

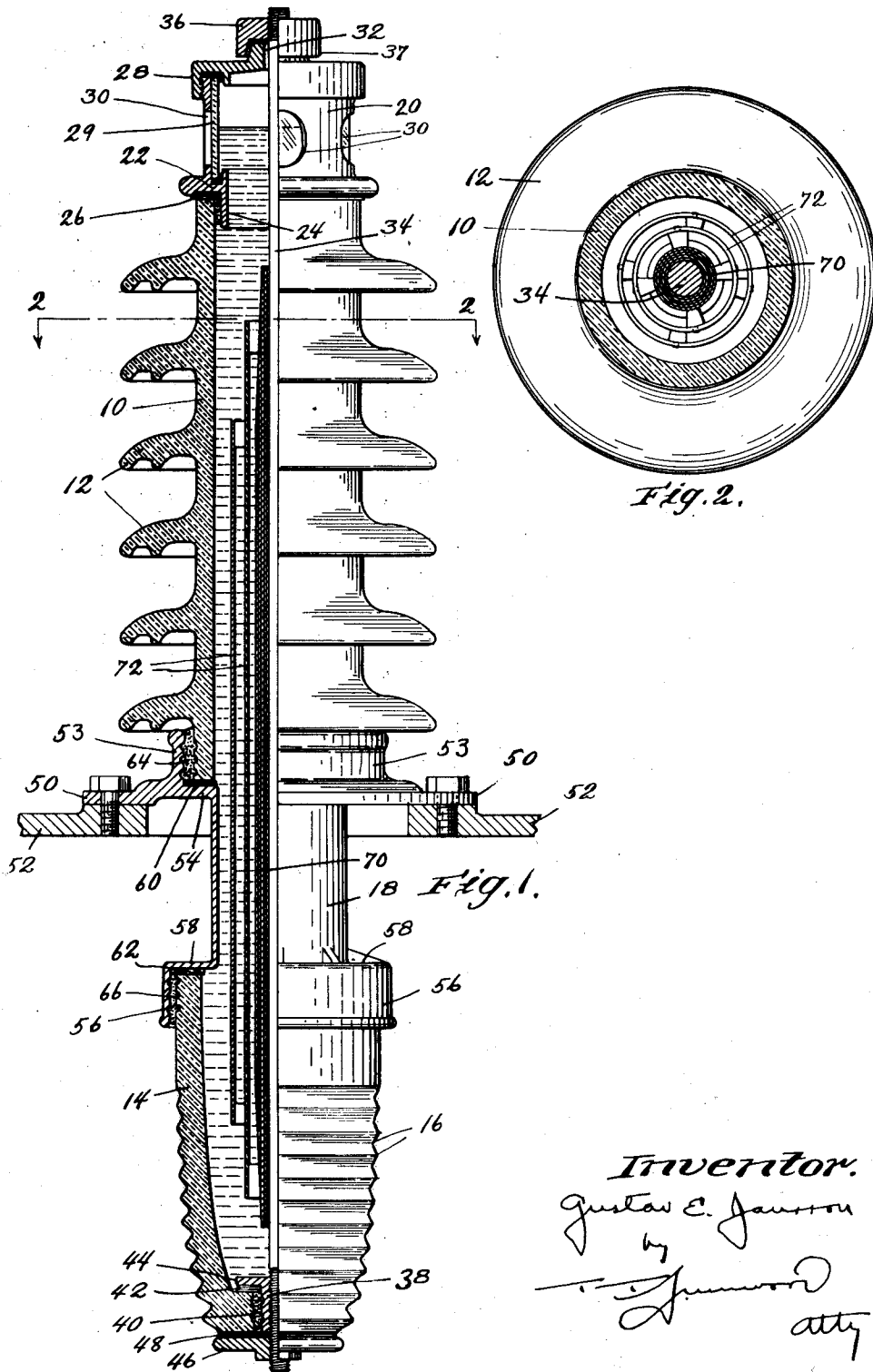
July 1, 1930.

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1,769,261

OIL FILLED BUSHING

Filed May 19, 1926



UNITED STATES PATENT OFFICE

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OIL-FILLED BUSHING

Application filed May 19, 1926. Serial No. 110,126.

This invention relates to electric insulators and particularly to high tension oil or compound filled insulating bushings.

An oil filled bushing usually comprises an oil containing insulating shell through which the conductor is passed. Solid insulating bodies, as a plurality of concentric tubes, are usually disposed about the conductor to provide increased insulation and also to separate the body of oil into a plurality of smaller bodies. Since these insulating tubes are in the region of greatest electric field they are the most liable to break down upon over voltage.

It is an object of this invention to provide an improved oil-filled insulating bushing having an insulating enclosing shell and one or more removable and renewable insulating tubes disposed therein about the centrally disposed conductor.

It has been customary to make the insulating enclosing shell of the bushing of two or more insulating sections which are detachably connected together at the middle of the insulator. Such a construction necessitates provision of a breakable oil tight joint between the sections, which joints must be made with care as otherwise the insulator will leak and soon lose its oil and thereby become defective.

It is an object of this invention to provide an oil filled bushing with a unitary enclosing shell composed of a plurality of sections which are permanently united rigidly together to form in effect a solid, one-piece, insulating tube which is open at the top, with provision for withdrawing the internal insulating members and the conductor outwardly through the open top of the insulating shell.

A further object of the invention is generally to improve the construction of insulating bushings.

In a co-pending application Serial No. 152,030 filed December 1, 1926, I have illustrated an insulator embodying some of the features herein described and claimed.

Fig. 1 is an elevation, partly in section, of an insulating bushing embodying the invention.

Fig. 2 is a section taken along line 2—2 of Fig. 1.

As here shown, the insulating bushing embodying this invention comprises the upper insulating section 10 provided with the usual petticoats or capes 12 the lower insulating section 14 provided with external corrugations 16, and the intermediate metal spacing sleeve which serves to connect and separate said insulating sections. The upper insulating section comprises essentially a porcelain tube which is open at the top and bottom. The top of said section is provided with an oil reservoir comprising essentially a metal cylinder 20 which has a bottom wall 22 provided with a depending flange 24 which is received within the open top of the insulator and is affixed thereto by a body of cement. Suitable packing material 26 may be interposed between the bottom wall 22 and the top of the insulator for the purpose of making an oil tight seal thereat. The oil reservoir is provided with a cap 28 which is screw-threaded upon the upper end of cylinder 20 and forms a cover for the reservoir. A glass cylinder 29 is disposed within said cylinder 20 with suitable packing material located at the upper and lower ends thereof to provide oil tight seals at the ends of the glass cylinder. The height of oil in the insulator and in the glass cylinder is visible through suitable apertures 30 of the metal cylinder 20. Said reservoir cover 28 is provided with an axial opening 32 therein through which the conductor 34 of the bushing is loosely inserted and in which said conductor is free for axial movement due to its expansion and contraction in response to temperature variation. Said opening is adapted to be covered against entrance of water by a cover 36 which is screw-threaded on said conductor and is provided with a depending apron 37 which surrounds said opening.

The lower insulating section 14 is provided with an opening in its lower end in which a bushing 38 is secured by means of a body of cement 40. The joint between the bushing and insulator may be made further oil tight by the provision of packing washers

42 between the insulator and the outstanding flange 44 of said bushing. Said conductor 34 is adapted to be screw-threaded removably through said bushing and a lock nut 46 is screwed onto the lower and extended end of said conductor to hold said stud against rotation. A packing washer 48 is disposed between said nut and the bottom of said insulator to provide an oil tight seal thereat.

Said metal spacing sleeve 18 is a solid and rigid unitary structure and is provided with an integral outstanding flange 50 by which the bushing is adapted to be secured to any suitable support as the casing wall 52. Said spacing sleeve is formed with an upper annular recess provided by the integral upstanding wall 53 and the bottom wall 54. It is also provided with a lower and similar recess provided by the integral depending wall 56 and the bottom wall 58. The bottom end of the upper insulating section 10 is received loosely within said upper recess and the bottom of said insulator is disposed upon a packing ring 60 of suitable material which is supported upon the bottom wall 54. The upper end of the lower insulating section 14 is similarly disposed against a packing ring 62 which rests upon the bottom wall 58 of the lower recess. Said insulating sections are rigidly and permanently secured to the spacing sleeve 18 by bodies of cement 64 and 66 respectively which are received in said upper and lower recesses between said walls 52 and 56 respectively and said insulating sections. For the purpose of insuring an oil tight connection between said insulating sections and said spacing sleeve, said insulating sections are compressed upon said packing rings 60 and 62 before the cement is placed in the recesses by applying pressure upon the opposite ends of the insulating sections. The recesses are then filled with cement and the pressure is maintained upon said insulating sections during the setting of the cement so that after the cement has hardened and the external pressure has been removed, the cement will hold the insulating sections rigidly in their pressure-applying relation with the packing discs.

The conductor 34 of the insulator is provided with a solid body 70 of insulation which may comprise a tube of bakelized paper which is built up on the conductor and extends over the major portion of the length thereof. A plurality of concentric insulating tubes 72 are disposed within the insulating containing shell and spaced from each other and from said shell and between said conductor and said spacing sleeve. Said insulating tubes and conductor 34 are adapted to be placed in and withdrawn from the insulating shell through the top thereof. For this purpose the diameter of the flange 24 of the oil reservoir is adapted to be at least as

great as the outer diameter of the outermost insulating tube 72 so that said tubes can be withdrawn through the top of the insulator when the cover 28 of the oil reservoir is removed and when the conductor 34 is unscrewed from its connection with the metal bushing 38 in the end of the insulating shell. Since the insulator is most liable to fail by puncture between the spacing sleeve 18 and the insulating tubes 70 and 72 it will be seen that the insulator can be reconditioned for service by withdrawing the punctured tubes outwardly through the top of the insulator and by replacing them with undamaged tubes.

I claim:

1. In an oil-filled insulator, the combination of opposed insulating members, a connecting sleeve surrounding the opposed ends of said insulating members, compressed packing members interposed between said insulating members and sleeve and against which said insulating members bear forcibly, and bodies of cement disposed between and rigidly connecting said sleeve and insulating members and holding them in the aforesaid relation.

2. In an insulator, the combination of a connecting member, an insulating member, an interposed compressed packing member against which said insulating member bears forcibly, and a cemented connection between said insulating and connecting members holding them in the aforesaid relation.

3. In an insulator, the combination of a tubular member having an internally-disposed ledge, packing material disposed thereon, an insulator received within said tubular member against said packing material, and a body of cement received between said insulator and said tubular member above said packing material and fixedly connecting said insulator and tubular member permanently.

4. In an insulator, the combination of a tubular member having an internally-disposed ledge, packing material disposed thereon, an insulator received within said tubular member against said packing material, and a body of cement permanently connecting said insulator and said tubular member rigidly.

5. An oil filled bushing comprising a conductor, an insulating tube surrounding said conductor, and an oil-containing shell comprising permanently connected upper and lower insulating members and an intermediate connecting and supporting sleeve enclosing said conductor and tube one of said members having a uniform diameter and having an opening at the top through which said conductor and tube are removable.

6. An oil filled bushing comprising a conductor, an insulating tube surrounding said

conductor, and a sectional insulating shell having means permanently uniting its sections enclosing said conductor and tube and having an opening at the top through which said conductor and tube are removable.

7. An insulating bushing comprising the combination of an outer insulating casing including two nested tubes having confronting portions, a compressible packing disposed between the confronting ends of said tubes, and a body of cement arranged in engagement with the adjacent sides of said nested tubes and holding said tubes in compressing engagement against said packing.

8. In an insulating bushing the combination of a tubular casing having two loosely nested sections, a yielding packing held in a state of compression between and by the proximate ends of said sections, and a body of cement disposed between and binding together the overlapping portions of said nested sections and holding said packing in a permanent state of compression.

9. An insulating bushing comprising two tubular sections, one of which has an enlarged recess at one end adapted to receive the adjacent end of the second section, a packing of yielding material disposed in the bottom of said recess and held in compression by said second tube, and a body of self-hardening cement engaging the proximate sides of said second tube and said recess and holding said packing permanently in compression.

10. An insulating bushing having insulating members, a sleeve for spacing said members apart, resilient packing disposed between adjacent ends of said members and said sleeve, and means to hold said members permanently in compression against said packing, said means comprising a body of cement allowed to set while said members are held in compression.

11. An insulating bushing comprising a plurality of nested tubes, a compressible packing disposed between the nested ends of said tubes, and means to hold said packing permanently in compressed relation between said tubes, said means comprising a body of cement adapted to harden while said tubes and said packing are held in compressed relation.

12. In an insulating bushing the combination of an outer casing including an upper and a lower porcelain shell, a metal connecting sleeve disposed between said shells and having a recess at each end in which the adjacent ends of said shells are received, and means disposed in said recesses constituting permanent mechanical connections and fluid-tight joints between the sleeve and said shells, said means including a fluid impervious yielding packing arranged in fluid-tight engagement both with a shell and with said sleeve, and a body of cement connecting

the shell and sleeve fixedly and holding them in fluid-tight engagement with said packing.

13. An oil-filled insulating bushing having an intermediate metal attaching sleeve, insulating shells cemented directly to the top and bottom of said sleeve and connected irremovably therewith, one of said shells being open at its free end and having an internal diameter thereat which is at least as great as that of said sleeve, and a conductor extended through said shells and sleeve and having exposed terminal members at the ends of said shells.

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

GUSTAV E. JANSSON.

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