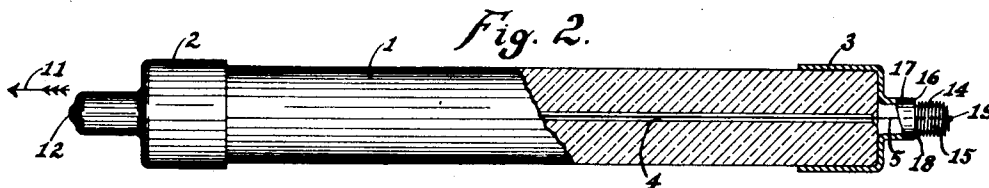
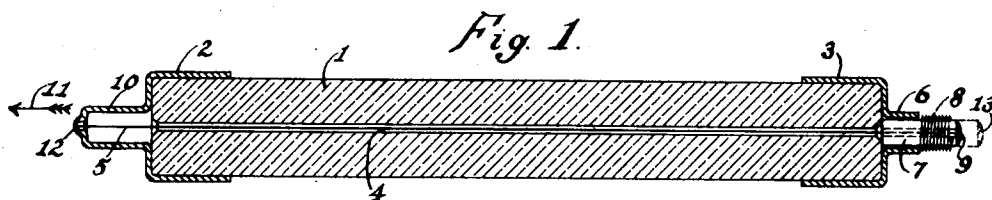


F. B. COOK.
 AUTOMATIC SELF INDICATING FUSE.
 APPLICATION FILED MAR. 1, 1909.

942,248.

Patented Dec. 7, 1909.



WITNESSES:

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AUTOMATIC SELF-INDICATING FUSE.

942,248.

Specification of Letters Patent.

Patented Dec. 7, 1909.

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To all whom it may concern:

Be it known that I, FRANK B. COOK, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Automatic Self-Indicating Fuse, of which the following is a specification, reference being had to the accompanying drawings, illustrating same.

My invention relates to devices for automatically indicating the condition of electrical fuses, that is, whether the fuses are in condition to be blown or whether they have been blown, my principal objects being to provide an improved device of this character which is very simple in construction and very efficient in its operation, and to provide an improved fuse wire for such a device, which permits same to be made so as to blow on a very small amperage.

Other objects will be apparent from the following specification.

In the accompanying drawings illustrating the preferred form of my invention, Figure 1 is a longitudinal cross-sectional view of an inclosed fuse provided with the device of my invention; Fig. 2 is a similar view of a modified form of the invention shown in Fig. 1, with portions shown in elevation; and Fig. 3 is a transverse cross-sectional view of the improved fuse wire of the invention.

Like characters refer to like parts in the several figures.

The invention comprises spring mechanism normally held under tension by the fuse wire so that when the latter is fused or disrupted the spring mechanism will operate and thus indicate the disruption of the fuse wire. In the preferred form of my invention I preferably attach the spring mechanism to one end of the fuse wire and then by pulling on same place the spring mechanism under tension, or in a set position, in which position the fuse wire is soldered or secured to the opposite end of the fuse so that when the fuse wire is blown or severed at any point it will release the spring mechanism and cause the latter to spring out from the end of the fuse and thus indicate that the fuse is disrupted.

In Fig. 1 of the drawings, 1 represents a tubular casing preferably of porcelain or some other suitable insulating material, and 2 and 3 represent suitable metallic end caps for the casing 1. The casing 1 has a small

longitudinal bore 4 therethrough through which the fusible conductor or fuse wire 5 extends. The cap 3 is preferably formed with a small hollow cylindrical portion 6 thereon in which a metallic plunger 7 is located, the plunger 7 being conductively connected with the portion 6 by a coil spring 8 which surrounds the plunger 7 and is soldered to these parts preferably as shown. The fusible conductor 5 is attached to the outer end of the plunger 7 at 9, preferably by solder, and is then extended through the bore 4 in the casing 1 and through the neck-like portion 10 of the cap 2. To set the apparatus for operation the fusible conductor 5 is pulled in the direction of arrow 11 until the coil spring 8 is compressed as shown in Fig. 1, whereupon the fusible conductor is soldered to the neck-like portion 10 of cap 2 at 12. Now when the fusible conductor 5 is blown or disrupted in any manner the plunger 7 is released whereupon the coil spring 8 automatically springs out away from the end cap 3 and thus moves the plunger 7 to the position 13 shown in dotted lines. When the plunger 7 is seen in the position 13 it is known that the fuse wire 5 is blown or that it is disrupted.

In order to re-fuse the device and set same for operation it is only necessary to supply a new fuse wire 5 thereto, soldering same to the plunger 7 at 9 and then stretching the wire 5 through the fuse casing 1 in the direction of arrow 11 and soldering it at 12. It will be readily seen that the device may be reset and operated as many times as desired.

In order to properly utilize this invention it is necessary to employ a fuse wire having considerable tensile strength, so that it may be pulled upon considerably to set the device for operation and also be able to stand the stress of the operating spring for a long period without being disrupted. In such indicating fuses which are required to operate on a very small amperage, say $\frac{1}{4}$ of an ampere, the ordinary soft lead fuse wire cannot be used, because the tension put upon the wire in setting the indicating device will rupture the wire. Neither is it advisable in some such fuses to employ a fuse wire of high resistance. As a fuse wire to overcome these objections and meet the required conditions I preferably employ in this invention the double-metal fuse wire described in my copending application for Letters Patent on individual protector, Serial No. 437,722, filed

June 10, 1908. This fuse wire has a steel core 20 to give great strength to the wire and a copper sheath or covering 21 surrounding the core to give high conductivity to the wire. The copper sheath also protects the steel core from corrosion or deterioration. The advantages of such a wire in such a device can be readily seen.

The double-metal wire used in this invention is preferably made by rolling or drawing it from a steel ingot having a copper jacket placed therearound.

In the device shown in Fig. 2 there is no indicating plunger employed, this device consisting merely of a coil spring 14 suitably mounted on a small hollow cylindrical portion 15 having a shoulder at 16 and a somewhat larger cylindrical portion at 17, the spring 14 being soldered to the shoulder 16 at 18. In this device the fusible conductor 5 is soldered to the spring member 14 at 19. The spring member 14 is compressed as shown in Fig. 2 when the fusible conductor 5 is pulled in the direction of arrow 11, the same as in the device shown in Fig. 1. When the spring member 14 is suitably compressed, the fuse wire 5 is soldered to the end cap 2 at 12 as hereinbefore stated, which sets the device for operation. When this device operates, that is, when the fusible conductor is blown or becomes disrupted, the coil spring 14 is simply released whereupon it springs out away from the end cap 3 and thereby indicates that the fuse wire is disrupted. This device may be reset for another operation by supplying a new fuse wire 5 thereto, first soldering the fuse wire to the spring 14 at 19, then pulling the fuse wire 5 through the fuse casing in the direction of arrow 11 sufficiently to compress the spring 14, and then soldering the fuse wire 5 to the cap 2 at 12.

In the fuse of this invention the coil spring keeps the fuse wire stretched tightly

and therefore keeps the wire away from the sides of the bore 4 in the casing 1, if the bore 4 is not too small in diameter. This construction causes the fuses to blow very uniformly because the heat is not conducted away from the fuse wires through the fuse casings, as is the case with ordinary fuses in which the heat is conducted away from the fuse wires very ununiformly.

I do not wish to limit this invention to all of the particular details of construction herein shown, as many modifications in same may be made without departing from the scope of the appended claim.

What I claim as my invention is:

A fuse of the character described having a casing for the fusible conductor and metallic end caps on the casing, at least one of the end caps having a hollow outwardly-projecting hub thereon, a metallic plunger carried within the said hub and movable therein, a coil spring encircling the said plunger and being conductively attached to the latter and to the said hub, and a fusible conductor extending through the said casing and through the said plunger and being attached to the outer end of the latter, the said fusible conductor being normally under tension whereby the coil spring is held under compression to normally hold the said plunger down into the said hub, the fusing of the fusible conductor releasing the said coil spring and thereby permitting same to extend itself and thus move the said plunger outwardly, relatively to the said hub, for purposes substantially as described.

As inventor of the foregoing I hereunto subscribe my name the 24th day of February, 1909.

FRANK B. COOK.

Witnesses:

FREDERICK R. PARKER,
FRANCES K. PARKER.