July 25, 1933. M. E. MATHIEU 1,919,663

SAFETY DEVICE FOR OVERHEAD ELECTRIC LINES

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Fig. 1

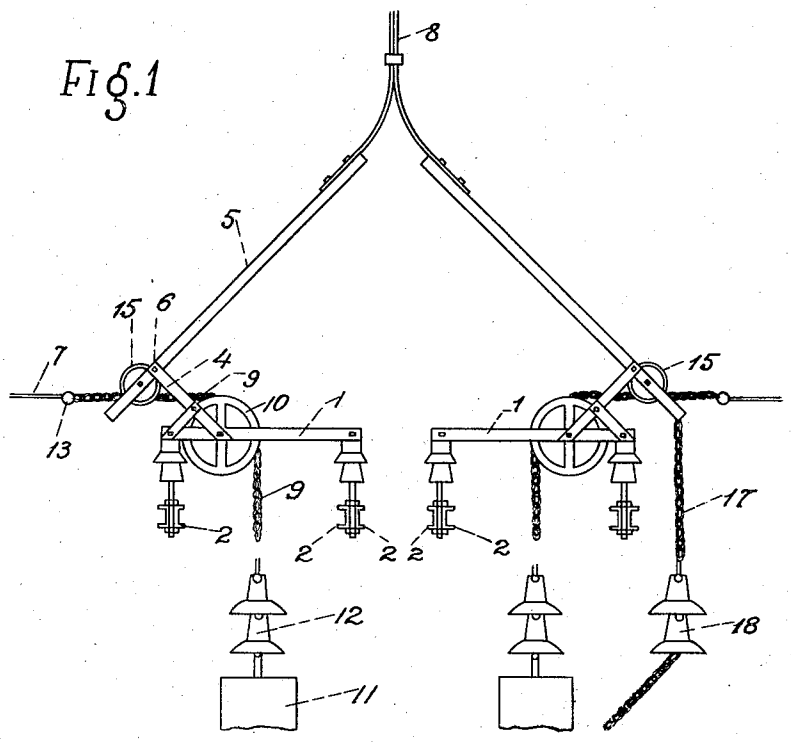

Fig. 3

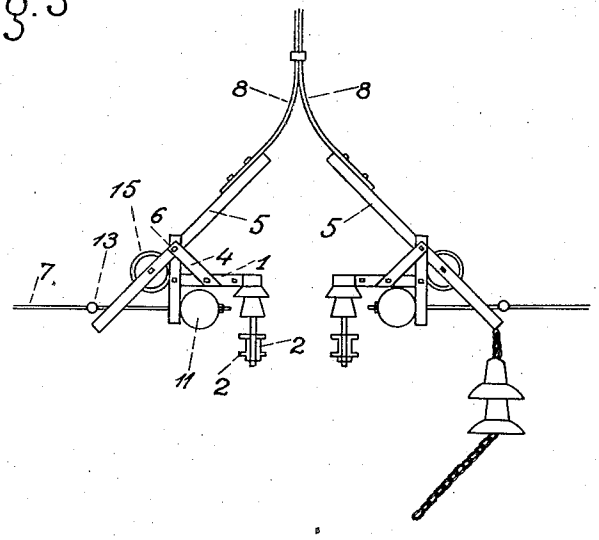

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FIG. 2

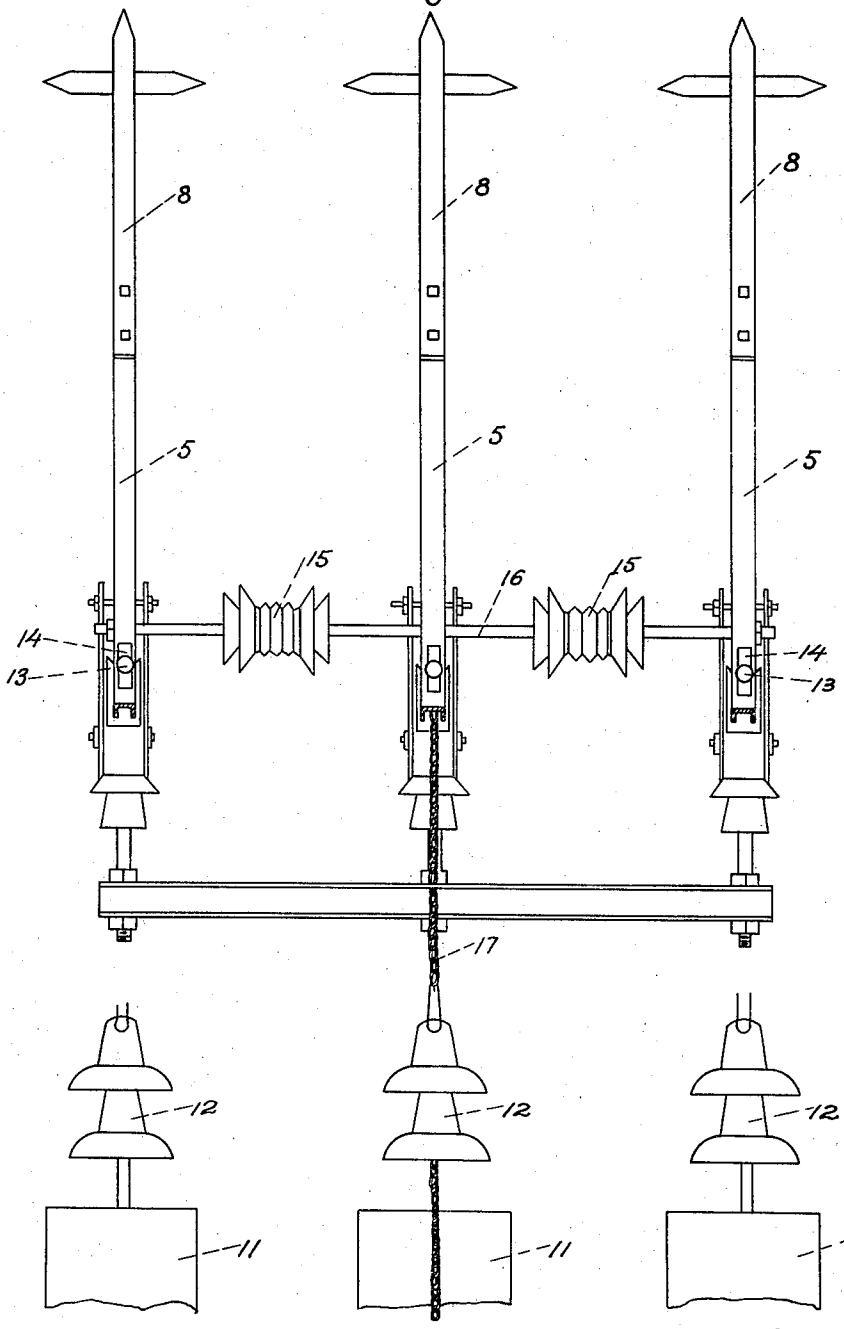

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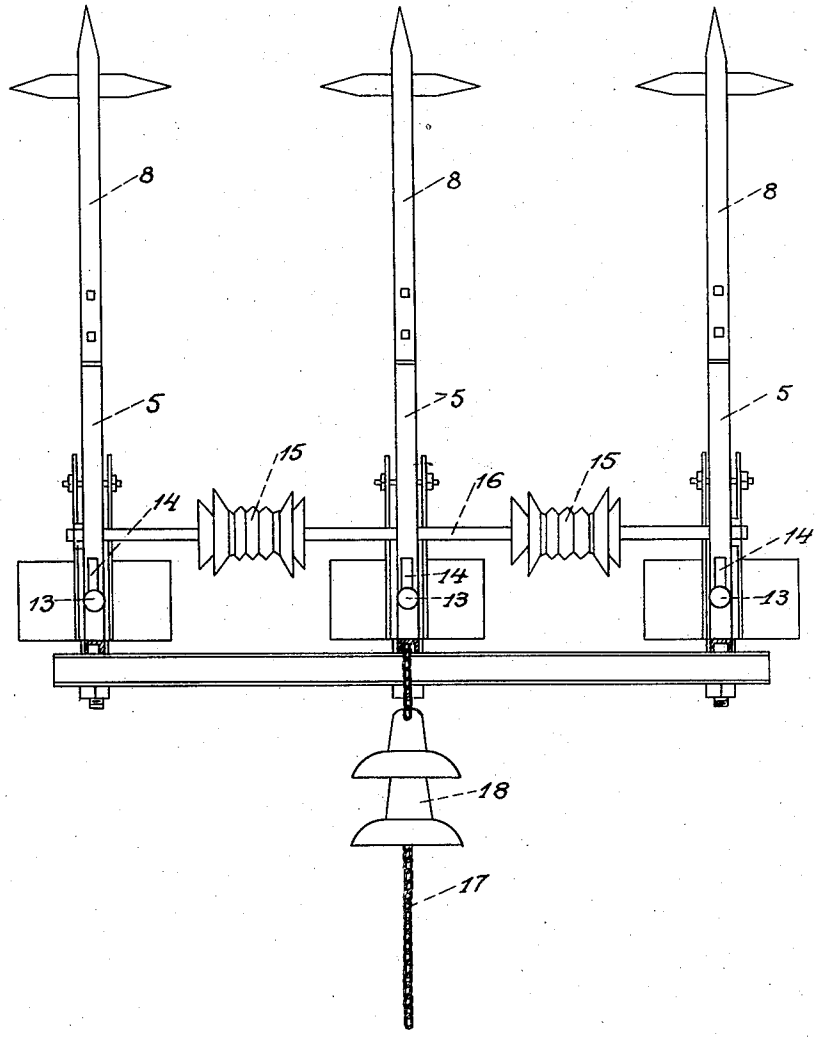
Fig. 4



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UNITED STATES PATENT OFFICE

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SAFETY DEVICE FOR OVERHEAD ELECTRIC LINES

Application filed March 8, 1933, Serial No. 660,072, and in France March 9, 1932.

My invention relates to overhead electric lines and its chief object is to provide a safety device for such lines that is capable of preventing the occurrence of any accident that might be caused by an accidental breaking of the line.

Another object of my invention is to provide a safety device of that kind that is further adapted to be used for cutting off the current in the line.

In order to obtain these results, the electric line is divided into a certain number of sections, and two adjacent sections are electrically connected together through two pivoting connecting elements normally in contact with each other. The end of each section is mechanically connected to a counterweight adapted to balance the tension of the line. Means, operatively connected with the counterweight, are adapted to cause the connecting elements to pivot out of contact with each other when the counterweights move a certain distance greater than a determined maximum value.

Preferred embodiments of my invention will be hereinafter described with reference to the accompanying drawings, given merely by way of example, and in which:

Fig. 1 is a diagrammatical side elevational view of the safety device according to my invention;

Fig. 2 is a corresponding elevational view at right angles to Fig. 1;

Figs. 3 and 4 are elevational views similar to Figs. 1 and 2 respectively illustrating a simplified embodiment of my invention.

In the device shown in Fig. 1, two bars 1, carried by supports 2, from which they are insulated by insulators 3. Said bars 1 support, through arms 4, connecting bars 5 pivoted at 6 to the ends of said arms 4. Said connecting bars are electrically connected to the line 7, and their upper ends 8 are applied against each other, thus electrically connecting together two sections of the line.

The end of a section 7 of the line is mechanically connected to a chain 9 wound around a pulley 10 journalled on bar 1. The other end of said chain 9 carries a counterweight 11 electrically insulated from chain 9 through insulators 12.

The lower end of connecting bar 5 is provided with a slot 14 through which chain 9 may slide freely. But said chain is provided with a stop 13 of a diameter greater than the width of said slot.

Counterweight 11 is so chosen as to normally balance the tension of the section of the line to which it corresponds.

The operation of the device is as follows: If, under certain variations of temperature or weather, the line is subjected to certain additional stresses, the counterweights move within certain limits, thus ensuring a substantially constant mechanical tension of the line. If, for any reason whatever, one or more of the conductors of the line is broken, the action of the corresponding counterweight is no longer balanced by the tension of the line. Said counterweight therefore moves down, driving chain 9 together with it. Stop 13 is thus brought into contact with the edges of slot 14 and bar is subjected to the action of counterweight 11 which causes it to pivot about point 6 so that it is no longer in contact with the connecting bar 5 of the adjacent section of the line. Any electric connection is therefore cut off between the broken section of the line and the other sections connected to a source of current.

The arrangement above described might not be sufficient if, one conductor of the line being broken, for instance the middle one in Fig. 2, the two other conductors remained connected to the source of current. The broken conductor might then come into contact with any of the two other conductors and accidents would still be possible.

In order to obviate this drawback, the connecting bars 5 of the conductors corresponding respectively to the three phases of the current are mechanically connected together and electrically insulated from one another. Under these conditions, when one of the conductors is broken, the action of its counterweight causes the three bars to pivot out of contact with the respective corresponding bars of the adjacent section.

An example of such an arrangement is shown in Fig. 2. It consists of rods 16 rigidly connecting together the three connecting bars 5, insulators 15 being inserted between said rods so as to electrically insulate said bars from one another.

The length of a section of electric line provided with the device according to my invention depends on the length of the displacements that the counterweight is allowed to have, on the diameter and on the nature of the conductors. It may vary between 3 and 5 kilometers.

An operating chain 17 is fitted to the middle connecting bar, as shown in Figs. 1 and 2. Said chain is provided with insulators 18. It serves to cut off at will the circuit of the line.

The safety device according to my invention can be adapted to overhead electric lines made according to the ordinary methods. Such an embodiment is shown in Figs. 3 and 4. The connecting bars are disposed as in the preceding example. The ends of the conductors are adapted to slide in their supports. The ends of each conductor has, attached to it, a counterweight 11′ bearing against the support and the weight of which is sufficient for causing, in case of the conductor being broken, stop 13 to act on the lower end of the connecting bar so as to rotate it and cut off the electric connection between the two adjacent sections of the line.

While I have described what I deem to be preferred embodiments of my invention, it should be well understood that I do not wish to be limited thereto as there might be changes made in the arrangement, disposition, and form of the parts without departing from the principle of my invention as comprehended within the scope of the appended claims.

What I claim is:

1. A safety device for overhead electric lines which comprises in combination, a conductor forming a section of the line, pivoting contact means for electrically connecting said section of the line to another conductor, a counterweight mechanically connected to said section of the line, and means, operatively connected with said counterweight, for causing said contact means to pivot out of contact with the second mentioned conductor when the counterweight has moved a distance greater than a predetermined value.

2. A safety device for overhead electric lines, which comprises in combination, a conductor forming a section of the line, a pivoting bar for electrically connecting said section of the line to another conductor, a pulley, a chain passing round said pulley and fixed at one end to the first mentioned conductor, the lower end of said pivoting bar being provided with an opening through which said end of the chain passes freely, a stop on said chain adapted to butt against the edges of said opening, and a counterweight fixed to the other end of said chain.

3. A safety device according to claim 1 further comprising at least another conductor corresponding to another phase of the current, pivoting contact means for the last mentioned conductor, rigid means for mechanically connecting the last mentioned pivoting contact means with the first mentioned pivoting contact means, and means for electrically insulating the last mentioned pivoting contact means from the first mentioned contact means.

4. A safety device according to claim 2 further comprising at least another conductor corresponding to another phase of the current, a pivoting bar for the last mentioned conductor, rigid means for mechanically connecting together the two bars, and means for electrically insulating from each other said two bars.

5. A safety device according to claim 1 further comprising means for manually operating said pivoting contact means.

6. A safety device according to claim 2 further comprising a chain operatively connected with said bar, and at least an electrical insulator provided in said chain, whereby said pivoting bar can be manually operated.

7. A safety device for overhead electric lines which comprises in combination, a support, a conductor forming a section of the line, the end of said conductor being slidably mounted in said support, a pivoting bar for electrically connecting said section of the line to another conductor, the lower end of said pivoting bar being provided with an opening through which said end of the conductor passes freely, a stop on said conductor adapted to butt against the edges of said opening, and a counterweight fixed to the end of the conductor and butting against said support.

8. A safety device according to claim 7 further comprising a chain fixed to the lower end of said pivoting bar, and at least one electrical insulator provided in said chain, whereby said pivoting bar can be manually operated.

MARIE ERNEST MATHIEU.