

E. J. LEES.  
 SELF ADJUSTING OIL PUMP.  
 APPLICATION FILED JAN. 24, 1908.

917,466.

Patented Apr. 6, 1909.

2 SHEETS—SHEET 1.

FIG. 1.

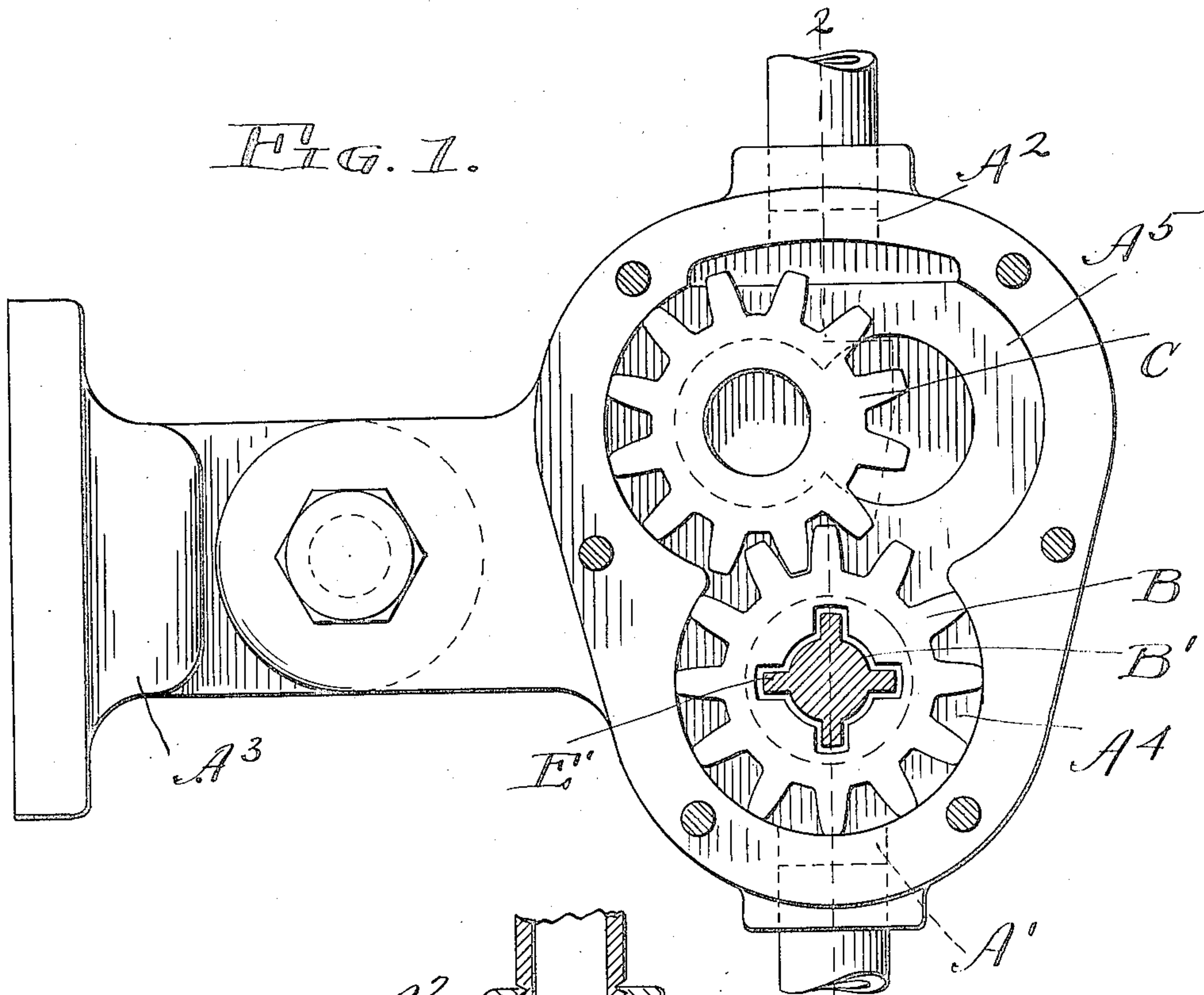


FIG. 2.

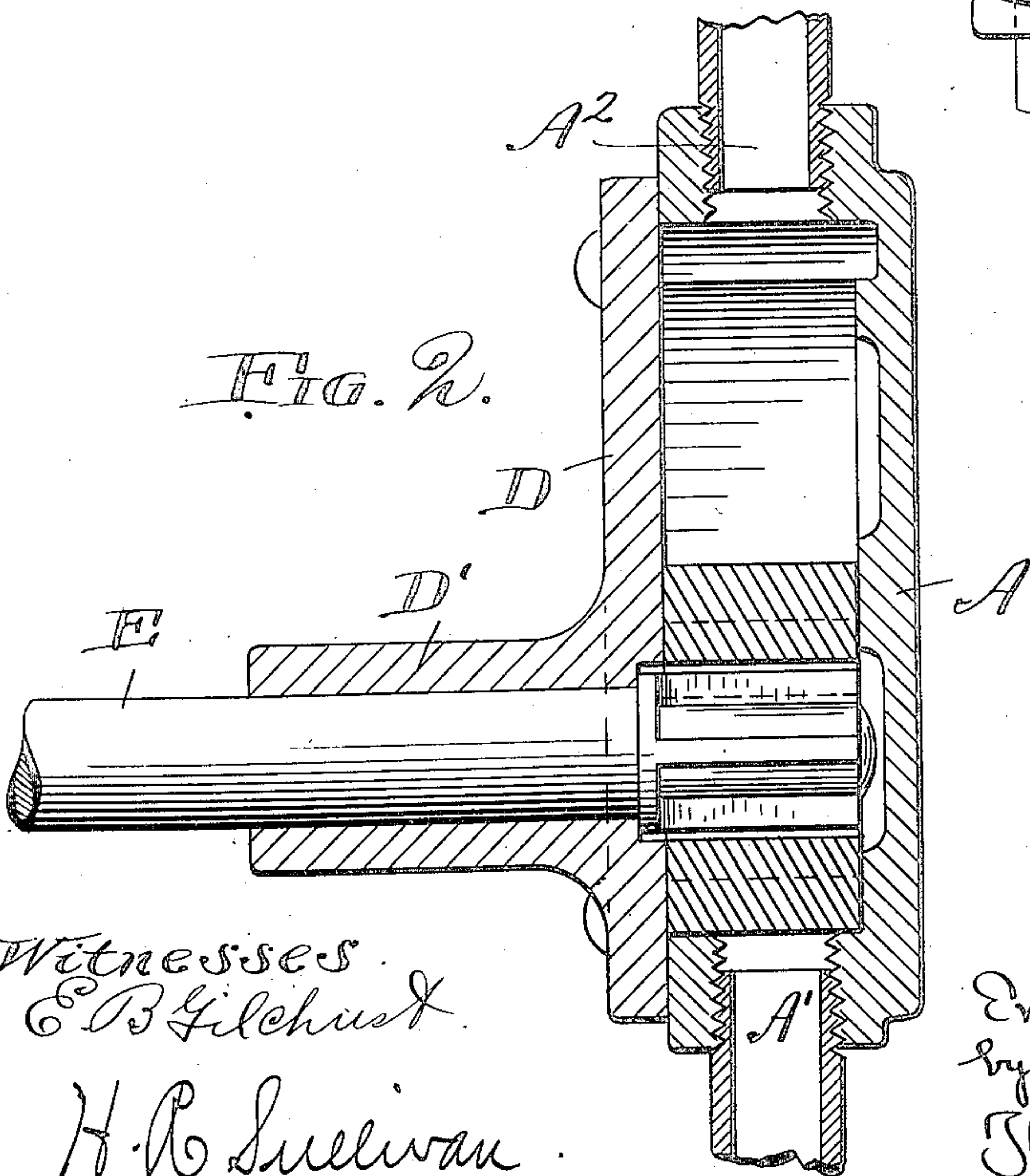
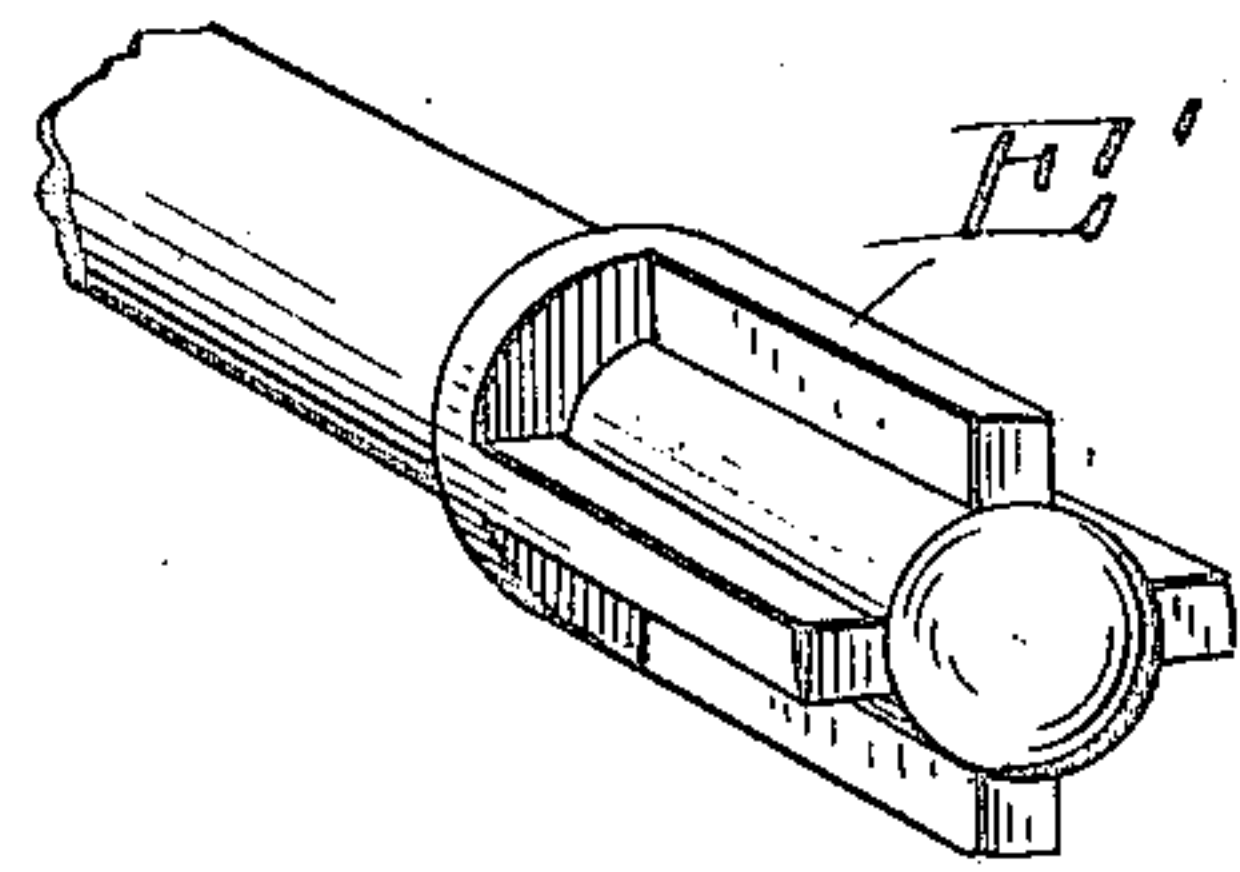


FIG. 3.



Witnesses  
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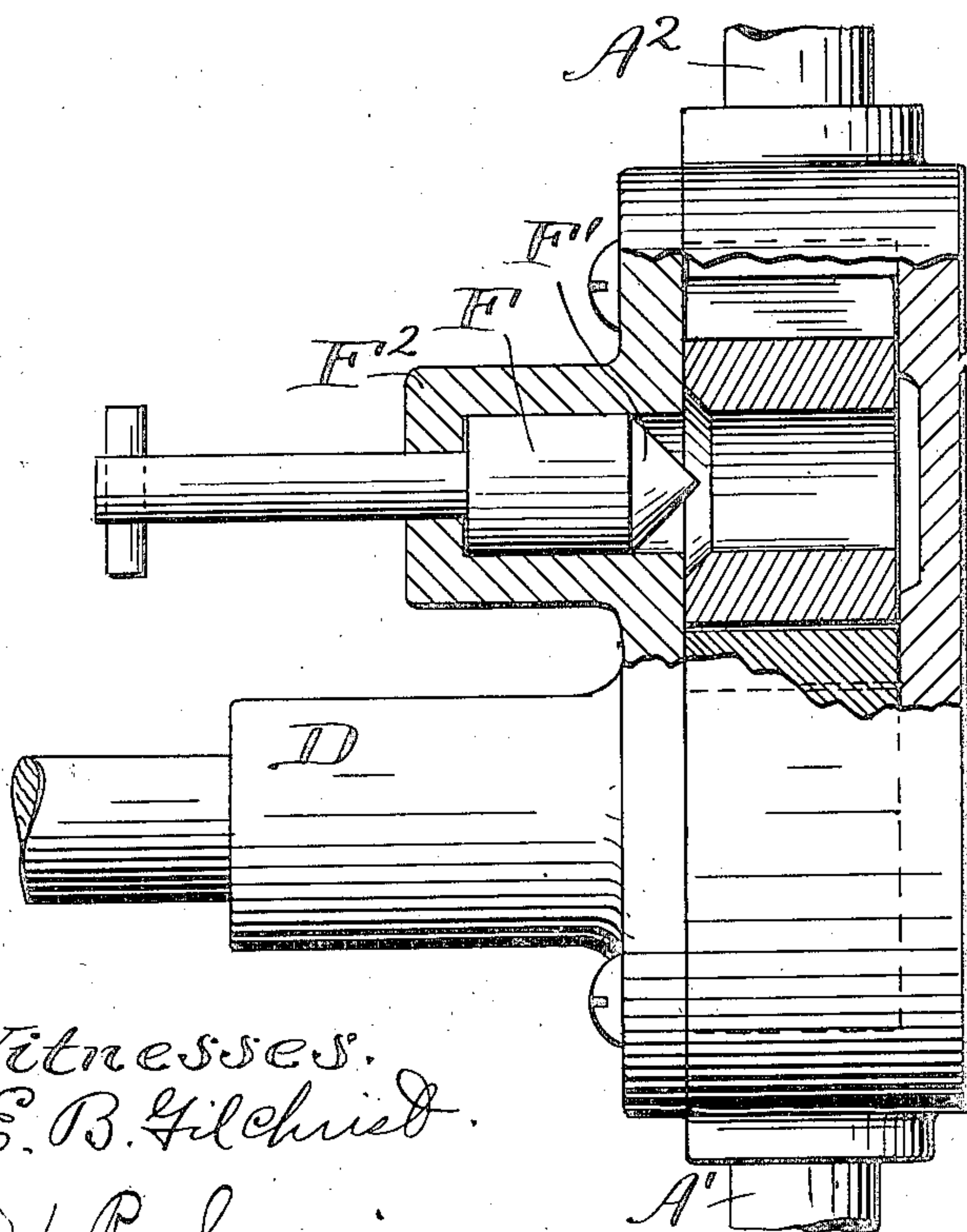
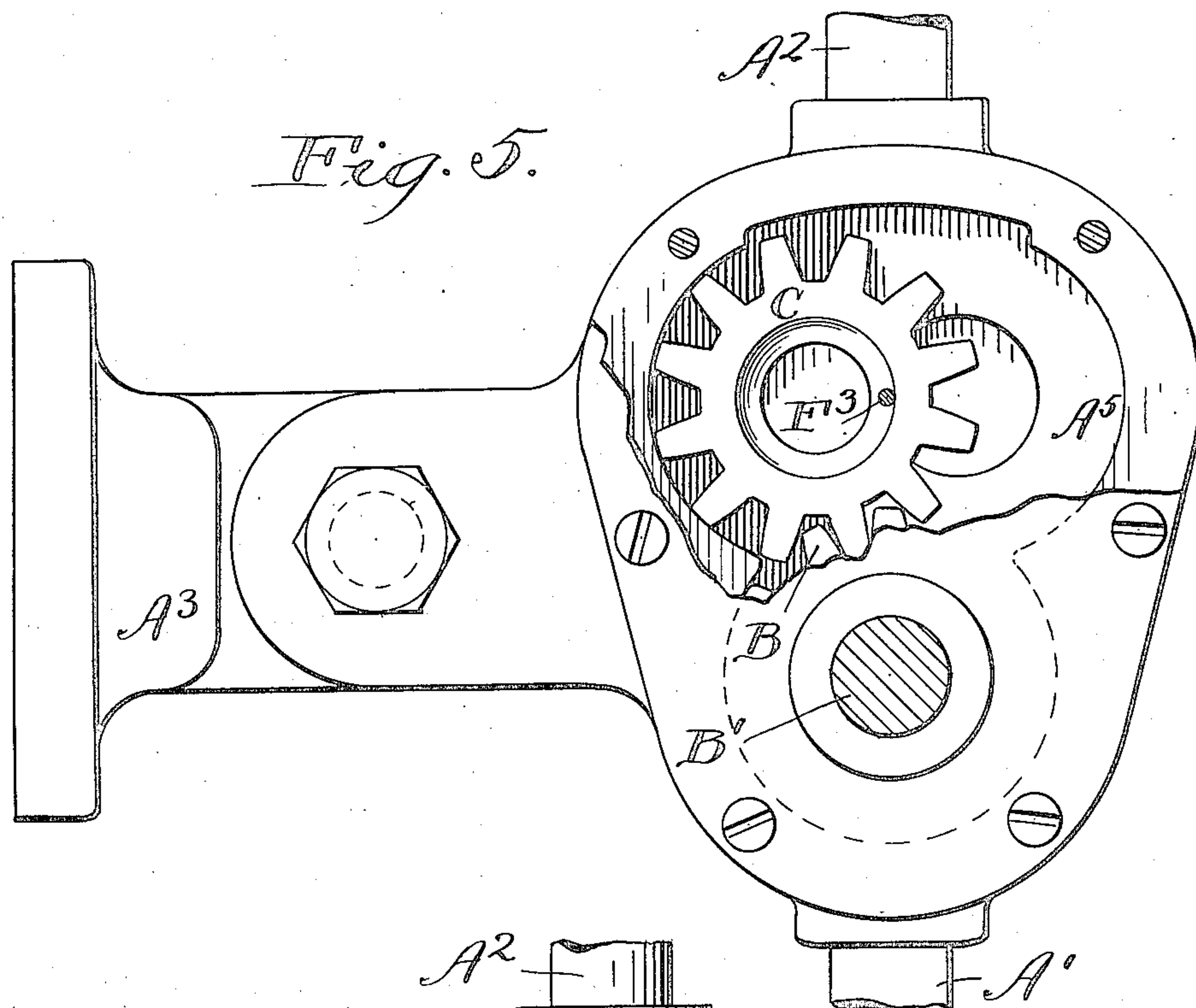
Inventor.  
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 Thurston Woodward  
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2 SHEETS—SHEET 2.



*Fig. 6.*

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Inventor:  
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# UNITED STATES PATENT OFFICE.

ERNEST J. LEES, OF CLEVELAND, OHIO, ASSIGNOR TO THE GRANT-LEES COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

## SELF-ADJUSTING OIL-PUMP.

No. 917,466.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed January 24, 1908. Serial No. 412,419.

*To all whom it may concern:*

Be it known that I, ERNEST J. LEES, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Self-Adjusting Oil-Pumps, of which the following is a full, clear, and exact description.

The object of the present invention is to provide an improved oil pump of simple construction, capable of a longer term of service than that possessed by pumps, of the same general type, heretofore.

More particularly, my invention is directed to the class of pumps in which a pair of meshing gears are used to force the fluid from one side of the casing to the outlet at another side thereof, and to provide means whereby the gear, which is fitted to the receiving cavity, may automatically take up such wear as may occur between its outer periphery and the wall with which such periphery contacts in making an effective fit.

Referring to the accompanying drawings, which illustrate an embodiment of my invention, Figure 1 is an elevation of the pump with its front plate removed, the driving shaft, and securing screws being shown in cross section. Fig. 2 is a vertical section on the line 2—2 of Fig. 1. Fig. 3 is a detail perspective view of the end of the driving shaft. Figs. 4 and 5 are respectively a section and side elevation, each partly broken away, illustrating the application of means for drawing the idler away from either side.

The casing body A is provided with a suitable inlet orifice A' and an outlet orifice A<sup>2</sup> on different sides thereof, and is supported by means of a suitable adjustable foot A<sup>3</sup>. At one side of the casing is provided a receiving cavity A<sup>4</sup> of proper diameter, and communicating with this cavity is what might be called the discharge cavity A<sup>5</sup>, which is in communication with the outlet A<sup>2</sup>. In the cavity A<sup>4</sup> is fitted a driven gear B having mesh with an idler gear C, which latter is of proper diameter to rotate within the discharge cavity A<sup>5</sup>. I prefer that the discharge cavity shall be of such diameter and its sides of such curvature that the idler gear may find a bearing wall at either side leaving a proper discharge passage.

The side of the casing against which the idler gear will ride will, of course, depend

upon the direction of rotation of the driven gear fitted in the receiving cavity. I provide a front plate D for the casing secured in any proper manner thereto, and having a bearing D' in which is journaled a driving shaft E. This shaft at its inner end takes within a central opening of the driven gear B, in such manner as to transmit its rotary motion to said gear. When oil or other liquid is fed to the receiving cavity, and the gear B rotated by means of the shaft E, as, for example, from right to left in Fig. 1, the gear C will lie against the left hand side of the casing and fit the curve of the left hand wall thereof.

Assuming the gear B to fit its cavity snugly, it will be obvious that the oil fed in the receiving opening A' will be caught by the gear teeth and carried up the right hand side of the cavity as the gear teeth pass therealong, the oil being delivered into the discharge cavity A<sup>5</sup>. The idler gear C, lying against the left hand wall of the discharge cavity and meshing with the gear B, will prevent any of the oil from passing down again onto the left hand side of the cavity A<sup>4</sup>, and thus the liquid will be forced through the pump. In the event that the driven gear should rotate in the opposite direction, the idler gear C would, of course, lie against the right hand wall of the cavity A<sup>5</sup>, and the same forcing action would take place, except that the oil would pass up the left hand side of the gear B instead of at the right hand side thereof. So long as the gear B fits snugly against the wall, along which the teeth take their downward movement toward the inlet opening A', the pump will work well, but, when the fit at this point is no longer good, the forcing action of the pump is diminished, and its utility, as a pump, ceases. Heretofore the driven gears in such pumps have been rigidly fixed to the driving shaft, and, consequently, retain their original position throughout their use, remaining concentric with the shaft. Thus, when wear takes place between the periphery of the gear and the walls of the receiving cavity, it would be either necessary to permanently shift the shaft in its bearings, which would be an impractical proposition, or to give up the pump. I have provided a construction, however, which obviates these difficulties and which permits of the gear B being automatically



fitted to its coacting cavity wall throughout its period of use.

As shown in Fig. 3, the shaft E is provided with suitable wings E' projecting therefrom, and, in the instance shown, at 90° from each other. This is the preferable form, though, obviously, it is not the only form capable of use. There is an opening B' in the central portion of the gear B corresponding in contour with the end of the shaft E, and its wings E', which opening is, however, larger than the shaft end. In actual practice, I prefer to provide a clearance of one-eighth of an inch between the shaft end and the sides of the opening in which it is placed. Obviously, upon rotating the shaft E, the wings E' will rotate the gear by bearing against the walls, to which the wings are proximate, on the side toward which they are moving. So long as the gear fits snugly in its cavity without wear, it will be properly driven and its action will be the same as if it were centered and permanently fixed to a shaft. When, however, the cavity becomes enlarged by the wearing of the gear teeth against the side walls, the connection which I have shown will permit the gear to be thrown toward that side in which the direction of rotation takes place. The amount of play which I generally allow in the driving connection,—it being, as stated above, approximately one-eighth of an inch,—is amply sufficient to take care of such wear as is apt to occur. By this means I have made my pumps last much longer than hitherto known in the art, and am sure that they may be relied upon at all times, it not being possible that a pump could ordinarily begin to leak within a short time after being started in use.

The pump described is, obviously, simple in construction and efficient in operation, and possesses many advantages in addition

to those above pointed out, which will be plain to those skilled in the art.

As shown in Figs. 4 and 5 I may employ a reciprocable plunger F with a cone shaped end F' thereon for drawing the idler gear C away from either side when a cessation of operation is desired. This plunger is normally retracted away from the idler back into its casing F<sup>2</sup>, but the idler has a central bore of sufficient diameter at its mouth for the tip end F<sup>3</sup> of plunger cone to pass within the same in all positions of the idler. By merely pushing in the plunger the cone will cause the idler to move away from the side against which it may be lying and draw it over to the center where it will be held in idle rotation without operative effect as a pump.

Having described my invention, I claim:

1. A pump comprising a casing and having an inlet, an outlet, a receiving cavity, and a discharge cavity, two meshing gears in said casing, one of said gears being in the receiving cavity, the other being in the discharge and of less diameter than the cavity and supplemental means for moving it away from either side wall of the cavity.

2. A pump comprising a casing and having an inlet, an outlet, a receiving cavity, and a discharge cavity, two meshing gears in said casing, one of said gears being in the receiving cavity, the other being in the discharge and of less diameter than the cavity and supplemental means for moving it away from either side wall of the cavity, and holding it so moved.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

ERNEST J. LEES.

Witnesses:

E. B. GILCHRIST,  
H. R. SULLIVAN.