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APPARATUS FOR CLEANING STRANDS

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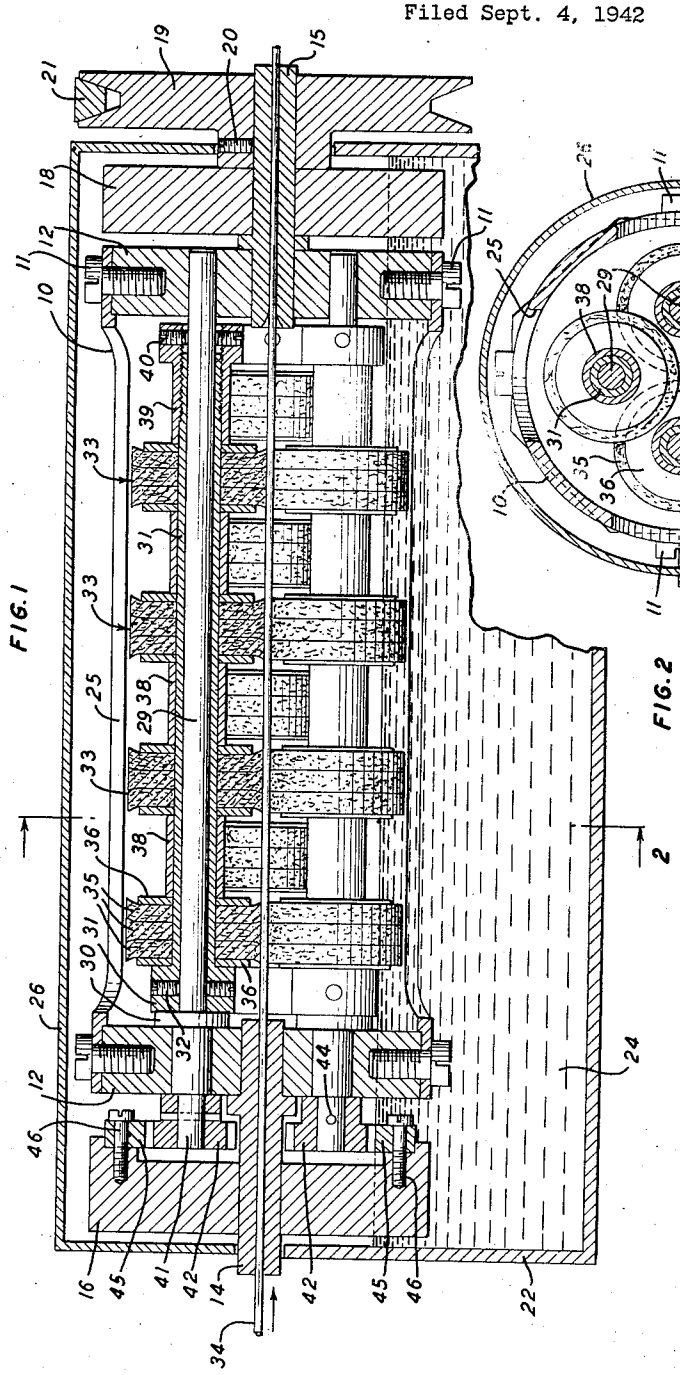


FIG. 1

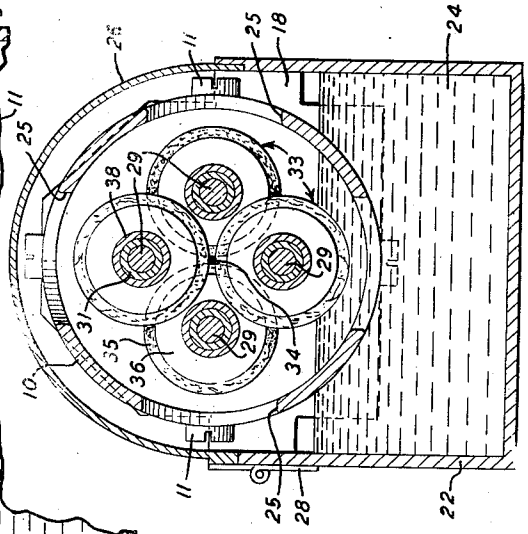


FIG. 2

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APPARATUS FOR CLEANING STRANDS

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1 Claim. (Cl. 15—97)

This invention relates to apparatus for cleaning strands.

In the manufacture of coaxial cables, a plurality of discs of insulating material are positioned upon a central conductor and a tubular conductor disposed over the discs. Each of the insulating discs has a V-shaped slot formed therein into which the central conductor is forced. It was discovered that, when the insulating discs were thus applied to a central conductor whose surface was not clean, a minute film of dirt, metallic dust, or the like was deposited upon the edges of the V-shaped slot in the insulating disc and provided a path of a low resistance between the central conductor and the outer tubular conductor.

A second source of trouble in coaxial circuits is the presence of slivers on the surface of the central conductor. The formation of these slivers and the damage they cause is common knowledge to those familiar with the art of drawing and insulating copper wire. In a coaxial circuit such slivers may extend from the central conductor toward the outer tubular conductor and form a path or bridge of low resistance. These two sources of trouble, if present, reduce the insulation resistance between the two conductors and often lead to defective circuits which may not be discovered until after installation of the cables. These difficulties may be eliminated by thoroughly cleaning the central conductor to remove any dirt, grease, grit, splinters, etc., which might cause trouble.

An object of this invention is to provide new and improved apparatus for cleaning strands.

An apparatus embodying the present invention comprises means for advancing a strand through the apparatus, a plurality of friction members positioned about the path of the strand, and means for simultaneously rotating the friction members about their individual axes and revolving them about the path of the strand to effect a brushing action upon the strand.

Other features and advantages of the invention will become apparent from the following detailed description of one embodiment thereof when read in conjunction with the accompanying drawing, in which

Fig. 1 is a longitudinal sectional view of an apparatus for cleaning strands, and

Fig. 2 is a cross-sectional view of the apparatus taken on line 2—2 of Fig. 1.

In the particular embodiment of the invention shown in the accompanying drawing, a hollow cylindrical frame 10 is fastened by means of screws 11—11 to blocks 12—12. The blocks 12—12 are rotatably mounted upon hollow shafts 14 and 15 which rotate in bearing brackets 16 and 18 affixed to a container 22. A pulley 19 is fastened to the shaft 15 by means of a set screw 20 and is connected to a power source (not shown) by means of a belt 21. The container 22 retains a supply of cleaning liquid 24, such as carbon tetrachloride, just sufficient to cover the lower portion of the frame 10. A number of elongated slots 25—25 are formed in the frame 10 to admit the cleaning liquid 24 to the interior thereof. The container 22 is provided with a cover 26 connected thereto by a hinge 28 to permit convenient access to the apparatus within the container. Four arbors 29—29 are rotatably mounted in the blocks 12—12, each arbor having formed thereon an enlarged disc-like portion 30 which acts as a washer and restricts longitudinal movement of the arbors. Over each arbor 29 is positioned a sleeve 31 which is longitudinally adjusted upon the arbor 29 by means of a set screw 32. The arbors 29—29 are uniformly spaced about the path of a strand 34 (see Fig. 2) so that each of the arbors 29 is diametrically opposite another arbor relative to the path of the strand 34. Over each of the sleeves 31 are positioned a plurality of friction members 33—33, which in the particular embodiment of the invention herein described are composed of a number of felt pads 35—35 held between metal rings 36—36. The friction members are separated from one another by means of tubular spacers 38—38 and are secured against longitudinal movement along the sleeve 31 by means of an end spacer 39 which screw threadedly engages the sleeve 31 and may be secured in the desired position by means of a set screw 40 which engages the shaft 29. The friction members 33—33 mounted upon diametrically opposite arbors 29—29 are positioned in the same vertical plane and are offset from the friction members mounted upon the other two arbors.

Each arbor 29 has a narrowed end portion 41 upon which a pinion gear 42 is mounted by means of a pin 44. All of the pinion gears 42—42 mesh with a stationary ring gear 45 attached to the bearing block 16 by means of screws 46—46.

In the operation of the device, the strand 34 is passed from left to right through the device, as shown in Fig. 1 of the accompanying drawing. The pulley 19 is rotated by means of the belt 21 and causes the frame 10 and the blocks 12—12 carried thereby to rotate. The rotation of the blocks 12—12 causes the arbors 29—29 to simul-

taneously revolve about the path of the strand **34** with the frame **10** and to rotate upon their individual axes through the engagement of the pinion gears **42—42** with the stationary ring gear **45**.

This planetary gear arrangement causes all of the arbors **29—29** and the friction members **33—33** mounted thereon to rotate in the same direction at the same time, but in a direction opposite to that in which the frame **10** rotates. This increases the buffing action of the friction members on the strand **34**. Since the friction members are mounted in pairs diametrically opposite one another relative to the path of the strand, the felt pads **35—35** of each friction member support the strand **34** at a point at which the felt pads **35—35** of an oppositely rotating friction member also support the strand. As a result, the tendency to bend the strand is reduced to a minimum. As the friction members carried by the arbors **29—29** revolve about the path of the strand **34**, they are carried through the upper portion of the cleaning liquid **24** and because the members are continuously rotating, their entire surfaces are intermittently immersed in the cleaning liquid **24**. Since the pads **35—35**, which contact the strand **34** to be cleaned, are made of felt, they are constantly saturated with the cleaning liquid. By constantly flooding the surface of the strand **34** with a liquid which dissolves grease, oil, etc. and by continuously brushing the strand with the felt pads **35—35**, all grease, dirt, grit, splinters and the like are removed from the strand, leaving the surface thereof free from any substance which might cause a break down of the cable. In order to prevent the concentration of the dirt and metallic dust that has been removed from the strand **34** from building up within the supply of cleaning liquid **24**, the cleaning liquid may be purified by circulating it through any suitable purifying means (not shown).

The use of the strand cleaning device hereinabove described is particularly advantageous for cleaning a central conductor of a coaxial cable, since there is no danger of the strand becoming bent during the cleaning operations. Any bending of the central conductor of a coaxial cable would introduce undesirable characteristics into the cable. Furthermore, the described embodiment of the invention provides a large cleaning area in contact with the central conductor, whereas the over-all dimensions of the cleaning device are comparatively small. Since the container **22** retains a considerable quantity of cleaning liquid **24**, the felt pads **35—35** of the friction member **33—33** are continuously being cleaned by the relatively fresh cleaning liquid which they contact when they are immersed therein.

A number of changes may be made in the hereinabove described apparatus without departing from the spirit of the invention. For example, the number of rotating arbors or the number of friction members on each arbor may be changed. Fabrics other than felt, brushes, etc. may be substituted for the felt used in the pads **35—35** in the friction members **33—33**. The cleaning liquid may be composed of any degreasing agent, although carbon tetrachloride is preferred because of its non-inflammability. It is desirable to use a cleaning fluid that will evaporate from the conductor rapidly and thus eliminate a subsequent drying operation.

What is claimed is:

In an apparatus for cleaning strands, a container for retaining a cleaning liquid, a hollow cylindrical frame rotatably mounted within the container so as to be partially submerged in the cleaning liquid and having elongated slots formed therein to admit the cleaning liquid therein, the container and frame each having openings therein to permit the passage of a strand therethrough, means for rotating the frame, a plurality of arbors rotatably mounted within the frame about the axis of the frame, each arbor being diametrically opposite to another arbor, a plurality of fabric surfaced discs mounted upon each arbor so that the fabric surfaces of the disc contact a strand passing through the frame along the axis thereof, and means to rotate the arbors and the discs disposed thereon when the frame is rotated.

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