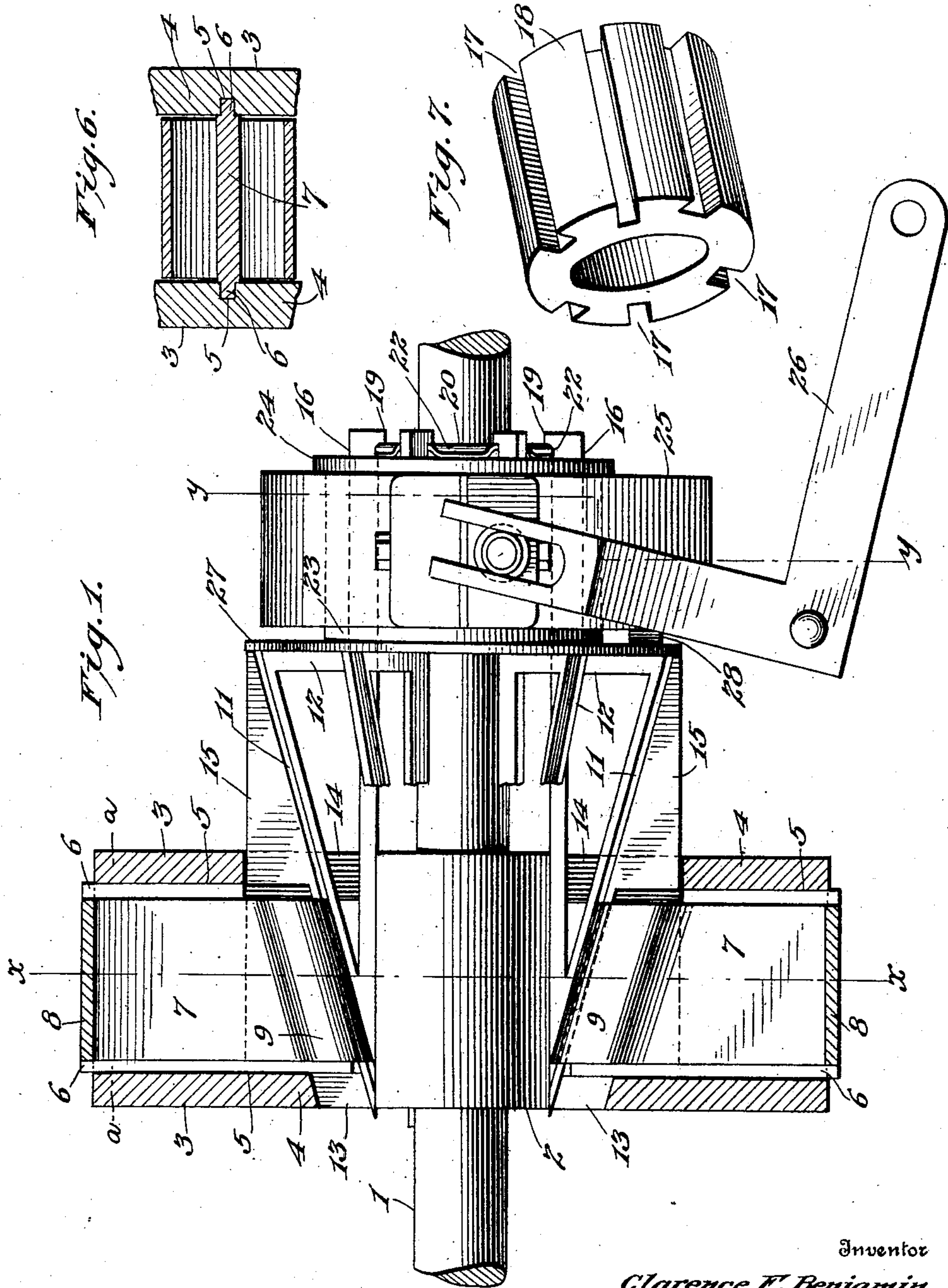


C. F. BENJAMIN.  
EXPANSIBLE PULLEY.  
APPLICATION FILED OCT. 16, 1908.

912,442.

Patented Feb. 16, 1909.

3 SHEETS—SHEET 1.



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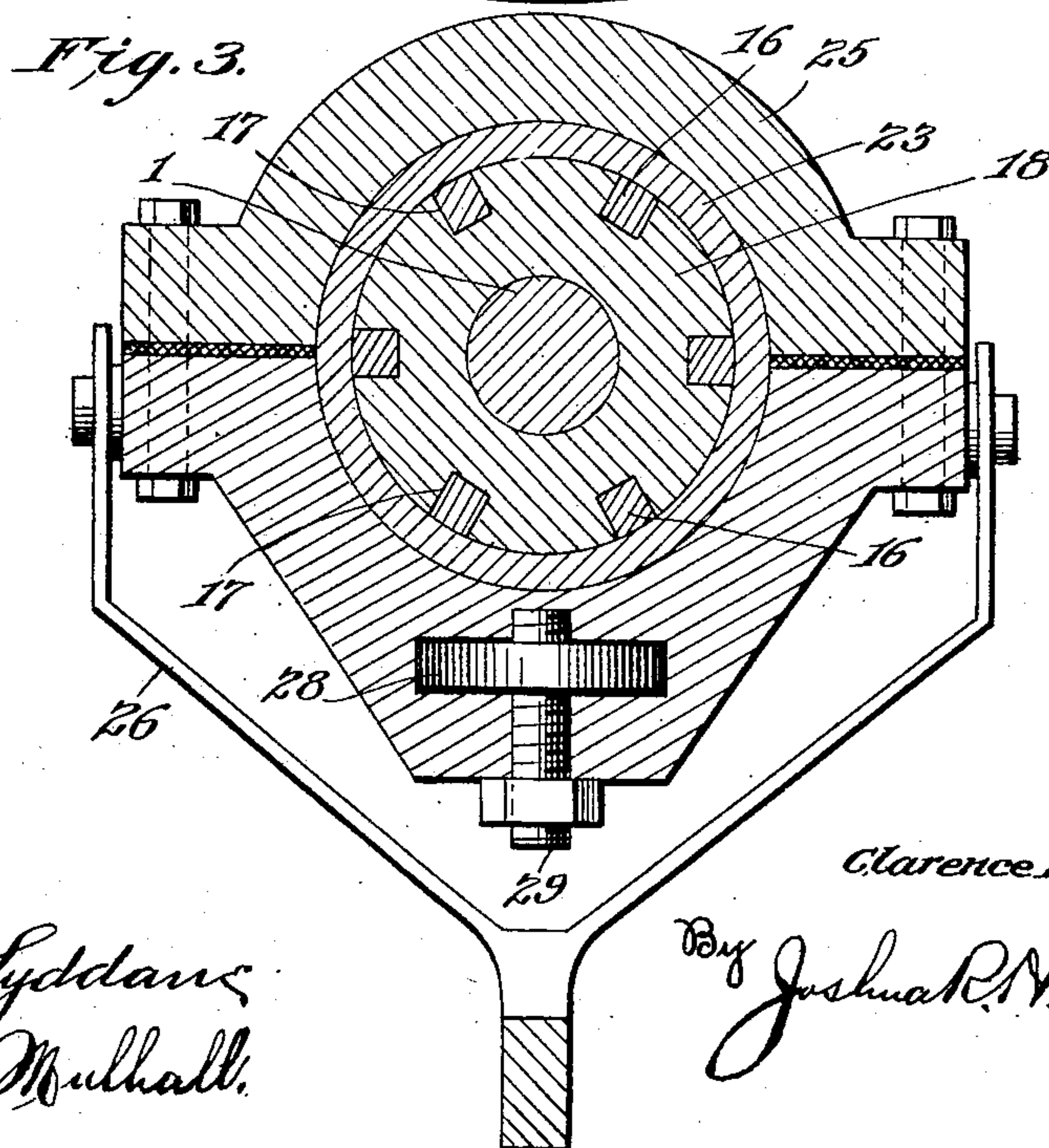
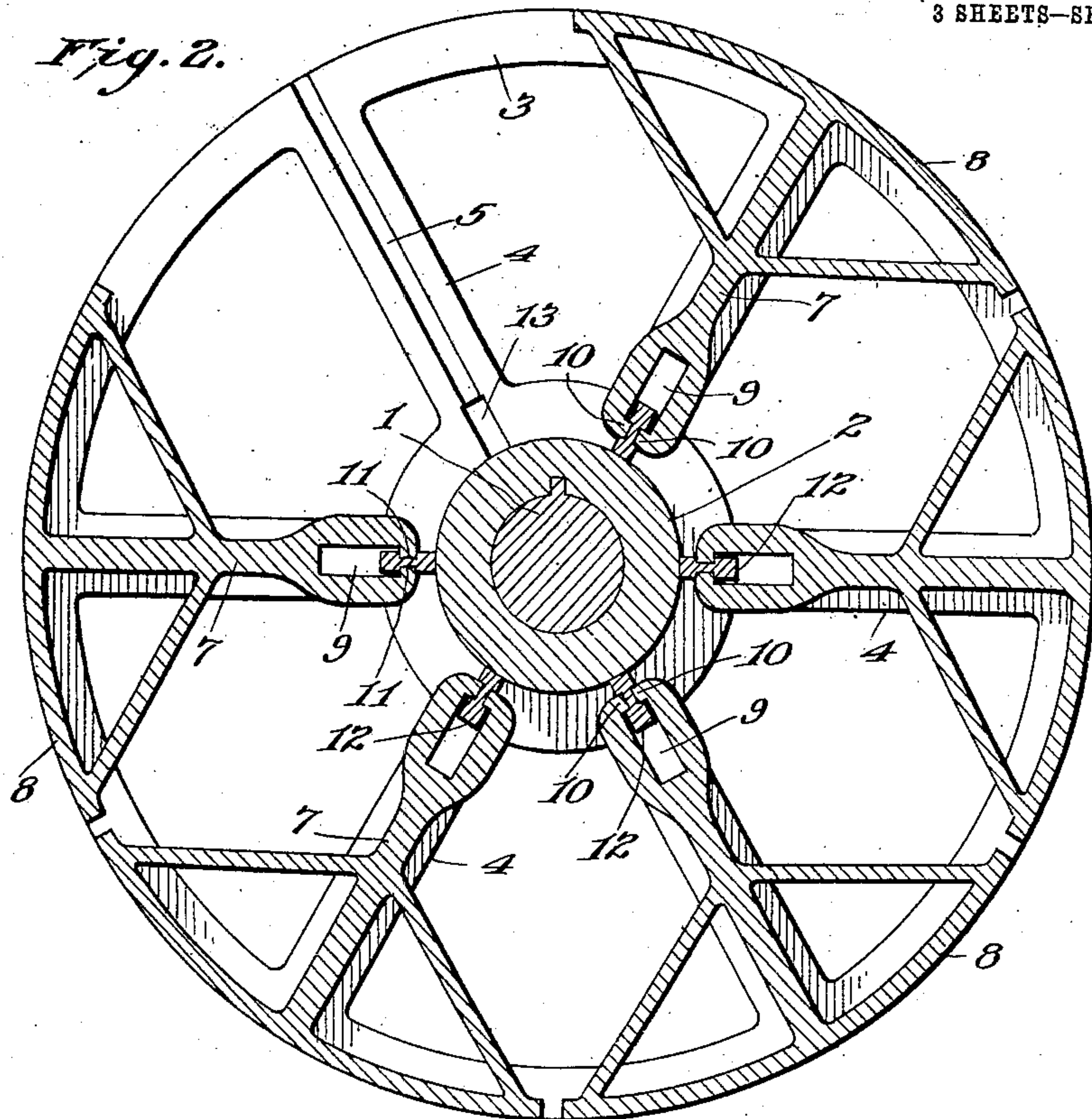
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3 SHEETS—SHEET 2



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3 SHEETS—SHEET 3.

Fig. 4.

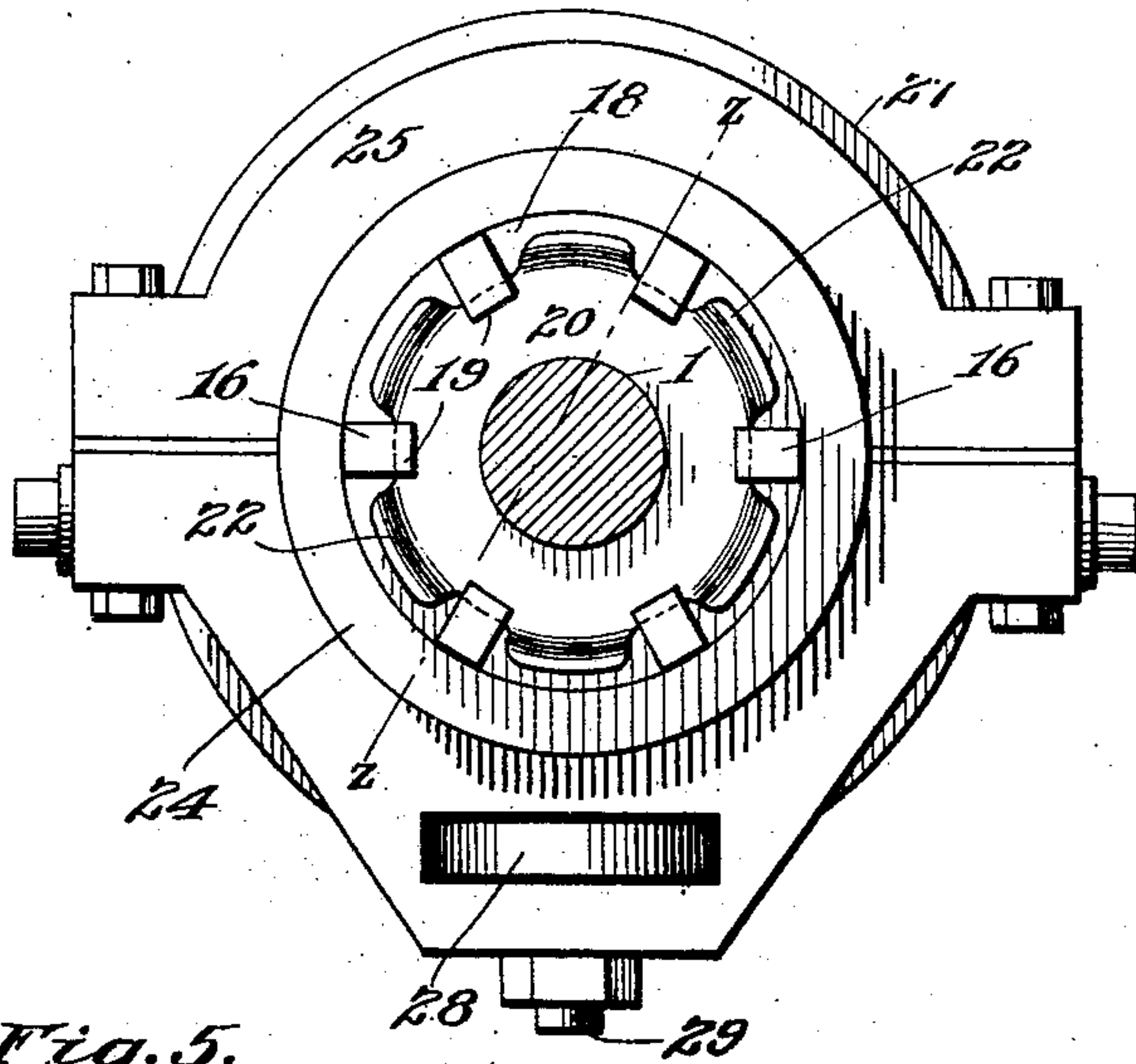


Fig. 5.

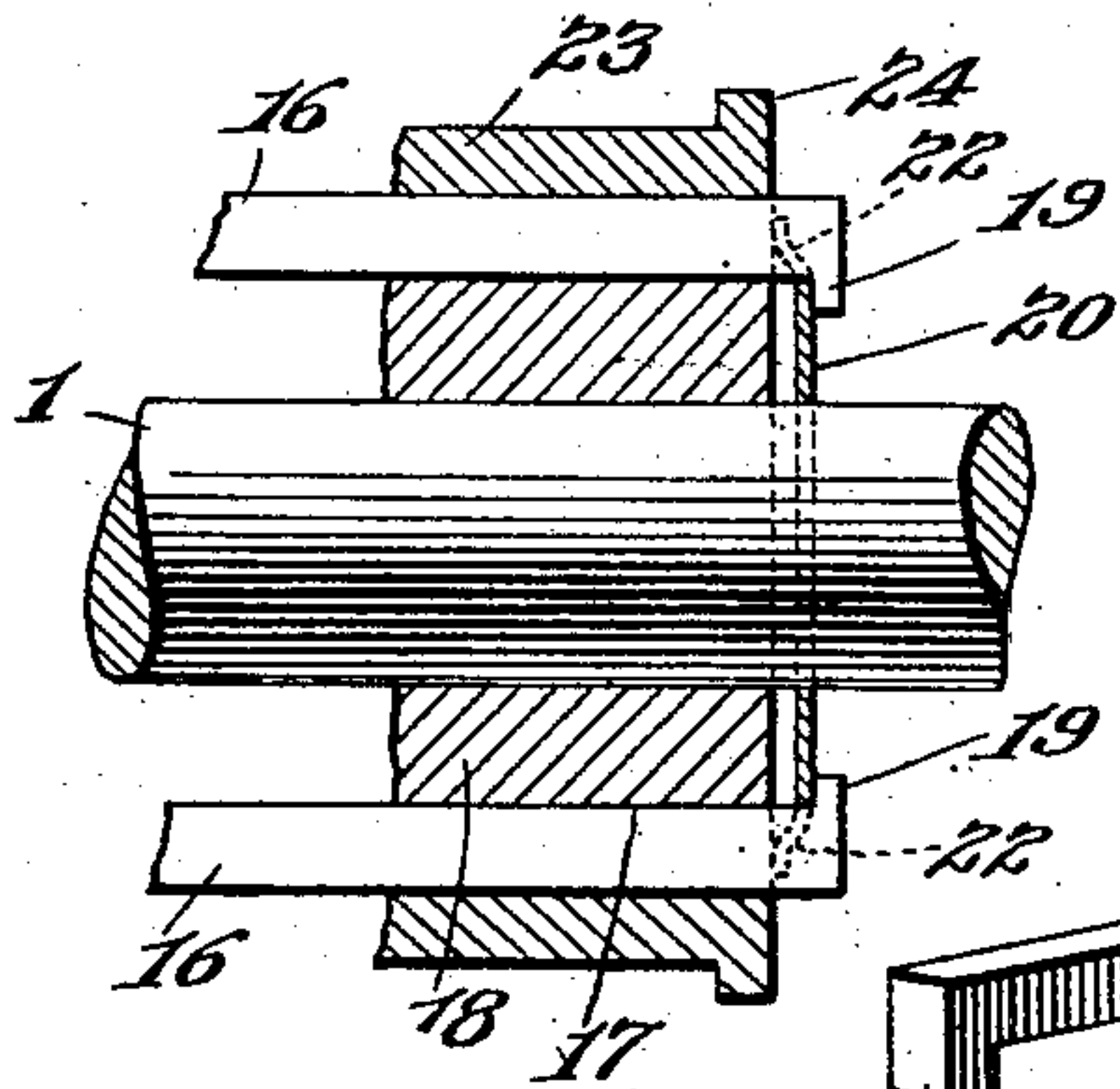


Fig. 8.

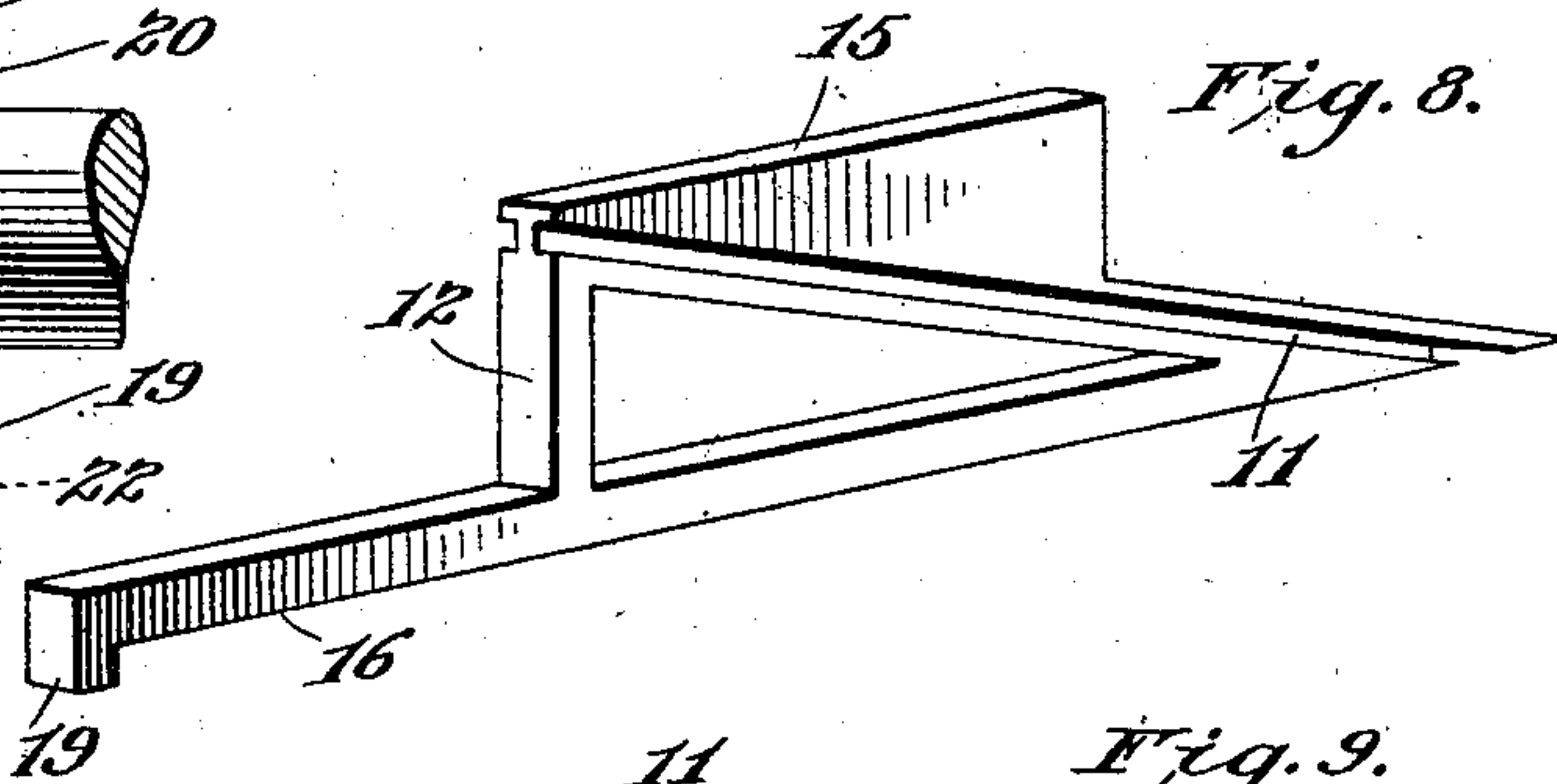
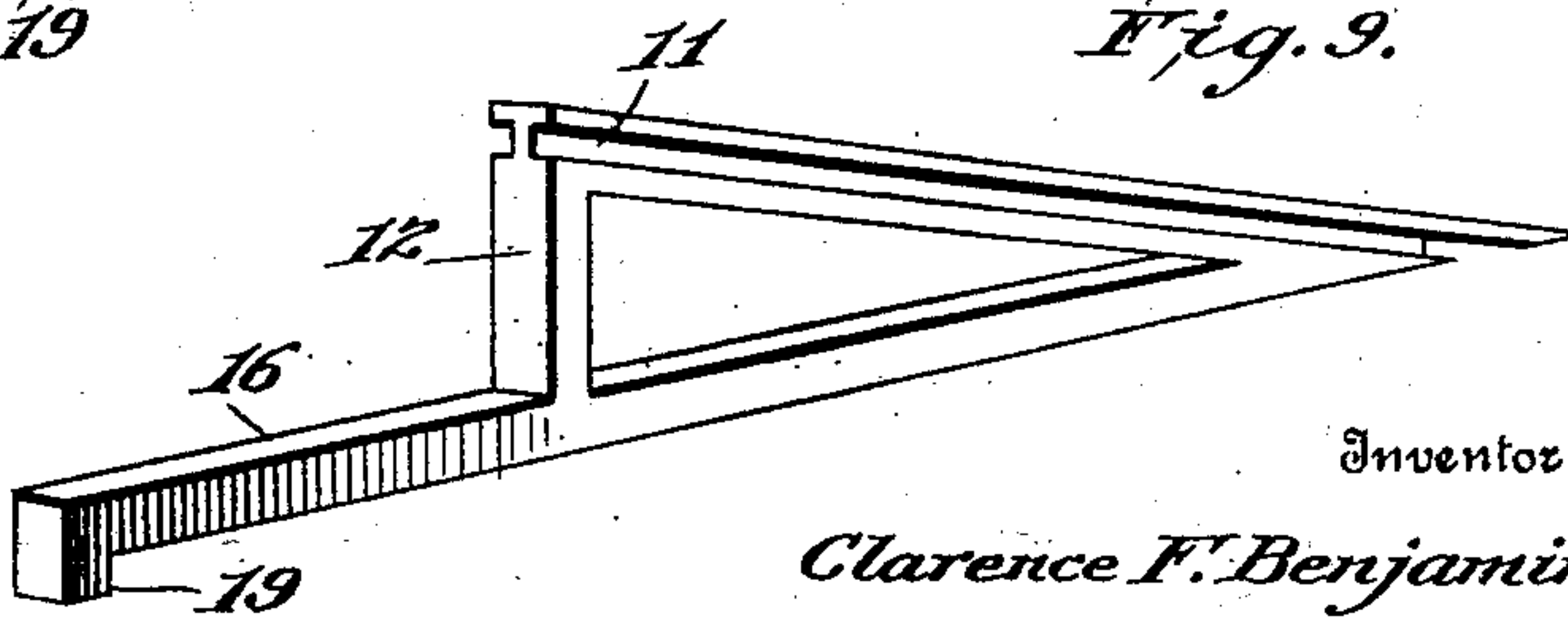


Fig. 9.



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# UNITED STATES PATENT OFFICE.

CLARENCE FRANKLIN BENJAMIN, OF PHILADELPHIA, PENNSYLVANIA.

## EXPANSIBLE PULLEY.

No. 912,442.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed October 16, 1908. Serial No. 457,979.

*To all whom it may concern:*

Be it known that I, CLARENCE F. BENJAMIN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Expansible Pulleys, of which the following is a specification.

My invention relates to improvements in 10 expansible pulleys, and more particularly to improvements upon the structure set forth in Letters Patent No. 896,267, granted to me August 18, 1908, an object of the invention being to provide improved mounting and 15 operating mechanism for the radially movable segmental rim sections of the pulley, so as to absolutely preclude any possibility of the rim sections being moved by the centrifugal action of the revolving pulley.

20 A further object is to provide mechanism of this character with improved wedges, which are so connected with the radially movable rim sections that the movement of the wedges in one direction will force the 25 sections outward, and the reverse movement of the wedges will draw the sections inward without the employment of springs of any kind.

A further object is to provide improved 30 means for moving each of a circular series of wedges in turn, so as to gradually expand the pulley.

A further object is to provide improved 35 mechanism for compelling the simultaneous movement of the wedges when contracting the pulley.

With these and other objects in view the invention consists in certain novel features of construction, combinations and arrange- 40 ments of parts as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings Figure 1, is a view partly in section and partly in elevation illustrating my improvements. Fig. 2, is a view in section on line  $x-x$  of Fig. 1. Fig. 3, is a view in section on line  $y-y$  of Fig. 1. Fig. 4, is a view in end elevation of the adjusting collar and its cooperating parts. 45 Fig. 5, is a fragmental view in longitudinal section on line  $z-z$  of Fig. 4. Fig. 6, is a fragmental section on line  $a-a$  of Fig. 1. Fig. 7, is a perspective view of the sliding sleeve. Fig. 8, is a detail perspective view

of one of the wedges, and Fig. 9, is a similar 55 view of a slightly modified construction of wedge.

1 represents a shaft and 2 a sleeve keyed to said shaft and having integral disks 3—3 at its ends forming a wheel. The spokes 4 60 of these disks 3—3 are provided with radial grooves 5 in which are mounted tongues or tenons 6 at the respective edges of radially movable arms 7, the latter at their outer ends, carrying the segmental pulley rim sections 8. It will be seen that when the pulley is in its contracted form the segmental sections are substantially flush with the edges of the disks 3, and when expanded will be forced outward beyond the edges of the 70 disks 3 as will be hereinafter explained.

The inner ends of the arms 7 are bifurcated as clearly shown at 9 in Fig. 2. The inner edges of all of the arms 7 are inclined or beveled at an angle substantially as shown 75 in Fig. 1, and the bifurcated inner ends of these arms 7 are provided on their inner faces with opposed flanges or tongues 10 located in grooves 11 in the opposite faces of wedges 12. The straight inner edges of all of the 80 wedges are mounted to slide upon the sleeve 2, and the spokes 4 are made with openings 13 and 14 respectively to permit free sliding movement of the wedges through the spokes and one series of openings 14, in one of the 85 sets of spokes 4, are long enough to receive enlargements 15 on the outer portion of the wedges. The enlargements 15 have their outer edges disposed parallel with the inner edges of the wedges, and the openings 14 90 are just long enough to accommodate the enlarged portion of the wedges and absolutely prevent any movement of the wedges away from sleeve 2. As the wedges and the arms 7 are locked by the groove and flange 95 connection above described, the one member cannot move without moving the other, and hence no amount of centrifugal force could possibly draw the segmental sections outward as they are securely held against such 100 accidental movement by the shape of the wedges above described. At the larger ends of the wedges, which I will term the forward ends, arms or extensions 16 are provided, having their lower edges in alignment with the lower edges of the main portion of the wedges, and these arms are 105 located in longitudinal grooves 17 in a



45 collar is moved toward the pulley, will tend  
to throw the ring 27 at a tangent, and will  
hence first cause the wedges nearest the  
roller to be moved first, and as the pulley  
revolves the several wedges will be forced  
50 inward in turn.

The operation of my improvements is as  
follows: With the parts as shown in Figs.  
1 and 2, the pulley is contracted. By swing-  
ing the lever 26 so as to move the collar 25  
55 to the left, the roller 28 will press against  
ring 27 and force all of the wedges in turn  
to the left, and due to the cam engagement  
of the arm 7 with the wedges 12, the arms  
and their segmental rim portions will be  
60 forced outward to expand the pulley. When  
the wedges 12 are moved in the direction  
above described, the lugs 19 on the arms 16  
of the wedges, due to their engagement with  
the spring 20, will compel the sleeve 18 and  
65 the casing 23 to follow the wedges during

scribed, the combination with a support and 110  
a series of radially movable pulley sections  
thereon, of a series of longitudinally movable  
wedges having cam engagement with said  
sections, and enlargements on said wedges  
having their outer edges constructed to en- 115  
gage the section supports to prevent the acci-  
dental radial movement of the sections.

2. In a mechanism of the character de-  
scribed, the combination with a shaft, a  
sleeve secured thereon, and disks at the ends 120  
of said sleeve having radially disposed  
grooves in their opposed faces, radially mov-  
able arms, tenons on the arms located in the  
grooves, segmental rim sections on said arms,  
said arms having bifurcated inner ends, a 125  
wedge for each arm having inclined grooves  
on its opposite sides, tongues in the bifur-  
cated ends of the arms located in said  
grooves, means for moving the wedges, and  
enlargements on the wedges having their 130

outer edges parallel with the inner edges of the wedges and located in slots in one of said disks.

3. In a mechanism of the character described, the combination with a series of radially movable pulley sections, and a series of longitudinally movable wedges to move said pulley sections, a sliding sleeve having longitudinal grooves in its periphery, arms or extensions on said wedges located in the grooves, inwardly projecting lugs on the free ends of the arms, a spring ring at one end of the sleeve and engaging behind the lugs of the arms, and means for moving said sleeve in one direction to compel movement of the wedges to contract the pulley.

4. In a mechanism of the character described, the combination with a series of radially movable pulley sections, and a series of longitudinally movable wedges to move

said pulley sections, a sliding sleeve having longitudinal grooves in its periphery, arms or extensions on said wedges located in the grooves, inwardly projecting lugs on the free ends of the arms, a spring ring at one end of the sleeve and engaging behind the lugs of the arms, a casing inclosing said sleeve and arms, a split collar around said casing, a flange at one end of the casing overlapping the edge of the collar, a ring on the shaft between said collar and the main portion of the wedges, and a roller carried by said collar in engagement with the said ring.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CLARENCE FRANKLIN BENJAMIN.

Witnesses:

R. H. KRENKEL,

J. A. L. MULHALL.