

H. L. MORSE.  
ELECTRIC FUSE OR CUT-OUT.

APPLICATION FILED JULY 25, 1902.

NO MODEL.

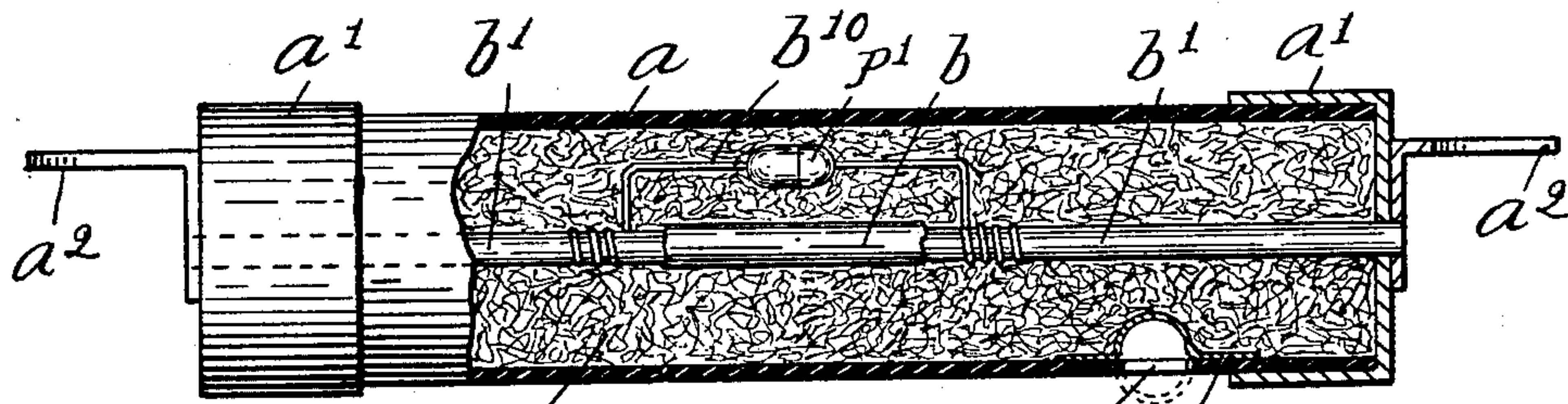


Fig. 1.

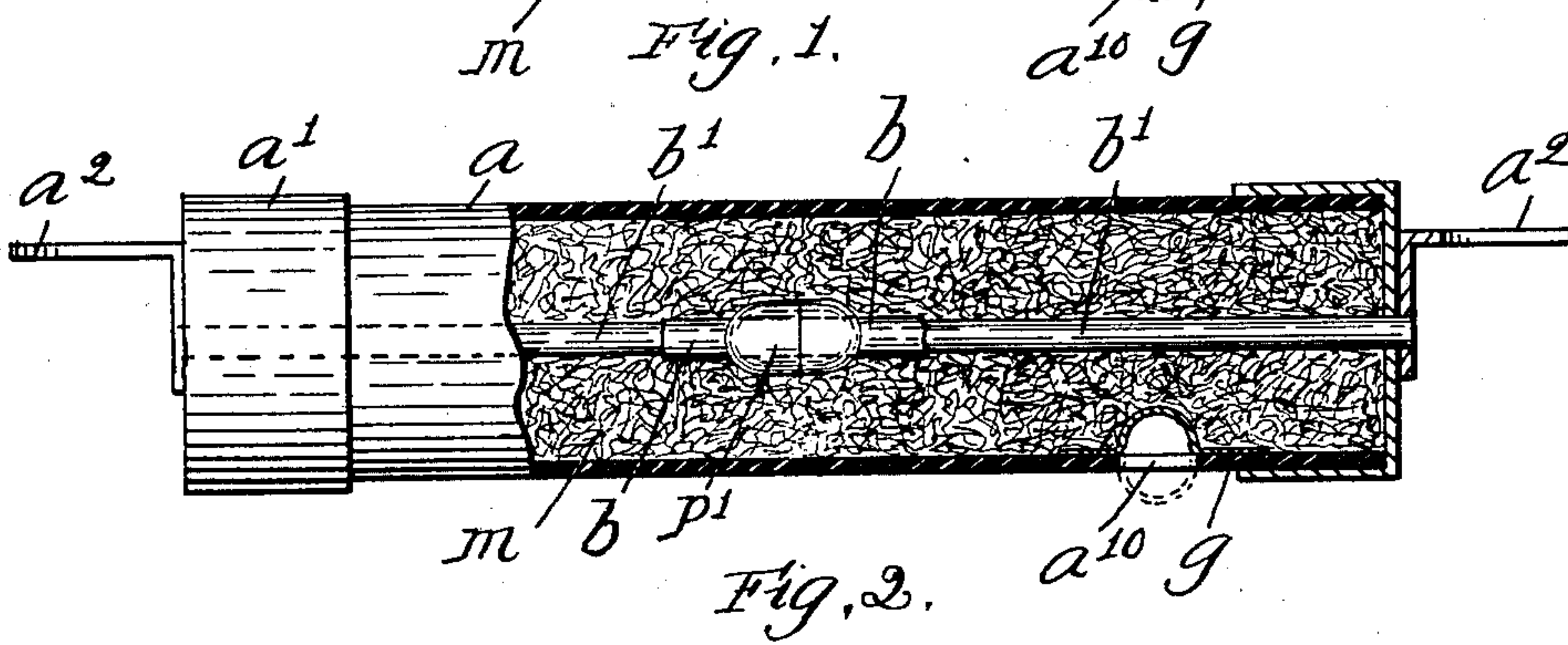


Fig. 2.

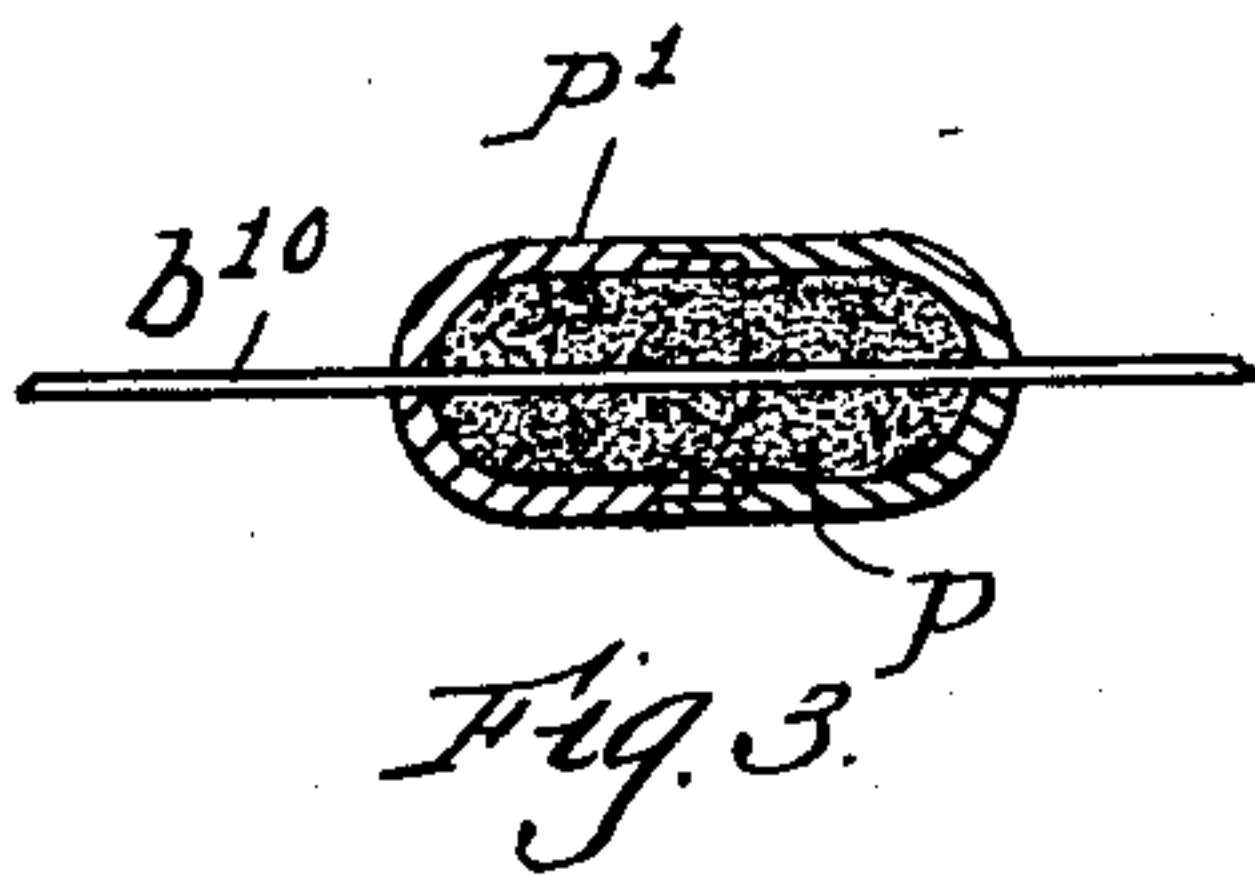


Fig. 3.

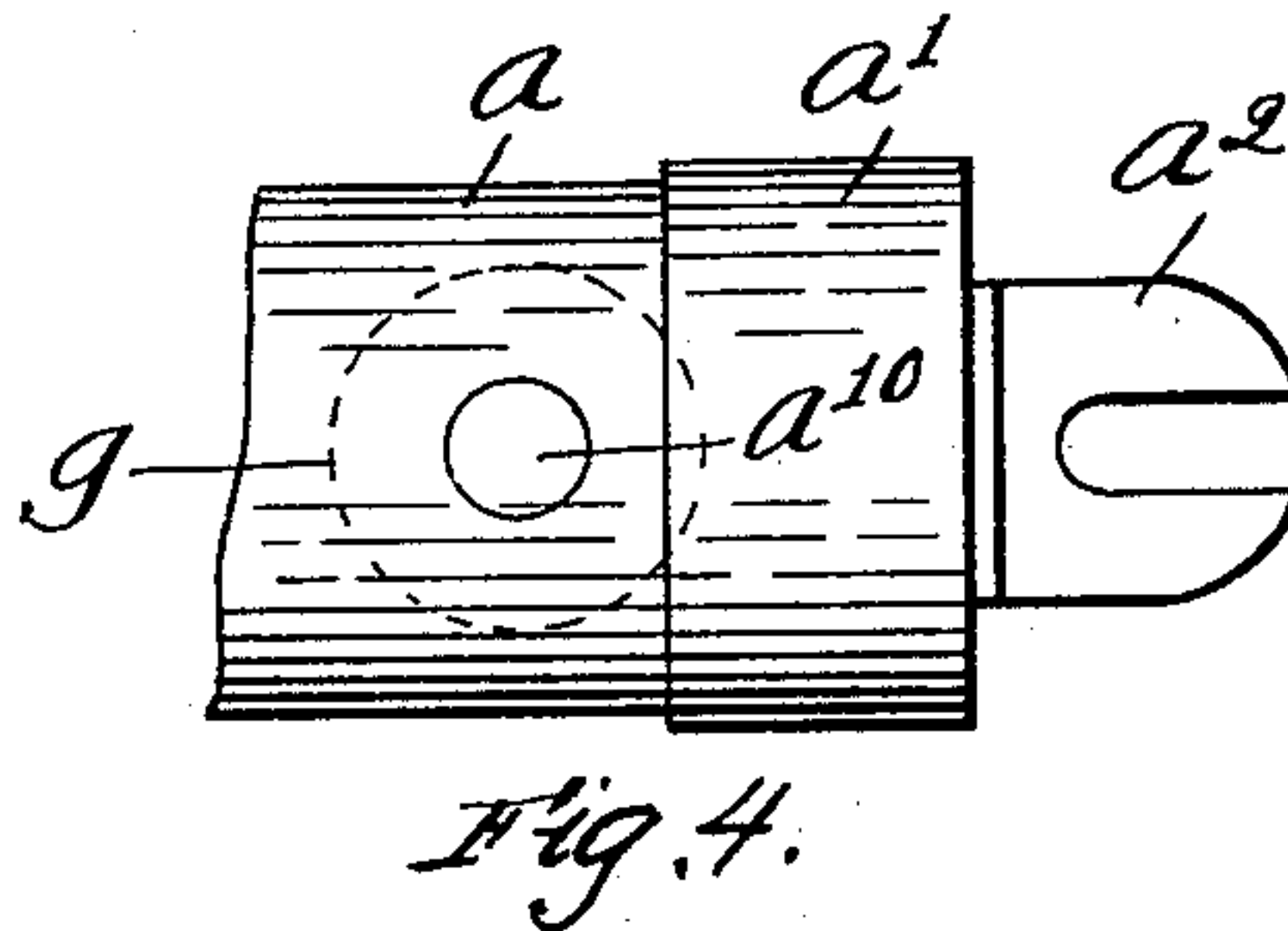


Fig. 4.

Witnesses:

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# UNITED STATES PATENT OFFICE.

HARRY L. MORSE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO CHASE-SHAWMUT CO., OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

## ELECTRIC FUSE OR CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 719,026, dated January 27, 1903.

Application filed July 25, 1902. Serial No. 116,918. (No model.)

*To all whom it may concern:*

Be it known that I, HARRY L. MORSE, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Electric Fuses or Cut-Outs, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to electric fuses or cut-outs, and is intended as an improvement upon the fuse or cut-out shown in my application for Letters Patent, Serial No. 95,190, filed February 24, 1902; and the invention has for its object to provide a novel indicating device adapted to be operated by an increase of pressure within the shell or case containing the fuse or other wire to indicate that said fuse or other wire has been ruptured; also, to provide a novel gas-producing element which is contained in the shell or case and adapted to be ignited by the arc produced by the rupture of the fuse-wire, whereby the pressure within the shell or case is increased. However, I desire it to be understood that the indicating device to be hereinafter described may be employed in a fuse or cut-out without regard to the construction or employment of a gas-producing element, and also the gas-producing element to be hereinafter described may be employed in a fuse or cut-out having any form of indicating device adapted to be operated by an increase of the pressure within the shell or case.

Figure 1 shows in side elevation and partial longitudinal section a fuse or cut-out embodying this invention. Fig. 2 is a similar view showing the gas-producing element connected with the fuse-wire directly in the circuit instead of with a shunt-wire, as shown in Fig. 1. Fig. 3 is a longitudinal section of the gas-producing element on an enlarged scale, and Fig. 4 is a side elevation of one end of the fuse or cut-out.

$a$  represents the cylindrical tubular body of the shell or case, and  $a'$   $a'$  the metallic end pieces or caps thereon, to which the terminal plates  $a^2$   $a^2$  are attached.

$b$  is the fuse-wire, which is contained within the shell or case, which is herein shown as

a fusible wire connected at its ends to rods  $b'$   $b'$ , the whole passing through said shell or case lengthwise and connected at its ends to the terminal plates  $a^2$ .

The shell or case is filled or packed with asbestos, gypsum, mica, or other refractory material  $m$ .

In Fig. 1 a wire  $b^{10}$  is connected at its ends to the rods  $b'$   $b'$ , which shunts the fuse-wire  $b$ , and in Fig. 2 this shunt-wire  $b^{10}$  is omitted.

In some types of fuses I employ the shunt-wire  $b^{10}$  and in others I do not.

The shell or case  $a$  is provided with a hole  $a^{10}$  of circular or other form.

The indicating device consists of a circular or other shaped piece of flexible and preferably foraminous material  $g$ —as cotton cloth, for instance—secured to or applied at the inside of the shell or case at the hole  $a^{10}$  and made of suitable size to more than cover said hole.

After the piece  $g$ , of cloth or other suitable material, has been placed in proper position in the shell or case that portion thereof covering the hole  $g$  is pressed inwardly, as shown, by means of a suitable peen or other tool. The pressed-in portion of the material  $g$  therefore projects more or less into the shell or case, yet, being flexible, is capable of being pressed outward into and through the hole in said shell or case, and thereby caused to project more or less from the shell or case, as represented by dotted lines, to visually indicate that the fuse-wire has been ruptured.

I prefer to employ foraminous material for the indicator, as provision is thereby made for the passage of the pressure through it to a certain extent, yet as the increase of pressure is quite sudden the pressed-in or inwardly-projecting portion of the piece  $g$  will be forced outward notwithstanding the employment of material which is more or less foraminous.

The pressure within the shell or case is increased when the arc is produced by a rupture in the fuse-wire; but as the increase in the pressure produced solely by the arc is not sufficient to be relied upon to operate the indicating device in all cases means are pro-



vided to positively insure a substantial increase in the pressure when the fuse-wire ruptures.

The gas-producing element herein shown comprises, essentially, a quantity of gas-producing material—such, for instance, as picrate of potassium or any equivalent material—represented at  $p$  and contained in a suitable capsule  $p'$ , the parts of which are separable for the introduction of the gas-producing material.

The capsule is intended to be located in close proximity to the fuse-wire, although in practice it is preferably connected to the fuse-wire—as, for instance, the fuse-wire may pass through it.

The capsule may be connected to the fuse-wire  $b$ , as shown in Fig. 2, or with the shunt-wire  $b^{10}$ , as shown in Fig. 1.

In operation the gas-producing material becomes ignited by the arc produced by the rupture of the fuse or other wire, yet is not ignited by any increase of temperature to and including the melting-point of the fuse-wire.

By the employment of a capsule a predetermined quantity of gas-producing material may be easily and cheaply provided and the same connected with the fuse or other wire in a secure manner, whereby accidental derangement of the parts is effectually provided against.

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

1. In an electric fuse or cut-out, a shell or case provided with a hole, a fuse-wire contained in said shell or case, and an indicating device at said hole consisting of a piece of flexible material covering said hole and adapted to be protruded therefrom by an increase of pressure in said shell or case, substantially as described.

2. In an electric fuse or cut-out, a shell or case provided with a hole, a fuse-wire contained in said shell or case and an indicating device at said hole consisting of a piece of flexible, foraminous material covering said hole and adapted to be protruded therefrom by an increase of pressure in said shell or case, substantially as described.

3. In an electric fuse or cut-out, a shell or case provided with a hole, a fuse-wire contained in said shell or case, and an indicating device at said hole consisting of a piece of flexible material covering said hole and formed with a depression at the hole, adapted to be protruded therefrom by an increase of pressure in said shell or case, substantially as described.

4. In an electric fuse or cut-out, a shell or case provided with a hole, a fuse-wire contained in said shell or case, a gas-producing element also contained in said shell or case, and an indicating device at said hole consisting of a piece of flexible material covering said hole and adapted to be protruded there-

from by an increase of pressure in said shell or case, substantially as described.

5. In an electric fuse or cut-out, a shell or case provided with a hole, a fuse-wire contained within it, refractory material contained in said shell or case between the fuse-wire and hole, and an indicating device at said hole consisting of a piece of flexible material covering said hole and adapted to be protruded therefrom by an increase of pressure in the shell or case, substantially as described.

6. In an electric fuse or cut-out, a shell or case provided with a hole, a fuse-wire contained within it, refractory material contained in said shell or case between the fuse-wire and hole, a gas-producing element contained in said shell or case, and an indicating device at said hole consisting of a piece of flexible material covering said hole and adapted to be protruded therefrom by an increase of pressure in the shell or case, substantially as described.

7. In an electric fuse or cut-out, a shell or case provided with a hole, a fuse-wire contained within it, a gas-producing element contained in said shell or case consisting of a quantity of gas-producing material and a capsule containing it, and an indicating device operated by an increase of pressure in said shell or case, substantially as described.

8. In an electric fuse or cut-out, a shell or case provided with a hole, a fuse-wire contained within it, a gas-producing element contained in said shell or case consisting of a quantity of gas-producing material and a capsule containing it, connected to the fuse-wire, and an indicating device operated by an increase of pressure in said shell or case, substantially as described.

9. In an electric fuse or cut-out, a shell or case provided with a hole, a fuse-wire contained within it, a gas-producing element contained in said shell or case, consisting of a quantity of gas-producing material and a capsule containing it, through which the fuse-wire passes, and an indicating device operated by an increase of pressure in said shell or case, substantially as described.

10. In an electric fuse or cut-out, a shell or case provided with a hole, a fuse-wire contained within it, a shunt-wire connected around the fuse-wire, a gas-producing element contained in said shell or case consisting of a quantity of gas-producing material and a capsule containing it connected with said shunt-wire and an indicating device operated by an increase of pressure in said shell or case, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HARRY L. MORSE.

Witnesses:

B. J. NOYES,  
H. B. DAVIS.