank **104** to permit it to be located relative to the spindle and against rotation by suitable key **110**.

Thus, it will be seen that it is possible to adjust the block **92** transversely of the axis of the spindle arm represented by the spindle tube **57**, and the block **92** may be clamped securely in position in any offset relationship. When the zero on plate **94** (see FIGURE 4) is coincident with the zero on block **74**, the dop socket or recess **96** is on the center axis of the pivot arm. By loosening the clamp nut **86**, the block **92** can be readily shifted transversely of this axis. Thus, by placing a gem in the dop head **106**, it can be applied to the rotating table **22**, having a suitable abrasive or polishing surface, in the various angles that are required for so-called marquise or oval grinding. The block **74** remains free to rotate in positions controlled by the index plate **61** and latch **64** about the center line of the spindle shaft **56** while the actual holding chuck can be offset to positions where the center line of the gem stone blank remains parallel with the spindle center line but revolves around the spindle center line. The offset at the point of adjustment is suitably graduated at plate **94** to indicate the amount of offset and, as has been described, can be securely locked in position. By means of this offsetting of the dop chuck, the two sides of the gem stone can be precisely ground to the required radius as in the marquise cut where the width of the gem is one-half of its length, and the two sides are sections of a true circle. The keyways **108** in each side of the shaft **104** of the gem dop permit it to be rotated 180° to duplicate the form on the opposite side thereof. When the crown or portion of the gem stone above the girdle line **120** is finished, the stone may be remounted on another dop in the reverse position so that the pavilion or lower portion of the gem stone can be preformed, cut and polished. This transfer and reversal of the gem stone is accomplished in a transfer fixture well known to the art which maintains the axis of the gem stone centered and true in the second dop. It also keeps the relationship to the keyway in the shank of the new dop lined up with the location in the old dop. This results in the facets on the lower part of the gem matching precisely with the facets on the upper part.

Thus, it will be seen that the offset head permits revolving of the gem about the spindle axis on a radius equal to that selected for the sides of the marquise cut. In FIGURE 2, for example, the center point A for radius R is materially offset by distance AC from the gem center C permitting the wide arc on the sides of the gem.

What is claimed as new is as follows:

1. In an apparatus for facilitating the faceting of gem stones of the type wherein a gem dop is held on a supporting spindle supported on a mast adjacent a rotating cutting wheel, that improvement for the faceting of oval stones, which comprises:

(a) a dop holder including a shank having diametrically opposed grooves extending axially thereof,

(b) a collet block rectangular in shape having a collet disposed at a right angle to the axis of the block,

(c) a means in said collet for engagement with one of the grooves in said shank to locate said shank in one of two selective positions,

(d) a mounting block rectangular in shape having a recess to receive and lock a portion of the supporting spindle in a position wherein the axis of the mounting block is disposed at a right angle to the axis of the spindle, and

(e) means adjustably associating said blocks with the axes thereof maintaining a parallel relationship for relative endwise adjustment and mutual support to a plurality of positions whereby said collet may be

shifted from a position coincident with the axis of the spindle to positions wherein the axis thereof is parallel to and spaced from the axis of said spindle.

2. In an apparatus for facilitating the faceting of gem stones of the type wherein a gem dop is held on a supporting spindle on a mast adjacent a rotating cutting wheel, that improvement for the faceting of oval stones which comprises:

(a) a pair of mutually slidable blocks, one of which is mountable on a supporting spindle and relatively slidable in a direction normal to the axis of said spindle, the second of said blocks having a collet with an axis at right angles to direction of slide of said block and parallel to the axis of a supporting spindle,

(b) a dop having a shank receivable in said collet, and

(c) means at said collet and means on said shank to locate said shank selectively in one of two positions 180° apart.

3. A device as defined in claim **2** in which means is provided for mutually guiding and locking said blocks relative to each other comprising an interlock rib on one of said blocks, and means on the other of said blocks forming an interlock groove, one side of said groove being formed by a side plate movable transversely of said other block, and means to move said side plate to a clamping position against said interlock rib.

4. A device as defined in claim **3** in which the side plate is engaged longitudinally with said other block by a rib and groove connection.

5. An apparatus for facilitating the faceting of gem stones in oval shapes which comprises:

(a) a vertical mast support,

(b) a horizontal moving cutting surface adjacent said support,

(c) a supporting arm mounted to project over said surface and for movement on a vertical axis relative to said mast and having a dop support portion manually rotatable to positions about the axis of the arm,

(d) a dop holder on said dop support portion including a shank,

(e) a dop for receiving and holding a gem, and

(f) means connecting said shank and said dop to permit selective and adjustable lateral movement of said dop relative to the axis of said shank to move the axis of said dop relative to the axis of said shank in coincident or spaced parallel positions wherein gems may be faceted with an oval contour.

6. A device as defined in claim **5** in which the means connecting the shank and the dop comprises a pair of mutually slidable blocks mounted respectively on said shank and said dop and joined in a sliding joint to permit said relative lateral motion, and means to lock said blocks in selective adjusted positions.

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U.S. Cl. X.R.

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