July 6, 1948. L. M. WEIR 2,444,795

FACETING HEAD

Filed Sept. 28, 1945

2 Sheets-Sheet 1

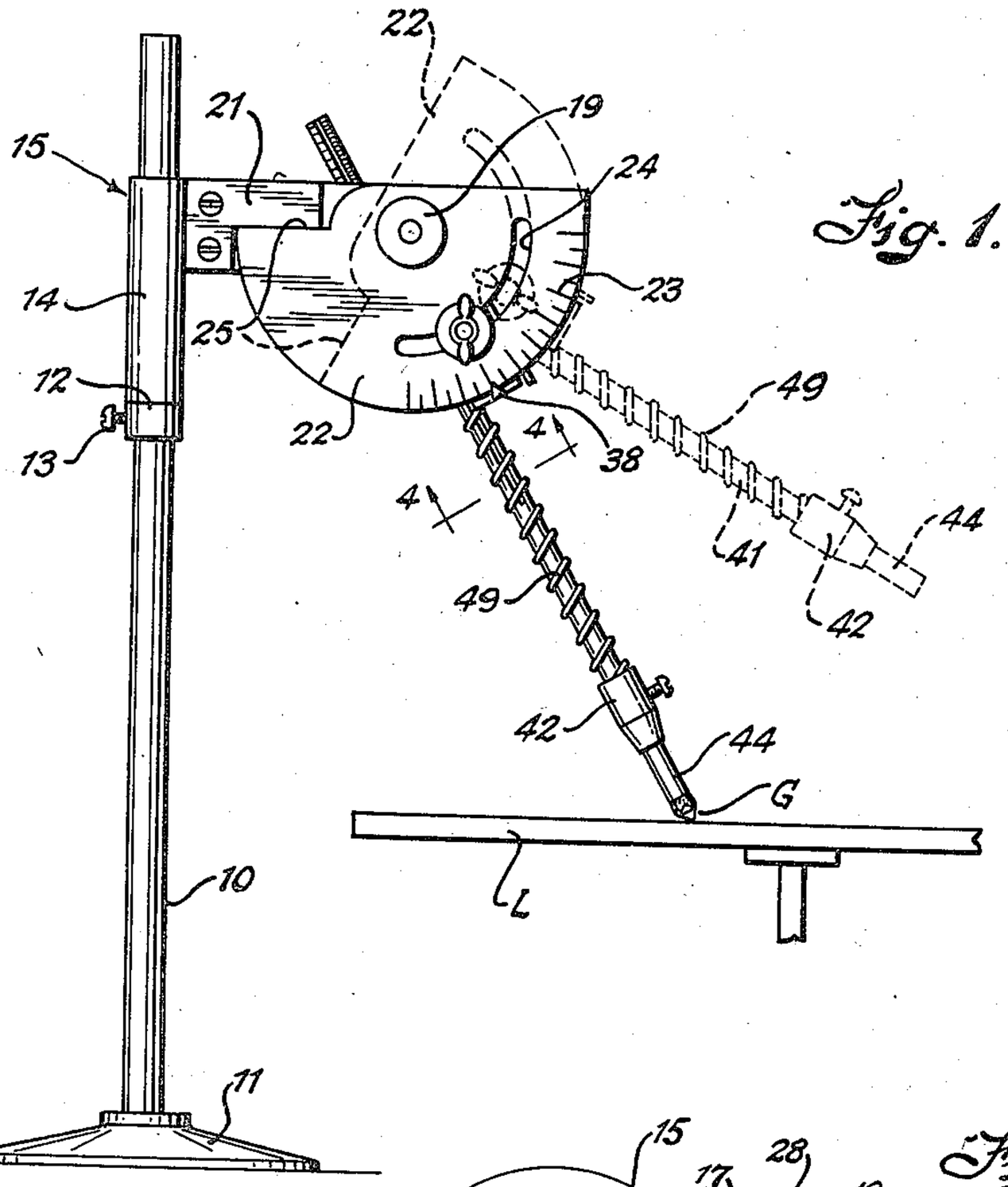

Fig. 1.

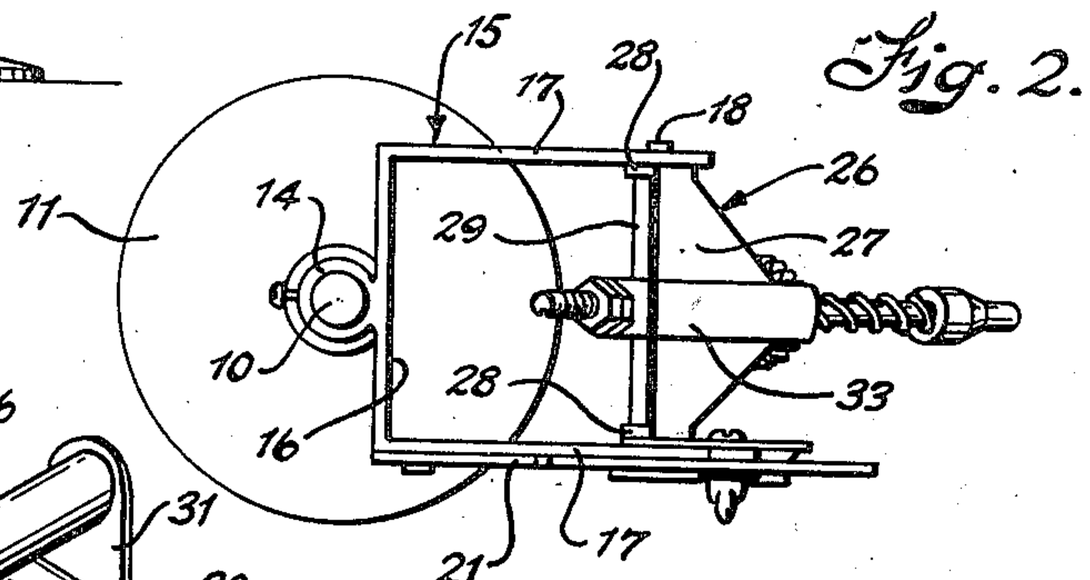

Fig. 2.

Fig. 6.

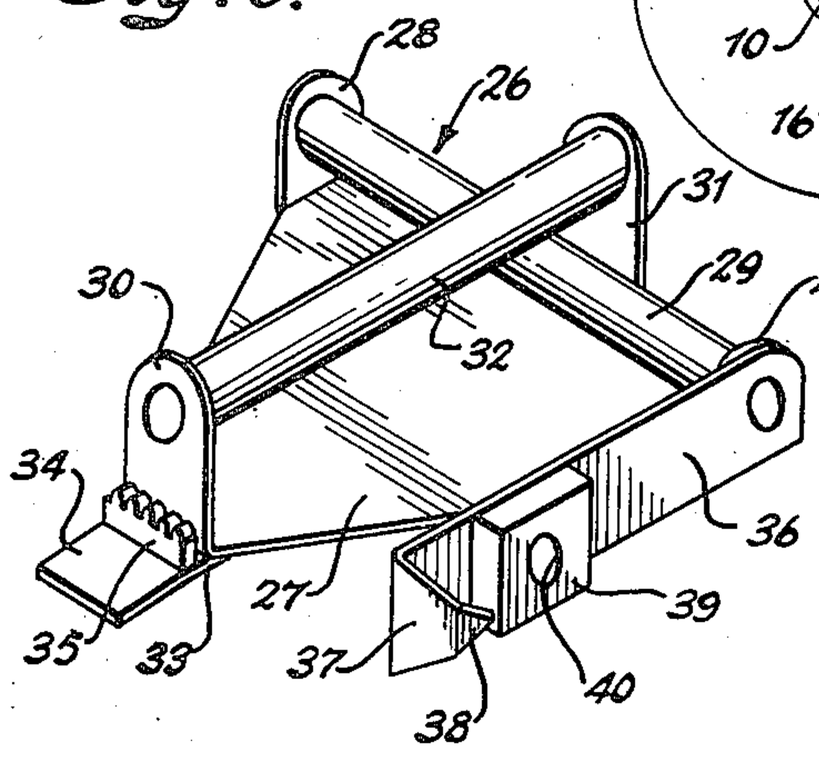

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Fig. 3.

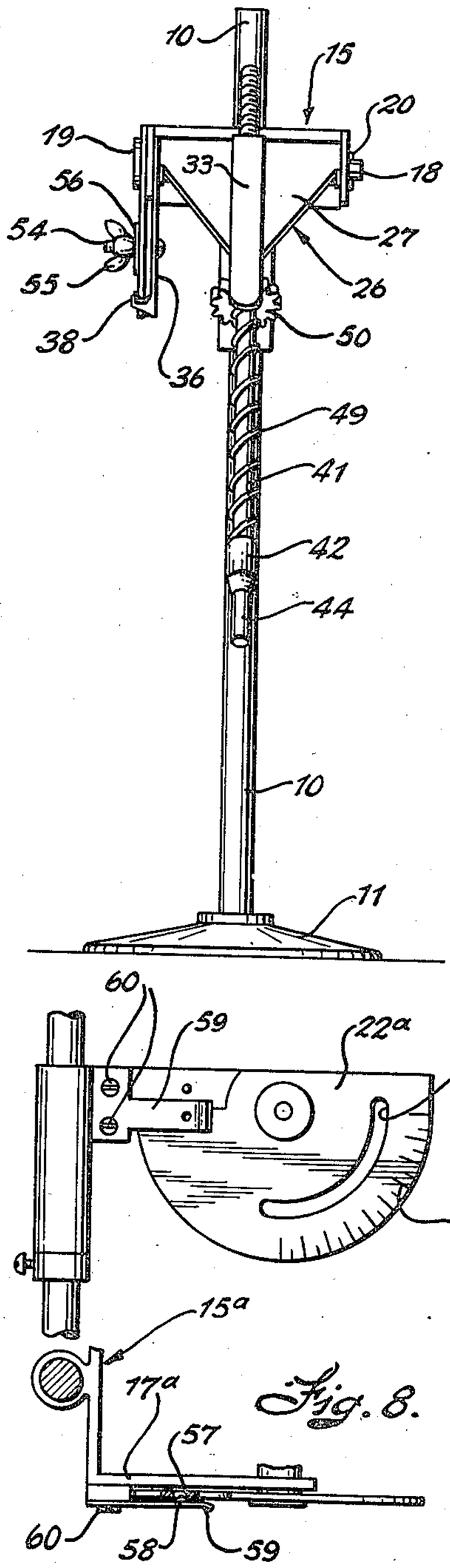
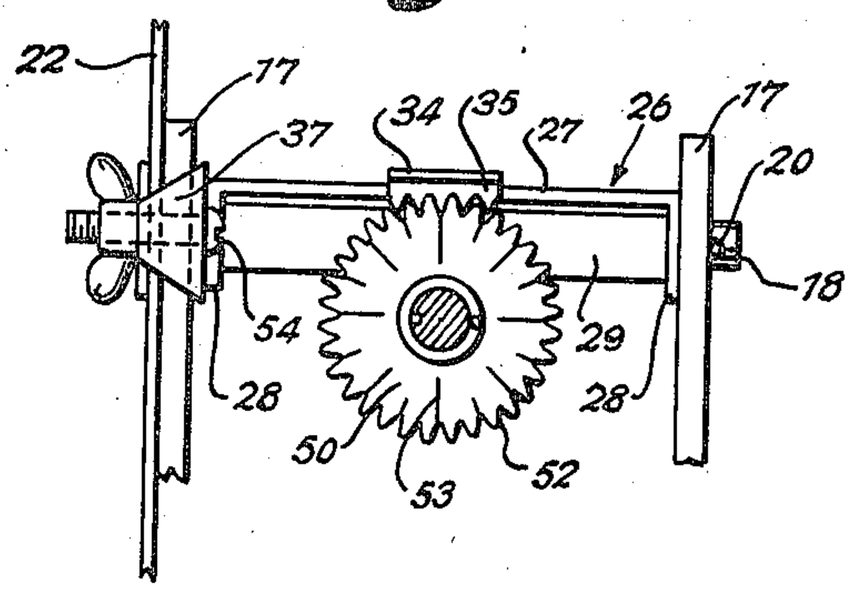


Fig. 4.



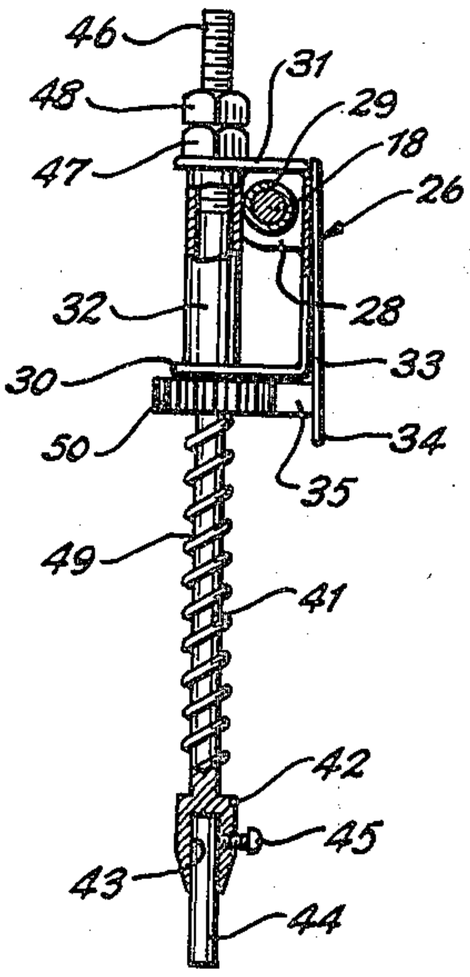


Fig. 5.

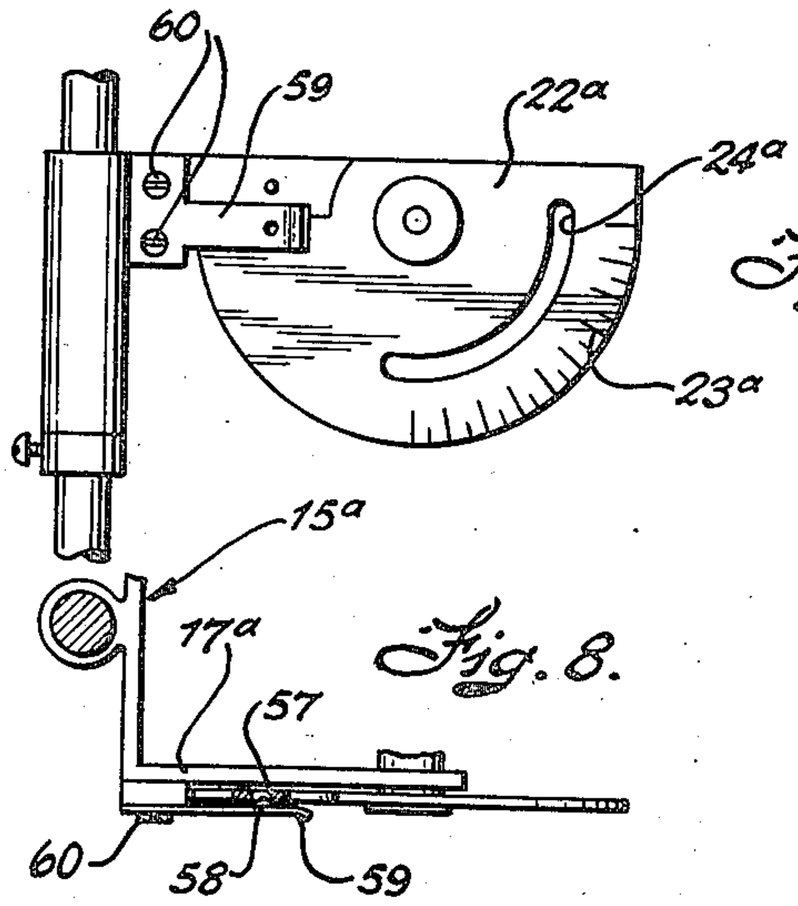


Fig. 7.

Fig. 8.

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UNITED STATES PATENT OFFICE

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FACETING HEAD

Leander M. Weir, Hyde Park, N. Y.

Application September 28, 1945, Serial No. 619,225

3 Claims. (Cl. 51—229)

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This invention relates to faceting heads for use by lapidaries and gem cutters.

The primary object of the invention is to regulate the angle of a facet to be cut or being cut in a gem and to assure that all facets similarly positioned about the gem will be at the same angle to the axis of the gem in the finished product.

Another object of the invention is to regulate the depth of cut of the facet or a group of facets so as to assure that they all coincide on the finished gem.

Still other objects include a faceting head which will enable the facets to be cut at different predetermined angles or to different predetermined depths which may be chosen by the lapidary or gem cutter.

Still another object is to facilitate the inspection of the gem being cut without in any manner disturbing the various adjustments or settings by which the angle and depth of cuts are controlled.

The above and other objects may be obtained by employing this invention, which embodies, among its features, a vertically adjustable supporting device or yoke, a substantially semi-circular protractor plate pivoted on the yoke to swing about a horizontal axis, a carriage mounted on the yoke to swing about the same axis as the protractor plate, means to adjustably secure the protractor plate and carriage together, whereby they may be swung in unison about the horizontal axis, means to stop the swinging movement in one direction when the protractor attains a predetermined position, and means on the carriage for supporting a gem-holding dop stick in such a position that the axis of the gem supported thereby is perpendicular to the horizontal axis about which the carriage swings.

Other features embody yielding means to urge the dop stick and gem carried thereby toward a lap wheel, and means to limit the distance which the dop stick may be advanced under the influence of the yielding means toward the lap wheel.

In the drawings:

Figure 1 is a side view of a faceting head embodying this invention.

Figure 2 is a top plan view of Figure 1.

Figure 3 is a front view of Figure 1 showing the lap wheel omitted,

Figure 4 is an enlarged transverse sectional view taken on the line 4—4 of Figure 1,

Figure 5 is a side view partially in section of the carriage and dop stick supporting rod,

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Figure 6 is an inverted perspective view of the carriage,

Figure 7 is a fragmentary side view of a faceting head showing a modified form of protractor plate, and

Figure 8 is a top plan view of Figure 7.

Referring to the drawings in detail, I provide a standard 10 which is supported by a suitable foot 11 and carries a vertically adjustable collar 12 which may be held in various positions on the standard by means of a set-screw 13.

Fitting loosely over the upper end of the standard 10 and adapted to rest on the upper edge of the collar 12 is a sleeve 13 carrying a yoke designated generally 15. This yoke comprises a bight portion 16, to which the sleeve 14 may be attached in any suitable manner, or these parts may be formed integral as illustrated in the drawings. Extending forwardly from the bight portion 16 of the yoke 15 is a pair of parallel arms 17 which are provided, near their outer end, with aligned openings for the reception of a pivot pin 18, one end of which carries a head 19 for a purpose to be more fully hereinafter described. The opposite end of the pin 18 is pierced to receive a locking or cotter pin 20 by means of which the pivot pin 18 is held against longitudinal displacement. Attached to one of the arms 17 is a stop 21, the purpose of which will hereinafter appear.

Rotatably mounted on the pivot pin 18 beneath the head 19 is a substantially semi-circular segmental plate 22 carrying, on its outer face adjacent its curved edge, graduations 23 of the type of a protractor. Formed inwardly of the outer curved edge of the plate 22 is an arcuate slot 24 which lies concentric with the axis of the plate and its curved edge. A stop shoulder 25 is formed at one side of the plate for engagement with the stop 21 previously mentioned so as to limit the movement of the plate in one direction.

Mounted to rotate about the pin 18, between the arms 17, is a carriage designated generally 26. This carriage comprises a substantially triangular bed plate 27 carrying at two of its corners ears 28 in which a bearing tube 29 for the reception of the pin 18 is supported. It is to be understood, of course, that the ears 28 are formed with aligning openings through which the ends of the pin 18 may project. Formed at the third corner of the plate 27 is an ear 30 and formed midway of the end of the plate carrying the ear 28 is a similar ear 31 which cooperates with the ear 30 in supporting a bearing tube 32,

the axis of which lies perpendicular to the axis of the bearing tube **29** previously mentioned. Like the ears **28**, the ears **30** and **31** are formed with aligning openings which also align through the bearing tube **32**. Riveted or otherwise secured to the upper side of the plate **27**, i. e., that side of the plate opposite the one from which the ears **28**, **30** and **31** project, is a leaf spring **33**, the end of which projects beyond the end of the plate **27** carrying the ear **30** to form a lifting lever **34**. This projecting part carries, adjacent the ear **30**, a toothed rack section **35** for a purpose to be more fully hereinafter described. Secured to one of the ears **28** and extending toward the end of the plate **27** carrying the ear **30** in parallel relation with the axis of the bearing tube **32** is an arm **36**, the free end of which is turned at right angles as illustrated at **37** in Figure 6 and bent back to form an indexing finger **38**, which, as illustrated in Figure 1, partially overlies the outer face of the plate **22** and cooperates with the graduations **23** thereon. Formed in the arm **36** is an opening which aligns with the slot **24** in the plate **22** and carried by the arm **36** is a filler block **39** formed with an opening **40** which aligns with the opening in the arm. It will thus be seen that when the carriage is assembled in the yoke, the space between the plate **22** and the arm **36** will be filled, it being understood that the filler block **39** is of a thickness equal to the thickness of the arm **17** of the yoke over which the plate **22** lies.

Slidably mounted in the bearing tube **32** is a shaft **41** carrying, at its lower end, a head **42** which is drilled axially to form a socket **43** for the reception of a dop stick **44** which is held in the socket by means of a suitable set-screw **45**. The upper end of the shaft **41** is screw-threaded, as at **46**, with which a locking nut **47** and a jam nut **48** are engaged. A compression coil spring **49** surrounds the shaft **41** between the head **42** and the carriage **26** and the upper end of this spring bears against an indexing wheel **50** which is splined to allow the shaft to move longitudinally through the wheel but to prevent relative rotation between the two. As illustrated in Figures 4 and 5, the periphery of the wheel is provided with teeth **52** for engagement with the teeth of the rack section **35** previously described, and the outer face of the wheel is provided with graduations **53** indicating quarters, eights and sixteenths of the periphery thereof. It is to be understood that the number of teeth **52** may vary according to the number of stations at which it is desired to lock the shaft **41** against rotation, but in general it has been found that if the wheel carries thirty-two teeth, it will be adequate for most purposes.

Assuming the device to be assembled, as illustrated in Figures 1, 2, 3 and 4, a bolt **54** is thrust through the opening in the arm **36**, and passing through the opening **40** of the filler block **39**, it enters the slot **24** and projects outwardly from the outer face of the plate **22**, as illustrated in Figure 3. A wing nut **55** is threaded on the outer end of the bolt to abut a washer **56** supported on the bolt and bearing on the outer face of the plate **22**. Due to the slotted connection between the plate **22** and the arm **36**, it is obvious that the carriage may be tilted about the pivot pin **18** to the desired angle and the plate **22** and carriage may then be locked together to swing in unison about the pivot **18** as suggested by the dotted line position of the parts in Figure 1.

In some instances, it may be found desirable to lock the segmental plate against horizontal swinging movement about its pivot, and to this end I provide a plate **22***a* with an arcuate slot **24***a* and graduations **23***a*, as shown in Figures 7 and 8, with an opening **57** which is adapted to be engaged by a pin **58** carried adjacent the free end of a leaf spring latch **59** which is attached by screws **60** to the arm **17***a* of a yoke designated generally **15***a* which corresponds, in all respects, to the yoke **15**. It will thus be seen that the plate **22***a* will be held against rotary movement when the carriage **26** is being adjusted, but that at any time it may be so desired, the user may lift the latch **59** so as to disengage the pin **58** and permit the plate **22***a* to swing with the carriage.

In use, a gem G is mounted on the end of the dop stick **44**, as illustrated in Figure 1, to engage a lap wheel L. The angle at which the facet to be cut in the gem G is next determined and the wing nut **55** loosened on the bolt **54** so as to permit the shaft **41** to be swung to the desired angular position with respect to the lap wheel in accordance with the graduations **23** on the plate **22**, it being understood that the pointer **38** cooperates with the graduations in determining the angle. The wing nut **55** is then tightened and the carriage and protractor plate **22** will thus be locked together so as to move in unison about the pivot pin **18**. Due to the engagement of the stop shoulder **25** with the stop **21**, it is obvious that the plate **22** and carriage cannot now be moved beyond the angular position desired. The collar **12** is next adjusted vertically on the standard **10** to produce the desired contact of the gem G with the lap wheel L and the nuts **47** and **48** are then adjusted on the upper end of the shaft **41** to limit the axial movement of the shaft under the influence of the spring **49**. In this manner, the angle of the facet to be produced and the depth of cut on the gem can be automatically regulated. Having cut one facet, it is but a simple matter to swing the shaft **41** as suggested in the dotted lines in Figure 1 and by lifting the thumb piece **34** of the latch spring **33**, the teeth on the rack section **35** may be withdrawn from engagement with the teeth **52** of the wheel **50** so as to permit it to be turned about the axis of the shaft **41**. Such rotation of the wheel **50** will, of course, cause the shaft **41** to rotate and thereby rotate the gem G about its axis to the desired position for cutting the next facet. Upon releasing the lifting pressure on the shaft **41**, it will return to original position with the gem G contacting the lap wheel L and the cutting of the second facet may proceed. The operation is repeated until all of the similarly positioned facets have been cut, and it will be seen that due to the various controls and adjustments all similarly positioned facets will be cut to the same depth and at the same angle as the first one. In this way a uniformly cut stone may be produced. Should it be so desired, the shaft **41** may be elevated off of the lap wheel at any time and the gem inspected so as to ascertain the progress of the cutting operation.

Geometrically, a variable right-angle triangle is formed by prolongation of the face of the lap wheel, the axis of the standard and the axis of the dop rod, wherein the face of the lap wheel and the axis of the standard are the legs and the axis of the dop rod is the hypotenuse. With the two legs of the right angled triangle fixed, the dop rod is movable axially along the hypotenuse, thus

assuring an adjustably fixed angle of cut and with the depth of cut on the gem determined by the axial movement along the hypotenuse represented by the dop rod. Any variation in the length of the leg of the right-angle triangle represented by the axis of the stand is relatively unimportant because of the fact that the angles are fixed (as desired and shown on the protractor) and the hypotenuse and other leg of the triangle vary according to the setting of the one leg.

While in the foregoing there has been shown and described the preferred embodiment of this invention, it is to be understood that minor changes in the details of construction and combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

Having thus described the invention, what I claim as new is:

1. A faceting head which includes a vertically adjustable U-shaped yoke the arms of which lie in spaced parallel relation in the same longitudinal plane, a carriage pivotally supported between the arms of the yoke to swing about a horizontal axis, a sectorial plate pivotally supported by the yoke to swing about the horizontal axis, a stop carried by the yoke to limit the pivotal movement of the plate in one direction, a dop stick on the carriage lying along an axis perpendicular to that about which the carriage swings and means adjustably to couple the carriage with the sectorial plate to cause the stop to hold the dop stick at a predetermined angle with relation to the vertical, and means yieldingly to urge the dop stick away from the carriage.

2. A faceting head which includes a vertically adjustable U-shaped yoke the arms of which lie in spaced parallel relation in the same horizontal plane, a carriage pivotally supported between the arms of the yoke to swing about a horizontal axis, a sectorial plate pivotally supported by the yoke to swing about the horizontal axis, a stop carried by the yoke to limit the pivotal movement of the plate in one direction, a dop stick mounted on the carriage to rotate about an axis which lies perpendicular to the horizontal axis about which the carriage swings, means adjustably to couple the carriage with the plate to cause the stop to hold the dop stick at a predetermined angle to the vertical, means releasably to hold the dop stick against rotation about its axis, and means yieldingly to urge the dop stick away from the carriage.

3. A faceting head which includes a vertically adjustable U-shape yoke the arms of which lie in spaced parallel relation in the same horizontal plane, a carriage pivotally supported between the arms of the yoke to swing about a horizontal axis, a sectorial plate pivotally supported by the yoke to swing about the horizontal axis, a stop carried by the yoke to limit the pivotal movement of the plate in one direction, a dop stick holder rotatably supported on the carriage to rotate about an axis which lies perpendicular to the horizontal axis about which the carriage swings, means adjustably to couple the carriage with the plate, a pinion on the dop stick holder adjacent the carriage, a toothed dog yieldingly supported on the carriage to engage the pinion and hold the dop stick holder against rotation about the perpendicular axis, and means yieldingly to urge the dop stick holder away from the carriage.

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