

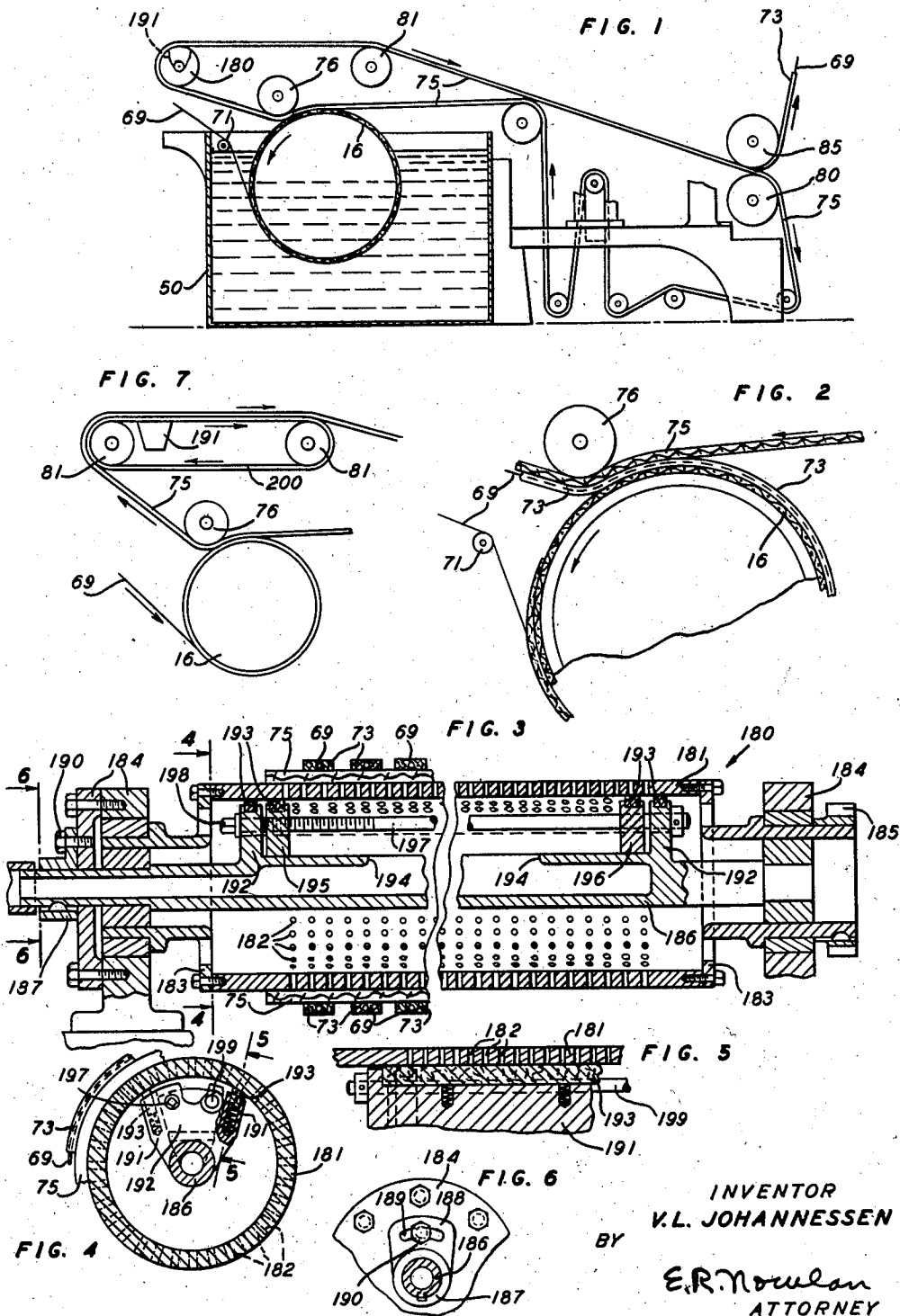
Nov. 24, 1942.

V. L. JOHANNESSEN

2,303,124

APPARATUS FOR HANDLING ARTICLES

Original Filed May 3, 1940



INVENTOR
V.L. JOHANNESSEN

BY

E.R. Moulton
ATTORNEY

UNITED STATES PATENT OFFICE

2,303,124

APPARATUS FOR HANDLING ARTICLES

Vaughn L. Johannessen, Cranford, N. J., assignor
to Western Electric Company, Incorporated,
New York, N. Y., a corporation of New York

Original application May 3, 1940, Serial No.
333,077. Divided and this application July 26,
1941, Serial No. 404,116

14 Claims. (Cl. 34—123)

This invention relates to apparatus for handling articles and more particularly to apparatus for creating a seamless sheath of felted fibrous insulating material on electrically conductive strands.

In the manufacture of insulated electrical conductor strands, particularly such as the wires used in multi-conductor electrical cables for telephone use, there have recently been developed methods and apparatus for sheathing metal wire with a continuous seamless covering of paper created substantially in situ on the wire. A suitable apparatus for this purpose is disclosed and described in detail in U. S. Patent 1,615,394 of January 25, 1927, to J. S. Little. In the apparatus there disclosed pulpous material, e. g., paper stock, is caused to form a flat narrow ribbon of wet, felted fibres about a wire core substantially in the center of the ribbon as formed. The ribbon is folded into a cylinder about the core and compacted and integrated into a substantially seamless sheath about the core. In doing this, the pulp is deposited, to form a ribbon, between parallel deckles, on a foraminous drum, the wire core being laid on the partially formed ribbon and the rest of the ribbon deposited thereover. The flat, wet, pulp ribbon containing the core runs from the drum between a pair of endless belts of felt or the like absorptive material, held together by suitable guide rolls and travelling with the ribbon and its core pressed between them to absorb a portion of the water contained in the wet pulp ribbon and in some degree to compact and integrate together the ribbon.

An object of the present invention is to simplify the construction, maintenance and operation of apparatus such as described, by dispensing with one of the two felt belts, and thereby also with the need for means to drive and support the second belt and to maintain it in the necessarily close alignment and synchronism with its companion belt.

This is a division of application Serial No. 333,077, filed May 3, 1940, by the same inventor.

With the above and other objects, the invention may be embodied in apparatus having means such as a sheet of porous absorptive material to receive wet porous articles on one face in mutually spaced relation and means to apply suction to the other face of the sheet sufficiently severe to suck moisture from the portions of the sheet between the articles but not sufficiently severe to suck moisture from the articles through the sheet so that after cessation of the suction the dried portions of the sheet will remove moisture

from the articles by capillary absorption without disturbance of the substance of the articles.

Other objects and features of the invention will appear from the following detailed description of one embodiment thereof, taken in connection with the accompanying drawing in which the same reference numerals are applied to identical parts in the several figures and in which

Fig. 1 is a diagrammatic view in side elevation of a portion of an apparatus constructed in accordance with the invention for forming a seamless sheath of fibrous insulating material upon a wire core;

Fig. 2 is a fragmentary detailed transverse section of the foraminous drum;

Fig. 3 is an enlarged horizontal central section of the suction roll;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a section on the line 5—5 of Fig. 4;

Fig. 6 is a section on the line 6—6 of Fig. 3; and

Fig. 7 is a partial view similar to Fig. 1 of a modified form.

Of the embodiment herein disclosed, only so much of the apparatus is shown and described as is required for a clear understanding of the present invention. For a detailed disclosure and description of the construction and mode of operation generally and for matters not specifically disclosed herein, reference may be had to U. S. Patent 1,615,394 cited above. The reference numerals herein employed are the same as or related to those of the cited patent.

In the apparatus disclosed here wires 69 to be coated are drawn by means (not shown) through the apparatus from supplies (not shown), and pass over guide sheaves 71 and under a foraminous drum 16 partially submerged in a vat or tank 50 filled with suitable paper stock. The drum has circumferential deckles between which the pulp from the stock is deposited in ribbons. After each ribbon 73 has been partially formed on the down running side of the drum, one of the wires 69 is laid thereon and continues around the drum therewith while the rest of the ribbon is formed.

A belt 75, preferably of felt, having absorptive properties, runs over the top of the drum as shown, under a pressure roller 76 to hold the belt firmly against the drum and thence over a roll 180, horizontally back over a guide roll 81 and slantingly down between a pair of squeezing rolls 80 and 85. Thence the belt returns deviously through washing, rinsing and drying means (not shown) to the drum 16.

As the belt 75 leaves the drum 16, the wire 69 encased in the wet pulp ribbon 73 accompanies the belt as best shown in Fig. 2, lying against the under side of the belt, and passes in contact with the belt and on the outer face thereof over the rolls 180 and 81 to and through the squeeze rolls 80 and 85. Emerging from these the wire and its enveloping ribbon part company with the belt and pass off upwardly for further treatment while the belt turns downwardly to return to the drum 16.

An essential general feature of the present invention resides in the structure and effect of the suction roll 180 and its associated elements, as shown in detail in Figs. 4, 5 and 6. The body of this roll is a foraminous hollow cylinder 181, preferably a substantial self-sustaining continuous cylindrical sheet of metal formed with numerous radial perforations 182, and rigidly mounted on heads 183 which are journaled in stationary standards or supports 184 to be rotatable therein and to be driven, if desired, as by a gear 185 by any suitable means (not shown).

A coaxial shaft 186 is journaled inside of the body 181 to be stationary while the body rotates around it and is held stationary by a collar 187 keyed thereto and having an integral upstanding lever arm 188 provided with an arcuate slot 189 through which a clamp screw 190 passes into the left hand standard 184 whereby the stationary shaft 186 may be angularly adjusted about its axis. The shaft 186 is formed within the roll body 181 with two radially spaced outwardly extending fins or walls 191 defining between them a V-shaped or sector-shaped suction box closed at each end by a transverse wall 192. The four walls 191, 191, 192 and 192 extend out nearly to the inner surface of the cylinder body 181 and each is provided with a sealing member 193 carried in a suitable recess in the outer edge of the wall and of some material such as vulcanized fiber adapted to make a suitable sliding fit against the inner surface of the cylinder. The shaft 186 is hollow from its left hand end (Fig. 4) to a point past its center and its bore communicates by way of a radial slot 194 with the interior of the suction box. Air or a mixture of air and water may be exhausted from the suction box through the hollow shaft by any suitable means (not shown).

Two close-fitting slidable transverse walls 195 and 196 are located in the suction box to be adjustable longitudinally thereof. Each is provided with a suitable sealing member 193 like those carried by the end walls 192 of the box. A threaded rod 197, journaled in the walls 192 and provided with a squared head 198, passes through a correspondingly threaded bore in the wall 195 and a smooth bore in the wall 196, and thus may be used to adjust the position of the wall 195 in the box without disturbing the wall 196. A similar rod 199 analogously arranged serves to adjust the wall 196.

In operation a plurality of strands arranged parallel to each other and spaced suitably apart, travels over the sheaves 71 and down under the revolving drum 16. They leave the drum a little beyond the top of its periphery, each encased in a flat, soft wet ribbon of felted paper pulp, adherent to and travelling with the under side of the belt 75 to and around the suction roll 180. Ordinarily the suction box is about in the position shown in Figs. 1 and 5. However, according to the requirements of a given set of circumstances (ribbon thicknesses, spacing of ribbons

on the belt, age of the belt and its consequent porosity, and the like) the effectiveness of the suction may be increased or diminished by tilting the box more or less to the left or right from the position shown in Fig. 1 where there is leakage of air into the box over the right hand wall since the belt has left the roll before reaching this wall.

The wet pulp ribbons, each containing a wire core approximately in its center, are spaced side by side along the length of the roll with the belt between them and the roll as best shown in Fig. 4. The exhaustion of air from the suction box tends to draw water from the wet belt substantially uniformly over its width as it passes over the box, and also to suck water through the porous belt from the wet ribbons on its outer face. If the suction effect is strong enough, however, to accomplish this it is found that air also is drawn through the pulp ribbons with sufficient force to inter-mat fibers of the ribbon with the substance of the belt making it difficult to remove the ribbon whole and cleanly from the belt at 85, and also air thus sucked through the ribbon tends to disintegrate the felting of the fibers of the ribbon.

If the suction effect is suitably adjusted, roughly by varying the power used to exhaust from the suction box and accurately by adjusting the position of the box, a condition may be arrived at and substantially continuously maintained, in which the suction will be effective to remove water by direct sucking from those portions of the belt which are not covered by ribbons, and yet will not draw directly through the belt plus the ribbons and so will neither disturb the material of the ribbons directly nor cause them to mat into the belt. After the belt leaves the suction roll, the relatively dry parts of the belt between and more or less under the edges of the ribbons absorb water from the ribbons by capillary attraction to such an extent that the ribbons are dry enough to be self sustainingly coherent when removed at 85 from the support of the belt.

If a less number of wires is being handled than requires the full effective length of the roll 180, the width of belt exposed to the suction effect of the box may be narrowed as appropriate by adjustment of position of the walls 195 and 196.

In Fig. 7 is disclosed a modified form of the apparatus above described. The foraminous roll 180 of the above arrangement is replaced by a solid roll 81 similar to the other roll 81. An auxiliary belt 200 of woven wire runs over the two rolls 81 and over the top of the suction box 191 located just back of the first roll 81. The felt belt 75 is supported on this wire mesh belt as the two together pass over the suction box.

While the invention as disclosed and described above is embodied in an apparatus for embedding wires in ribbons of paper pulp, it is not limited to this one particular use but is applicable wherever ribbon-like and fragile strands or other articles of porous material are to be freed of contained liquid without being subjected to possibly harmful or even destructive forces the while.

The embodiment disclosed is illustrative and may be modified and departed from in various ways without departing from the spirit and scope of the invention as pointed out in and limited only by the appended claims.

What is claimed is:

1. An apparatus for handling articles of wet

5

19

15

20

25

30

25

40-

13

50

55

30

35

10

sheet, so that moisture will not be removed from the strands directly by the suction but after cessation of the suction will be removed by capillary absorption into the partially dried portions of the sheet.

9. An apparatus for handling strands of wet porous material to remove moisture therefrom which comprises a foraminous supporting member, a flexible belt of porous absorptive material running over the member to receive on the free surface thereof a plurality of wet porous strands in spaced relation thereon, means to distribute such plurality of such strands thereon in such relation, means to apply suction to the free surface of the member and thereby to the adjacent surface of the portion of the belt in contact with the member, and means to adjust the severity of the suction to draw moisture from the portions of the belt between the spaced strands thereon but not from the strands, so that moisture will not be removed from the strands directly by the suction but after cessation of the suction will be removed by capillary absorption into the partially dried portions of the sheet.

10. An apparatus for handling strands of wet porous material to remove moisture therefrom which comprises a hollow foraminous cylindrical roller, a flexible belt of porous absorptive material running over the roller to receive on the free surface thereof a plurality of wet porous strands in spaced relation thereon, means to distribute such plurality of such strands thereon in such relation, means to exhaust air from the interior of the roller to create a suction on the adjacent surface of the portion of the belt on the roller, and means to adjust the severity of the suction to draw moisture from the portions of the belt between the spaced strands thereon but not from the strands.

11. An apparatus for handling strands of wet porous material to remove moisture therefrom which comprises a hollow foraminous cylindrical roller, a flexible belt of porous absorptive material running over the roller to receive on the free surface thereof a plurality of wet porous strands in spaced relation thereon, means to distribute such plurality of such strands thereon in such relation, means to exhaust air from the interior of the roller to create a suction on the adjacent surface of the portion of the belt on the roller, and means to adjust the severity of the suction to draw moisture from the portions of the belt between the spaced strands thereon but not from the strands, the said exhausting means comprising a normally stationary suction box within the roller and effective to exert a suction effect over a portion only of the surface of the roller.

12. An apparatus for handling strands of wet porous material to remove moisture therefrom which comprises a hollow foraminous cylindrical roller, a flexible belt of porous absorptive material running over the roller to receive on the

free surface thereof a plurality of wet porous strands in spaced relation thereon, means to distribute such plurality of such strands thereon in such relation, means to exhaust air from the interior of the roller to create a suction on the adjacent surface of the portion of the belt on the roller, and means to adjust the severity of the suction to draw moisture from the portions of the belt between the spaced strands thereon but not from the strands, the said exhausting means comprising a normally stationary suction box within the roller and effective to exert a suction effect over a portion only of the surface of the roller, and the said adjusting means comprising means to adjustably vary the position of the suction box angularly about the axis of the roller.

13. An apparatus for handling strands of wet porous material to remove moisture therefrom which comprises a hollow foraminous cylindrical roller, a flexible belt of porous absorptive material running over the roller to receive on the free surface thereof a plurality of wet porous strands in spaced relation thereon, means to distribute such plurality of such strands thereon in such relation, means to exhaust air from the interior of the roller to create a suction on the adjacent surface of the portion of the belt on the roller, and means to adjust the severity of the suction to draw moisture from the portions of the belt between the spaced strands thereon but not from the strands, the said exhausting means comprising a normally stationary suction box within the roller and effective to exert a suction effect over a portion only of the surface of the roller, and the said adjusting means comprising means to adjustably vary the effective dimension of the suction box longitudinally of the roller.

14. An apparatus for handling strands of wet porous material to remove moisture therefrom which comprises a hollow foraminous cylindrical roller, a flexible belt of porous absorptive material running over the roller to receive on the free surface thereof a plurality of wet porous strands in spaced relation thereon, means to distribute such plurality of such strands thereon in such relation, means to exhaust air from the interior of the roller to create a suction on the adjacent surface of the portion of the belt on the roller, and means to adjust the severity of the suction to draw moisture from the portions of the belt between the spaced strands thereon but not from the strands, the said exhausting means comprising a normally stationary suction box within the roller and effective to exert a suction effect over a portion only of the surface of the roller, and the said adjusting means comprising means to adjustably vary the effective dimension of the suction box longitudinally of the roller and means to adjustably vary the position of the suction box angularly about the axis of the roller.

VAUGHN L. JOHANNESSEN.