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APPARATUS FOR APPLYING SERVING MATERIAL TO CORES

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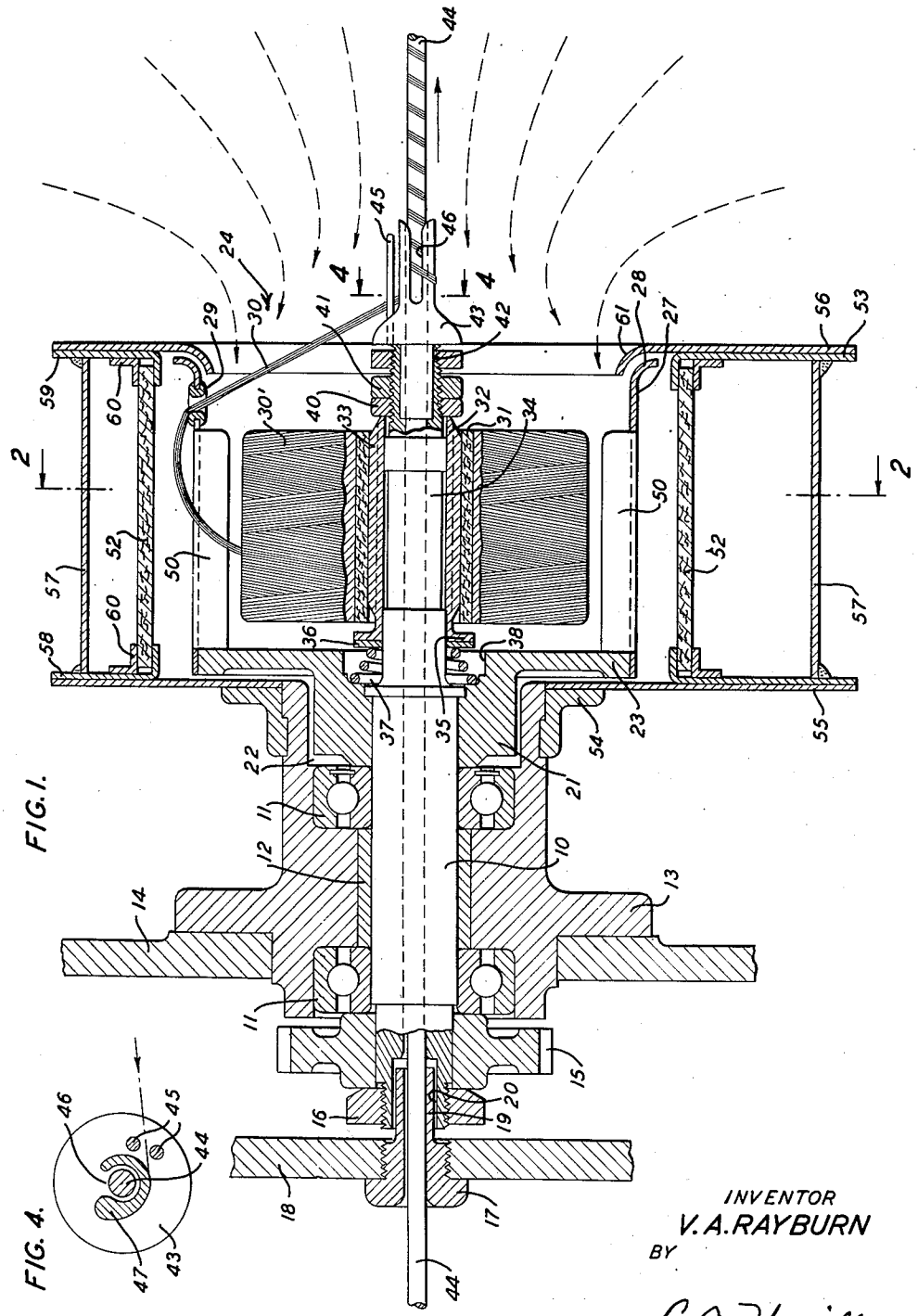

FIG. 1.



FIG. 4.

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FIG. 2.

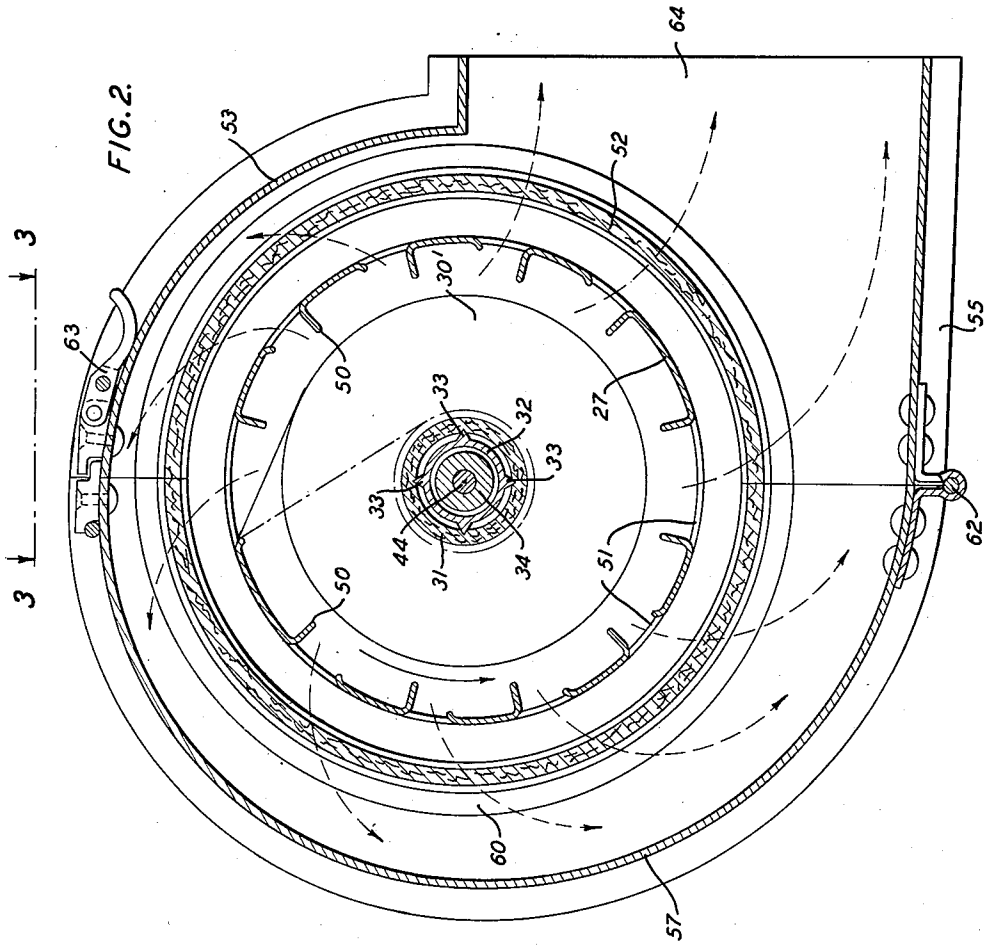
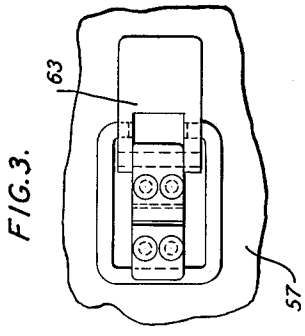



FIG. 3.

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## APPARATUS FOR APPLYING SERVING MATERIAL TO A CORE

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14 Claims. (Cl. 57—6)

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This invention relates to material serving apparatus of the type in which a cop or bobbin of serving yarn is rotatably mounted concentrically of the strand to be served and the cop or bobbin is adapted in its rotation to have the serving yarn drawn therefrom and applied spirally to the strand, and more particularly to such an apparatus for applying a serving of fiberglass over a strand or core.

In the application of fiberglass or like yarn as insulation servings on conductors or as lashings to bind together several strands of conducting wire, there in an expulsion of a considerable quantity of lint or very short fibers broken away from the yarn and thrown into the air by the rapidly rotating server head. These lints of fiberglass or like materials become imbedded in the skin and mucous membranes of the respiratory tract of the operator of the serving machine and produce considerable irritation and pain if not actual permanent injury.

The primary object of this invention is to provide a serving head having an air impelling means and an air filter for preventing the atmosphere adjacent the serving head from being contaminated with particles broken away from the serving yarn material.

Another object is to provide a serving guide for applying the serving material to the strand or core without abrupt or sharp bends to thus prevent or minimize the breaking of particles from the serving material.

In accordance with this and other objects the serving head is provided with a rotating cylindrical exhaust hood or bobbin case air impeller having slots and inwardly extending radial fins which induce a flow of air inwardly over the serving head, the serving guide and the bobbin of serving material. This exhaust hood or bobbin case air impeller is enclosed in an involute housing split transversely and provided with a hinge and latch so that it can be opened to afford access in threading the serving head with a material to be served on a strand or core. Fitted inside this housing with suitable clearances between the inside housing wall and the cylindrical bobbin case is a filter saturated with a viscous oil and placed in the path of the induced airstream so as to catch all particles broken off from the serving yarn material. The serving head is also provided with a serving guide having a pair of guide pins and a slotted cylindrical member so shaped that roughening or abrupt bending of the serving material is avoided.

A clear understanding of the invention will be

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had from the following description of one embodiment thereof illustrated in the accompanying drawing, wherein,

Fig. 1 is a longitudinal sectional view of a serving head and serving guide equipped with an air impeller and air filter housing embodying the present invention;

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

Fig. 3 is a fragmentary view of a portion of the housing showing a latch for securing the two hinged parts of the serving head housing together, looking in the direction indicated by the arrows in Fig. 2, and

Fig. 4 is a sectional view of the serving guide taken on line 4—4 of Fig. 1.

Referring now to the drawings in which like reference numerals indicate the same parts throughout the several views, a hollow spindle 10 is rotatably mounted on two bearings 11 and in a spacer sleeve 12 which separates these bearings. The bearings 11 and sleeve 12 are held in proper place by a tubular support 13 which is secured to a frame 14 of the machine.

The spindle 10 is rotated by a suitable power means, such as a motor (not shown), through a gear 15 which is keyed or splined to the spindle and locked thereon by a threaded nut 16. Adjacent this locking nut is a strand or core guide bushing 17 threaded into a stationary bracket 18 on the machine and having a reduced portion 19 projecting into a recess 20 in the left end of the spindle.

Secured to the spindle 10 at a point adjacent the right hand bearing 11 is a hub 21 which extends partially into a circular opening 22 in the tubular support 13. The hub 21 has a circular flange 23 which forms the left hand wall of the serving head, designated generally by the reference numeral 24. A serving head shell 27 having an outwardly flared rim 28 is fastened to the flange 23 by welding or any other suitable means. This shell 27 is also provided with suitable openings in which are fixed polished eyelets 29 for threading a serving material, such as fiberglass 30, which in the form of a cop or bobbin 30' is mounted on a tubular fiber member 31. The tubular member 31 is secured in position on a cop sleeve 32 by pressing the member 31 over a plurality of fins 33 integral with the sleeve 32.

The cop sleeve 32 is mounted on a reduced portion 34 of the spindle 10 so that it may be rotated freely thereon. An integral upturned flange 35 at the left end of the sleeve 32 is adapted to engage a disk 36 loosely mounted on the reduced

portion 34 of the spindle 10. The disk 36 is resiliently engaged by a cone shaped coil spring 37 which encircles the reduced portion of the spindle and nests in a circular recess 38 provided in the right hand side of the hub 21. The cop sleeve 32 with its flange 35 along with the disk 36 are pushed toward the left to compress the spring 37 by an adjustable nut 40 which is threaded onto the right hand end of the reduced portion 34 of the spindle 10 a desired amount. This adjusting nut 40 is held in the desired position by a lock nut 41.

The right hand end of the reduced portion of the spindle 10 is so constructed as to terminate in a split collet chuck 42 which receives and holds a serving guide 43 for applying the serving material 30 to a strand, core, or conductor 44 which is advanced through the rotatable hollow spindle 10 and hollow guide 43 at a uniform speed in the direction indicated by an arrow in Fig. 1.

The serving guide 43 (Figs. 1 and 4) is provided with two spaced guide pins 45, which extend parallel with a slot 46 in the guide. The serving guide as shown in Fig. 4, has a thickened and rounded nose edge 47 over which the serving material 30 passes without sharp bends in being applied to the advancing conductor 44. With this particular arrangement of parts in the serving guide it has been proven by numerous tests that less lint or fibers are liberated from the fiberglass serving material, when being served on the core, than is evident when using the ordinary server nose, due to the fact that the serving material contacts only smooth gradually curved surfaces which reduces friction and bending of the material to a minimum.

To remove from the atmosphere any lint or short fibers that may be broken away from the serving material 30 of fiberglass as it is served over the conductor 44, the serving head shell 27 is provided with a plurality of inwardly extending fins 50 (Fig. 2) adjacent a plurality of spaced openings or slots 51, which are produced by partially piercing or punching out portions of the metal shell 27. This construction makes of the serving head shell 27 an air impeller, which due to the high rotative speed of the serving head induces a flow of fast moving air inwardly over and around the serving guide 43 and a cop 30' of serving material 30 to suck any lint from the surrounding atmosphere through the openings 51 and directing such lint to and impinging it upon semi-cylindrical air filtering elements 52.

The air filtering elements 52 which form a circle are supported and spaced in concentric arrangement from the air impeller shell 27 by a housing 53 which is secured to the tubular support 13 of the machine by a flanged collar 54. This housing 53 comprises spaced side plates 55 and 56, the plate 55 being suitably secured to the collar 54 and the plate 56 being spaced therefrom by means of a semi-cylindrical member 57 and two flanged members 58 and 59, the latter supporting filtering element 52 in conjunction with spaced flanges 60 secured to the two flange members 58 and 59 as shown in Fig. 1. The plates 55 and 56, the flanged members 58 and 59 and the semi-cylindrical members 57 may be secured in air-tight relation by means of welding, soldering, etc. The plate 56 is provided with an inlet opening through which loose fiber and lint are drawn from the serving guide 43 to and through the openings 51 in the air impeller 27. The edge of the plate 56 surrounding the opening is flared inwardly at 61 and cooperates with outwardly flared edge 28 of the rotating shell 27 to provide an air seal between the rotating shell and the stationary housing.



The housing 53 as shown in Fig. 2 is split transversely into two parts and joined together by a hinge 62 and a latch 63 so that it may readily be opened for access to effect the changing of the filtering elements, renewing a cop of serving material, and threading the serving material 30 through the serving head to the serving guide 43. The spacing of the flange members 58 and 60 is such that the filtering elements 52 fit snugly therebetween and can be readily removed when renewal is necessary. The filters 52 comprise bats of low resistance viscous film air filter such as bronze wool backed by a metal screen and the whole is saturated by a nonoxidizing oil or light grease. However, it is to be understood that any type of filter might be used that would arrest the travel of lint or fiber. The filtered air passing through the filtering elements 52 passes out of the serving head housing through an outlet 64 into a suitable duct system.

In the operation of the serving head, the serving material 30 is threaded from the cop 30' up through an opening 51 in the air impeller shell 27, through the polished guide eyelet 29 down between the pair of guide pins 45 (Fig. 4) around the rounded thickened nose portion 47 of the serving guide 43 and then onto the core or conductor 44 where it is tied. The conductor 44 is then advanced through the hollow spindle 10 in the direction indicated by the arrow and driving power is supplied to the gear 15 to rotate the spindle 10, the hub 21, the air impeller shell 27, and the serving guide 43 at high speed. The serving material 30 is thus pulled from the cop 30' and served in a spiral on the advancing conductor or core 44 by the serving guide 43 as shown in Fig. 1.

The tension on the serving material 30 is controlled by turning the threaded adjusting nut 40 on the reduced portion 34 of the spindle 10 to determine the pressure exerted by the spring 37 on the disk 36 which frictionally engages the flange 35 of cop sleeve 32 which carries the rotating bobbin 30' of serving material 30. By screwing the adjusting nut 40 toward the spring 37 the pressure between the flange 35 on the cop sleeve 32 and the disk is increased to thus increase the tension on the serving material 30.

The rapid rotation of the serving head shell 27 carrying the radially inwardly extending blades 50 creates a suction of sufficient force to effect the atmosphere around the nose of the serving head and any lint, fiber, etc., which might become loose, would be drawn by the force of the air stream into the housing and through the holes 51 in the serving head shell 27 and be impinged onto the air filter. Thus the fibers of glass or any material loosened from the serving material or from the core would be entrapped on the filtering elements 52.

Although the invention has been described in connection with a specific form thereof, it will be understood that it has further applications and it is not intended to be limited in scope by the embodiment shown herein for illustration.

What is claimed is:

1. In an apparatus for applying a serving material to a core, a serving head, a serving guide for directing the material to the core, means for inducing a flow of air inwardly and around the serving head and guide at the location where

the serving material is applied to the core to carry directly into the serving head any lint or fibers that might become separated from the serving material, and a filter for separating said lint or fibers from the flow of air.

2. In an apparatus for applying fiberglass strands to a conductor, a serving head, a rotatable shell surrounding the serving head and provided with a plurality of openings around the periphery thereof, radial air impeller fins adjacent to said openings and secured to the rotary shell to rotate therewith and for causing air to flow over the serving head and into said openings, and a filtering element surrounding the shell for removing particles of glass fiber from the air passing therethrough.

3. In an apparatus for applying fiberglass strands to a conductor, a serving head, a serving guide for directing the material to the conductor, a housing surrounding the head, air suction means positioned in the housing for causing air to flow past and around the serving head at the union of the strands with the conductor and into the housing so that any loose fiberglass fibers thrown off of the strands will be entrained in the air stream and carried directly into the housing, and a filter for removing the particles of glass fibers from the air passing therethrough.

4. In a serving machine of the class wherein a cop of serving material is rotatably mounted concentrically of a core to be served and the cop is adapted in its rotation to have the serving material drawn therefrom and applied spirally to the core, the combination with said serving machine of means for inducing a stream of air along the core and inwardly around the cop and the serving material at the union of the serving material and the core to carry directly into the serving head any lint or fibers that might become separated from the serving material, and means for removing such lint or fibers from the air stream.

5. In an apparatus for applying a serving material to a core, a hollow rotating spindle through which the core advances, a serving guide attached to the spindle for applying the material to the core, and an air impelling means attached to the rotating spindle for inducing a flow of air over the serving material and around the serving guide where the union of the serving material with the core is made to carry directly into the serving head any lint that becomes separated from the serving material.

6. In an apparatus for applying a serving material to a core, a rotatable serving guide for applying the serving material to the core, an exhaust means rotatable with the serving guide for inducing a flow of air around the serving guide to carry away any lint from the serving material, and means secured to the exhaust means for threading and guiding the serving material through the exhaust means onto the serving guide.

7. In an apparatus for applying a serving material to a core, a rotatable serving head carrying a bobbin of material to be served, a rotatable air impeller substantially enclosing the bobbin of serving material, a stationary housing enclosing the rotatable air impeller, and a filtering element mounted in the housing.

8. In an apparatus for applying a serving strand to a core, a frame, a hollow rotary shaft through which the core passes, means for rotatably mounting the hollow shaft in the frame, a



bobbin mounted on the shaft, a rotary air impeller shell mounted on and adapted to rotate with the hollow shaft, and a stationary housing mounted on the frame and surrounding the bobbin and air impeller shell, said housing comprising two complementary semi-cylindrical members hinged together and maintained in closed position by a cooperating latching means.

9. In an apparatus for applying a serving material to a core, a frame, a hollow spindle through which the core passes, means for rotatably mounting the spindle to the frame, a bobbin of serving material mounted on the spindle, a serving guide secured to the spindle, an air impeller substantially enclosing the bobbin and secured to the rotatable spindle, said air impeller having an opening toward the serving guide, a housing surrounding the air impeller and secured to the frame and having an opening coinciding with the said opening in the rotatable air impeller, means in the housing for holding a removable filtering element, and means for rotating the spindle to operate the bobbin, the serving guide and air impeller to cause the material to be served on the core and set up air currents which pass around the serving guide through the said openings into the air impeller to the filtering elements to cause any lint from the serving material to impinge and be held thereon.

10. In an apparatus for applying a serving material from a bobbin thereof onto a core, a rotatable air impeller substantially enclosing the bobbin of material to be served and having an opening through which the bobbin is inserted, a stationary housing enclosing the rotatable air impeller and having an opening coinciding with the opening in the air impeller, and a serving guide projecting through the said openings for applying the serving material to the core.

11. In an apparatus for applying a serving material to a core to prevent lint or fibers from the serving material reaching the open air, a serving head, a serving guide, said guide having a gradually rounded portion over which the serving material passes in being applied to the core, said rounded portion reducing considerably the quantity of lint or fibers separated from the serving material, means for inducing a flow of air inwardly along the core and over the serving guide to carry off any lint or fibers that might become separated from the serving material, and a filter for separating said lint or fibers from the flow of air.

12. In an apparatus for applying a serving material to a core, a rotatable serving head carrying a bobbin of material to be served on the core, a bobbin sleeve for carrying the bobbin of material, means resiliently engaging the bobbin sleeve for the purpose of maintaining a uniform tension on the serving material and preventing the separation of fibers from the serving material due to backlash action, a rotatable air impeller substantially enclosing the bobbin of serving material, a stationary housing enclosing the rotatable air impeller, and a filtering element mounted in the housing.

13. In an apparatus for applying a serving material to a core, a rotatable serving head carrying a bobbin of material to be served on the core, adjustable means for applying a desired tension on the serving material for the purpose of minimizing the separation of fibers from the serving material, a rotatable air impeller substantially enclosing the bobbin of serving material, a stationary housing enclosing the rotatable air impeller,

and a filtering element mounted in the housing.

14. In an apparatus for applying a serving material to a core, a serving head, means for inducing a flow of air inwardly along the core and around the serving head at the location where the serving is applied to the core to carry directly into the serving head any lint or fibers that might become separated from the serving material, and a filter for separating said lint or fibers from the flow of air, said filter being concentric with the said air flow inducing means.

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