

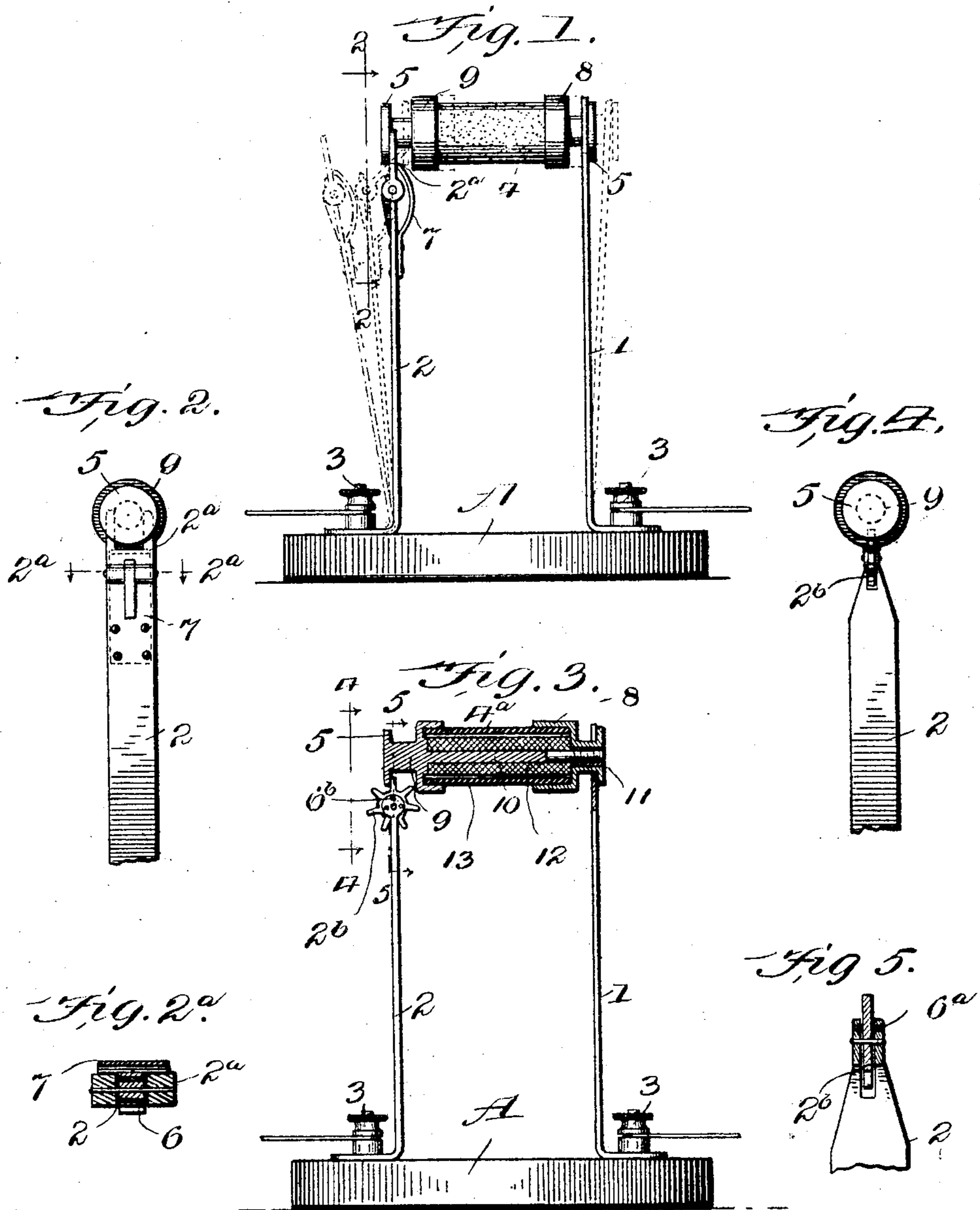
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ELECTRICAL CIRCUIT PROTECTOR.

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UNITED STATES PATENT OFFICE.

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ELECTRICAL-CIRCUIT PROTECTOR.

No. 800,830.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES A. ROLFE, a citizen of the United States, residing at Adrian, in the county of Lenawee and State of Michigan, have invented a certain new and useful Improvement in Electrical-Circuit Protectors, 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 electrical-circuit protectors for protecting electrical circuits and instruments from the injurious effects of unduly-strong currents.

The prominent objects of my invention are to provide a simple, inexpensive, and practical device of this character to render it unnecessary to make any repairs or undergo any expense in connection with the apparatus after it has been operated by the passage of an unduly-strong current, to simplify and cheapen its construction as much as possible, and to accomplish the foregoing and other desirable results in a simple and expeditious manner.

In the accompanying drawings, Figure 1 is a side elevation of a protective device embodying my present invention. Fig. 2 is a view taken on line 2 2 in Fig. 1. Fig. 2^a is a cross-section taken on line 2^a 2^a in Fig. 2. Fig. 3 is a view, partly in elevation and partly in vertical section, of a modified form of device. Fig. 4 is a view taken on line 4 4 in Fig. 3. Fig. 5 is a view taken on line 5 5 in Fig. 3.

Referring first to the device shown in Figs. 1, 2, and 2^a, A is any common or desirable form of insulating-base, made of wood, porcelain, rubber, or the like. On this are mounted two springs 1 and 2, secured to the base A by means of binding-posts 3 3. A heat-cartridge 4 is mounted upon and supported by the springs 1 and 2. Each of the springs 1 and 2 is forked, as shown in Fig. 2, and the heat-cartridge is provided with circular lugs or ears 5 5, by which the forked ends of the springs are engaged, the cartridge being thus readily removable from the springs. The spring 2 is made in two parts or sections, the upper one, 2^a, of which is hinged to the lower part or section. A small quantity of solder 6, Fig. 2^a, is introduced into this hinged connection and serves when it is hard to hold the

two sections of the spring rigid with reference to one another. A small spring 7 is secured to the lower section of the spring 2 and is arranged to act outwardly upon the upper section 2^a.

The heat-cartridge 4 consists of a graphite block or pencil secured to two caps 8 and 9, which latter are provided with the lugs or ears 5 5.

The operation of the device thus described is as follows: Under normal circumstances the device is in the condition shown in Fig. 1. When an unduly-strong current traverses the circuit, however, the graphite stick of the cartridge 4 becomes heated and the caps 8 and 9 also become heated and the latter heats the upper section 2^a of the spring 2, which in turn heats the small quantity of solder 6 in the hinged joint of this spring. As a result the spring 2 springs out—that is, in a direction away from the other spring—by reason of the loosened connection between its two sections. This breaks the circuit between the end of the spring 2 and the cap 9 of the cartridge, thereby opening the line and relieving the circuit of the unduly-strong current. When the spring 2 has become freed from the cap 9, the spring 7 will operate to move or swing the upper section 2^a of said spring out into normal position—that is, straight with the other section of the spring—and in this normal condition the solder 6 will harden, thereby holding the two sections rigid with one another. The device is reset by reengaging the upper end of the section 2^a with the cap 9.

The modification shown in Fig. 3 has an insulating-base A and the springs 1 and 2, as in the other arrangement. The spring 2, however, instead of being hinged is provided at its upper end with a star-wheel 2^b, which is arranged to rotate, and a small quantity of solder 6^a, Fig. 5, is provided in the upper end of the spring-arm, so as to rest against the star-wheel. The heat-cartridge 4^a of this modification consists of two metallic caps 8 and 9, provided with the lugs or ears 5 5, one of the same, 9, being provided with a longitudinally-extending pin or spindle 10, whose end is screw-threaded and fits into a threaded insulating-bushing 11 in the cap 8. A coil of wire 12 is arranged about the spindle 10, and an insulating-sleeve 13 is arranged about the coil of wire 12. One end of the wire of the coil

12 is connected with the cap 9 and the other end with the cap 8, whereby connection is made between the springs 1 and 2 through the coil of wire 12.

5 The device thus described operates as follows: Under normal conditions it is as shown in Fig. 3. An unduly strong current, however, will cause the coil 12 to become heated, and this in turn will heat the cap 9, star-wheel
10 2^b, and solder 6^a. The latter on becoming softened will release the star-wheel and permit the same to turn, whereupon the spring 2 will fly outwardly, thereby breaking the circuit between the star-wheel and the cap 9 and
15 relieving the circuit of the unduly-strong current. The solder upon hardening will hold the star-wheel rigid in the position to which it was turned by the outward movement of the spring. The device can be placed in position
20 again by simply moving the spring 2 inwardly, so that another of the prongs of the star-wheel 2^b engages the ear 5.

It will be seen that by my invention I make it possible to construct the simplest possible
25 form of heat-coil without any moving or detachable parts. The cartridge itself is simply a heat-concentrating device with suitable means for engaging the ends of the springs. It will also be seen that after each operation
30 the device is automatically resoldered or self-soldered by the hardening of the solder connected with the movable part which engages one end of the heat-cartridge. In the form of device shown in Fig. 1 a movable part on the
35 spring is restored to its original condition, whereas in the other form of device there is no restoration of any movable part to its original condition, the device being put into condition for another operation by the bringing
40 of another prong or tooth in the star-wheel into position to engage the heat-cartridge. In each case, however, the self-soldering parts are carried by one of the springs, which may be said to be the circuit governing or control-
45 ling means or part of the apparatus, in contradistinction to the heat-concentrating means embodied in or forming a part of the heat-cartridge.

It will be understood that changes and modifications can be made in the apparatus herein set forth without departing from the spirit of my invention.

What I claim is—

1. In an electrical-circuit protector, the combination of a heat-concentrating device, and means for controlling the circuit having provisions for automatically restoring itself to operative condition.

2. In an electrical-circuit protector, the combination of a heat-generating device, and spring means for controlling the circuit, said spring means having provisions whereby it is automatically resoldered in operative condition.

3. In an electrical-circuit protector, the com-

bination of a heat-cartridge containing in its construction a heat-concentrating device, spring means for controlling the circuit operating in conjunction with said heat-cartridge, said spring means having a solder-secured joint normally holding it in engagement with the heat-cartridge, but releasing it when melted or softened, substantially as described.

4. In an electrical-circuit protector, the combination of a heat-cartridge comprising a heat-generating device, a pair of spring-arms supporting said heat-cartridge and engaging the same, one of said spring-arms being provided with a movable member held normally in position by a softenable material, substantially as described.

5. In an electrical-circuit protector, the combination of a heat-cartridge comprising a heat-generating device, a pair of spring-arms supporting said heat-cartridge and engaging the same, one of said spring-arms being provided with a movable member held normally in position by solder, substantially as described.

6. In an electrical-circuit protector, the combination of a heat-cartridge comprising a heat-generating device, and a pair of spring-arms supporting and engaging said device, one of said spring-arms being provided with a pivoted member adapted to engage the heat-cartridge and held normally rigid with the spring-arm by solder, substantially as described.

7. In an electrical-circuit protector, the combination of a heat-cartridge comprising a heat-concentrating member and a pair of metallic caps at the ends of the cartridge, each of said caps being provided with ears or lugs, a pair of spring-arms supporting and engaging said cartridge, each of said arms being forked at its upper end to engage the ears on said cartridge, a pivoted member carried by one of said spring-arms, a small quantity of solder engaging and holding said pivoted member normally rigid with the spring-arm carrying it, and means for restoring said member to normal position, substantially as described.

8. In an apparatus of the class specified, thermally-operable circuit-controlling means having provisions for automatically restoring themselves to operative condition.

9. In an apparatus of the class specified, a line-spring provided with a releasable engaging device, and having provisions for automatically resoldering said device after release.

10. In apparatus of the class specified, a jointed line-spring having provisions for automatically resoldering said joint after release.

11. In apparatus of the class specified, a line-spring constructed with a solder-secured joint in combination with a spring acting upon one of the parts of said joint to restore the same to operative position.

12. An electrical-circuit protector, comprising thermally-operable securing means normally holding the protector against oper-

ation, and circuit-controlling instrumentalities coöperating with said securing means and having provisions whereby they are automatically restored to operative condition.

5 13. An electrical-circuit protector, comprising thermally-operable securing means normally holding the protector against operation, and circuit-controlling instrumentalities coöperating with said securing means and
10 having provisions whereby they are automatically reset and resecured in reset condition.

14. An electrical-circuit protector comprising securing means normally holding the
15 protector against operation, and circuit-controlling instrumentalities coöperating with said securing means, and having provisions whereby they are automatically resoldered after operation preparatory for another operation.
20

15. An electrical-circuit protector, comprising securing means normally holding the protector against operation, and circuit-controlling instrumentalities having provisions

whereby they are automatically reset and re- 25
soldered in reset condition.

16. An electrical-circuit protector, comprising spring-actuated circuit-opening devices, and means for holding said devices normally against operation, said devices having
30 provisions whereby they are automatically reset and resoldered in reset condition.

17. An electrical-circuit protector, comprising a heat-cartridge, and a circuit-controlling spring coöperating therewith and having
35 provisions for automatically resoldering itself in operative condition.

18. An electrical-circuit protector, comprising a heat-cartridge, and a jointed circuit-controlling spring coöperating therewith and
40 having provisions for automatically resoldering itself in operative condition.

In witness whereof I hereunto subscribe my name this 2d day of September, A. D. 1903.

CHARLES A. ROLFE.

Witnesses:

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I. C. LEE.