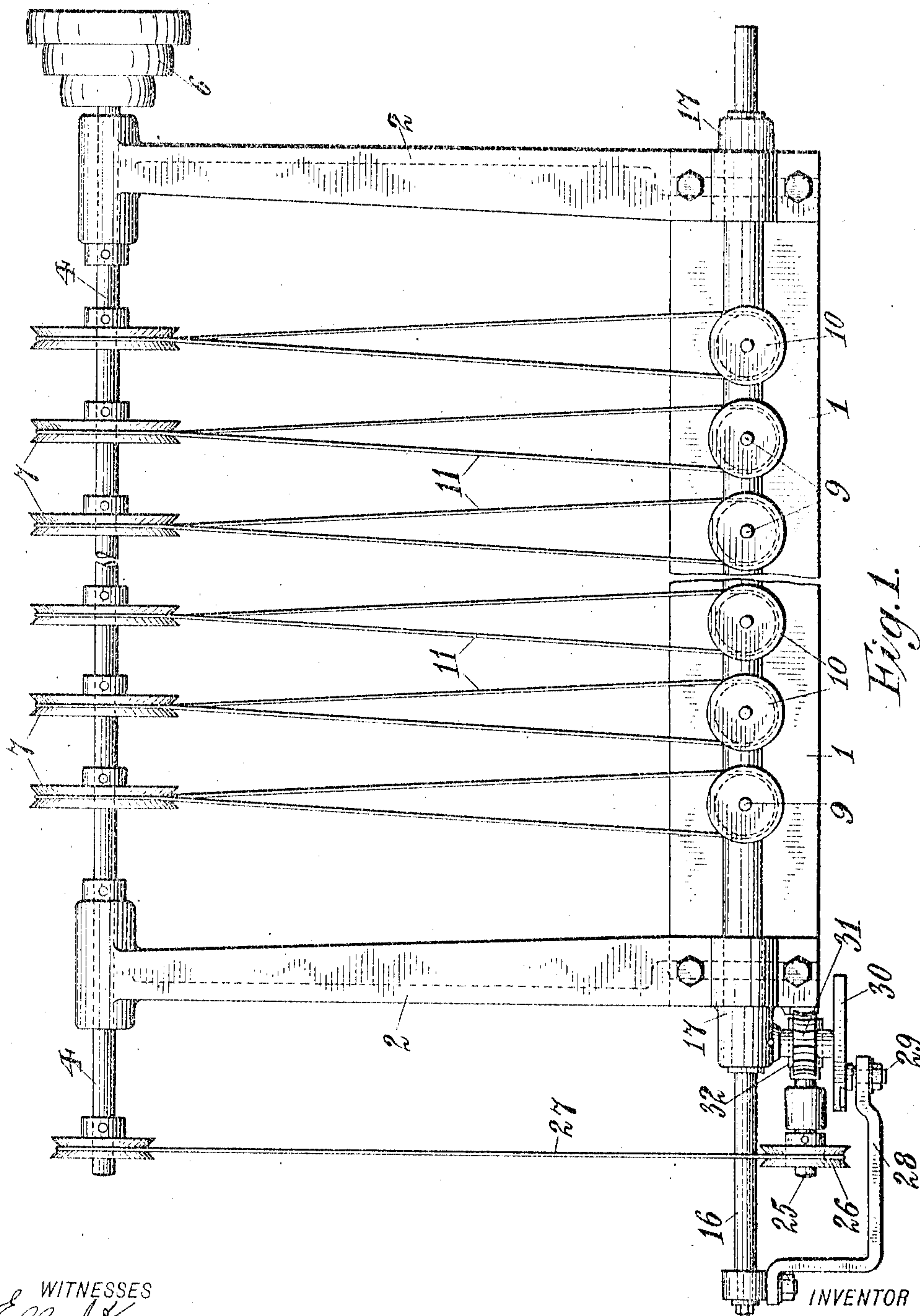


M. W. BRINKMANN.
LENS GRINDING MACHINE.
APPLICATION FILED NOV. 5, 1907.

966,730.

Patented Aug. 9, 1910.

4 SHEETS—SHEET 1.



WITNESSES
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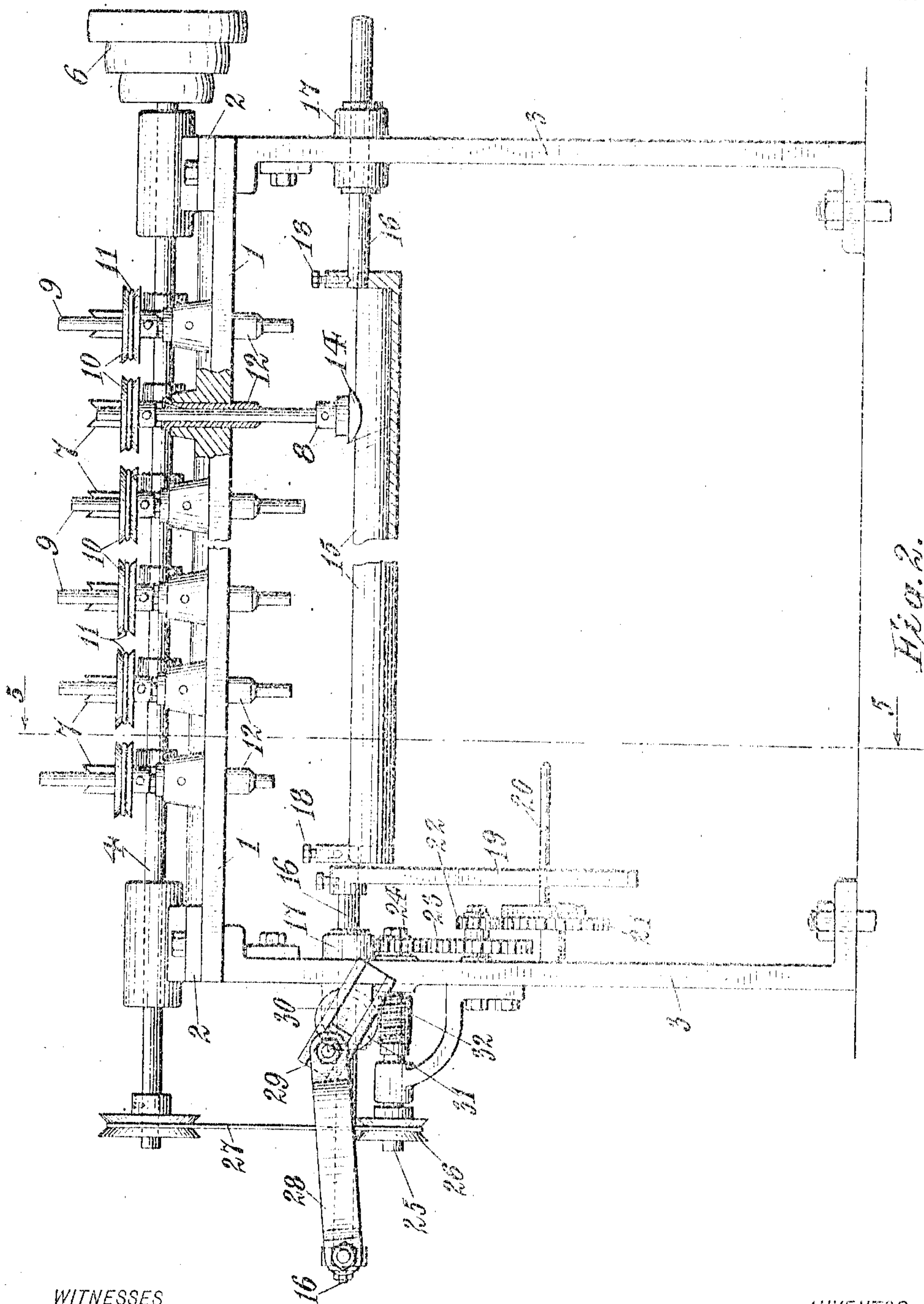
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4 SHEETS—SHEET 2.



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4 SHEETS--SHEET 3.

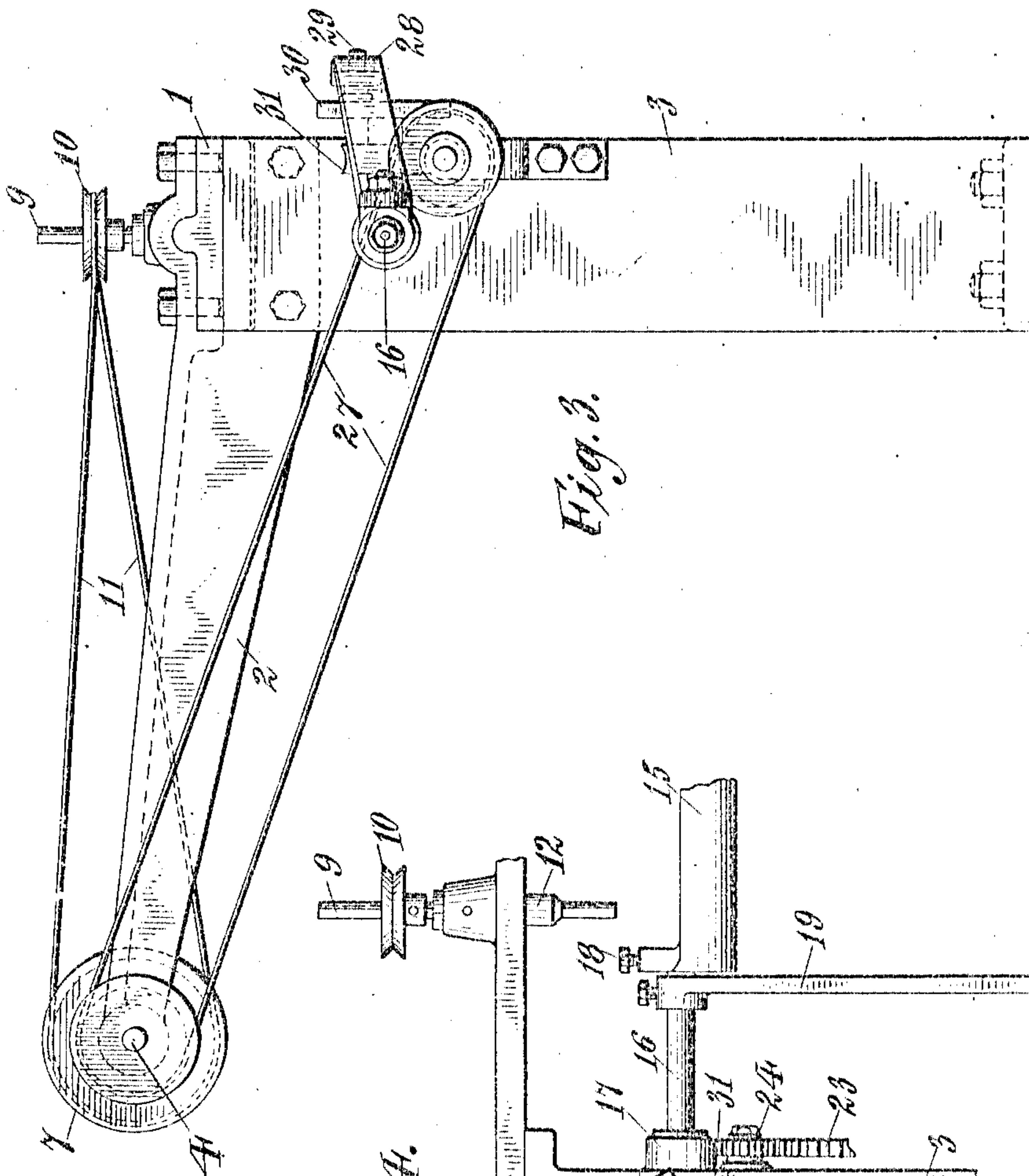


Fig. 3.

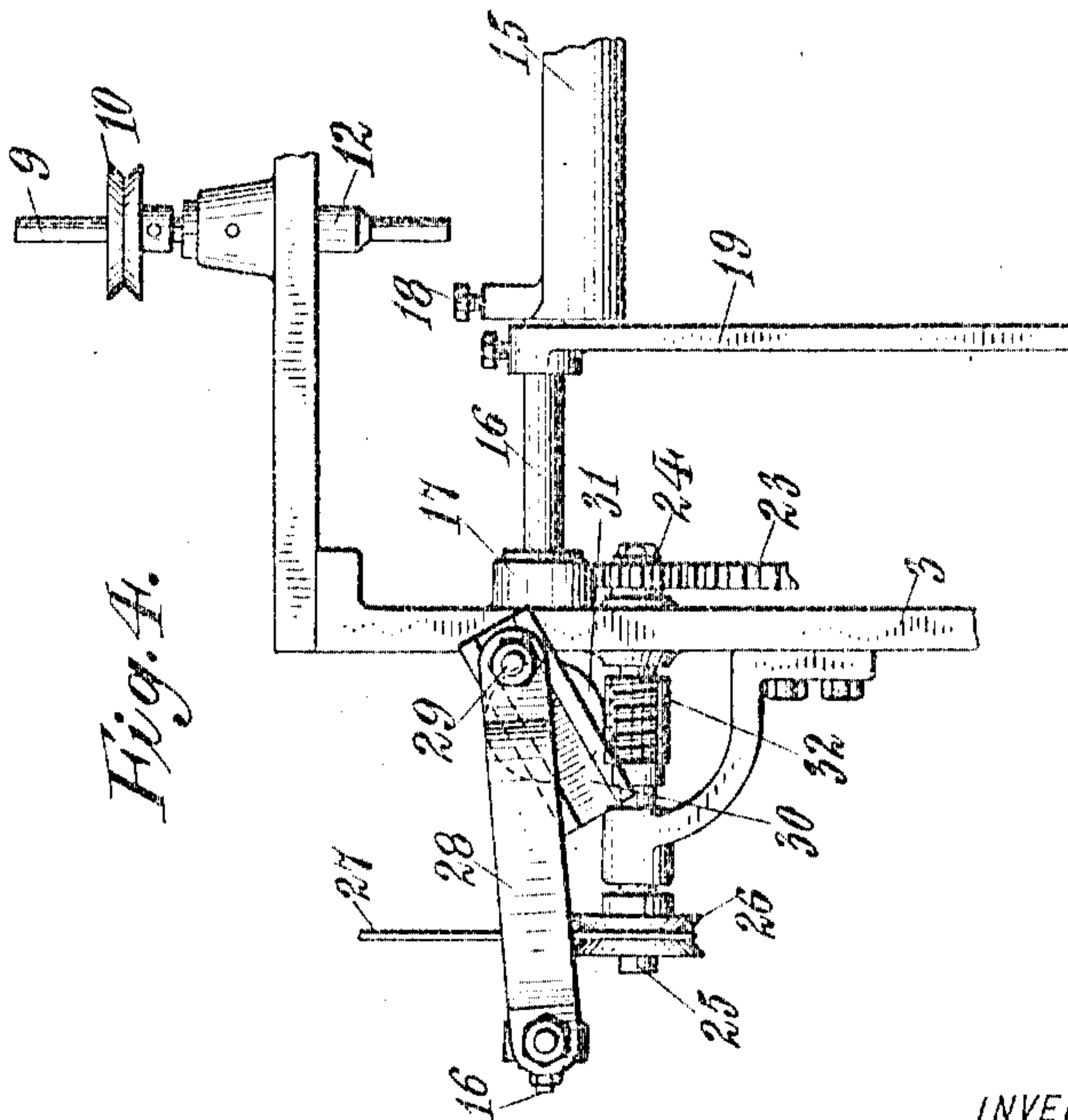


Fig. 4.

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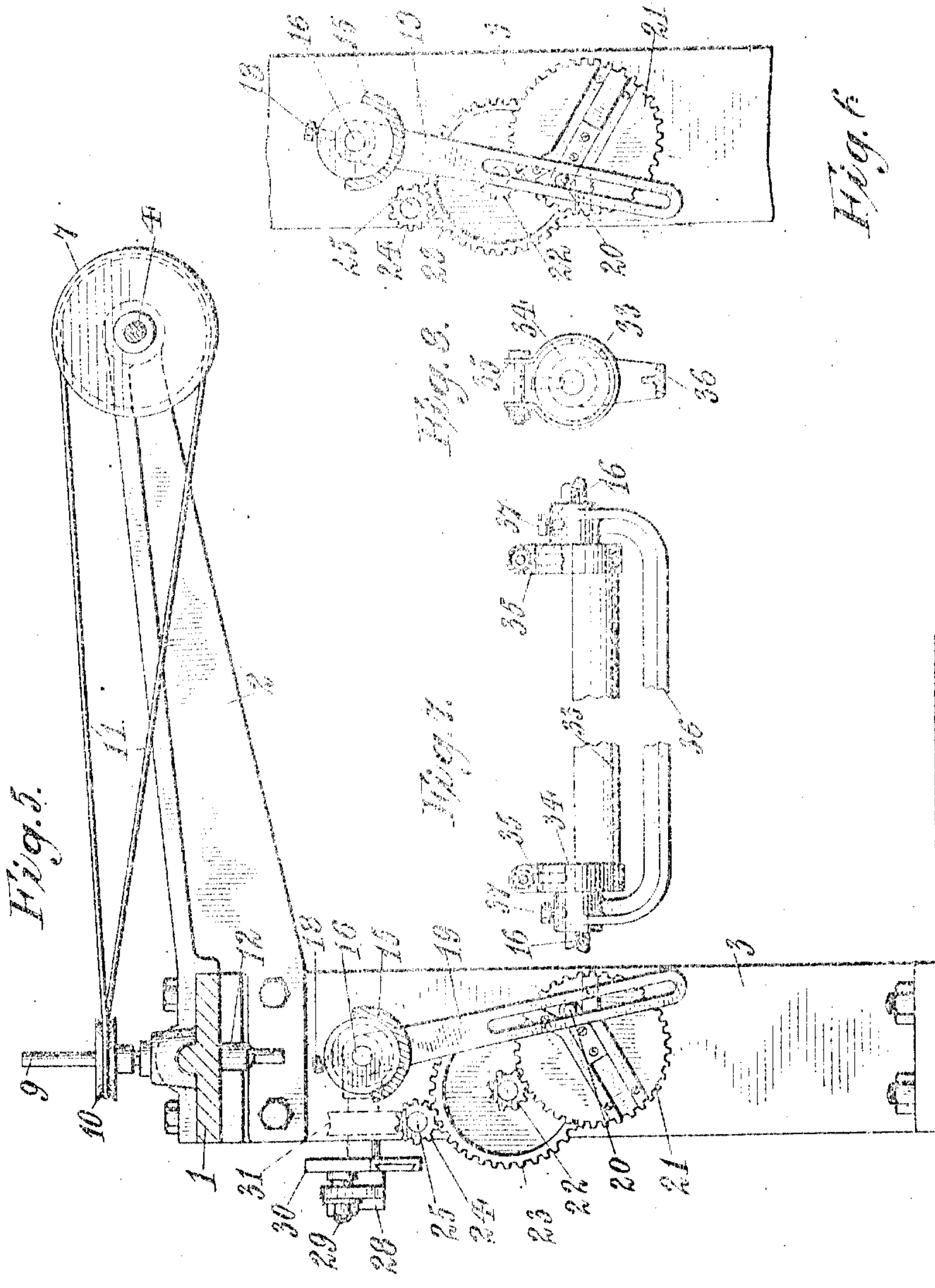
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4 SHEETS—SHEET 4.



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LENS-GRINDING MACHINE.

966,730.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed November 5, 1907. Serial No. 400,880.

To all whom it may concern:

Be it known that I, MORRIS W. BRINKMANN, a citizen of the United States, residing in the borough of Manhattan of the city of New York, in the State of New York, have invented certain new and useful Improvements in Lens-Grinding Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

The object of this invention is to provide suitable mechanism whereby lenses may be ground and polished with mathematical accuracy and without flaws, and the invention consists in new and novel features of construction and combination of parts hereinafter set forth and claimed.

Referring to the accompanying drawings, Figure 1 represents a plan view of my improved automatic lens grinding machine. Fig. 2 represents a side elevation thereof, one of the holding devices being shown in section. Fig. 3 represents an end view of the machine. Fig. 4 is a detail view showing the mechanism for moving the grinding tool. Fig. 5 represents a vertical section on the line 5-5 of Fig. 2. Fig. 6 is a detail view illustrating a different position of the mechanism shown in Fig. 5. Figs. 7 and 8 are longitudinal and sectional views respectively, showing means for polishing the lens after it has been ground.

The frame of my improved machine comprises a platen 1 provided with outwardly extending arms or brackets 2 supported by standards 3. The main driving shaft 4 is journaled in said arms and is rotated by a pulley 6 connected with any suitable source of power. One or more driving pulleys 7 are keyed to the main shaft at suitable distances apart.

The holder for the lens to be ground comprises a head 8 secured to a spindle 9 having a pulley 10 keyed thereto which is rotated by a belt 11 from one of the driving pulleys 7. The spindle 9 is rotatably mounted in a bushing 12 supported by the platen. The lens 14, or other article to be ground or polished, is secured to the head 8 by wax or any other suitable means. Preferably a plurality of these holders are arranged in line on the platen and are used in one machine.

Arranged immediately below the holder or holders is a grinder or grinding tool comprising a concave receptacle or trough 15 mounted on trunnions 16 that are freely

movable in bearings 17 provided in the uprights 3 of the frame. Preferably said grinder is adjustable upon the trunnions by means of the set screws 18. The wearing, abrading or polishing substance if any be used may be placed or secured in the trough 15 in any suitable manner.

A swinging or rocking movement is imparted to the grinder through a slotted arm 19 secured to one of the trunnions 16. Said arm is actuated by an adjustable crank pin 20 on a gear 21, which is rotated through a train of gears 22, 23 and 24 from a shaft 25 having a pulley 26 thereon which is connected by suitable means as a belt 27 with a pulley on the main shaft. Simultaneously with the swinging movement of the grinding tool a reciprocating or to and fro movement thereof in the line of its axis is obtained by means of an arm 28, which is adjustably secured at one end to one of the trunnions 16 and is provided at its other or free end with a pin or stud 29. Said pin engages a slotted arm 30, which is rotated by a gear 31 that meshes with a worm 32 formed upon the shaft 25.

After the lens 14 has been ground a tool comprising any suitable polishing material 33 may be substituted for the trough or receptacle 15 to polish and finish same. In order that the surface of said polishing material shall correspond mathematically with the desired curvature of the lens, it is preferably secured to disks 34 which may be mounted on the ends of the trunnions 16 and is held in position thereon by suitable means as clips 35. Since the polishing material is flexible and yielding, a rigid arm 36 is secured by means of set screws 37 between the trunnions so as to insure uniform movement thereof. Preferably the disks 34 are movable on the trunnions so that the polishing material may be subjected to considerable tension and thus retain its shape when in contact with the lens.

The operation of the machine causes the holders to be rotated at a fixed rate of speed and causes the grinding or polishing tool to rock or swing and, at the same time, to reciprocate or move to and fro in line with its axis. Both the rate and the amount of each movement may be readily controlled and adjusted and every part of the lens be equally subjected to the grinding action of the machine. So long as the machine is properly adjusted, it is obvious that the grinding

must be performed with mathematical accuracy with respect to the curvature desired, which can be readily determined by the shape of the trough of the grinding tool. It is obvious also that the machine may be used for making various geometrical figures upon the surface of glass or any other material by adjusting and regulating the movements of the parts with relation to each other.

Various changes within the skill of the mechanic may be made in the mechanism herein set forth without departing from the spirit of the invention provided the means set forth in the following claims be employed.

I claim as my invention:

1. In a grinding and polishing machine, the combination with a holder, and means for rotating said holder, of a grinding or polishing tool having an interrupted swinging movement transversely to its axis and a to and fro movement in the line of its axis.

2. In a grinding and polishing machine, the combination of a holder and a grinding or polishing tool, one of said parts having a rotating movement and the other part having simultaneously a swinging movement and a reciprocating movement in different planes, substantially as described.

3. In a grinding and polishing machine, the combination with a holder, and means for rotating said holder, of a grinding or polishing tool comprising a receptacle shaped in section to correspond with the desired curvature of the article to be ground and arranged opposite said holder, means for rocking said receptacle and means for reciprocating said receptacle, substantially as described.

4. In a grinding and polishing machine, the combination with a holder comprising a spindle, a head on said spindle, and means for rotating said spindle and head, of a grinding or polishing tool comprising a receptacle arranged opposite said holder, means for rocking said receptacle, means for reciprocating said receptacle, and means for regulating the rate and extent of said movements, substantially as described.

5. In a grinding and polishing machine, the combination of a holder and a grinding or polishing tool, one of said parts having a rotating movement and the other part a swinging movement and a reciprocating

movement in different planes, and means for regulating the rate and extent of each of said movements, substantially as described.

6. In a grinding and polishing machine the combination with a holder, means for rotating said holder on a stationary axis, and means for securing the article to be ground to said holder, of a grinding or polishing tool arranged to be in continuous contact with the article to be ground and having simultaneous movement in planes transverse to each other during the grinding operation, substantially as described.

7. In a grinding and polishing machine the combination with a holder for the article to be ground, and means for rotating said holder on a stationary axis, of a grinding tool comprising trunnions longitudinally and rotatably movable in bearings provided in the frame of the machine, and means for simultaneously imparting a swinging movement and a reciprocating movement to said tool.

8. In a grinding and polishing machine, the combination with a holder for the article to be ground, and means for rotating said holder, of a grinding tool comprising trunnions longitudinally and rotatably movable in bearings provided in the frame of the machine, and a flexible material secured to said trunnions, means for holding said material to desired shape, and means for imparting a swinging movement and a reciprocating movement to said material.

9. In a grinding and polishing machine, the combination with a holder for the article to be ground, and means for rotating said holder, of a grinding tool comprising trunnions longitudinally and rotatably movable in bearings provided in the frame of the machine and grinding or polishing material mounted on said trunnions, a driving gear operatively connected with said trunnions for rotating same, and a worm gear operatively connected with said trunnions for reciprocating same, substantially as described.

This specification signed and witnessed this 2nd day of November A. D. 1907.

MORRIS W. BRINKMANN.

Signed in the presence of—

AGNES L. REILLY,
AMBROSE L. O'SHEA.