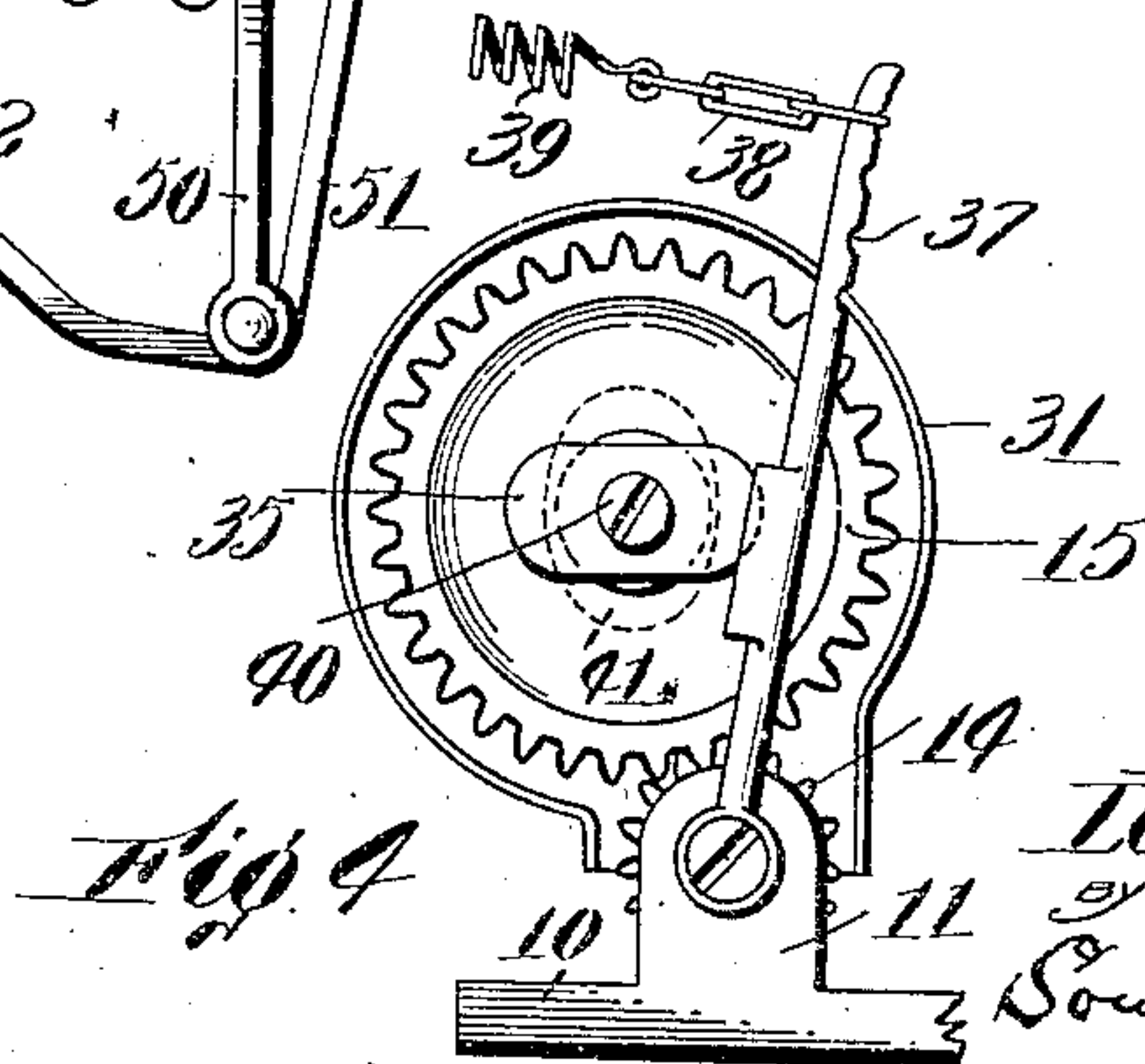
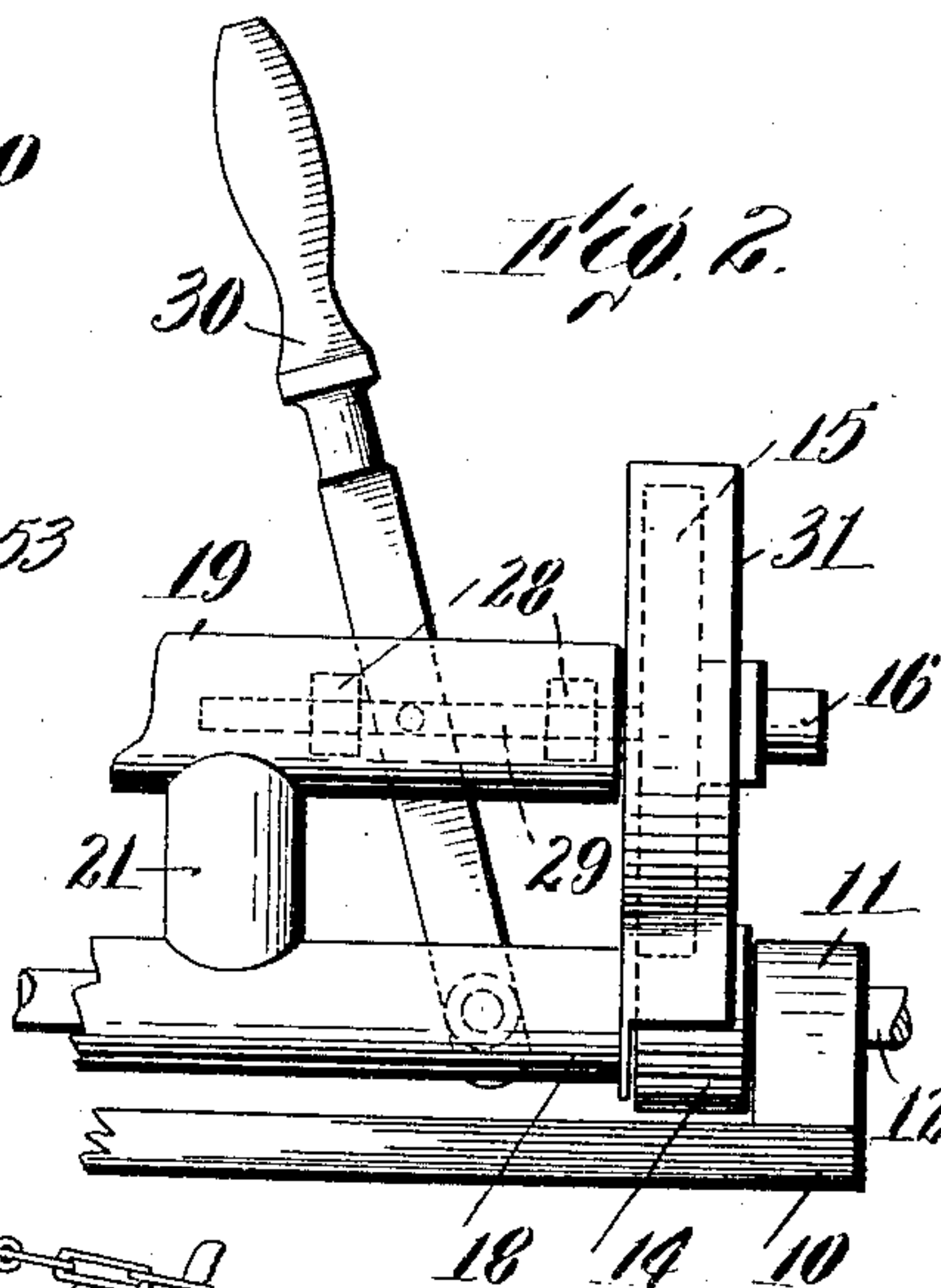
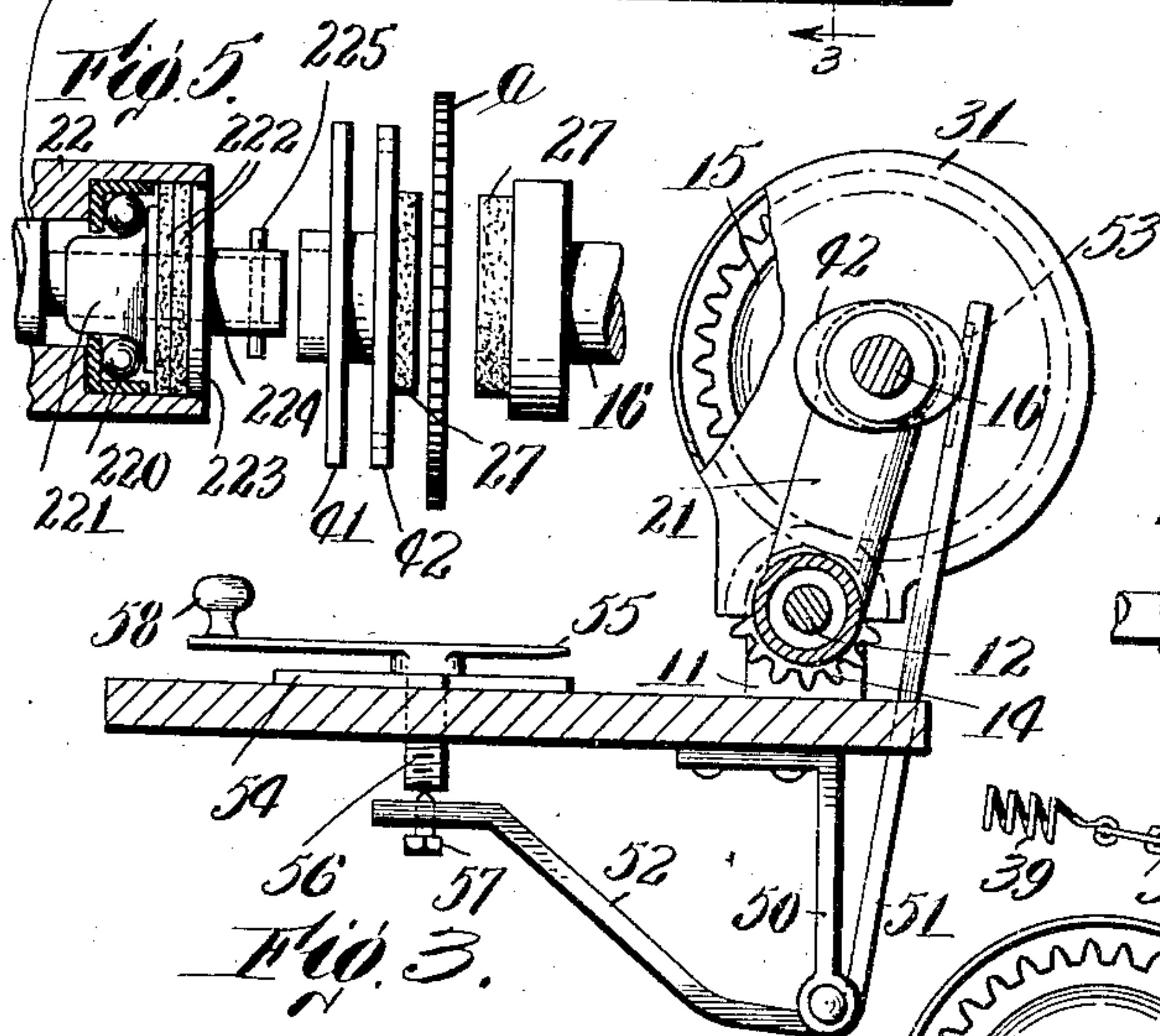
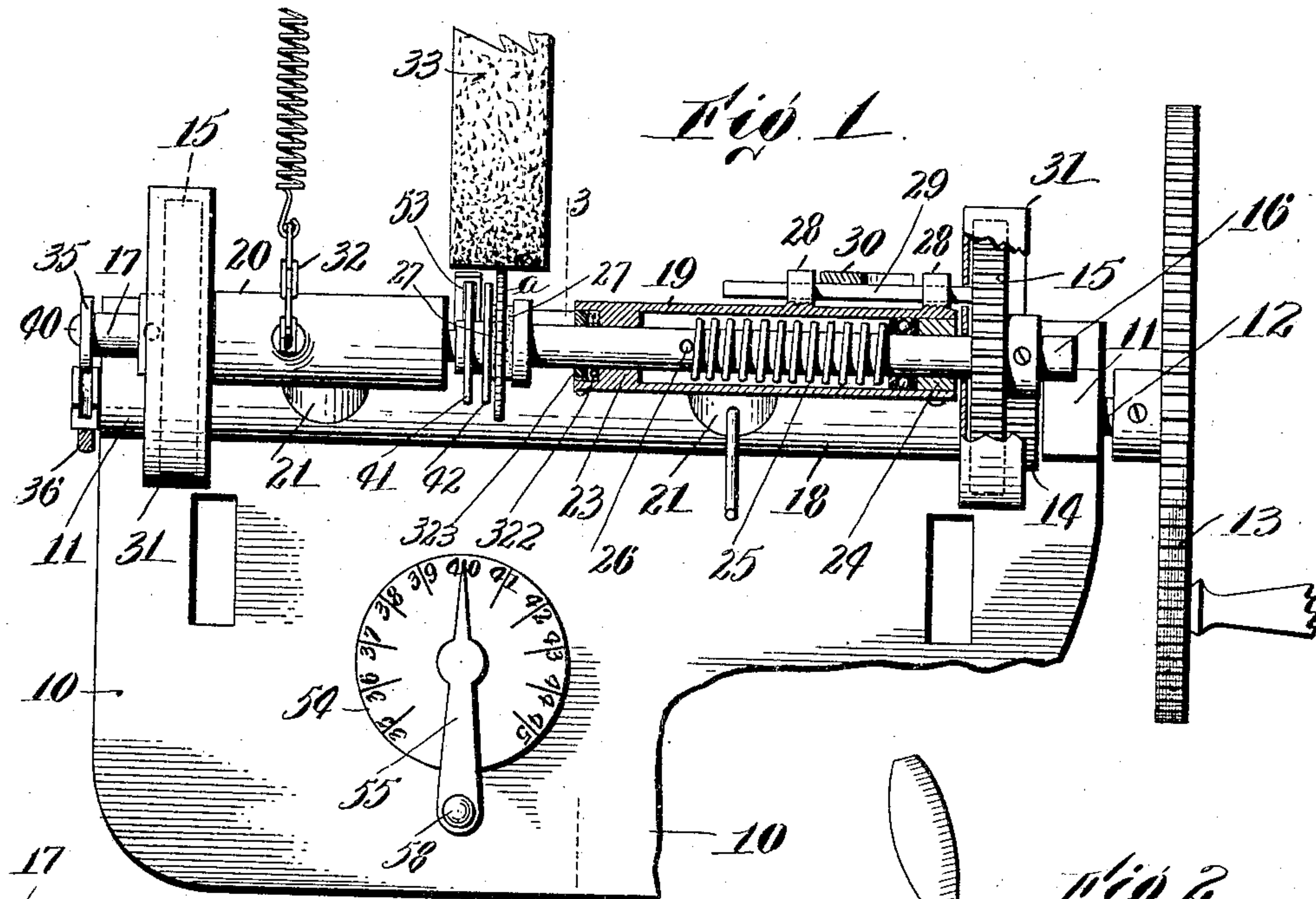


L. WILHELM.
LENS GRINDING MACHINE.
APPLICATION FILED JAN. 20, 1908.

912,518.

Patented Feb. 16, 1909.



Witnesses:

C. F. Mason
C. I. Hartnett.

Inventor:
Louis Wilhelm
by Attorneys
Southgate &
Southgate.

UNITED STATES PATENT OFFICE.

LOUIS WILHELM, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO GLOBE OPTICAL CO., OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

LENS-GRINDING MACHINE.

No. 912,518.

Specification of Letters Patent.

Patented Feb. 16, 1909.

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To all whom it may concern:

Be it known that I, LOUIS WILHELM, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Lens-Grinding Machine, of which the following is a specification.

This invention relates to a grinding machine for shaping lenses for spectacles and eye-glasses, and for similar purposes.

The principal objects of the invention are to provide a machine of this character with means whereby the shafts and operating parts for supporting the work will be protected from the dirt, mud, etc., which is thrown about in the use of machines of this character; also to provide means whereby when the former is covered with mud and dirt, and thus obscured, the position thereof will be apparent to the eye so that it will not be necessary to clean it every time it is desired to inspect it; also to provide improved means for supporting the two work-supporting shafts; to provide an improved arrangement for regulating the position of the work with respect to the grinding stone; and to provide an additional tension device for causing the work to bear harder on the stone when the thick edges are being ground than when the thin ones are presented to the stone.

Further objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings which show one embodiment of the invention, and in which—

Figure 1 is a plan thereof with parts in section. Fig. 2 is an elevation of a portion of one part of same. Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1. Fig. 4 is an end elevation, and Fig. 5 is a plan of an enlarged scale showing certain details of construction and illustrating how the work is supported in the machine.

The invention is shown as comprising a base-plate 10 provided with bosses 11 having bearings for a shaft 12. This shaft is provided with a gear 13 through which the device is driven in any desired way. It is also provided with a pair of pinions 14 meshing with gears 15 on a pair of work-supporting shafts 16 and 17 for driving the latter. The shafts 16 and 17 are adapted to swing about the shaft 12, being supported therefrom by a frame which constitutes a casing for these

three shafts and is shown as made up of a cylindrical portion 18 and two cylindrical portions 19 and 20. The latter two cylindrical portions are connected with the cylindrical portion 18 by integral cross pieces or struts 21. On account of having the shafts housed in this casing or frame the shafts are protected from the accumulation of dirt and mud and do not have to be cleaned frequently. The portion 18 is simply hollow to permit the shaft 12 to pass through it, and it is provided with bearings at its ends whereby the whole frame can swing on this shaft. The casing 20 is similarly constructed, one of the bearings 22 being shown in Fig. 5.

A ball retainer 220 is shown with a cone 221 having a curved conical surface of such a slant that when the shaft is pushed to the left by the other shaft, as it is when in operation, the bearing balls will be forced outwardly, and will hold the shaft firmly against vibration. At the end of the cone 221 are a pair of felt washers 222 to keep the bearing free from dust, etc. on which bears a plate 223 fixed to a sleeve 224 which is fixed to the shaft 17 by a pin 225.

The casing 19 is provided with bearings or collars 23 and 24 near its ends, one of which is removable and on the shaft 16 in this casing is a ball bearing near the bearing or collar 24. Near the other end is a felt washer 322 held in place by a plate 323. A spring 25 is located in the casing on the shaft 16 between the ball bearing and a pin 26 and tends to force the shaft 16 toward the shaft 17. In order to provide for moving the shaft 16 back in order to place the work *a* in the jaws 27 or remove it therefrom, the casing 19 is provided with lugs 28 having bearings for a sliding rod 29, which is operated by a lever 30 and engages the gear 15. The operation of this lever will move the gear 15 back, and this will move the shaft 16. Both of the gears 15 are protected from mud and dirt by means of guards 31 located at the ends of the casings 19 and 20.

The tilting frame is provided with the usual tension device 32, and in addition thereto a separate adjustable tension device is provided for the purpose of varying the pressure of the work against the grinding stone 33 one or more times during a complete revolution. This is desirable in grinding convex glasses, because in that case the edges being ground at two sides are thicker than

those at the other two sides. In order to accomplish this, the shaft 17 is provided with an attachment 35 on its end which is connected to a tension device shown in the form of a lever 36 having notches 37 thereon connected with a chain 38 and spring 39 of any desired form. The attachment 35 is preferably elliptical in form, and is fixed to the end of the shaft by a screw 40 usually in a position with its axis at right angles to the long axis of the former 41, it being understood that it is ordinarily used when an elliptical former is used. When arranged in this way it will be seen that when the short axis of the former is toward the stone and the short axis of the lens is against it, the long axis of the attachment 35 is working on the lever 36 and increasing the tension so that a deeper cut will be taken at this time. This is especially desirable with convex lenses, as stated, because they will stand a deeper cut when the stone is operating on the thicker portions thereof. The chain 38 may be adjusted in any of the notches 37 for an obvious purpose.

It has been stated above that the shafts 12, 16 and 17, as well as the gears 15 are protected from the dirt and mud. In order to carry out this idea with respect to the former 41 without providing a guard over it, which would be impracticable because it is necessary to see the position of this former, I have provided it with a plate 42 of substantially the same size and shape as the former, integrally mounted thereon, spaced therefrom and parallel therewith. This plate is shown as located between the former and the lens which is being ground. The purpose of this plate is to enable the operator to see exactly the angular position of the former without removing the mud and dirt which collects upon it. The former is held in position on the shaft by the pin 225 entering slots therein.

In order to simplify and improve the adjusting means for the former, it is shown as made in the following way. Below the base-plate are brackets 50 at the bottom of which a lever is pivoted having an upwardly extending arm 51 and a forwardly extending arm 52. On the upwardly extending arm the lever is provided with an elongated depression 53 in which the edge of the former works. On the top of the base-plate above the forward end of the arm 52 is a dial 54 and a pointer 55. This pointer is provided with a screw 56 passing through the base-plate and controlling the position of the end of the arm 52. It is preferred to provide an adjusting screw 57 engaging the end of the screw 56 and mounted on the arm 52. By this construction it will be seen that the turning of the pointer 55 by means of its handle 58 will adjust the end of the lever 52 and the guide 53 for the former 41. It is under-

stood, of course, that this guide for the former ought to work in a horizontal line between the centers of the stone and the work holding shafts, and that a swinging motion is not a proper one for it unless provision is made for obviating the fault due to the curvilinear motion which it would have in that case. It is to provide for this that the lever is pivoted well down below the bottom of the case plate as indicated in Fig. 3. On account of this construction, the guide while having a swinging motion on the arc of a large circle operates almost in a straight path and the slight curve that it has is not sufficient to cause any appreciable irregularity in the grinding of the lenses, therefore, the pivoting of the lever at a point well below the base-plate and shaft 12 in an important feature.

While I have illustrated and described a preferred embodiment of the invention, I am aware that many modifications may be made therein by any person skilled in the art without departing from the scope of the invention expressed in the claims. Therefore, I do not wish to be limited to the particular details of construction shown, but—

What I claim is:—

1. In a lens grinding machine, the combination of a base-plate, a frame pivoted thereon, work holding shafts carried by said frame above the base plate, a former supported by said shafts, a lever pivoted below the base-plate and having two arms both extending upwardly therefrom, one arm thereof engaging the former, and the other arm extending under the base-plate, and means on the base-plate for adjusting the latter arm.

2. In a lens grinding machine, the combination of a base-plate, work-supporting shafts arranged above said base-plate, a lever pivoted at a distance below said base-plate and having an upwardly extending arm and a forward upwardly extending arm, means on the first named arm for controlling the position of the work supporting shafts, and means on the top of the base-plate in front of said shafts and extending down through said base-plate, for adjusting the height of the forwardly extending arm.

3. In a lens grinding machine, the combination of a base-plate, work-supporting shafts arranged above said base-plate, a lever pivoted at a distance below said base-plate and having an upwardly extending arm projecting above the base-plate from behind and a forwardly extending arm under the base-plate, means on the upwardly extending arm for controlling the position of the work-supporting shafts, and means on the top of the base-plate in front of said shafts for adjusting the height of the forwardly extending arm, said means comprising a dial on the top of the base-plate, a pointer thereon, a screw

passing through the dial and base-plate and fixed to the pointer, and means for adjustably connecting the end of the arm with said screw.

5 4. A lens grinding machine comprising work supporting shafts adapted to support a former for the work, and a lever having in the upper end thereof, a depression in its operative surface for receiving the former,
10 the walls of said depression serving as guides for the lever.

5. In a machine of the character described, the combination of two work shafts, a former, and a similar shaped guide-plate parallel
15 with the former held between the adjacent ends of said shafts.

6. In a lens grinding machine, the combination of a pivoted frame, work-supporting shafts carried thereby and adapted to support a former for the work, a lever pivoted
20 at a distance below the pivot of said frame and extending up to said shafts, the upper end of said lever having an elongated depression therein for receiving the former,
25 and means for adjusting said lever, a former removably supported by said shafts and a plate fixed to said former spaced therefrom and parallel with it, said plate being of substantially the same size and shape as the
30 former.

7. A former for a lens grinding machine having integrally mounted thereon and parallel therewith a plate spaced from the former and of substantially the same size
35 and shape as the former.

8. In a lens grinding machine, the combination of a pair of work holding shafts, a frame for supporting said work holding shafts comprising a pair of hollow cylindrical portions surrounding said shafts, bearings for said shafts, and two sets of perforated felt disks on said shafts at the ends of said bearings to protect the same from dust and dirt.
40

9. In a lens grinding machine, the combination of a work-shaft, a ball retainer, a ball cone on the shaft having a slanting conical surface, a casing against which motion of the shaft endwise in one direction will push
50 the balls outwardly to prevent vibration, a second work shaft toward which the larger end of said conical surface extends, and means for yieldingly forcing it toward the first named work shaft.

10. In a lens grinding machine, the combination of a driving shaft, work-supporting shafts, means for driving said work-supporting shafts from the driving shafts, a frame or casing comprising a cylindrical part surrounding said driving shaft, a pair of cylindrical portions surrounding said work-supporting shafts and protecting them from dirt and the like, and means for connecting the last two casings with the first one, whereby
65 said casings constitute a rigid frame for sup-

porting and protecting said shafts, one of said work-supporting shafts having two collars thereon within its casing, a spring located within the casing between said collars, and means on the shaft for receiving the
70 thrust of one end of the spring.

11. In a lens grinding machine, the combination of a longitudinally movable work-holding shaft, a spring for normally moving the shaft in one direction, a gear fixed to
75 said shaft, a slide rod engaging the flange of said gear, and means for reciprocating said rod to move the gear and shaft.

12. In a lens grinding machine, the combination of a movable work holding shaft, a casing surrounding the shaft, a spring surrounding the shaft and located inside the casing, for forcing the shaft in one direction, a gear on said shaft for driving it, lugs on said casing having bearings, a rod
85 slidable in said bearings and adapted to engage said gear, and a lever for sliding said rod so as to move the gear and shaft against the resistance of said spring.

13. In a lens grinding machine, the combination of a longitudinally movable work-holding shaft, a casing inclosing said shaft, a spring within the casing for resisting motion of the shaft in one direction, a sliding rod journaled on the outside of the casing, a
95 gear fixed to the shaft against which the rod engages, and means for reciprocating said rod to move the gear and shaft.

14. In a lens grinding machine, the combination of a tilting frame, work-supporting shafts journaled thereon, a former carried by one of said shafts, a tension device for holding said frame in position for grinding, and a second tension device for varying the tension during a rotation.
100

15. A lens grinding machine comprising a bodily movable shaft, a former, and means independent of the former for putting said shaft under a tension of varying intensity during different portions of a single revolution.
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16. In a lens grinding machine, the combination of a shaft, a former supported thereby, yielding means for holding the shaft in grinding position, and additional means
115 for providing a varying tension during different portions of a revolution.

17. In a lens grinding machine, the combination of a shaft, a former carried thereby, a tension device, and a second tension device adapted to increase the tension when the former is at such position during a revolution as to bring the thick edges of the lens in contact with a grinding stone.
120

18. In a lens grinding machine, the combination of a shaft, a former carried thereby, an attachment on the shaft adapted to be set at right angles to the former, and a tension device acting on said attachment for controlling the tension.
125 130

19. In a lens grinding device, the combination of a shaft adapted to support a former thereon, an elliptical attachment on said shaft, a lever bearing on said elliptical
5 attachment throughout the revolution of the shaft, and a tension device connected with the lever.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

LOUIS WILHELM.

Witnesses:

R. E. FAY,

C. FORREST WESSON.