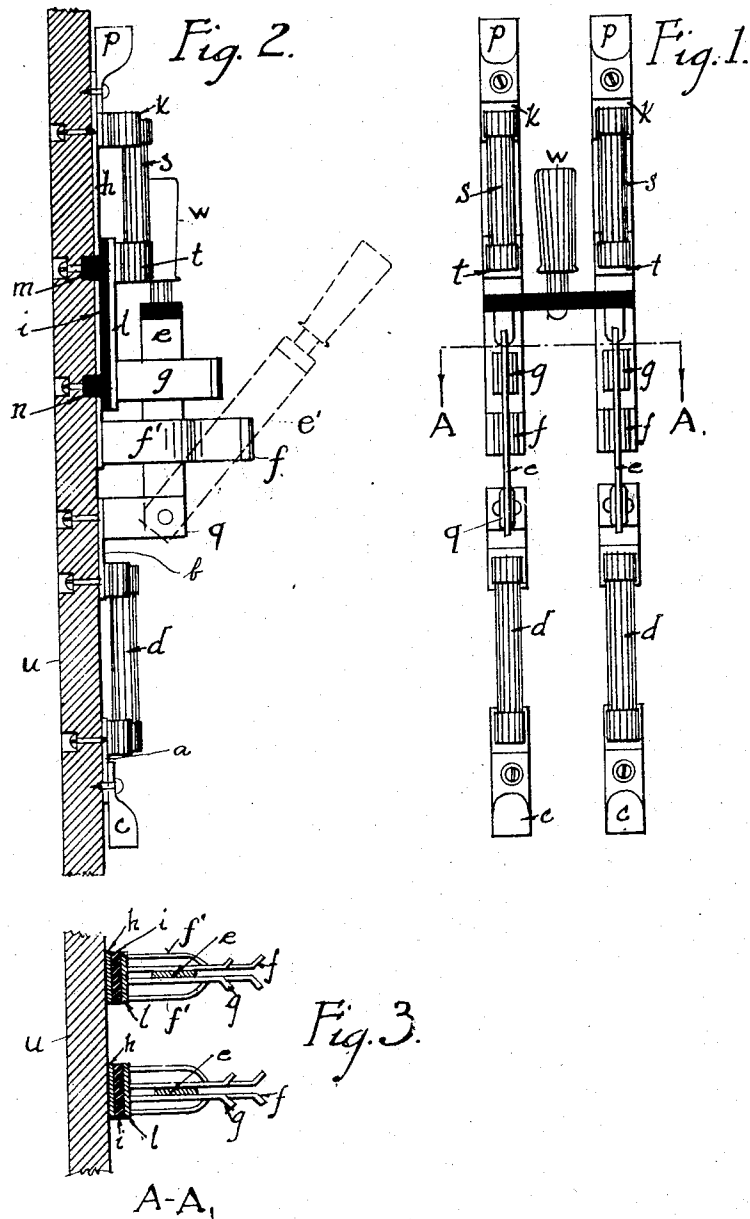


W. MUIRHEAD, JR.
TWO STEP KNIFE SWITCH.
APPLICATION FILED APR. 26, 1911.

1,005,060.

Patented Oct. 3, 1911.



WITNESSES:

Wm. Muirhead
Ed. Rosen

INVENTOR

William Muirhead, Jr.

BY

J. A. Rosen
ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM MUIRHEAD, JR., OF NEW YORK, N. Y.

TWO-STEP KNIFE-SWITCH.

1,005,060.

Specification of Letters Patent.

Patented Oct. 3, 1911.

Application filed April 26, 1911. Serial No. 623,523.

To all whom it may concern:

Be it known that I, WILLIAM MUIRHEAD, Jr., citizen of the United States, and resident of 973 Stebbins avenue, New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Two-Step Knife-Switches, of which the following is a specification.

My invention relates to knife switches used for motor control.

The objects of my invention are, first, to shunt the motor-running fuses during the starting-current period; and, second, to maintain the circuit continuous during the change from the starting step to the running step.

In the drawings accompanying and forming part of this specification, and in the description of the drawings, I have shown my invention in its preferred form, and have shown what I deem to be the best mode of applying the principles thereof; but it is to be understood that, within the scope of the appended claims, I contemplate changes in form, proportions, and materials, the transposition of parts, and the substitution of equivalent members, without departing from the spirit of my invention.

Figure 1 is a front elevation of a switch made in accordance with the principles of my invention. Fig. 2 is a side elevation, showing one method of mounting, and showing the blade in dotted outline in starting position and in full outline in running position. Fig. 3 is a cross section on a plane indicated by the line A-A in Fig. 1.

Similar reference characters indicate like or corresponding parts throughout the several views.

u is the base, made of any suitable material, shape, and size, on which the several parts are mounted.

c is a lug to which the wire or other conductor is connected, the current passing thence through a plate *a*, the fuse *d*, plate *b*, standard *g* and to the blade *e*, which is pivoted to the standard. Plates *a* and *b* are merely convenient electrical connections; and the fuse *d* is of sufficient carrying capacity for motor inrush current. The contact springs *f*, mounted on the plate *h*, are spread farther apart in their lower section, as shown at *f'*, than in their upper section where they are adapted to engage the blade, so that the initial closing movement of the blade will

make electrical connection with the contacts and the further and complete closing movement will leave the blade out of contact therewith. The wire or conductor may be connected with the plate *h* through the terminal lug *p*. The jaw or contact springs *g*, *g* are mounted on the copper strip *l*, which is mounted on and insulated from the base, as by means of the insulation *i* and insulating bushings *m*, *n*. This jaw is adapted to engage the blade after its initial engagement with the contacts *f*. The parts are so arranged with relation to each other that on initial closing movement, that is, the first step, the contact is formed between the blade and the contacts *f*; on further movement, and before the blade is out of contact *f*, the blade makes contact with the jaw *g*; and on still further movement, contact is broken at *f*, and maintained at *g*, this constituting the second step; the circuit remaining continuous through the switch while the blade is moved from the first to the second step. The fuse clip *t* is mounted on the strip *l* and insulated from the strip or plate *h*. The fuse clip *k* is mounted on and electrically connected with the strip *h*. The fuse *s* is mounted between the two clips.

It will now be understood that during the first step, the current will pass through the fuse *d*; that during the second step it will pass through the fuse *s*; and that it will be maintained continuously while the blade is passed from first to second step.

In actual use I contemplate that the fuse *d* shall be of greater carrying capacity than fuse *s*; that fuse *d* shall be of sufficient carrying capacity for motor inrush current; and that the capacity of fuse *s* shall be limited to the necessary running current.

In the drawings I have shown two switches, the blades being provided with a common handle *w*. But the invention may be applied to any number, one or more, to switches of any number of poles, and either front or back connected.

What I claim is:

1. The combination of a base, two fuses of different carrying power mounted thereon, a blade pivoted thereon, two contacts mounted thereon and so arranged with relation to the blade that on initial movement of the blade in closing said blade will connect with one of said contacts without connecting with the other contact, that on further and final closing movement said

blade will connect with the other contact and be disconnected from the first contact, and that it will be connected with both contacts in passing from the initial position to its final position; electrical terminals mounted on the base; and electrical connectors connecting one of said terminals with one of said fuses, connecting said fuse with the switch blade, connecting the initial contact with the other terminal, connecting the second contact with the other fuse and connecting said other fuse with said other terminal; whereby on initial movement of the switch the current is shunted around said second-named fuse.

2. The combination of a base, two fuses of different carrying power mounted on the face thereof, a blade pivoted on the face thereof, two contacts mounted on the face thereof and so arranged with relation to the blade that on initial closing movement of the blade said blade will connect with one of said contacts without connecting with the other, that on further and final closing

movement said blade will connect with the other contact and be disconnected from the first contact, and that it will be connected with both contacts in passing from the initial position to its final position; electrical terminals mounted on the face of the base; and electrical connectors connecting one of said terminals with one of said fuses, connecting said fuse with the switch blade, connecting the initial contact with the other terminal, connecting the second contact with the other fuse, and connecting said other fuse with said other terminal; whereby on initial closing movement of the switch blade the current is shunted around said second-named fuse.

Signed at New York city in the county of New York and State of New York this 20th day of March A. D. 1911.

WILLIAM MUIRHEAD, JR.

Witnesses:

JOHN ASHMEAD,
FRANK GEORGIO.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."