Aug. 30, 1938. F. C. LA MAR 2,128,418

INDICATOR

Filed July 16, 1936

Fig. 1.

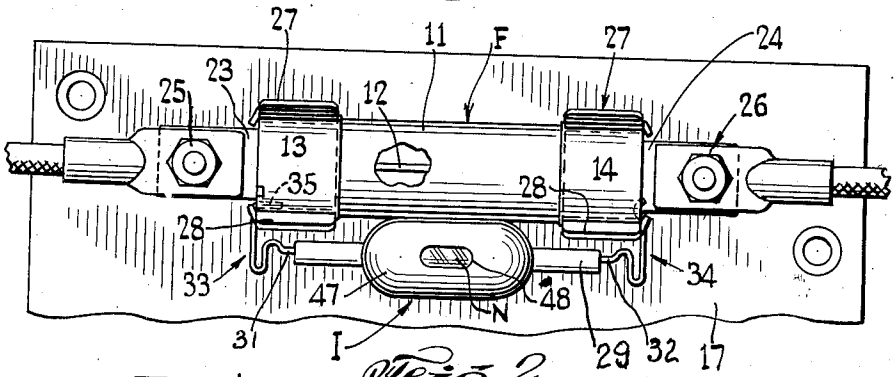


Fig. 2.

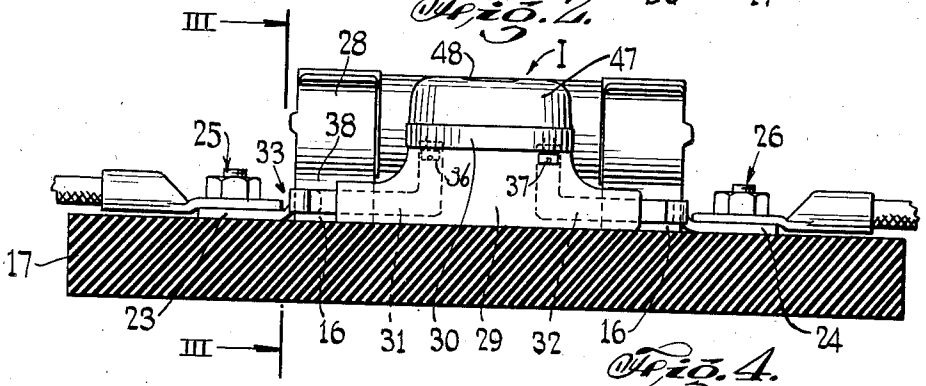


Fig. 4.

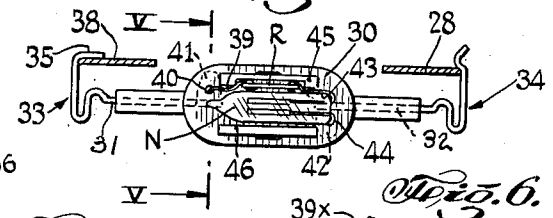


Fig. 3.

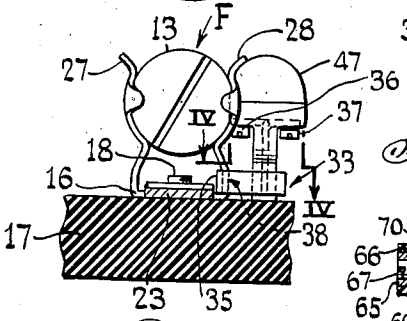


Fig. 9.

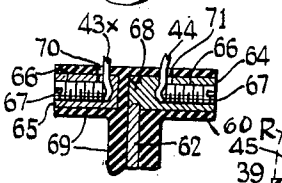


Fig. 6.

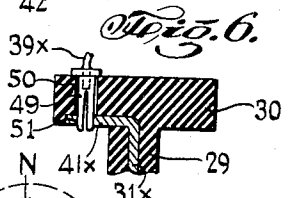


Fig. 7.

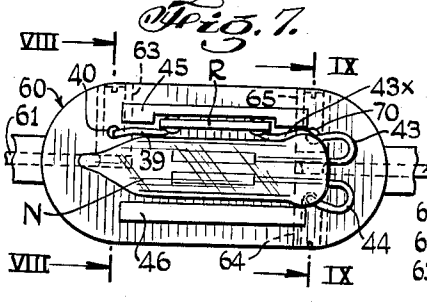


Fig. 8.

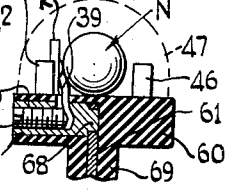
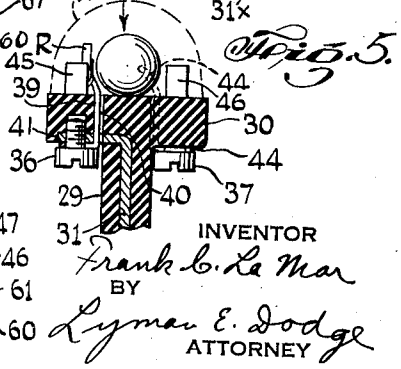


Fig. 5.



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INDICATOR

Frank C. La Mar, New York, N. Y.

Application July 16, 1936, Serial No. 90,859

11 Claims. (Cl. 200—121)

This invention relates to electrical fuse devices, especially to integrity indicator means for cartridge type fuses, and more particularly to the class of such integrity indicators in which the indicator device is formed as a unitary structure having an entity distinct from that of the cartridge fuse or other type of fuse with which the indicator device is intended to be assembled in use.

The present invention is an improvement upon the type of integrity indicator disclosed in my Letters Patent No. 1,951,308, issued March 13, 1934.

Among the requirements which are desirably to be satisfied by a fuse integrity indicator intended for assembly with a cartridge type fuse, and to provide for which is an object of the present invention, is the requirement that it shall be readily capable of electrical connection with the fuse cartridge, as for example by connection to the spaced apart electrical terminals by which the fuse is contacted and held and thereby included in the circuit to be protected; also that such an integrity indicator shall be adaptable for use with cartridge fuses of generally standard sizes and type, though differing in non-essential details; also that its adaptation to a given type of fuse can be effected without alteration of the structure of the fuse cartridge by a user, and that if any alteration of fuse cartridge, or of the integrity indicator, shall be required of the manufacturer, in its adaptation to one or another make of fuse, such alteration shall be of an inconsiderable character, and may be performed at the manufactory instead of at the place of installation of the cartridge fuse and indicator.

A further requirement is to have the integrity indicator so conjoined with the fuse cartridge structure that it will not be displaced by the vibrations and shocks encountered ordinarily in the use of such fuses and their cooperating integrity indicators; also that the integrity indicator shall be so disposed with relation to the fuse that its presence will not interfere at all with manipulation of the fuse cartridge during inspection, testing, adjustments and renewals thereof.

Many of the integrity indicators at present applied to cartridge fuse installations for the aforesaid purpose, fail to satisfy the foregoing requirements in various respects, and none of such indicators is to be regarded as meeting all of the requirements in a completely satisfactory manner.

Among the outstanding deficiencies that have been characteristic of fuse integrity indicators, may be mentioned their tendency to shake off and fall into positions where they cause dangerous shorts, or crosses, in the electrical circuits sought to be protected by the fuse, and the integrity or condition of which is desirably to be indicated; also the tendency to become loose to such an extent that the electrical contact is impaired, or broken, even if the indicator is apparently in place, a condition which is dangerous for the reason that a defective circuit condition may exist without being signalled, the normal appearance of the indicator being deceptive.

Another deficiency of certain of the integrity indicators for cartridge type fuse elements now upon the market is that when the fuse is to be removed it is necessary first to remove the integrity indicator, or in some cases to remove the integrity indicators concurrently with the fuse, and this undesirable condition has prevailed in particular with one form of protective device including a cartridge which comprises a fuse element and an integrity indicator element disposed side by side upon a supporting base common to both.

In some instances, the integrity indicator element has been disposed below the level of the cartridge fuse element in the usual elongated space of substantially triangular cross-section defined by the conventional cylindrical barrel of the cartridge and the meeting edge between the surface of the base and an upright wall member extending from the base. This arrangement is not altogether satisfactory, for the reason that the visibility of the indicating means is not good, owing to its partial concealment by the barrel of the fuse cartridge.

Under such conditions it is an outstanding object of the present invention to provide an integrity indicator element adapted to be mounted alongside of the fuse cartridge element upon a supporting mount which carries the indicator means at a level near that of the cartridge fuse, and in a position where it will afford, when energized, a perfectly visible and attention-arresting signal; also to provide a pair of connectors adapted to include said indicator means in a shunt with said fuse cartridge element across the terminals by which the last-named element is connected into the circuit to be protected, and to aid in supporting the mount for the indicating means firmly in upright position.

A further object of the invention is to provide an assembly comprising the elements combined and cooperating as just set forth and so disposed that the cartridge fuse element and the indicating

means will be removable selectively, each while the other remains in place, thereby avoiding the possibility that when the user replaces the cartridge fuse element, he will forget to replace the integrity indicator means; or if he has happened to lose or mislay the indicator will neglect to repair the omission, so that the fuse element will be left without indicating means, thus defeating the purpose of a protective installation of this class.

Other objects and advantages will appear as the description of the particular physical embodiment selected to illustrate the invention progresses, and the novel features will be particularly pointed out in the appended claims.

In describing the invention in detail and the particular physical embodiment selected to illustrate the invention, reference will be had to the accompanying drawing and the several views thereon, in which like characters of reference designate like parts throughout the several views, and in which:

Figure 1 is a view in plan of a protective device for an electrical circuit in which a fuse cartridge element is shown in assembly with a support and provided with an integrity indicator element in the construction of which the present invention has been embodied; Fig. 2 is a view thereof in side elevation; Fig. 3 is a view in vertical section on the line III—III of Fig. 2, the view being taken in the direction indicated by the arrows at the end of the line; Fig. 4 is a detail view in horizontal section on the line IV—IV of Fig. 3, the integrity indicator element being uncovered therein; Fig. 5 is a fragmentary detail view in vertical section taken on the line V—V of Fig. 4; Fig. 6 is a view similar to Fig. 5 of a modified form of connector terminal; Fig. 7 is a fragmentary detail view in plan, and upon a larger scale, of a modified form of indicator element, and the mounting structure therefor; Fig. 8 is a view in vertical section, taken on the line VIII—VIII of Fig. 7; Fig. 9 is a view in vertical section taken on the line IX—IX of Fig. 7.

In a now preferred embodiment of the present invention selected for illustration and description, the member designated generally by the reference character F is an electrical fuse of the cartridge type, the part **11** being a barrel or cylindrical body of insulating material confining the fusible element **12**, which, according to conventional usage, has suitable electrical connections (not shown) with metal terminal caps or ferrules **13** and **14**. In the instance illustrated, the cartridge F is held in operative position by metal clips **27** and **28** of known form, the feet **16** thereof being spaced apart and respectively secured to a block **17** of insulating material by screws **18** which may be desirably tapped into straps **23**, **24** furnished with binding screws **25**, **26** which constitute the terminals by which the protective device as an entity is connected into the electrical circuit to be protected.

The structure above identified is of conventional type, and intended to be merely illustrative, it being understood that the upright spring clip members **27** and **28**, extending upward from the feet **16**, as shown in Fig. 3, embrace, and serve to retain yieldingly, the metal caps **13** and **14**, making good mechanical and electrical connection therewith, so that a stout pull is required to remove the fuse plug F from its clipped position shown, in which its contained fuse element **12** operates normally to protect the circuit in known manner.

In order to afford a desirable visual and attention-arresting indication of the fusing of the element **12** by passage therethrough of an electrical current of predetermined strength, provision is made, pursuant to the present invention, of an indicating device designated generally by the reference character I, and which is supported upon the base **17** by means of an elongated body or mount **29** bearing an oblong platform **30** on which is carried the indicating means N to be described later herein, the mount **29** being preferably made of insulating plastic material in which are moulded a pair of metal connector straps **31** and **32** extended, as at **33** and **34** (see Fig. 1) and bent to form clips of suitable contour to be engaged with an appropriate part of the terminal structure at each end of the protective device. In the instance illustrated, the connector clip **33** has an L-shaped end **35** adapted to be tucked behind the lower portion **38** of one of the spring clip members **28** in the instance illustrated in Fig. 3, forming good mechanical and electrical connection therewith.

With the exception noted below, the connector clip **34** at the other end of the body may be desirably of identical structure in general respects with that of the hook **35**, inasmuch as the connector arms **33** and **34** are designed respectively to afford a sturdy anchorage for the associated end of the elongated body member **29** of the indicator element, it being understood that the indicator device herein shown and described is merely an illustrative example of numerous such integrity indicators which may be substituted at will in the protective assembly embodying the present invention. The clip **34**, in the present instance, is of suitable contour, as shown, to snap readily over the contiguous edge of the upright part **28** of the adjacent cartridge clip, and can be snapped off, but has a sufficiently stiff spring-characteristic to insure its retentive action when not released manually.

The connection between the indicator means I and its connectors **31** and **32** may be provided for in various ways, and it is effected, in the instance shown in Figs. 1 to 5 inclusive, by means of binding screws **36** and **37**, one for each of the connectors, as **31**, (see Fig. 5) which are formed with offset lugs **41** and **42**, only one of which is shown in Fig. 5, the other being disposed symmetrically at the other end of the elongated body **1** (see Fig. 4). The lugs **41** and **42** are so moulded into the platform **30** that their under surfaces are exposed to receive each binding screw, as **36**, (see Fig. 5) from which a conductor **39** may desirably extend upward through an orifice **40** to one end of a resistance R associated with a suitable form of indicator means, as N, to which a conductor **43** runs from the other end of resistance R.

The indicator means N may conveniently take the form of a neon-filled discharge lamp with exterior terminals **43** and **44** (see Fig. 4), the latter of which terminals is bound by screw **37** to the adjacent lug **42** of connector **32** while the terminal **43**, as already indicated, is soldered to the adjacent end of the resistance R, the latter being preferably of the order of 50,000 to 100,000 ohms. In Fig. 4, curbs **45** and **46** of insulating material are shown at each side of the platform to aid in positioning the lamp N and its cover **47**, the cover being provided with an orifice **48** through which the glow of the lamp may be viewed when energized to signal fusion of the fusible element **12**.

As long as the fusible element **12** of the car-

tridge remains intact, the current will find an easier path through 12 than through the lamp N, by reason of the high resistance R in series with the lamp, but the latter will be energized whenever sufficient current is diverted therethrough by fusion of the fusible element 12; whereupon a visible and attention-arresting indication of the impaired circuit condition will be yielded by the characteristic neon glow, visible through the window, 48.

The integrity indicator I is so disposed that it does not interfere in the least with the testing, removal and other manipulation of the fuse cartridge F, and conversely the integrity indicator may be tested, removed and otherwise manipulated in complete independence of the cartridge fuse element.

The disposition of the binding screws 36 and 37 beneath the platform 30 removes the connections at that region from any likelihood of contact therewith by metal objects likely to create crosses or short-circuits, an advantage which will be understood by persons skilled in the art, without further description.

A similar advantage is secured by the modifications illustrated in Figs. 6 to 9, in lesser degree perhaps, but by means which facilitate manipulation of the binding means.

In Fig. 6, for example, the electrical connection between the strap 31*x* and a conductor 39*x*, like that designated 39 in Fig. 5, and adapted to serve similarly for the inclusion of an integrity indicator N in shunt with the cartridge fuse element in the circuit to be protected, is completed by simply inserting a split plug 49 through a bore 50 into an orifice 51 in the lug 41*x* of the connector strap 31*x*, the latter being in general respects identical with the connector strap 31, already described. It will be understood that a like split plug 49 (not shown) is provided on the other side of the shunt circuit in place of the binding screw 37. These split plugs may be used desirably where the use of binding screws is not obligatory.

In Figs. 7, 8 and 9 a modification of the mount is shown in which a platform 60 carries an indicator lamp N like that of the earlier figures and provided with similar terminals 43 and 44. As shown in Fig. 8, the electrical connections with the straps 61 and 62, (moulded, as before into the structure of the mount 60) are made through the medium of tubular members 63, 64 and 65, of which those designated 63 and 64 are riveted respectively, as at 68, to the straps 61 and 62 respectively, and each plug has a screw-threaded bore 66 in which is screwed a binding screw 67.

The plug 63, as shown in Fig. 7, receives a conductor 39 which is led down from the resistance R through an orifice 46 like that described with reference to Fig. 5, and from the other end of the resistance R, the bare end of conductor 43*x* leads down through an orifice 70 into position to be bound in the plug 65 (see Figs. 7 and 9) in company with the conductor 43, thus establishing good electrical connection between the lamp N and resistance R, either of which may be replaced without essential disturbance of the other, by loosening the appropriate binding screws 67.

Similarly, the other terminal conductor 44 from lamp N is led, through orifice 71, (see Figs. 7 and 9) to plug 64 and is there held by binding screw 67 in operative position and it may be removed readily by loosening screw 67 in that plug. The screws 67 are accessible, and at the same time are protected by the insulating material of platform 60.

Although I have particularly described one particular physical embodiment of my invention and explained the operation, construction and principle thereof, nevertheless, I desire to have it understood that the form selected is merely illustrative, but does not exhaust the possible physical embodiments of the idea of means underlying my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. As a new article of manufacture, an integrity indicator for use with a cartridge fuse, said integrity indicator having a body member adapted to be mounted alongside of said cartridge fuse, and an indicating means carried by said body member at a level near that to be occupied by said cartridge fuse, said body member having a foot adapted to stand firmly on the base which supports the cartridge fuse and to extend outwardly therefrom to the indicating level.

2. As a new article of manufacture, an integrity indicator for use with a cartridge fuse, said integrity indicator having a body member adapted to be mounted alongside of said cartridge fuse, an indicating means carried by said body member at a level near that to be occupied by said cartridge fuse, and a pair of connector members adapted to include said indicator means in a shunt with said cartridge fuse across the terminals of the circuit to be protected, said body member having a foot adapted to stand firmly on the base which supports the cartridge fuse, extending outwardly therefrom to the indicating level, and said body, foot, indicating means and connecting members constituting a unitary structure, easily attachable to the cartridge fuse clips and readily detachable therefrom.

3. As a new article of manufacture, an integrity indicator for use with a cartridge fuse, said integrity indicator having a body member adapted to be mounted alongside of said cartridge fuse, and having a foot of adequate length to derive a substantial stance from the conventional base on which the cartridge fuse is supported, and attenuated in its lengthwise dimension, so as to be conformable to a confined space in an enclosure for the fuse cartridge and integrity indicator, an indicating means carried by said body member at a level near that to be occupied by said cartridge fuse, and a pair of connector members adapted to include said indicator means in a shunt with said cartridge fuse across the terminals of the circuit to be protected, said connector members each having a terminal clip adapted to constitute an easily attachable-detachable mechanical connection with a terminal clip of the cartridge-fuse-supporting structure, and to derive therefrom physical support to aid in maintaining said indicator means in its intended position.

4. An integrity indicator element comprising a mount comprising an elongated, relatively thin body of plastic material formed with a platform; an indicator means and a resistance mounted on said platform; and metal connector straps having exterior clips for attachment, and also having moulded-in strap portions extending to the vicinity of said platform; said integrity indicator element being also characterized by having electrical connections established between the moulded-in ends of said connectors and said indicator means and resistance respectively, said connections including binding screws on the lower

face of said platform and conductors leading upward through the platform to said indicating means and resistance.

5. An integrity indicator element comprising a mount comprising an elongated, relatively thin body of plastic material formed with a platform; an indicator means and a resistance mounted on said platform; and metal connector straps having exterior clips for attachment, and also having moulded-in strap portions extending to the vicinity of said platform; said integrity indicator element being also characterized by having electrical connections established between the moulded-in ends of said connectors and said indicator means and resistance respectively, said connections including binding plugs and screws set into the lateral face of the platform and conductors leading upward from said plugs through the platform to said indicating means and resistance respectively.

6. An integrity indicator element comprising a mount comprising an elongated, relatively thin body of plastic material formed with a platform; an indicator means and a resistance mounted on said platform; and metal connector straps having exterior clips for attachment, and also having moulded-in strap portions extending to the vicinity of said platform; said integrity indicator element being also characterized by having electrical connections established between the moulded-in ends of said connectors and said indicator means and resistance respectively, said connections comprising split plugs set removably through orifices in said platform into lugs formed at the ends of said connector members and conductors leading from said split plugs to said indicating means and resistance respectively.

7. As a new article of manufacture, a mount for an integrity indicator of the class described, said mount comprising an elongated, relatively thin body of plastic material formed with a transverse platform and metal connector straps having exterior clips for attachment, and moulded-in portions extending to the vicinity of said platform.

8. As a new article of manufacture, a mount for an integrity indicator of the class described, said mount comprising an elongated, relatively thin body of plastic material formed with a transverse platform and metal connector straps having exterior clips for attachment, and moulded-in portions extending to the vicinity of said platform, said platform being also provided with integral curbs extending upward from its free surface to cooperate in the emplacement of indicator and resistance devices thereon.

9. As a new article of manufacture, a mount for an integrity indicator of the class described, said mount comprising an elongated, relatively thin body of plastic material formed with a transverse platform and metal connector straps having exterior clips for attachment, and moulded-in portions extending to the vicinity of said platform, said platform being also provided with integral curbs extending upward from its free surface to cooperate in the emplacement of indicator and resistance devices thereon and a cover member adapted to be fitted removably over said platform and its associated devices.

10. As a new article of manufacture, an integrity indicator element comprising a mount made of plastic material with moulded-in connector members and formed with a platform provided with orifices through which conductors may be led from said connector members to the surface of said platform, and an indicating means, and a resistance mounted on said platform and respectively having conductors by which said indicating means and resistance are connected removably with said connector members.

11. As a new article of manufacture, an integrity indicator element comprising a mount made of plastic material with moulded-in connector members and formed with a platform provided with orifices through which conductors may be led from said connector members to the surface of said platform, and an indicating means, and a resistance mounted on said platform and respectively having conductors by which said indicating means and resistance are connected removably with said connector members, and a removable cover member enclosing said platform and associated parts, said cover having an orifice through which said indicating means may be viewed.

FRANK C. LA MAR.