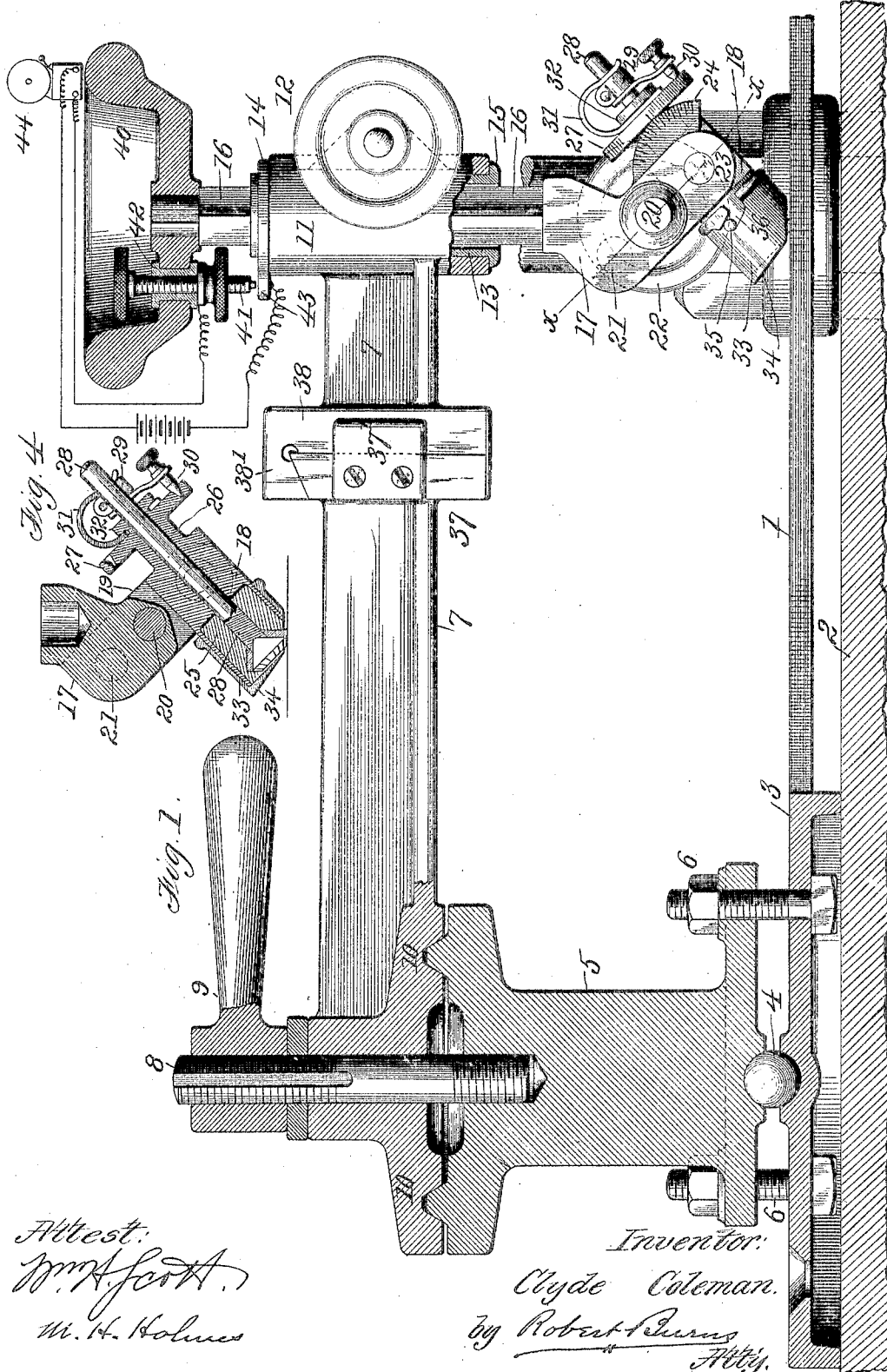


C. COLEMAN.
GRINDING OR POLISHING GEMS.

APPLICATION FILED DEC. 6, 1898.

2 SHEETS—SHEET 1.



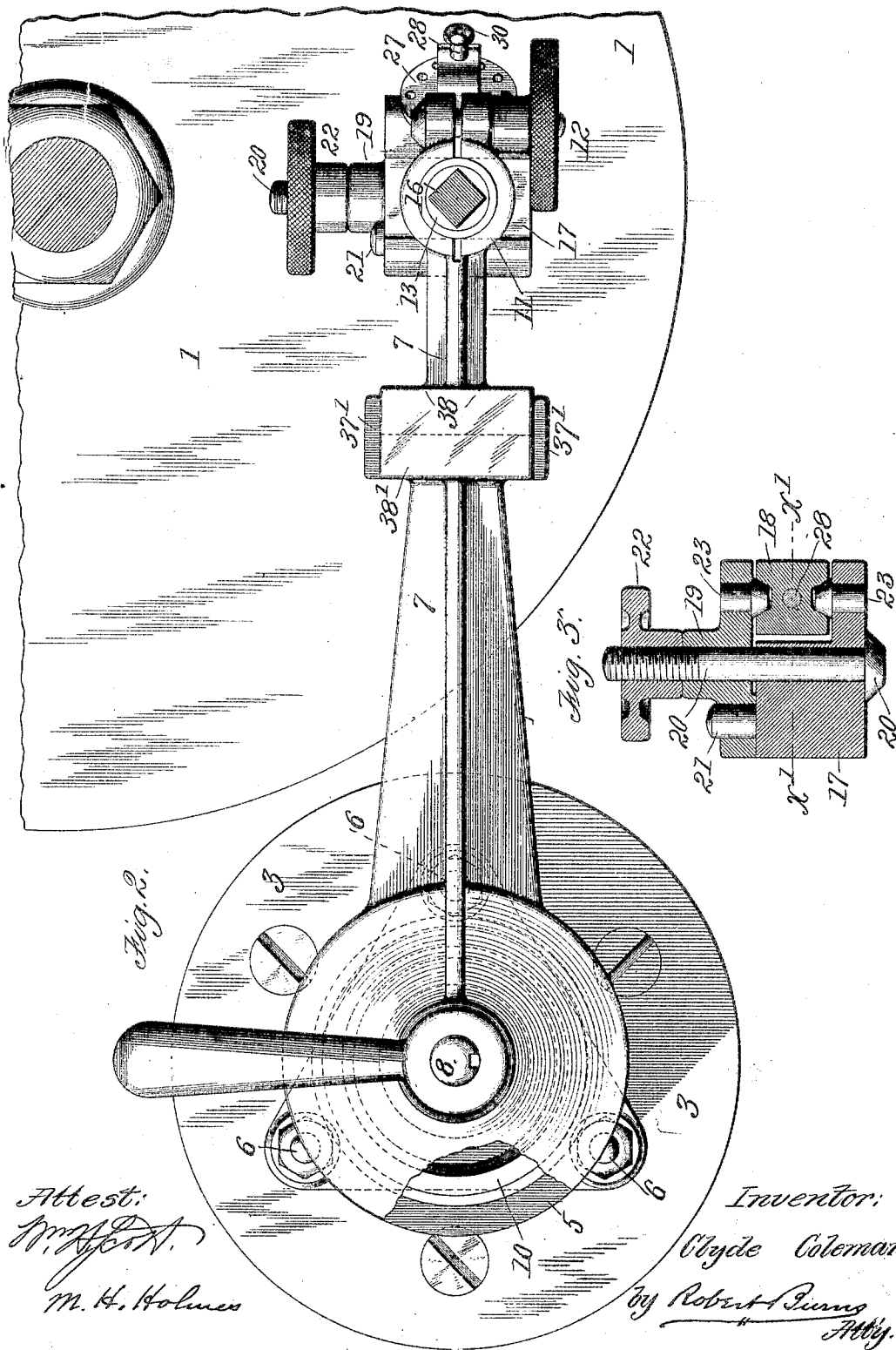
Attest:
J. H. Fort
W. H. Holmes

Inventor:
Clyde Coleman.
By Robert Burns
Atty.

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2 SHEETS—SHEET 2



Attest:
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M. H. Holmes

Inventor:
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UNITED STATES PATENT OFFICE.

CLYDE COLEMAN, OF CHICAGO, ILLINOIS.

GRINDING OR POLISHING GEMS.

No. 802,368.

Specification of Letters Patent.

Patented Oct. 24, 1905.

Application filed December 6, 1898. Serial No. 698,481.

To all whom it may concern:

Be it known that I, CLYDE COLEMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have
5 invented certain new and useful Improvements in Grinding or Polishing Gems; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming
10 a part of this specification.

The present invention relates to that type of machines for grinding and polishing diamonds and like gems in which a horizontally-revolving lap carrying diamond-dust, &c., is
15 used in connection with a suitable diamond-holder to effect the desired grinding or polishing action; and the object of the present improvement is to provide a simple, durable, and efficient mechanism for such uses and
20 which embodies features of merit as follows: an adjustment of the uncut gem to successively cut or polish the succeeding facets thereof in a positive, speedy, and accurate manner, so as to attain perfect uniformity in
25 the finished gem; a convenient and sensitive means for indicating when the particular facet of the gem has been sufficiently ground down or polished, as well as a convenient arrangement of the gem-carrier and supporting mechanism by means of which the gem-carrier is
30 held in accurate relation to the grinding or polishing lap and with which a traverse movement of the gem across the face of the polishing-lap can be effected in a ready manner during
35 the entire grinding or polishing operation or during the final polishing operation, all as will hereinafter more fully appear and be more particularly pointed out in the claims. I attain such objects by the construction and
40 arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation, with parts in section, of a grinding and polishing machine constructed in accordance with the present
45 invention; Fig. 2, a plan view of the same with parts broken away; Fig. 3, a detail section at line *x x*, Fig. 1; Fig. 4, a detail sectional elevation of the gem-carrier at line *x' x'*, Fig. 3.

Similar numerals of reference indicate like
50 parts in the several views.

As represented in the drawings, the present invention is more especially adapted to the usual horizontally-revolving lap 1, that is arranged immediately above the stationary
55 table or bench 2 and having its upper surface coated with diamond-dust or other analogous

material used in grinding and polishing diamonds and other precious stones.

The supporting-frame for the gem-carrier is of the overhanging-arm type, and in the
60 present invention will have a rigid attachment to the main table or bench 2 and in detail will consist of the following parts: 3 is a base-piece rigidly attached to the table 2 by screws or otherwise and provided on its upper surface
65 with a centrally-arranged cavity, in which the lower part of a pivot-ball 4 rests. 5 is an upright column, formed on its lower surface with a centrally-arranged cavity corresponding to that in the base 2, and which is adapted to
70 receive the upper portion of the pivot-ball 4, so that a pivoted adjustment of the column 5 in any required direction from a vertical may be effected. 6 represents a series of circularly-arranged adjusting-bolts connecting the lower
75 flanged end of the column 5 to the base 3, and by the independent adjustment of which any required adjustment of column can be effected, the purpose being to afford a convenient and positive means for attaining an adjustment
80 of the supporting-arm of the gem-carrier, so that the same will have a movement in a plane parallel with the surface of the grinding or polishing lap 1 in the different movements of
85 such gem-carrier during the grinding and polishing operations. 7 is the overhanging arm of the supporting-frame attached at one end on the top of the upright column 5 in a horizontally-swinging manner by means
90 of a central attaching bolt or arbor 8, that forms a pivotal connection between the parts, the said bolt being provided with a hand-nut 9, by means of which the parts can be bound together, so that there will be no danger of
95 any independent movement of such parts other than the swinging movement in a horizontal plane, as heretofore mentioned. 10 is a concentric track, preferably of an A shape, as shown, on the adjacent face of one part, fitting a correspondingly-formed groove in the
100 adjacent face of the other part, so as to provide a more effective and stable horizontal pivotal connection and avoid any rocking movement in a vertical plane of the arm 7 upon the column 5. The arm 7 at its outer or free end
105 is formed with a vertically-arranged holding-head 11, that is split vertically and provided with a clamping-screw 12, so as to be capable of firmly clamping and holding the circularly-adjustable guide-sleeve 13 of the diamond-carrier. The guide-sleeve 13 is formed with a
110 cylindrical periphery fitting the bore of the

holding-head 11 and is provided with top and bottom end collars 14 and 15 to prevent a vertical independent movement of the guide-sleeve 13 in the holding-head 11, one of the
 5 said collars being made removable to admit of the assemblage of parts. The guide-bore of the sleeve 13 is of a non-circular form, preferably of the square form shown, so as to receive the squared guide-stem 16 of the gem-carrier, that is adapted to have a free vertical
 10 movement in said sleeve without any ability to turn therein. At its lower end the guide-stem 16 carries a head 17, in which is secured in a pivotal manner the gem-carrier 18, so
 15 that the same can be adjusted to present the gem to the grinding or polishing lap at the required angle in grinding or polishing the facets of the gem. In the construction shown the head 17 has an oblique arrangement and
 20 consists of the main fixed member 17 and an adjustable auxiliary member 19, that is connected to the fixed member, so as to move in a straight line to or from the main member by means of the central clamping-bolt 20 and
 25 the guide-pin 21 at one end, 22 being a clamping-nut by which movement is imparted to the adjustable member 19. At the end opposite to the guide-pin 21 the members 17 and 19 are provided with truncated cone centers or pro-
 30 jections 23, that are adapted to engage in similarly-formed recesses at opposite sides of the gem-carrier 18, and by the action of the clamping-nut 22 such projections 23 bind in the recesses of the gem-carrier to clamp and hold
 35 said carrier at the required angular adjustment with relation to the grinding or polishing lap 2, to which it had been previously adjusted.

24 is a graduated sector on the fixed member 17 to aid in the proper adjustment of the
 40 gem-carrier, as above set forth.

In the present invention the gem-carrier will consist of a body portion 18, the lower end of which is chambered out to receive a
 45 body 25 of fusible material, such as lead, that acts as a holding-matrix for the gem during the cutting and polishing operation, as usual in the present type of apparatus, the central portion of carrier being provided with the
 50 cone-shaped sockets for the reception of the centers or projections 23 of the holding-head members 17 and 19 heretofore described, while at its upper end the gem-carrier is provided with a reduced neck 26, ending in
 55 a dial or index plate 27.

28 is a cylindrical arbor fitting an axial bore of the gem-carrier and adapted to have endwise movement in the same. The lower
 60 end of this arbor 28 is cupped out to receive the uncut diamond or other gem, which is secured in a permanent manner in such end by means of a suitable fireproof cement, so that the gem will remain a fixture upon said
 65 gem-holding arbor 28 during the different softenings or meltings of the metal matrix 25,

as the gem is successively adjusted to cut the succeeding facets thereof.

The upper end of the gem-holding arbor 28 projects above the gem-carrier, so as to be capable of being turned or adjusted by hand
 70 in the operation of changing the gem from a finished to a succeeding unfinished facet, (the matrix 25 being at the time in a softened or molten condition,) and to this end the arbor will be provided with a suitable fixed arm 29,
 75 preferably of a spring formation, as shown, which carries a pointer-stud 30, adapted to be engaged in any one of the index-holes of the index-plate 27 of the gem-carrier.

31 is a spring secured above the index-
 80 plate 27 in a revoluble manner, preferably by a forked end of the spring engaging beneath a confining-collar 32, that forms a portion of the index-plate, as shown in Fig. 4. The
 85 upper end of the spring 31 bears upon the fixed arm 29 of the gem-holding arbor 28, with a tendency to force the same downward.

33 is a gem-retaining device or gage at the lower end of the gem-carrier, which may be in the form of a simple stop-finger, but which
 90 preferably will be in the form of a detachable cap fitting the lower end of the gem-carrier and cut away diagonally at one corner, as shown. The head or end portion 34 of this cap forms an abutment or rest for the ini-
 95 tially-formed table portion of the gem that is to be finished, and by the engagement of such stop and the table portion of the gem a fixed relation of the gem within the gem-carrier and the metal matrix 25 thereof will at
 100 all times be insured in a ready and reliable manner.

Any usual and suitable means may be employed to secure the gem-retaining cap 33 in place upon the lower end of the gem-carrier,
 105 preference being given to fixed studs 35 on the sides of said carrier, that are adapted to enter L-shaped recesses 36 in the walls of said cap and by an independent turning movement of said cap effect an attachment of the parts to-
 110 gether in a manner similar to the well-known bayonet-joint.

In the present invention the overhanging arm 7 is made in two parts connected together in a readily-detachable manner, so that the
 115 outer portion thereof carrying the gem-carrier and attachments can be readily detached for the purpose of inspecting the work, &c., and again returned in place. In my preferred construction, as illustrated in the drawings, the
 120 adjacent ends of such parts are formed with enlargements 37 and 38, one of which is formed with a horizontally-beveled edge and top and the other with a hook-shaped projection 35', correspondingly beveled, so that the two ad-
 125 jacent surfaces will fit together to form an effective and accurate attachment between the parts that admits of ready attachment and detachment.

37' represents side lugs on the part 37 to 130

prevent independent lateral movement at the above-described point.

As shown in Fig. 2, the base 3 will be so positioned on the main bench or table 1 that the overhanging arm 7 will have a tangential arrangement with relation to the horizontal lap 2, so that said arm in its swing may be brought to any desired part of the lap, either close to the center or near the periphery, as desired, or swing entirely clear of the said lap. This arrangement also admits of the gem-carrier being moved laterally across the lap during the grinding or polishing operation by the hand of the operator or otherwise either during the entire process or during the final part of the polishing.

At top the square guide-stem 16, of the gem-carrier will be provided a hand-wheel 40, by which the rotary adjustment of the gem-carrier is effected to present the grain of the gem operated upon in the proper direction to the grinding or polishing lap. The guide-stem carries, preferably by means of its hand-wheel 40, an adjustable contact-point 41, that passes through an insulating-bushing 42, and is provided with proper adjusting and locking nuts or heads, as shown, and which is in connection with one pole of the battery of an alarm-circuit.

43 is a contact-point on the overhanging arm 7, that is in line with the contact-point 41 and has connection with the opposite pole of the battery of the aforesaid alarm-circuit, the construction being such that as the diamond or other gem is being ground away in the operation of the apparatus the vertical guide-stem 16 will gradually descend until the contact-point 41 touches the contact-point 43 to establish the electric circuit and ring the alarm-bell 44, the contact-point 41 having been previously adjusted so as to effect such alarm when the proper degree of grinding has been attained.

In the operation of the present machine the proper alinement of the overhanging arm 7 with relation to the upper surface of the lap 1 will be first attained by the means heretofore described, the diamond or other gem, with its table portion already formed, will be cemented into the cup-shaped receiving end of the gem-holding arbor 28, and the same inserted in place in the gem-carrier, which will then have its cavity filled with the molten-metal matrix 25 to surround the gem and firmly hold the same. The gem-carrier is then set at the required angle to which it is intended to grind the facets of the gem, and the metal matrix is removed from the particular portion of the gem to be ground and the grinding action commenced. The grinding progresses until the desired facet is formed, after which the gem-carrier is removed from the holder, and after being submitted to heat to soften or melt the metal matrix 25 the gem is turned, by means of its

holding-arbor 28, so as to bring the next facet into position to be ground, after which the metal matrix is allowed to again cool upon the gem previous to a recommencement of the grinding process, and so on until all the different facets of the gem are formed.

It is obvious that various modifications may be made in the construction above particularly described and shown in the drawings within the spirit and scope of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. The combination in an apparatus for grinding or polishing gems, of a carrier-head, a centrally-arranged holder carrying the gem, a detachable abutment on the lower end of the carrier-head, and a spring engaging the gem-holder to force it toward said abutment.

2. The combination, in an apparatus for grinding or polishing gems, of a carrier-head, a gem-holder carried in said head, an abutment movable into and out of operative position at the lower end of the carrier-head, and retractive means tending to force the gem-holder toward said abutment.

3. The combination, in an apparatus for grinding or polishing gems, of a gem-carrier, a fusible matrix carried thereby, and a rotatable gem-holder projecting within the matrix and adapted to effect a rotary adjustment of the gem when the matrix is in a plastic or fused condition.

4. The combination in an apparatus for grinding and polishing gems, of a gem-carrier, a fusible matrix carried thereby, a rotatable gem-holder projecting within the matrix and adapted to effect a rotary adjustment of the gem when the matrix is in a plastic or fused condition, and two members of an index device comprising an index-arm and index-plate, one of said members on the gem-holder and the other on the gem-carrier.

5. The combination, in an apparatus for grinding or polishing gems, of a gem-carrier, a fusible matrix carried thereby, a rotatable gem-holder projecting within the matrix and adapted to effect a rotary adjustment of the gem-holder when the matrix is in a plastic or fused condition, and an abutment movable into and out of operative position at the lower end of the gem-carrier.

6. The combination in an apparatus for grinding or polishing gems, of a gem-carrier containing a fusible matrix, a centrally-arranged holder carrying the gem, a detachable abutment on the lower end of the carrier, and a spring engaging the gem-holding arbor to force it toward said abutment, substantially as set forth.

7. The combination, in an apparatus for grinding or polishing gems, of a gem-carrier, a fusible matrix carried thereby, a rotatable gem-holder projecting within the matrix, an abutment movable into and out of operative position at the lower end of the carrier, and

retractive means tending to force the gem-holder toward said abutment.

8. The combination, in an apparatus for grinding or polishing gems, of a gem-carrier, a fusible matrix carried thereby, a rotatable gem-holder projecting within the matrix and adapted to have longitudinal movement in the gem-carrier, and an abutment movable into and out of operative position at the lower end of the carrier and comprising a cap fitting upon said end.

9. The combination in an apparatus for grinding or polishing gems, of a gem-carrier containing a fusible matrix, a centrally-arranged gem and adapted to effect a rotary adjustment of the same in the gem-holding matrix when such matrix is in a fused condition, holding-arbor carrying the gem and adapted to have longitudinal movement in the gem-carrier, and a detachable abutment on the lower end of the carrier formed by a cap fitting said end and secured thereto by studs 35, and L-shaped recesses 36, substantially as set forth.

10. The combination in an apparatus for grinding or polishing gems, of a gem-carrier formed with sockets on opposite sides, a holding-head for the carrier formed by main and auxiliary members 17 and 19, provided with projections 23, and guide-pin 21, and a clamping-bolt and nut 20 and 22, substantially as set forth.

11. The combination in an apparatus for grinding or polishing gems, of a grinding-lap, a stationary holding-frame, a gem-carrier having movement therein in a direction to and from the grinding-lap, and alined contact points or stops carried by the gem-carrier and the holding-frame, one of which points or stops is made adjustable.

12. The combination in an apparatus for grinding or polishing gems, of a grinding-lap, a stationary holding-frame, a gem-carrier having movements of adjustment in said frame, one movement in a direction to and from the grinding-lap, and another a turning movement in said frame to enable the grain of the gem to be submitted in a proper direction to the lap, and alined contact points or stops carried by the gem-carrier and the holding-frame, one of which points or stops is made adjustable.

13. The combination in an apparatus for grinding or polishing gems, of a gem-carrier, a holding-head therefor, the same provided with a vertical guide-stem, and a fixed overhanging arm having a vertical guide-head for said stem and adapted to afford limited rectilinear movement to the holder-head of the gem-carrier.

14. The combination in an apparatus for grinding or polishing gems, of a gem-carrier, a holding-head having a guide-stem, a fixed overhanging arm having a vertical guide-head, and an adjustable stop carried by the guide-stem and adapted to afford limited rectilinear

movement to the holder-head of the gem-carrier, to limit the downward movement thereof.

15. The combination in an apparatus for grinding or polishing gems, of a grinding-lap, a stationary holding frame or arm having a vertically-slitted guide-head, a gem-carrier, a holding-head for the gem-carrier provided with a guide-stem adapted to have limited rectilinear movement in the guide-head of the stationary frame, a circularly-adjustable guide-sleeve formed in sections and arranged in the guide-head of the stationary frame, and a clamping-screw for clamping the said slitted guide-head upon such guide-sleeve.

16. The combination in an apparatus for grinding or polishing gems, of a gem-carrier, a holding-head having a guide-stem, a fixed overhanging arm made in two parts detachably connected together, and a vertical guide-head on the outer end of said arm.

17. The combination in an apparatus for grinding or polishing gems, of a gem-carrier, a holding-head having a guide-stem, a fixed overhanging arm made in two parts detachably connected together by a tapering dovetail joint, and a vertical guide-head on the outer end of said arm.

18. The combination in an apparatus, for grinding or polishing gems, of a stationary vertical support, an overhanging arm pivoted to said support so as to swing horizontally, a gem-carrier connected to the outer end of said arm and having an independent vertical movement with relation to the same, a stop moving with said carrier, and an abutment therefor upon the arm.

19. The combination in an apparatus for grinding or polishing gems, of a stationary vertical support, a horizontally-swinging arm pivoted to said support, a gem-carrier connected to the outer end of said arm and having independent vertical movement with relation to the same, a stop moving with said carrier, an abutment therefor upon the arm, a source of electric energy, an alarm, and connections therefor embracing said stop and abutment.

20. The combination in an apparatus for grinding or polishing gems, of a stationary vertical support, a horizontally-swinging arm pivoted thereto, and a gem-carrier connected to the outer end of said arm and having an independent vertical movement with relation to the arm, the said arm and stationary support having a tangential arrangement with relation to the horizontal grinding or polishing lap.

21. The combination in an apparatus for grinding or polishing gems, of a stationary vertical support, formed in two parts, the upper one of which is adjustable upon the other, an overhanging supporting-arm connected to said upper part of the support, and a gem-carrier connected to the outer end of said arm, and having an independent vertical movement with relation to the arm.

22. The combination in an apparatus for grinding or polishing gems, of a stationary vertical support formed in two parts, connected together by a pivot-ball 4, an overhang-
5 ing supporting-arm connected to the upper part of the support, and a gem-carrier connected to the outer end of said arm, and having an independent vertical movement with relation to the same.

10 23. The combination in an apparatus for grinding or polishing gems, of a stationary vertical support, a horizontal swinging arm

connected thereto by a pivot-bolt 8, and concentric track 10, and a gem-carrier connected to the outer end of said arm, and having an
15 independent vertical movement with relation to the same.

In testimony whereof witness my hand this 28th day of November, 1898.

CLYDE COLEMAN.

In presence of—

ROBERT BURNS,
JAMES LAVALLIN.