

No. 845,687.

PATENTED FEB. 26, 1907.

F. H. BROWN.
CUTTING AND GRINDING MACHINE.

APPLICATION FILED NOV. 1, 1905.

3 SHEETS—SHEET 1.

Fig. 1

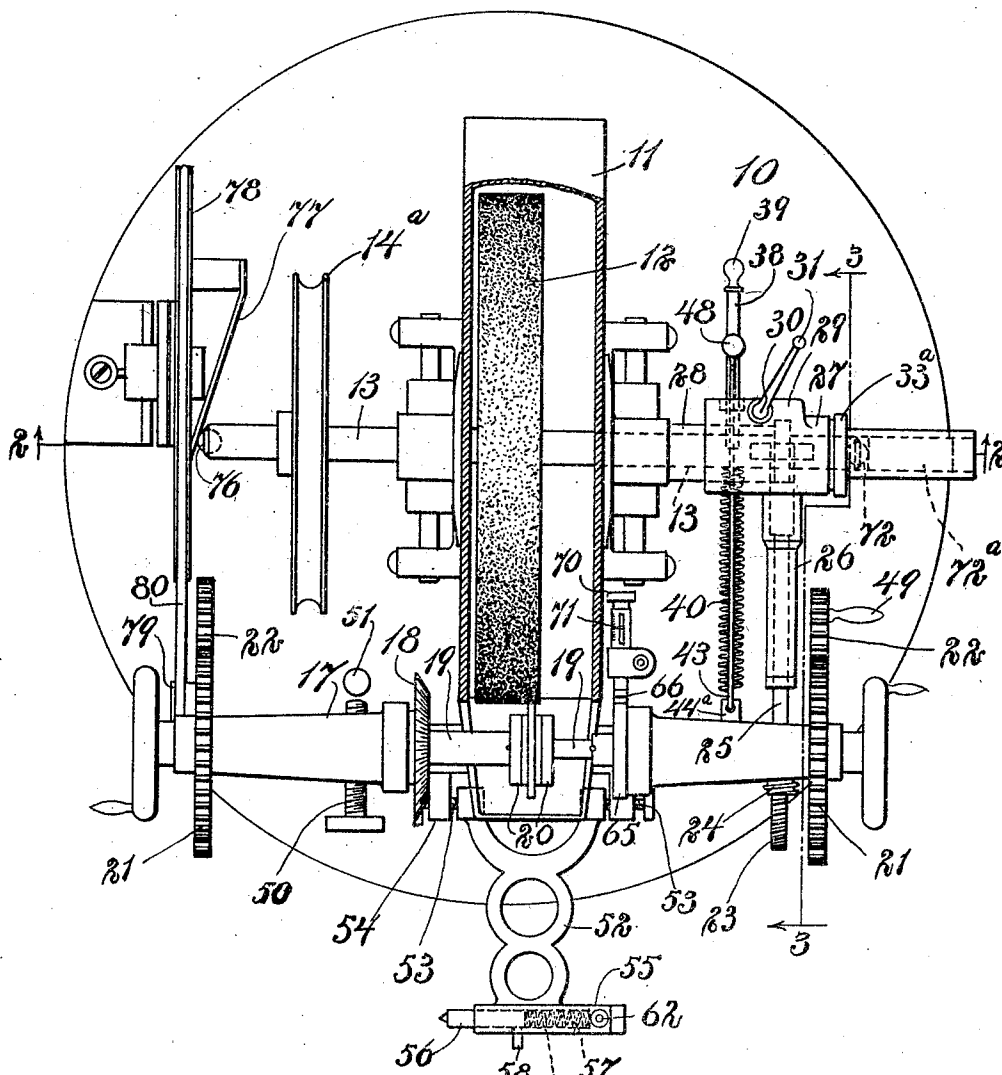
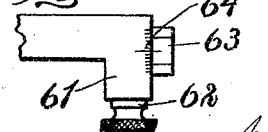


Fig. 4



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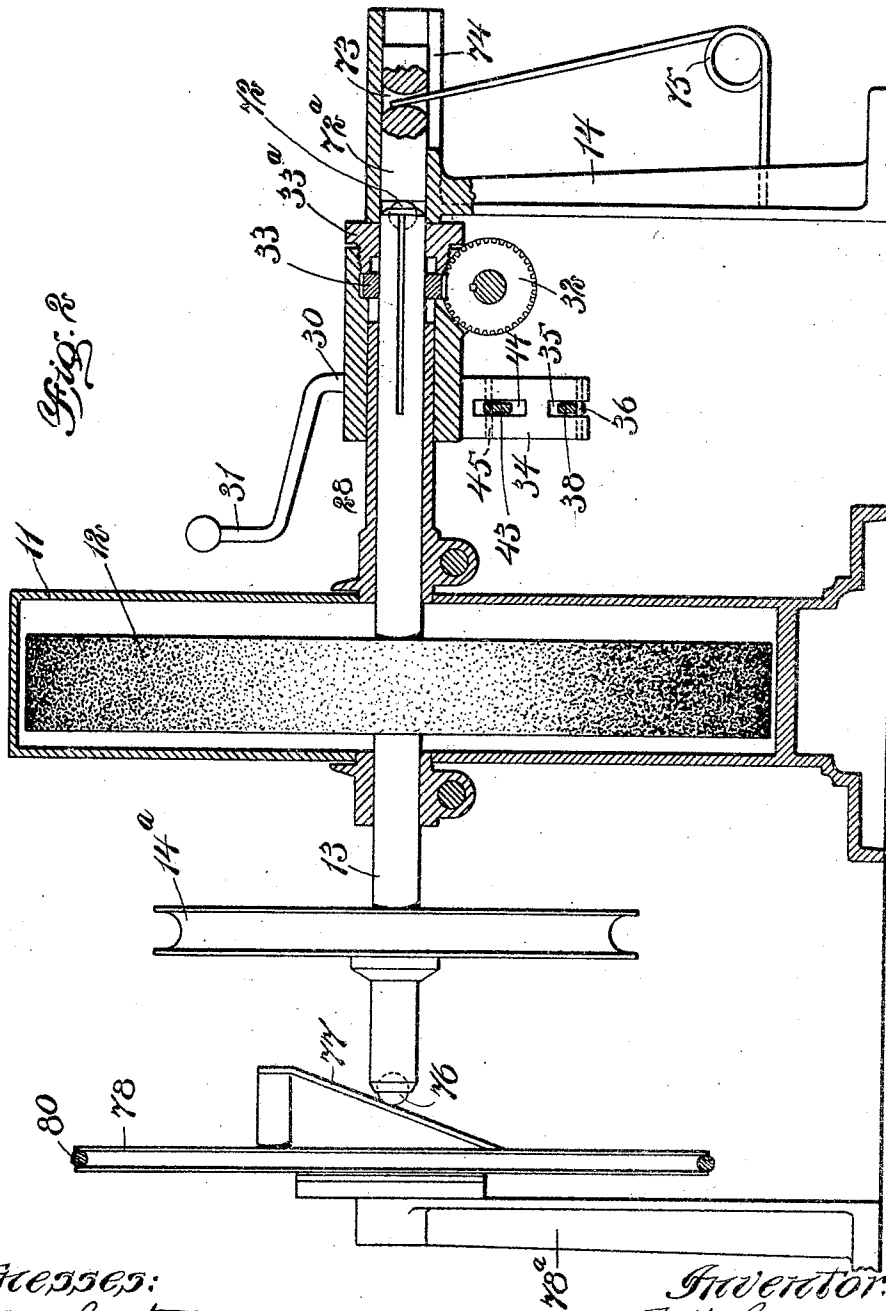
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3 SHEETS—SHEET 2.



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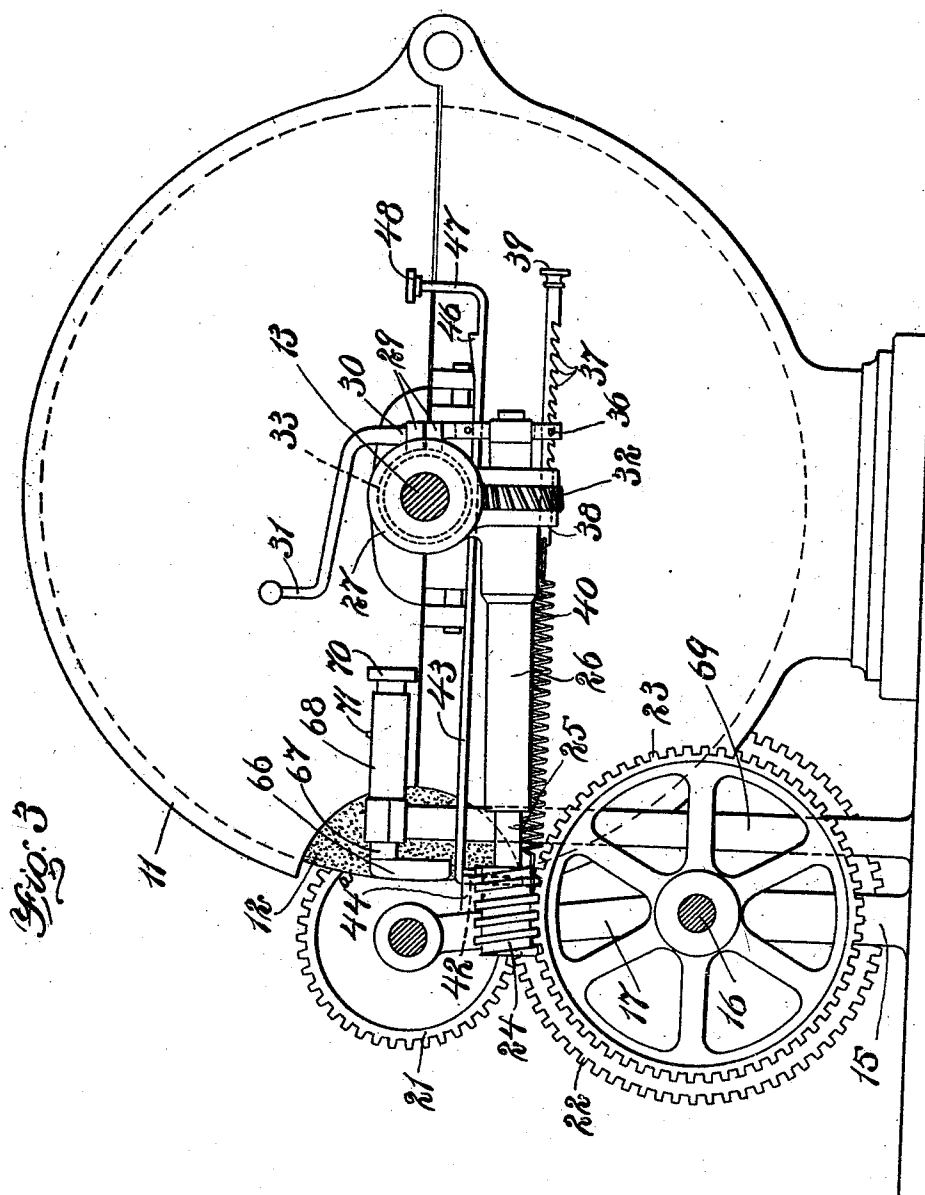
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

FREDRICK H. BROWN, OF LEBANON, NEW HAMPSHIRE.

CUTTING AND GRINDING MACHINE.

No. 845,687.

Specification of Letters Patent.

Patented Feb. 26, 1907.

Application filed November 1, 1905. Serial No. 285,396.

To all whom it may concern:

Be it known that I, FREDRICK H. BROWN, of Lebanon, in the county of Grafton and State of New Hampshire, have invented certain new and useful Improvements in Cutting and Grinding Machines, of which the following is a specification.

My invention relates to apparatus for cutting and grinding various objects, and more particularly to a machine for operating upon the edges of lenses described in the patent to Frank A. Morgan and myself, No. 670,500, of March 26, 1901. Its principal objects are to simplify and generally improve such apparatus.

In the accompanying drawings, in which similar characters designate like parts throughout the several views, Figure 1 is a top plan view of one embodiment of my invention. Fig. 2 is a vertical section there-through on the line 2 2 of Fig. 1. Fig. 3 is a similar view on the line 3 3 of Fig. 1, and Fig. 4 is an enlarged detail, in end elevation, of the diamond-holding arm.

The numeral 10 designates a base upon which is mounted a casing 11 for a grinding-wheel 12, the driving-shaft 13 of which may be journaled in the casing and in a standard 14, situated at one side thereof. The width of the casing is such that some lateral movement of the grinding-wheel in it is permitted. At the end of the driving-shaft opposite the standard is shown a pulley 14^a, by means of which rotation may be imparted to the shaft and wheel from some suitable source of power.

Near the front of the base are a pair of lugs 15 15, perforated to receive and furnish bearings for a shaft 16. Swinging upon this shaft toward and from the wheel is a carrier 17, provided with separated arms, one having an index-dial 18, and in which arms are rotatably and longitudinally movable spindles 19 19 for lens-clamps or work-holders 20 20. The mounting of these spindles is fully set forth in the patent above referred to. Fixed upon each spindle outside its arm is a gear 21, meshing with a larger gear 22, fast upon the end of the shaft 16. Just inside the gear 22 which is nearest the standard 14 is secured a worm-wheel 23, having cooperating with it a worm 24, fixed to a shaft 25. This shaft is preferably journaled in a tubular arm 26, projecting forwardly from the under side of a sleeve or supporting member 27, surrounding the shaft 13 and bearing at its in-

ner end about a cylindrical extension 28 from the casing. The sleeve is split longitudinally at one side, and upon opposite sides of the openings are lugs 29, threaded to receive a clamping-screw 30, which has at its upper end an operating-crank 31. This clamp serves to fix the position of the sleeve upon the extension, allowing the worm to be swung into gear with its wheel to impart a longitudinal feeding movement to the work-holder or thrown out. Secured upon the feeding-shaft, adjacent to the sleeve, is a spiral gear 32, meshing with a similar gear 33, situated in a chamber in the end of the sleeve and splined upon the shaft 13, so that it is compelled to rotate therewith, while permitting the shaft to move longitudinally through it. The gear 33 is retained within the sleeve-chamber by a screw-cap 33^a, threaded into the outer end of the sleeve. Depending from the sleeve between the arm and the wheel-casing is shown a securing-arm 34, having an opening 35, containing a contact-surface, which may be furnished by a transverse pin 36. With this pin may contact one of a series of teeth 37, formed in the edge of a bar 38, which has at its outer extremity a finger-piece 39. To the opposite end of the bar is attached a spring 40, which at its forward extreme engages the downturned end 42 of a controlling-rod 43, which passes through a perforated lug 44^a on the carrier and extends rearwardly above the spring through an opening 44 in the arm 34. In this opening is a pin or contact-face 45 for coaction with a shoulder or projection 46, by means of which the controlling member may be fixed in its extreme forward position against the tension of the spring. The rear end of the controlling-rod, as illustrated, is upturned at 47 and carries a finger-piece 48, by which the rod may be depressed to free the projection from its engagement.

When the worm 24 is not in mesh with its wheel, the shaft 16 may be manually rotated by means of a handle 49, projecting from the side of one of the gears 22. The movement of the carrier toward and from the wheel under the influence of the spring may be limited by a stop-screw 50, contacting with a projection 51, rising from the base.

The hand-feed is particularly used in cutting the edges of lenses, and for this purpose an arm 52 is mounted to swing at the outer side of the carrier between conical-pointed screws 53, threaded through lugs 54 upon

the carrier. The arm 52 has at its free end a guide portion 55, in which is a bore to receive a diamond-holder 56. This holder is pressed outwardly by a spring 57, situated
 5 between the end of the holder and the inner wall of the bore, and the holder may be retained in a position within the guide member by a projection 58, extending through a slot 59 in the guide and movable into an
 10 angular portion thereof. At the end of the guide portion opposite the diamond-holder is shown an enlargement 61, having an opening in which operates a screw 62, controlling the movement of a contact member 63, which
 15 may have adjacent to it a scale 64 to determine its position. This contact member coöperates with the edge of a pattern-disk 65, fixed upon the holder-spindle opposite the index 18, and when the spindle is rotated
 20 and the contact member pressed against the disk it causes the diamond to inscribe upon the lens the outline of the disk. The pattern-disk may also contact with an abutment 66, carried by a stem 67, adjustable through
 25 a sleeve 68, fixed in a standard 69, supported upon the base. The outer face of this abutment presents the same curvature as the periphery of the wheel and may be adjusted with relation thereto by turning a finger-
 30 piece 70 to shift the spindle within the sleeve, a scale and index-point 71 indicating the correct position. This abutment by its contact with the pattern-disk when the carrier is drawn inwardly by the spring causes the
 35 edge of the lens to be uniformly presented to the grinding-surface of the wheel throughout its rotary movement, this rotation being effected by the automatic feed.

The end of the shaft 13 is shown as extending but a short distance into the bearing
 40 in the standard 14 and may there be provided with a ball or antifriction member 72 for contact with the adjacent end of a head or sliding member 72^a. In this head is an
 45 opening 73, movable in alinement with a slot 74 in a standard-bearing to receive a spring 75, which may be fixed at its lower end to the standard. The opposite end of the driving-shaft may have a second ball
 50 or antifriction member 76 for contact with the inner face of a cam-disk 77, fixed at the center of a wheel 78, journaled upon a standard 78^a. Over this wheel and a relatively small wheel 79, which may be furnished by a
 55 hub upon the end of the adjacent gear 22, passes a belt 80, by which the cam-wheel is rotated from the feed-shaft 16. The tension of the spring 75 is communicated to the driving-shaft through the head, forcing the
 60 opposite extremity of the shaft against the disk and causing this member to reciprocate the shaft across the work-holder, the extent of this reciprocation preferably being substantially equal to the width of the grinding-
 65 face.

The general operation of this machine is similar to that described in the patent; but it may be said that the lens is fixed between the holder members adjacent to the index, with the position of its axis determined
 70 thereby. At this time the clamping-screw 30 is loosened, freeing the engagement of the sleeve with the casing extension and allowing the spring 40 to exert its tension, (this being adjusted to the proper degree by the engage-
 75 ment of one or another of the teeth 37 with the contact-pin,) to raise the arm 26, throwing out the automatic feed and at the same time through the controlling-rod swinging the carrier outward. The arm 52 is now
 80 raised and the diamond allowed to contact with the lens under the influence of the spring 57. Then upon applying the hand-feed the lens may be rotated to cause the diamond to inscribe upon it the outline of
 85 the pattern-disk. This having been done, the diamond is drawn back and locked by the projection 58 and its arm allowed to fall. Then the arm 26 is swung down until the worm meshes with its wheel, whereupon the
 90 sleeve is locked by the clamp. Now the tension of the spring 40 is exerted to draw the carrier toward the grinding-wheel, it being held, however, somewhat removed therefrom by the controlling-rod. Upon pressing
 95 down the finger-piece of this rod to release its projection from the contact-face the spring draws the carrier inwardly, so that the pattern-disk may contact with the abutment. The automatic feed now rotates the lens so
 100 that its edge is ground by contact with the wheel. It should be noted that in addition to this function of raising the arm and drawing up the carrier the spring also acts upon the controlling-rod to raise it into coaction
 105 with its contact-face to insure engagement of the projection therewith, this being secured by the attachment of the spring to the angular end of the controlling-rod. Attention may be further called to the fact
 110 that the reciprocation of the wheel across the edge of the lens to prevent scoring instead of a movement of the lens-holder simplifies the structure and obviates the necessity of employing a flexible transmitting-
 115 shaft or the like.

Having explained the nature of my invention, I claim—

1. A grinding-machine comprising a longitudinally-movable shaft, a grinding-wheel
 120 carried thereby, a cam for moving the shaft, a holder coöperating with the wheel, means for rotating the holder, and means for operating the cam from the holder-rotating means.

2. A grinding-machine comprising a longitudinally-movable shaft, a grinding-wheel
 125 carried by said shaft, a cam-wheel coöperating with the shaft near one extremity, a head contacting with the opposite end of the
 130

shaft and being movable independently thereof, a spring exerting its tension upon the head to force it against the shaft, and a holder cooperating with the grinding-wheel.

5 3. The combination with a driving-shaft, of a member for operating upon the work, a movable work-holder, a bodily-movable intermediate shaft, gearing connecting said intermediate shaft with the driving-shaft and
10 holder, and means for simultaneously moving the work-holder and intermediate shaft, the latter effecting a change in the relation to the gearing.

4. The combination with a driving-shaft,
15 of a member for operating upon the work, a movable work-holder, a bodily-movable intermediate shaft, gearing connecting said intermediate shaft with the driving-shaft and holder, and a spring operating to simultane-
20 ously move the work-holder and intermediate shaft.

5. The combination with a driving-shaft, of a member for operating upon the work, a movable work-holder, a bodily-movable intermediate shaft, gearing connecting said intermediate shaft with the driving-shaft and
25 holder, a controlling member cooperating with a work-holder and intermediate shaft, and a spring operating to simultaneously
30 move the work-holder, shaft and the controlling member.

6. The combination with the driving-shaft, of a member for operating upon the work, a movable work-holder, a swinging
35 member, a shaft journaled in said member, gearing connecting said shaft with the driving-shaft and holder, and a spring exerting its tension upon the swinging member and holder.

40 7. The combination with a driving-shaft, of a member for operating upon the work, a movable work-holder, a swinging member, a shaft journaled in said member, gearing connecting said shaft with the driving-shaft and
45 holder, and a spring exerting its tension upon

the swinging member and holder, and means for varying the point of attachment of the spring.

8. The combination with the driving-shaft, of a member for operating upon the
50 work, a movable work-holder, a swinging member, a shaft journaled in said member, gearing connecting said shaft with the driving-shaft and holder, a controlling member for the holder, and a spring exerting its ten-
55 sion upon the controlling member and holder.

9. The combination with a driving-shaft, of a member for operating upon the work, a movable work-holder, a sleeve which may
60 turn about the driving-shaft, an arm projecting from the sleeve, a shaft journaled in the arm, gearing connecting the arm-shaft with the driving-shaft and holder, and means for fixing the position of the sleeve about the
65 driving-shaft.

10. The combination with a driving-shaft, of a member for operating upon the work, a movable work-holder, a sleeve which may
70 turn about the driving-shaft, an arm projecting from the sleeve, a shaft journaled in the arm, gearing connecting the arm-shaft with the driving-shaft and holder, a spring operating to both turn the sleeve and move the holder, and means for fixing the position
75 of the sleeve about the driving-shaft.

11. The combination with a driving-shaft, of a member for operating upon the work, a movable work-holder, a sleeve which may
80 turn about the driving-shaft, an arm projecting from the sleeve, a shaft journaled in the arm, gearing connecting the arm-shaft with the driving-shaft and holder, a controlling member for the holder, and a spring connecting the controlling member and sleeve.

In testimony whereof I have affixed my
85 signature in presence of two witnesses.

FREDRICK H. BROWN.

Witnesses:

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HENRY M. DAY.