March 29, 1932. W. WEICKER 1,851,882

SUSPENSION INSULATOR

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Fig. 5.

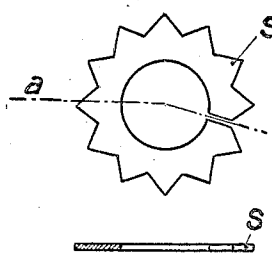


Fig. 6. (a-b)

Fig. 7.

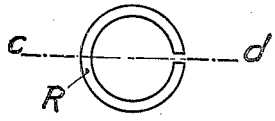


Fig. 8. (c-d)

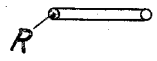


Fig. 9.

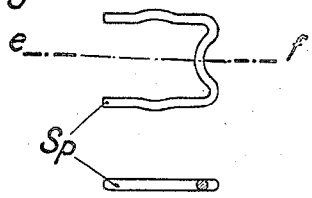
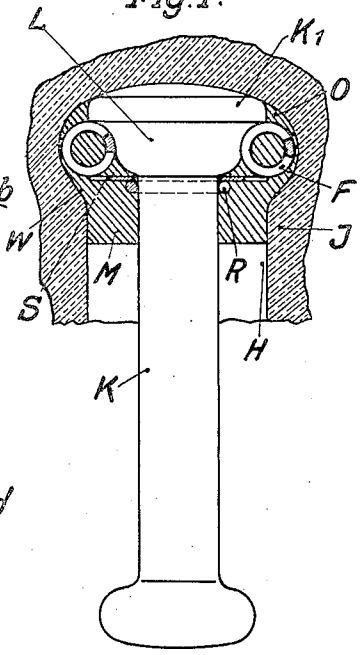


Fig. 10. (e-f)

Fig. 1.



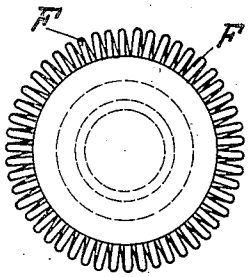


Fig. 2.

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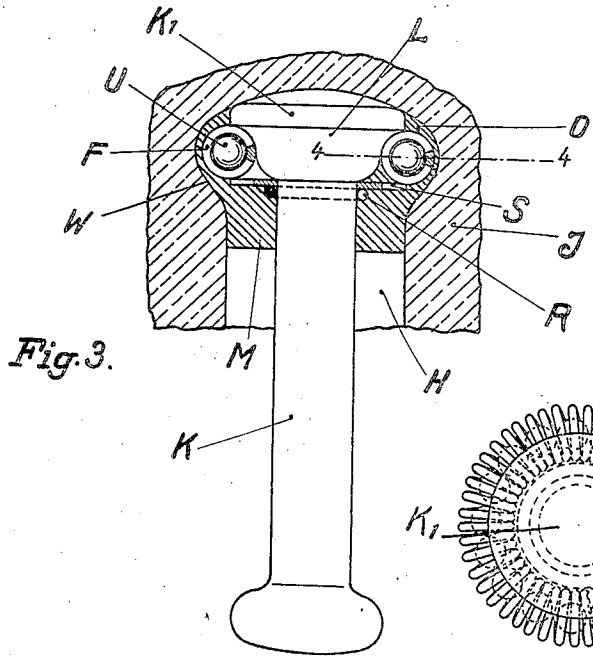

Fig. 3.

Fig. 4

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UNITED STATES PATENT OFFICE

WILLIAM WEICKER, OF KLOSTERLAUSNITZ, GERMANY, ASSIGNOR TO HERMSDORF-SCHOMBURG-ISOLATOREN G. M. B. H., OF HERMSDORF, THURINGEN, GERMANY

SUSPENSION INSULATOR

Application filed February 25, 1928, Serial No. 256,879, and in Germany October 10, 1927.

This invention concerns improvements in or relating to suspension insulators and to the manner of securing the insulator pins therein.

Generally speaking it has long been known to secure the pin in the pin cavity of the insulator by providing it with an enlarged head which can just be inserted through the throat of the cavity, which is widened at the bottom, and then filling the cavity by casting in a cement mass consisting mainly of Portland cement. When solid this cement material transmits the tensional stress acting on the pin to the insulator body as compressive stress. Due to the difference in the co-efficients of expansion of the porcelain and Portland cement, however, many difficulties were encountered which several years ago led to the cement material being replaced by a comparaitvely readily melting metal, for example, an alloy of lead and aluminium or other metals, which is poured in to the pin cavity in a liquid condition after the pin has been inserted and, when solid, secures the pin. This again has been found to have the disadvantage that in the case of sudden temperature rises in the insulator, such as may occur in the event of a flashover or arc, the metal filling melts and the pin falls out of the insulator.

One object of my invention is an insulator in which the pin is retained within the cavity even in case of a melting of the metal filling.

Another object of my invention is an insulator in which the pin is secured by means of an annular member which is, on the one hand, sufficiently rigid to serve as a holder for the pin and yet, on the other hand, sufficiently capable of being deformed to permit its introduction into the insulator cavity.

Other more specific objects of my invention will appear from the description hereinafter and the features of novelty will be pointed out in the claims.

The invention is illustrated by way of example in the accompanying drawings, in which:

Fig. 1 shows an axial section through a part of a suspension insulator provided with my invention, the pin being shown in elevation;

Fig. 2 the plan view of the pin and the coordinated elements;

Figs. 3 and 4, views similar to Figs. 1 and 2, of a modification; Figs. 5 and 6 illustrate a securing plate; Figs. 7 and 8 a securing ring; Figs. 9 and 10 another securing device.

Referring to the drawings the insulator body, indicated diagrammatically by J (Fig. 1), which may be of any desired known shape, has the usual pin cavity O which narrows downwardly to the throat H to such an extent that the enlarged head K_1 of the pin K can just be inserted therethrough. A yielding or resilient annular member, consisting in this case of a spring ring F wound from a wire spiral, is inserted between the pin K and the upwardly flaring wall W of the cavity. The spiral ring is preferably arranged on the pin K in such a manner that it bears from below against the pin head K_1. Due to its springy and resilient nature it may be introduced through the constricted throat H and, when it has entered the enlarged pin cavity O, returns again to its natural form. Thereupon a securing device, such as a washer S preferably provided with a slit, is placed over the pin stem to keep the annular member F in position. The washer may be pressed from below against the spring ring F so that it bears tightly against the said ring and presses the latter in turn tightly against the lower surface of the pin head K_1. The washer S and the spring ring F are secured in this position by placing a split pin Sp (Fig. 9) or a spring ring R (Fig. 7) on the pin stem and pressing it from below against the washer S so as to prevent the latter from sliding down the stem. The liquid metal M is then cast in and the pin head together with the securing devices S and R (or Sp) embedded therein, this creating when solid, a secure connection between the pin and the insulator body. In order to be certain that the liquid metal enters the coils of the spring ring F and fills the entire free space within the cavity the washer S is, as illustrated in Fig. 5, provided at the edge with incisions giving the washer for example, a toothed shape.

In order to prevent the annular member F

from being pressed out of the cavity when an axial pull is exerted on the pin K, the annular member is so constructed or coordinated with the pin that it is incompressible in radial direction. This object may be achieved in various ways without rendering the ring incapable of being deformed for the purpose of introduction into the cavity.

As illustrated in Fig. 4, the windings of the annular spiral touch each other at the line of the smallest diameter. A radial compression is rendered impossible thereby if the wire, under the exertion of pressure, is strong enough to maintain the cross-sectional shape of the helical coil. I want it to be clearly understood that the term "annular wire spiral" is intended to define a helical coil being so bent that its axis forms a circle.

Another way of rendering the annular member substantially incompressible in radial direction consists in slipping the same upon a shoulder L of the pin so that it bears with its inner circumference against the pin, as shown in Fig. 1.

Another way consists in filling the interior of the spiral with rigid bodies. In the embodiment illustrated in Figs. 3 and 4, a plurality of rigid bodies such as balls U of steel or other strong material, are arranged in the interior of this spring ring F, it being preferable to provide as many as can be filled in. The introduction is best effected before the ends of the coil forming the ring are soldered together but may also be carried out with the aid of a filling opening produced by bending apart two adjacent turns of the coil.

The provision of such balls does not interfere in any way with or cause difficulty in the introduction of the spring ring together with the pin into the interior of the upwardly enlarged cavity in the insulator; on the other hand they stiffen or strengthen said ring in such a manner that the mechanical safety is substantially increased.

The invention offers the following advantages:

If, the insulator being in the finished condition, the spring ring F is in the correct position illustrated in Fig. 1 and the metal filling melts and runs out due to a sudden temperature increase caused by an arc or the like, then the pin does not fall out but rests with its head K_1 and the spring ring F located therebelow on the wall W of the pin cavity.

It is obvious that the absence of the metal filling M does not render the connection between the pin and the insulator inoperative, because the annular member F cannot be pulled out of the cavity on account of the resistance which it offers to forces tending to compress it in radial direction.

What I claim is:—

1. An electric insulator comprising an insulator body provided with an inwardly flaring cavity, a headed pin inserted therein, an annular wire spiral inserted between said pin and the wall of said cavity, rigid bodies in the interior of said wire spiral, securing means attached to said pin to keep said spiral in position thereon, and a filling poured into said cavity to fill the free space therein.

2. An electric insulator comprising an insulator body provided with a pin cavity having an inwardly flaring wall, a one-piece pin entirely of hard metal having an enlarged downwardly and inwardly tapering head inserted in said cavity, and an annular wire coil of circular cross-section inserted between said wall and the head of the pin, said annular wire coil when in inserted position bearing with its inner circumference against the head and not extending therebelow, and a metal filling poured into said cavity to fill the free space therein.

3. An electric insulator comprising an insulator body provided with a pin cavity having an inwardly flaring wall, a one-piece pin entirely of hard metal having an enlarged downwardly and inwardly tapering head inserted in said cavity, and an annular wire coil of circular cross-section inserted between said wall and the head of the pin, said annular wire coil when in inserted position bearing with its inner circumference against the head and not extending therebelow, securing means attached to the pin to keep said coil in contact with the pin head, and a filling poured into said cavity to fill the free space therein.

4. An electric insulator, comprising an insulator body provided with a pin cavity having an inwardly flaring wall, a one-piece pin entirely of hard metal having an enlarged downwardly and inwardly tapering head inserted in said cavity, an annular wire coil of circular cross section inserted between said wall and the head of the pin, said annular wire coil when in inserted position bearing with its inner circumference against the head and not extending therebelow, securing means attached to one of the two first mentioned elements to keep said coil in contact with the pin head, and a filling poured into said cavity to fill the free space therein.

In testimony whereof I affixed my signature.

WILLIAM WEICKER.