Sept. 9, 1930. G. E. JANSSON 1,775,530

HIGH TENSION BUSHING HAVING INSULATED SUPPORTS

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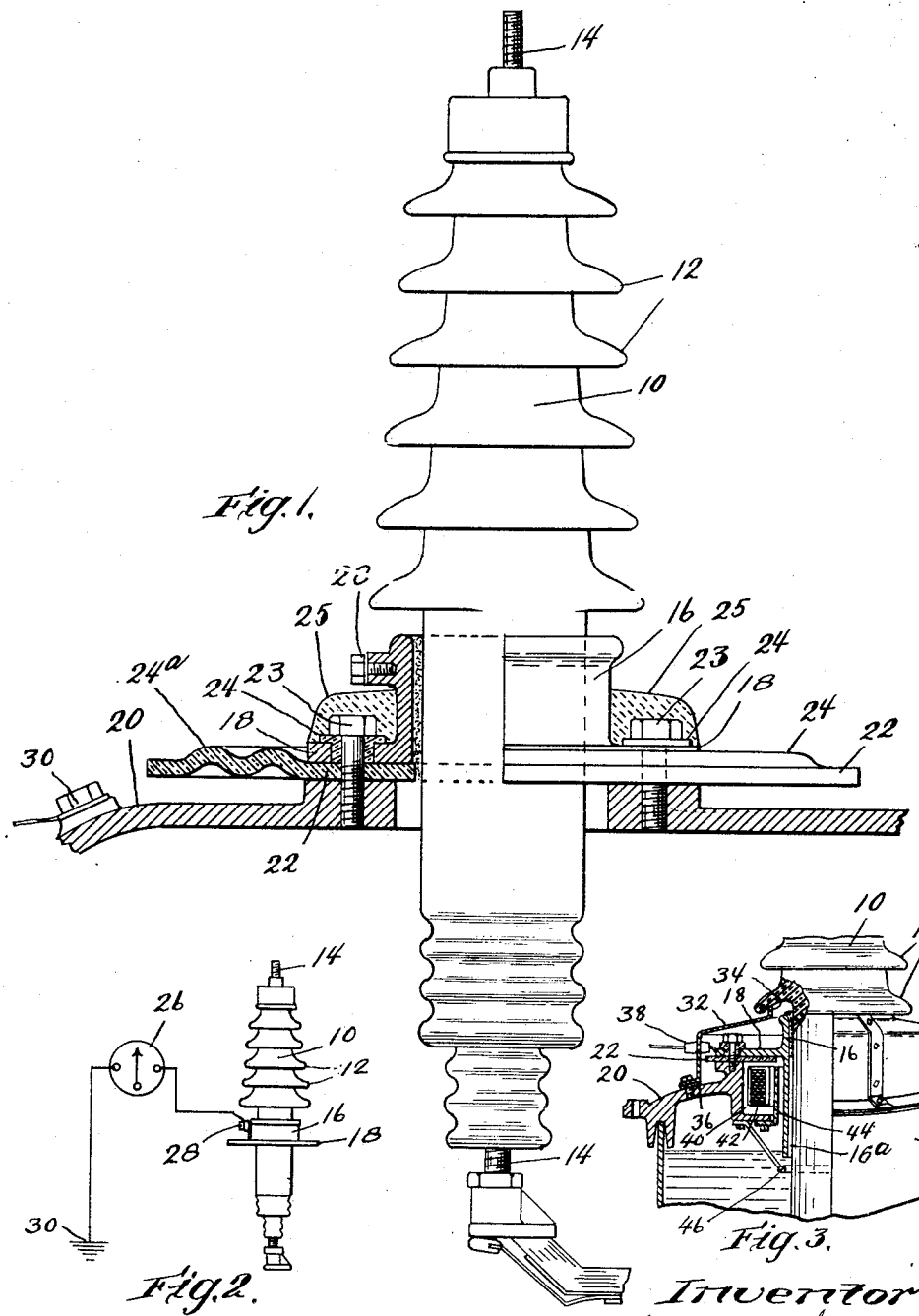


Fig. 1.

Fig. 3.

Fig. 2.

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by [illegible]

Atty.

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UNITED STATES PATENT OFFICE

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HIGH-TENSION BUSHING HAVING INSULATED SUPPORTS

Application filed January 20, 1928. Serial No. 248,238.

This invention relates to high tension electrical apparatus and insulating bushings therefor and means for deriving a small amount of power from the high tension circuit of said apparatus.

It is frequently desirable to obtain a small amount of power from the high tension circuit of an electrical apparatus for the operation of volt meters and the like and without the necessity of employing potential transformers which are expensive because they must be connected across the high tension line and therefore must be made to withstand the full potential of the line.

It is an object of the present invention to derive small amounts of power from an insulating bushing without in any way altering the internal construction thereof, by insulating the attaching flange of the bushing from its support and utilizing said flange as a condenser plate, the conductor of the bushing constituting the other plate of the condenser.

A further object of the invention is generally to improve the construction of high tension electrical apparatus.

Fig. 1 is an elevation partly in section of a high tension insulating bushing and the casing of an electrical apparatus arranged in accordance with this invention.

Fig. 2 is a diagrammatic view of the electrical circuit of Fig. 1.

Fig. 3 is a view similar to Fig. 1 and illustrating a modified form of the invention.

As here shown, the insulating bushing 10 may have a cylindrical outer insulating shell usually of porcelain, provided with the usual capes or petticoats 12 at the upper end, a central conductor 14 and an annular metal attaching collar or ring 16 which is cemented to the bushing below the petticoats 12 and has a radial outstanding flange 18 by which the bushing is adapted to be secured to the casing 20 of some suitable electrical apparatus as an oil switch or transformer. Usually the attaching flange 18 is bolted directly to the casing 20 and thus is electrically connected therewith.

In accordance with the present invention, however, I connect the flange and the casing in a manner that insulates the flange from the casing so that the flange and its collar can assume some elevated potential due to dielectric capacity of the insulating materials of the bushing interposed between the flange and the high tension conductor. I thus can utilize the potential of the flange and collar to actuate some desirable device as a volt meter, synchronizing indicator, or the like. To this end, I interpose an insulating disc 22 between the flange 18 and the casing wall 20. The clamping bolts 23 are insulated from the flange by flanged bushings 24. The insulating disc 22 preferably extends outwardly beyond the junction between the flange 18 and the casing wall and is provided with a plurality of continuous concentric corrugations 24ª that tend to increase the length of the leakage path between the flange 18 and the casing 20 so that the flange is not liable to be short circuited by rain. The bolts are insulated from moisture by caps 25 of insulating compound or by suitable material or devices. If, however, the bushing and the casing are installed within a protective housing the corrugated portion of the insulating disc, and the caps 25, can be omitted. The volt meter or other power consuming device 26 is connected to a terminal 28 of the collar 16 and to the ground as to a terminal 30 of the casing 20 and is operated by the potential assumed by the flange 18 and by the current that passes through the instrument circuit due to the capacity between the collar 16 and the conducting stud 14.

Fig. 3 illustrates a modified construction which, for some purposes, is preferred over that of Fig. 1. In this modification, the insulated attaching flange and collar 18 and 16 respectively are enclosed within a metal weather-protective shield 32 which prevents access of moisture to and the grounding of the flange. With the shield the corrugations 24ª of the insulating disc 22 are unnecessary and are herewith eliminated. The shield is provided with an upstanding neck 34 which is open only under the lowermost cape 12 of the bushing, and is shielded thereby, and the shield is secured at its bottom edge to the casing 20, with an interposed packing 36 in-

terposed therebetween when desirable. The shield has a multi-part construction to facilitate assembly of the bushing to the casing and the shield about the flange; and the joints between the parts are made in a weather tight manner not necessary to illustrate specifically. The lead from the collar 16 can pass through an insulating bushing 38 carried by the upstanding side wall of the shield. In the specific illustration of the modification, the collar 16 has a depending extension 16ª which passes through the transformer well 40 and the core of the current transformer 42 therein and is spaced and insulated therefrom by the insulating tube 44. A ground ring 46 surrounds the bushing 10 below and is spaced beneath the lower end of the collar and is carried by and is electrically connected with the casing wall 20 and serves to protect the insulated collar against a flash-over arc. This construction is similar to that illustrated in my co-pending application Serial No. 248,153 filed January 20, 1928. The shield 32 serves the same purpose externally of the casing.

I claim:

1. The combination of the casing of an electrical apparatus, a high tension insulating bushing extended through the wall of said casing having an internal high tension conductor and an externally disposed metal attaching collar supported by said casing, an insulating continuous disc interposed between said attaching collar and said casing and having a portion thereof spaced from said casing and collar and extended radially beyond said collar and providing a long creepage and strike-over path between said collar and casing, and insulated bolts connecting said collar and casing, said collar having a circuit terminal and constituting a condenser element of said bushing.

2. The combination of a high tension insulating bushing having a cape, an internal high tension conductor and an external metal attaching collar constituting a condenser element, insulating supporting means for said collar, and an annular weather shield which has sectoral sections detachably connected in a weather-tight manner enclosing and insulated from said collar and having an opening above said collar and under said bushing-cape and an upstanding neck surrounding said opening which engages said cape within its periphery.

3. The combination of the casing wall of an electrical apparatus, a high tension insulating bushing extended through said wall having an internal high tension conductor and an external metal attaching collar which constitutes a condenser element extended through and insulated from said wall, and a transformer carried by said wall and insulated from said collar.

4. The combination of an insulating bushing having a central high tension conductor and an external metal collar which constitutes a condenser element, and a transformer which surrounds said collar and bushing and is insulated from said collar.

5. The combination of an insulating bushing having a central high tension conductor and an external metal collar which constitutes a condenser element and a transformer which surrounds said collar and bushing and is entirely within the top and bottom ends of and is insulated from said collar.

6. The combination of a casing wall having a passage therethrough and a well which surrounds said passage, a high tension bushing having a central high tension conductor and an intermediate external metal collar which lies in said passage and is insulated from said wall, and a transformer located in said well surrounding said collar and bushing.

7. The combination of a casing wall having a passage therethrough and an open-top well which surrounds said passage, a high tension bushing having a central high tension conductor and an external metal collar which lies in said passage and is insulated from said wall and has an outstanding attaching flange which overlies said passage and well and constitutes a cover for both, and a transformer located in said well under said flange in surrounding relation with said bushing.

In testimony whereof, I have signed my name to this specification.

GUSTAV E. JANSSON.