

June 19, 1923.

1,459,569

L. W. BUGBEE

GRINDING MACHINE

Filed Nov. 5, 1919

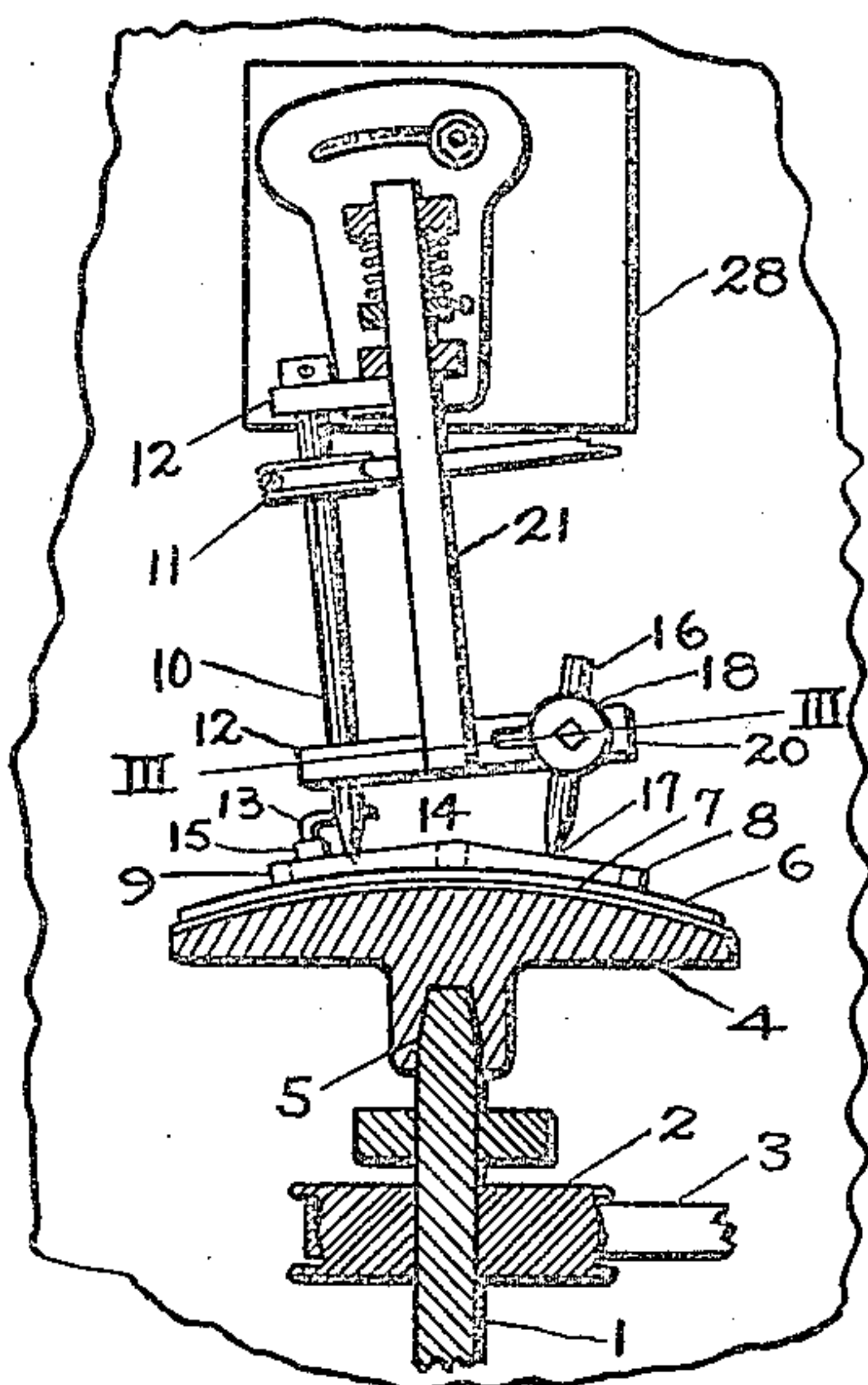


FIG. I

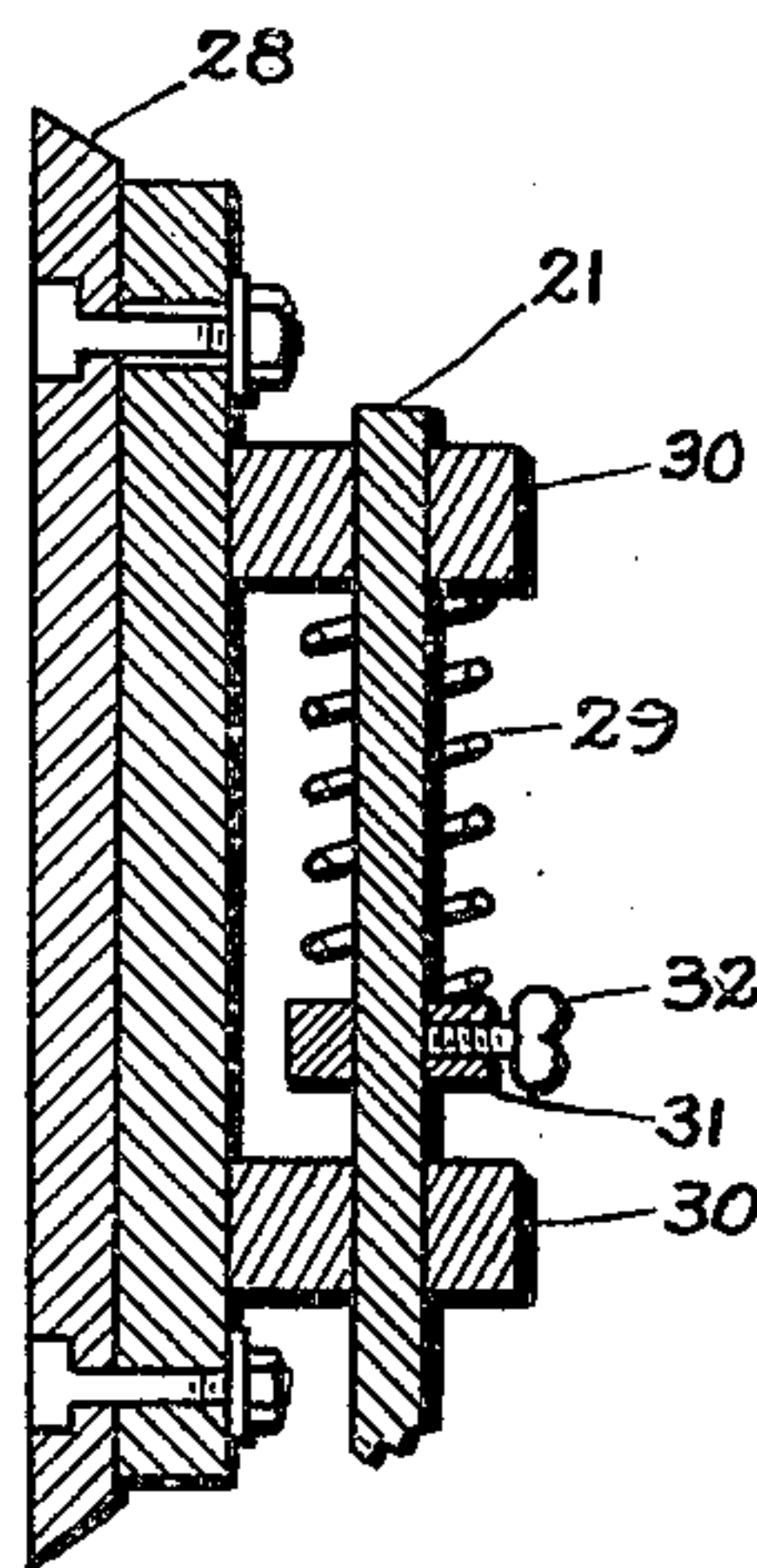


FIG. V

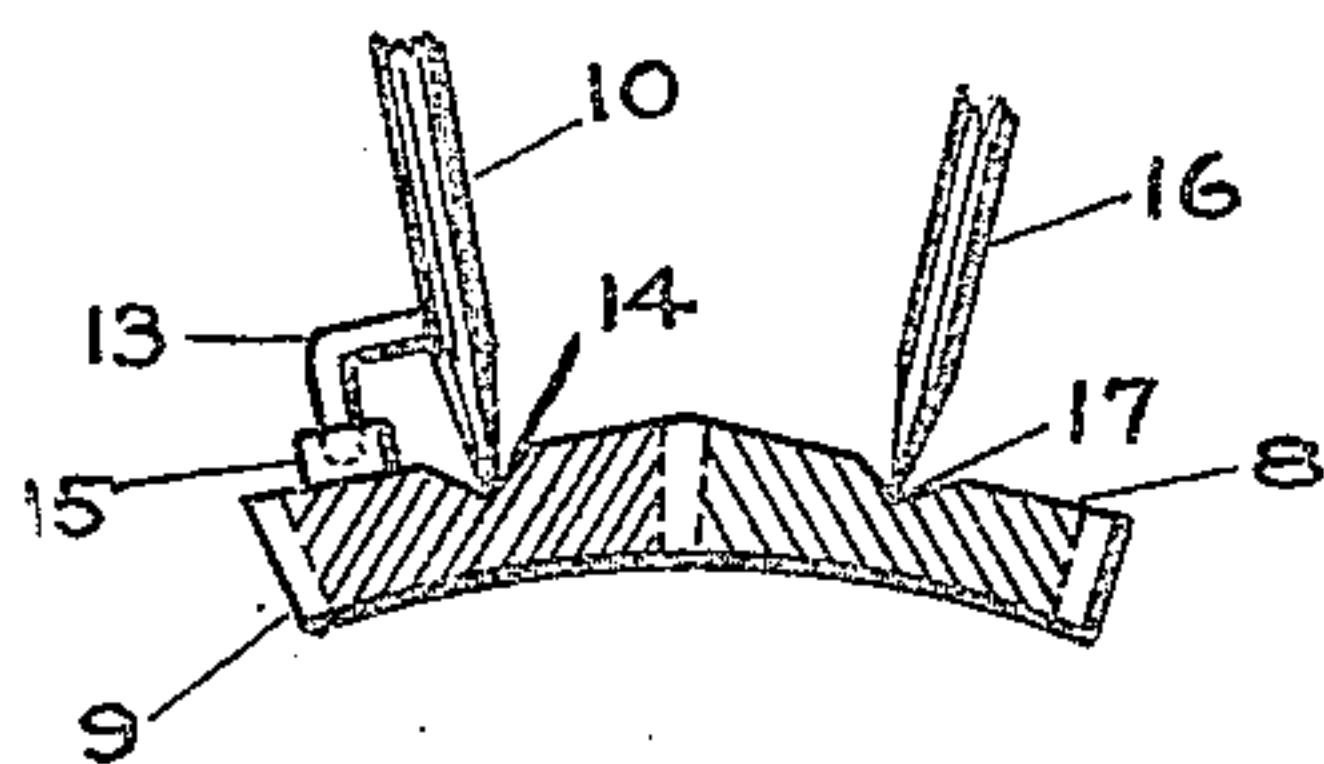


FIG. II

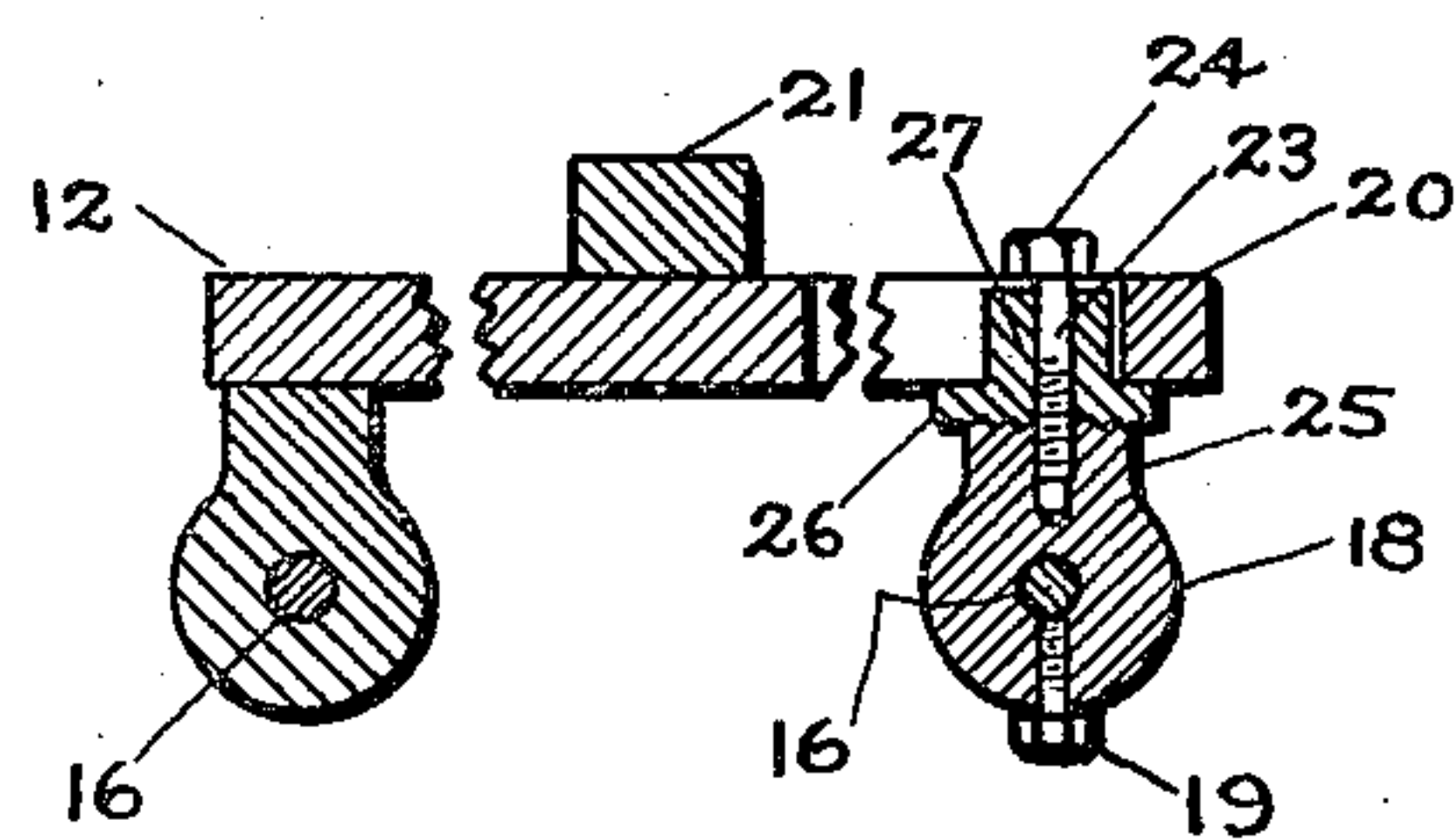


FIG. III

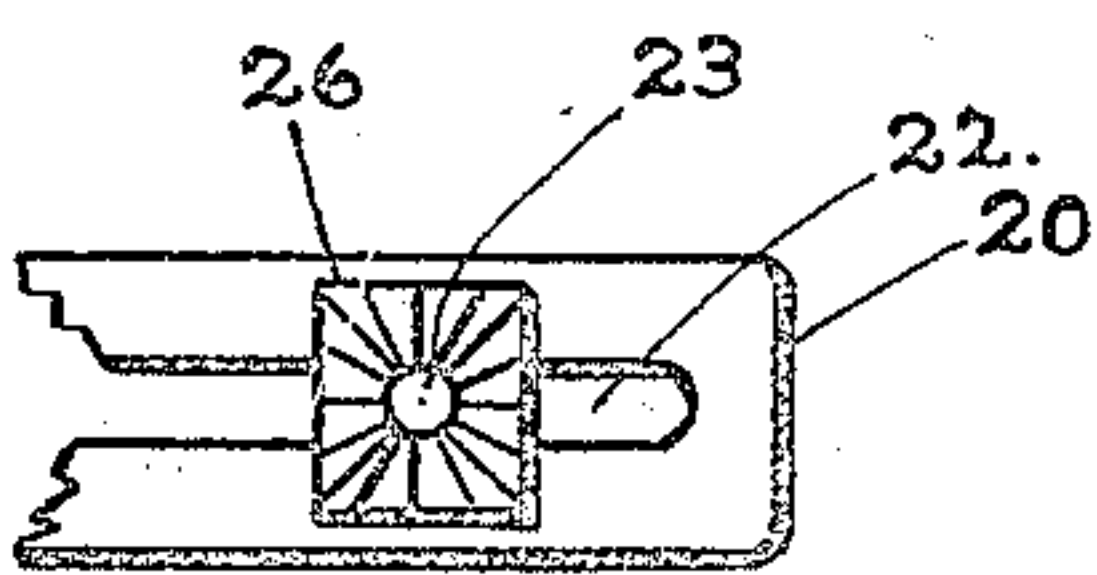


FIG. IV

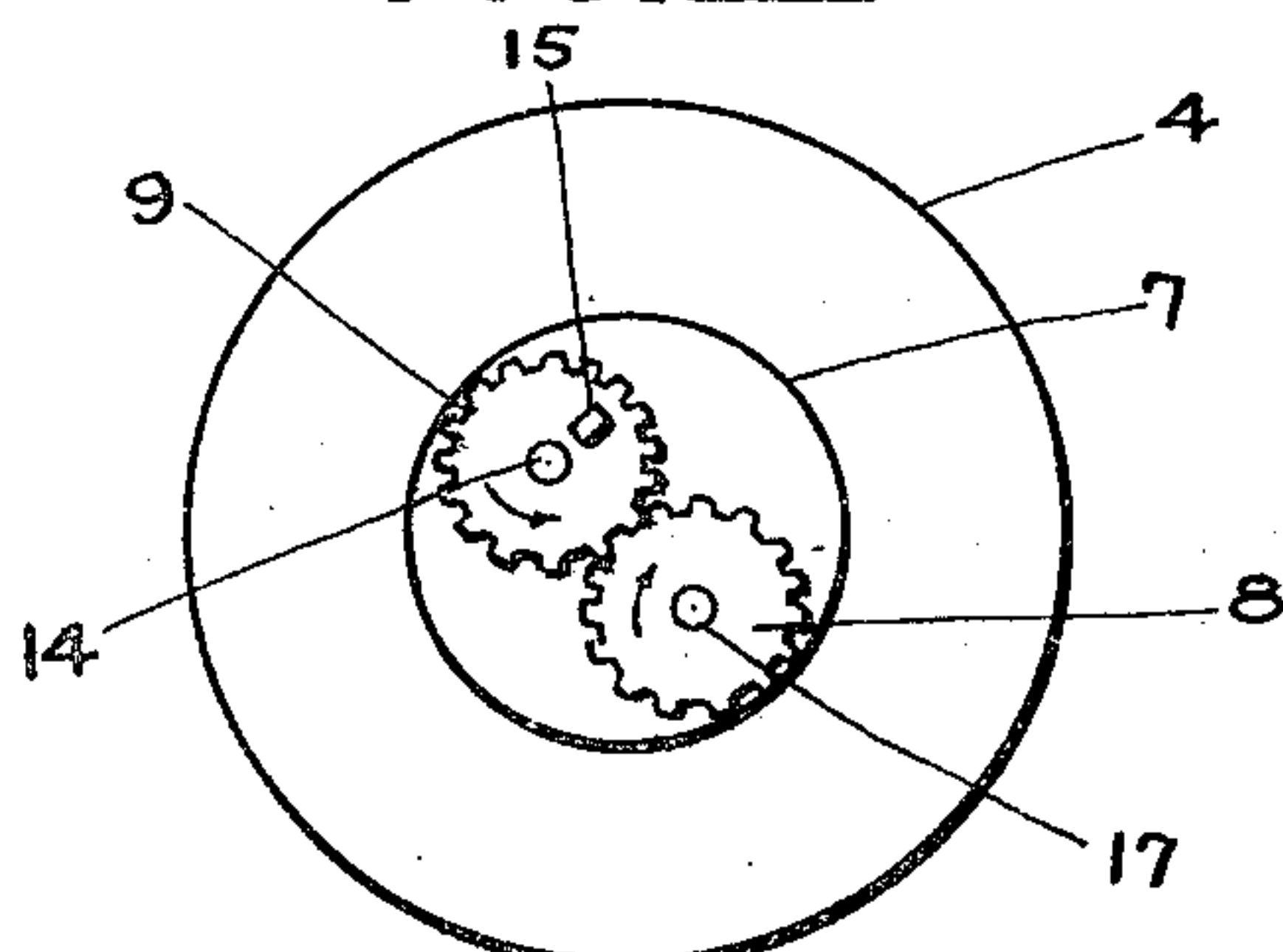


FIG. VI

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UNITED STATES PATENT OFFICE.

LUCIAN W. BUGBEE, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO AMERICAN OPTICAL COMPANY, OF SOUTHBRIDGE, MASSACHUSETTS, A VOLUNTARY ASSOCIATION OF MASSACHUSETTS.

GRINDING MACHINE.

Application filed November 5, 1919. Serial No. 335,868.

To all whom it may concern:

Be it known that I, LUCIAN W. BUGBEE, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Grinding Machines, of which the following is a specification.

This invention relates to new and useful improvements in polishing or grinding machines, and more particularly to what will be known as a bifocal lens polisher, the main object of the present invention being the provision of a device of the above character whereby the segment of a bifocal lens can be readily polished to a finished condition without having a tit in the center of the segment.

Another object of the present invention is the provision of a lens grinding or polishing machine wherein the polishing is accomplished through the medium of two rotating objects adapted to rotate in opposite directions and having the meeting edges overlapped in the center of the segment, while the edges thereof will extend to the extreme edge of the segment in the lens being polished, whereby the entire area of the segment is covered by the two polishing objects so as to provide for a uniform polishing over the entire segment.

A still further object of the invention is the provision of means for supporting the polishing devices whereby they may be readily adjusted so as to accommodate themselves to various thicknesses of segment and for either concave or convex lenses.

With the above and other objects in view the invention consists in the novel features of construction, the combination and arrangement of parts hereinafter more fully set forth, pointed out in the claims and shown in the accompanying drawings, in which:

Figure I is a side elevation of a portion of a polishing or grinding machine including my improvement, parts thereof being broken away and illustrated in cross section.

Figure II is a detail sectional view illustrating the connection between the polishing pads and the driving mechanism.

Figure III is a detail sectional view taken on the line III—III of Figure I.

Figure IV is a face view of the retaining plate which assists in holding one of the polishing discs in position.

Figure V is a vertical sectional view of the bar adjustment.

Figure VI represents a plan view of my improved polishers in use on a bifocal lens.

Referring now more particularly to the drawings, the numeral 1 indicates the main spindle or supporting shaft of the polishing machine and attached thereto is a pulley 2 which is driven through the medium of a belt 3 applied to any well known source for imparting movement to the pulley 2. Applied to the upper end of the shaft 1 is the usual lens support or lap 4, which in the present instance is illustrated as adapted for the reception of concave lenses, said lap being provided with the usual socket 5 adapted to fit over the upper end of the shaft 1 whereby to removably retain the lap in position thereon so that it can be readily exchanged for different size laps.

Secured in any well known manner to the upper face of the lap 4 is the lens 6, which in the present instance is in the form of a bifocal lens, which includes the segment 7 adapted to be polished by the polishing discs 8 and 9.

As illustrated in the accompanying drawings, the polishing discs 8 and 9 are preferably provided with teeth and are positioned upon the segment 7 in such a manner that the two discs will cover the entire segment and the teeth which are formed upon the outer edges of the discs will mesh at approximately the center of the segment, and as these discs are rotated in opposite directions, over the face of the segment 7, the polishing will be uniform over the entire face of the segment as the teeth meshing in the center of the segment will prevent the usual tit from being formed and thus provide for uniform grinding over the face of the segment.

As illustrated in Figure I the gear shaped polishing disc 9 is positively driven through the medium of the upright shaft 10, which is connected by means of the pulley 11, to any source of power desired, and supported in position by means of the brackets 12. The lower end of the shaft 10 is provided with the angular finger 13 which engages with

the upper face of the disc 9, whereby to rotate the disc simultaneously with the shaft 10.

It will be noted that the lower end of the shaft 10 extends into the central opening 14 in the disc 9, while the angular finger or crank 13 engages within a small socket 15 formed in the upper face of the disc so that upon rotation of the shaft 10 the disc 9 will be positively driven therewith.

While the disc 9 has been illustrated and described as positively driven through the medium of the shaft 10, the disc 8 is suitably retained in position so that the teeth thereon will mesh with the teeth on the disc 9 approximately over the center of the segment being ground, and in order to retain the disc 8 in its proper position I provide a pin 16, the lower end of which engages within a socket 17 formed in the upper face of the disc 8, while the upper end is extended through an opening in a ball member 18 and adjustably retained in position by means of the set screw 19, which extends through the outer surface of the ball 18 and engages with the pin 16. It will be noted that this ball 18 is laterally adjustable and as the pin 16 is adjustable longitudinally the disc 8 can be readily shifted to various desired positions, that is it can be readily shifted into or out of engagement with the teeth on the disc 9 when it is desired to change the lens 6.

In supporting the pin 16 in its operative position I provide a bracket 20 which extends out from the lower end of the supporting shank 21 upon the side opposite the brackets 12, and formed within the bracket 20 is a slot 22 having disposed therein a bolt 23, one end of which is headed as at 24, while the other end is provided with screw threads adapted to engage in the shank 25 formed on the ball member 18, and in order to retain the ball member 18 in its various adjusted positions I provide a plate 26 having an internal threaded shank portion 27 which is adapted to engage with the bolt 23, and as the upper face of the plate 26 is corrugated to correspond with the lower corrugated face of the shank 25, it will be noted that when the shank 25 is tightened down onto the upper face of the plate 26 the ball member 18 will be securely held in any position to which it has been adjusted. From this it will be apparent that the pin 16 can be readily adjusted either laterally or longitudinally to permit of shifting of the polishing disc 8.

In order to provide for the polishing of the different segments which it is understood are placed in different positions in the various makes of lenses, the standard 21 is mounted for swinging and lateral adjustment upon the main supporting bracket 28, and it will be apparent that upon shifting the standard 21 the polishing discs can

be readily arranged in various positions with respect to the segment in the lens being polished. It will be understood, however, that this adjustment can be made in various ways and must be so arranged that the polishing discs can be quickly and readily changed when desired.

As will be noted in the accompanying drawings, the lens blank 6 will be positively driven and should run relatively slow while the discs 8 and 9 will be driven at a relatively high rate of speed, and as the discs are running in opposite directions the rouge or grinding material will be forced toward the center of the grinding movement instead of moving outwardly onto the main lens 6. It will be noted that by having the two discs 8 and 9, one positively driven and the other driven through the movement of this disc in the opposite direction, it will result in a more complex movement than can be obtained with a single disc, and as the teeth formed on the discs 8 and 9 overlap at the center of the segment there will be no chance to generate a tit in the center of the segment, as usually occurs with a single grinding disc.

While I have shown and described only one of the discs as positively driven, it will be understood that arrangements can be made whereby both of the discs will be positively driven, thus giving more power to the grinding operation.

From the description as given above it will be apparent that in the operation of my improved device the lens 6 is first placed within the lap 4 and the discs 8 and 9 placed in position over the segment 7. The shaft 21 is then lowered until the lower ends of the shaft 10 and pin 16 are engaged within the openings 14 and 17 in the center of the discs. The angular finger 13 is also engaged with a socket 15 so as to impart movement to the two discs through the medium of the one disc 9. It will be apparent that this raising and lowering of the shaft 21 can be carried on through the member 28. It will be noted that the disc 8 can be readily adjusted toward or away from the disc 9 and moved in various positions by the adjustment of the pin 18.

While I have shown and described the main feature of this invention as operating upon a concave lens it will be apparent, as illustrated in Figure V that the device can be used equally as well in polishing or grinding a convex lens, it only being necessary to change the shape of the polishing discs 8 and 9.

In order to apply pressure to the polishing discs 8 and 9 I provide a coil spring 29, which is mounted upon the upper end of the shaft 21 and disposed between the brackets 30. The tension of the spring 29 is controlled through the medium of a slid-

ing block 31 adjusted upon the slot 22 and retained in various adjusted positions by means of the set screw 32. From this it will be apparent that the pressure on the discs 8 and 9 can be varied through the adjusting of the tension of the spring 29.

I claim:

1. A machine of the character described, including a pair of polishing disks each having toothed edges extending to the lens engaging faces thereof, and means for supporting the disks with the toothed edges in interlocking engagement one with the other.

2. A device of the character described, including a pair of disks having interfitting polishing surfaces, cone points engaging said disks to retain them in interfitting engagement but permit of relative movement thereof, and means for positively rotating one of the disks.

3. In a machine of the character described, the combination with a lens block spindle, of an angularly adjustable frame opposed thereto, a driven spindle carried

by the frame and angularly adjustable therewith, a supplemental spindle carried by the frame and angularly adjustable therewith and with respect thereto, and interengaged lens grinding members carried by the two spindles of the frame.

4. A substantially cylindrical lens polishing member having the periphery of the polishing surface formed with indentations and projections, substantially as illustrated.

5. In a machine of the character described, the combination with an angularly adjustable head, of an offset crank bearing spindle carried by the head, a gear shaped polisher carried by the spindle, a pin carried by the head, and a second gear shaped polisher meshing with the first and retained in rotatable engagement therewith by the pin.

In testimony whereof I have affixed my signature, in presence of this witness.

LUCIAN W. BUGBEE.

Witness:

JULIA H. WELLS.