

**No. 662,746.**

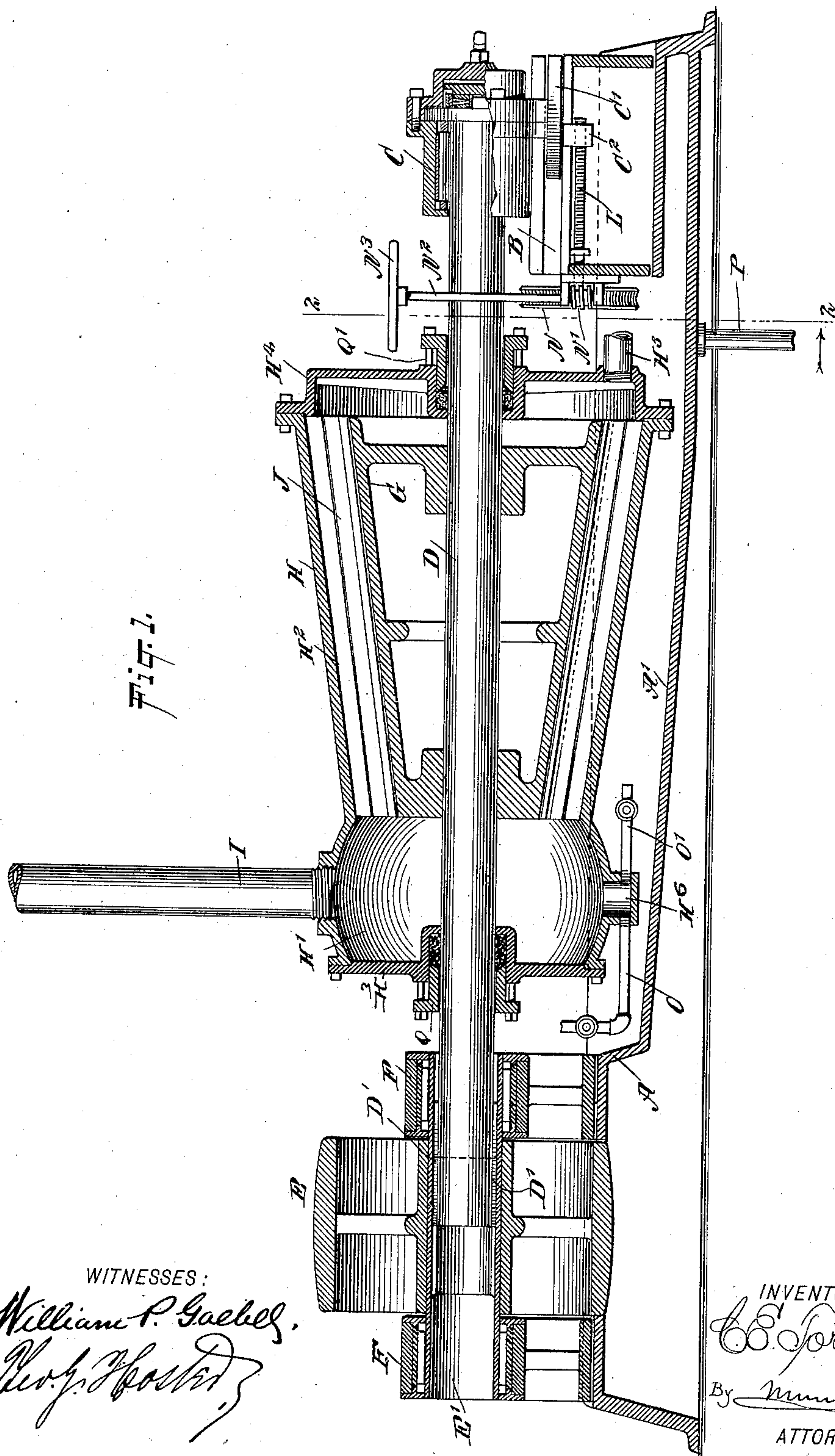
**Patented Nov. 27, 1900.**

C. E. TORRANCE.  
REFINING ENGINE.

(Application filed July 21, 1899.)

(No Model.)

**2. Sheets—Sheet 1.**



WITNESSES:

William P. Gaebel,  
Rev. J. Foster,

INVENTOR

INVENTOR  
C. E. Forrance

By Munir G.

ATTORNEYS

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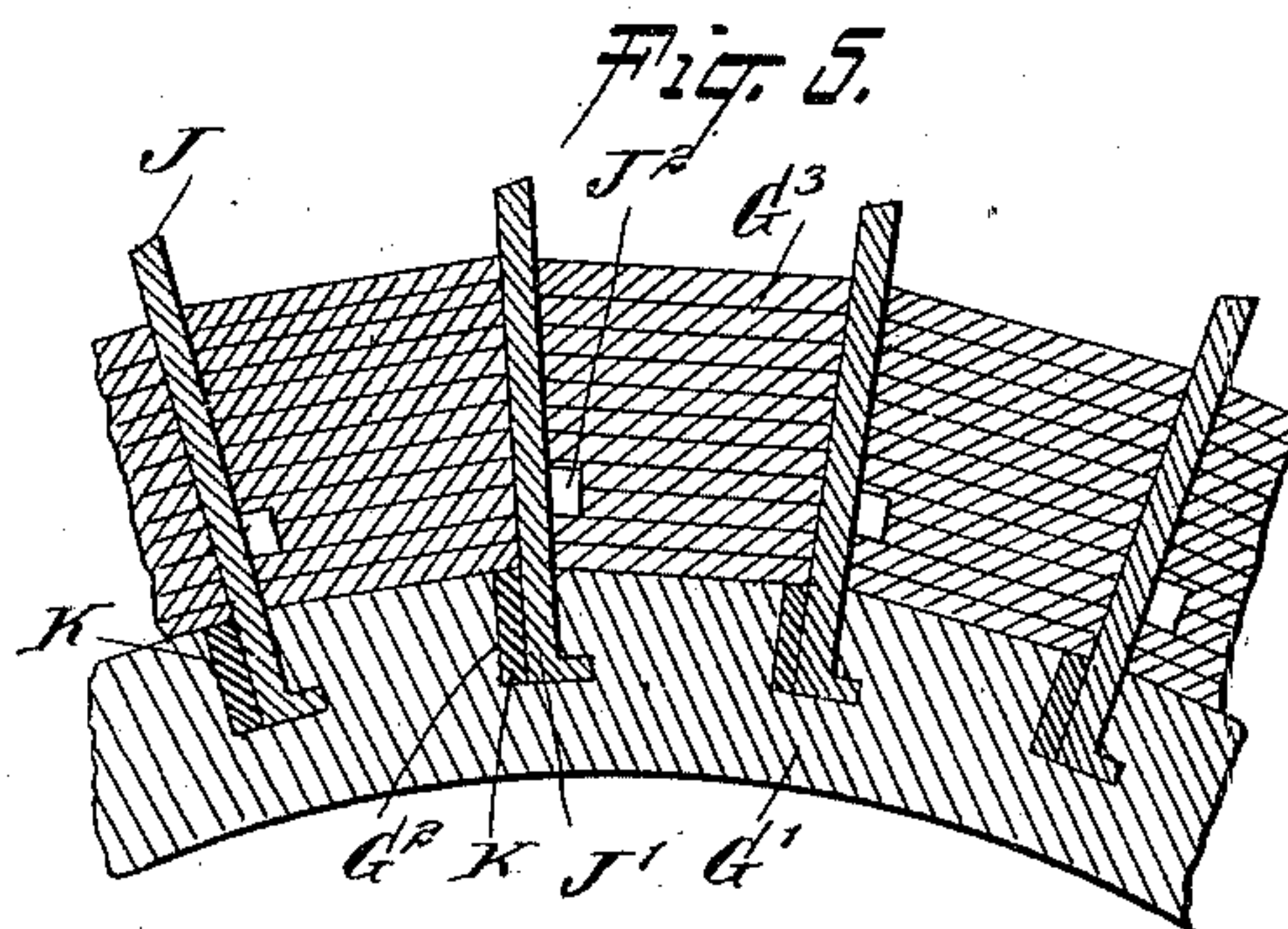
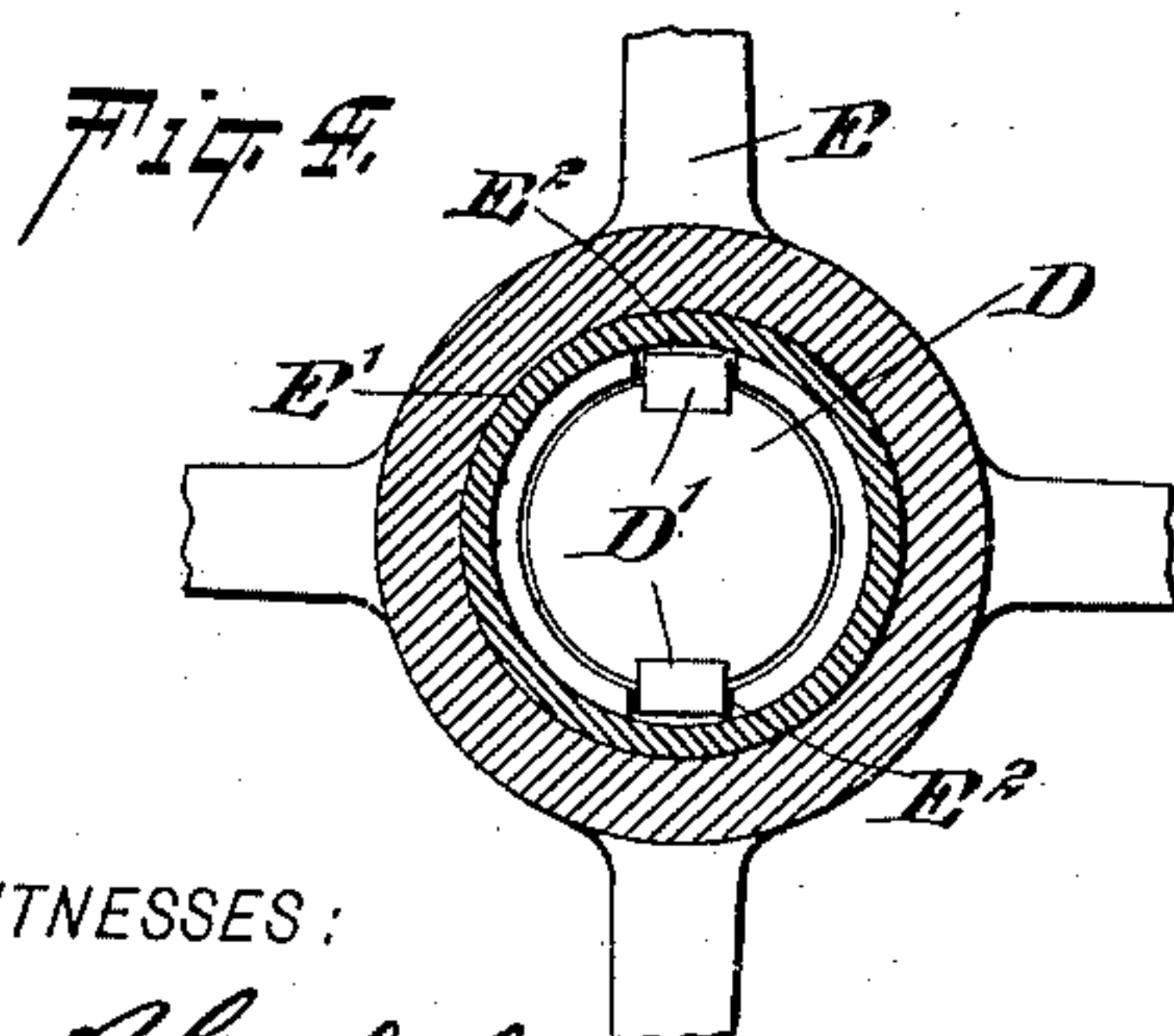
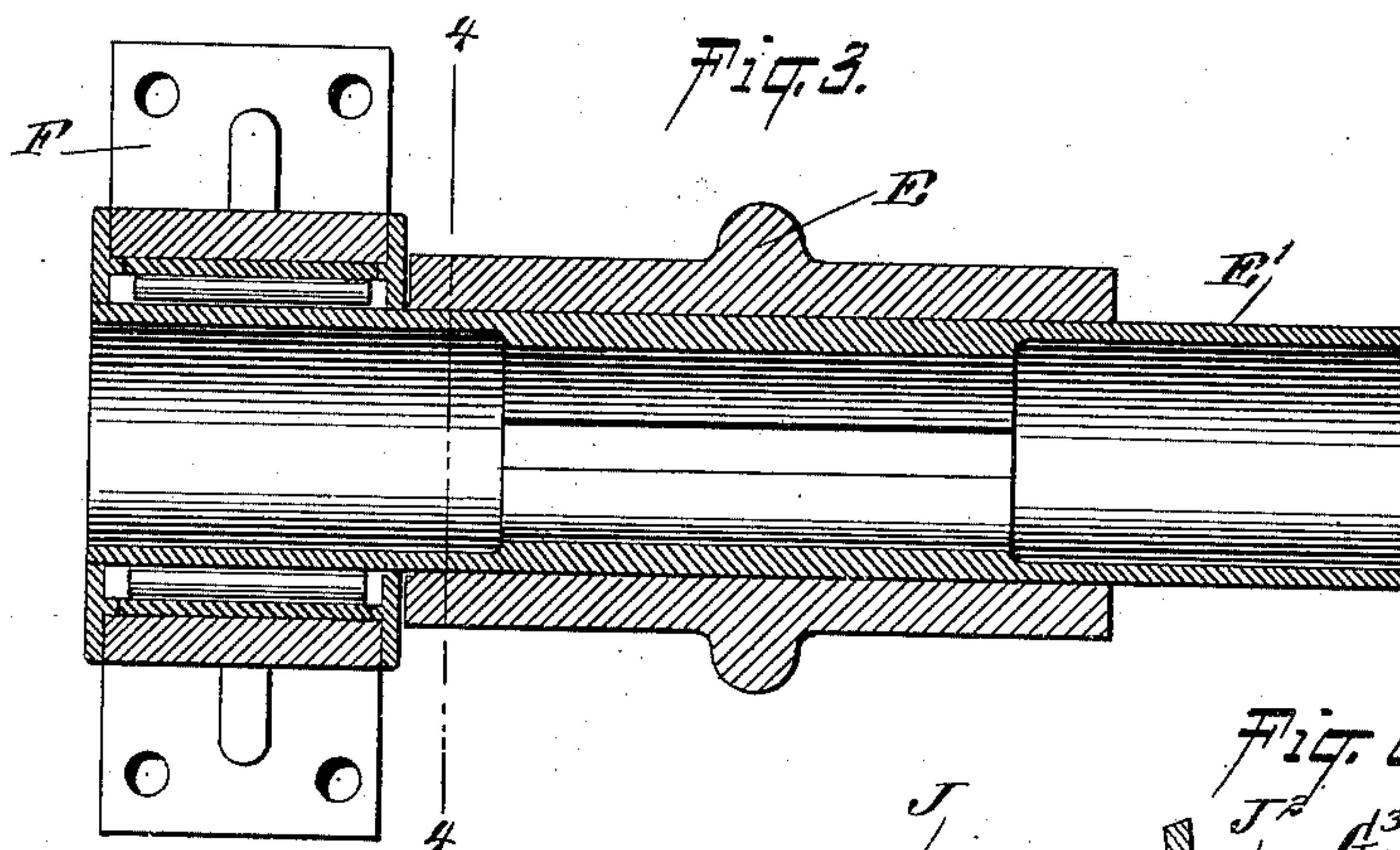
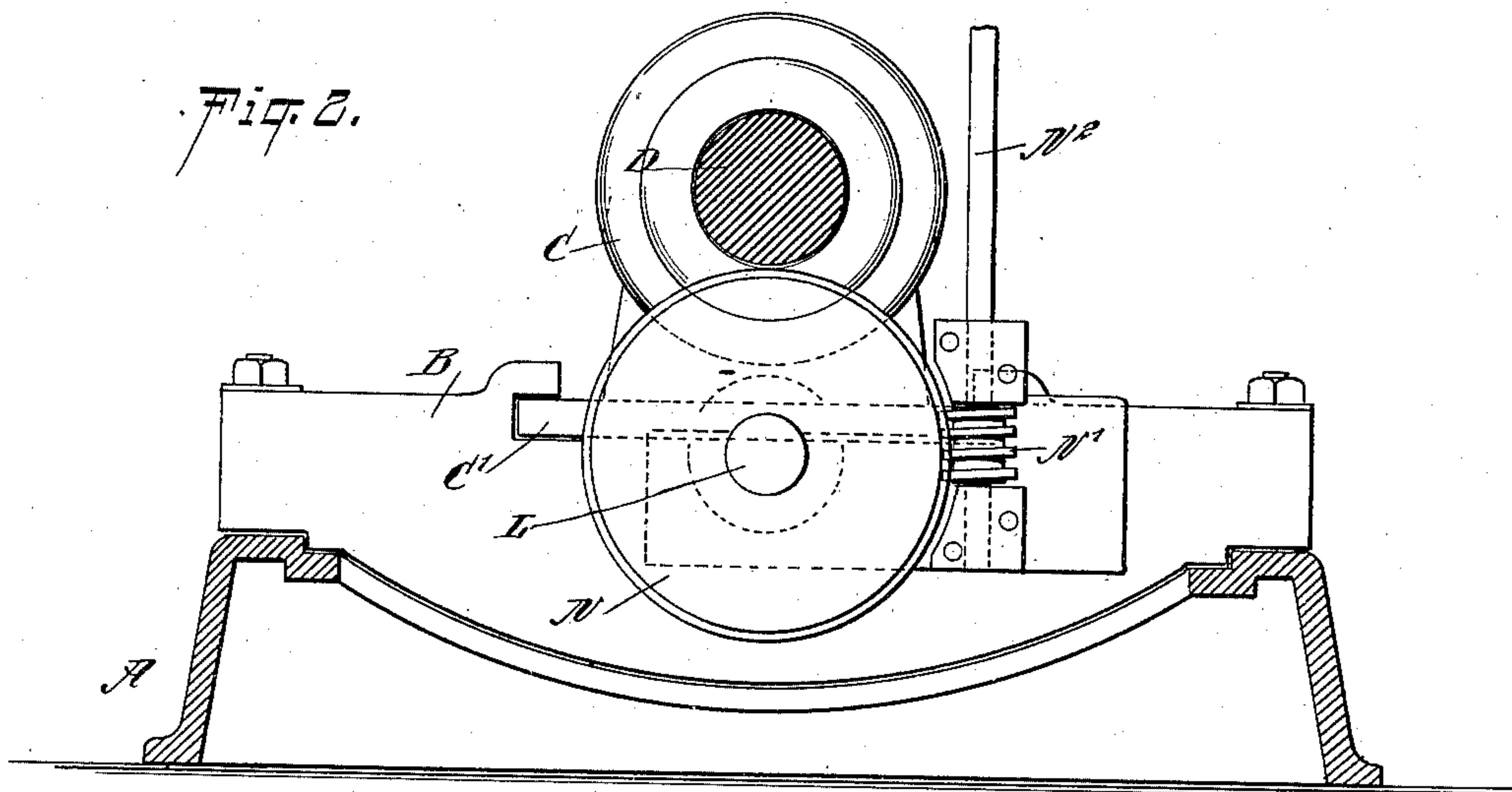
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**2 Sheets—Sheet 2.**



WITNESSES:

William P. Gehel  
Rev. J. H. Foster

*INVENTOR*

INVENTOR  
C. C. Torrance  
BY  
Munroe & Co.  
ATTORNEYS.



# UNITED STATES PATENT OFFICE.

CHARLES EVERETT TORRANCE, OF NORTHAMPTON, MASSACHUSETTS,  
ASSIGNOR TO THE E. D. JONES & SONS COMPANY, OF PITTSFIELD,  
MASSACHUSETTS.

## REFINING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 662,746, dated November 27, 1900.

Application filed July 21, 1899. Serial No. 724,621. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES EVERETT TORRANCE, of Northampton, in the county of Hampshire and State of Massachusetts, have  
5 invented a new and Improved Refining-Engine, of which the following is a full, clear, and exact description.

The invention relates to paper-making machinery, and its object is to provide a new and  
10 improved refining-engine arranged to prevent hard substances from coming in contact with and injuring the cutter bars or blades and to allow convenient adjustment of the revolving plug in the shell to compensate for  
15 wear of the bolts without, however, shifting or otherwise disturbing the driving-gear for the plug-shaft.

The invention consists of novel features and parts and combinations of the same, as will  
20 be fully described hereinafter and then pointed out in the claims.

A practical embodiment of my invention is represented in the accompanying drawings, forming a part of this specification, in which  
25 similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal central sectional elevation of the improvement. Fig. 2 is an enlarged transverse section of part of the same  
30 on the line 2 2 in Fig. 1. Fig. 3 is an enlarged sectional plan view of the driving-pulley and one of its bearings. Fig. 4 is a transverse section of the same on the line 4 4 in Fig. 3 and with the plug-shaft in elevation, and Fig.  
35 5 is an enlarged transverse section of part of the revolving plug.

The improved refining-engine is mounted on a suitably-constructed bed-plate A, one end of which is provided with a bearing B, in  
40 which is mounted to slide longitudinally the base C' of a thrust-bearing C for one end of a plug-shaft D, fitted to slide in and to turn with at its other end a sleeve E', forming part of the driving-pulley E, connected by belt with  
45 other suitable machinery for imparting a rotary motion to the plug-shaft D. The sleeve E' is journaled at its ends in roller-bearings F, attached to the bed-plate A, the hub of said pulley extending close to the inner opposite faces of said roller-bearings to hold the  
50 pulley against longitudinal shifting.

As indicated in the drawings, the plug-shaft D is provided with two keys D', engaging longitudinal keyways E<sup>2</sup> in the sleeve E', so that the shaft is free to slide in the said sleeve E', but when the pulley E is rotated a rotary  
55 motion is given to the plug-shaft D.

As indicated in Fig. 1, the plug-shaft extends in the sleeve E' about half-way of its length, so that the shaft can slide in said  
60 sleeve to the left a suitable distance before reaching the outer end of the sleeve.

On the plug-shaft D between its bearings is secured a plug G, made conical and revolving within a similarly-shaped shell H,  
65 bolted or otherwise fastened to the bed-plate A and provided at its throat or receiving end H' with a pipe I for conducting the macerated matter constituting the paper stuff into the throat H' to pass from the latter into the  
70 shell proper to be acted upon by blades J, extending longitudinally on the rim G' of the said plug G in close proximity to the lining H<sup>2</sup> of the shell H. The blades J (see Fig. 5) extend approximately radially from the rim G',  
75 and their inner ends J' are made L-shaped to engage a correspondingly-shaped slot formed on said rim G', a key K being driven into the slot on the back of said end J' to hold the same firmly in engagement with the  
80 walls of the slot and prevent transverse or longitudinal movement of the blades. Each of the blades J is further provided outside of the rim G' with a lug J<sup>2</sup>, engaging a correspondingly-shaped recess in a laminated  
85 block G<sup>3</sup>, fitted between adjacent blades on the peripheral surface of the rim G' within short distance of the outer cutting ends of the blades, as is plainly indicated in Fig. 5. This additional lug J<sup>2</sup> is a further safeguard  
90 for preventing the blade from shifting longitudinally on the rim G' of the plug G.

As is well known, when the machine is in use the outer ends of the blades J wear to such an extent that it is necessary to shift  
95 the shaft D, with the plug G, to compensate for such wear and to bring the outer ends of the blades J in proper relation to the inner surface of the lining H<sup>2</sup> of the shell. In order to allow the operator to make such  
100 minute adjustment, the thrust-bearing C is shifted to the left, and for this purpose I pro-



vide the following mechanism: On the under side of the base C' of the thrust-bearing is formed or secured a nut C<sup>2</sup>, in which screws a screw-rod L, mounted to turn in suitable bearings on the casting formed with the guideway B, previously mentioned, and on the outer end of this screw-rod L is secured a worm-wheel N in mesh with a worm N', having its shaft N<sup>2</sup> journaled in suitable bearings on the said casting, the shaft extending upward, a hand-wheel N<sup>3</sup> being on the top for the operator to turn the hand-wheel to rotate the worm-wheel N', the worm N, and the screw-rod L to cause the nut C<sup>2</sup> to move the thrust-bearing C to the left and move the shaft D, and with it the plug G, to the left to make the desired adjustment between the blades J and the lining H<sup>2</sup>.

By the construction previously described the shifting of the shaft D to the left does not change the position of the pulley E nor does it disconnect the pulley and the shaft, and the pulley always remains in alinement with the pulley on the counter-shaft or other device connected with the pulley for rotating the same.

The throat or receiving-chamber H' is formed at its bottom with a depending collecting-box H<sup>6</sup>, in which hard substances, such as nails or other matter, may readily collect, and thereby prevent undue injury to the blades J. In one of the sides of the box H<sup>6</sup> opens a valved pipe O, connected with a suitable source of steam, water, or other fluid under pressure, and directly opposite this pipe O leads from the box a valved outlet O', so that when the two valves in the pipes O O' are opened then the fluid under pressure passing through the pipe O into the box H<sup>6</sup> forces the accumulated matter therein through the pipe O' to clean the box, the discharged matter passing upon the inclined bottom A' of the bed-plate and which inclined bottom is provided at its lowermost point with a discharge-pipe P.

The throat or receiving-chamber H' of the shell H is provided with a suitable head H<sup>3</sup>, carrying a stuffing-box Q, and the base of said shell is provided with a head H<sup>4</sup>, also carrying a stuffing-box Q' for the shaft D. An outlet-pipe H<sup>5</sup> for the discharge of the matter under treatment leads from the bottom of the head H<sup>4</sup> to a suitable place of discharge.

By having the bottom A' of the bed-plate A inclined under the shell and adjacent to the innermost bearing F a convenient means is provided for carrying any drippings or the accumulations discharged by the pipe O', as previously explained, to the pipe P to be carried off to a suitable place of discharge.

From the foregoing it is evident that the machine is very simple and durable in construction and convenient adjustment of the plug can be had to compensate for wear, and at the same time the plug can be kept free from hard substances to prevent injury, and the driving-pulley E is not thrown out of

alinement with the overhead counter-shaft pulley when adjusting the shaft longitudinally, as above explained.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A refining-engine comprising a shell, a plug in said shell, a shaft rigidly attached to said plug, a driving-pulley having its axis in alinement with said shaft, independent fixed bearings for the pulley arranged concentrically to the shaft, the pulley being journaled in said bearings said shaft being arranged slidably within the pulley but held to turn therewith, and means for adjusting the shaft longitudinally substantially as set forth.

2. A refining-engine comprising a shell, a plug in said shell, a shaft rigidly attached to said plug, a driving-pulley having its axis in alinement with said shaft, two independent fixed bearings for the pulley one arranged on each side of the same concentrically to the shaft, the pulley being journaled in said bearings, means for connecting the shaft to the pulley for a rotation therewith but free longitudinal movement within the same, and means for adjusting said shaft longitudinally, substantially as described.

3. A refining-engine comprising a shell, a plug in said shell, a shaft rigidly attached to said plug, a driving-pulley having its axis in alinement with said shaft, two independent fixed bearings for the pulley one arranged on each side of the same concentrically to the shaft, a sleeve rigidly connected to the pulley and having its ends extended on each side of the same and turning in the fixed bearings, the said shaft being extended into said sleeve and connected to it for positive rotation but longitudinally adjustable within the same, and means for imparting an endwise adjustment to the shaft, substantially as described.

4. A refining-engine comprising a shell, a plug in said shell, a shaft rigidly attached to said plug, a driving-pulley having its axis in alinement with said shaft, two independent fixed supports for said pulley provided with roller-bearings, one of said supports being arranged on each side of the pulley, a sleeve rigidly connected to the pulley, and having its ends extended on each side of the same and turning in said roller-bearings, the said shaft being extended into said sleeve and connected to it for positive rotation, but longitudinally adjustable within the same, and means for imparting an endwise adjustment to the shaft, substantially as described.

5. A refining-engine provided with a plug, the rim of which has longitudinal slots L-shaped in cross-section, blades having L-shaped ends for engaging said slots, and keys driven into the slots at the back of said L-shaped ends of the blades, substantially as shown and described.

6. A refining-engine provided with a plug, the rim of which has longitudinal slots L-



shaped in cross-section, laminated filling-blocks on said rim, blades having L-shaped ends for engaging said slots, lugs for engaging recesses in said laminated blocks, and 5 keys for engaging said slots at the back of the L-shaped ends of the blades, substantially as shown and described.

7. A refining-engine comprising a bed-plate having an inclined bottom, a discharge-pipe 10 leading from the lower end of said bottom, a shell above the said inclined bottom and through which extends a shaft, a plug on said shaft within said shell, inlets and outlets for the shell, and a collecting-box on said shell 15 and having its outlet-opening on said bed-plate at the upper end of the bottom thereof, substantially as shown and described.

8. In an engine substantially as described, the combination of a shell, a shaft passing 20 through the shell, and having a plug rigidly attached to the shaft and rotatable in the shell, a pulley for driving the shaft arranged

concentrically thereto, and a fixed bearing supporting the pulley and receiving the lateral pull and strain of its belt independently 25 of the shaft, said shaft being extended concentrically within the pulley and connected to it for a positive rotation but free longitudinal adjustment substantially as described.

9. A refining-engine, comprising a bed-plate, having fixed bearings and a thrust-bearing, a shell on said bed-plate, a plug in 30 said shell, a shaft for said plug, and having one end mounted in said thrust-bearing, and a pulley having a sleeve extending beyond 35 each side thereof and mounted in the fixed bearings, the said sleeve having the other end of the shaft slidably inserted therein, but held to turn therewith, as set forth.

CHARLES EVERETT TORRANCE.

Witnesses:

WILLIAM P. BUCKLEY,  
R. OGDEN DWIGHT.