Type "S" Outdoor Condenser Bushing

for

Transformers—Continued

INSTRUCTIONS—Continued

Construction of Type "S" Bushings

3. The condenser is the heart of the bushing and consists of a central copper tube or stud upon which is wound, under heat and pressure, specially treated kraft paper. At specified diameters, copper foil is inserted to form condensers. By proportioning the lengths and thicknesses of the paper layers, a series of equal capacity condensers, uniformly arranged along the length of the bushing, is formed between the central conductor and the outmost layer of copper foil, which is connected to the grounded flange. No concentration of stresses can take place within the bushing, between the condenser and grounded flange or along the porcelain weather casing. The condenser principle employed, permits designs of bushings with a greater uniform factor of safety, combined with smaller dimensions, than can be obtained in other types of bushings.

4. The inner end of the condenser is protected with polymerizing oil which enters the paper as a liquid, but is turned to a solid by application of heat, thereby effectively sealing the condenser against moisture or oil penetration. The condenser is then treated with a varnish which further seals the condenser, gives the surface a high resistance to "Treeing and Tracking" and provides a hard, smooth surface.

5. The fabricated mounting flange is attached to the condenser by a mechanical press-fit, which forms a permanently gas and oil-tight joint.

6. When the current carrying capacity of the bushing does not exceed 400 amperes, the condenser is wound on a copper tube and the lead is fished through from the winding to the terminal cap of the bushing. This arrangement facilitates power factor testing.

7. The outer end of the condenser is protected by a weather casing of wet-process porcelain. Westinghouse has developed a process to provide a metallic glaze on the upper and lower ends of the porcelain so that a drawn or spun copper cap can be soldered at the upper end and a copper ring can be soldered to the lower end. By soldering the cap to the condenser tube or stud and the ring to the flange, all gaskets, packings and cements are eliminated.

8. The space between the weather casing and the condenser is tested for tightness and then is filled with a compound, leaving sufficient space on top for expansion. The compound is a low melting point plastic having high dielectric strength, high moisture resisting properties and ability to adhere to materials with which it comes in contact.

9. The breathing opening in the cap is permanently sealed by plugging and soldering to prevent breathing and entrance of moisture. Since no materials subjected to deterioration are used, the solder seal bushing will remain permanently moisture proof, unless it is injured mechanically.

10. Although plastic encased bushings are standard, the space between weather casing and condenser may be filled with "Wemco C" oil.

Shipping

11. Whenever practicable, the bushings are shipped installed on the apparatus. When this is not possible, bushings are shipped in a vertical position, rigidly supported from the flange, in a crate of a suitable size. The lower end of the bushing is wrapped with treated cloth and dipped in gum to protect the exposed part of the condenser from moisture, dirt and damages due to rough handling.

Unpacking and Handling

12. Care should be used in unpacking to protect the bushing from being injured by tools, or parts of the packing crate. Use care in handling the bushing; lift by the stud, terminal cap or by the flange, but not by the porcelain. Do not remove the protecting wrapping from the lower end of condenser until immediately before installing for service.

Storage

13. Bushings, which are not put into service, should be stored vertically in a clean dry place. When placing bushing temporarily in a horizontal position, allow it to rest on a clean padded surface.

Installation

14. The protective wrapping should be removed from the lower end of the condenser by pulling downward, the rip cord provided for that purpose. Do not use knives or scrapers. Remove all gum from condenser and flange as it will discolor the oil in the tank. Use a clean cloth, saturated with benzine or warm transformer oil, for cleaning the condenser.

15. Check power factor and capacity of the bushing, which was stored, before installing it for service. For detailed instruction, see Bushing Manual Technical Data 33-156.

Maintenance and Test

16. Connections to the outside end of the bushing should be made so that no stresses will develop, due to expansion or contraction of the lead with temperature changes. Detailed instructions for maintenance and care are given in Manual of Westinghouse Outdoor Bushings Technical Data 33-156.

Westinghouse Electric & Manufacturing Company

Sharon, Pa.

Westinghouse Press
Printed in U.S.A. Reprint (11-42)

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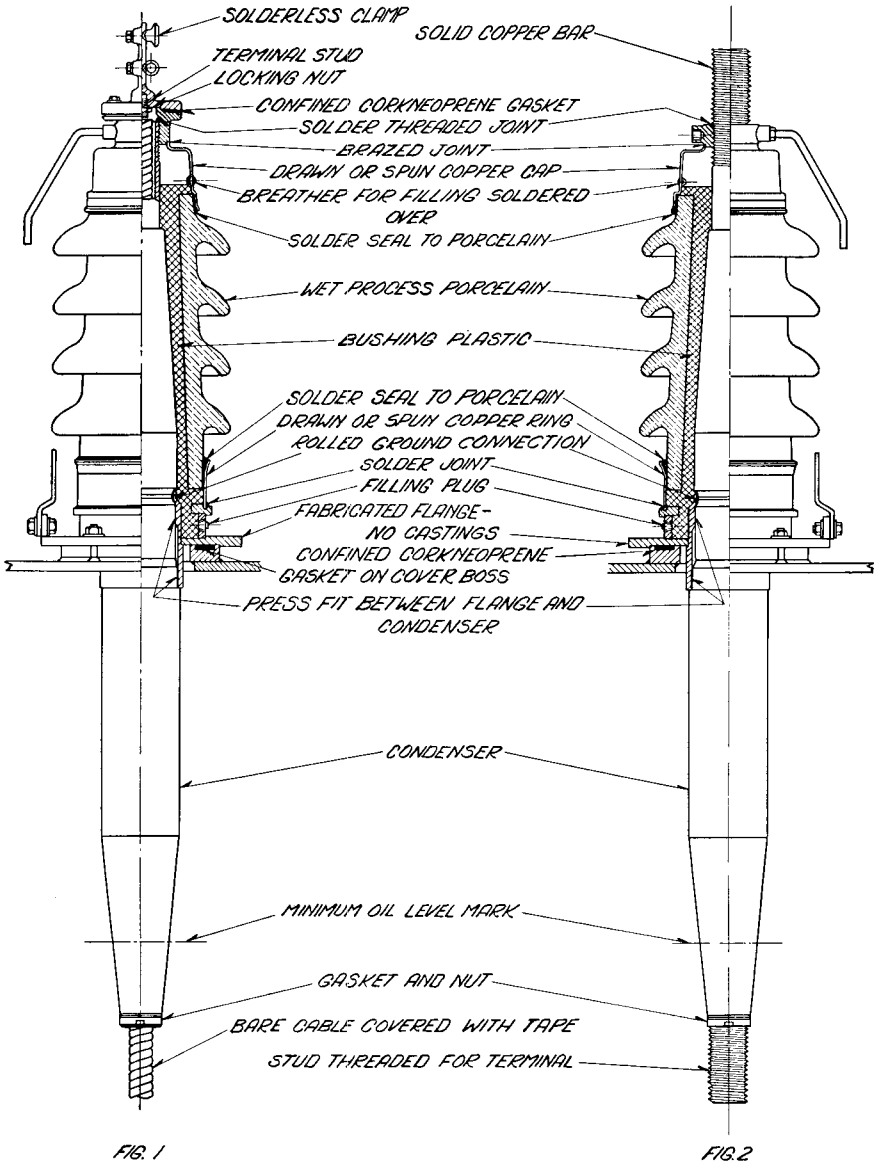
for

Transformers

INSTRUCTIONS



Partial Sections of Type "S" Condenser Bushings

FIG. 1—BUSHING WITH FISHED THROUGH CABLE FIG. 2—BUSHING WITH SOLID COPPER BAR

General

1. The condenser bushing is an exclusive Westinghouse development. It consists of a cylindrical condenser, protected on its outer end with a wet-process porcelain weather casing and on its inner end with polymerizing oil and varnish. The space between the condenser and the porcelain is filled with a plastic or transformer oil. See Figs. 1 and 2. 2. These instructions should be carefully studied before unpacking, handling and installing Westinghouse type "S" solder seal condenser bushings.