

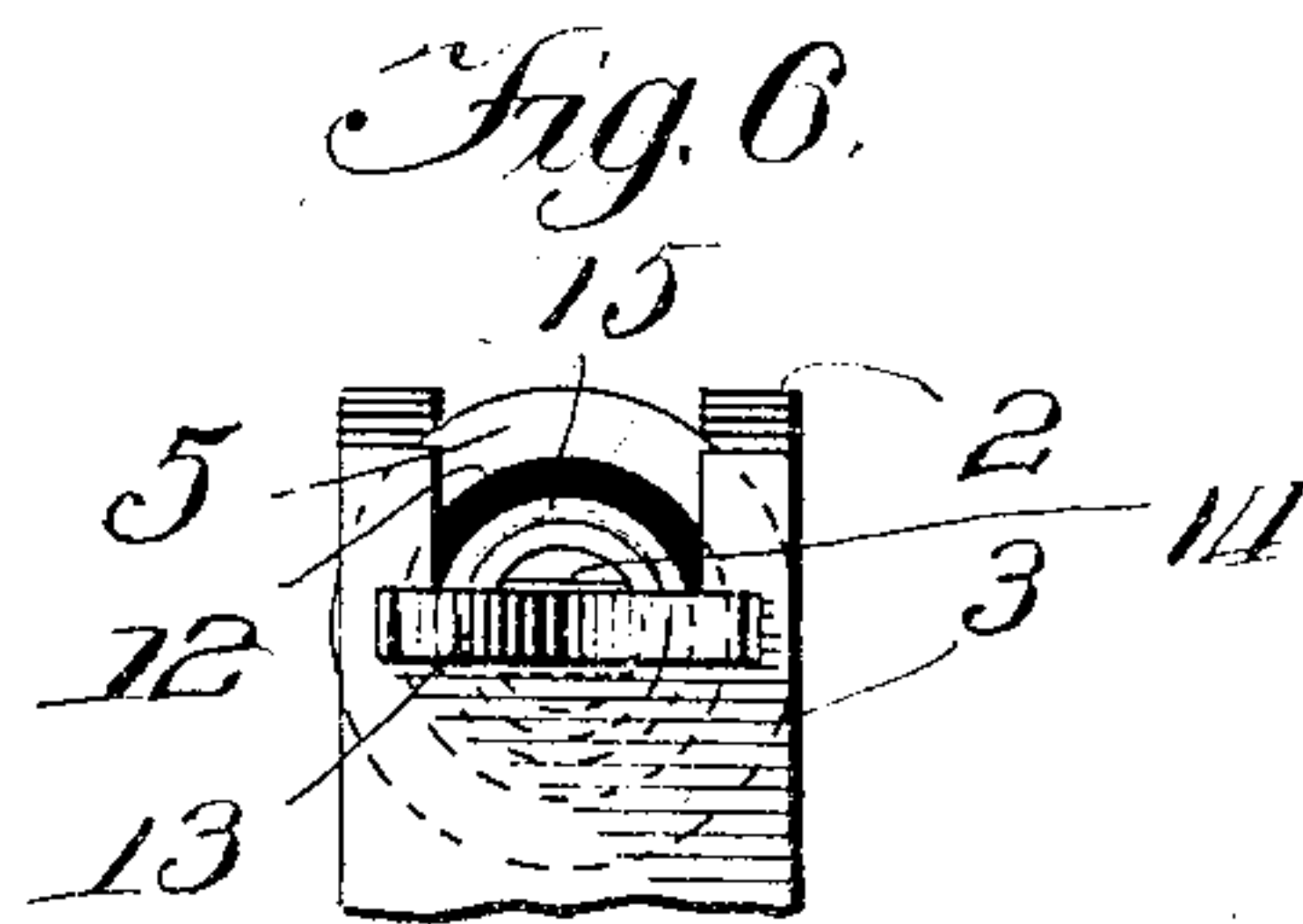
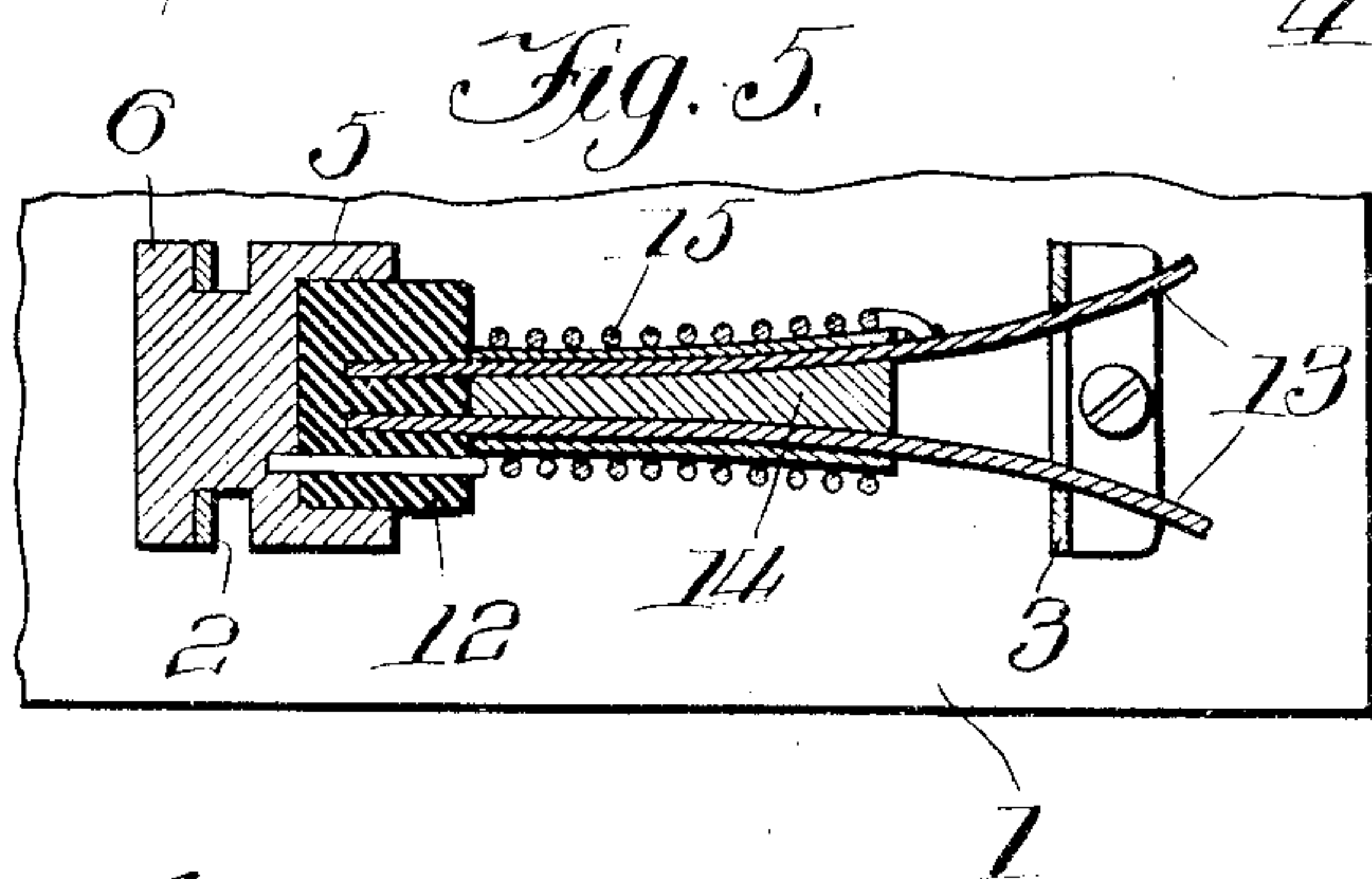
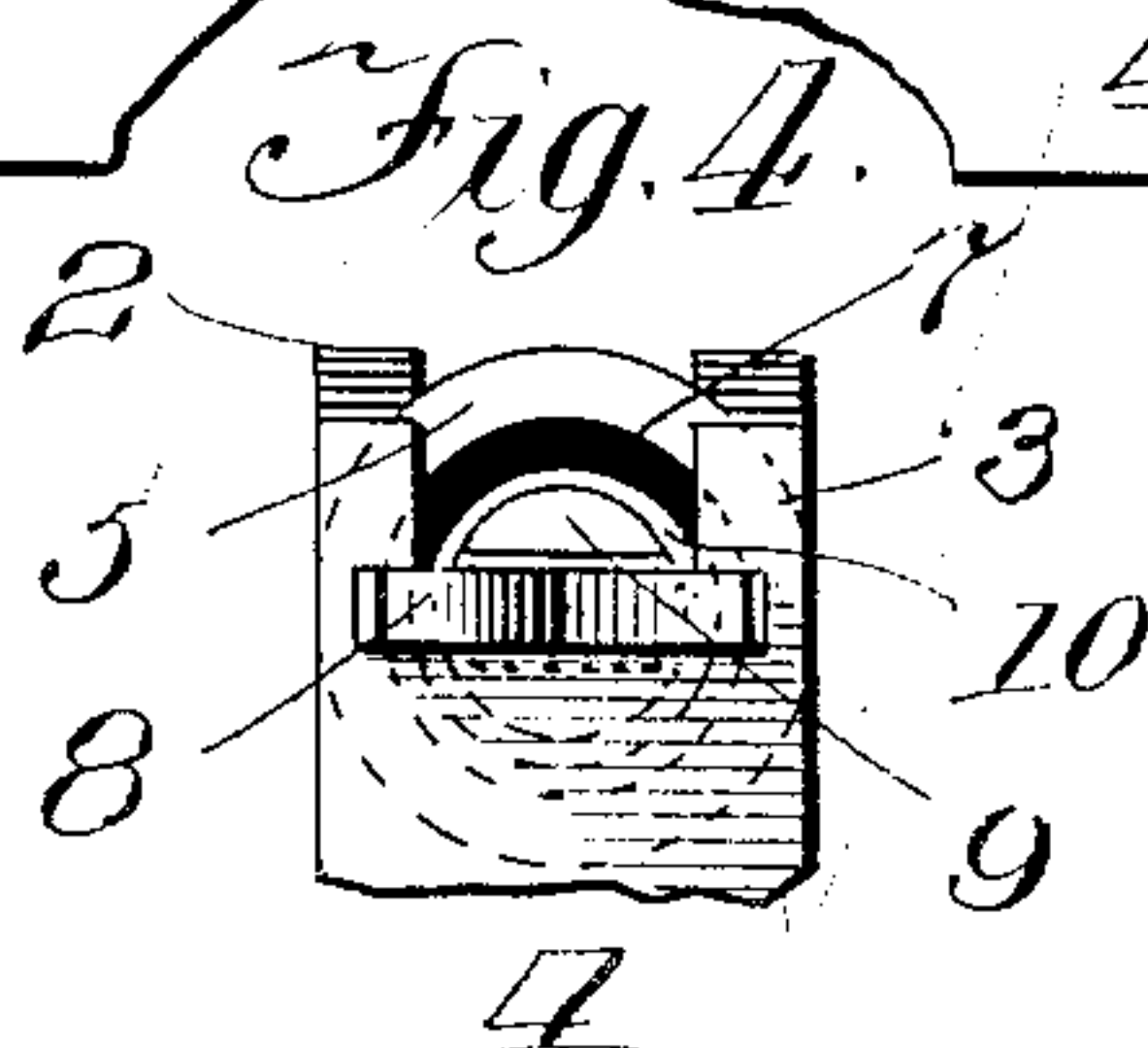
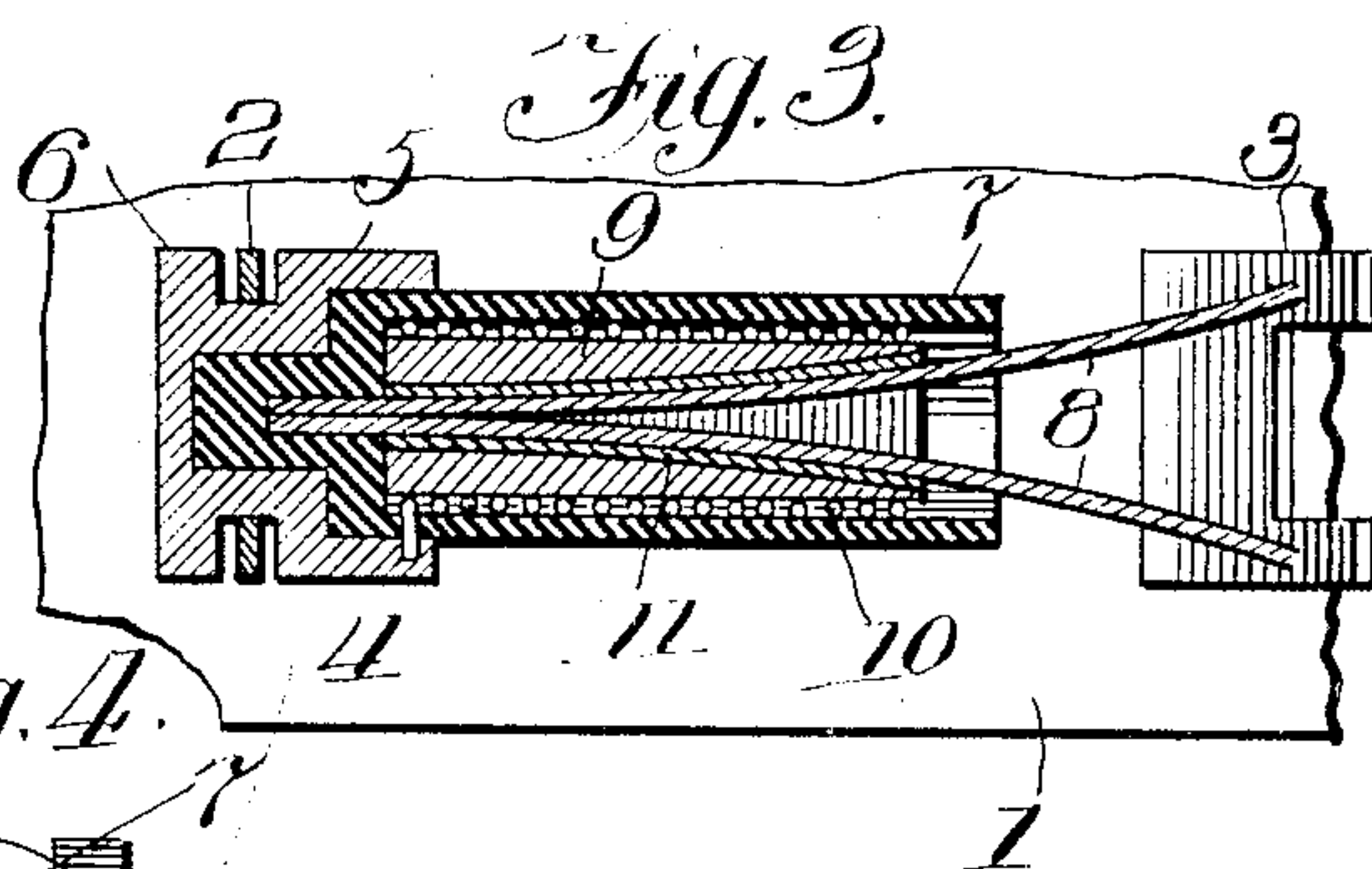
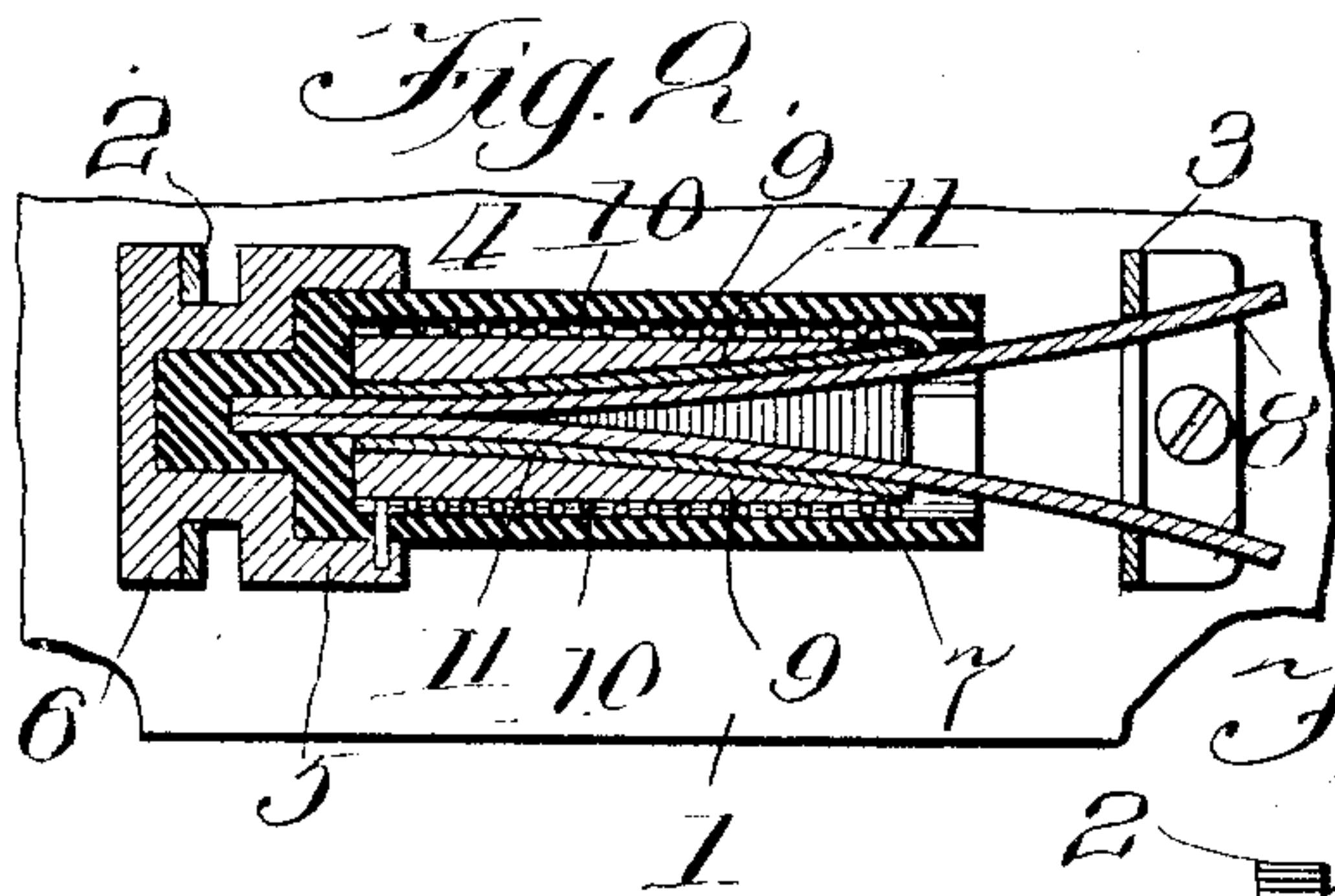
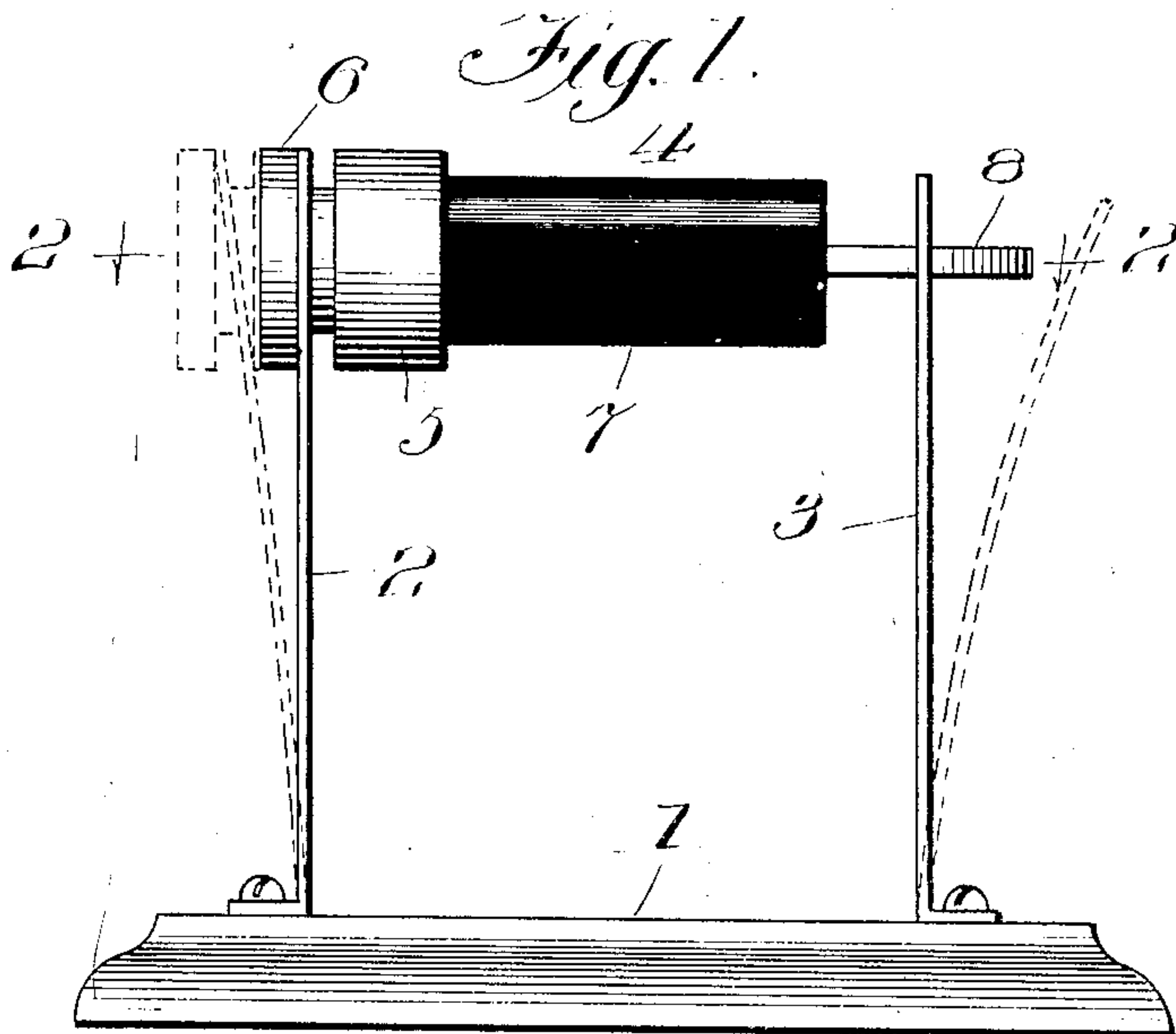
C. A. ROLFE.

ELECTRICAL CIRCUIT PROTECTOR.

APPLICATION FILED DEC. 29, 1903. RENEWED FEB. 13, 1908.

898,509.

Patented Sept. 15, 1908.



Witnesses:
H. S. Gaither
J. C. Lee

Inventor:
Charles A. Rolfe
by A. Miller Bigfield
attorney

UNITED STATES PATENT OFFICE.

CHARLES A. ROLFE, OF ADRIAN, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO ROLFE ELECTRIC CO., OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

ELECTRICAL-CIRCUIT PROTECTOR.

No. 898,509.

Specification of Letters Patent.

Patented Sept. 15, 1908.

Application filed December 29, 1903, Serial No. 187,044. Renewed February 13, 1908. Serial No. 415,763.

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 devices for protecting low tension circuits such as telegraph, fire-alarm and the like, from injurious effects of unduly strong currents such as those carried by power and lighting circuits.

Prominent objects of the invention are to provide a simple, practical and inexpensive form of protector of this kind; to make it unnecessary for the device to be repaired or have its parts replaced after operation; and to accomplish the foregoing results in a practical and expeditious manner.

In the accompanying drawing, Figure 1 is a side elevation of a protective device embodying my present invention; Figs. 2 and 3 are longitudinal and horizontal sections of a portion of such device, Fig. 2 showing the device unoperated and Fig. 3 after operation; Fig. 4 is an end view of the device; Figs. 5 and 6 are respectively a longitudinal, horizontal section, and an end view of a modified form.

Referring to the arrangement shown in Figs. 1 to 4 inclusive, 1 is a base made of insulating material such as wood, porcelain or the like. Upon this is mounted a pair of line springs 2 and 3 which tend to spring or separate from one another and are constructed with forked upper ends. These springs carry or support a heat cartridge 4 which is constructed as best shown in Figs. 2 and 3. It comprises a metallic terminal 5 having a head 6 and an insulating sleeve 7 having one end fitted in the terminal 5. A pair of leaf or flat springs 8, 8, are arranged within the insulating sleeve 7 and have their inner ends embedded and secured in the end of the sleeve 7. These springs tend to separate from one another and assume the diverging position shown in Figs. 2 and 3. Outside of the springs 8, 8, is arranged a metallic thimble or sleeve 9 and about this is coiled a coil of insulated wire 10. The springs 8, 8, are soldered along their outer faces as indicated at 11, 11, to the thimble 9 so that they are held nor-

mally in their separated condition. The coil 10 has one of its ends connected with one of the springs 8 and the other end connected with the terminal 5 so that the circuit is completed through the coil, the springs 8, 8 and the line springs 2 and 3. This heat cartridge is so mounted upon the springs 2 and 3 that the head 6 is engaged by the spring 2 and the springs 8, 8, by the spring 3.

The operation of the device is as follows. Under normal conditions the heat cartridge is sustained by the two springs 2 and 3 as shown in Figs. 1 and 2, the cartridge in turn holding the springs under restraint. So long as the current in the circuit under protection is normal, the device remains in this condition. When however it becomes unduly strong, sufficient heat is generated by the coil 10 to soften or melt the solder 11, 11, whereupon the outward tension of the springs 2 and 3 causes the springs 8, 8, to be compressed together by the spring 3 with the result that the spring 3 slides along the springs 8, 8, and passes off the ends thereof as shown in Fig. 3, the position of the springs 2 and 3 after operation being indicated in dotted lines in Fig. 1. In this way the circuit is opened by the separation of the spring 3 from the ends of the springs 8, 8. As soon as this separation occurs, the springs 8, 8, immediately spring away from each other back into their normal diverging position, and upon assuming this position the solder 11, 11, again becomes hardened, thereby holding the springs in that position.

In the arrangement shown in Figs. 5 and 6, a base and a pair of line springs 2 and 3 are provided as before. The heat cartridge supported by the springs 2 and 3 comprises a terminal 5 constructed with a head 6 and an insulating plug or bushing 12 inserted and secured in the terminal 5. A pair of springs 13, 13 are embedded at one end in the bushing 12 and extend outwardly so that their outer ends engage the forked end of the spring 3. These springs 13, 13 tend to separate from one another and assume and maintain the diverging condition shown in Fig. 5. Between them is a body or mass of solder 14 and arranged about them is a coil of wire 15. One end of this coil of wire is connected to one of the springs 13, 13, and the other end is connected with the metallic terminal 5. Thus the circuit is made from one line spring to the other, through the heat cartridge by

way of the springs 13, 13, the coil 15 and the terminal 5. The operation of this device is substantially that of the foregoing device, the springs 13, 13, being held normally apart by the solder 14, and being compressed when such solder is softened by the coil 15 so as to allow the release of the spring 3 by the springs 13, 13. As soon as the spring 3 is separated from the springs 13, 13, the latter resume their original diverging condition and the solder 14 thereupon hardens, resoldering such springs in that condition.

From the foregoing it will be seen that when either form of device is operated, it is not necessary to renew any of the parts or to repair it in any way. The heat cartridge springs engaging the line springs, by automatically restoring themselves to normal condition and being resoldered in such condition, place the cartridge in shape to be re-engaged by the line springs, ready for another operation. This, it will be seen, happens after every operation of the device, so that it can operate time after time without any expense or inconvenience of repairs or replacements.

It will be understood that changes and modifications can be made in the forms of devices herein set forth, without departing from the spirit of my invention, and also that other forms can be devised embodying the invention.

What I claim as my invention is:—

1. In apparatus of the class specified, the combination of a pair of line springs, a heat cartridge supported by said line springs, and comprising spring members subjected to the tension of the line springs, softenable material holding said spring members normally against such tension, and a heat concentrating device adapted to soften or melt said softenable material, substantially as described.

2. In apparatus of the class specified, the combination of a pair of line springs, a heat cartridge supported thereby, and comprising a pair of springs tending to move or spring in a lateral direction and engaged by one of said line springs, softenable material holding said cartridge springs against such lateral action, and a heat concentrating device adapted to melt or soften said material, substantially as described.

3. In apparatus of the class specified, the combination of a pair of line springs, a heat cartridge supported thereby, and comprising a pair of flat springs tending to spread or separate from one another, said springs being engaged by one of the line springs, softenable material adapted to hold said cartridge springs in such spread condition, and a heat coil adapted to soften or melt such softenable material, substantially as described.

4. In apparatus of the class specified, the combination of a pair of line springs having forked ends, said line springs tending nor-

mally to separate from one another, a heat cartridge supported by said springs and comprising a metallic terminal having a head for engaging one of the line springs, a pair of leaf springs tending to spread or separate from one another, said springs being in engagement with the forked end of the other line spring, a quantity of solder normally holding said springs in their spread condition, and a heat coil associated with said solder for melting or softening the same, substantially as described.

5. In a thermal circuit-protector, in combination, a fixed member; a spring; a spring-finger fixed with relation to said fixed member and tending to lie in contact therewith, which finger is adapted to hold said spring flexed, said spring tending to separate the spring-finger from said fixed member; and a solder connection between said fixed member and said spring-finger.

6. In a thermal circuit-protector, in combination, a fixed member; a spring; a spring-finger fixed with relation to said fixed member and tending to lie in contact therewith, which finger is adapted to hold said spring flexed, said spring tending to separate the spring-finger from said fixed member; a solder connection between said fixed member and said spring-finger; and a substance offering comparatively high resistance to the passage of an electric current, in proximity to said solder connection.

7. In a thermal circuit-protector, in combination, two ears; a spring-finger adapted to lie in contact with each one of said ears; a spring adapted to be held flexed by said spring-fingers and tending to separate said spring-fingers from said ears; and a fusible solder connection between each one of said ears and its spring-finger.

8. In a thermal circuit-protector, in combination, two ears; a spring; a spring-finger adapted to lie in contact with each one of said ears and to hold said spring flexed, said spring tending to separate the spring-fingers from said ears; and a fusible solder connection between each of said ears and its spring-finger.

9. In a thermal circuit-protector, in combination, two ears; a spring; a spring-finger adapted to lie in contact with each one of said ears and to hold said spring flexed, said spring tending to separate the spring-fingers from said ears; a fusible solder connection between each of said ears and its spring-finger; and a substance offering comparatively high resistance to the passage of an electric current, in proximity to said solder connection.

10. In a thermal circuit-protector, in combination, a fixed member; a spring; a spring-finger fixed with relation to said fixed member and tending to lie in contact therewith, which finger has a projection adapted to en-

gage said spring to hold the latter flexed, said projection also causing said spring to tend to separate said spring-finger from said fixed member; and a fusible solder connection between said fixed member and said spring finger.

11. In a thermal circuit-protector, in combination, a fixed member; a spring; a spring-finger fixed with relation to said fixed member and tending to lie in contact therewith, which finger has a projection adapted to engage said spring to hold the latter flexed, said projection also causing said spring to tend to separate said spring-finger from said fixed member; a fusible solder connection between said fixed member and said spring-finger; and a substance offering comparatively high resistance to the passage of an electric current, in proximity to said solder connection.

12. In a thermal circuit-protector, in combination, two ears; a pair of spring-fingers having inclined outer ends, said fingers adapted to lie between said ears, each of said fingers contacting one of the ears; a fusible solder connection between each one of said ears and its spring-finger; and a spring having an opening adapted to receive the outer ends of said spring-fingers, said spring being held flexed by said fingers when the fingers are held by said solder connection but tending to separate said fingers from said ears.

In witness whereof, I hereunto subscribe my name this 16th day of November A. D., 1903.

CHARLES A. ROLFE.

Witnesses:

A. MILLER BELFIELD,
I. C. LEE.