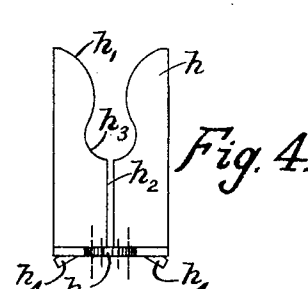
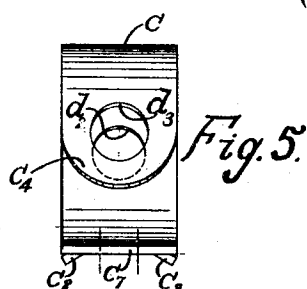
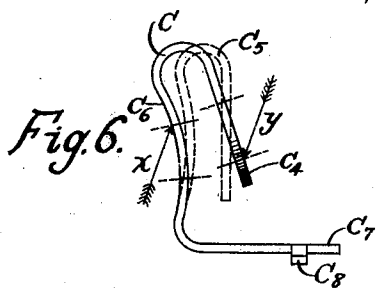
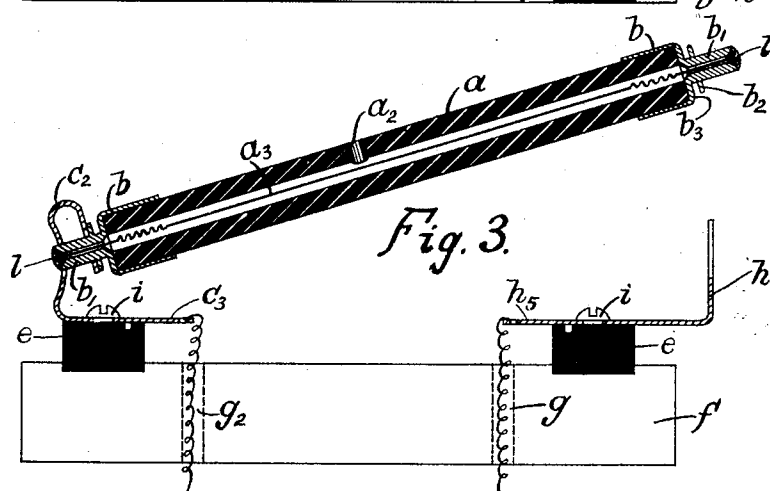
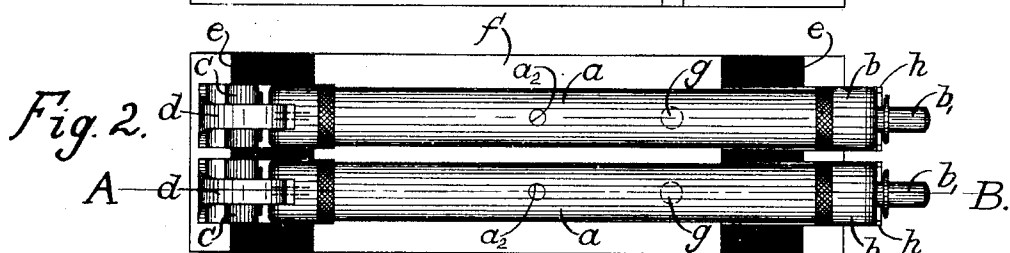
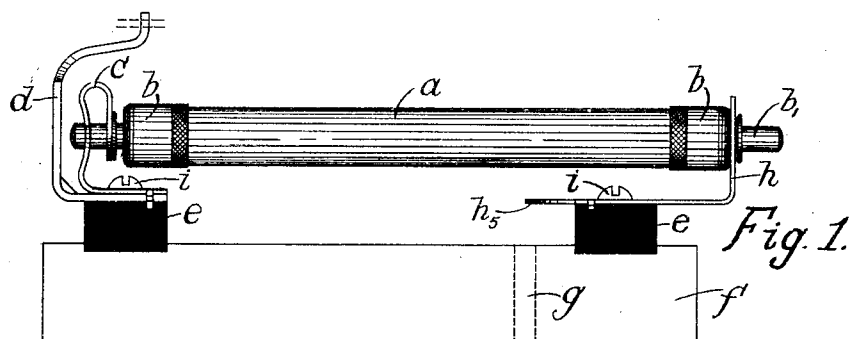


F. B. COOK.
ELECTRIC FUSE.

APPLICATION FILED JULY 9, 1904.



Witnesses:

Frederick R. Parker.
Harry B. Elmer

Inventor:

Frank B. Cook.

UNITED STATES PATENT OFFICE.

FRANK B. COOK, OF CHICAGO, ILLINOIS.

ELECTRIC FUSE.

No. 802,736.

Specification of Letters Patent.

Patented Oct. 24, 1905.

Application filed July 9, 1904. Serial No. 215,942.

To all whom it may concern:

Be it known that I, FRANK B. COOK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Electric Fuses, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to a fuse, the general characteristics of the fuse proper being similar to those shown in my patent on fuses, No. 711,921, dated October 21, 1902. In this patent the fuse proper, consisting of the fuse-wire and tubular casing, is shown and claimed. Therefore it is the object of the present invention to provide improved means whereby such fuses may be better adapted to the various electrical circuits and conditions for which they are intended and at the same time to maintain simplicity of construction.

Another object is to provide an improved arrangement whereby fuses may be readily, easily, and substantially put in place in electrical circuits and readily and easily replaced by others should the first have served their purpose as fuses.

A third object is to provide an arrangement of contact-springs for a fuse whereby the ends of the fuse are substantially clamped to the said contact-springs without the aid of nuts, pins, &c., generally used.

As will be hereinafter shown, the arrangement as disclosed in this invention provides a fuse which may be effectually used under all conditions where a fuse is desirable either on inside or outside circuits. The simplicity of the operation of replacing a fuse of the type herein described is a very desirable and much-needed improvement.

Another advantage is the safety of the person replacing the fuse, as one end only of the fuse need be touched and then not necessarily on the conducting-surface. In high-voltage circuits this is a very desirable arrangement.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 is a view showing the side elevation of a fuse and its clamping-springs mounted on a suitable base or support. Fig. 2 is a top view of Fig. 1, showing a pair of fuses mounted side by side. Fig. 3 is a cross-sectional view of a fuse and its connecting apparatus with portions shown in elevation, taken on line A B of Fig. 2, and showing one end

of the fuse taken from its clamping-spring. Fig. 4 is a detail view of spring *h* looking from the opposite end of the base *f*, and Figs. 5 and 6 are views showing details of spring *c*.

Like characters refer to like parts in the several figures.

A series of fuses may be mounted side by side, as shown in Fig. 2, in this invention; but as each fuse is a complete device in itself and similar to the others I will describe in detail one only of a series.

The tubular casing *a* is provided at its ends with conducting-caps *b b*, secured thereto, and which are centrally bored to correspond with a bore in the tube *a*. The fuse-wire *a'* extends through the bores in the tube *a* and caps *b b* and is secured to the caps *b b* by solder. The bores in caps *b b* are preferably flared at their outer ends to admit the solder for securing the fuse-wire in place. Either cap *b* is provided with a spindle *b'*, which carries an annular projection *b''*, forming a recess between *b''* and the end *b'* of cap *b*. The tubular casing *a* is provided with a small hole *a''* therein to allow gases caused by the fusing of the fuse-wire *a'* to escape from the casing.

The fuse, with its terminal-connecting springs, is mounted on insulating-strips *e e*, preferably of hard rubber, which are suitably secured to the base *f*, preferably of insulating material. Spring *h* is suitably mounted on one strip *e* and spring *c* and terminal *d* are suitably mounted on the other strip *e*. Spring *h*, as shown in Fig. 4, is cut away, as at *h'*, and is split at *h''*, the opening between *h'* and *h''* being smaller than at *h'''* and also smaller than the spindle *b'* of cap *b*, so that when the fuse is pressed into place the opening has to give, due to the split *h''*, and thereby clamp the spindle *b'* in place in the opening at *h''*. Lugs *h⁴* *h⁴* fit in a groove in block *e* and are for the purpose of preventing spring *h* from turning on block *e*. The inner end *h⁵* of spring *h* is provided with a small hole therein and is used as a terminal for a circuit-wire which passes through a hole *g* in the base *f*. Terminal *d* is provided with a small hole at its free end for receiving one of the circuit-conductors and with lugs which fit in a groove in block *e*, and thereby prevent *d* from turning upon *e*, as shown in Fig. 1. Spring *c* is best shown in Figs. 5 and 6. It is of a peculiar shape, preferably as shown, and is provided with lugs *c⁸* *c⁸* to prevent its turning upon ter-

minal d when secured thereto. The part c^4 of spring c is provided with a hole d^3 therein for receiving a spindle b' of cap b and is preferably somewhat larger than b' . The part c^6 of spring c is provided with a hole d^2 therein, preferably somewhat smaller than hole d^3 , but amply large to admit the spindle b' of cap b . Spring c^2 is similar to spring c , except that a portion c^3 of spring c^2 is used for a connection-terminal, which does away with the terminal d of Fig. 1.

In putting the fuse in place, the spindle b' of an end cap b is first inserted through holes d^3 and d^2 of spring c or spring c^2 , as shown in Fig. 3, after which the spindle b' between b^2 and b^3 of the other end cap b is pressed into place in the opening h' h^3 of spring h . As the fuse is pressed into place, the spindle b' exerts a pressure on spring c in the direction of arrows x and y of Fig. 6, thus producing a torsion on spring c which firmly holds the spindle b' in place. The projection on b' keeps same from passing through holes d^3 and d^2 too far. As the fuse is still further depressed spring c changes from the solid-line position of Fig. 6 to the dotted-line position c^5 of the same figure. The dotted-line view c^5 of spring c shows the parts c^4 and c^6 closer together than in the solid-line view of Fig. 6, which gives an end thrust to the tubular fuse and presses the surface b^3 of one cap b against the spring h , thereby making good contacts between the conducting end caps b and their respective connecting-springs h and c . When the tubular fuse is withdrawn from the position shown in Fig. 1, the reverse operation of that just described takes place.

It will be readily seen that this arrangement provides a very simple and effective means for holding the fuse in place, giving good contacts for each terminal of the fuse and allowing the latter to be readily withdrawn and replaced by another.

While I have described particular details of construction for the whole arrangement, as herein shown, I do not wish to limit myself to these exact details. I therefore wish it to be understood that the combinations and principles of this invention as hereinafter claimed are the essential features therein and not the minor details which go to make up the arrangement as a whole.

While I have herein shown a tubular fuse, it is not essential that the fuse should be tubular. In fact, any form of fuse supplied with suitable end connecting-lugs may be equally used in this invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a fuse of the character described, of a cap for each end thereof, a lug for each cap and secured thereto, a spring member provided with a hole therein in which one of the said lugs is inserted to produce a

torsional stress thereon when the fuse is in place in the circuit, and a second spring member provided with a slot adapted to grasp the other said lug therein, the said springs automatically clamping the fuse in the circuit. 70

2. The combination with a fuse and a casing therefor, of a cap for each end of the casing, a lug for each cap and in circuit with the fuse, a spring member provided with holes therein through which one of the said lugs is inserted to produce a torsional stress thereon when the fuse is in place in the circuit, and a second spring member provided with a slot adapted to grasp the other said lug therein, the said springs automatically clamping the fuse in the circuit. 80

3. The combination with a fuse and connecting-terminals therefor, of spring means for engaging one said terminal, and a suitable support for the other said terminal, the said spring means exerting a torsional stress on its engaging terminal, and thereby automatically clamping the fuse in place. 85

4. The combination with an electric fuse, of spring means cooperating with a terminal thereof to produce a torsional stress thereon and automatically hold the fuse in the circuit. 90

5. The combination with a fuse and connection-terminals therefor, of a suitable support for one said terminal, and spring means cooperating with the other said terminal and put under a torsional stress by the latter when the fuse is in the circuit, to automatically hold the fuse in the circuit. 95

6. The combination with a fuse-protector of the character described, of a metal cap secured to each end thereof and provided with a spindle and an annular shoulder thereon, a spring member provided with a slot adapted to receive one said spindle, and another spring member provided with holes through which the other said spindle is inserted to produce a torsion on its spring member and thereby cause the latter to press the other said end cap against its spring-support to hold the fuse in the circuit. 100

7. The combination with a tubular fuse-protector of the character described, of a metal cap for each end thereof and secured thereto, a spindle for each cap and an annular shoulder on each spindle, each said shoulder forming an annular recess at the end of its cap, a bent spring provided with holes therein through which one of the said spindles is inserted, another spring provided with a slot therein and adapted to receive one of the said spindles, the said slot being more narrow at its center than at either end, a split extending from the bottom of the said slot, suitable connection-terminals for each spring adapted to receive the respective circuit-conductors of the circuit to be protected, and a suitable base to which the whole is secured for support, the said fuse-protector exerting a torsion on the first-mentioned spring when put in place in the circuit, and thereby causing same to pro- 130

duce a pressure between the fuse-protector and the other said spring, to clamp the said fuse-protector in place in the circuit, substantially as described.

5 8. The combination with a fuse-protector for electrical circuits, consisting of a hollow casing of insulating, weather-proof material, end caps of conducting material fitted over the ends of said casing, each cap being provided with a spindle and an annular projection thereon which forms an annular recess with the end of the said cap, the said spindles being longitudinally bored, and a fuse-wire extending through the said casing and said
10 bores and soldered to the latter, of a bent spring provided with holes therein through which one of the said spindles is inserted, another spring provided with a slot therein adapted to receive one of the said spindles, at
15 the said annular recess thereon, the said slot being more narrow at its center than at either end, a split extending from the bottom of the slot, suitable connection-terminals for each spring adapted to receive the respective circuit-wires of the circuit to be protected, and a suitable base of insulating material to which the whole is secured for support, the said fuse-protector exerting a torsion on the first-mentioned spring when put in place in the
20 said springs, one of the said spindles being first inserted through the said holes of one spring and then the annular recess of the other spindle being pressed into place in the slot of the other spring, thereby causing said first-mentioned spring to produce a pressure between the fuse-protector and the other said

spring to clamp the said fuse-protector to the said springs, the split in the second-mentioned spring also clamping the said fuse-protector in place, the said fuse-protector, end caps, 40 springs, and connection-terminals being thus connected in a series circuit with the circuit to be protected, substantially as described.

9. The combination with a fuse and connection-terminals connected thereto, of a spring 45 provided with two holes through both of which one of the said terminals is inserted, and a suitable support for the other terminal, the said spring automatically clamping the terminals to their respective supports when the 50 fuse is in place in the circuit.

10. The combination with a tubular fuse, of end connecting-lugs therefor, the said lugs being similar and each provided with a spindle and an annular collar thereon, a spring 55 provided with two holes therein and adapted to receive either said spindle through the holes, a second spring provided with a slot therein and adapted to receive either said spindle in the said slot, between the annular collar 60 and the end of the connecting-lug of the said spindle, the said springs automatically clamping the fuse in place, substantially as described.

As inventor of the foregoing I hereunto subscribe my name this 7th day of July, A. D. 1904.

FRANK B. COOK.

Witnesses:

FREDERICK R. PARKER,
HARRY B. ELMERS.