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A. V. FOLCO

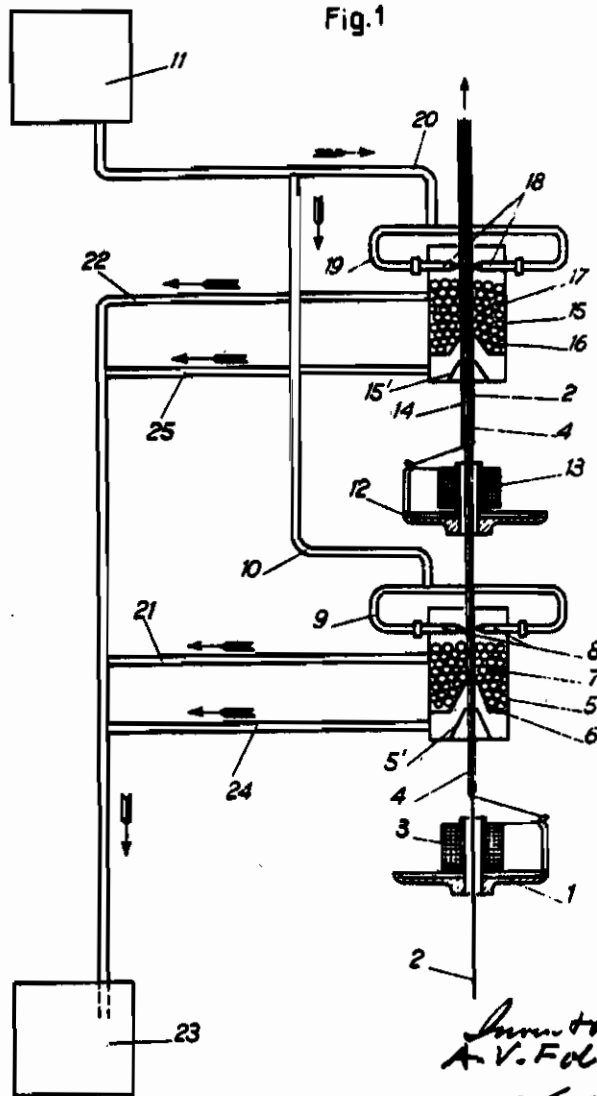
Serial No.

MAY 4, 1943. TREATMENT OF GLASS-COVERED ELECTRIC CONDUCTORS **352,642**

BY A. P. G.

Filed Aug. 14, 1940

2 Sheets-Sheet 1



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Fig. 2

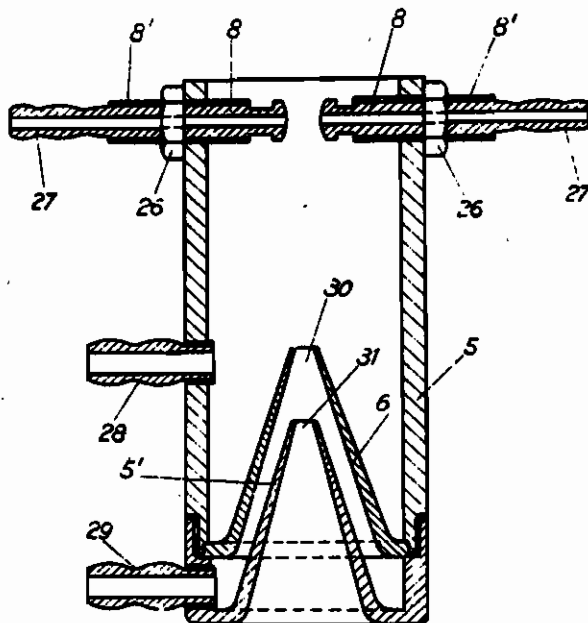
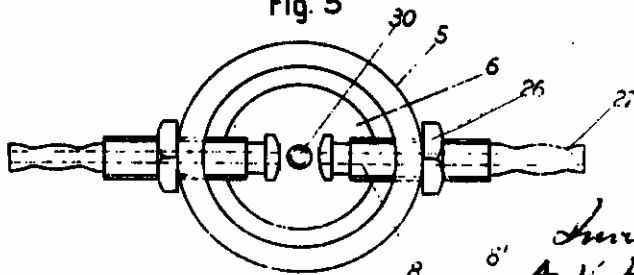


Fig. 3



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ALIEN PROPERTY CUSTODIAN

TREATMENT OF GLASS-COVERED ELECTRIC CONDUCTORS

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Application filed August 14, 1940

This invention relates to the manufacture of electric conductors provided with an insulating covering or sheath of glass yarn or thread and it includes a method and an apparatus for treating a glass yarn covering or sheath laid on a conductor, by means of a liquid as well as for smoothing or finishing said sheath.

In accordance with this invention a moving glass yarn sheathed conductor is treated by a liquid adapted to remove the size applied to the glass yarn for its preparation and to impregnate or varnish said sheath as desired; during the above stated treatment the portion of the conductor which is located within the liquid is submitted to the action of a loose material which prevents said liquid from leaking along the conductor and distributes it in the conductor sheath, said loose material also assisting the penetration of the conductor sheath by said liquid and removing the excess liquid.

The loose material consists preferably of pellets adapted to roll on the conductor sheath and to finish its surface. On the other hand the liquid for treating a sheathed conductor whose sheath consists of several superimposed layers laid at spaced points of its longitudinal extent is supplied to the several points of treatment directly, to make uniform the treatment the several layers providing said sheath undergo.

This invention also includes an apparatus for carrying out the above outlined treatment, which ensures said liquid to develop the desired action and prevents any liquid leakage along the conductor.

The device of this invention effects the treatment of a conductor directly during the provision of the insulating sheath thereon in an usual sheathing machine in which the conductor travels upwardly through an annular rotary head carrying a bobbin of glass yarn intended to provide the covering or sheath and laying it on the conductor, and it prevents liquid leakages along the conductor during its upward travel which could affect the bobbin of glass yarn intended to be laid on the conductor.

An embodiment of an apparatus for the treatment in accordance with this invention is shown by way of example on the annexed drawings and

Fig. 1 is a diagrammatical representation of said apparatus partly in section;

Fig. 2 is a section to an enlarged scale of a cleaning impregnating and smoothing device embodied in the apparatus;

Fig. 3 is a plan view thereof.

In Fig. 1, the reference 1 is affixed to a cen-

trally perforated rotary sheathing head through which a conductor 2 is caused to travel longitudinally under the action of a suitable feeding device not shown.

The sheathing head 1 carries a bobbin 3 of glass-fibre yarn intended to be laid on the conductor 2 to provide a covering or sheath thereon; said yarn is drawn by the conductor in its travel and is paid from the bobbin 3 by effect of the rotation thereof to be laid and wound over the conductor 2 thus providing a first covering as shown at 4; the described device substantially corresponds with the usual sheathing or covering machines on which, as above stated, the treatment of this invention may be developed.

In the course of this treatment the conductor 2 after having been provided with a first covering 4 of glass yarn is caused to proceed through a cleaning and impregnating device which includes an annular casing 5 through which the covered conductor 2, 4 runs; said casing 5 is provided near its bottom end with an annular tapering partition 6 which tapers in the direction of the conductor travel the orifice of said annular partition 6 having a diameter which substantially corresponds with that of said covered conductor; a loose mass consisting of balls or pellets 7 of suitable material, as glass or metal, is located on said partition 6. The liquid intended to effect the treatment of the conductor sheath is introduced in the casing 5 through two nozzles 8 arranged in front to each other, said nozzles discharging therein in register with the conductor 2, 4 and directing on the conductor the liquid fed thereto from a reservoir 11 through the tubes 9 and 10.

The partially sheathed conductor 2, 4 subsequently travels through a second sheathing head 12 similar to the described one and including a rotary support carrying a glass yarn bobbin 13; the glass yarn unwinding from said bobbin 13 is laid and wound on the covering 4 located on the conductor and provides a second covering 14 located on the conductor 2 and its first covering 4.

After the second covering 14 has been provided thereon, the conductor 2, 4, 14 travels through a further impregnating and finishing device; this device includes a casing 15 having an annular tapering partition 16 on which a mass 17 of pellets or balls of metal or glass is located; the treating liquid is supplied from the reservoir 11 to the covered conductor lying in said casing by means of nozzles 16 and tubes 19, 20.

The tubes 21, 22 extending from casings 5 and

15 at a point above their tapering partitions 6 and 16 lead to a pit 23 intended to collect the liquid used for the treatment.

The bottom portions of the casings 5, 15 included between the bottom walls 5', 15' thereof which are suitably apertured for the travel of the conductor therethrough, and the annular conical partitions 6, 16, are connected with the pit 23 by means of tubes 24, 25.

In the development of the treatment of this invention as above outlined, the glass yarns laid on the conductor 2 during its travel through the devices 5, 15 undergo an action which removes the yarn size and impregnates said yarns.

The loose material 7, 17 which is in contact with the travelling covered conductor, keeps the liquid in contact with the covered conductor and makes the escape of the liquid through the tubes 21, 22 slow; it also restricts the liquid from leaking down and reaching the yarn bobbins 3, 13 to prevent it from affecting the mechanical strength of the yarns; at the same time said material being wetted or compenetrated with liquid, cooperates to clean and impregnate the glass yarns and also acts to remove by a mechanical action such excess liquid as could remain on the conductor coverings.

When balls or pellets 7, 17 are used to provide the loose material as in the illustrated embodiment, the further advantage is secured that said balls by their rolling on the surfaces of the coverings 4, 14, make said coverings smooth and remove their defects, the said coverings being thus made more even and compact and taking a more uniform diameter.

The supply of liquid unto the conductor at a point intermediate that where the provision of the first covering 4 occurs and that where the second covering 14 of yarn is laid to complete the conductor sheath has the advantage that said second covering 14 reduces the thickness of the liquid layer existing intermediate the two coverings 4, 14, because said second covering 14 absorbs the excess liquid which encircles the first covering 4.

It is useful that the supply of liquid to the treating devices 5, 15 is effected directly to each of them by means of the tubes 10, 20 connected to the reservoir 11 as above described, to cause the liquid to develop an equal action on both coverings 4, 14 as above described; the excess liquid which collects in the pit 23 may be recovered and purified or regenerated for its re-use.

The three operations usually necessary for the treatment of glass fibre sheathed conductors such as the removal of a portion of the size of the glass yarn, its coating or impregnation and the finishing operation intended to make the sheath surface uniform and to smooth out and finishing the sheath may be made substantially at the same time.

The described treatment is effected by means of a liquid able to act at the same time as a solvent for the size and as an impregnating medium and a varnish, as an appropriate resin (known in the trade as Sterling varnish or equivalent) dissolved in a solvent able to dissolve the size (as alcohol, gasoline and equivalent ones).

Figures 2 and 3 illustrate a cleaning and impregnating device particularly proper for the described treatment this device enabling the treatment to be carried out on usual vertical sheathing machines.

Said device includes a casing 5 having at its top two nozzles 8 arranged in front of each other and intended to direct the liquid on the conductor; said nozzles 8 are provided with screwthreaded regions 8' and nuts 26 to engage and fasten them in the wall of the casing 5 and also to adjust the distance of their outlets with respect to the covered conductor running intermediate them; the couplings 27 are intended for connecting the liquid feeding tubes 9 with said nozzles.

The bottom of the casing 5 includes the annular tapering partition 6 which is held in position by the annular bottom wall 5'; said bottom wall 5' has a tapering shape similar to that of the partition 6 and it collects the liquid drops which may leak along the bottom face of the partition 6 and usually fall down therefrom after having travelled along a portion of said partition.

Above the partition 6 the casing 5 includes a coupling 28 for the tube 21 intended to discharge the liquid; a further coupling 29 is connected with the casing 5 intermediate the partition 6 and the bottom wall 5' for connection of a tube 24 intended to recover the liquid collecting on the bottom wall 5'.

The bottom wall 5' is removable from the casing 5 to provide for substituting the tapering partition 6 and also the bottom 5' if desired, in order to use tapering parts 6 and 5' having a taper and a size in respect of the respective orifices 30, 31, adapted to the cross section of the conductor to be treated in the device.

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