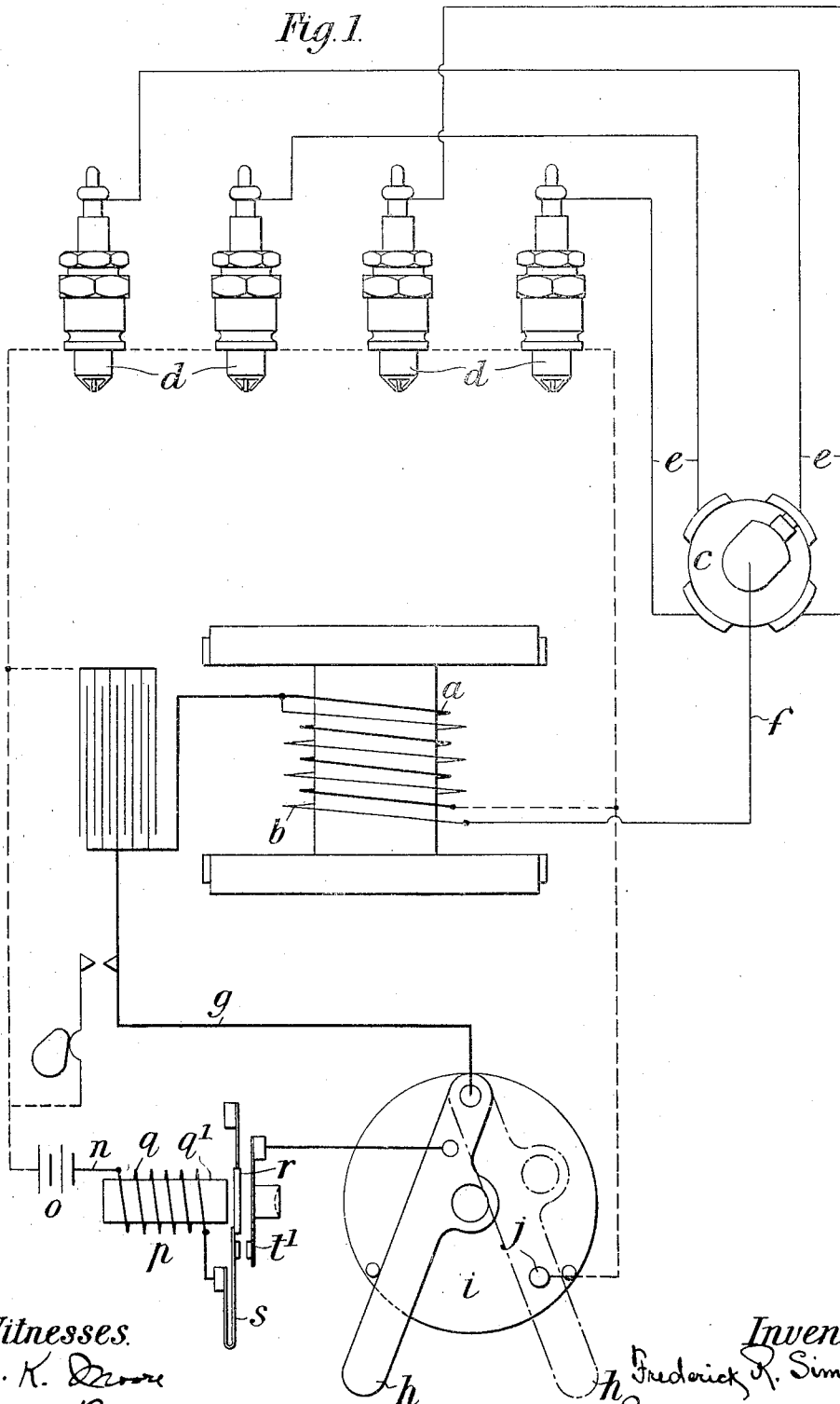


F. R. SIMMS.
 STARTER FOR INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED FEB. 23, 1910.

1,083,221.

Patented Dec. 30, 1913.

2 SHEETS—SHEET 1.



Witnesses.
J. K. Darrow
R. E. Barry.

Inventor.
Frederick R. Simms
 By *Whitcomb Peacock*
attys.

F. R. SIMMS.
STARTER FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED FEB. 23, 1910.

1,083,221.

Patented Dec. 30, 1913.

2 SHEETS-SHEET 2.

Fig. 2.

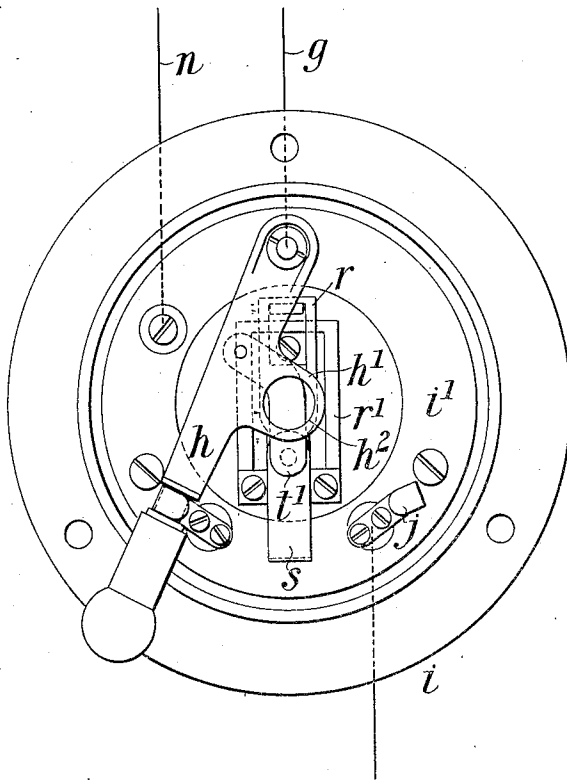
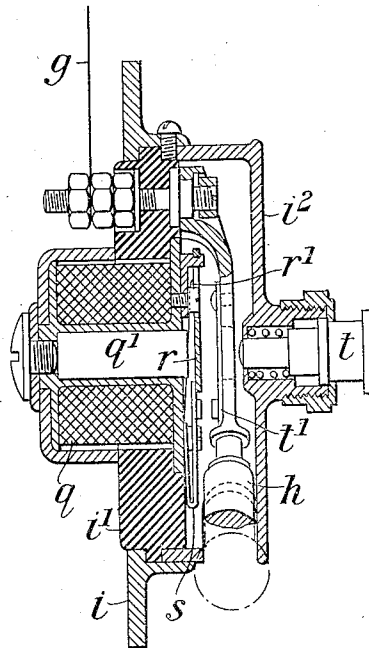


Fig. 3.



Witnesses

J. K. Brown
R. E. Barry.

Inventor.

Frederick R. Simms
By Whitaker & Brown
Attors.

UNITED STATES PATENT OFFICE.

FREDERICK RICHARD SIMMS, OF WILLESDEN LANE, LONDON, ENGLAND, ASSIGNOR TO
THE SIMMS MAGNETO COMPANY, A CORPORATION OF NEW YORK.

STARTER FOR INTERNAL-COMBUSTION ENGINES.

1,083,221.

Specification of Letters Patent.

Patented Dec. 30, 1913.

Application filed February 23, 1910. Serial No. 545,452.

To all whom it may concern:

Be it known that I, FREDERICK RICHARD SIMMS, a subject of the King of Great Britain, residing at Welbeck Works, Kimberley Road, Willesden Lane, London, England, have invented new and useful Improvements in Starters for Internal-Combustion Engines, of which the following is a specification.

My invention relates to internal combustion engines, such as petrol motors employed for the propulsion of motor road vehicles, of the kind having ignition gear of the high-tension magneto type in which the armature is composed of a primary and a secondary coil and is connected up and driven in the ordinary way, and in which a battery and trembler coil are provided in conjunction with the primary coil in such a manner that the primary and secondary coils of the armature can be utilized as an induction coil for generating the high tension current required for producing the ignition sparking for starting the motor.

According to my invention I provide a combined trembler coil and operating switch. Such a device may comprise a casing in which is mounted a trembler coil in circuit with the accumulator or battery the said casing being also provided with a switch lever connected up with the magneto and adapted to be brought into contact with an earth terminal when it is desired to stop the machine. The casing is also provided with a push button which cannot be operated when the switch lever is in the "off" position but which, on the said lever being brought into the position for starting, can be depressed through an opening in the latter so as to complete the accumulator circuit and thus cause current to pass through the trembler coil, the said trembler then vibrating so as to make and break contact as long as the push-button is depressed.

To enable the invention to be fully understood I will describe it by reference to the accompanying drawings, in which:—

Figure 1 is a diagrammatic view illustrating means of the kind hereinbefore described for starting internal combustion engines, provided with a combined trembler coil and operating switch according to my invention. Fig. 2 is an elevation representing on a larger scale the switch and the trembler coil,

the cover being removed to better show the parts, and Fig. 3 is a vertical section thereof.

a represents the primary coil and *b* the secondary coil of a high-tension magneto-electric machine of the well-known Simms type.

c is the distributor and *d, d* are the sparking plugs, the said sparking plugs being connected to the distributor by the leads *e, e*, and the distributor being connected by a wire *f* to one end of the secondary coil *b* the other end of which is connected to the primary coil *a* in the usual way. The said primary coil is also connected up by the wire *g* to the lever *h* of the operating switch *i*, the said switch handle or lever *h* being put to earth when in the off position by engagement with the contact *j*. The lever *h* is provided with a contact *t*¹ designed, as hereinafter described, to be brought into circuit through the wire *n*, with one pole of the battery *o*, the other pole of which is earthed.

The base plate *i*¹ of the switch is recessed to receive the coil *g* in connection with which there operates the trembler *r* normally held in its outer position, that is to say, away from the core *q*¹ of the trembler by means of the spring *r*¹. Between the trembler *r* and the coil there is located the bent spring contact *s* which is connected to one end of the coil *q*, the other end of which is connected to the battery *o* as shown in Fig. 1. The switch lever *h* is provided with an extension *h*¹ having a hole *h*² which, when the said lever is brought into the position shown in Fig. 2, that is to say, the position for starting the motor, is opposite the spring push-button *t* mounted in the cover *i*² of the switch.

The operation is as follows: When the switch lever *h* is in the position shown in broken lines in the drawing, the magneto is connected up to the distributor and the sparking plugs in the normal manner. When however, it is desired to start the motor the switch lever is manipulated so as to bring the contact spring *t*¹ upon the inside of the lever adjacent to the contact *s*. By pressing the said contact *t*¹ against the contact *s* by the spring-push button *t* current is caused to flow from the battery *o* through the wire *n*, coil *q* wire *g* and the primary coil *a* of the magneto-electric machine, the coil *q* is thus energized and attracts the trembler *r* which depresses the contact *s* so

as to break the circuit, whereupon, the trembler *r* is released and the operation begins *de novo*, that is to say, the current flows through the primary coil in a series of impulses, the make and break continuing as long as the push-button *t* is depressed.

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

1. An electric spark producing apparatus comprising a high tension magneto electric machine having a part constructed with primary and secondary windings and forming an induction coil, an external source of electricity, a trembler coil in circuit therewith, a circuit connecting the trembler coil and external source of electricity with the said primary winding and a controlling switch for said circuit.

2. An electric spark producing apparatus comprising a high tension magneto electric machine having a part constructed with primary and secondary windings and forming an induction coil, an external source of electricity, a trembler coil in circuit therewith, a circuit connecting the trembler coil and external source of electricity with the said primary winding, an auxiliary switch normally open, for controlling the said circuit and a main switch for connecting said circuit with the said primary winding.

3. An electric spark producing apparatus comprising a high tension magneto electric machine, having a part constituting an induction coil, an external source of electricity, a trembler coil, connected therewith, and means for connecting said trembler and source of electricity with the primary winding to produce a succession of sparks, irrespective of the position of the armature.

4. An electric spark producing apparatus comprising a magneto electric machine, having a part constituting an induction coil, an external source of electricity to excite the primary coil of said magneto, an operating switch, and a trembler coil in circuit with said external source of current and said primary coil, an auxiliary switch for closing the circuit through the trembler coil and means for preventing the operation of said auxiliary switch except when the operating switch is in a predetermined position.

5. An electric spark producing apparatus

comprising a magneto electric machine, having a part constituting an induction coil, an external source of electricity to excite the primary coil of said magneto, an operating switch, and a trembler coil in circuit with said external source of current and said primary coil, and an auxiliary switch for closing the circuit through the trembler coil, and having a part carried by the operating switch, and operable only when the operating switch is in a predetermined position.

6. An electric spark producing apparatus comprising a magneto electric machine, having a part constituting an induction coil, an external source of electricity to excite the primary coil of said magneto, an operating switch, and a trembler coil in circuit with said external source of current and said primary coil, and an auxiliary switch for closing the circuit through the trembler coil, comprising a stationarily mounted member, and a movable member operatively connected with the operating switch and adapted to be moved thereby into operative relation with the stationarily mounted member.

7. An electric spark producing apparatus, comprising a magneto electric machine, having a part constituting an induction coil, an external source of electricity to excite the primary coil of said magneto, an operating switch, and a trembler coil in circuit with said external source of current and said primary coil, and an auxiliary switch for closing the circuit through the trembler coil, having a member operatively connected with and adapted to be moved into operative position by the operating switch.

8. An electric spark producing apparatus comprising a magneto electric machine, having a part constituting an induction coil, an external source of electricity to excite the primary coil of said magneto, an operating switch, and a trembler coil in circuit with said external source of current and said primary coil, and an auxiliary switch for closing the circuit through the trembler coil comprising a yielding part carried by the operating switch, and a stationarily mounted push button.

FREDERICK RICHARD SIMMS.

Witnesses:

C. G. REDFERN,
JOHN E. BOUSFIELD.