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L. R. GOLLADAY

INDICATING DEVICE FOR LIGHTNING ARRESTERS

Filed May 10, 1922

Fig. 1.

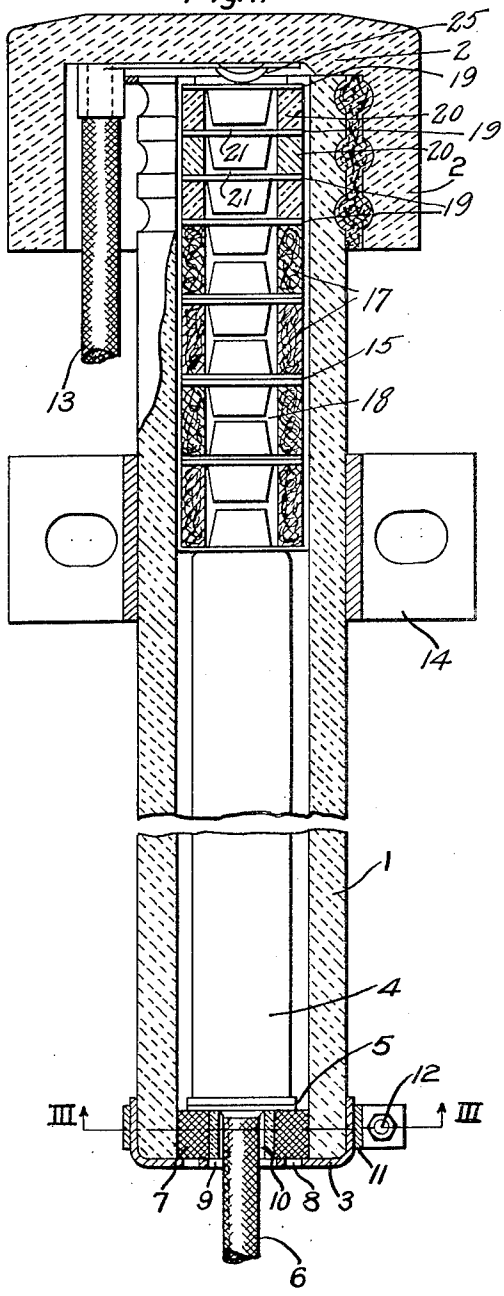


Fig. 2.

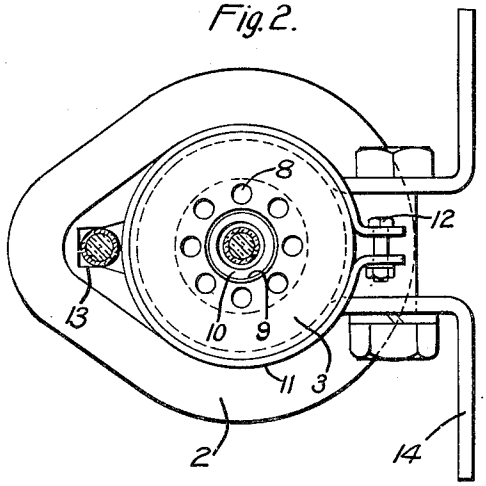
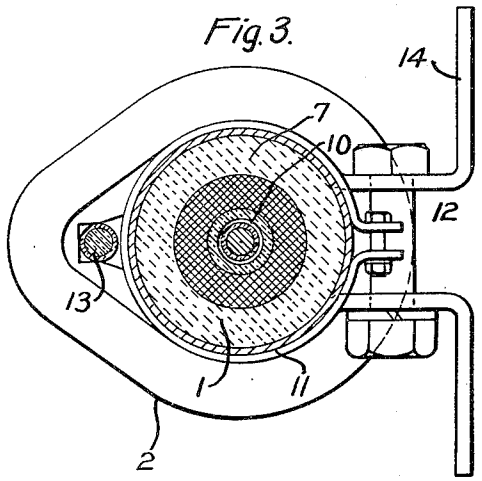


Fig. 3.



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UNITED STATES PATENT OFFICE.

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INDICATING DEVICE FOR LIGHTNING ARRESTERS.

Application filed May 10, 1922. Serial No. 559,916.

My invention relates to indicating devices, more especially to devices for protecting electrical installations in power-transmission circuits from abnormal voltages.

It is among the objects of this invention to provide a device of the above designated character which shall be of simple, compact structure, inexpensive to manufacture and efficient in its operation.

It is a further object of this invention to provide a device which shall indicate, by a visual inspection, the condition of the elements contained therein.

In my copending application, Serial No. 562,150, filed May 19, 1922, is described a lightning arrester comprising a cylindrical porcelain housing containing a resistor element and a plurality of series and shunt-gap electrodes which are connected to terminal leads projecting through the ends of said housing.

My present invention is directed to an improvement in the means for securing the series resistor and ground leads to the housing so that, if the arrester fails from any cause, excepting a direct stroke of lightning, it results in overheating the series resistor and thereby indicating failure of the device. I accomplish this by resting the resistor element upon a fusible base, such as wax, in which a bushing is embedded. Upon overheating of the resistor, the wax melts and escapes, allowing the resistor and gap elements to move downwardly to provide a large gap in the arrester. At the same time, the bushing drops out of the arrester, indicating that the device has failed.

In the accompanying drawings, constituting a part hereof and in which like reference characters designate like parts,

Figure 1 is a longitudinal sectional view of a device made in accordance with this invention;

Fig. 2 is an end view thereof; and

Fig. 3 is a cross sectional view taken along the line III—III of Fig. 1.

The device consists of a cylindrical insulating housing 1, such as porcelain, having an end cap 2 secured thereto and containing a plurality of electrodes and a resistor as described in the above-identified application, which are supported by an end cap or base 3 secured to the housing 1. The resistor 4 rests on a bottom terminal plate 5 secured to a terminal conductor or ground lead 6. The terminal plate 5 is supported by an annular column 7 of fusible material, such as wax or a similar substance having a low melting temperature.

The cap 3 is provided with a plurality of openings 8 and a central opening 9. A sleeve 10 of suitable insulating material, such as a fibrous material impregnated with the well-known phenolic condensation products, is embedded in the wax column 7 below the terminal plate 5. The end cap 3 is secured to the housing by a clamp strip 11 held by a bolt 12. The arrester may be secured by a mounting bracket 14 on the cross-arm of a pole, or like support.

Any suitable or usual form of columnar lightning arrester may be utilized in my device. As set forth in my co-pending application hereinabove mentioned, the arrester may comprise a plurality of shunt gap electrodes 15 which are superposed on the resistor rod 4 and which are spaced by annular spacing collars 17 of a suitable resistance material to provide a number of resistance-shunted gaps 18. Superposed over the set of shunt gap electrodes 15 is a second set of electrodes 19 which are spaced by insulating collars 20 to provide a plurality of series gaps 21. The lightning arrester column may be maintained in place by a spring 25 interposed between the cap 2 and the top of the column.

My apparatus functions as follows: The device is connected to a line to be protected by the lead 13 and to the ground by lead 6 and is designed to be inoperative at normal line voltages. If, for any reason, the device is defective, resulting in overheating of the resistor 4, as may be caused by an abnormal voltage in the line, the heat melts the wax column 7 supporting the terminal plate 5. The molten wax escapes through the openings 8, causing the terminal plate 5 to drop on the end cap 3, due to the weight of the resistor rod 4 and the series and shunt gap electrodes, (not shown) thereby forcing out the sleeve 10 through the opening 9, making it visible to the inspector that the device is defective. The melting of the wax produces a large gap between the upper terminal and the gap electrodes of the lightning arrester, thereby increasing the resistance of the arrester and preventing discharge of the line

current therethrough. The apparatus may then be dismantled and the elements replaced to again put it in operative condition.

It will be readily understood from the above description of my invention that a protective device provided with an indicating element, such as is described herein, simplifies the inspection of a lightning arrester in a distributing system which is impossible in the ordinary enclosed arrester. It also makes it easy to determine the trouble occurring in such a system in a simple and expeditious manner. The indicating means is of simple structure and is inexpensive, thereby but slightly increasing the total cost of the device and greatly enhancing its value in service.

Although I have described a specific embodiment of this invention, it will be obvious to those skilled in the art that various modifications may be made in the details of construction thereof without departing from the principles herein set forth. For instance, any fusible material of a low melting temperature may be substituted for the wax employed in the terminal support and the end cap may be of any suitable design to facilitate the functioning of the device as herein described.

I claim as my invention:

1. An indicating device comprising a structure to be supported, a supporting means comprising fusible material disposed underneath said structure and means for so supporting said fusible material as to enable it to support said structure, and a bushing normally embedded in said fusible material and released by the fusion thereof.

2. An indicating device comprising a base adapted to support a structure and having a plurality of openings, a fusible material disposed between said base and structure and indicating means operated by the fusion of said material, said indicating means comprising an insulating bushing embedded in said fusible material and adapted to project through one of said openings in said base.

3. An indicating device comprising a base secured to an insulating housing and adapted to support a resistor element and having a plurality of openings therein, a fusible material having an insulating bushing embedded therein disposed between said base and column, said bushing being adapted to escape through one of said openings when said material fuses.

4. In a protective device comprising a plurality of members constituting a discharge path, an inclosing casing having a base supporting said members, a fusible mass disposed between said base and said members and means adapted to be expelled through said base for visually indicating abnormal operation of said device.

5. In a protective device comprising a plurality of members constituting a discharge path, an inclosing casing having a base supporting said members, a fusible mass disposed between said base and said members and a bushing actuated upon the fusion of said mass for visually indicating abnormal operation of said device.

6. In a protective device comprising a plurality of members constituting a discharge path, an inclosing casing having a base supporting said members, a fusible mass disposed between said base and said members and a bushing disposed under said members and adapted to be expelled through said base upon the fusion of said material.

7. A lightning arrester comprising gap electrodes including a bottom terminal plate and terminal conductor, an enclosing casing, and a separate fusible supporting member for retaining said terminal plate in position within said casing.

8. A lightning arrester comprising gap electrodes including a bottom terminal plate and terminal conductor, an enclosing casing, a separate fusible supporting member for retaining said terminal plate in position within said casing, and means associated with said casing for retaining said terminal plate after said fusible member has melted and after said terminal plate has dropped sufficiently to prevent the discharge of line current through the arrester.

9. A lightning arrester comprising gap electrodes, a resistor rod, and an enclosing casing, said structure comprising a fusible part for permitting a part of the structure to fall down within said casing.

10. A lightning arrester comprising gap electrodes, a resistor rod, and an enclosing casing, said structure comprising a fusible part for permitting a part of the structure to fall down within said casing to prevent the continued discharge of line current therethrough.

11. In a lightning arrester, the combination with a plurality of gap electrodes, a bottom terminal plate, and a terminal conductor secured to said terminal plate, of an enclosing casing, and a separate fusible supporting member of insulating material disposed below said terminal plate for retaining the same in position.

12. A lightning arrester comprising a vertically disposed insulating cylindrical supporting casing, a high-potential lead entering the upper portion of said casing, a column of active material disposed within said casing, a flexible ground lead suspended from the bottom of the arrester, and supporting means disposed below the bottom of said column, said means operating upon the occurrence of abnormal heating of said column to permit said column to fall downwardly, the upper portions of said casing remaining intact.

13. A lightning arrester comprising a vertically disposed insulating cylindrical supporting casing, a high-potential lead entering the upper portion of said casing, a column of active material disposed within said casing, a flexible ground lead suspended from the bottom of the arrester, and supporting means disposed below the bottom of said column in spaced relation above the lower end of said supporting cylinder, said means operating upon the occurrence of abnormal heating of said column to permit said column to fall downwardly, the upper portions of said casing remaining intact.

14. A lightning arrester comprising a vertically disposed insulating cylindrical supporting casing, a high-potential lead entering the upper portion of said casing, a column of active material disposed within said casing, a flexible ground lead suspended from the bottom of the arrester, supporting means disposed below the bottom of said column in spaced relation above the lower end of said supporting cylinder, said means operating upon the occurrence of abnormal heating of said column to permit said column to fall downwardly, the upper portions of said casing remaining intact, and means for limiting the downward movement of said column whereby the same is retained within said cylindrical casing.

15. A lightning arrester comprising a vertically disposed insulating cylindrical supporting casing, a high-potential lead entering the upper portion of said casing, a column of active material disposed within said casing, said column comprising a resistor rod and a plurality of discharge electrodes in superposed relation, a flexible ground lead suspended from the bottom of the arrester, and supporting means disposed below the bottom of said column, said means operating upon the occurrence of abnormal heating of said column to permit said column to fall downwardly, said resistor rod being disposed at the bottom of the column whereby the heat generated within the device is greater at the lower end.

In testimony whereof, I have hereunto subscribed my name this 2nd day of May, 1922.

LAWRENCE R. GOLLADAY.