

No. 800,829.

PATENTED OCT. 3, 1905.

C. A. ROLFE.  
ELECTRICAL CIRCUIT PROTECTOR.  
APPLICATION FILED SEPT. 25, 1903.

Fig. 1.

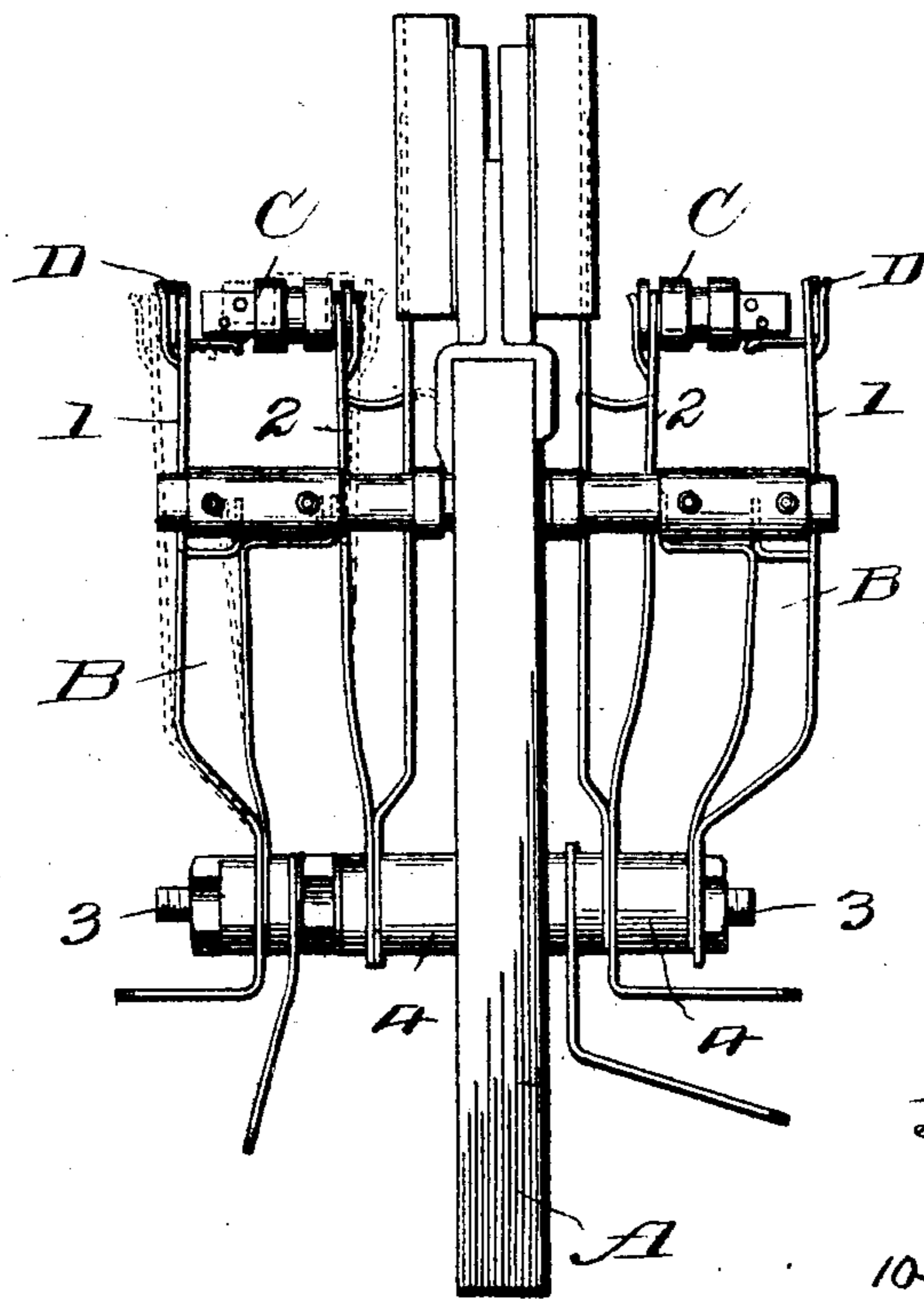


Fig. 2.

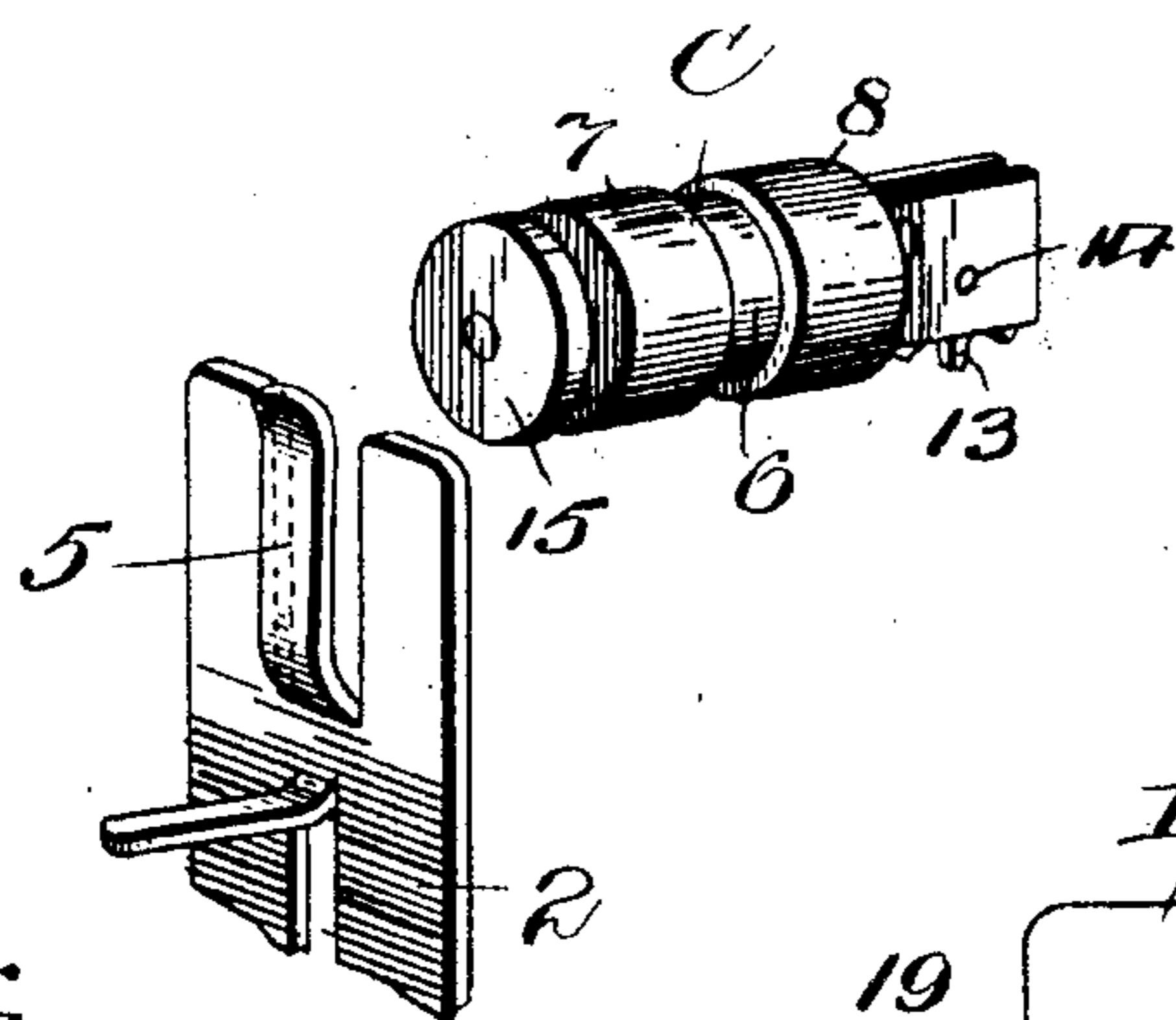


Fig. 3.

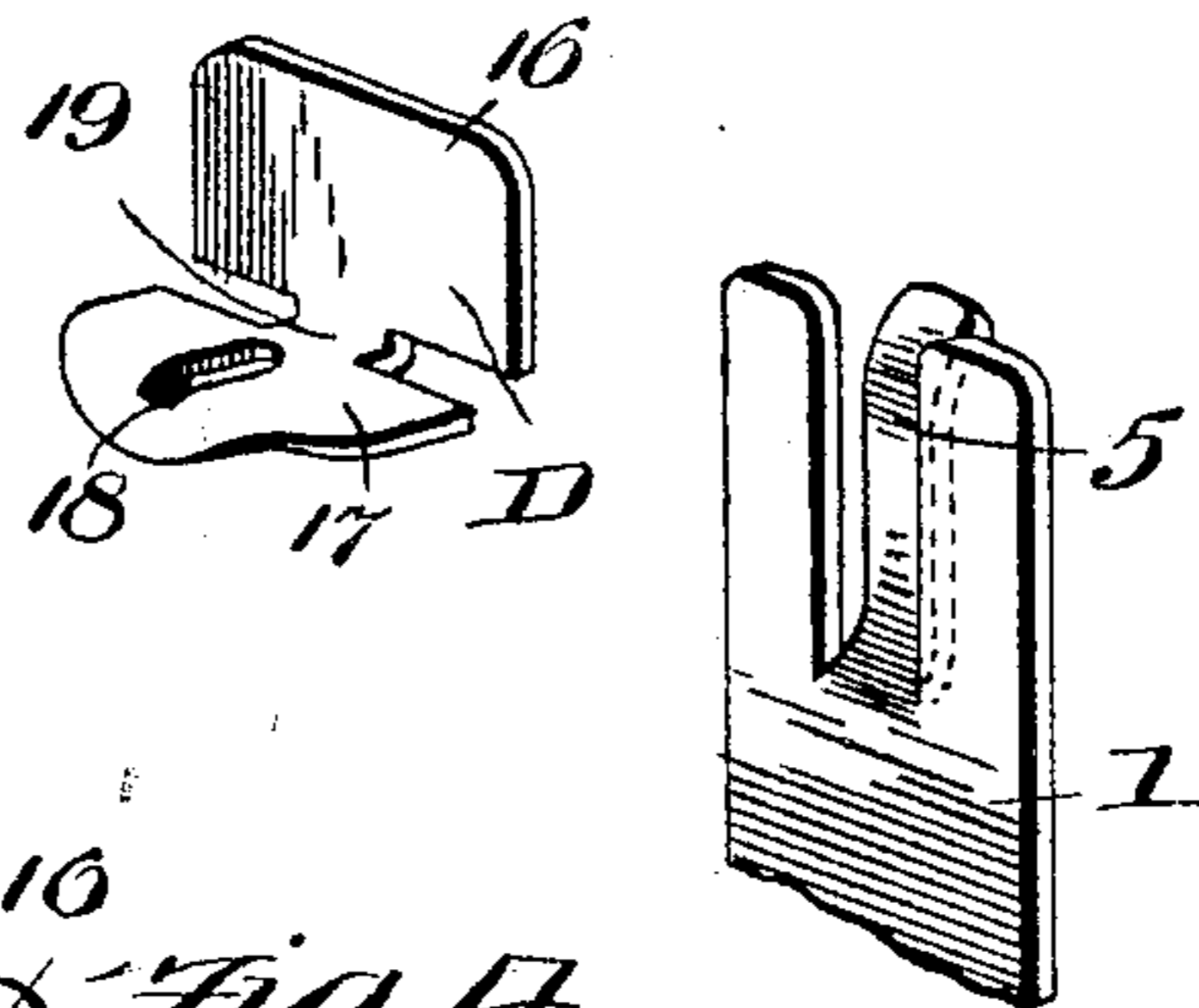
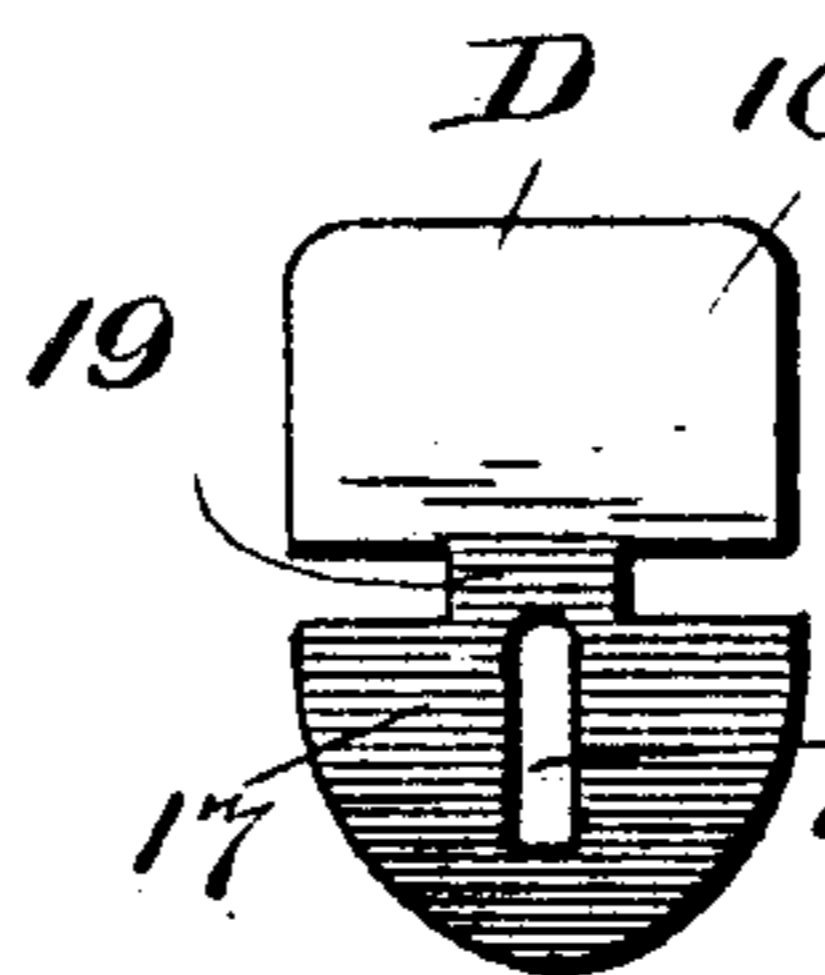


Fig. 4.



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# UNITED STATES PATENT OFFICE.

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## ELECTRICAL-CIRCUIT PROTECTOR.

No. 800,829.

Specification of Letters Patent.

Patented Oct. 3, 1905.

Application filed September 25, 1903. Serial No. 174,600.

*To all whom it may concern:*

Be it known that I, CHARLES A. ROLFE, a citizen of the United States, residing at Adrian, State of Michigan, have invented a certain  
5 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.

10 My invention relates to electrical-circuit protectors for protecting instruments and circuits from unduly-strong currents.

The principal object of the invention is to make possible the use on certain forms of pro-  
15 tectors of self-soldering heat-cartridges embodying recent inventions made by me and set forth and claimed in certain copending applications for patents—to wit, Serial No. 104,021, filed April 21, 1902, and Serial No.  
20 133,449, filed December 1, 1902.

In the accompanying drawings, Figure 1 is an end elevation of a portion of an assembling rack or board provided with a set of protec-  
25 tors of the kind in which it is desired to employ my self-soldering heat-cartridges, together with such cartridges embodied therein, in accordance with my present invention. Fig. 2 is a view showing in perspective a portion of the protector and of the cartridge.  
30 Fig. 3 is a similar perspective view of another portion of the protector and the means by which the use of the cartridge is made possible. Fig. 4 is a view of a detail of construction. Fig. 5 is a central longitudinal section  
35 of the cartridge.

In Fig. 1 I have shown an end elevation of a portion of a board or rack provided with protectors to which I desire to apply my self-soldering heat-cartridges. This protector-  
40 board comprises, essentially, a central upright or support A and protectors B B, mounted on opposite sides thereof. It is understood that the protectors are arranged in rows lengthwise of the board.

45 As the protector shown herein comprises no part of my present invention, I will refer to it but briefly. It consists of suitable line-springs 1 1 and 2 2, suitably connected at their lower ends to the support A by connect-  
50 ing-screws 3 3, which are provided with suitable insulating-sleeves 4 4, so as to properly insulate the lower ends of the line-springs from one another and provide them with con-

nections by which they can be properly connected in the circuit, it being understood that  
55 each protector B is for one circuit. The peculiarity of this form of protector is that the upper ends of the springs 1 and 2 are forked, as shown in Figs. 2 and 3, and a punched-out  
60 portion 5 is left in the rear, as it may be said, of the body of the spring. I have shown heat-cartridges C C, supported at the upper  
ends of these springs 1 1 and 2 2 in each protector.

Each heat-cartridge consists of an insulat-  
65 ing-sleeve 6, made of vulcanite or the like, a terminal cap 7 at one end of the sleeve 6, and a metallic collar 8 at the other end of the same, as shown in Fig. 5. A metal plug 9 fits within the sleeve 6 and has a reduced  
70 threaded end 10, which screws into a threaded socket in the metallic terminal 7. A coil of wire 12 is wound about a metal spindle 12<sup>a</sup>, one of whose ends is threaded and fitted into  
75 a plug 12<sup>b</sup>, of insulating material, and the other of which projects from the sleeve and the collar 8 and is bifurcated. A star-wheel  
13 is mounted between the bifurcated end of the cartridge, and a small quantity of solder  
80 is arranged about the star-wheel, being conveniently introduced through small apertures 14 14 in the bifurcated ends. The metallic  
terminal 7 is provided with a head 15, which is adapted to slide between the forked ends  
85 of the upper end of the spring 2 and the strip 5 thereon. A clip D is mounted upon the upper end of the spring 1. This clip is provided with a vertically-arranged back portion  
90 16 and a horizontally-extending lip 17, provided with an aperture 18 and connected with the back 16 by a tongue 19 of less width than  
the back 16 and lip 17. Thus the clip can be fitted to the spring 1 by sliding the back 16  
95 down between the forked sides of said spring and the strip 5 thereon, and when so mounted the lip 17 will project forwardly—that is, in  
toward the other line-spring, as shown in Fig. 1. The heat-cartridge C is thus mounted by  
100 having one of its ends in engagement with one of the springs 2 by means of the head 15 on said cartridge and its other end engaged  
by having a prong or spoke of the star-wheel 13 inserted in the aperture 18 in the clip D  
105 and having the clip in engagement with the other line-spring 1. It will be understood, of course, that the arrangement of the clips

in connection with the line-springs can be reversed, the clips being mounted on the springs 2, if desired; but the arrangement shown is preferred.

5 The device I have thus constructed and mounted operates as follows: Under normal conditions the apparatus is as shown in Fig. 1 in full lines. An unduly-strong current, however, will cause the heat-coil in the heat-  
10 cartridge to soften the solder holding the star-wheel 13 in place, and thereby release said wheel, which will be turned by the line-spring 1, and will thus release said spring, which will fly out and become disconnected with the  
15 star-wheel, and thereby break or open the circuit. After this operation the solder will harden again and hold the star-wheel 13 rigidly in position, after which it can be reengaged with the clip D to put the apparatus  
20 again in normal condition. By this arrangement it will be seen that self-soldering heat-cartridges embodying my invention can be readily applied to protectors of the kind set forth, in which the back strips 5 5 on the line-  
25 springs prevent direct application of such cartridges in a convenient manner because of difficulty in securing engagement of the star-wheels with such line-springs. When so equipped, these protectors will have all the  
30 advantages of self-soldering heat-cartridges, which, as previously set forth in my other applications, make repairs and cost of maintenance practically nothing.

The clips D can be easily and cheaply constructed by stamping them out in the form of  
35 flat metallic blanks, as shown in Fig. 4, and then bending them to the desired shape.

The form of heat-cartridge which I have shown herein while it embodies the principles of construction and operation set forth  
40 in my aforesaid applications is novel in specific construction, and that construction I intend to claim herein.

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

What I claim as my invention is—

1. In an electrical-circuit protector, the combination of spring means for controlling the  
50 circuit, a heat-cartridge, and an intermediate member holding said cartridge and said spring means together, substantially as described.

2. In an electrical-circuit protector, the combination of line-springs for controlling the  
55 circuit, a heat-cartridge engaging one of said line-springs, and an intermediate member mechanically connecting said heat-cartridge and the other line-spring, substantially as described.  
60

3. In an electrical-circuit protector, the combination with a pair of line-springs controlling the circuit, of a heat-cartridge engaging  
65 one of said line-springs, and a detachable clip adapted to form a connection between the

other line-spring and said cartridge, substantially as described.

4. In an electrical-circuit protector, the combination of a pair of line-springs for controlling the circuit, a self-soldering heat-cartridge  
70 comprising a heat-concentrating device and a self-soldering movable part, and a clip adapted to engage the other line-spring and said movable part on said heat-cartridge, substantially as described.

5. In an electrical-circuit protector, the combination of a pair of line-springs for controlling the circuit, a heat-cartridge comprising  
75 means for engaging one of said springs, a heat-concentrating device, a pivoted abutment held normally in position by softenable material, and a detachable clip adapted to engage the  
80 other line-spring and also to engage said pivoted abutment on the heat-cartridge, substantially as described.

6. In an electrical-circuit protector, the combination of a pair of line-springs, a heat-cartridge comprising means for engaging one of  
85 said springs, a heat-concentrating device, a pivoted abutment, and a small quantity of solder engaging said abutment, and a detachable clip D adapted to engage the other line-spring and having an aperture in which the  
90 abutment on said heat-cartridge can be inserted, substantially as described.

7. In an electrical-circuit protector, the combination of a pair of line-springs 1 and 2 having  
95 forked ends provided with back strips 5 5, a heat-cartridge C comprising an insulating-sleeve 6, a metallic terminal 7 having a head 15, a heat-concentrating device confined within the sleeve 6, a star-wheel 13, solder holding  
100 said star-wheel normally in position, a clip D having a back 16 adapted to engage one of said line-springs, and a laterally-projecting lip 17 having an aperture 18, substantially as described.  
105

8. In an electrical-circuit protector, a clip adapted to form a mechanical connection between  
110 a line-spring and a heat-cartridge and provided with means for engaging the same, substantially as described.

9. In an electrical-circuit protector, a clip D having a back 16 and a lip 17 provided with  
115 an aperture 18, said lip and back being connected by a narrow tongue 19, substantially as described.

10. In an electrical-circuit protector, a heat-cartridge C comprising an insulating-sleeve  
120 6, a metallic terminal 7 having a head 15, a heat-concentrating device confined within the sleeve 6, a pivoted abutment secured to the other end of the heat-cartridge, and softenable material for holding said abutment normally in position, substantially as described.  
125

11. In an electrical-circuit protector, a heat-cartridge comprising an insulating-sleeve 6, a  
130 metallic terminal 7 having a head 15, a heat-concentrating device confined within the sleeve 6, a plug also arranged therein and having a

reduced and threaded end engaging the terminal 7, said plug being constructed with a bifurcated end which projects from the sleeve 6, a star-wheel mounted between the forked portion of said plug, and a small quantity of solder holding said star-wheel normally in position, substantially as described.

12. An electrical-circuit protector comprising thermally-operable circuit-controlling instrumentalities, and securing means holding the same normally from operation, said securing means being composed of separable members and the protector having provisions for automatically resetting itself in operative condition.

13. An electrical-circuit protector comprising thermally-operable circuit-controlling instrumentalities, and securing means holding the same normally from operation, said securing means being composed of separable members and the protector having provisions for automatically resetting itself in operative condition and resealing itself in such condition.

14. An electrical-circuit protector comprising spring-actuated circuit-controlling instrumentalities, and securing means normally holding said instrumentalities from operating, said securing means being composed of separable members, and having provisions whereby it is automatically resoldered in operative condition.

15. An electrical-circuit protector comprising a circuit-opening spring, securing means for holding said spring against action, and means for holding the securing means against the strain of the spring, said securing means being composed of separable members, said members being provided with engaging devices, one of which is movable and having provisions for automatically resoldering itself after release, and a heat-concentrating device for generating heat on the passage of an unduly-strong current.

16. An electrical-circuit protector, comprising a pair of line-springs and a restraining device normally holding said line-springs against action, said restraining device comprising a pair of separable members adapted to engage one another, one of which has provisions for automatically resoldering itself in operative condition.

17. An electrical-circuit protector comprising

ing circuit-controlling instrumentalities, and securing means normally holding the same against operation, said securing means being composed of a pair of separable members, one of which has provisions whereby it is automatically reset during operation and resoldered in such reset condition.

18. In apparatus of the class specified, a heat-cartridge, comprising a tubular casing of insulating material, a metallic head at one end of said casing, a line-spring-engaging device at the other end thereof, and a core confined within the casing, said core being provided with a shank extending through the end of the casing and engaging said head, and being also provided with a heat-coil and carrying the said line-spring-engaging device, substantially as described.

19. A heat-cartridge for electrical-circuit protectors having its opposite ends provided with detachable line-spring-engaging devices, and a connection extending through the body of the cartridge for detachably connecting said devices together.

20. A heat-cartridge for electrical-circuit protectors, having detachable line-spring-engaging devices one of which has provisions for automatically resoldering itself for operation, and means for detachably connecting said devices to the cartridge.

21. A heat-cartridge for electrical-circuit protectors having a detachable line-spring-engaging device having provisions for automatically resoldering itself in operative condition.

22. A heat-cartridge for electrical-circuit protectors having a bodily-removable core provided with a heating device and also with a line-spring-engaging device, which has provisions for automatically resoldering itself in operative condition.

23. In apparatus of the class specified, a heat-cartridge comprising separable members, one of which has provisions for automatically resetting itself in operative condition and resealing itself in such condition.

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

CHARLES A. ROLFE.

Witnesses:

A. MILLER BELFIELD,

I. C. LEE.