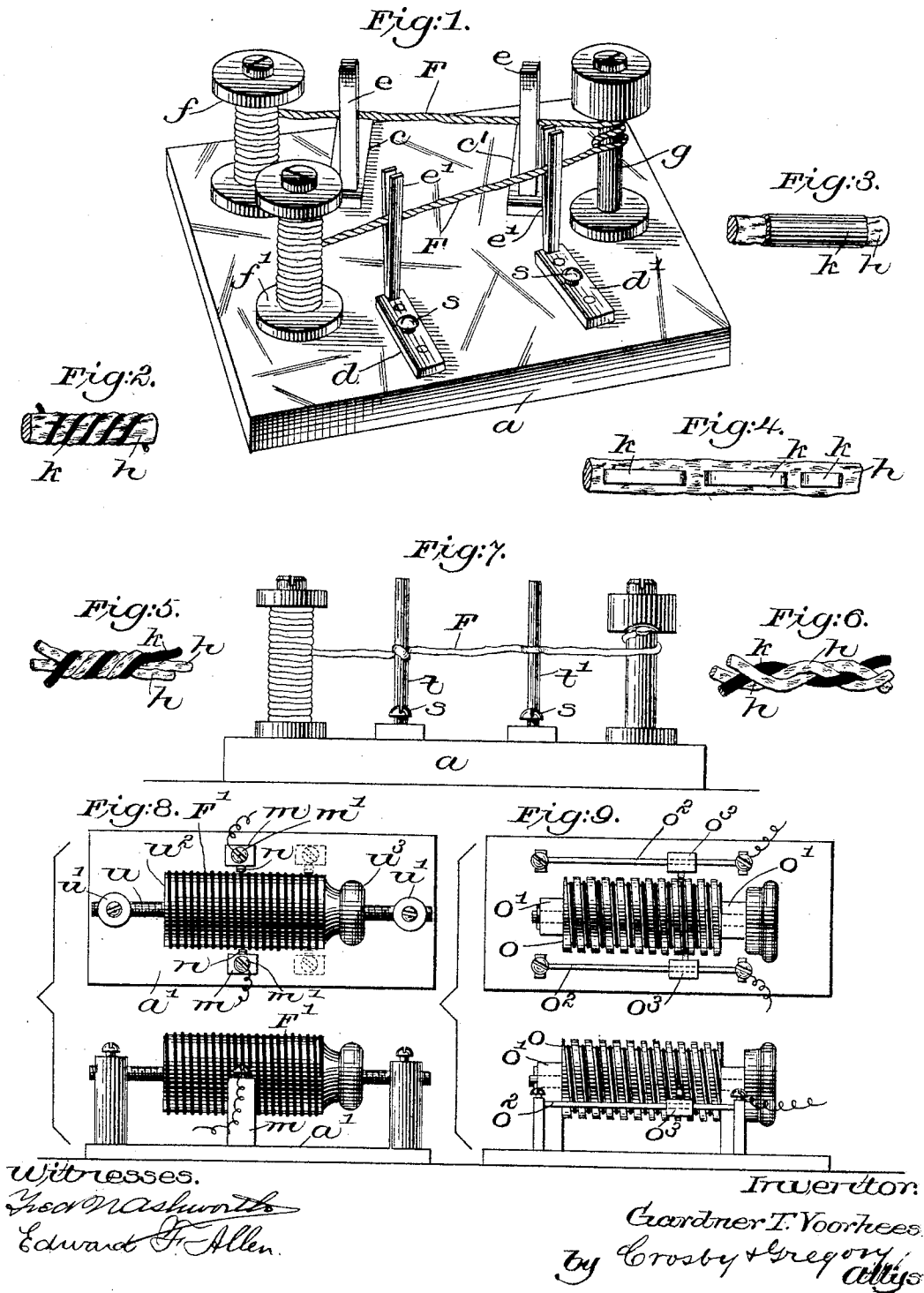


(No Model.)

G. T. VOORHEES.
RELAY FUSE BLOCK.

No. 499,485.

Patented June 13, 1893.



UNITED STATES PATENT OFFICE.

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RELAY FUSE-BLOCK.

SPECIFICATION forming part of Letters Patent No. 499,485, dated June 13, 1893.

Application filed August 23, 1892. Serial No. 443,909. (No model.)

To all whom it may concern:

Be it known that I, GARDNER T. VOORHEES, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Relay Fuse-Blocks, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In the various branches of electrical work requiring some kind of a fuse device to protect the apparatus from injury by an abnormally high current or a short circuit, much time and labor has been expended upon the production of a fuse simple in construction, yet highly effective, and which may be readily replaced when blown out. So far as known to me, however, the many devices now in use are difficult of access when the fuse has been blown out, or are of complicated construction, and even what are known as multiple fuse blocks are short lived.

It is the object of this my invention to produce a relay fuse block possessing great simplicity of construction and ease of access under any and all conditions, and which shall be substantially continuous in its operation, as will be hereinafter described.

Figure 1 represents in perspective one form of fuse block embodying my invention, adapted for use with an incandescent electric light. Fig. 2 is an enlarged view of a portion of the fuse shown in Fig. 1. Figs. 3 to 6 inclusive, are enlarged views showing different forms of fuse. Fig. 7 in side elevation shows a modified form of fuse block. Fig. 8 in plan and side elevation, represents another modification, and Fig. 9 also in plan and side elevation, represents yet another modification, to be described.

As herein shown, the base *a* composed of hard rubber or other suitable insulating material, has attached thereto by suitable screws line terminals *c* and *d*, and at a short distance therefrom lamp terminals *c'*, *d'*, each terminal being provided with a suitable binding screw *s*. Electrically connected to the terminals are spring like contacts *e*, *e'*, each of said contacts being composed of two spring-

like metallic strips soldered or otherwise held at one end to each other and to the terminals. 50

Adjacent to and beyond each line terminal I have shown a spool or reel *f*, *f'*, free to rotate upon spindles inserted in the base *a*, and a similar spool or reel *g* is mounted beyond the lamp terminals, as best shown in Fig. 1. A quantity of the fuse *F*, to be described, is wound upon the spool *f*, and passed between the contact strips *e*, as shown, and thence to the spool *g* to which the free end of the fuse is secured, and another fuse is similarly wound upon the spool or reel *f'*, passed between the contacts *e'*, and its free end also secured to the spool *g*. 55 60

The fuse is composed of a carrier strip *h*, of non-combustible material which is also a non-conductor of electricity, and which is shown in Fig. 1 as flexible, and a wire or ribbon of some fusible material. I connect the fuse wire or ribbon *k* to this carrier strip, either by completely inclosing the carrier therewith, as in Fig. 3, or by wrapping it spirally around the carrier strip as a core, as in Fig. 2, or by twisting or braiding several carrier strips and a fuse wire or ribbon together, see Figs. 5 and 6, or I may attach separate pieces of fuse wire or ribbon to the carrier, as shown in Fig. 4, in the latter case the length of each piece being somewhat greater than the distance between the terminal contacts of the fuse block with which the fuse is to co-operate or I may make use of any other convenient mode of combining the fuse and carrier strip. 65 70 75 80

I have found in my experiments that asbestos makes a very efficient carrier strip, it possessing the properties of incombustibility and flexibility, and it is a non-conductor of electricity, but I do not wish to restrict myself to the use of asbestos, nor to a flexible carrier strip, as the same can be made of other non-conducting and incombustible materials, such as porcelain or gutta-percha, and the carrier strip need not necessarily be wound upon spools or reels. 85 90

Viewing Fig. 1, it will be seen that the fuse is supported by the spools or reels be-

tween and in electrical contact with the line and lamp terminals, and that by rotating the reel *g* the fuse is drawn off from the reels *f*, *f'*, presenting successive portions between the line and lamp terminals, and completing the circuit therebetween. Should an abnormally high current pass over the line, or should the line become short-circuited it would blow out the metallic portion of the fuse between a line and a lamp terminal, and in order to remove the old and insert a new fuse all that is necessary is to rotate the reel *g* until a new section of the fuse is drawn from the reel *f* and held between the contacts. The part of the fuse wound upon the spools *f*, *f'*, constitutes the relay, from which a sufficient length is drawn from time to time to extend from one to the other terminal contact.

In Fig. 7 a modified form of fuse block is shown, only two terminals *t* and *t'* being therein shown, each being composed of an up-turned lug or post, preferably cylindrical, the fuse being represented as wound once around the post of the terminal *t*, and as partially extended around the post of the terminal *t'*. It will be readily seen that the life of a fuse block, as herein described, will be greatly extended, for a large quantity of fuse may be wound upon a reel or spool and occupy a very small space. The whole device may be inclosed in a suitable casing or box to protect the parts from injury.

In Fig. 8 a modified form of fuse block is shown, in plan and side elevation, wherein a threaded rod *u* is securely held by supports *u'* rising from the base *a'*, upon which rod and engaging the thread thereof is mounted a cylinder *w* of incombustible and insulating material provided at one end with a suitable head *w³* by which to rotate it, and having a spiral groove of low pitch in its cylindrical surface, in which groove is placed and held the fuse wire *F'*, the pitch of the threads on the rod and cylinder being the same. Line terminals *m*, *m*, each provided with a binding screw *m'*, are secured to the base on opposite sides of said cylinder, to which terminals the yielding contacts *n*, *n*, are secured. As shown in Fig. 8, said contacts bear upon the wire at substantially opposite points, and include between them less than a complete turn of the fuse wire, so that a complete revolution of the cylinder will bring an entirely new portion of wire between the contacts, the cylinder at such time moving longitudinally along the rod *u*. The portion of wire between the contacts constitutes the fuse, and when blown out by a high current or a short circuit, a new portion of wire is brought between and into co-operative position with the contacts, by rotating the cylinder, thus replacing the fuse blown out, by a new one. In said Fig. 8 I have shown by dotted lines two other terminals, which may be used in connection with

the line wire and a lamp circuit, as described in Fig. 1. When both pairs of terminals are used the fuse wire on the carrier would be severed at substantially its central point, each half then operating as the relay fuse for one pair of terminals.

Fig. 9 shows in plan and side elevation yet another modification of the device shown in Fig. 1, wherein the cylindrical carrier *o* is mounted to rotate in suitable standards *o'*, said carrier having cut in it a spiral groove, the fuse wire or ribbon being secured to the carrier in the bottom of said groove. Guides *o²* extend along each side of the carrier, on which slide the contacts *o³*, the extremities thereof engaging the groove in the carrier, rotation of the latter moving the contacts upon the guides, thereby bringing successive portions of the fuse between the contacts. The line wires are attached to the guides by binding screws in usual manner. It will be understood that the base of the fuse block is composed of insulating material.

This invention is not restricted to the particular construction of parts as herein shown and described, as I consider any means for bringing successive portions of a continuous or relay fuse between and into operative contact with the terminals as coming within the scope of my invention.

I claim—

1. A continuous fuse, of conducting material a movable carrier supporting the fuse throughout its length, and terminals in electrical contact with intermediate points thereof, substantially as described.

2. A continuous flexible fuse, a movable carrier supporting the fuse throughout its length, and terminals in electrical contact with intermediate points thereof, substantially as described.

3. A continuous fuse, a conducting material a movable carrier therefor, coextensive with and supporting the fuse throughout its length, and contact terminals in electrical contact with said fuse, combined with means to move said fuse carrier and the fuse supported thereby with relation to the terminals, and thereby present new and successive portions of the continuous fuse to and thereby complete the circuit between the terminals, substantially as described.

4. A continuous fuse, of conducting material combined with a carrier by which said fuse is held and supported throughout its length, and contact terminals in electrical contact with intermediate points on said fuse, whereby the circuit between the terminals is closed, movement of the carrier and the positively connected fuse presenting successive portions thereof to co-operate with said terminals and complete the circuit, substantially as described.

5. A continuous fuse, of conducting material and a carrier supporting the fuse through-

out its length, combined with contact terminals therefor in electrical contact with intermediate points on the fuse, relative movement of the carrier and terminals presenting successive portions of the fuse to, and to complete the circuit between, the terminals, substantially as described.

5 6. An electric fuse consisting of a flexible non-electric-conducting carrier strip, and a

fusible material carried thereby, substantially as described.

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

GARDNER T. VOORHEES.

Witnesses:

GEO. W. GREGORY,
JOHN C. EDWARDS.