

(No Model.)

4 Sheets—Sheet 1.

J. WARWICK.

MECHANICAL MOVEMENT.

No. 300,539.

Patented June 17, 1884.

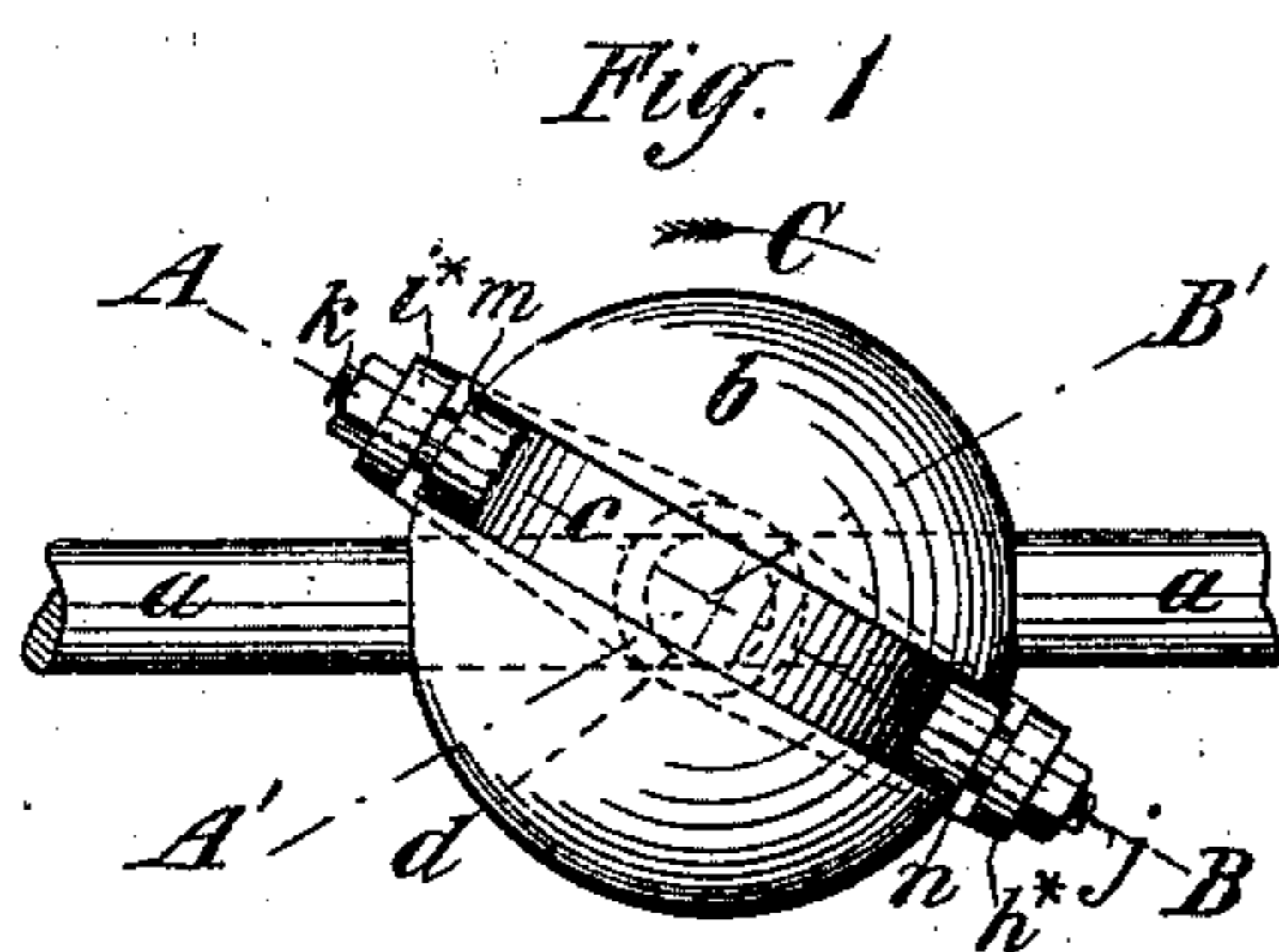


Fig. 3.

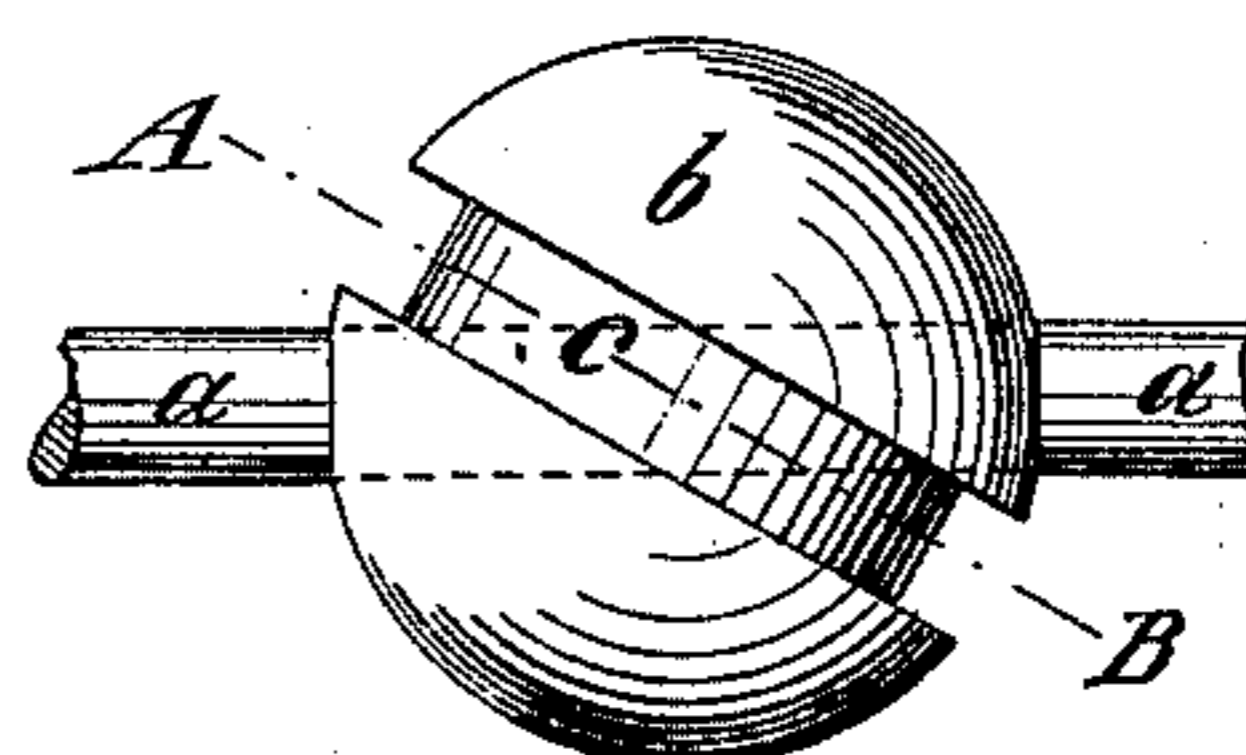


Fig. 2.

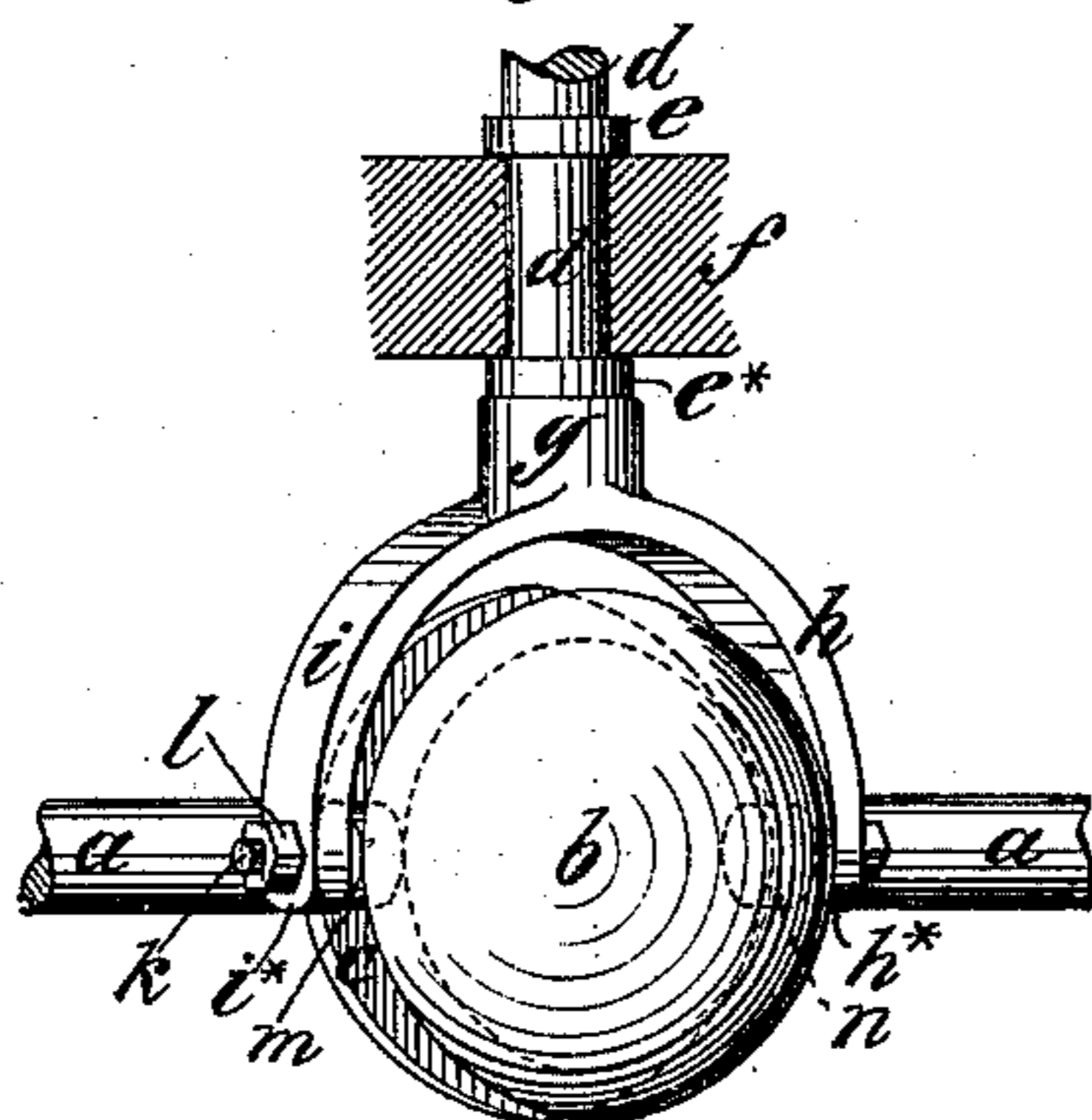


Fig. 4.

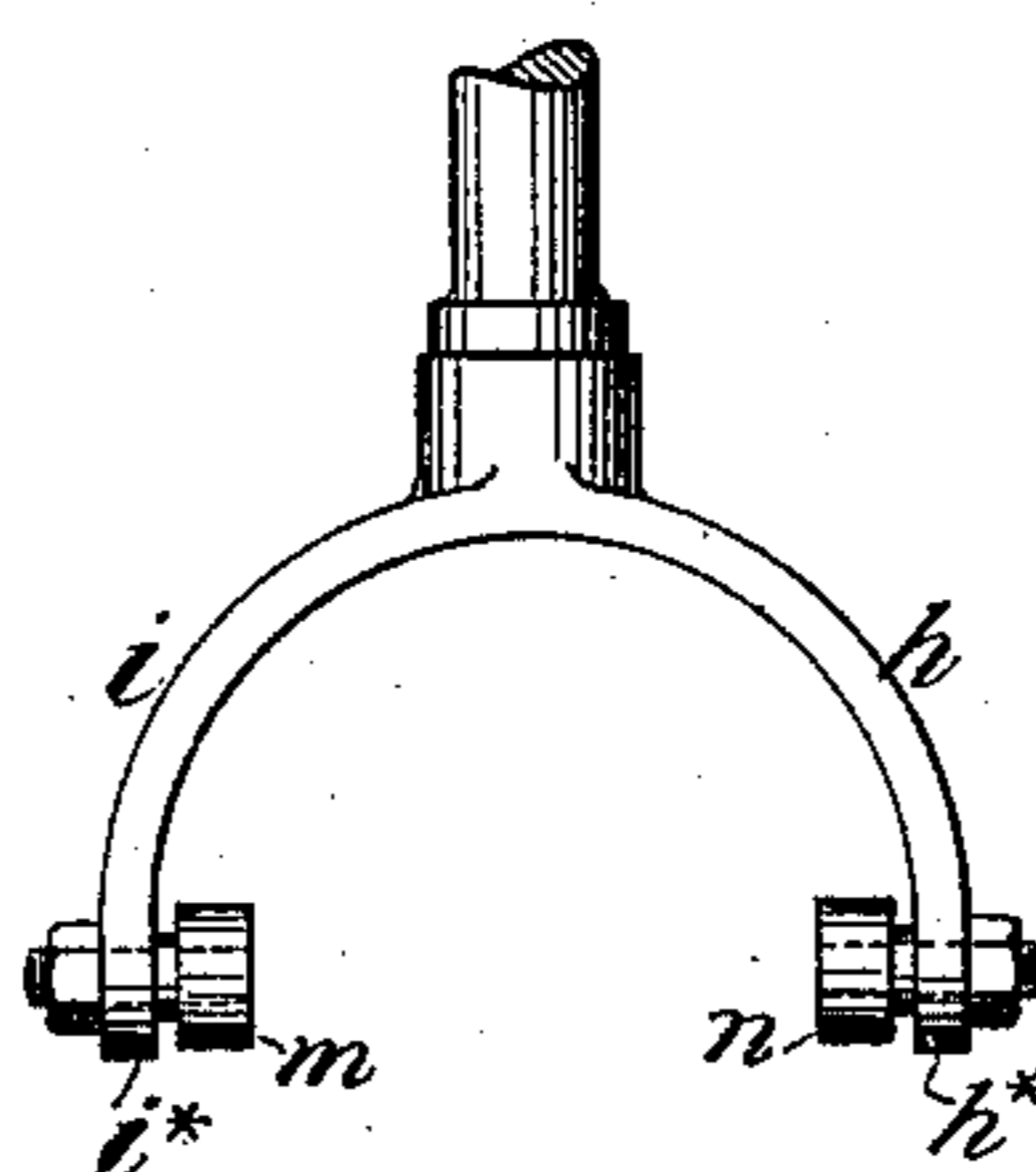


Fig. 5.



Fig. 8.

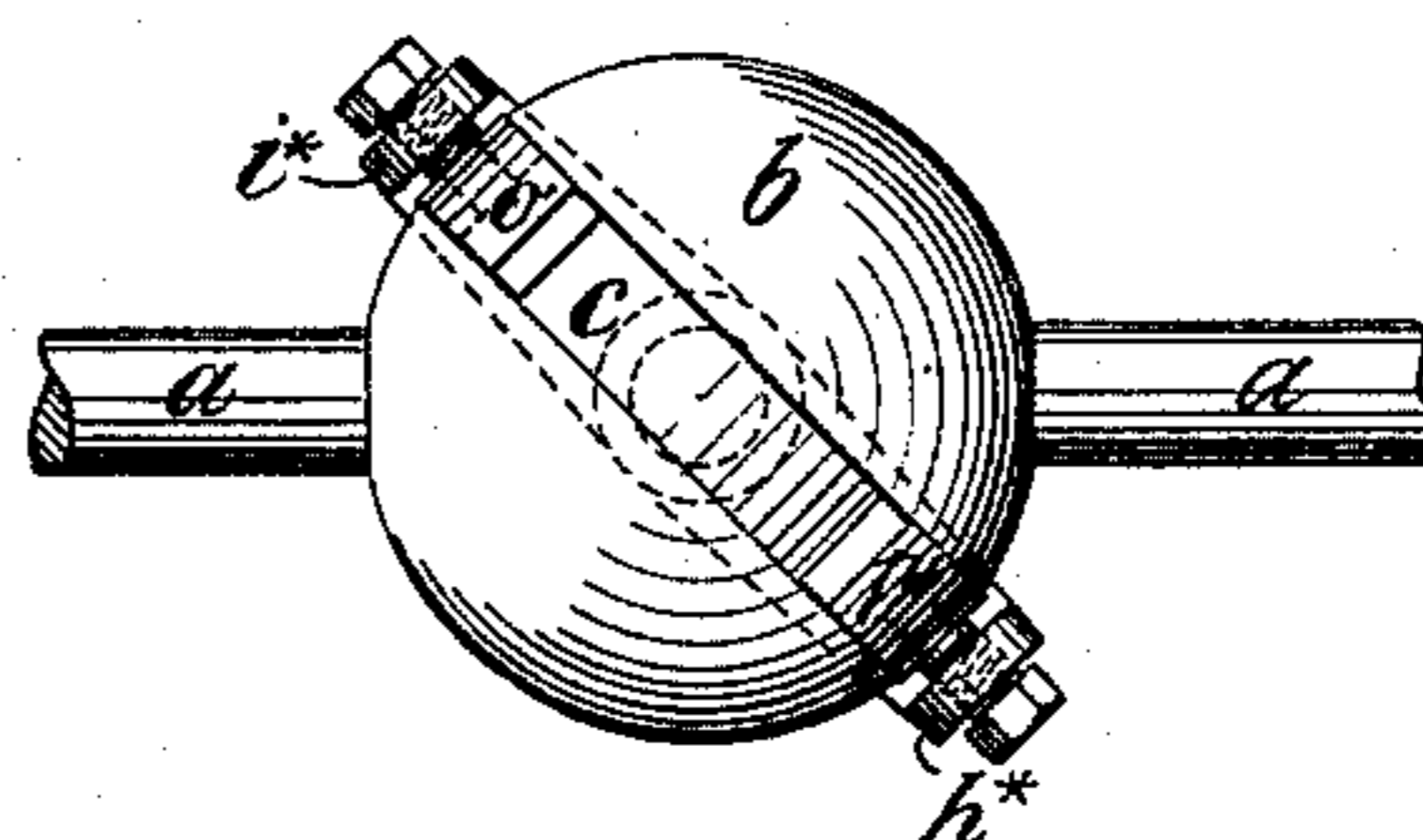


Fig. 6.

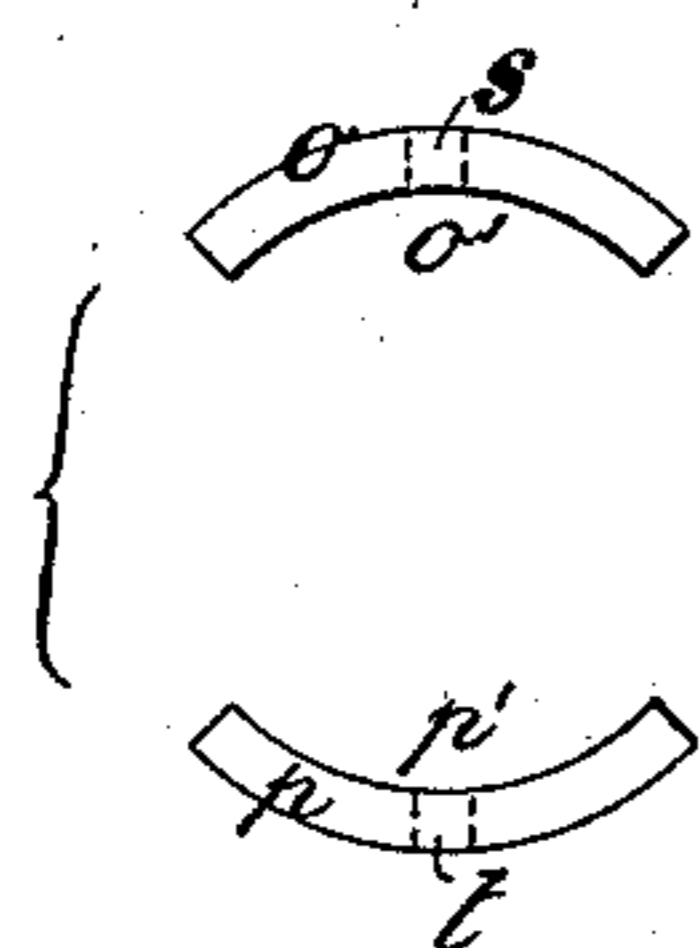
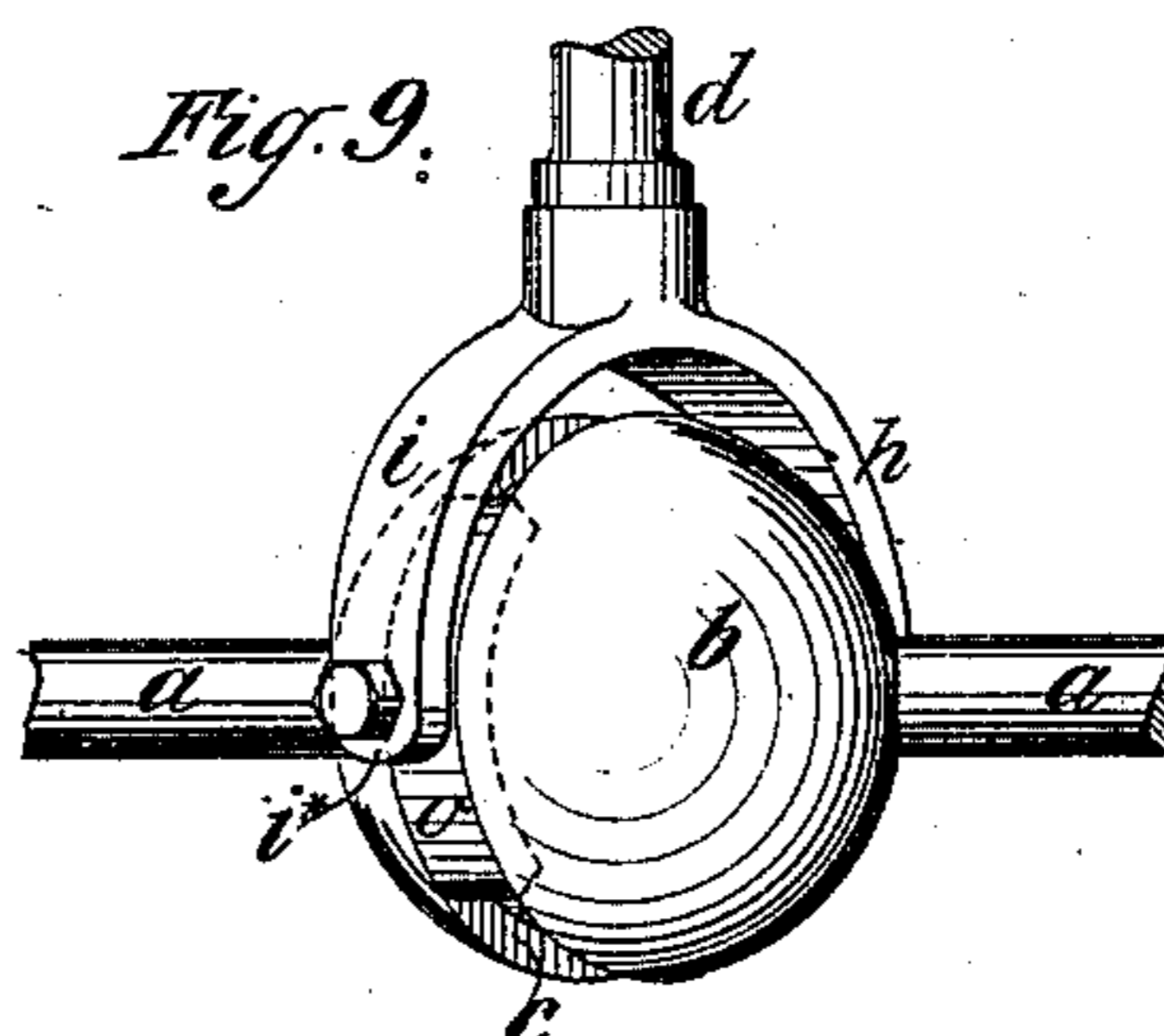


Fig. 7.



Fig. 9.



Witnesses:

Matthew Pollock
Fred Hayner

Inventor:

Inventor:
James Warwick
by his Attorneys
Brown & Hall

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Fig. 10.

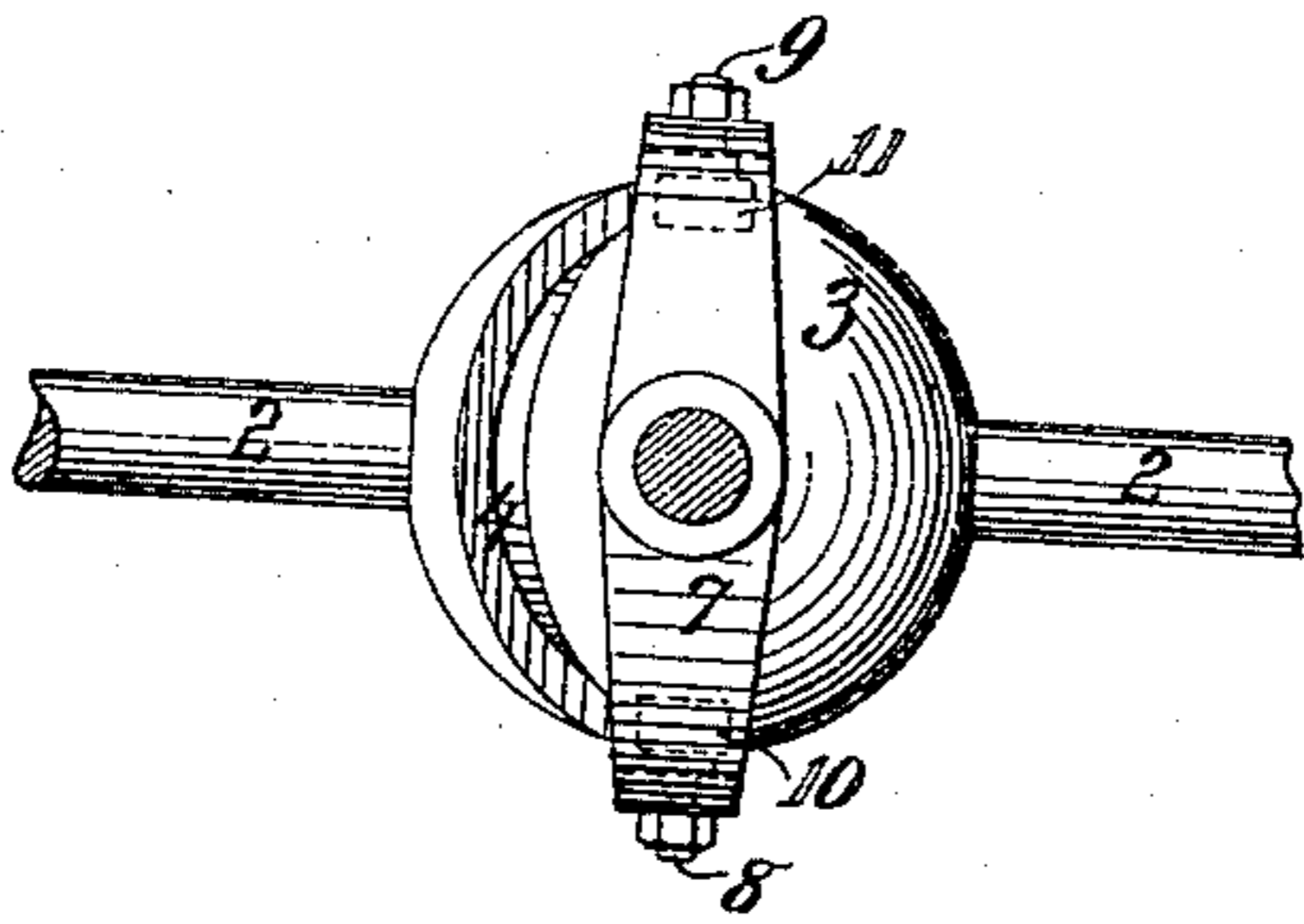


Fig. 12.

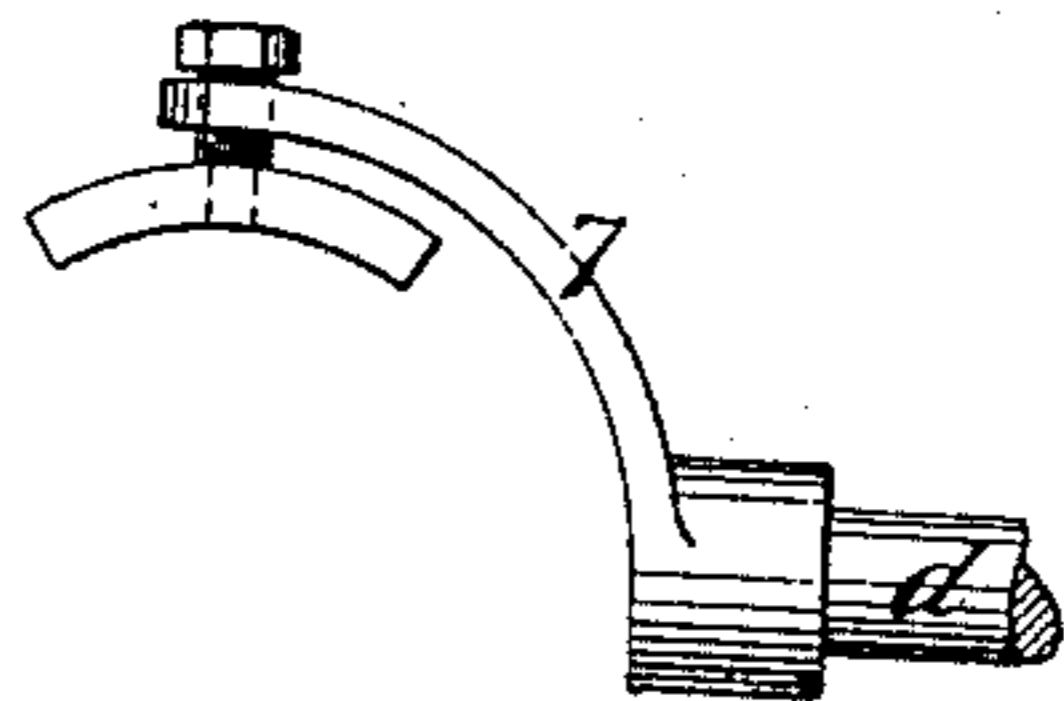


Fig. 11.

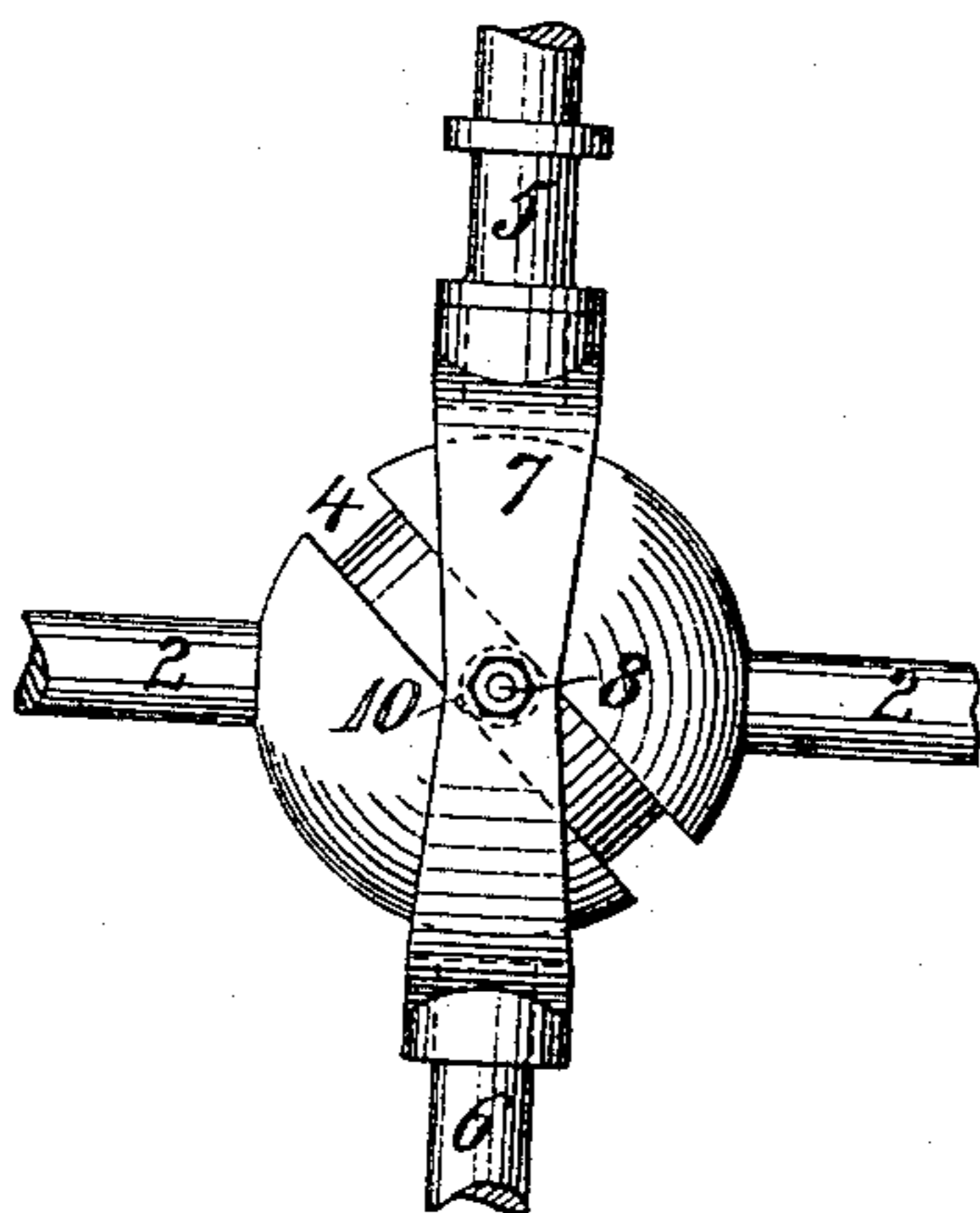


Fig. 13.

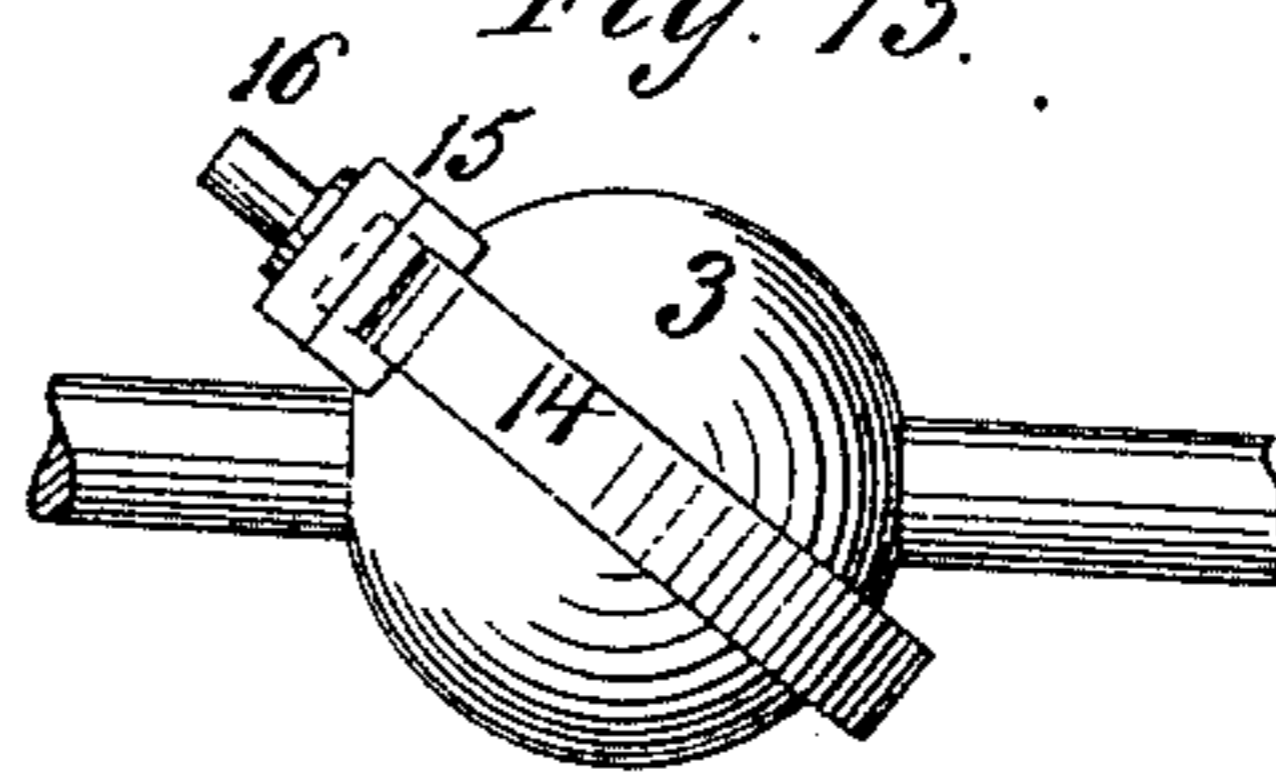


Fig. 14.

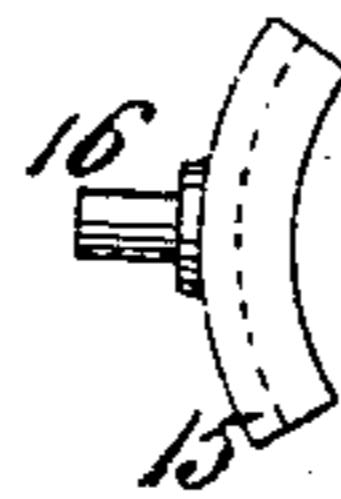


Fig. 15.

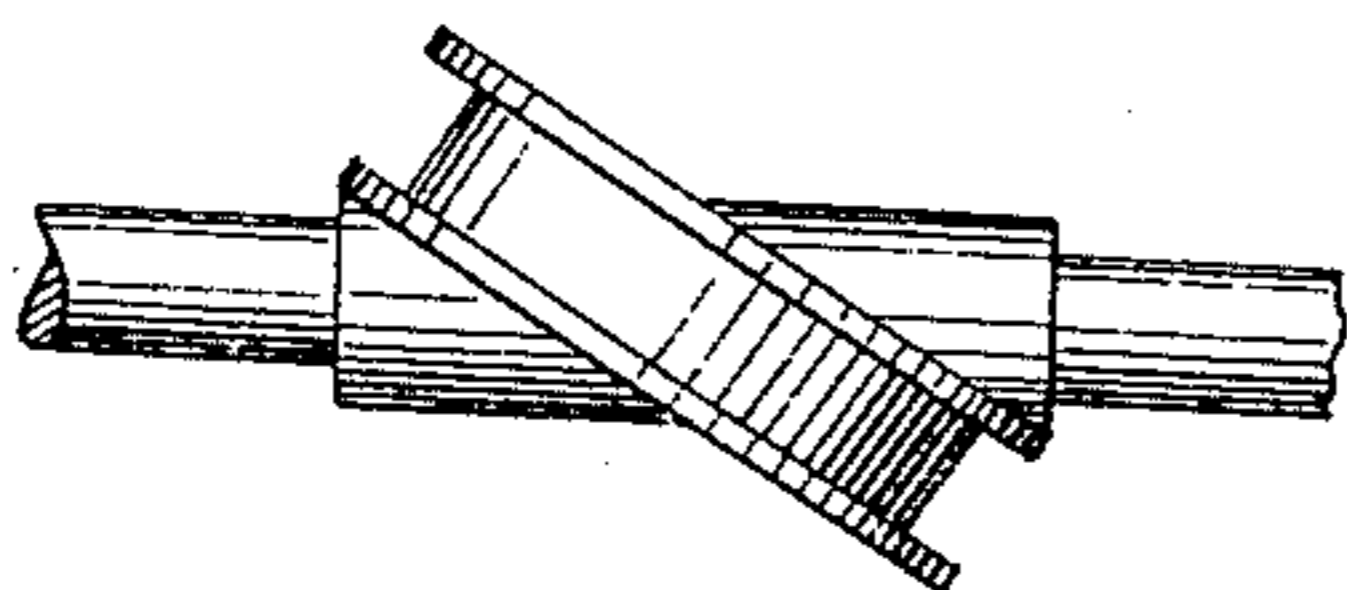
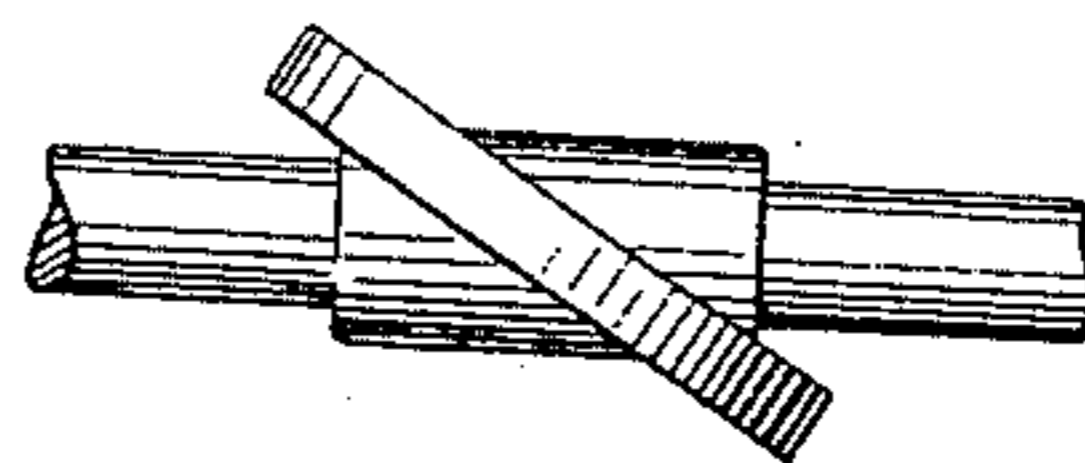


Fig. 16.



Witnesses:
Matthew Pollock
Fred W. Hayes

Inventor:
James Warwick
By: H. H. Brown & Hall

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Fig. 18.

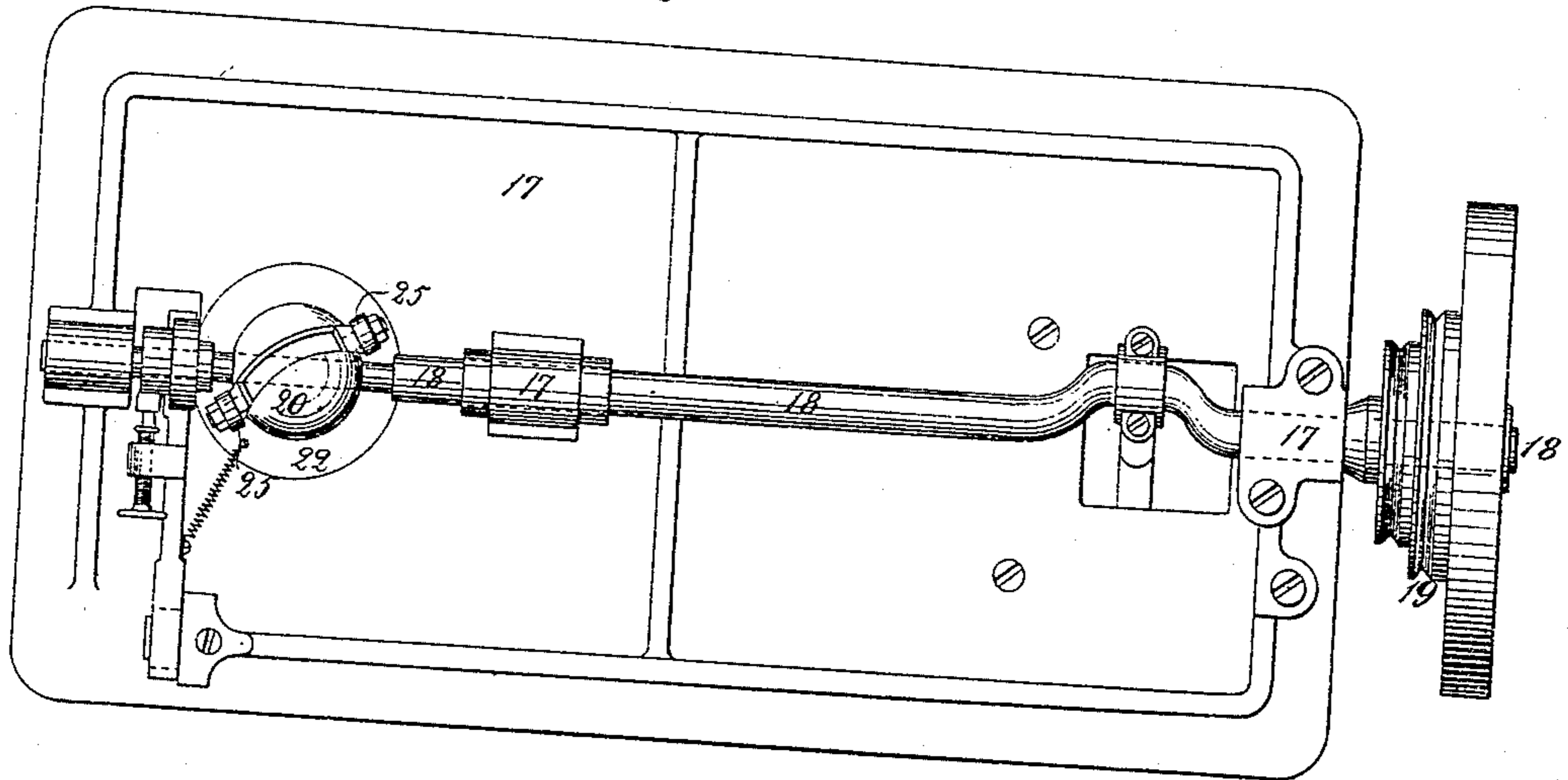
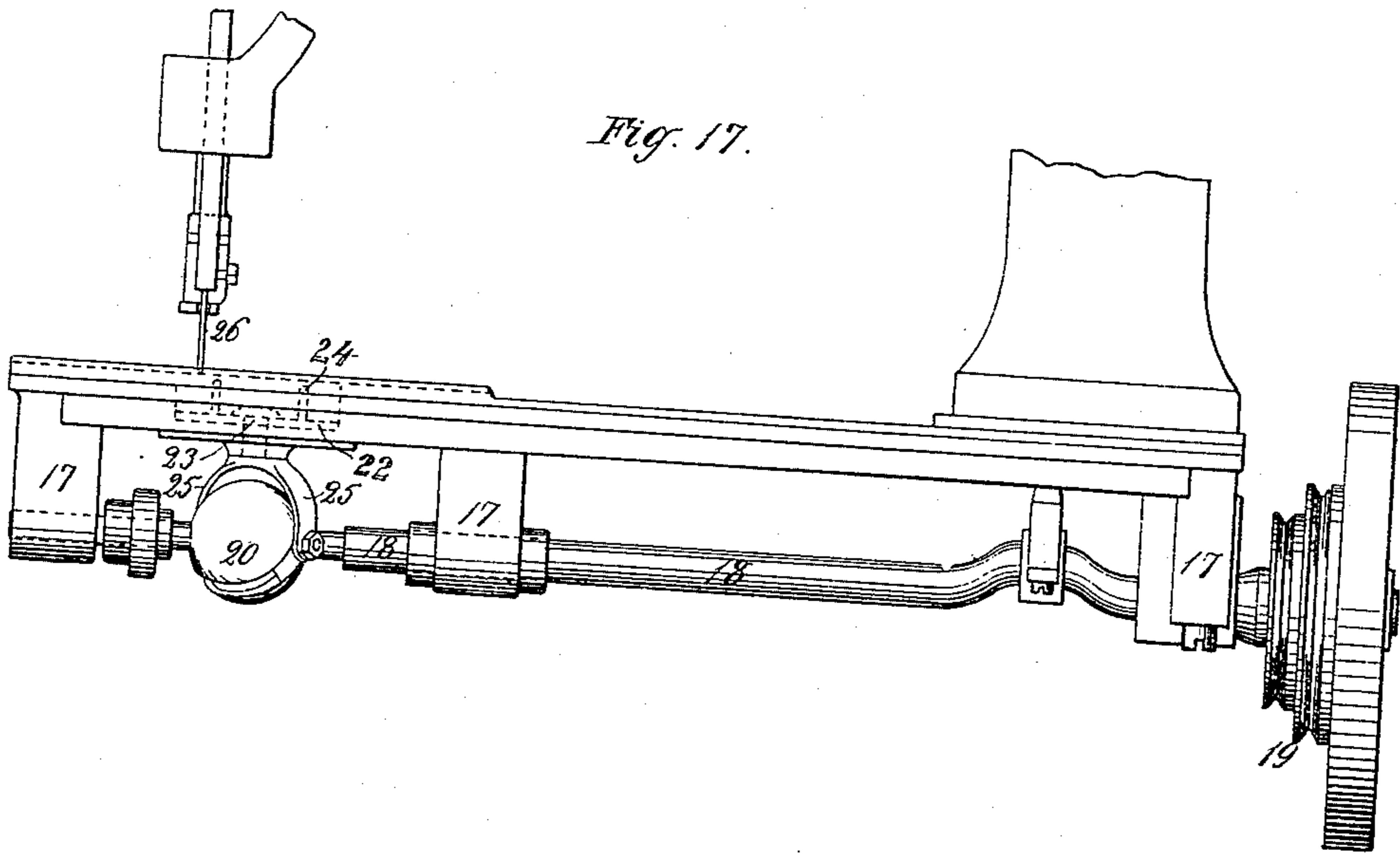


Fig. 17.



Witnesses:
Matthew Pollock
J. H. Hayes

Inventor:
James Warwick
by his Attorney
Brown & Hall

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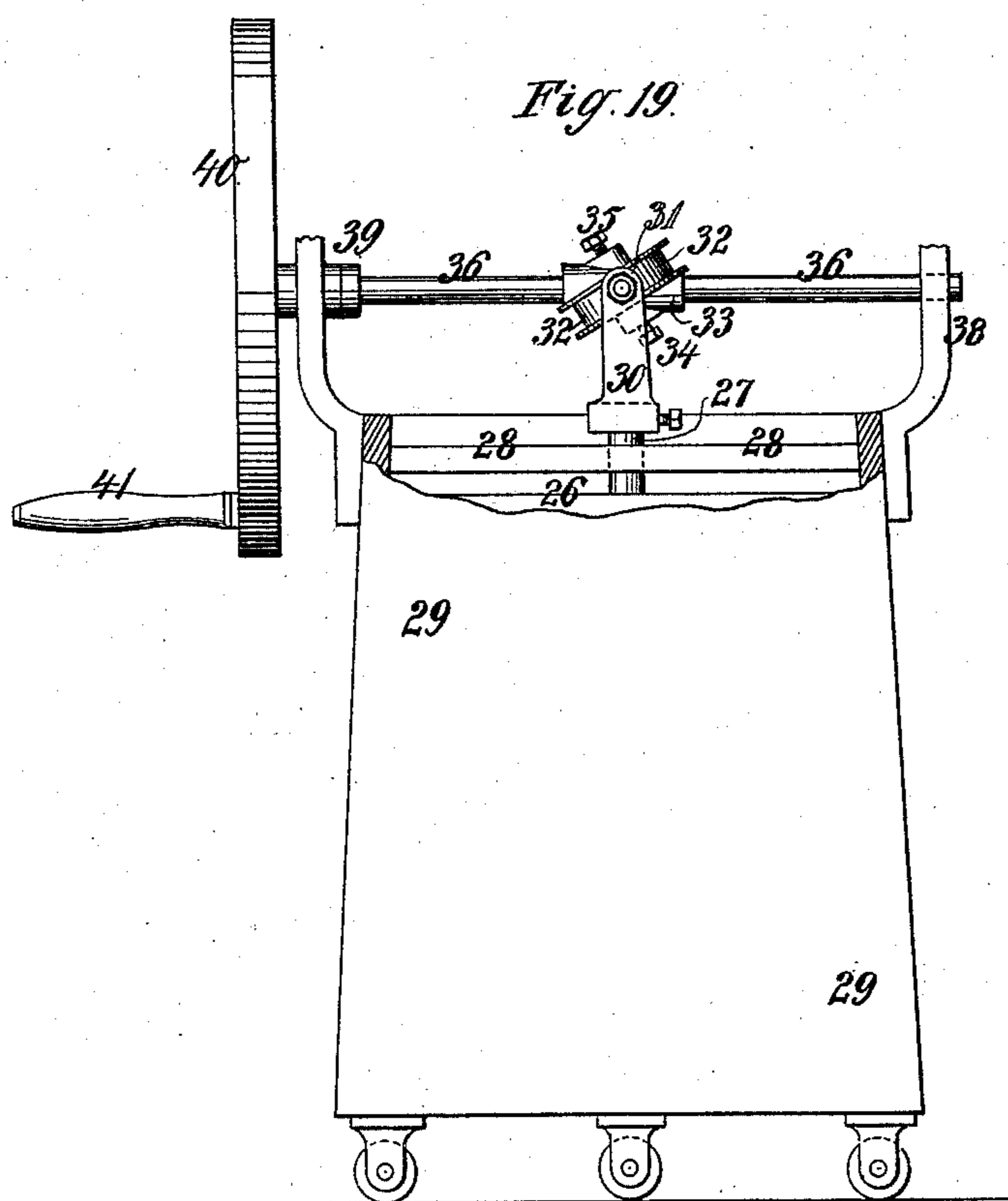
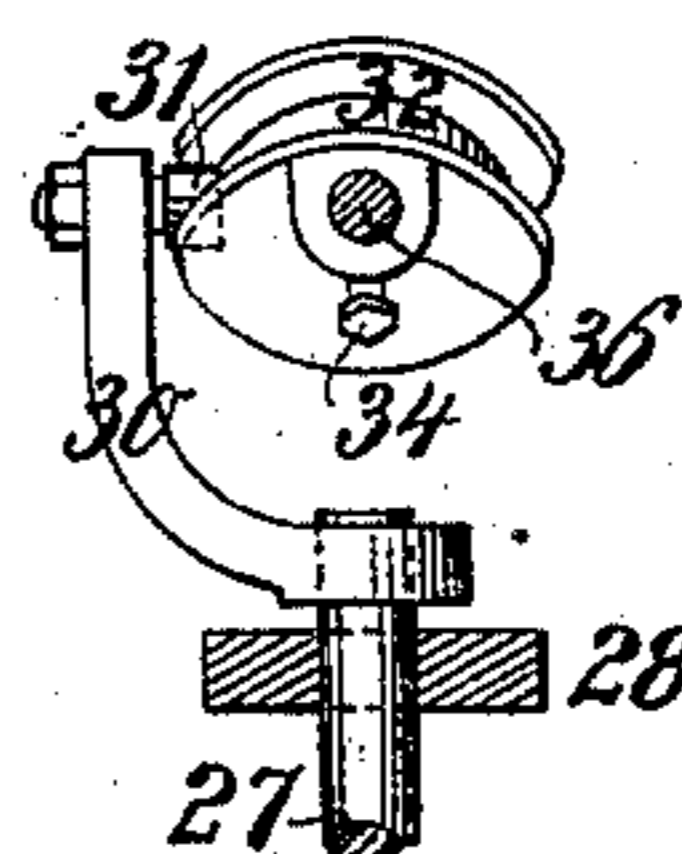


Fig. 20.



Witnesses:
Matthew Pollock
Fred Haynes

Inventor:
James Warwick
By his Attorney
Brown & Hall.

UNITED STATES PATENT OFFICE.

JAMES WARWICK, OF MANCHESTER, COUNTY OF LANCASTER, ENGLAND.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 300,539, dated June 17, 1884.

Application filed April 18, 1884. (No model.) Patented in England February 24, 1883, No. 1,009; in Germany July 20, 1883, No. 26,292, and in France September 10, 1883, No. 157,465.

To all whom it may concern:

Be it known that I, JAMES WARWICK, of 59 Hilton Street, Manchester, in the county of Lancaster, England, have invented a new and useful Improvement in Mechanical Movements for Converting Rotary Motion into Oscillatory or Vibrating Motion, of which the following is a specification, reference being had to the accompanying drawings.

This invention is applicable to the shuttle-motion of sewing-machines, to churns, to washing-machines, and to all machines in which it is desired to obtain an oscillating or vibratory motion of one shaft or pivoted part of the machine from a rotating shaft whose axis is at right angles to the axis of the shaft or pivoted part first mentioned.

Figure 1 is a side view, and Fig. 2 a plan, of a mechanical movement constructed according to my invention. Figs. 3, 4, and 5 represent the details of Figs. 1 and 2. Fig. 6 is a side view, and Fig. 7 an edge view, of slides or bars which are substituted for the bowls or anti-friction rollers shown in Figs. 1, 2, 4, and 5. Fig. 8 is a side view, and Fig. 9 a plan, showing the movement like that shown in Figs. 1 and 2, except that it has slides like those shown in Figs. 6 and 7, instead of the friction-rollers shown in the first-described figures. Fig. 10 is a side view, and Fig. 11 a plan, corresponding with Figs. 1 and 2, except that the oscillating shaft extends in both directions from the rotating shaft, instead of in one direction only. Figs. 12, 13, 14, 15, and 16 exhibit modifications of the details, which will be hereinafter described. Fig. 17 is a side view of the shuttle-motion of a sewing-machine having my invention applied. Fig. 18 is an inverted plan of the same. Fig. 19 is an elevation, partly in section, of a churn having my invention applied. Fig. 20 is a section of the mechanical movement at right angles to Fig. 1.

I will first describe Figs. 1, 2, 3, 4, 5. *a* is a rotating shaft, upon which I mount a ball, *b*. I form in the surface of the ball *b* a circular groove, *c*, the plane of which groove (indicated by the dotted lines *A B*) is placed at an angle to the axis of the shaft *a*, as shown in the detached view, Fig. 3. At *d* is the shaft to

which an oscillatory or vibratory motion is to be imparted, the axis of such shaft *d* intersecting the axis of the shaft *a*. The shaft *d* is prevented from moving in a longitudinal direction by the collars *e e**, formed thereon at each side of the bearing *f*, within which the shaft *d* vibrates or oscillates. Upon the shaft *d*, I mount a boss, *g*, provided with arms *h i*. (Shown more clearly in the detached views, Figs. 4, 5, of which Fig. 5 is a side view at right angles to Fig. 4.) The arms *h i* embrace the ball *b*. The ends *h* i** of the arms *h i*, I provide with pivots *j k*, respectively, such pivots *j k* being inserted into the arms *h i*, respectively, and are secured therein by nuts *l*. Upon the projecting parts of the pivots *j k*, I mount bowls or rollers *m n*, respectively, capable of being rotated upon the said pivots *j k*, the diameter of each of the bowls *m n* being equal to the width of the groove *c*. The pivots *j k* must be so placed that when the shaft *d* is oscillated or vibrated the axis of each of the said pivots will move in a plane at right angles to the axis of the shaft *d* and coincident with the plane of the axis of the shaft *a*. Upon the shaft *a* being rotated half a revolution, the plane of the groove *c* will be rotated in the direction of the arrow *C*, and placed at an angle to its previous position, and during such rotation of the shaft *a* the sides of the groove *c*, acting against the circumferences of the bowls *m n*, will have turned the shaft *d* so that the center line, *A B*, passing through the pivots *j k*, will coincide with the line *A* B**. Upon turning the shaft *a* another half-revolution, the arms *h i* will be again returned to the position shown in the drawings. It will be seen that while the shaft *a* makes one revolution the shaft *d* will be oscillated or vibrated once in one direction and once in the opposite direction.

I will now describe the modification illustrated by Figs. 6, 7, and 9, in which I dispense with bowls *m n*, and in place thereof employ two metal bars or slides, *o p*. (Shown in Figs. 6, 7.) The surfaces *o' p'* of the bars or slides *o p* are curved to the same degree of curvature as that of the bottom of the groove *c*, formed in the ball *b*, in conjunction with which such bars *o p* are employed, and the

width from *q* to *r* is the same as the width of the groove *c*, before named. The bars *o p* are provided with openings *s t*, respectively, to receive the ends of the pivots *j k*, respectively.

5 Figs. 8, 9 show the bars or slides *o p* in their working position. The curved bars or slides *o p* lie within the groove *c*, formed around the ball *b*, the studs *j k* passing into the holes formed in the bars *o p*. As the shaft *a* revolves and the shaft *d* vibrates or oscillates, the pivots *j k* will be turned in the openings formed in the bars *o p*, thereby permitting the bars *o p* to oscillate as the groove *c* takes varying angular positions relative to the axis of the shaft *y*. In some cases, instead of mounting two arms, *h i*, upon the shaft *d*, I only mount one of them, as shown in Fig. 12.

Figs. 10 and 11 illustrate a method by which shafts situate at each side of and at right angles to a revolving shaft may be vibrated or oscillated. At 2 is the revolving shaft, fast upon which is a ball, 3, provided with a groove, 4. At 5 6 are the two shafts to which vibratory or oscillatory motion is to be imparted. Secured upon the ends of the shafts 5 6, respectively, is a ring, 7, formed of metal, to which ring 7 are jointed, by means of the studs 8 9, bars 10 11, respectively, lying in the groove 4. It will be seen that as the shaft 2 revolves the groove 4 will cause the ring 7 and shafts 5 6, upon which it is secured, to vibrate or oscillate. If desired, a portion of the ring 7 and one roller or bar may be employed to transmit motion from the groove 4 to the shafts 5 6. In some cases, instead of the ring 7 imparting vibratory or oscillatory motion to both the shafts 5 6, as previously described, such ring or portion thereof may be fast upon the end of the shaft 5 and vibrate freely upon the end 6* of the shaft 6, the shaft 6 merely serving as a support to the ring 7.

In place of forming a groove in the ball similar to those hereinbefore described, a projecting circular flange may be formed upon such ball, in which case I cause the projecting flange 14, as shown in Fig. 13, to pass through a groove formed in a part, 15, provided with a pivot, 16, which projects through a hole formed in an arm similar to the arms 7, previously described, such part 15 being made of a curved shape to correspond with the flange 14, as shown in the detached view, Fig. 14; or two parts 15 and studs 16 may be employed.

In cases where the weight of the ball would be undesirable or inconvenient, the form illustrated by Fig. 15 may be employed; or, instead of forming a flange around a ball, a circular plate or disk may be employed, as shown in Fig. 16, the center of the disk being contained within the axis of the shaft upon which such disk is mounted.

I will now describe, with reference to Figs. 17 and 18, the application of my invention for converting a rotary motion into a vibratory or oscillatory motion as applied for actuating the shuttle of a sewing-machine.

At 17 is the frame of the machine, and at 18 is the horizontal shaft ordinarily employed in such machines, and driven by means of the usual cone-pulleys, 19. Secured upon the shaft 18 is a ball, 20, in and around which is formed a groove, 21. Directly over the center of the ball 20 is the shuttle-race 22, through the center of which a short shaft or stud, 23, passes. The shuttle or carrier 24 is secured to the top of the stud or shaft 23, and to the base of the stud 23 are secured arms 25, which embrace the ball 20. The ends of the arms 25 carry bowls or bars, as previously described in reference to Figs. 1 to 12, inclusive. When rotary motion is imparted to the shaft 18, the arms 25 and shuttle-carrier 24 will be caused to vibrate or oscillate. As the shaft 18 rotates and brings those portions of the groove 21 which are situate nearest to the shaft 18 into position to act upon the arms 25, and while the direction in which the arms 25 are being moved is changing from one direction to the other, the speed of the vibration or oscillation of such arms 25 gradually decreases and then gradually increases twice during each revolution of the shaft 18. During one of such times of decreased speed of oscillation or vibration the needle 26 of the sewing-machine forms a loop of thread, through which the shuttle passes, and at the next time of decreased speed of vibration or oscillation of the arms 25 the needle 26 aforesaid draws up the thread above named into the fabric being operated upon by the sewing-machine. The application of my invention to a washing-machine or churn illustrated in Figs. 19 and 20 will now be described.

At 26 is the dolly or dasher of the washing-machine or churn, secured to a vertical shaft, 27, which shaft 27 is supported at its upper end by the cross-piece 28, secured at its ends to the tub or vessel 29 of the washing-machine or churn. Fast upon the upper end of the vertical shaft 27 is a lever, 30, carrying a bowl or roller, 31, which passes into the groove 32, formed around and within a part, 33, secured by means of set-screws 34 35 to the horizontal shaft 36, such horizontal shaft 36 being supported by and being capable of being rotated within brackets 37 38, secured to the tub or vessel 29, such shaft 36 being prevented from moving longitudinally by the collar 39 and the boss of the fly-wheel 40, mounted fast upon the shaft 36. As the shaft 36 is rotated by means of the handle 41, secured to the fly-wheel 40, the groove 32 will, by means of the bowl or roller 31, arm 30, and shaft 27, impart a vibratory or oscillatory motion to the dolly or dasher 26 of the washing-machine or churn.

Although I have hitherto only shown and described my invention as applied to a sewing-machine and washing-machine or churn, I would have it understood that it can be applied to a variety of purposes—such as working the fly-combs of carding-machines used for carding cotton, wool, and other fibrous mate-

rials; or my invention may be used in any other machine in which such oscillatory or vibratory motion may be applicable.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination, with a rotary shaft having a circular groove or projection inclined to its axis, of a shaft having secured to it an arm or arms furnished with a roller or slide, or roll-

ers or slides, to work in or on the said inclined groove or projection, substantially as and for the purpose herein described.

JAMES WARWICK.

Witnesses:

ALBERT E. HALL,
9 Mount St., Manchester, England.

W. T. CHEETHAM,
Patent Agent, 18 St. Ann St., Manchester.