June 9, 1942. V. GROSSE 2,285,964

HIGH TENSION INSULATOR

Filed Oct. 23, 1940

Fig. 1.

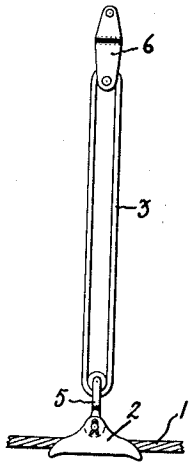


Fig. 2.

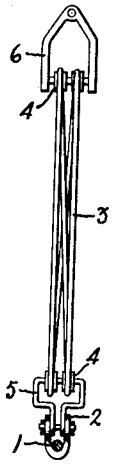


Fig. 6.

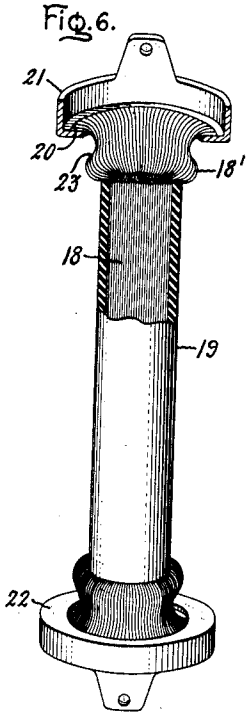


Fig. 3.

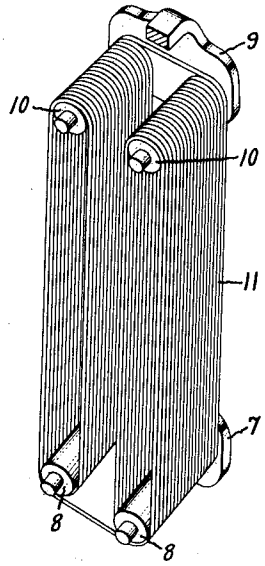


Fig. 4.

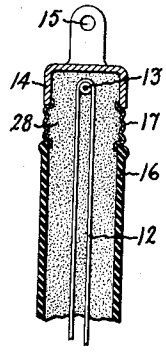


Fig. 5.

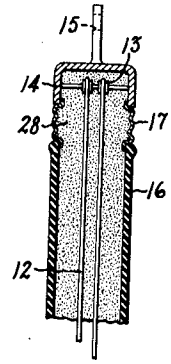
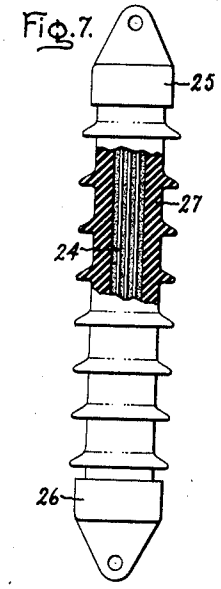


Fig. 7.



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Patented June 9, 1942

2,285,964

UNITED STATES PATENT OFFICE

2,285,964

HIGH TENSION INSULATOR

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Application October 23, 1940, Serial No. 362,437
In Germany November 9, 1939

3 Claims. (Cl. 174—179)

The present invention relates to high tension insulators and especially to high tension insulators comprising flexible suspension means.

The object of the invention is to provide an improved construction and arrangement in a high tension insulator of the above type, and for a consideration of what is believed to be novel and the invention, attention is directed to the following specification and the claims appended thereto.

In the drawing, Fig. 1 is a side elevation of a high tension insulator arrangement embodying the invention; Fig. 2 is a side view of the construction shown in Fig. 1; Fig. 3 is a perspective view of a further modification; Figs. 4 and 5 are detail views similar to Figs. 1 and 2 of an arrangement similar to that shown in Figs. 1 and 2 wherein the glass ropes are enclosed in protective casings; Fig. 6 is a view partly in section of a further modification; and Fig. 7 is a similar view of still another modification.

According to the invention, the insulator comprises a suspension member formed of flexible glass fibers woven to form a glass strand, rope or the like. The rope or strand may be made up of threads, bands or strings formed from individual glass fibers. Preferably, several parallel lengths of the glass rope or strand are utilized to form a suspension member.

Referring first to Figs. 1 and 2, 1 indicates an electrical conductor or cable mounted in a hanger 2. Hanger 2 is supported by a strain insulator comprising a plurality of glass ropes or strands 3, four being shown in the present instance. The ropes or strands extend around pulleys 4, the lower pulleys being carried by a frame 5 attached to hanger 2, and the upper pulleys being carried by a frame 6 mounted on a suitable support, such as a tower (not shown). As will be seen from Fig. 2, ropes or strands 3 are continuous or endless, thus enabling them to adjust themselves relatively to each other to distribute the load evenly among them.

In Fig. 3 is shown a modification wherein a large number of turns of strands or rope are wound over pulley members carried by suitable frames. In Fig. 3, 7 indicates a lower frame similar to frame 5 of Fig. 1 provided with two pulleys 8, and 9 indicates an upper frame similar to frame 6 provided with two pulleys 10. Wound back and forth over the pulleys 8 and 10 is continuous glass rope or glass strands 11. This arrangement is similar to that shown in Figs. 1 and 2 except that a larger number of turns are utilized. This adapts the construction for carrying heavier loads or for being formed from lighter strands or rope.

When used in closed rooms, such as switchboard rooms, for example, the glass rope or strands may be given a coating of lacquer or a coating of a non-organic varnish having a base of colloidal clay to reduce the settling of dust. For outdoor installation, however, it is preferable to provide the glass rope or strands with a tubular protection to shield them from moisture and frost. For this purpose, a ceramic tube may be used, which tube may have a smooth surface or may be provided with corrugations. In Figs. 4 and 5, glass strands or glass rope 12 extend around pulleys 13 carried by a suitable metal head 14, head 14 being provided with an eye 15 by means of which it may be suspended. Surrounding the strands 12 is an insulating tube 16, such as a ceramic tube, connected to head 14 by a yieldable member 17 which may be in the form of a metallic bellows suitably attached at its ends to head 14 and the upper end of tube 16. Only the upper end of the construction is shown in Figs. 4 and 5. The lower end may be of similar construction but arranged, of course, to carry a support for a line wire or cable. With this arrangement, the suspension insulator when used outdoors has its strands 12 protected from the atmosphere. At the same time, the arrangement permits the equalization of the load among the several strands as described in connection with Figs. 1 and 2.

In Fig. 6 is shown a modification wherein glass strands 18 are mounted in an insulating tube 19, the same being preferably compacted therein. In the upper ends of the strands 18, metal wires 18' are suitably woven so as to be firmly connected thereto and such wires are fanned out as indicated at 20 to provide flanges for supporting the upper and lower ends of the insulator in heads 21 and 22. The parts 19 are curved as indicated at 23 so as to provide for a limited amount of yielding action. Thus yielding means are provided to connect the insulator proper to the heads.

Fig. 7 illustrates a construction wherein the plurality of strands of glass rope 24 are suitably connected to upper and lower heads 25 and 26, which heads in turn are connected to each other by an insulating tube 27 of suitable material, such as a ceramic material. In this construction the arrangement may be such that normally the support is formed by the tube 27, the glass rope coming into play only should the tube be broken.

In the case of the construction shown in Figs. 4, 5 and 7, the hollow space within the tubes

may be filled with a solid or liquid filler. As a liquid filler, a suitable incombustible oil may be utilized. If a solid filler is desired, a suitable wax-like substance which retains its plasticity even at lower temperatures may be used. Also, a non-organic powder may be used to advantage. Such a powder may be a condensation urea resin powder which emits a gas so that in case of a flash-over which would destroy the casing, the gas developed will protect the high tension insulator against the effects of arcing. Such a filling is indicated at 23.

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

1. A high tension strain insulator comprising an insulating tube, strands formed from glass extending longitudinally of and compacted in the bore of said tube to form a unitary strain insulator member, supporting heads, and axially yielding means connecting said member to said heads.

2. A high tension strain insulator comprising an insulating tube, strands formed from glass extending longitudinally of and compacted in the bore of said tube, a supporting head, and metal wires interwoven with said strands and yieldingly connecting said tube and strands to said head.

3. A high tension strain insulator comprising an insulating tube, strands formed from glass extending longitudinally of and compacted in the bore of said tube, a flanged metal head, and curved metal wires interwoven with said strands and shaped to provide a flange which engages the flanged metal head to yieldingly connect the tube and strands to said head.

VITALY GROSSE.