

No. 672,196.

Patented Apr. 16, 1901.

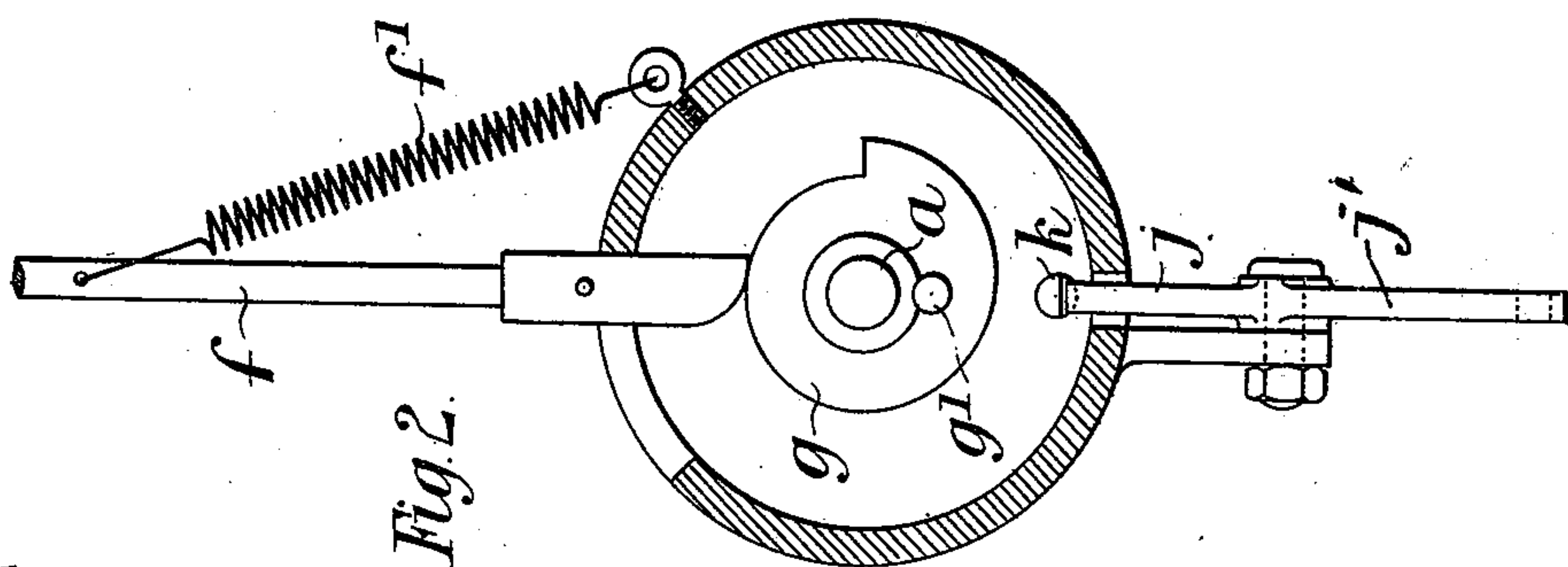
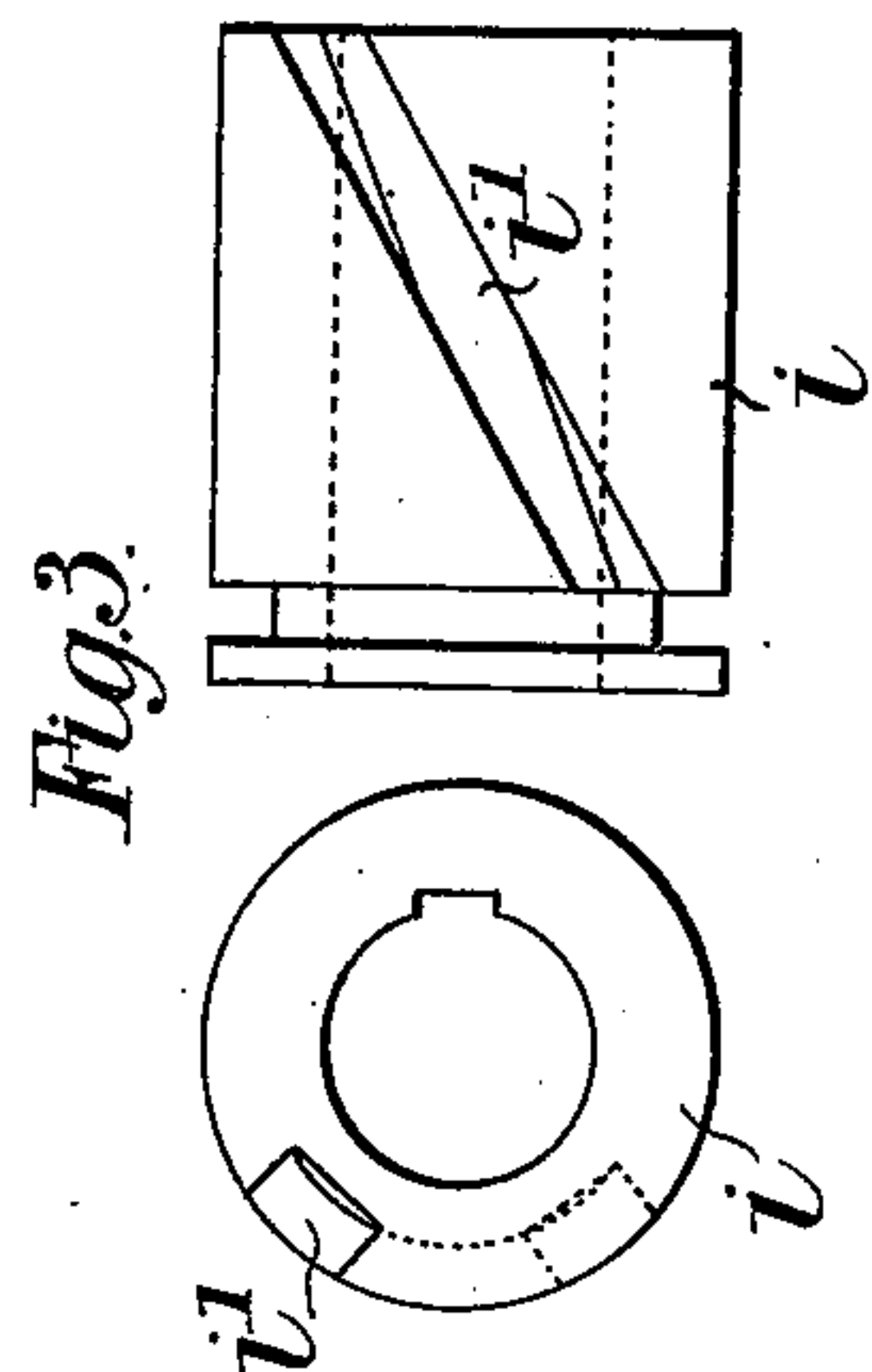
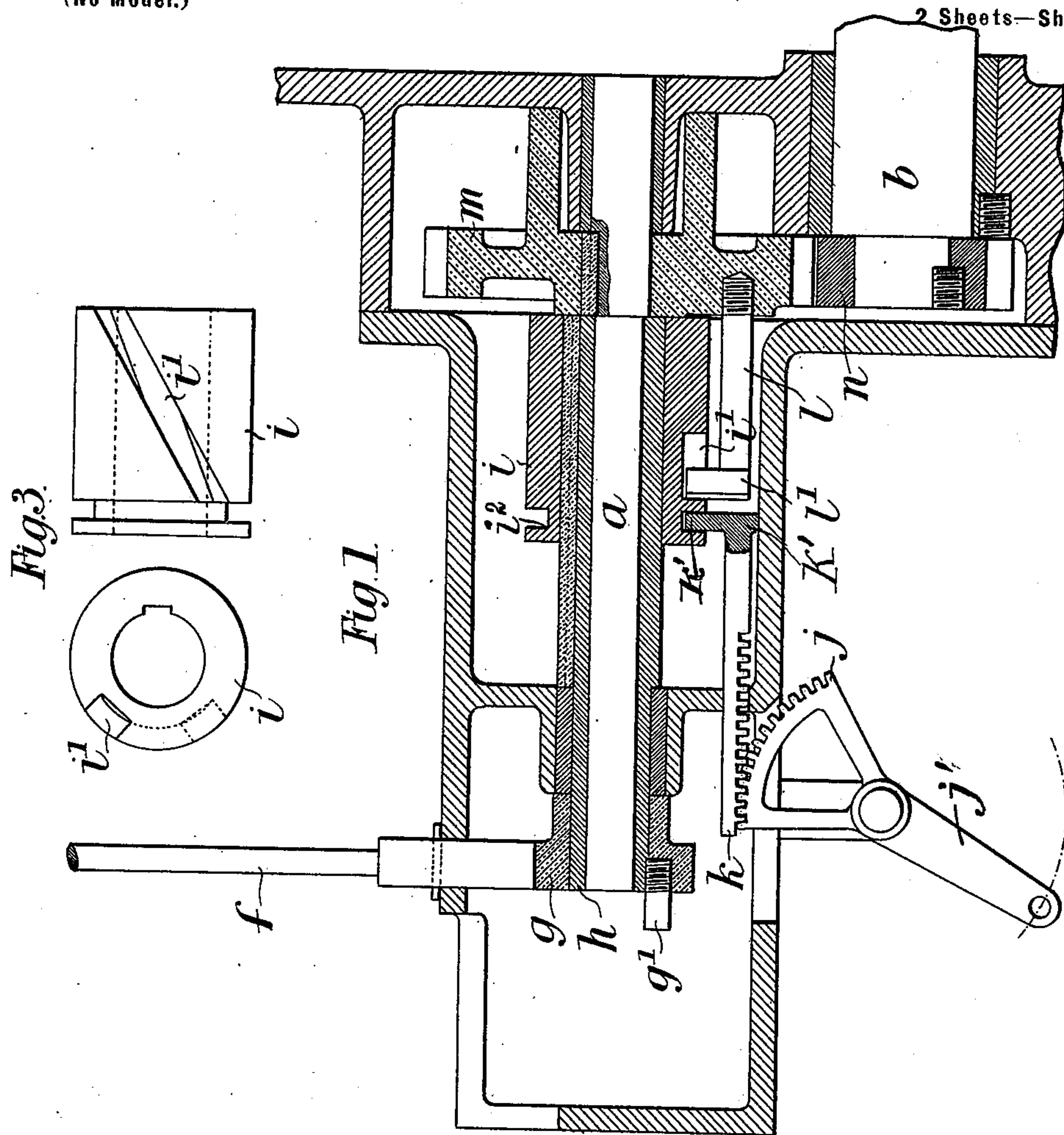
F. R. SIMMS.

SPARKING IGNITER FOR EXPLOSIVE ENGINES.

(Application filed Sept. 14, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
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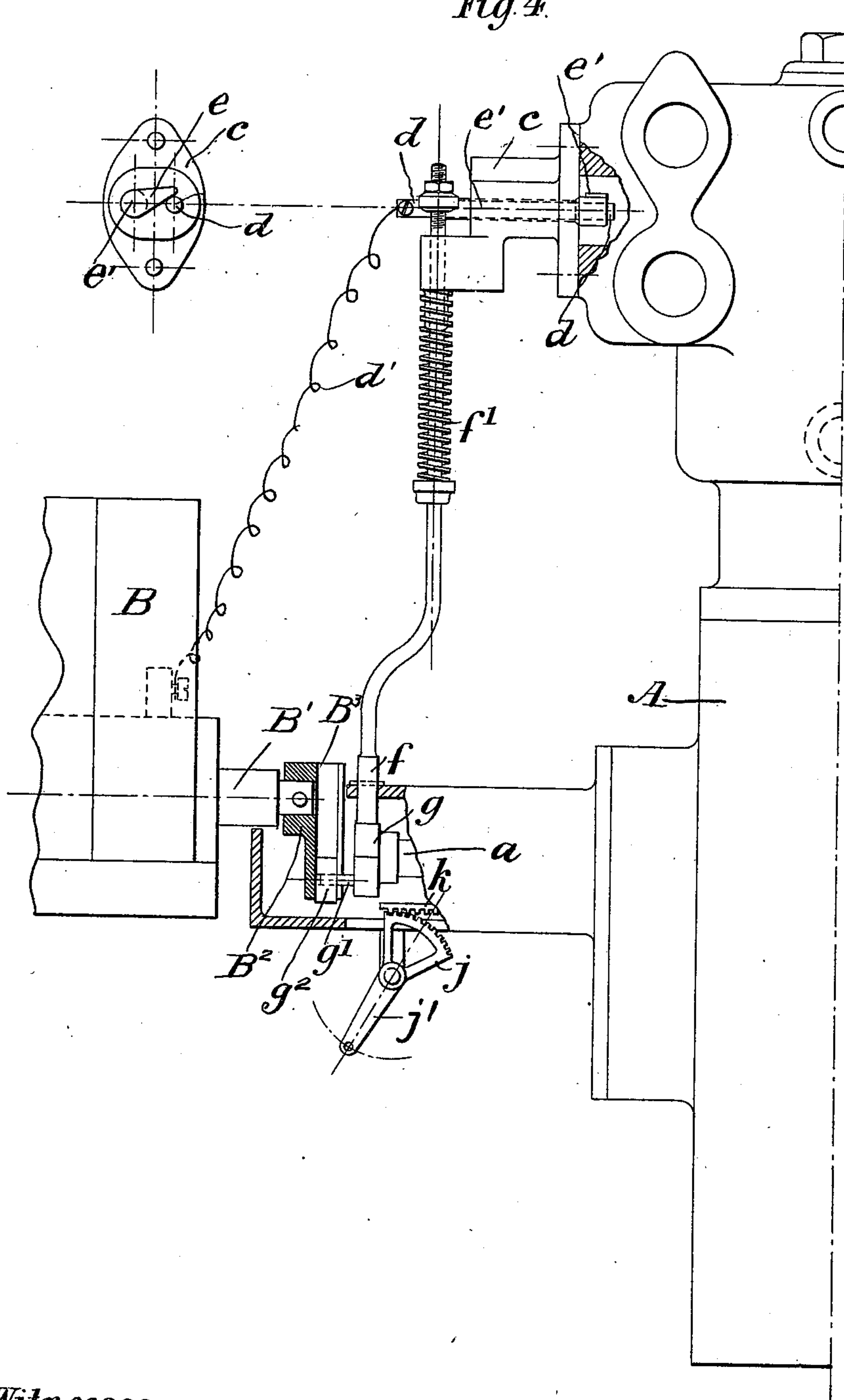
SPARKING IGNITER FOR EXPLOSIVE ENGINES.

(No Model.)

(Application filed Sept. 14, 1899.)

2 Sheets—Sheet 2.

Fig. 4.



Witnesses.

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Inventor.

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UNITED STATES PATENT OFFICE.

FREDERICK RICHARD SIMMS, OF LONDON, ENGLAND.

SPARKING IGNITER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 672,196, dated April 16, 1901.

Application filed September 14, 1898. Serial No. 690,960. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK RICHARD SIMMS, a subject of the Queen of Great Britain, residing at London, England, have invented new and useful Improvements in or Connected with Ignition-Gear for Explosion-Engines, (for which I have applied for patents in Great Britain, No. 7,196, dated March 24, 1898, and in France, No. 267,308, dated July 5, 1898,) of which the following is a specification.

This invention relates to improvements in or connected with electric ignition-gear for explosion-engines, and has for its object to provide means whereby the time at which ignition of the explosive charges takes place, and thereby the speed of the engines, can be varied while the engines are running.

In the accompanying drawings, Figure 1 is a sectional side elevation of ignition-gear made in accordance with the invention. Fig. 2 is a sectional end elevation. Fig. 3 represents views of a detail hereinafter described. Fig. 4 is a view, partly in section, of an explosive-engine and electric generator, showing my ignition-gear connected therewith.

In the drawings, A represents the explosion-engine, which is provided with a crank-shaft *b*, having a gear *n* keyed thereon and meshing with a gear *m*, of double its diameter, on a half-speed or counter shaft *a*, (see Fig. 1,) so that the shaft *a* revolves at half the speed of the shaft *b*.

B represents the generator for producing the electric spark for igniting the explosive charge of the engine, and in this instance I have illustrated in Fig. 4 a magneto-electric machine of the kind described in British Patent No. 15,411 of 1897, granted to Bosch. I do not, however, limit myself to the use of this or any other particular form of generator. The generator B is provided with a shaft *B'*, carrying an arm *B²*, slotted longitudinally, as indicated at *B³*. The counter-shaft *a* of the engine is provided with a crank-pin *g'*, which engages a sliding block *g²*, located in the slot *B³* in arm *B²*, the arm *B²* being longer than the throw of the crank-pin *g'*. The rotation of the crank-pin *g'* therefore produces an oscillation of the arm *B²* and generator-shaft *B'*.

The sparking device comprises a hollow plug *c*, extending into the ignition-chamber

of the engine A and carrying a stationary contact *d*, insulated from the plug and connected by a wire *d'* with one terminal of the generator B, as shown in Fig. 4. The other terminal of the generator is connected in any desired way to any part of the engine A which will form a good conductor. A pin *e'* is pivotally mounted in and extends through the plug *c* and has its inner end provided with a contact-arm *e*, which normally rests in contact with the stationary contact *d*. The outer end of the pivot-pin *e'* is operatively connected with an operating-rod *f*, which is moved upward longitudinally by a cam *g* on a sleeve *h*, loosely mounted on the counter-shaft *a*, and is caused to descend quickly by means of a spiral spring *f'*, connected to its lower end, as shown in Fig. 2, or to its upper end, as shown in Fig. 4, thereby causing it to momentarily break the contact between contact *d* and contact-lever *e* and produce a spark in the ignition-chamber. This particular form of sparking device is not herein claimed, as it forms no part of my present invention and, moreover, is specifically described and claimed in a prior application, Serial No. 690,764, in which I am a joint inventor.

The object of my present invention is to produce means whereby the time of the ignition (or, in other words, the point in the cycle at which the explosion of the charge is effected) can be adjusted, and to this end I provide means whereby the relative positions of the cam *g* and the crank-shaft *b* of the engine can be altered.

h represents a sleeve, before referred to, which is mounted loosely upon the counter-shaft *a*, (see Fig. 1,) and upon this sleeve I mount a second sleeve *i* in such manner that it will rotate with the sleeve *h*, but is capable of longitudinal movement thereon. The sleeve *i* is provided with an annular groove *i²*, which is engaged by a lug *k'* on a sliding rack-bar *k*, mounted in a part of the frame of the engine.

j represents a toothed sector meshing with the teeth of the rack-bar *k*, and *j'* represents an arm formed integrally with or secured to said sector for operating it in any desired way. The sleeve *i* is also provided with a spiral groove *i'*, (see Fig. 3,) which receives the end *l'* of an arm *l* or the like, secured to

the gear-wheel *m* on shaft *a*. In this construction it will be obvious that by moving the lever *j'* the outer sleeve *i* will be moved longitudinally thereby, and through the intervention of the projection *l'* of arm *l* and the spiral groove *i'* both sleeves *h* and *i* will be rotated partially upon the shaft *a*. As the cam *g*, which operates the sparking device, is secured to the sleeve *h*, said cam will therefore be partially revolved with respect to the shaft *a*, thus altering the relative time at which the spark will be produced. At the same time the engagement of the projection *l'* with said spiral groove *i'* will cause the sleeves to rotate continuously with the half-speed of shaft *a*. The crank-pin *g'*, which operates the generator, as previously described, is shown in this instance as secured to the cam *g*.

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

1. In an explosive-engine, the combination with a shaft provided with a gear-wheel driven from the engine, a sleeve loosely mounted on said shaft and capable of longitudinal movement thereon, igniting mechanism operatively connected with said sleeve, said sleeve being

provided with a spiral groove, a stud secured to the said gear-wheel and having a part engaging said spiral groove, and means for moving said sleeve longitudinally of the shaft, substantially as described.

2. In an explosive-engine, the combination with a shaft operated by the engine, and provided with an operating gear-wheel, a sleeve loosely mounted on said shaft, igniting mechanism operatively connected to said sleeve, a second sleeve mounted on said first sleeve so as to revolve therewith but be capable of longitudinal movement thereon, said second sleeve being provided with a spiral groove, a stud secured to said gear-wheel and provided with a part engaging said groove in said second sleeve, a rack-bar extending longitudinally of said sleeve and operatively connected therewith, a sector engaging said rack-bar and a lever for operating said sector, substantially as described.

FREDERICK RICHARD SIMMS.

Witnesses:

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