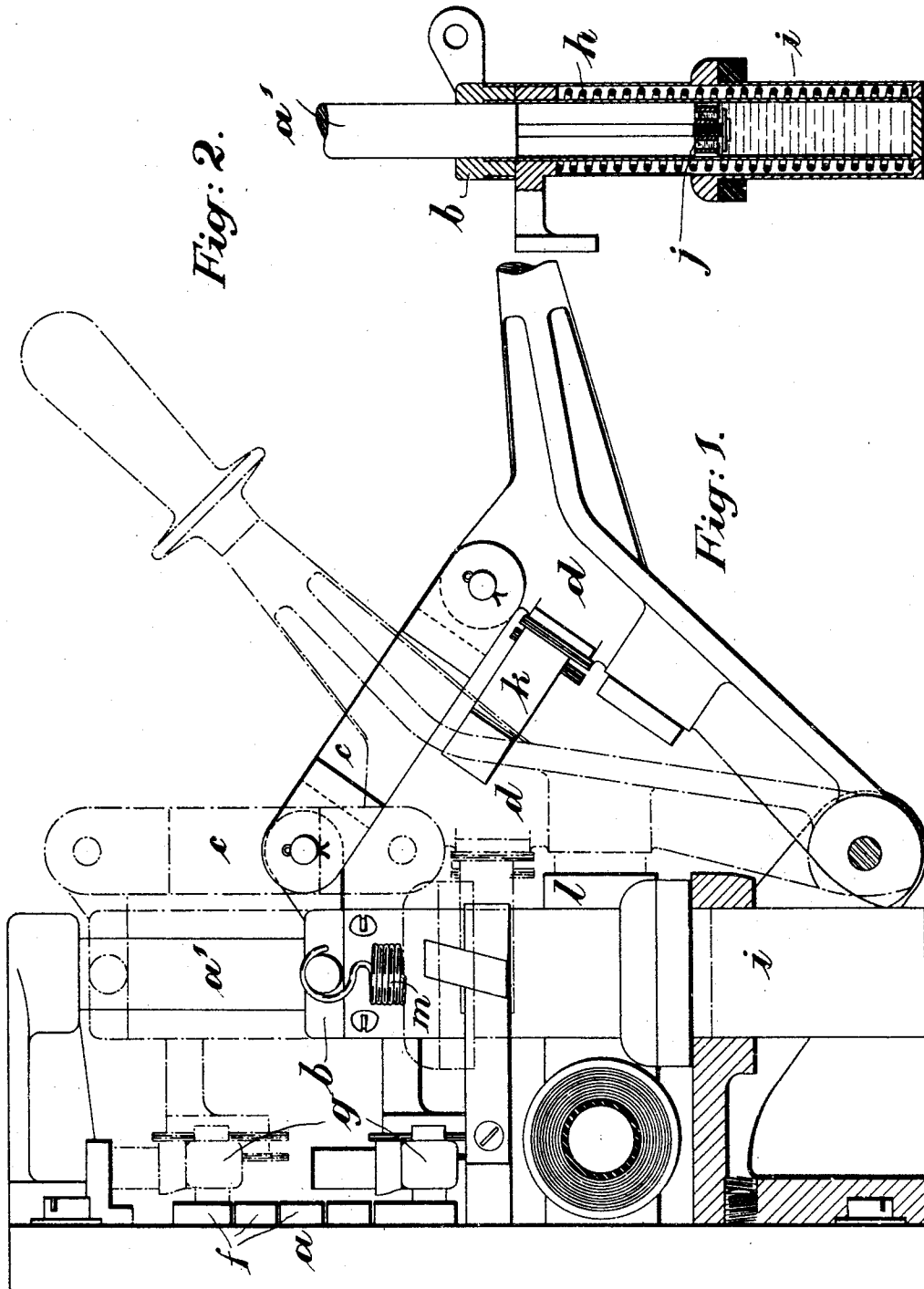


E. GARSIDE.
 STARTING SWITCH FOR ELECTRIC MOTORS.
 APPLICATION FILED OCT. 2, 1909.

957,945.

Patented May 17, 1910.

2 SHEETS—SHEET 1.



WITNESSES:

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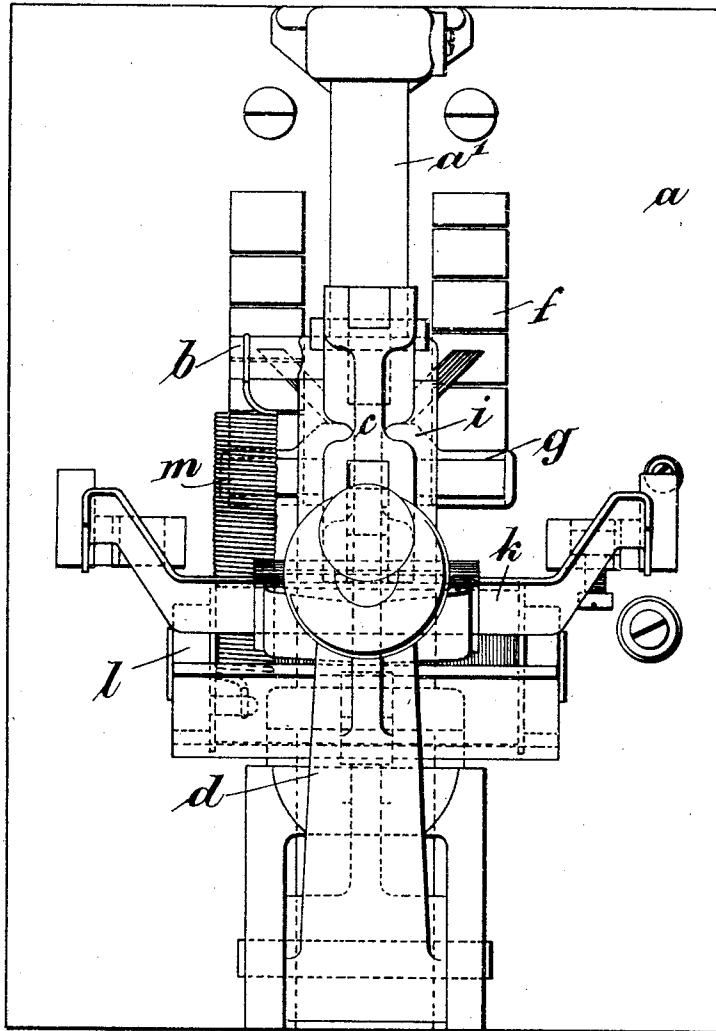


Fig. 3.

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UNITED STATES PATENT OFFICE.

EDMUND GARSIDE, OF DARLINGTON, ENGLAND, ASSIGNOR TO ENGINEERING INSTRUMENTS LIMITED, OF DARLINGTON, ENGLAND.

STARTING-SWITCH FOR ELECTRIC MOTORS.

957,945.

Specification of Letters Patent.

Patented May 17, 1910.

Application filed October 2, 1909. Serial No. 520,688.

To all whom it may concern:

Be it known that I, EDMUND GARSIDE, a subject of Great Britain, residing at Darlington, in the county of Durham, England, have invented new and useful Improvements in Starting-Switches for Electric Motors, of which the following is a specification.

This invention relates to starting switches for electric motors of that class in which a series of resistances are gradually cut out of the motor circuit when the current is first switched on and in which the switch is held on by a "no volt" release, and has for its object the arrangement and construction of such a switch in a simple and effective manner, with no risk of derangement and for operation by a simple push of the switch lever into the "closed" position.

In order that the invention may be the better understood, I will now proceed to describe the same in relation to the accompanying drawing, reference being had to the letters marked thereon.

Figure 1 is a side view of a switch constructed according to this invention, being shown open in full lines and closed in dotted lines. Fig. 2 is a detail sectional view of the dash-pot arrangement. Fig. 3 is a front elevation of Fig. 1, the switch being shown in its open position.

To carry the invention into effect I mount upon the base *a* of the apparatus a straight guide or rod *a'* upon which slides a crosshead *b* adapted to be operated slidingly on the said rod by a pair of toggle levers *c d*, one of which *d* is the switch lever. Upon the base *a* is also arranged a series of resistance contacts *f* over which a movable contact *g* is adapted to slide in a line parallel with the crosshead *b*, the motion of the said crosshead being transmitted to the movable contact *g* through a spiral spring *h*. To the movable contact *g* is attached a dash-pot arrangement *i* preferably arranged on the crosshead guide *a'*, the piston *j* of such dash-pot being a non-return valve so that the movement of the movable contact *g* over the resistance contacts *f* is made slowly in one direction while the return stroke can be made quickly and without any influence from the dash-pot.

When the toggle levers *c d* are in the

"open" position as shown in full lines they form nearly a right angle with each other so that considerable pressure has to be exerted to overcome the pressure of the spring *h* situated between the crosshead *b* and movable contact *g* but when once the static friction has been overcome the switch lever *d* quickly flies into the "closed" position as shown in dotted lines owing to the reduction in the resistance to motion due to the increase of mechanical leverage. When the main switch *k* is closed and held on by the "no volt" release *l* the toggle levers *c d* are practically straight with one another thus destroying the power of the spring pressure to pull the switch into the "open" position.

The operation of the switch is as follows: Assuming it is open as shown in full lines, the switch lever *d* is pushed into the "closed" position as shown in dotted lines and is held on there by the "no volt" release *l*, this action is done quickly and during such action the crosshead stresses the spring *h* which tends to draw the movable contacts *g* over the resistance contacts *f* to cut out the resistance but such movement is controlled by the dash-pot *i* and is slow in character. When the switch is opened by short circuiting the "no volt" release *l* the piston valve arrangement *j* in the dash-pot *i* allows the liquid to be quickly displaced from one side of the piston to the other and give a quick return. If necessary a spring *m* may be employed in order to insure a quick return to the "open" position, the said spring being attached at one end to the dash-pot and at the other to some stationary part of the device.

I claim:—

An electric motor starting switch consisting of in combination a pivoted switch arm carrying a main circuit closing device, a series of resistance contacts, a movable contact device adapted to slide over said contacts, a dash-pot adapted to control the movement of the said contact device in cutting out resistance, a crosshead adapted to slide parallel with said contact device, a spring disposed between the said contact device and said crosshead, toggle levers of which one is the said switch arm connected to the crosshead and arranged so that their

leverage over the spring reaction is least at the open position of the main switch and gradually increases to maximum at the closed position and a "no volt" release device to hold the main switch closed when
5 current is on, substantially as described.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

EDMUND GARSIDE.

Witnesses:

JOHN WILLIAM SHAW,
WILLIAM CHARLES FLETCHER.