

E. A. HAMMETT.
LENS GRINDING APPARATUS.
APPLICATION FILED FEB. 26, 1910.

974,880.

Patented Nov. 8, 1910.

2 SHEETS—SHEET 1.

Fig. I.

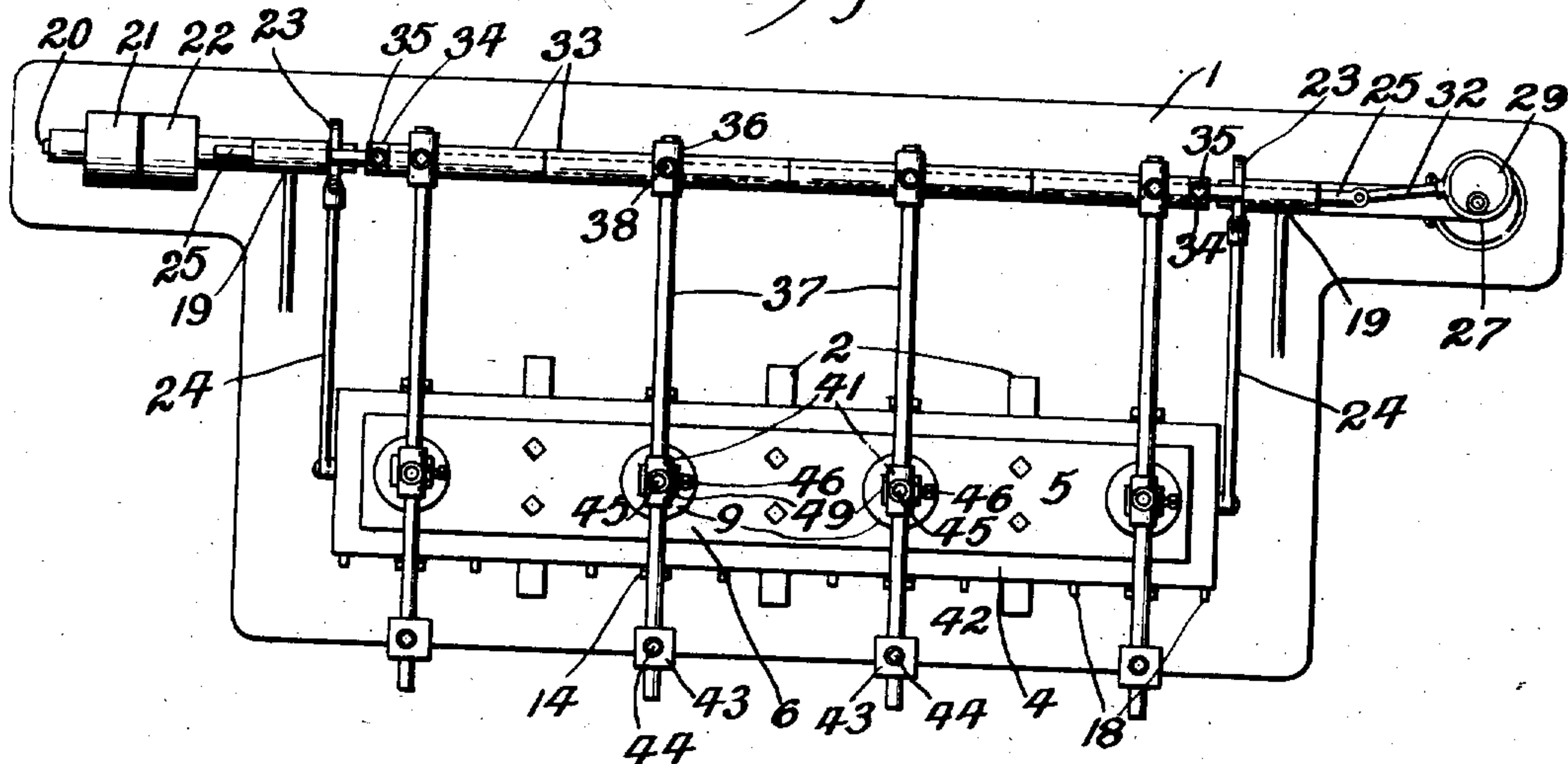
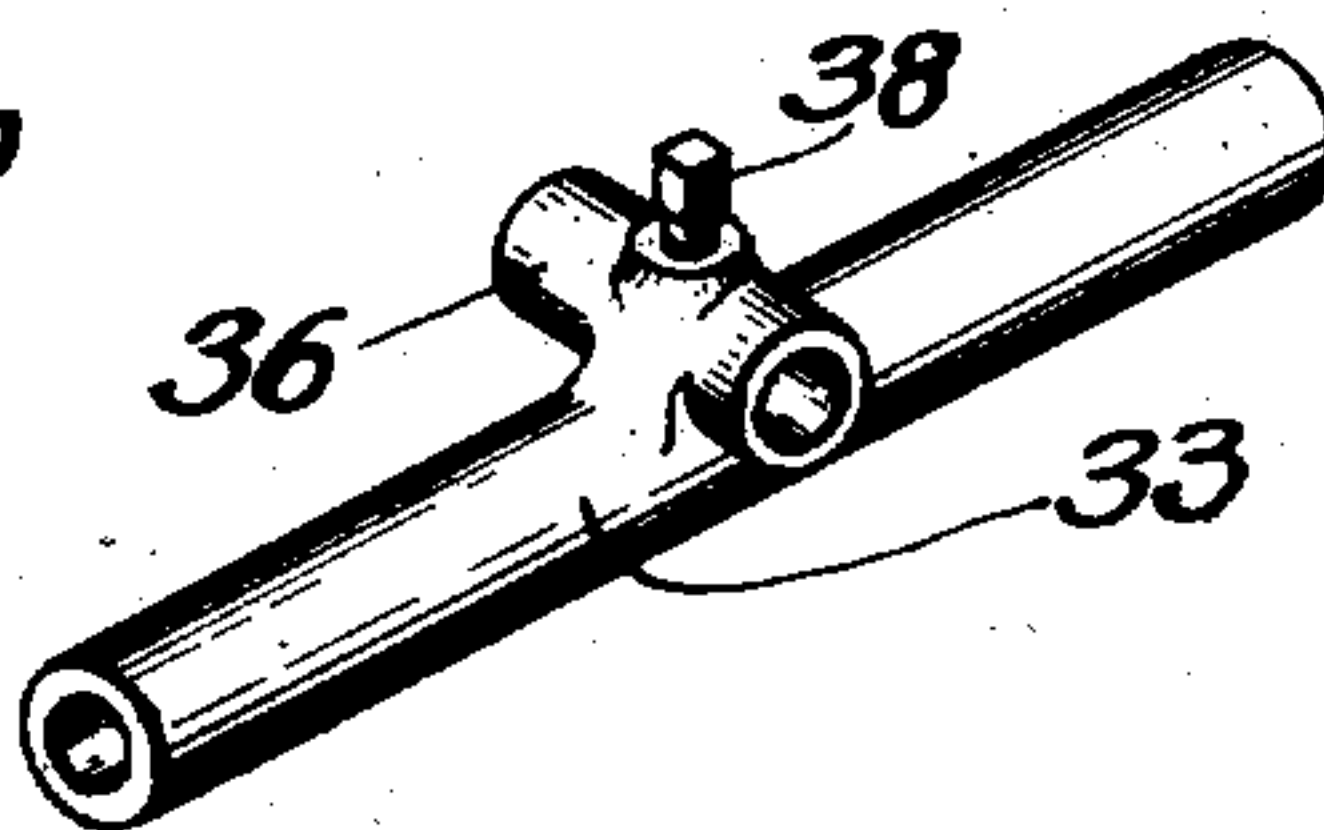
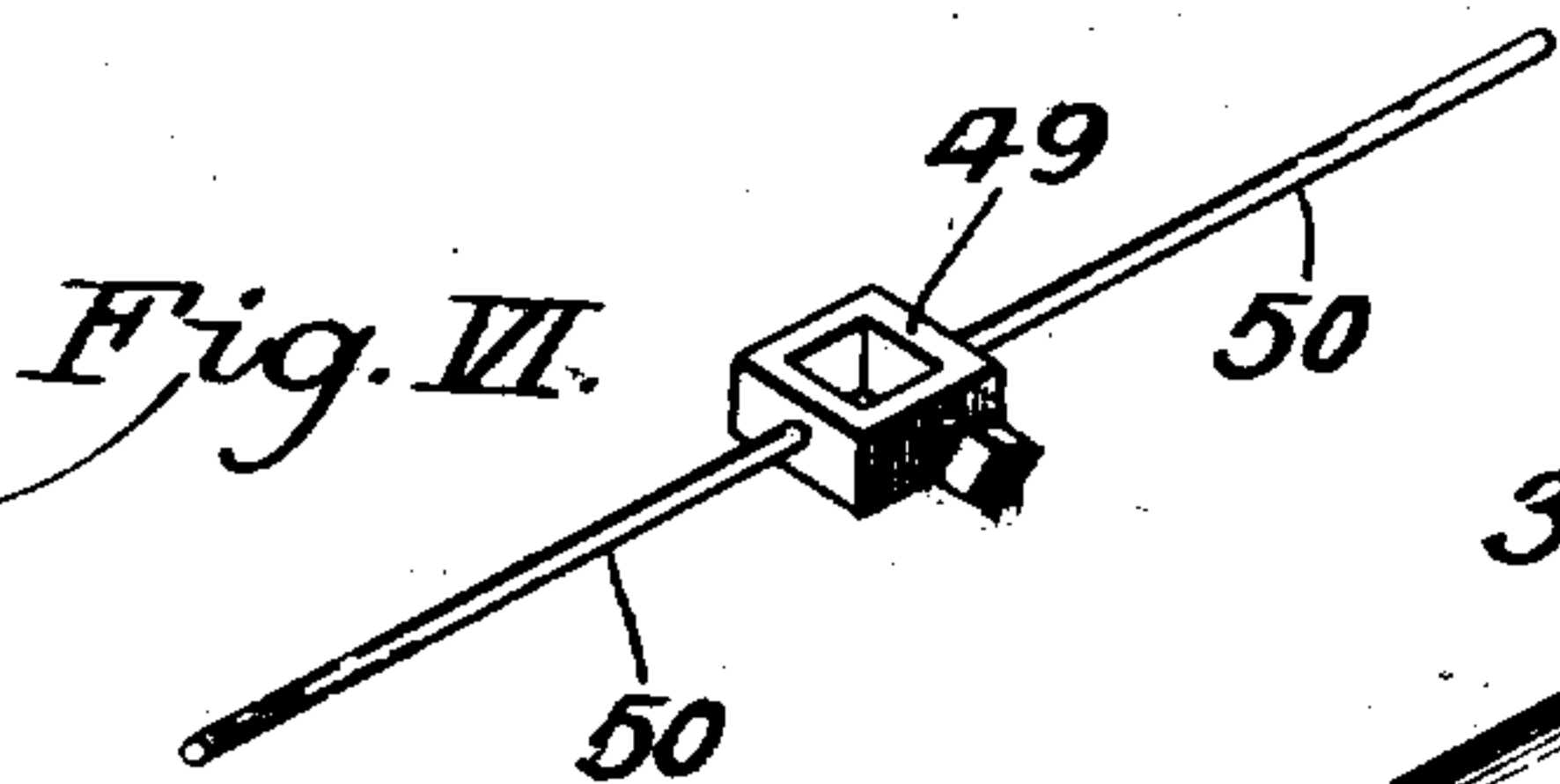
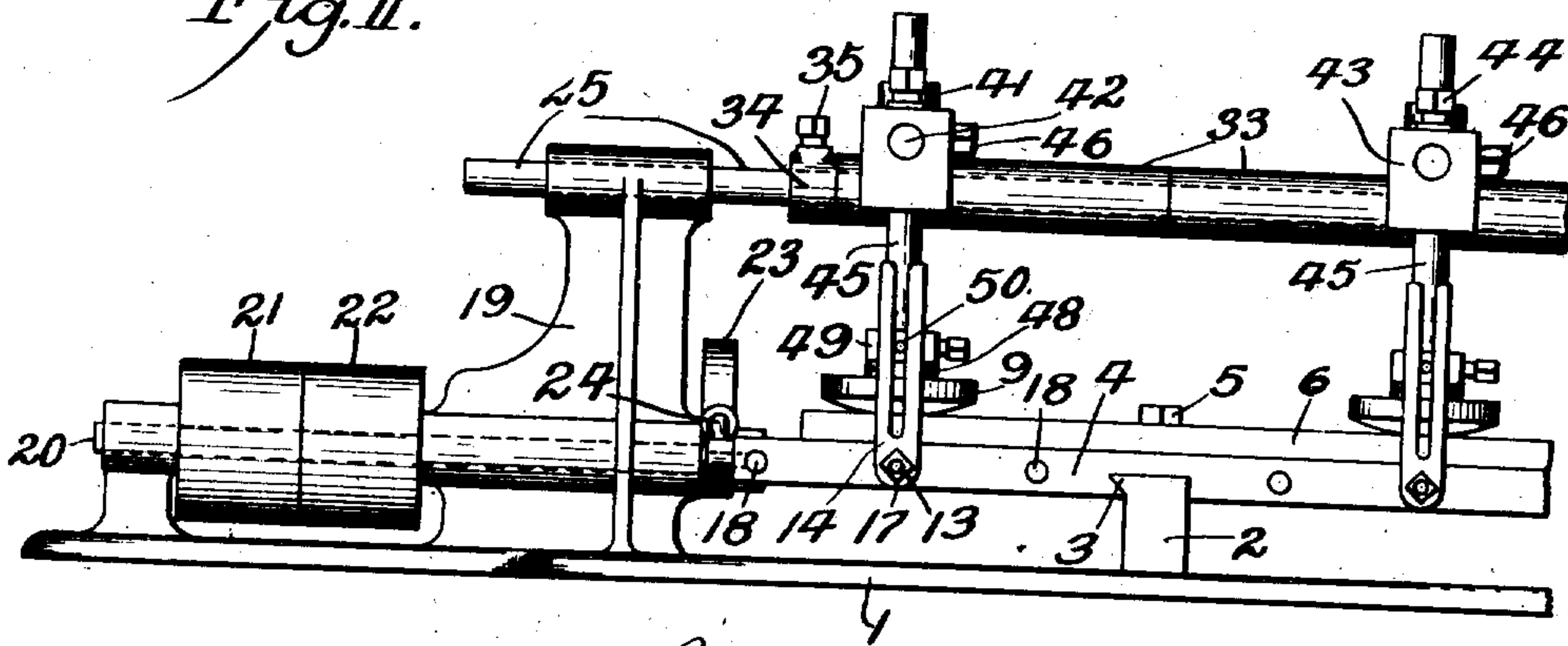


Fig. II.



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2 SHEETS—SHEET 2.

Fig. III.

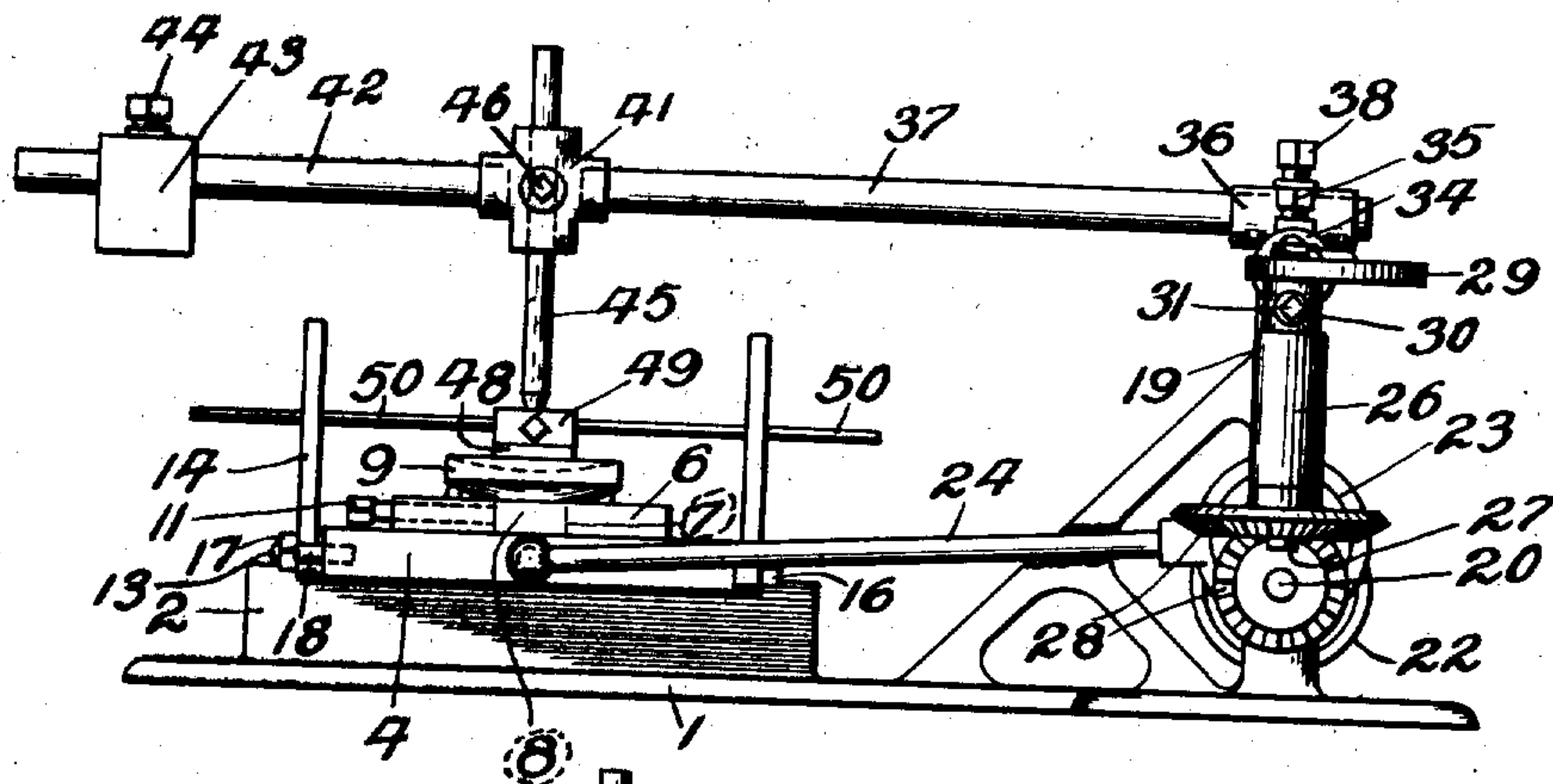


Fig. IV.

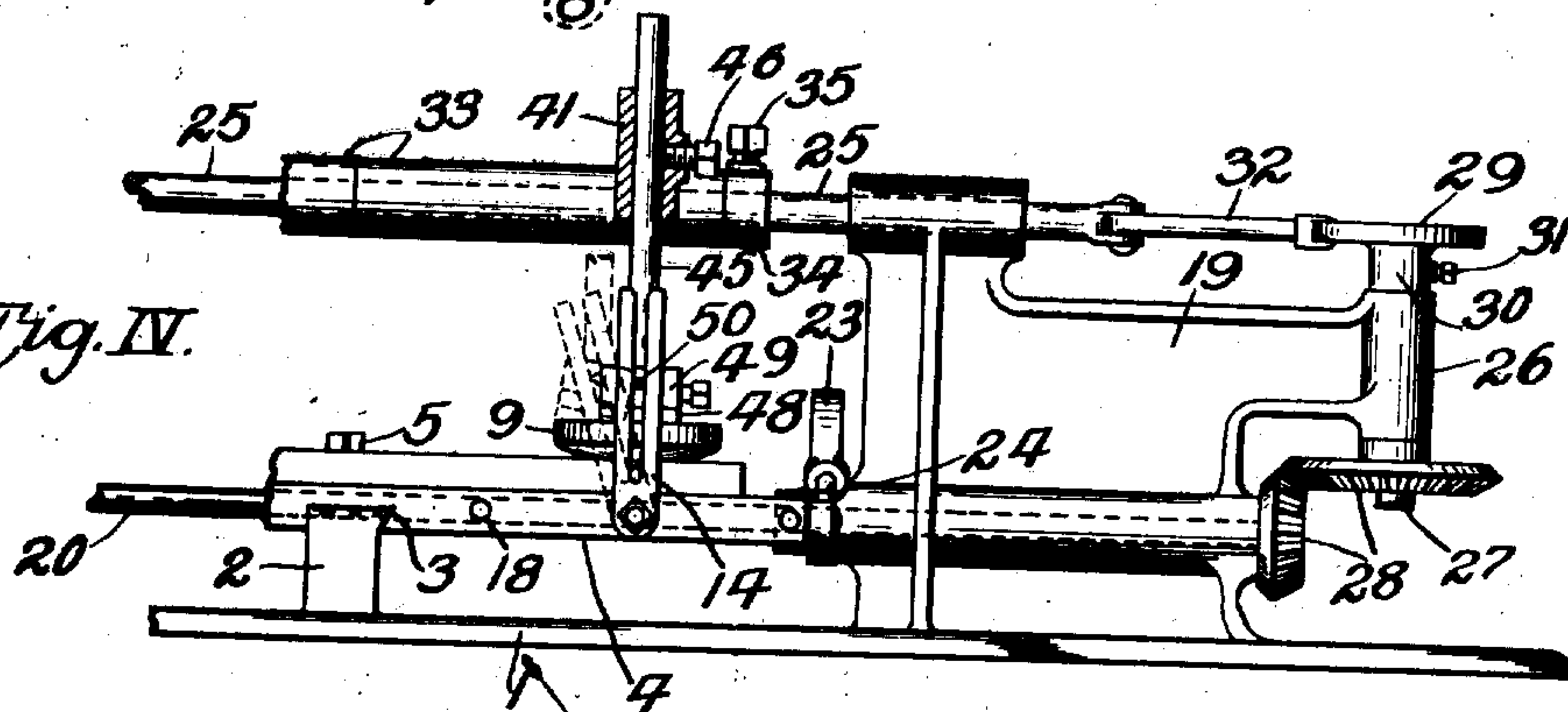
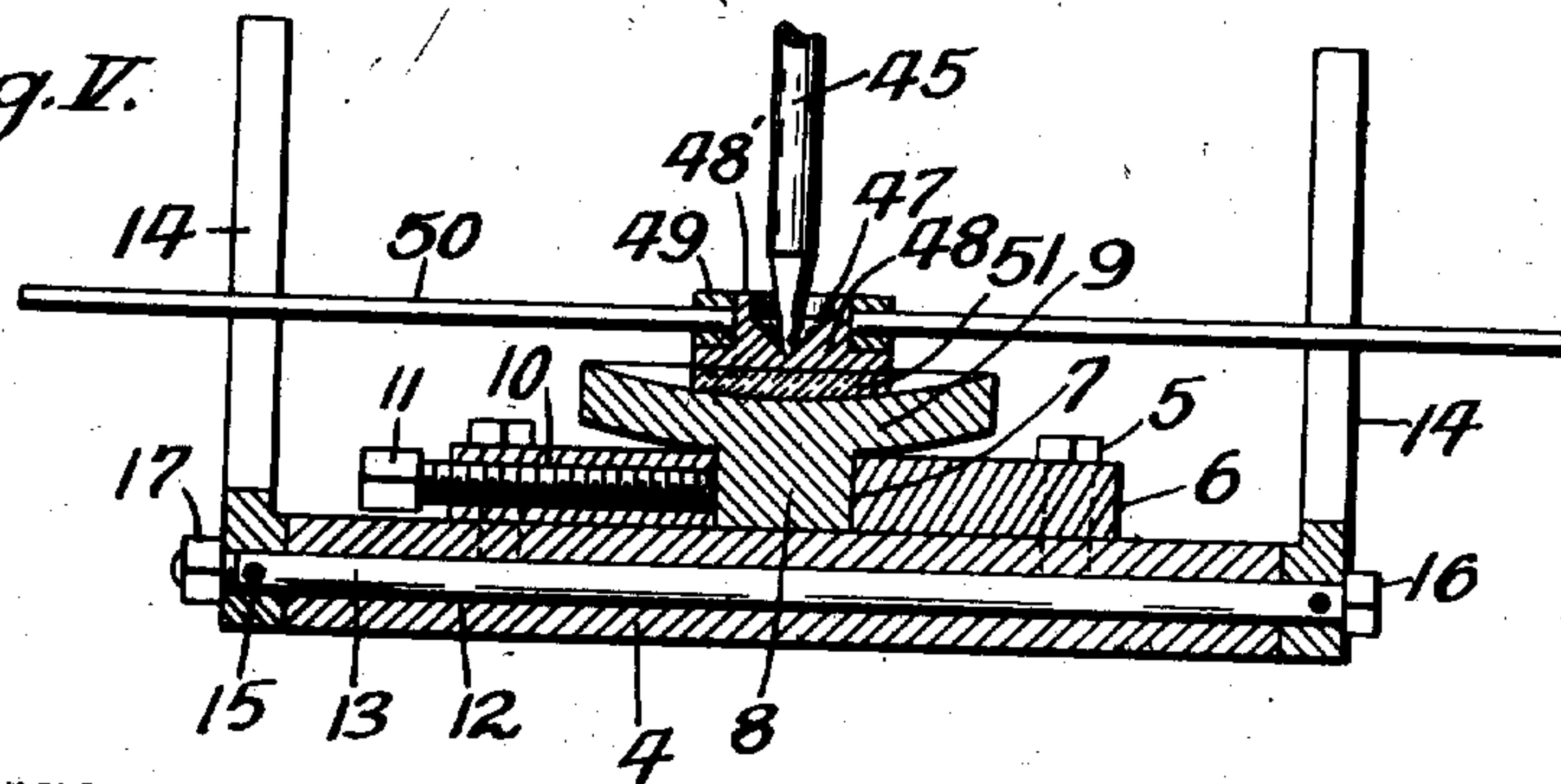


Fig. V.



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LENS-GRINDING APPARATUS.

974,880

Specification of Letters Patent.

Patented Nov. 8, 1910.

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To all whom it may concern:

Be it known that I, ELBERT A. HAMMETT, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Lens-Grinding Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in lens grinding apparatus and has for its object to provide an apparatus of that class adapted for grinding and polishing toric, flat cylinder or spherical lenses. In accomplishing this object I have provided the improved details of structure which will presently be fully described and pointed out in the claims, the preferred embodiment of my invention being illustrated in the accompanying drawings, in which:—

Figure I is a plan view of an apparatus constructed according to my invention and comprising four tool sets. Fig. II is an enlarged front view of a portion of the apparatus, showing two of the tool sets. Fig. III is an end view of the apparatus, illustrated in Fig. I. Fig. IV is a front view of a portion of the apparatus, showing the reciprocating mechanism, the tool pin collar being in vertical section. Fig. V is an enlarged cross section of the tool base and parts mounted thereon. Fig. VI is a detail view of an adapter used in my apparatus. Fig. VII is a detail view of one of the sleeves carried on the reciprocatory shaft.

Referring more in detail to the parts:—1 designates the frame of the apparatus upon which are supported the transverse parallel rails 2, the upper portions of which are provided with dove-tail flanges 3.

Mounted on the rails 2 is a tool base 4 having dove-tailed slots within which the upper portions of the rails 2 and the flanges 3 are fixed to permit sliding travel of the base without lost motion.

Fixed on base 4, preferably by bolts 5 is a plate 6 having sockets 7 at intervals throughout its length adapted for receiving shanks 8 of lens grinding tools 9.

Extending transversely through one side of the plate 6 are sockets 10 into which the set screws 11 are threaded in order that they may engage the tool shanks and hold same rigidly in position.

Extending transversely through the tool base 4 are apertures 12 within which the rods 13 are adapted to revolve. The ends of rods 13 project laterally beyond the sides of said base and mounted upon said projecting ends are the slotted arms 14 which project upwardly beyond the top of the tools 9 when the latter are in position. The slotted arms 14 are held rigidly to the rods 13 by means of pins 15 which extend through the arm hubs and through said rods. The rods 13 may also be provided with the bolt heads 16 and nuts 17 which may assist in holding said arms in position. When the parts are assembled, the arms 14 are adapted for free revoluble movement, lengthwise of the base 4; such movement being limited by an adapter which will presently be described and also by the posts 18 which are mounted on base 4 and project laterally therefrom.

Also mounted on frame 1 are the bearing brackets 19, within which a drive shaft 20 is revolubly mounted; said shaft being provided with the ordinary tight and loose pulleys 21—22 for connection with a suitable driving power, not shown.

Fixed on shaft 20 are the eccentrics 23, having pitmen 24 which are pivotally connected with the ends of the tool base 4, so that when the drive shaft is operated, the tool base will be moved forwardly and back on the rails through such eccentric connection.

Revolubly mounted in bearings 19 above the drive shaft is an arm shaft 25 which is adapted for longitudinal reciprocation in its bearings. On one of the brackets 19 is a vertically disposed bearing 26 within which is revolubly mounted a shaft 27 having beveled gear connection 28 with the drive shaft 20.

29 designates an eccentric having a hub 30 which is fixed to the upper portion of shaft 27 by a set screw 31 and engages the upper face of the bearing 26 in a manner to support the eccentric and shaft.

32 designates a pitman which connects the eccentric 29 with the arm shaft 25.

Revolubly mounted on arm shaft 25 are a number of sleeves 33 which abut against

each other and are held in contact by the end set collars 34 which are fixed to shaft 25 by the set screws 35. On the sleeves 33 are transverse collars 36 and extending into said collars are the tool arms 37 which project forwardly over the base 4. The arms 37 are fixed in adjusted position in said collar by the set screws 38. Fixed to the forward ends of said arms are the four way fittings 41, the forward neck of each of which carries an extension arm 42 upon which is slidably mounted a weight 43 which may be fixed in an adjusted position on the arm by a set screw 44.

Extending vertically through each fitting 41 is a pin 45 which may be fixed within the fitting by a set screw 46. The lower end of pin 45 is pointed in order that it may move freely in its seat in the socket 47 of a lens plate 48 when the parts are in operation.

49 designates an adapter which I use with my apparatus and which consists of the body member 49 having an aperture into which the shank 48' of the lens plate 48 is adapted to project and the pins 50 which extend forwardly and back from the adapter body and project through the slots in the arms 14 when the parts are assembled.

51 designates a piece of lens glass which is attached to the plate 48 and is held in contact with the grinding face of the tool 9.

The operation of my apparatus is as follows:—Presuming the machine parts to be assembled as described, that is with the tool base slidably mounted on the dove-tail rails and the shafts and eccentrics properly mounted and connected, the tool parts are prepared for the grinding operation by inserting the tool shanks into the sockets of plates 6 and tightening same by the set screws 11. A lens piece is then secured to the flat face of the lens plate 48 and the plate shank fitted into the socket of the adapter 49. The adapter pins are then fitted into the arm slots, so that the lens piece may seat in the tool curve. Each arm 37 is then turned until the point of the pin 45 enters the socket in the lens plate, so that the weight of said arm will bear the lens piece against the tool surface. The weight 43 may then be fixed at the required distance from the fitting to give the pressure desired, the weight being held nearer to the fitting when a thin lens is to be ground than for a thick lens, or for rough work. If more than one lens is to be ground at the same time, the other tools and cooperating parts are assembled as described, it being possible to simultaneously grind as many lenses as may be assembled on the base 4. When the parts have been assembled, the drive shaft is started in operation and will reciprocate the base 4 transversely of the frame through the eccentric and pitman

connection. Simultaneously with the transverse movement of the base, the arms 37 are reciprocated longitudinally through the horizontal eccentric, so that the tools 9 are moved in one direction across the lens carrier 48 and the lens carrier is moved at a right angle across the tool, the right angle travel of the lens carrier being assured by the guiding of the pins 50, by the slot arms 14. Inasmuch as the cross movement is not uniform, the parts move irregularly across each other, so that a twisting, grinding effect is produced.

With this apparatus it is possible to accurately grind either a spherical or a compound curve of given dimensions and to simultaneously grind lenses of different curvature.

Having thus described my invention, what I claim as new therein and desire to secure by Letters-Patent is:—

1. In a lens grinding apparatus, a suitable frame, a base adapted for reciprocatory movement on said frame, a shaft adapted for reciprocatory movement on said frame, at a right angle to the movement of said base, a sleeve revolvably mounted on said shaft, an arm fitted on said sleeve, a four way fitting fixed on the free end of said arm, an extension arm fitted in said fitting, a weight adjustable on said extension arm, a pin fitted on said fitting and projecting into proximity to said base, and means for actuating said base and said shaft from a common driving mechanism.

2. In a lens grinding apparatus, a suitable frame, a base mounted on said frame, arms pivotally mounted on said base and provided with longitudinal slots, means on said base for holding optical tools, a device for carrying a lens plate and comprising a socketed head, and pins fixed in said head and projected through the slots in said arms, and arms 37 adapted for movement over said base and having pins depending into position for engaging a lens plate, substantially as set forth.

3. In a lens grinding apparatus, a suitable frame, a base supported on said frame, means on said base for holding a lens tool, a lens tool carried by said means, an adapter comprising a socketed head having laterally projecting pins, a lens plate having a shank projecting into the adapter socket, arms pivotally mounted on said base and having longitudinal slots through which the adapter pins are projected, an arm 37, and a pin carried by said arm 37 and having a pointed end engaging said lens plate, substantially as and for the purpose set forth.

4. In a lens grinding apparatus, a suitable frame, a base adapted for reciprocatory movement on said frame, a rod extending transversely through said base and adapted for revoluble movement, a slotted arm fixed

on each end of said rod, a plate fitted on said base and provided with a vertical socket for receiving tool shanks and with a lateral screw socket opening into said first named
5 socket, an optical tool having a shank seated in said vertical socket, a set screw threaded into said lateral socket and impinging against the shank, an adapter comprising a socketed body and pins projecting from the
10 body into the slots in said arms, a lens plate having a shank located in the adapter socket, an arm 37 adapted for reciprocatory movement over said base, a pin having a pointed end seated on said lens plate, and
15 means for reciprocating said tool base and arm 37 in transverse paths.

5. In a lens grinding apparatus, a suitable frame, a base adapted for transverse reciprocatory movement on said frame, rods
20 extending transversely through said base and adapted for revoluble movement therein, slotted arms fixed at opposite ends of said rods, stop members projecting laterally from said base and adapted for engagement by

said arms, a plate fixed on said base and provided with a vertical socket and with a lateral socket opening into said vertical socket, an optical tool having a shank projected into said vertical socket, an adapter comprising a
25 socketed head having pins projecting laterally therefrom, into the arm slots, a lens plate having a shank projected into the adapter socket, said shank having a beveled socket in its upper face, a shaft adapted for reciprocatory movement above said frame at a
30 right angle to the movement of said base, an arm 37 revolubly mounted on said shaft, and a pin carried by said arm and having a pointed end projected into the lens plate socket, substantially as and for the purpose
40 set forth.

In testimony whereof I affix signature in presence of two witnesses.

ELBERT A. HAMMETT.

Witnesses:

MYRTLE M. JACKSON,
E. A. CAHILL.