G. A. BURNHAM.

FUSE FOR ELECTRIC SWITCHES.

APPLICATION FILED JULY 1, 1915.

1,312,792.

Patented Aug. 12, 1919.

2 SHEETS—SHEET 1.

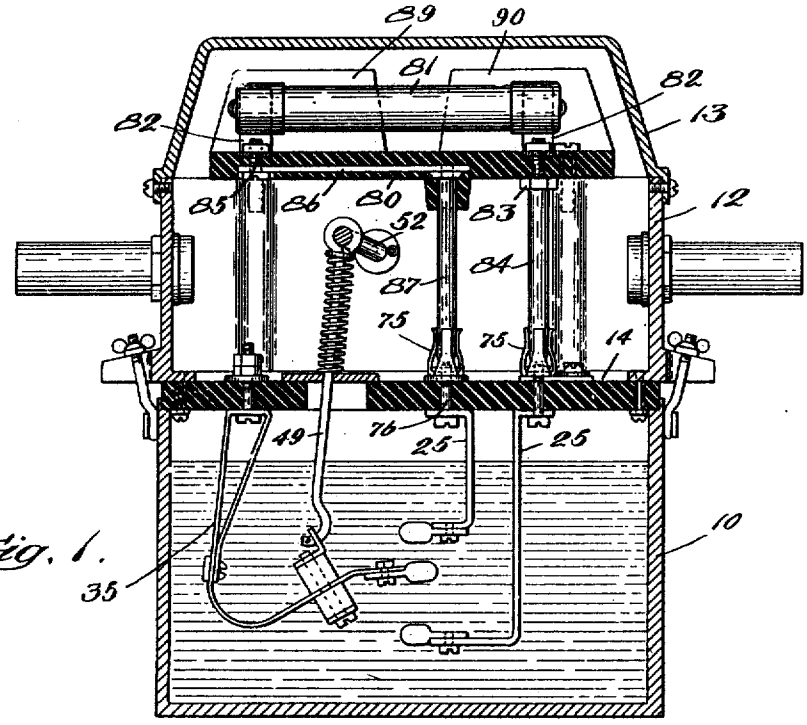


Fig. 1.

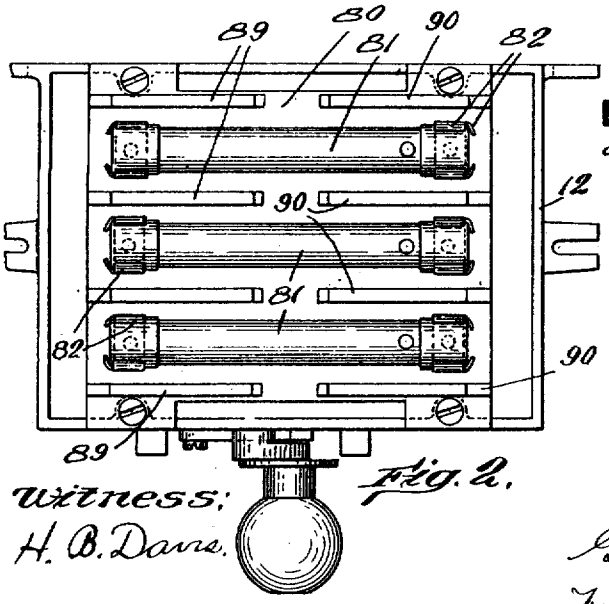


Fig. 2.

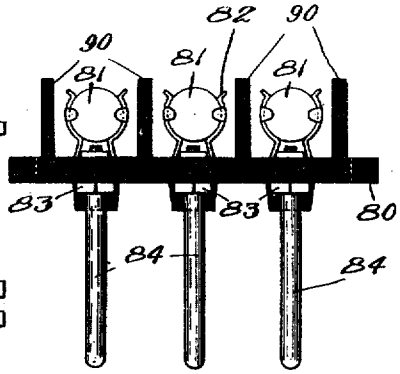


Fig. 3.

Witness:
H. B. Davis.

Inventor:
George A. Burnham
by Sayre & Harriman
Attys

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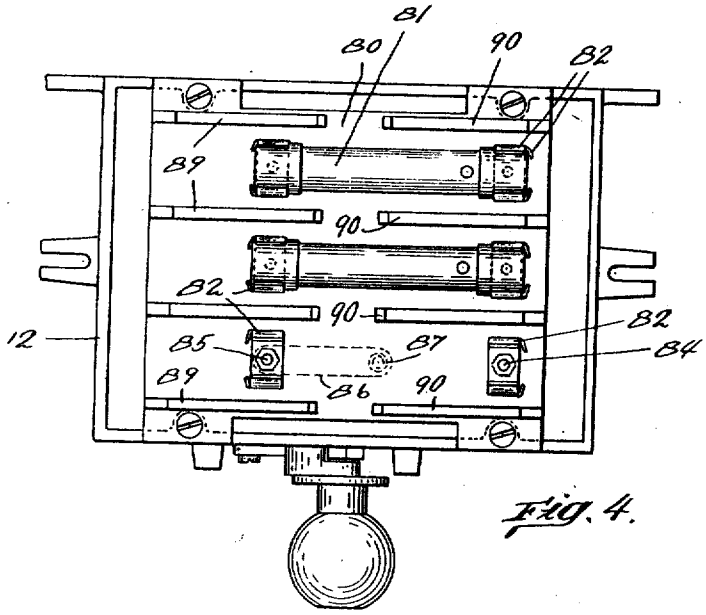


Fig. 4.

Inventor.
George A. Burnham
by
B. J. Noyes Atty

UNITED STATES PATENT OFFICE.

GEORGE A. BURNHAM, OF SAUGUS, MASSACHUSETTS, ASSIGNOR TO SEARS B. CONDIT, JR., OF BROOKLINE, MASSACHUSETTS.

FUSE FOR ELECTRIC SWITCHES.

1,312,792. Specification of Letters Patent. Patented Aug. 12, 1919.

Application filed July 1, 1915. Serial No. 37,606.

To all whom it may concern:

Be it known that I, GEORGE A. BURNHAM, a citizen of the United States, residing at Saugus, in the county of Essex and State of Massachusetts, have invented an Improvement in Fuses for Electric Switches, of which the following is a specification.

This invention relates to electric-switches having fuses associated with them, adapted for use as motor starting switches and has more particular reference to the construction and arrangement of the fuse holding means. In my application #16,773, filed March 24, 1915, there is shown an electric-switch of this type well adapted for illustrating my invention, and the fuses are arranged in a compartment by themselves, which is separated from the compartment containing the switch-members.

The demand calls for switches of different voltage capacities, and it is practicable to make a standard switch which is suitable for capacities varying from, say 250 to 600 volts, but the fuses which are associated with the switches must be of capacities corresponding to the voltage of the circuit with which the switch is connected.

With fuses of different voltage capacities, the length of the fuse varies, while the diameter may remain constant, and with a fuse of say, 600 volts the length is considerably greater than with a fuse of a lower voltage capacity such, for instance, as 250 volts.

Switches are commonly constructed with members between which the fuse is to be connected which are spaced an unvariable distance apart, which distance cannot be conveniently changed after the switch has been constructed. Consequently the switch, although its stationary and movable switch members and other components are so constructed and arranged that the switch may be safely operated on different circuits, the voltages of which may be considerably different, is limited to the particular voltage determined by the initial spacing of the members between which the fuse is connected.

Consequently this invention has for an object the provision of means whereby fuses of differing lengths may be electrically connected between terminals or connecting members spaced a fixed and unvariable distance apart.

This object is attained in the provision of a plurality, or series, of different fuse holders, each holder adapted to receive and hold a fuse of a certain voltage capacity and therefore of a certain fixed length, and all of which have terminal extensions spaced the same distance apart for connection with switch components and with the electric circuit. To condition the switch for operation upon circuits of differing voltages it is merely necessary to replace one fuse holder by a different fuse holder having fuse clips spaced a different distance apart and having fuses of the necessary length.

Figure 1, is a vertical section of a double-throw motor starting-switch embodying this invention.

Fig. 2, is a plan view of the fuse-carrying plate arranged to receive and hold fuses of a certain length.

Fig. 3, is an end view of the fuse-carrying plate.

Fig. 4 is a plan view of a fuse-carrying plate arranged to carry fuses of a length different from that for which the plate of Fig. 2 is adapted, but otherwise similar to that shown in Fig. 2.

The fuse holding structure embodying my invention is contained in the inclosing casing of a switch of the type specified which comprises a compartment 12, a cover 13, a heavy bottom-plate 14 of insulating material, such as slate, secured to its vertical wall, and an oil-containing receptacle 10, preferably detachably connected to said compartment. It is obvious that the fuse holding structure may be entirely independent of any switch structure if desired. Said plate 14 serves as a carrying-plate for the switch elements, which are arranged beneath it, and for terminal connections for the fuses which are arranged above it. These terminal connections are here shown as each comprising a group of spring-fingers 75, arranged on the plate and secured in position by bolts 76, or other means extended through the plate and connected with the stationary switch-members thereabeneath, said groups of spring-fingers forming upright yielding sockets which are

spaced apart a distance determined by the spacing of the stationary switch members. 25, which spacing cannot be conveniently varied. The self-contained fuse-carrying element will now be described.

An insulating plate 80 is arranged in the compartment and inclosed by its cover, which is secured to the upright side-wall of said compartment at the top, see Fig. 2, and said plate is arranged to support the fuses 81 of a certain voltage capacity and length, it having fuse-holders 82, arranged upon it of any usual or suitable form for detachably holding the fuses, there being one pair of fuse-holders for each fuse, and three pairs being here shown. The fuse holders of any particular plate are secured thereon a fixed distance apart, but the distance between fuse holders, in any two plates, may vary. One of the fuse-holders of each pair is connected with the plate 80 by a bolt 83, having its head formed as a long terminal pin 84, which extends vertically in a downward direction, said pin being made long enough to engage one of the yielding sockets 75. The other fuse-holder of each pair is secured to the plate 80 by a bolt 85, and a conducting-strip 86, is arranged in or beneath the plate 80, one end of which is arranged on said bolt, and said strip extends in a direction toward the other fuse-holder of the pair, and a long terminal pin 87 is connected to the other end of said plate, said pin extending vertically downward far enough to engage the other yielding socket 75, thus electrical connection is provided between a pair of fuse-holders and a pair of yielding sockets, which it will be understood, are electrically connected with a pair of stationary switch-members of a double-throw switch. The fuse-holders of each pair are widely spaced apart to receive fuses of large capacity, and the terminal connections for the switch-members are arranged near together relative to the spacing of the fuse holders but it is understood that while the distance between the terminal connections is fixed and is equal to the distance between the sockets 75 yet the distance between the fuse clips or holders 82 may be varied in different fuse-holding plates to provide for the holding of different lengths of fuses. The plate 80 has arranged on its upper side upright walls 89 and 90, of insulating material between the several fuses. It will be noted that the terminal-pins 84 and 87 slidably engage the yielding sockets, represented by the groups of spring-fingers 75, but while this structure is preferable it is not a necessity, but is employed particularly in this instance as it provides for easily and cheaply electrically connecting the fuse-holders, which are supported by the plate 80 with the switch-members.

Fig. 4 shows a fuse holder adapted to receive fuses of a length different from those adapted to be received by, but otherwise similar to, the fuse holder above described and adapted to replace said plate to condition the switch for operation upon a circuit of a different voltage, and the switch itself may be of a standard form and capacity. It is understood with each fuse holder the terminal pins will all be spaced the same distance apart but that the fuse clips will be spaced different distances apart to receive fuses of different lengths and the fuse clips on any plate will be spaced a fixed definite distance apart to receive fuses of a different length.

In the structure here shown, 25, 25, represent the stationary switch-members of a double-throw switch, 35 the movable switch-member, arranged in the oil receptacle 10, 49 a link connecting said switch-member with an oscillating crank-shaft 52, which is adapted for oscillation by any suitable means, and is arranged in the compartment above the oil receptacl This switch is substantially the structure shown in my application aforesaid, but is intended to typify any form of double-throw switch with which the fuse-carrying attachment, here shown, may be associated. It will be noted that the fuse-carrying plate 80 is arranged in the compartment above the operating means, being thus supported to enable the employment of a longer fuse-carrying plate in a small compartment, wherein, for compactness of parts, a large portion is occupied by the operating means, and that the long terminal pins 84 and 87 are closely associated and arranged at one side of the operating means, so as to make direct connections with the sockets 75, 75, which are in turn directly connected with the stationary switch members which are contained in the oil receptacle. Furthermore, it will be noted that the fuse-carrying plate is arranged at the top of the compartment in which the operating means is arranged, and above said means, so that the fuse which is supported by it is readily accessible upon lifting the cover 13, of said compartment.

I claim:—

1. A series of fuse holders, all of the fuse holders of the series adapted to receive fuses of definite lengths and the length of the fuse adapted to be received by any fuse holder differing from the lengths of the fuses adapted to be received by all other fuse holders of the series, each fuse holder comprising a base of insulating material, terminals thereon spaced a fixed distance apart, which distance is the same for all fuse holders of the series, and fuse clips electrically connected with said terminals, the fuse clips of each fuse holder of the

series spaced a fixed distance apart, which distance is different for all fuse holders of the series.

2. A protective device comprising an inclosing casing, a cover therefor, an insulating plate arranged in said casing, and disposed considerably below the top thereof, two members carried by said plate, and a detachable fuse holder arranged within said casing comprising an insulating base, fuse clips arranged thereon to receive a fuse, terminal pins connected with said fuse clips depending from said base and arranged for detachable connection with said members, said fuse holder being supported in said casing above said insulating plate and immediately beneath said cover for access to a fuse carried thereby upon removal of said cover, said fuse holder detachably engaging said members for removal from said casing.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE A. BURNHAM.

Witnesses:
B. H. AHLERS,
E. F. LAWRENCE.