

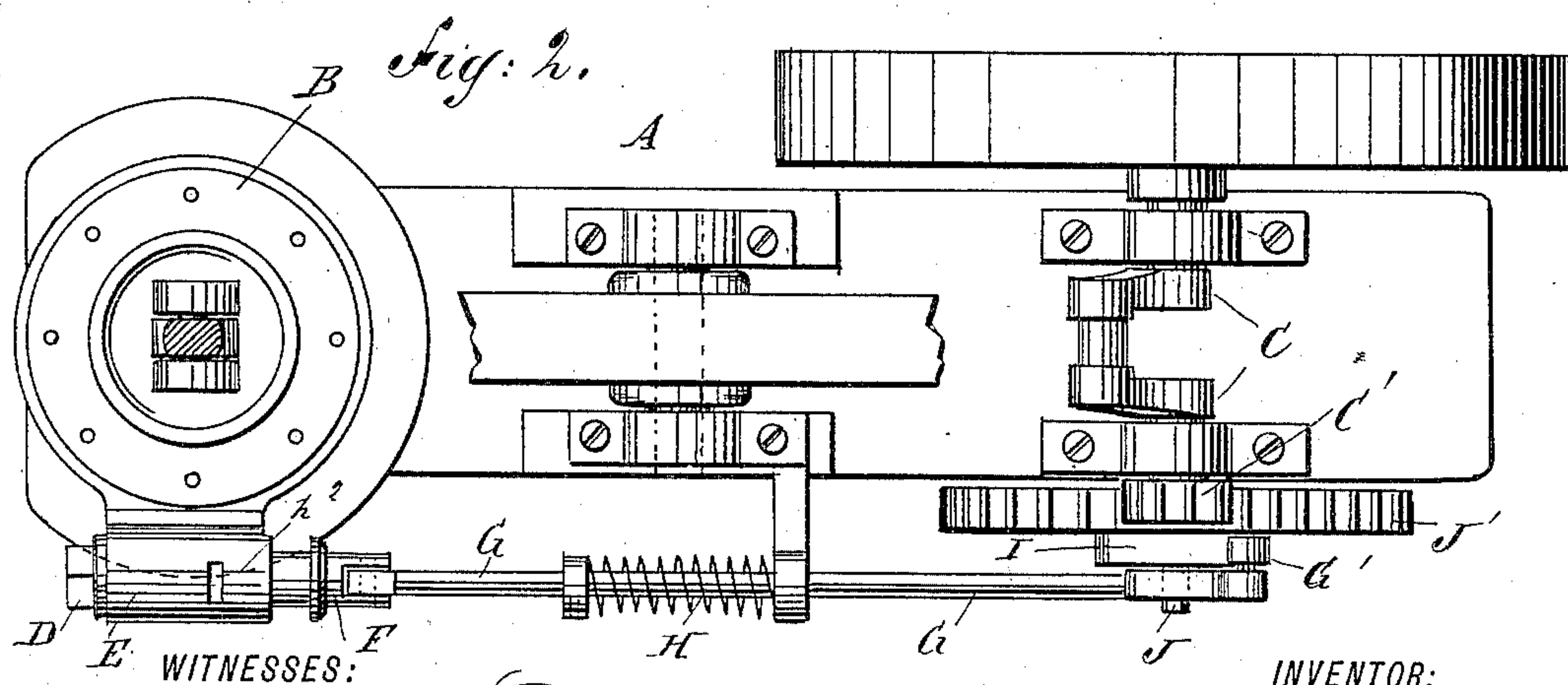
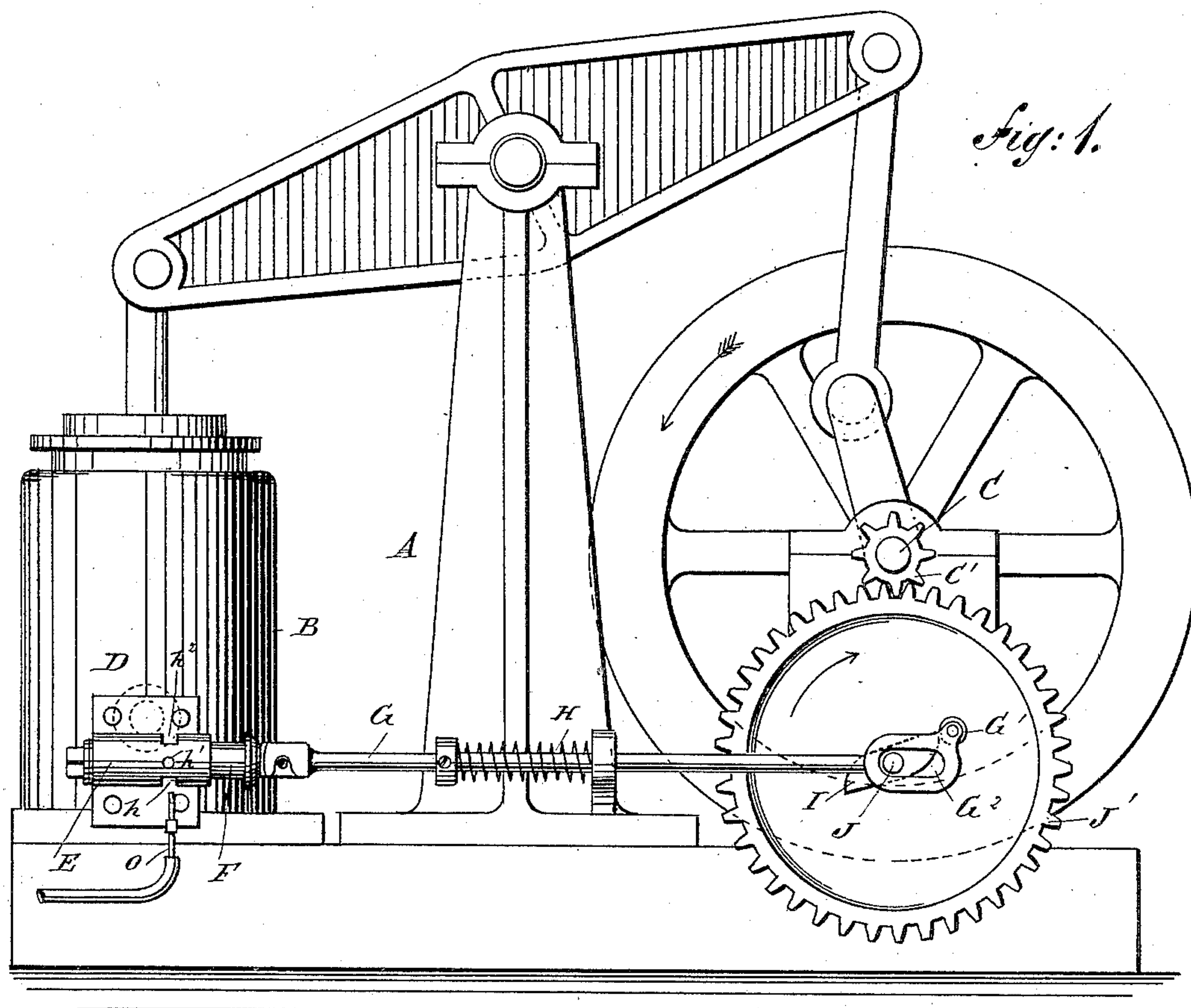
(No Model.)

2 Sheets—Sheet 1.

I. F. ALLMAN.
IGNITOR FOR GAS ENGINES.

No. 411,211.

Patented Sept. 17, 1889.



WITNESSES:

Chas. Aida
C. Sedgwick

INVENTOR:

I. F. Allman

BY

Munn & Co

ATTORNEYS.

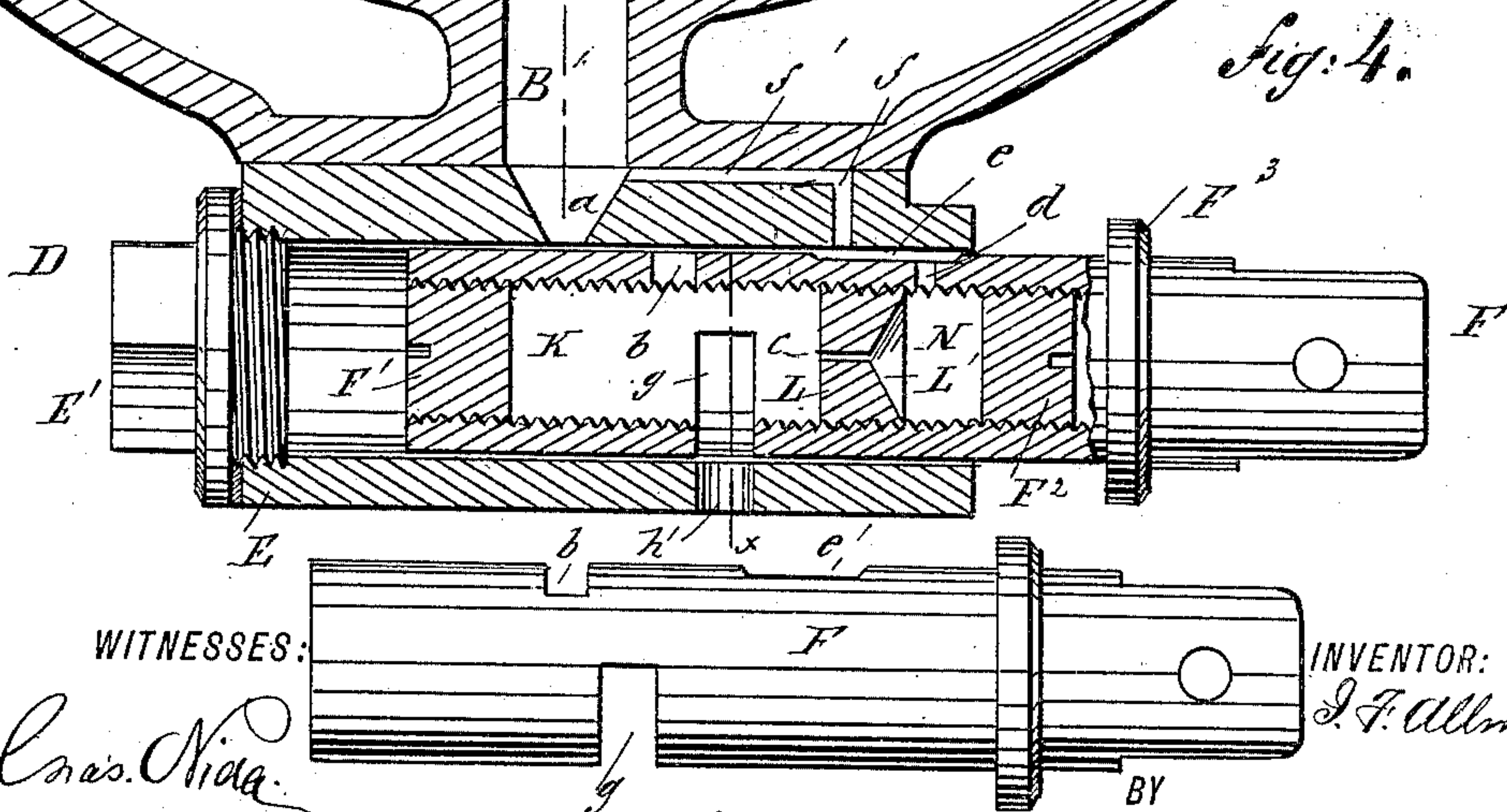
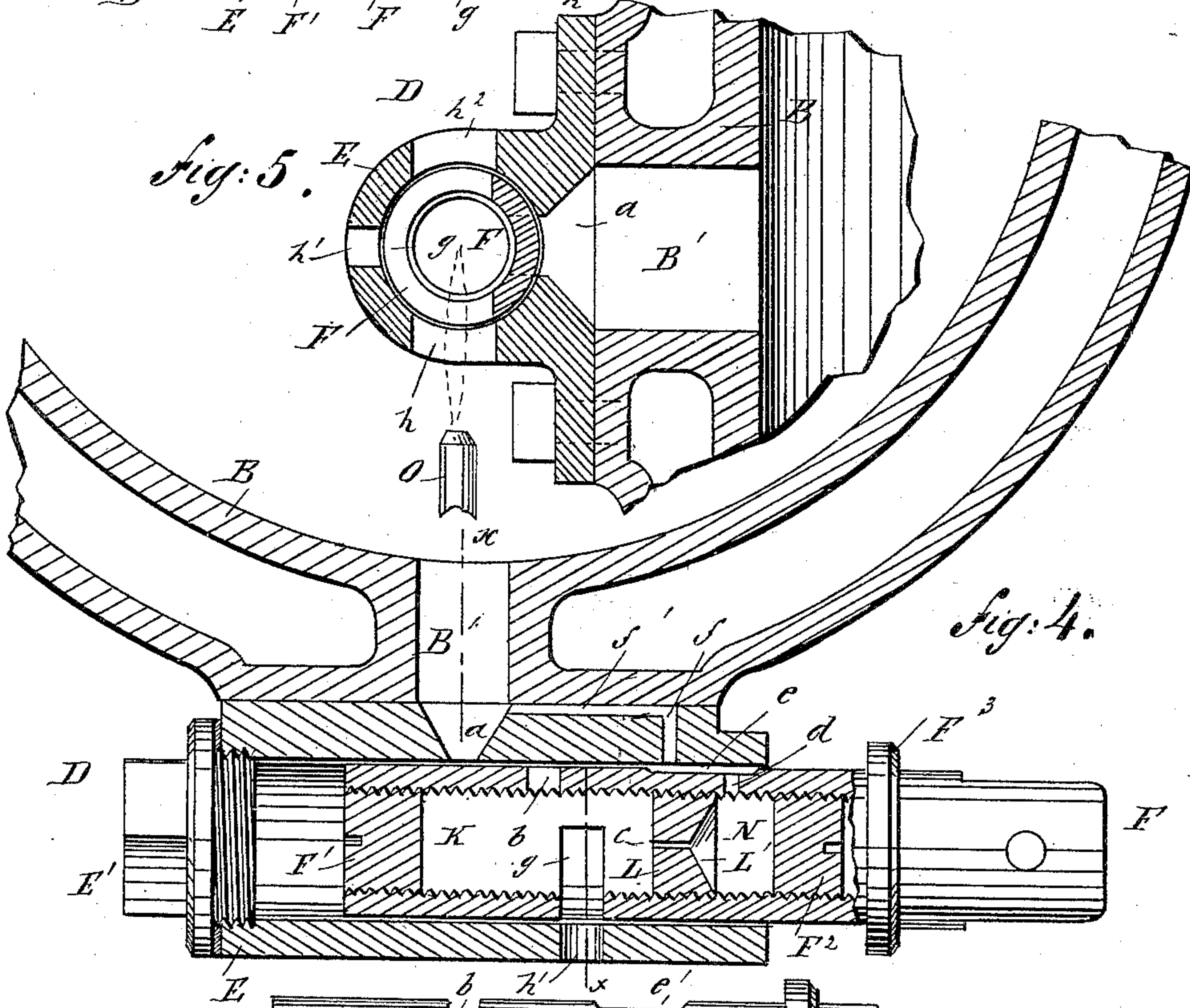
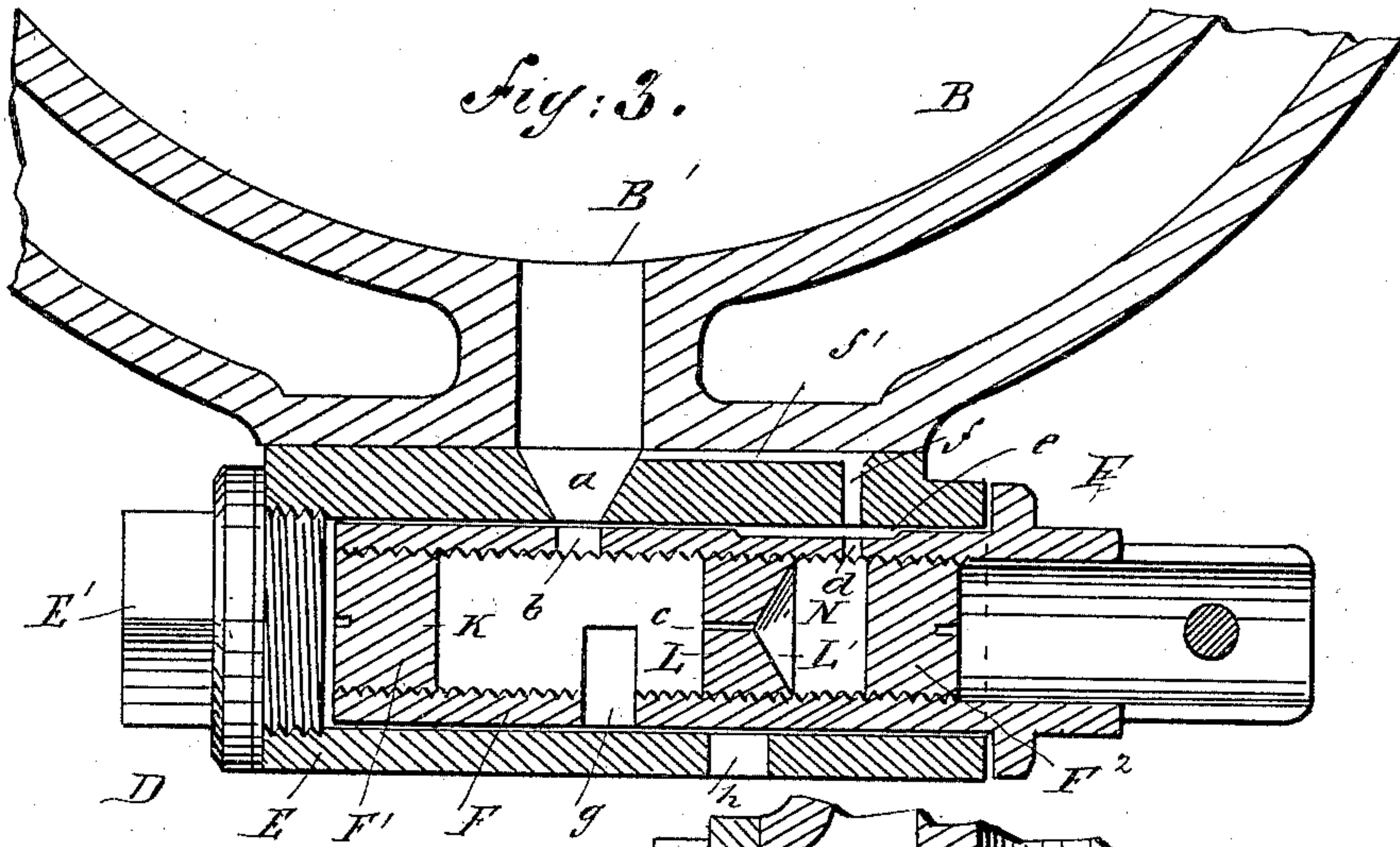
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Fig: 6.

INVENTOR:
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UNITED STATES PATENT OFFICE.

ISAAC F. ALLMAN, OF JERSEY CITY, NEW JERSEY.

IGNITOR FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 411,211, dated September 17, 1889.

Application filed May 22, 1889. Serial No. 311,686. (No model.)

To all whom it may concern:

Be it known that I, ISAAC F. ALLMAN, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and Improved Ignitor for Gas-Engines, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved gas-engine ignitor which is very simple and durable in construction and reliable and effective in operation.

The invention consists of a barrel connected with the interior of the gas-engine cylinder and provided with slots for the passage of the igniting-flame, and of a plunger held to slide in the said barrel and provided with a fixed apertured plug dividing the interior of the plunger into two compartments, of which one is continually connected with the interior of the cylinder, while the other is alternately connected with the igniting-flame and the interior of the cylinder.

The invention also consists in certain parts and details and combinations of the same, as will be hereinafter described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of a gas-engine provided with the improvement. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged sectional plan view of the improvement as applied on an engine-cylinder. Fig. 4 is a like view of the same with the plunger in a different position. Fig. 5 is a transverse section of the improvement on the line $x x$ of Fig. 4, and Fig. 6 is a plan view of the plunger.

The improved gas-engine A, of any approved construction, is provided with the cylinder B, in which operates a piston connected by suitable mechanism with the main driving-shaft of the gas-engine. The ignitor D is secured to the cylinder B near one end, and is provided with a barrel E, in which is held to slide a plunger F, pivotally connected with a rod G, mounted to slide longitudinally, and pressed inward by a coil-spring H, so as to

force the plunger F quickly to its seat in the barrel D. On the outer end of the rod G is held a friction-roller G', operated on by a double cam I, secured on a shaft J, carrying a gear-wheel J', meshing into a pinion C', fastened on the main driving-shaft C. The relative proportions of the pinion C' and the gear-wheel J' are as one to four. The end of the shaft J preferably passes through an elongated aperture G², formed in the outer end of the rod G, thus guiding said outer end of the rod.

The double cam I is so shaped that when the engine is operating it presses against the friction-roller G', so as to move the rod G outward, whereby the latter draws the plunger F out of the barrel E, at the same time compressing the spring H. When the pointed end of the cam I has passed the friction-roller G', the compressed spring H quickly returns the rod G and the plunger F to their former positions—that is, the plunger F is drawn back into the barrel E.

In the cylinder B is formed a passage B', leading to a port a , formed in the wall of the barrel E, near its middle, and adapted to register with a port b , formed in the plunger F, and leading to a chamber K, also formed in the plunger F, between the plugs F' and L, of which the former is screwed in the inner end of the plunger and the latter near the middle of the same.

In the plug L is formed, in the center, a longitudinally-extending small aperture c , leading into a conical recess L', formed in one face of the plug L. The conical recess L' opens into a chamber N, formed in the plunger F between the plug L and the plug F².

From the chamber N leads a port d , opening into a longitudinally-extending recess e , registering at all times with the port f , formed in the wall of the barrel E next to the cylinder B. The port f leads to a channel f' , opening into the port a at the passage-way B', as is plainly shown in Figs. 3 and 4. In the plunger F, between the plugs F' and L, is arranged a large port g , adapted to register with the flame-inlet ports $h h' h^2$, formed in the barrel E and passing through the flame from the igniting-pipe O. The ports b and g

in the plunger F are so arranged that when the port *b* is connected with the port *a* the other port *g* is disconnected from the flame-ports *h* *h'* *h*², as is plainly shown in Fig. 3.

5 When, however, the plunger F is drawn into its outermost position, as shown in Fig. 4, the ports *a* and *b* are disconnected and the ports *g* and *h* are connected with each other.

The operation is as follows: When the cylinder B is charged with the explosive mixture and the latter is compressed ready to be ignited, then the device stands in the position shown in Figs. 1 and 4. Part of the explosive mixture in the cylinder B can pass through the passage-way B', into the channel *f'*, through the port *f*, and from the latter, by the groove *e*, to the port *d*, which conducts the explosive mixture into the chamber N. As the explosive mixture is under pressure, it passes from the chamber N to the conical recess L' and through the port *c*, from which it passes in a fine jet into the center of the chamber K. At this time the ports *g*, *h*, *h'*, and *h*² register with each other, so that part of the igniting-flame from the pipe O passes through the ports *g* and *h* into the interior of the chamber K, and there ignites the small jet of explosive mixture from the cylinder B. At this moment one point of the cam I has passed the friction-roller G', so that the coil-spring H quickly forces the plunger F inward, thereby cutting off the flame from the igniting-pipe O and at the same time carrying the ignited explosive-mixture jet in the chamber K, through the ports *b* and *a*, into the passage B', to the interior of the cylinder, whereby the explosive mixture in the latter is ignited. During the time that the main driving-shaft C makes two revolutions the cam I makes half a revolution—that is, it draws the rod G slowly outward in the position shown in Fig. 4, at the same time again compressing the spring H. When the shaft C is near the end of the second revolution, the cylinder B is again filled with an explosive and compressed mixture and the above-described operation takes place again. Thus it will be seen that a very simple device is provided for igniting the mixture in the cylinder B, part of the mixture forming the fuel for the flame carried to the inlet-port leading to the interior of the cylinder.

In order to limit the inward motion of the plunger F, I may provide the latter with the collar F³, abutting against one end of the barrel E when in its innermost position. The opposite end of the barrel E is preferably closed by a plug E'.

The plugs F', F², and L are preferably screwed in the plunger F, and can be quickly removed whenever necessary for clearing the interior of the plunger. The plug L can be adjusted in the plunger F so as to balance the latter when the ignition of the explosive mixture in the cylinder B takes place.

It will be seen that when the flange F

moves inward and the port *g* is cut off from the flame-ports *h* the cut-off flame in the chamber K cannot be extinguished, as the port *b* now registers with the port *a*, filled with explosive mixture from the passage B' in cylinder B.

It will further be seen that no relief-chamber for the ignitor is necessary, as the piston of the engine when drawing in a fresh charge of explosive mixture also draws the burned gases from the chamber K in plunger F, so that the latter is always kept clean.

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

1. A gas-engine ignitor comprising a plunger provided with two compartments, of which one is connected at all times with the engine-cylinder and the other alternately connects with the engine-cylinder and the igniting-flame, and a plug forming the partition between the said two compartments and provided with a small aperture connecting the two compartments with each other, substantially as shown and described.

2. A gas-engine ignitor comprising a barrel connected with the engine-cylinder, a plunger held to slide in the said barrel and provided with two compartments, of which one is connected at all times with the engine-cylinder and the other alternately connects with the engine-cylinder and the igniting-flame, and a plug forming the partition between the said two compartments and provided with a small central aperture connecting the two compartments with each other, substantially as shown and described.

3. A gas-engine ignitor comprising a barrel connected with the engine-cylinder, a plunger held to slide in the said barrel and provided with two compartments, of which one is connected at all times with the engine-cylinder and the other alternately connects with the engine-cylinder and the igniting-flame, a plug forming the partition between the said two compartments and provided with a small central aperture connecting the two compartments with each other, and means, substantially as described, for moving the said plunger slowly outward and rapidly inward, as set forth.

4. The combination, with the gas-engine cylinder, of a barrel secured on the said cylinder and having a port opening into a passage leading to the interior of the cylinder, and a plunger held to slide in the said barrel and provided with an apertured plug dividing the said plunger into two compartments, of which one is at all times connected with the said cylinder-passage and the other alternately connects with the said barrel-port and with the igniting-flame, substantially as shown and described.

5. The combination, with the gas-engine cylinder, of a barrel secured on the said cylinder and having a port opening into a pas-

sage leading to the interior of the cylinder, a
plunger held to slide in the said barrel and
provided with an apertured plug dividing the
said plunger into two compartments, of which
5 one is at all times connected with the said
cylinder-passage and the other alternately
connects with the said barrel-port and with

the igniting-flame, and means, substantially
as described, for moving the said plunger in
the said fixed barrel, as set forth.

ISAAC F. ALLMAN.

Witnesses:

S. A. COUCH,
CHARLES ALLMAN.