(No Model.) 2 Sheets—Sheet 1.

# R. A. MORGAN, Jr.

## SAFETY DEVICE FOR OVERHEAD CONDUCTORS.

No. 442,816. Patented Dec. 16. 1890.

Fig. 1.

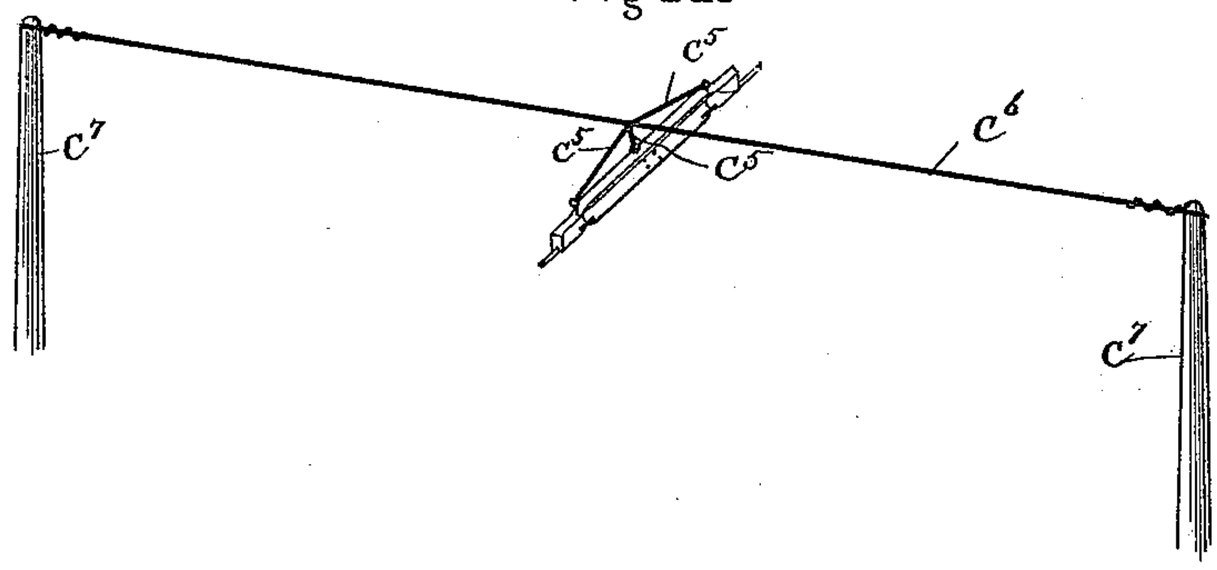



Fig. 5.

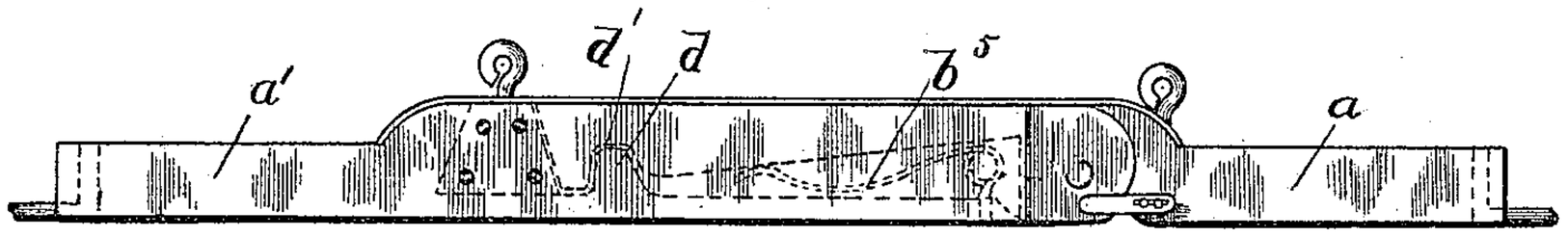



Fig. 2.

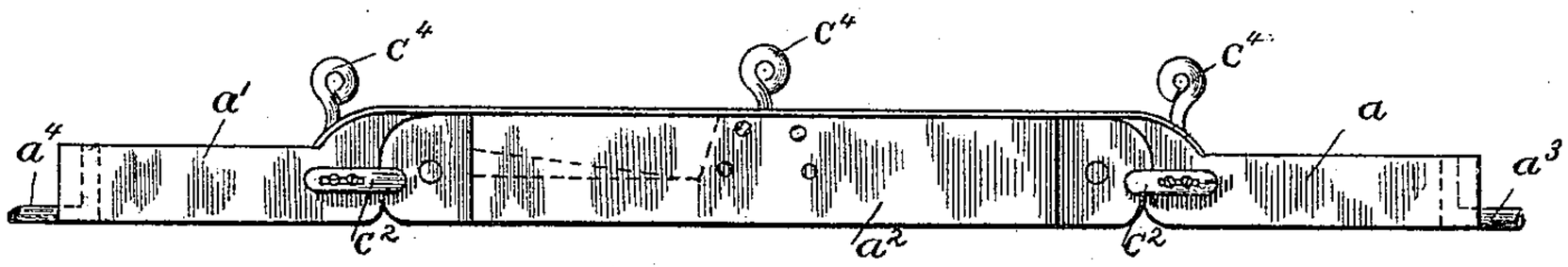



Fig. 3.

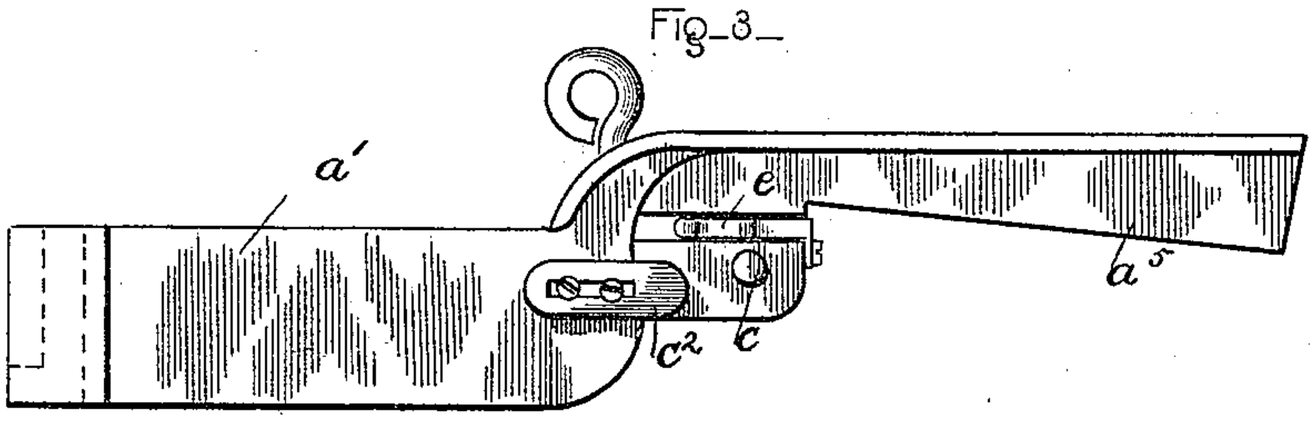
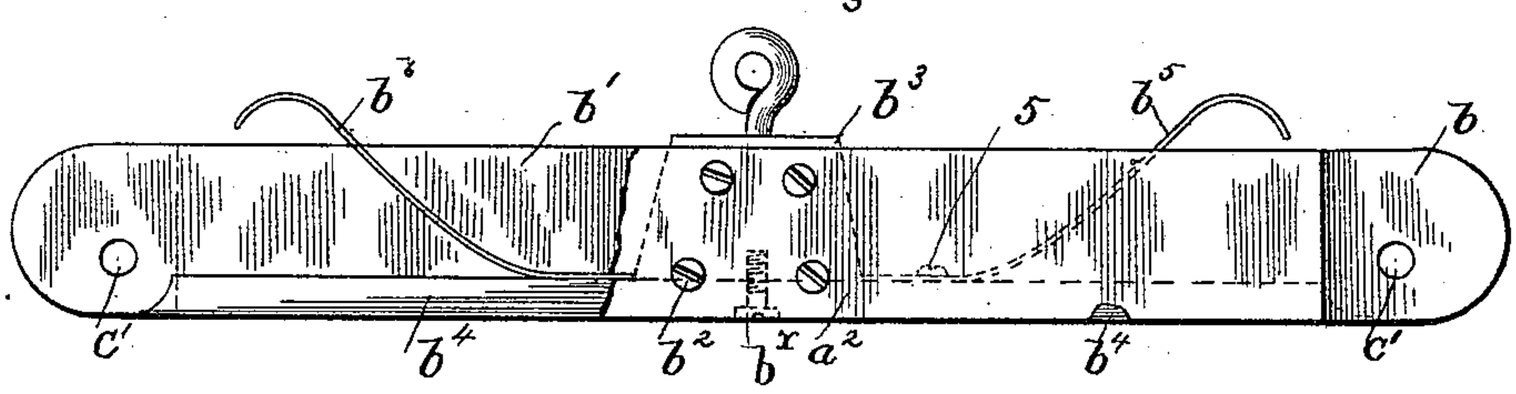



Fig. 4.




WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

# R. A. MORGAN, Jr.

## SAFETY DEVICE FOR OVERHEAD CONDUCTORS.

No. 442,816. Patented Dec. 16. 1890.

Fig. 6.

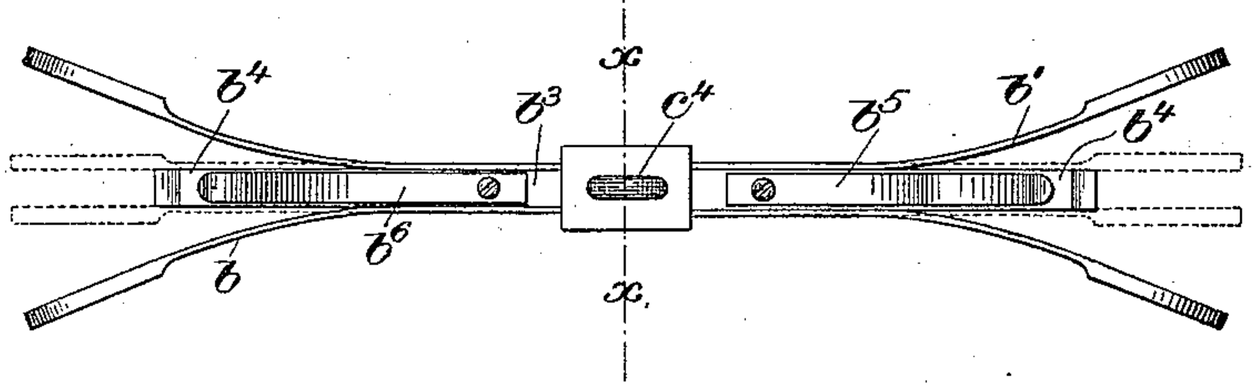



Fig. 7.

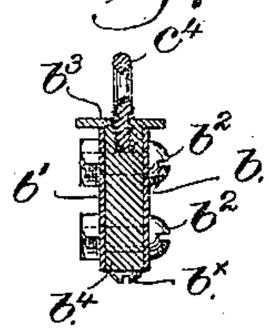
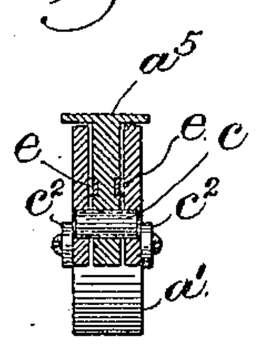



Fig. 8.

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# UNITED STATES PATENT OFFICE.

ROBERT A. MORGAN, JR., OF BOSTON, MASSACHUSETTS.

## SAFETY DEVICE FOR OVERHEAD CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 442,816, dated December 16, 1890.

Application filed March 14, 1890. Serial No. 343,819. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT A. MORGAN, Jr., of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Safety Devices for Overhead Conductors, 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 a safety device for overhead conductors, and is an improvement upon the safety device shown and described in United States Patent No. 417,497, granted to me December 17, 1889, and has for its object to improve and simplify the construction of the same.

In accordance with my present invention the safety device or switch is preferably made of two or more parts or members, one of which is made as a spring or is spring-actuated, so that when the overhead conductor is broken the said spring member is carried away from the member co-operating with it and the danger of an arc being formed between the said members is reduced to a minimum.

My invention therefore consists in the herein-described device for overhead conductors, comprising a rigid member, a spring member, and a locking device, whereby the spring member is secured to the rigid member and held locked thereto, while the overhead conductor remains intact, but is disconnected from the rigid member by the action of the spring member when the said conductor becomes broken, substantially as will be described.

Other features of my invention will be pointed out in the claims at the end of this specification.

Figure 1 represents a sufficient portion of an overhead electric-railway system provided with my improved safety device to enable my invention to be understood; Fig. 2, a side elevation of the form of safety device preferred by me; Fig. 3, a detail on an enlarged scale of one member of the safety device; Fig. 4, a detail on an enlarged scale, partially broken out, of the spring member of the safety device; Fig. 5, a modification to be referred to; Fig. 6, a top or plan view of the spring member, shown separately; Fig. 7, a transverse section on line $x\,x$, Figs. 2 and 6; and Fig. 8, a transverse section on line $y\,y$, Fig. 2.

My improved safety device or switch is preferably composed of two substantially rigid members $a\,a'$ and an intermediate spring-actuated member $a^2$, as shown in Fig. 2. The rigid members $a\,a'$ are preferably made of metal, and have secured to them in any suitable or desired manner sections $a^3\,a^4$ of a conductor, which may be the overhead wire of an electric-railway system, forming one branch or half of a circuit, the other branch or half of which is formed by the ground. Each rigid part or member $a\,a'$ is provided with an arm or extension $a^5$, (see Fig. 3,) which, as shown in Figs. 2 and 4, is adapted to extend between the two arms $b\,b'$ of the spring member $a^2$, the said arms being secured substantially near their center, as herein shown, by screws $b^2$ to a block $b^3$, preferably of metal. The block $b^3$ preferably has secured to its under side, as by screws $b^\times$, a bar $b^4$, which extends between the spring-arms $b\,b'$ on opposite sides of the block $b^3$ to substantially near the ends of the said arms. The bar $b^4$ on opposite sides of the block $b^3$ has secured to its upper face, as shown in Fig. 4, two springs $b^5\,b^6$, which in practice bear against the under side or surface of the arms $a^5$ of the rigid members $a\,a'$ when the spring member is secured in position between the said members and the latter are suspended.

Each of the rigid members $a\,a'$ is provided with a stud or post $c$, which is adapted to enter a hole or slot $c'$ in the ends of the spring-arms $b\,b'$ when the said spring-arms are fitted into position between the rigid members, as shown in Fig. 2, and the said spring-arms are maintained locked in such position, as herein shown, by a locking device shown as projecting clips or lugs $c^2$, secured to the rigid members.

The rigid members $a\,a'$ and the block $b^3$ of the spring member are provided, as herein shown, with hooks or eyes $c^4$, to which are secured tie-wires $c^5$, which in practice will preferably be connected to a span-wire $c^6$, or it may be to any other suitable means of support, the said tie-wires in practice being preferably connected in any suitable manner to a suitable insulator, (not shown,) which is sus-

pended from the span-wire, the latter being secured to posts $c^7$, located on opposite sides of the roadway or street.

In practice the sections $a^3$ $a^4$ of the trolley or other overhead conductor are first secured in position, and the spring member is then turned down into a position substantially at right angles to that shown in Fig. 2, and one end of the arms $b$ $b'$ is fitted over the stud $c$ on one rigid member, as $a$, and the said ends are compressed until the ends of the spring-arms come within the clips $c^2$, and thereafter the spring member is turned up into the position shown in Fig. 2, after which the opposite end of the spring-arms $b'$ $b$ are fitted upon the stud $c$ on the rigid member $a'$ and compressed until locked by the clips or lugs $c^2$. The tension on the wire sections $a^3$ $a^4$ is sufficient to keep the arms $a^5$ of the rigid members $a$ $a'$ down in position until released by the breaking of one of the wire sections—as, for instance, if the wire-section $a^3$ should become broken, the tension upon the rigid member $a$ would be withdrawn and the latter would tend to fall by gravity, but would be prevented from falling to the ground by its tie-wire $c^5$, the said rigid member falling but substantially a short distance below the span-wire.

When the wire section $a^3$ is ruptured, the spring $b^5$ assists gravity and turns the rigid member on the stud $c$ as a pivot until the lug or clip $c^2$ of the said rigid member is cleared or disengaged from the spring-arms $b$ $b'$, and as soon as the latter are released they fly apart or away from the rigid member $a$, thereby obviating formation of an arc between the rigid member and the said spring member.

The arms $b$ $b'$ are made of metal, and are shaped so as to have a spring action outward at their ends, and to assist the natural tendency of the spring-arms to fly outward each rigid member has secured to it auxiliary springs $e$, located substantially above the stud or post $c$.

I have thus far described my improved safety device or switch as composed of two rigid members and an intermediate spring member, and while I may prefer to adopt this construction I do not desire to limit my invention to the particular construction shown, as the said safety device may be variously modified to effect the complete and wide separation of the members when a wire section becomes broken.

In some instances only one spring-arm, as $b$, may be used, and this may be secured to or form part of one of the rigid members, as $a'$, as clearly shown in Fig. 5, and when thus made the bar $b^4$, which is secured to or forms part of the rigid member $a'$, is preferably provided with an upright stud or post $d$, adapted to fit into a socket or recess $d'$ on the under side of the arm $a^5$ of the rigid member.

With the safety device constructed substantially as shown in Fig. 5 the spring $b^5$ may be coiled at one end, and thus secured to the bar $b^4$.

I have herein described my improved safety device as employed in connection with an overhead conductor, forming part of a ground circuit; but I do not desire to limit my invention to its use with a ground circuit, as it may be used in connection with a metallic circuit.

I prefer to make the bar $b^4$ independent of the block $b^3$ and secure it to the said block by a screw $b^\times$, so that the said bar may be disconnected from the block and new springs $b^5$ $b^6$ substituted for the old ones in case it is desired to repair the said springs; but I do not desire to limit my invention in this respect, as the said bar may form an integral part of the block.

I claim—

1. The herein-described safety device for overhead conductors, comprising a rigid member, a spring member, and a locking device whereby the spring member is secured to the rigid member and held locked thereto while the overhead wire remains intact, but is disconnected from the rigid member by the action of the spring member when the said conductor becomes broken, substantially as described.

2. The herein-described safety device for overhead conductors, comprising two rigid members and an intermediate spring member, and locking devices to secure the spring member to the rigid members when the overhead conductor connected to the said rigid members remains intact, but which release the spring member when the overhead conductor is broken, substantially as described.

3. The combination, with an overhead conductor composed of sections, of a safety device comprising a rigid member to which one section of the conductor is secured and a spring member to which the other section is electrically connected, and independent tie-wires or supports for said members, substantially as described.

4. The combination, with an overhead conductor composed of sections, of a safety device consisting of rigid members to which the sections of the conductor are secured, an intermediate spring member, and a locking device to secure the spring member to the rigid member, and independent tie-wires or supports for said members, substantially as described.

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

ROBERT A. MORGAN, JR.

Witnesses:

JAS. H. CHURCHILL,

EMMA J. BENNETT.