

No. 662,317.

Patented Nov. 20, 1900.

F. R. SIMMS.

ELECTRIC IGNITION PLUG FOR INTERNAL COMBUSTION ENGINES.

(Application filed Aug. 30, 1900.)

(No Model.)

Fig. 1.

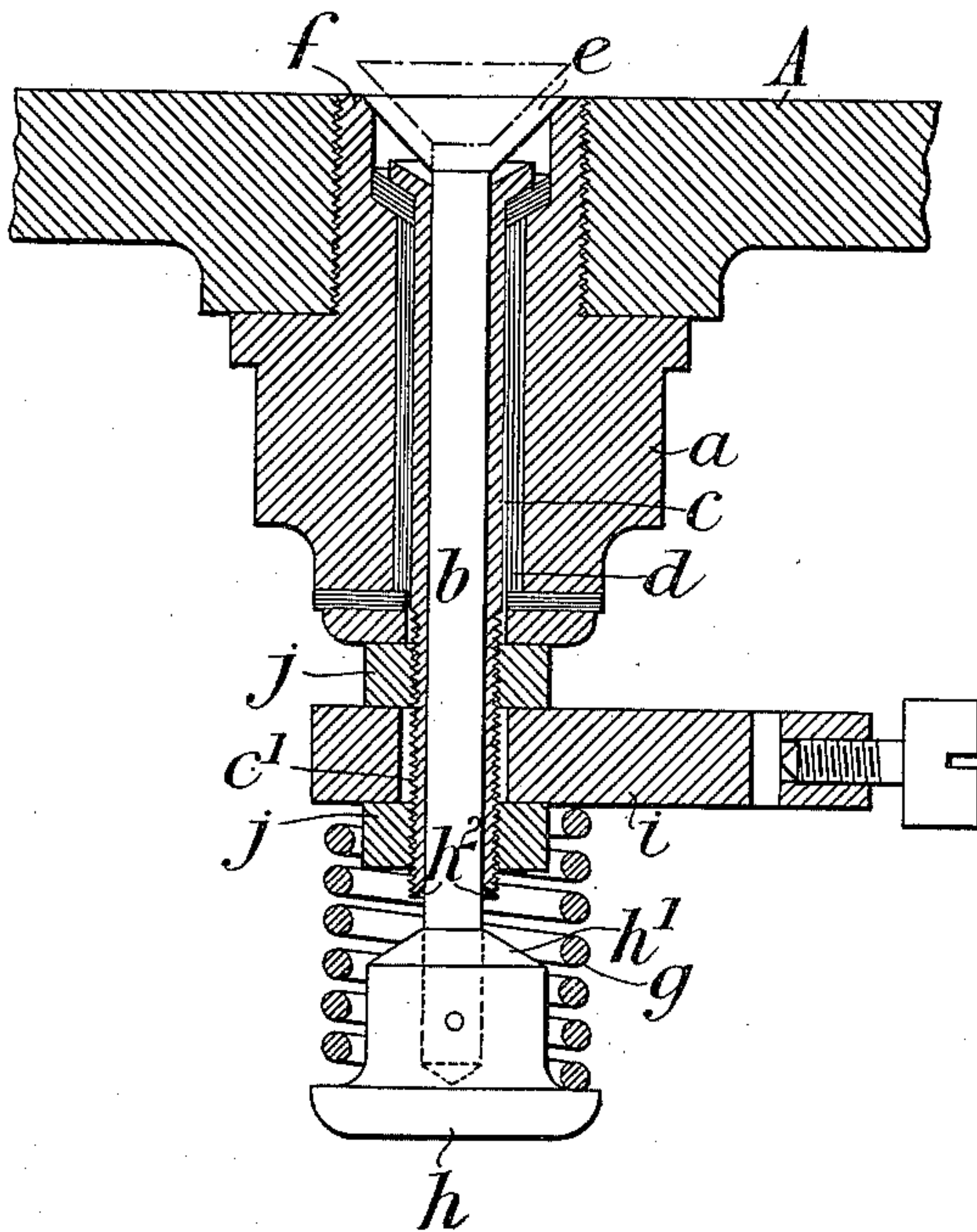


Fig. 2.

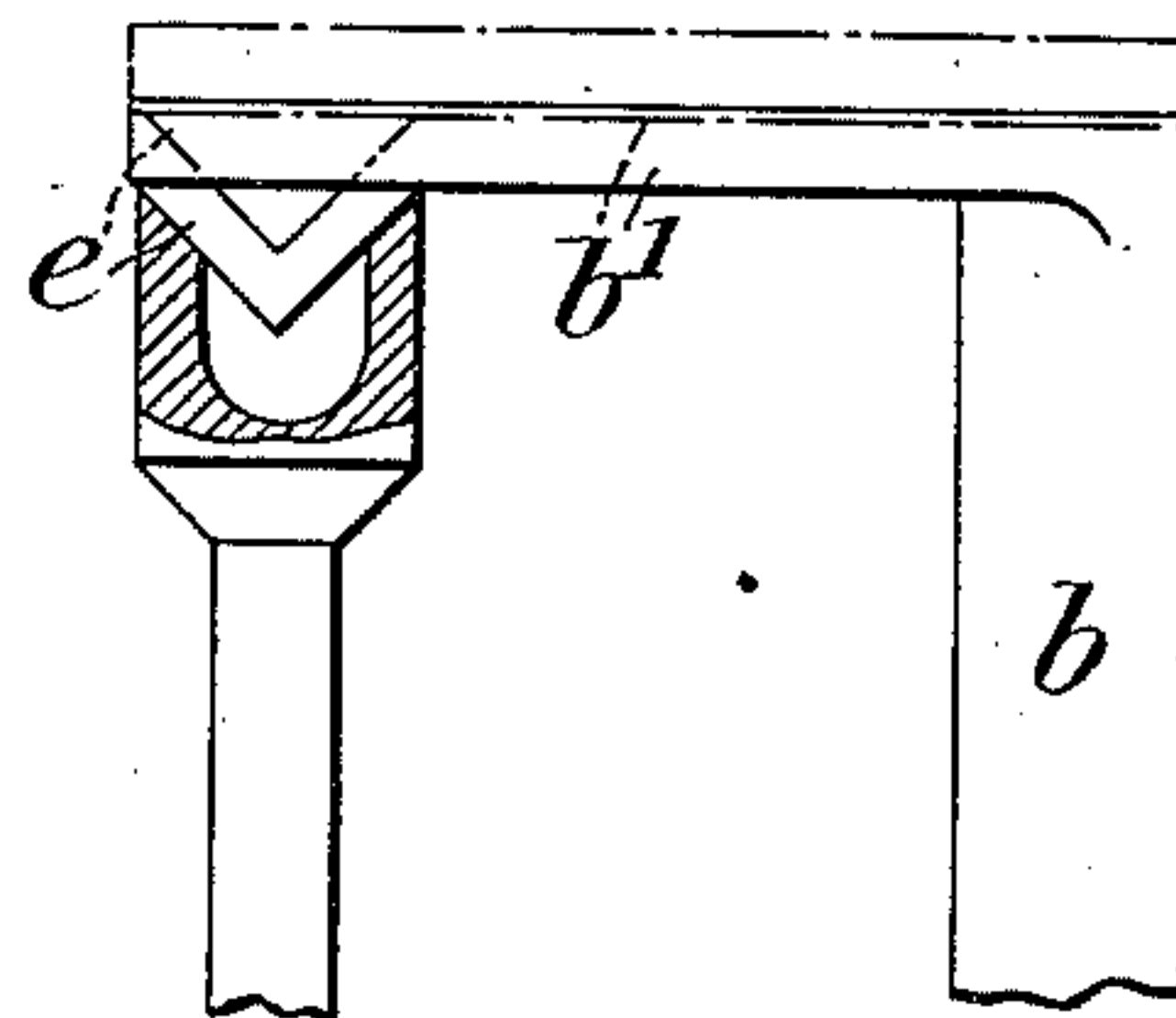


Fig. 3.

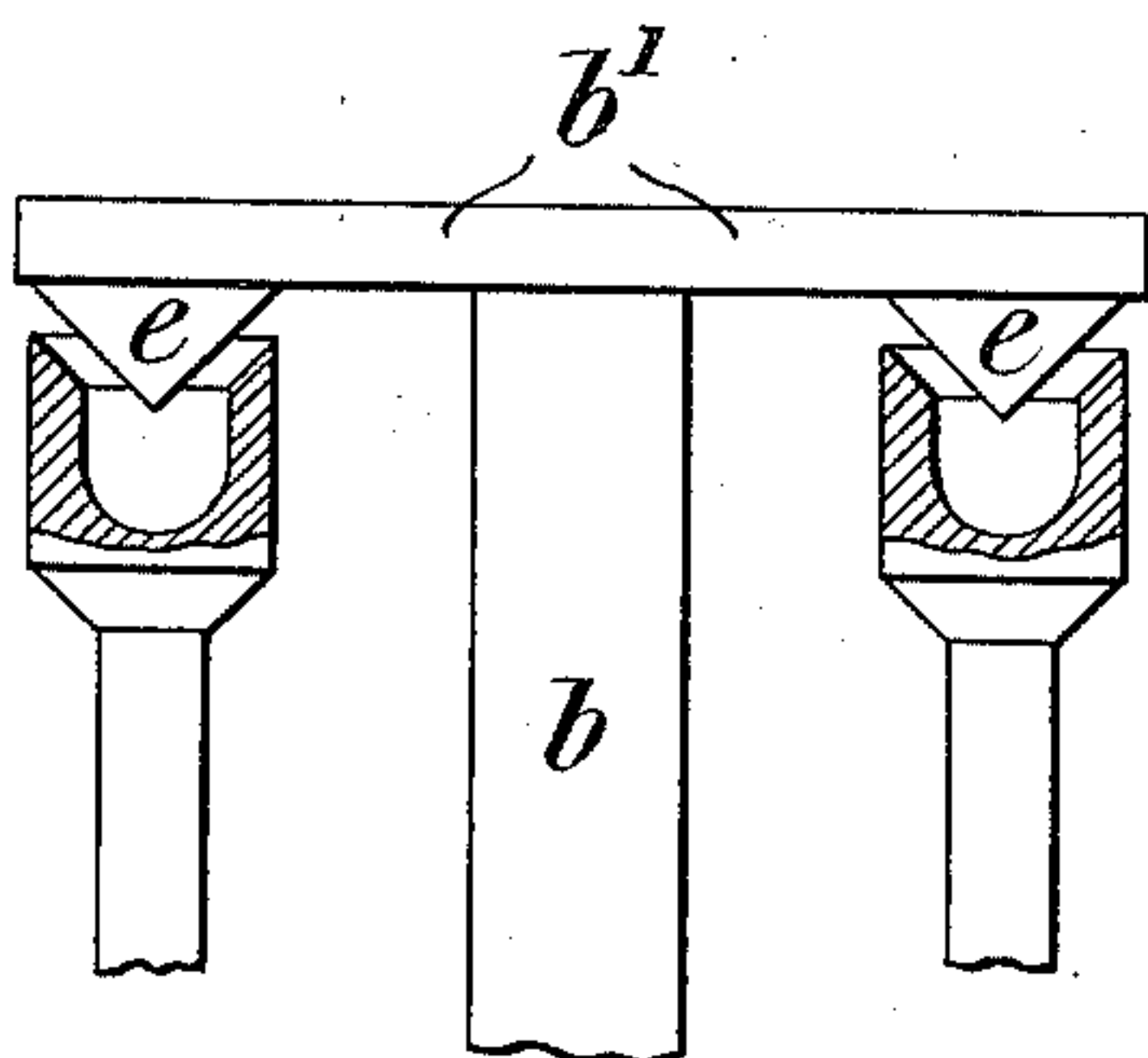
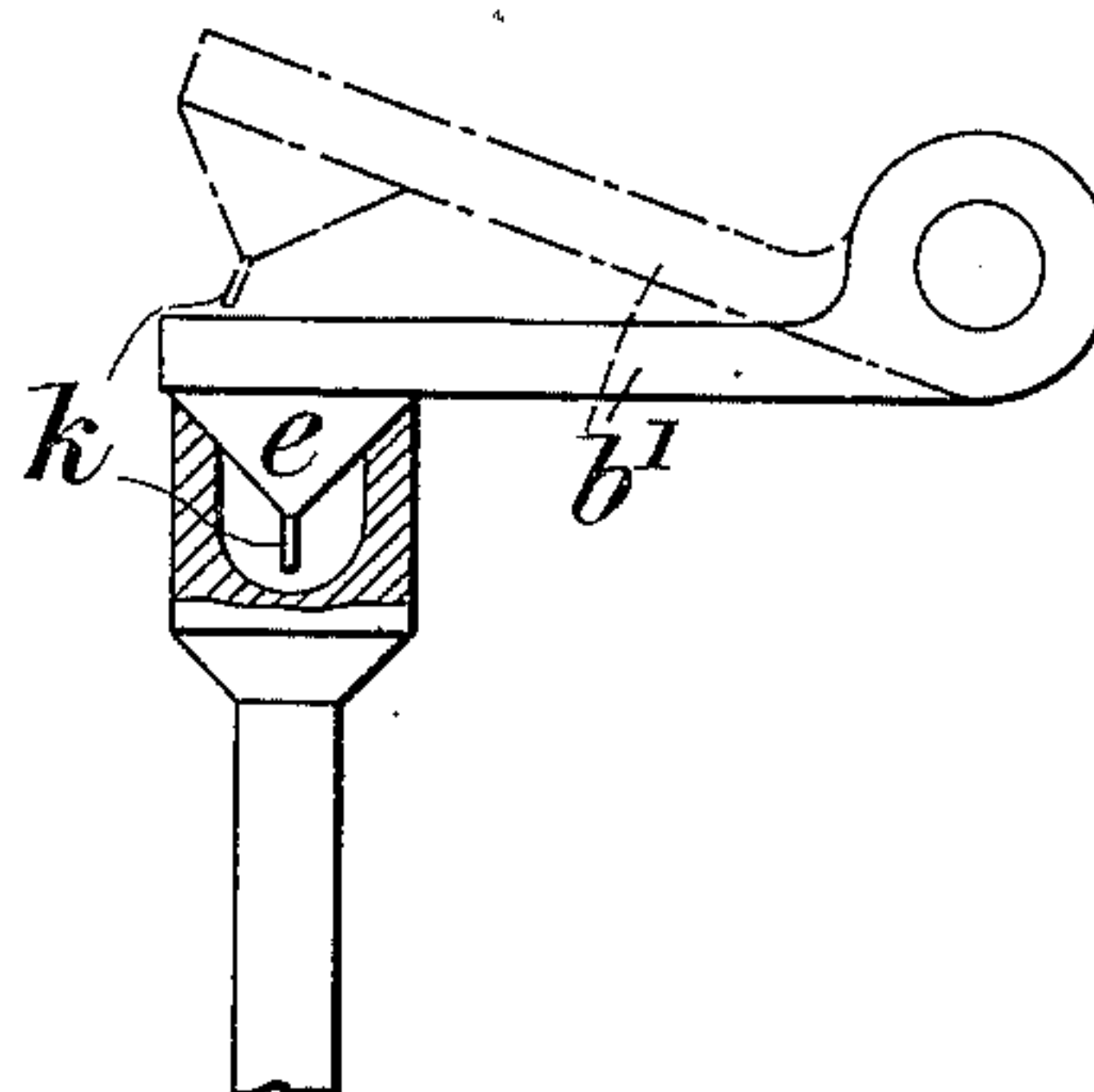


Fig. 4.



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# UNITED STATES PATENT OFFICE.

FREDERICK RICHARD SIMMS, OF LONDON, ENGLAND.

ELECTRIC-IGNITION PLUG FOR INTERNAL-COMBUSTION ENGINES.

SPECIFICATION forming part of Letters Patent No. 662,317, dated November 20, 1900.

Application filed August 30, 1900. Serial No. 28,595. (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 17 Balderton street, Oxford street, London, England, have invented new and useful Improvements in Electric-Ignition Plugs for Internal-Combustion Engines, of which the following is a specification.

This invention relates to improvements in electric-ignition plugs applicable to motors wherein electric ignition having an internal contact-breaker is employed.

The object of the invention is to provide a plug which reduces to a minimum the surface of the internal parts of the device exposed to the flame and which furnishes a large contact-surface between the sparking-points of the plug and generally to simplify the construction of the plug.

In the accompanying drawings, Figure 1 is a longitudinal section of an ignition-plug made according to the invention. Figs. 2, 3, and 4 are sectional elevations of three modifications of the movable contact of the plug.

Referring first to the arrangement shown in Fig. 1, *a* is a hollow plug proper which is screwed into the cylinder *A* of the motor, and *b* is a pin which works in a guide *c*, fitted in the hollow plug *a* and insulated therefrom by means of the asbestos or mica packing *d*. The inner end of the pin *b* is provided with a coned head *e*, which is normally held upon a conical seat *f*, formed on the inner end of the plug proper, *a*, by means of a spring *g*, which bears at one end against a boss *h*, secured upon the outer end of the pin *b*, and at the other end against a terminal *i*, fixed upon the screw-threaded outer end *c'* of the guide *c*, the said terminal *i* being secured in position by means of the nuts *j j*, which work on the screw-thread *c'* and which clamp the terminal *i* between them.

The dynamo, magneto-electric machine, or other device for generating the electric current is connected to the hollow plug *a* and to the terminal *i*.

A suitable device for operating the coned head for effecting ignition comprises an insulated tappet operated from any convenient part of the motor so as to hit the boss *h* and raise the pin *b*, and thereby lift the coned head *e* from its seat and produce a fat or full

spark around or partially around the periphery of the said coned head. When the head *e* is thus lifted, the compressed mixture from the cylinder rushes into the space beneath the head, and is thereby more readily ignited than would be the case if it were stationary at the moment of ignition. There is no serious leakage past the pin *b*, as the contact is only momentarily broken. Where, however, more than one cylinder is employed, and in which case contact is maintained broken for some considerable time, the aforesaid boss *h* is formed with a cone *h'* at its inner end, which when the pin *b* is raised enters a coned seat *h''*, provided in the end of the guide *c*, so as to prevent leakage.

In practice it is advantageous to make the coned head separately from the pin which operates it, and the said head can be made of platinum, nickel, or other suitable material.

Instead of forming the head *e* axially upon the pin *b* it can be formed upon an arm *b'* of the pin, as shown in Fig. 2, and in some cases (where it is desired to render ignition more certain) two such arms *b'* can be provided, each bearing a coned head adapted to fit upon a separate plug-seat, as shown in Fig. 3. Furthermore, instead of adapting the conical contact *e* to a rod which is arranged to move axially it can be fitted to a pivoted arm *b'*, as shown in Fig. 4, adapted to be operated by any suitable means.

A platinum wire *k*, Fig. 4, can be fitted to the apex of the coned head *e*, so as to attract the spark.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be preformed, I declare that what I claim is—

1. In an electric-ignition device, the combination with an electrode provided with a conical seat, of a second electrode having a conical portion adapted to make electrical contact with said conical seat, substantially as described.

2. In an electric-ignition device, the combination with an electrode having a conical seat, of a movable electrode, provided with a conical portion adapted to make electrical contact with said conical seat, and a spring normally holding said electrodes in electrical contact, substantially as described.



3. In an electric-ignition device, the combination with a plug provided with a conical seat forming an electrode, of a movable stem mounted in but insulated from said plug and  
5 provided with a conical electrode adapted to make contact with said conical seat, and a spring connected with said stem for holding said electrodes in electrical contact, substantially as described.
- 10 4. In an electric-ignition device, the combination with a plug having a part provided with a conical seat forming an electrode, of a sleeve mounted in said plug but insulated therefrom, and provided at its outer end with a valve-  
15 seat, a stem mounted in said sleeve and provided with a conical portion forming an electrode adapted to make contact with said conical seat, a spring normally holding said electrodes in contact, and a part on said stem  
20 adapted to engage the valve-seat on said sleeve

to prevent leakage of the explosive mixture when the electrodes are separated, substantially as described.

5. In an electric-ignition device, the combination with a plug having a part provided with  
25 a conical seat forming an electrode, of a sleeve mounted in said plug but insulated therefrom, and provided at its outer end with a conical valve-seat, a stem mounted in said sleeve and extending outside of said plug provided with  
30 a conical electrode adapted to engage said conical seat of the plug, a boss on said stem provided with a conical part to engage the valve-seat of said sleeve to prevent escape of gas, and a spring interposed between said boss and  
35 the plug, substantially as described.

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