

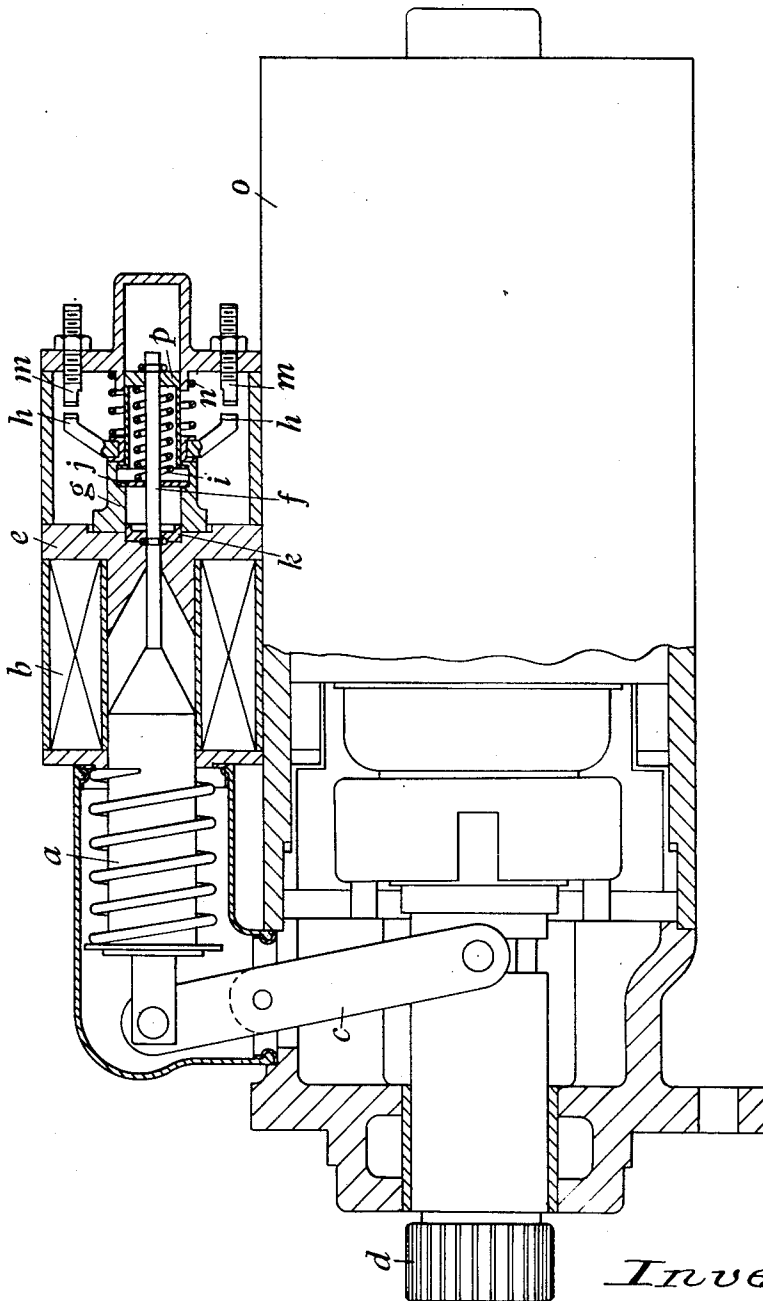
Sept. 23, 1952

E. H. C. THORPE

2,611,274

ELECTRIC STARTING MOTOR FOR INTERNAL-COMBUSTION ENGINES

Filed Oct. 25, 1949



Inventor

E. H. C. Thorpe

*By Howard Downing Runkle
Attys.*

UNITED STATES PATENT OFFICE

2,611,274

ELECTRIC STARTING MOTOR FOR INTERNAL-COMBUSTION ENGINES

Ernest Harry Charles Thorpe, Kew Gardens, England, assignor to C. A. V. Limited, London, England

Application October 25, 1949, Serial No. 123,347
In Great Britain October 25, 1948

2 Claims. (Cl. 74-7)

1

This invention relates to electric starting motors for internal combustion engines, of the kind in which a pinion associated with the motor is slidable by an electromagnet into operative connection with a gear wheel on the engine, and in which a switch operable by the electromagnet is closed for supplying current to the motor after the pinion has been moved to its operative position. Hitherto it has been usual for the rate of closing of the switch to be dependent on the rate of sliding of the pinion, and as a consequence it has been possible for the fixed and movable contacts of the switch to make only a light contact with each other for a short time before the full pressure has been exerted on them, a condition which is accompanied by risk of fusion of the contacts.

The object of the present invention is to eliminate the said risk.

The accompanying drawing is a sectional view illustrating one embodiment of the invention.

In one known arrangement the axially movable spring loaded core *a* of a solenoid *b* is connected at one end by a lever *c* to the slidable pinion *d*. From the other end of the core extends (through one end of the iron enclosure *e* of the solenoid winding) a plunger *f*. The circuit containing the solenoid winding is controlled by a push-button or other manually operable switch.

In applying the present invention to such an arrangement, there is freely mounted on the plunger *f* a hollow iron armature *g* which can be held in contact with the adjacent end of the winding enclosure *e* by the magnetic flux passing through that end when the winding is excited, and on the said armature there is mounted the movable contact *h* of the switch controlling the motor *o*. Within a part *p* secured to the said armature I arrange a strong spring *i* which at one end abuts against the part *p* and which at the other end bears against an abutment consisting of a collar *j* slidable relatively to the plunger and armature. Also there is secured to the plunger *f* a collar *k*.

The arrangement is such that when the winding *b* is excited for moving the motor pinion *d* into action, the armature *g* is initially held by magnetic attraction. During the first part of the movement of the core *a* and plunger *f*, the collar *k* is advanced into contact with the abutment *j*. Continued movement of the core and plunger causes the collar *k* to move the abutment *j* into contact with the adjacent end of the part *p* against the action of the spring *i*, and later (after the pinion has been partially or wholly engaged with the engine) causes the

2

armature *g* to be separated from the part *e*, thereby enabling the spring *i* to move the contact *h* quickly into engagement with the fixed contact *m* and with the desired full pressure. During the return of the solenoid core a spring *n* returns the armature and movable contact to their initial position.

By this invention risk of burning or fusion of the motor switch contacts is obviated in a very simple and effective manner.

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

1. An electric engine-starting mechanism comprising in combination an electric motor, a pinion rotatable by the motor and capable of axial sliding movement, an electromagnet having a movable part, means for transmitting sliding movement to the pinion from the movable part of the electromagnet, a switch for controlling the supply of electric current to the motor, and spring means arranged to be energised by the movable part of the electromagnet, and thereafter to close the switch.

2. An electric engine-starting mechanism comprising in combination an electric motor, a pinion rotatable by the motor and capable of axial sliding movement, an electromagnet having a movable part, means for transmitting sliding movement to the pinion from the movable part of the electromagnet, a movable armature arranged first to be held stationary by magnetic flux and then to be released by the movable part of the electromagnet when the latter is excited, a switch for controlling the supply of current to the motor and having a movable part carried by the armature, and a spring arranged to be energised by movement of the said part of the electromagnet in the direction for releasing the armature, and thereafter to impart rapid movement to the armature for closing the switch.

ERNEST HARRY CHARLES THORPE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,700,890	Hodgkins et al.	Feb. 5, 1929
2,255,542	Ehrlich	Sept. 9, 1941
2,476,794	Austin	July 19, 1949

FOREIGN PATENTS

Number	Country	Date
379,318	Italy	Mar. 21, 1940
522,839	Great Britain	June 28, 1940