Sept. 9, 1930. G. E. JANSSON 1,775,529

HIGH TENSION ELECTRICAL APPARATUS AND INSULATING BUSHING THEREFOR

Filed Jan. 20, 1928

Fig. 1.

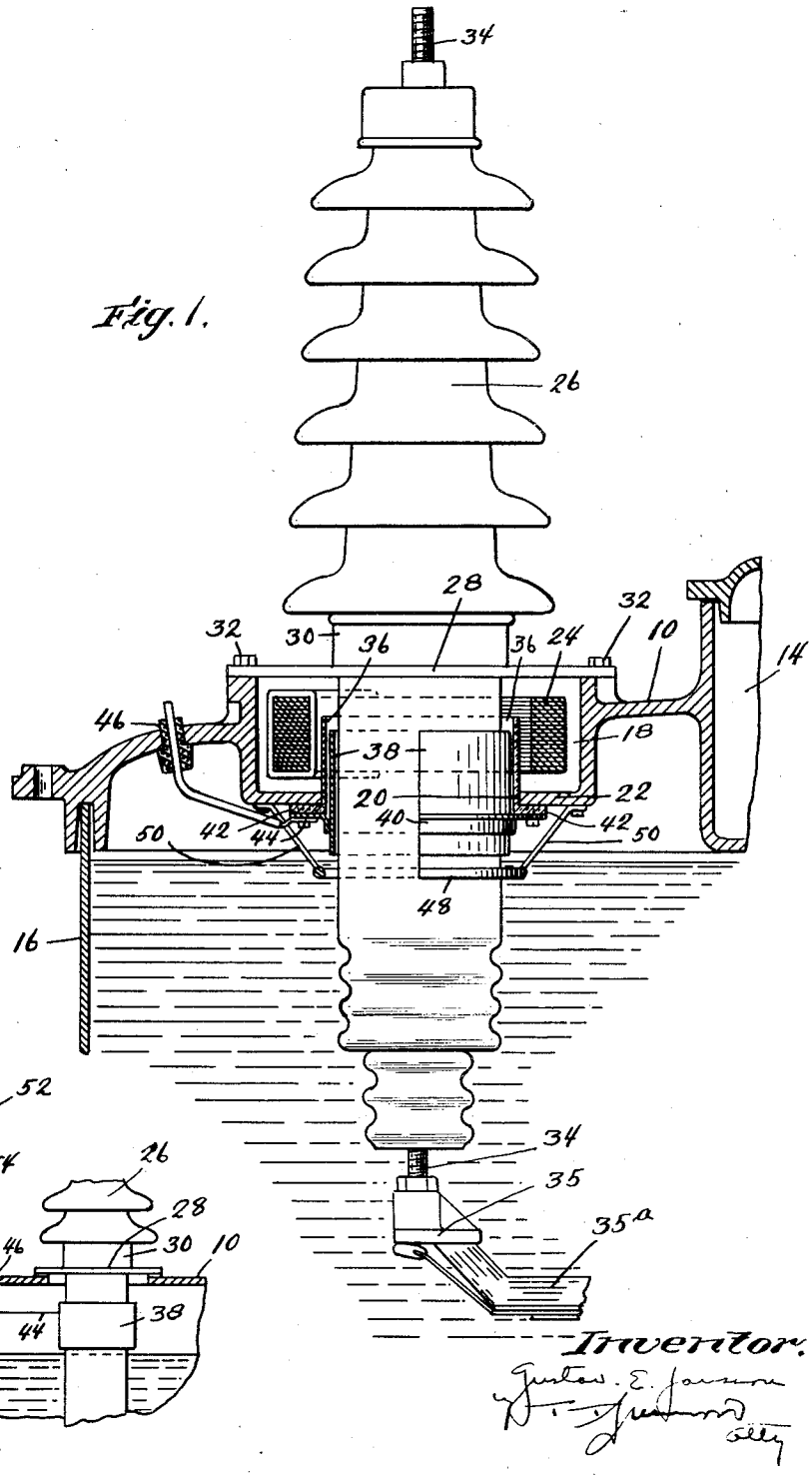


Fig. 2.

Inventor.
Gustav E. Jansson
by [illegible]
Atty

Patented Sept. 9, 1930 1,775,529

UNITED STATES PATENT OFFICE

GUSTAV E. JANSSON, OF WOLLASTON, MASSACHUSETTS, ASSIGNOR TO CONDIT ELECTRICAL MANUFACTURING CORPORATION, OF SOUTH BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

HIGH-TENSION ELECTRICAL APPARATUS AND INSULATING BUSHING THEREFOR

Application filed January 20, 1928. Serial No. 248,153.

This invention relates to high tension electrical apparatus and insulating bushings for the conductors thereof.

It is desirable for many purposes to derive small amounts of power from high tension alternating current lines without connecting directly to the line and without employing potential transformers, which must be insulated against full line potential and are therefore expensive. It has been proposed to derive small amounts of power by the use of condensers, or the capacitance of insulators, and in my copending application Serial No. 248,237, filed January 20, 1928, I have illustrated a construction of high tension bushing which is arranged to supply a small amount of power by capacity effect from the bushing conductor.

It is an object of the present invention to provide an arrangement of electrical apparatus and the insulating bushing for a high tension conductor thereof wherein means independent of the bushing construction, but utilizing the bushing, is provided to supply by condenser-effect a small amount of power and without modifying the construction of the bushing so that any commercial type of bushing can be used in the apparatus.

A further object of the invention is the combination of an electrical apparatus having a high tension bushing with an insulated condenser plate located adjacent the bushing so that the capacity current between the plate and the conductor through the insulating medium of the bushing, and the voltage of the plate, can be utilized for the operation of volt meters, synchronizing and the like low-power consuming devices.

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 electric switch and one of its insulated terminals with which this invention is concerned, much of the construction of the switch not necessary for the understanding of the present invention being omitted.

Fig. 2 is a diagrammatic view of the circuit connections of the condenser element herein concerned.

The electric switch with which this invention is associated comprises a cover 10 that has a compartment 14 in which the switch mechanism is received and is disposed in covering relation with the top of an oil receptacle 16. The cover 10 and the oil receptacle 16 comprise the enclosing casing for the switch. The cover 10 is formed with an annular well 18 therein which is open at the top and has a reduced opening 20 in the bottom wall 22 thereof. A current transformer 24 having an annular core is received in said well. An insulating bushing 26 of any suitable or usual type is extended through said well and the transformer therein and to a position beneath the level of the oil in the receptacle 16; and the flange 28 of the attaching collar 30 of the insulator is secured to the cover 10 over the top opening of the well 18 by suitable bolts 32.

The bushing has a conductor 34 which extends therethrough and is extended above the insulating shell of the bushing at its upper end to provide a connection with the high tension line and is also extended beyond the lower end of the bushing and is provided with a fixed contact member 35. Said contact member is adapted to be engaged by a movable switch member 35a.

In accordance with this invention, an insulating tube or sleeve 36 is extended through the bottom opening 20 in the transformer and extends upwardly into said well and into the current transformer 24 thereof and is spaced from the outer shell of the insulator. A condenser plate 38 here shown as a metal tube is disposed within the insulating sleeve 36 and surrounds the bushing shell. Said sleeve is provided with an outstanding annular flange 40 which is fixed to the bottom wall 22 of the transformer well and is insulated therefrom by the insulating disc 42. Said condenser plate 38 is provided with a terminal 44 which is connected electrically with the flange 40 and extends through an insulating bushing 46 fixed in the cover 10 to a point external of said cover. An annular ground ring 48 surrounds said bushing

shell below said condenser plate 38 and under the oil in the switch casing and is connected electrically with the wall of the transformer well by feet 50.

As thus arranged, the bushing can be of any suitable type since the condenser plate 38 is supported independently of the bushing and derives its potential, and the current in its circuit, by capacity effect from the potential of the bushing conductor 34. The ground ring 48 is located below the condenser plate and is independent of the bushing and serves to protect the condenser plate against a flash over from the lower terminal 35 of the bushing. The condenser plate can be connected with the circuit of the instrument 52 which may be a volt meter or otherwise through a step up transformer 54 or through other voltage amplifying apparatus wherein the voltage of the condenser plate is amplified in the instrument 52.

The primary of the transformer is connected with ground which, in this case, is the casing of the electrical apparatus.

I claim:

1. The combination of an insulating bushing having an enclosing shell and a high tension terminal therein, an insulated condenser plate disposed externally of and supported independently of the shell of said bushing and located within the field thereof, and an insulated terminal connected with said plate.

2. The combination of an insulating bushing having a tubular shell a high tension conductor extended therethrough, and an insulated condenser plate surrounding said bushing externally of said shell and supported independently thereof and having an insulated terminal.

3. The combination of an insulating bushing having a high tension conductor therethrough, an insulated condenser plate surrounding said bushing and independent thereof and having an insulated terminal, and a ground ring located between said insulated condenser plate and one end of said bushing and independent thereof.

4. The combination of a casing wall, an insulating bushing carried thereby having an internal high tension conductor, and an insulated condenser plate surrounding said bushing and supported by said wall independently of and mechanically free from said bushing and having an insulated terminal extended through said wall.

5. The combination of a casing wall, an insulating bushing carried thereby having an internal high tension conductor, an insulated condenser plate surrounding said bushing and supported by said casing wall independently of said bushing, and a ground ring surrounding said bushing between said condenser plate and one end of said bushing.

6. The combination of a casing wall having a well therein, a current transformer located in said well, a high tension bushing extended through said well and the transformer therein and having means detachably securing it to said casing over said well, and a condenser plate surrounding said bushing in said well having insulating means securing it to said casing wall independently of said bushing.

7. The combination of a casing wall having a well therein, a current transformer located in said well, a high tension bushing extended through said well and the transformer therein and having means detachably securing it to said casing over said well, a condenser plate surrounding said bushing having insulating means securing it to said casing wall independently of said bushing, and a ground ring carried by said casing wall below said condenser plate independently of said bushing.

8. The combination of the casing of an electrical apparatus having a transformer well therein open at the top and having a bottom provided with an opening therethrough, a high tension bushing extended through said well and the bottom opening thereof and having means detachably securing it to said casing wall in covering relation with the top of said well, an insulating sleeve carried by the bottom wall of said well and extended upwardly within said opening and said well about and spaced from said bushing, an annular condenser plate surrounding said bushing within said insulating-sleeve and having insulating means connecting it with the bottom wall of said well, and a ground ring surrounding said bushing below said condenser plate and connected with the bottom wall of said well.

9. The combination of a casing of electrically conducting material having an aperture in a wall thereof, an annular condenser plate supported by and insulated from said casing and disposed within said casing adjacent the aperture therein, and an insulating bushing received removably in said aperture and extended freely through said aperture and said annular condenser plate and having an insulated conductor therein which extends within said condenser plate.

10. The combination of an insulating bushing including a tubular enclosing shell and a conductor extended axially therethrough, a support for said bushing intermediate its ends, an insulated condenser plate located externally of said shell and within the electrical field of said bushing and carried by the support for said bushing, and an insulated terminal connected with said plate, said bushing and condenser plate having independent connections with said support whereby to permit the removal of said bushing from said support independently of said plate and terminal.

11. The combination of a casing having

means providing a well having a bottom wall, a transformer therein, an insulating bushing extended through said well, wall and transformer having a central conductor and an outstanding flange which overlies the top of said well and transformer and has a supporting connection with said casing, a metal plate constituting a condenser plate located at least in part within said well in surrounding relation with said bushing, and an insulating support for said condenser plate which is independent of said bushing.

12. The combination of a casing having means providing a well having a bottom wall, a transformer therein, an insulating bushing extended through said well, wall and transformer having a central conductor and an outstanding flange which overlies the top of said well and transformer and has a supporting connection with said casing, a metal plate constituting a condenser plate located at least in part within said well in surrounding relation with said bushing, insulating means located in said well between said condenser plate and said transformer, and an insulating support for said condenser plate which is independent of said bushing.

13. The combination of a casing having means providing a well having a bottom wall, a transformer therein, an insulating bushing extended through said well, wall and transformer having a central conductor, and an outstanding flange which overlies the top of said well and transformer and has a supporting connection with said casing, and an insulated condenser plate located in said well between said transformer and said bushing and in surrounding relation with said bushing.

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

GUSTAV E. JANSSON.