

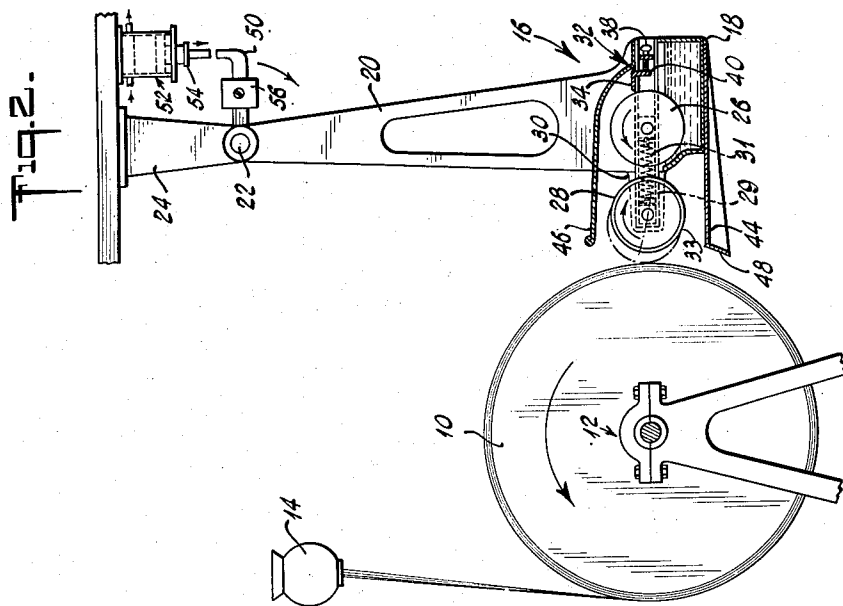
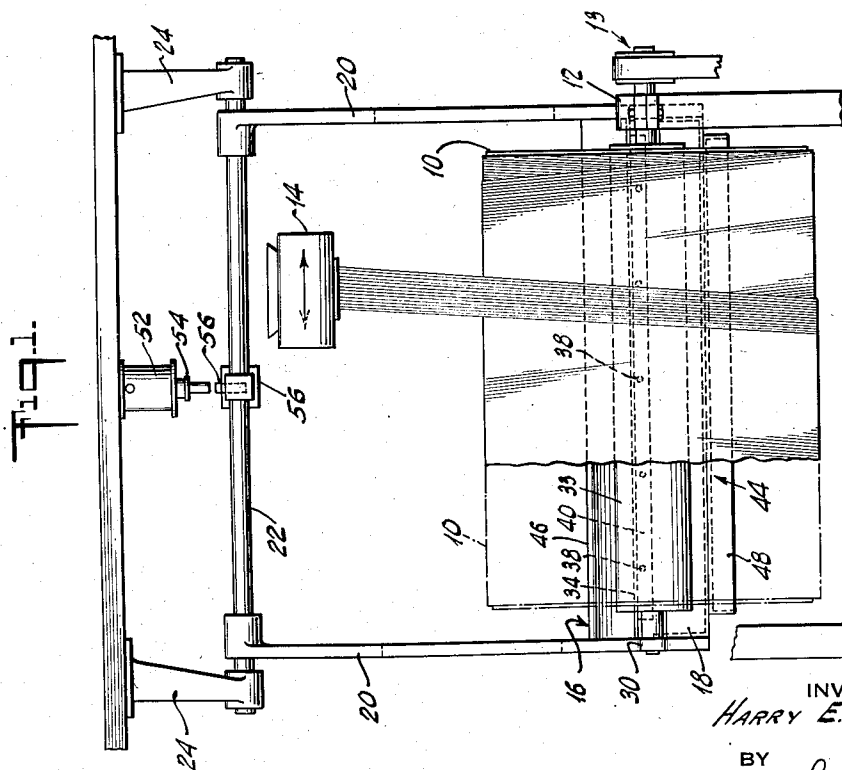
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H. E. HOLCOMB

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BINDER APPLICATOR

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INVENTOR  
HARRY E. HOLCOMB.

BY  
Virgil C. Klein  
ATTORNEY

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## BINDER APPLICATOR

Harry E. Holcomb, Stratford, Conn., assignor to  
 Johns-Manville Corporation, New York, N. Y.,  
 a corporation of New York

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The instant invention relates to devices or applicators for applying treating materials of various types, such as liquid phase binders, for example, to a mat of filaments or the like on a winding drum. The invention is particularly adapted for use with equipment employed for forming glass mats by winding a plurality of layers of the filaments drawn from a glass furnace onto a drawing drum, and will be described in that connection. It will be appreciated, however, that it may have other applications where similar problems are involved.

In a mat forming operation of the type referred to above, a multiplicity of glass filaments are drawn simultaneously from the spinning orifices of a glass melting furnace by a rotating drum on which the filaments are wound. Either the furnace or the drum, usually the former, is reciprocated whereby the filaments are laid in a plurality of intercrossed layers. When an accumulation of filaments has been built up on the drum to the desired thickness, the operation is stopped, the mat is severed along the line of generation of the drum, and is removed. Heretofore when a binder or other treating material was to be distributed on the mat it was applied at intervals during the winding operation by a manually operated spray moved back and forth across the material on the drum.

This procedure has certain inherent disadvantages. That is, the efficiency of hand spraying is necessarily dependent on the skill and conscientiousness of the mechanic. Also, the method is relatively wasteful of material. It has been found that the airstream set up by the rotation of the drum strikes the spray and conveys a high proportion of the material into the atmosphere. Tests have indicated that approximately 80% of the material is not deposited upon the fibers at all. In addition to loss of material, this diffusion of the spray may cause contamination of materials of other types used upon adjacent machines, as well as create undesirable working conditions.

The principal object of the invention is the provision of a treating agent applicator which will eliminate these disadvantages. More specifically an object of the invention is the provision of an applicator including a supply of the binder or other treating agent and a transfer device for removing the treating agent from the supply and depositing it directly on the fibrous mat carried by the drum.

Another object of the invention is the provision of an apparatus of the type referred to in which

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the applicator is mounted for movement from a position where the transfer device is in operating contact with the mat or drum to a position where it is out of such contact, the movement of the applicator between the two positions being under either manual or automatic control as desired. The construction thus permits application of the material for predetermined periods only, or continuous application.

Briefly stated, the invention resides in a treating agent applicator mounted adjacent the winding drum of a filament drawing and winding device for movement toward and away from the drum. The winding device is of the type in which the furnace, rather than the drum, is reciprocated to build up the mat of intercrossed filamentary layers. The applicator includes a tank or container for the material to be applied, a delivery roll mounted for rotation with its lower side immersed in the material in the tank, and a transfer roll mounted for rotation with one side for contact with the delivery roll and the other side free to contact the mat on the drum. The drum serves as the driving force for the transfer and delivery rolls, the former being driven directly by its frictional contact with the drum or the mat carried thereby, and the delivery roll being driven when the device is in its operative position by frictional contact with the transfer roll. The applicator is mounted on a fixed pivot with the transfer roll normally out of contact with the drum. Means of a suitable type which may be under either manual or automatic control, are provided to swing the device on its pivot to bring the transfer roll into contact with the drum and maintain it in such position during the desired interval or intervals.

My invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description of a preferred embodiment of the invention which is to follow, and to the accompanying drawings in which:

Fig. 1 is an elevational view looking toward the apparatus in the direction indicated by the arrow in Fig. 2; and

Fig. 2 is an end elevational view of the apparatus of Fig. 1.

Referring now to the drawings there is illustrated a glass filament drawing and winding apparatus of generally conventional type, the apparatus including a winding drum 10 supported for rotation on suitable bearings 12 and driven at conventional speeds and in the direction indicated by the arrow in Fig. 2 by any suitable ap-

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paratus such as the pulley or belt drive illustrated diagrammatically at 13. Supported above the drum is a melting furnace 14 in which glass or other suitable thermoplastic material may be reduced to a molten state and drawn in the form of a plurality of strands or filaments through spinning orifices. The furnace is supported by suitable means (not shown) for reciprocation longitudinally of the drum to substantially the full length thereof whereby the glass filaments are laid in a plurality of layers of spirals with the filaments of each layer crossing the filaments of adjacent layers.

In accordance with the instant invention a device is provided for applying a liquid phase material such as a binder, waterproofing material or other treating agent. It will be appreciated that the device is not limited to use with any particular treating agent. The applicator, indicated generally at 16, comprises an elongated container or tank 18 of a slightly greater length than the width of the mat built up on the drum. Tank 18 is mounted on arms 20 which in turn are fixed to a shaft 22 mounted for pivotal or rocking movement in hangers 24. A delivery roll 26, extending substantially the length of the tank 18, is supported on suitable fixed bearings for free rotation with its lower surface within the tank so that it will be immersed in the material carried therein. A transfer roll 28 is mounted for rotation in slidable bearings supported in tracks 29 in stub arms 39. The slidable bearings are normally held at the outer ends of their tracks by resilient means such as springs 31 to space the transfer and delivery rolls apart an appreciable distance, say  $\frac{1}{4}$  inch. The transfer roll lies parallel to the delivery roll and is of substantially the same length.

In the preferred embodiment delivery roll 26 is relatively smooth surfaced and suitably may be a metal roll. Transfer roll 28, however, is provided with a yieldable resilient covering 33, such as rubber. Due to the characteristics of this covering, delivery roll 26, when in contact with the transfer roll, will be driven thereby without, however, interfering with the delivery of the layer of treating material to the transfer roll. A doctor device 32 is mounted on the tank in position to control the thickness of the layer of material carried by the delivery roll. This device may be of any suitable type and, as shown, suitably comprises an L-shaped member having a doctor blade 34 with the ends slidably supported on the frame of the device. Adjustability is provided by a screw 38 threaded into a relatively fixed element of the apparatus and bearing against flange 40 of the doctor blade.

A spray return baffle 46 is supported from the apparatus to overlie the rolls to catch and return any of the treating material which may be thrown upwardly from the surface of the transfer roll or drum or carried upwardly by windage created by rotation of the drum. The guard extends toward the drum to be just out of contact with the mat on the drum in the operative position of the device.

A fiber deflector or guard 44 is carried by the applicator below the transfer roll, the deflector including a forward flanged edge 48 which closely approaches the mat in the operative position of the device. The guard serves to deflect and break off any loose fibers extending outwardly from the surface of the mat which might otherwise become entangled in and foul the applicator.

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Movement of the transfer roll into and out of contact with the mat on the drawing drum is effected by means including a lever arm 50 fixed to shaft 22 and an actuating device 52 co-operating with the lever arm. The actuating device may be a solenoid, or an air or fluid piston-cylinder combination, or the like, which includes a piston or plunger 54 adapted, when forced downwardly by the actuating means, to press against the end of lever arm 50 and swing the applicator in a counter-clockwise direction until the surface of the transfer roll is in contact with the mat on the drum. In the specific construction shown a hydraulically operated piston-cylinder combination is illustrated. It will be understood that the previously mentioned equivalent devices may be substituted therefor, all of which may be subject to either manual or automatic control.

The pivotal mount of the applicator is sufficiently remote from the drum to insure that the transfer roll will not be in contact with the material on the drum except when the plunger 54 is in operative contact with lever arm 50. That is, the position of the pivot with respect to the center of gravity of the pivotally supported parts is such that the transfer roll is normally spaced from the drum. A counterweight, indicated at 56, may be movably mounted on the lever arm to permit the gap between the transfer roll, when in inoperative position, and the drum to be adjusted as desired.

In the operation of the apparatus described above, the filaments drawn from furnace 14 are continuously wound on the drawing drum in a series of layers of spirals, with the filaments of each layer crossing the filaments of adjacent layers until a mat of the desired thickness is built up on the drum. At suitable intervals during the winding operation or continuously, as desired, applicator 16 is swung on its pivot into operative position. As previously mentioned, where intermittent operation is desired, the flow of fluid to the cylinder of device 52 may be under either manual or automatic control. Control devices of the type required are conventional and, hence, have not been shown or described.

When the applicator is swung toward the drum, the transfer roll 28 contacts the mat and is rotated thereby. Under continued pressure of the actuating solenoid or other mechanism, springs 31 are compressed and the transfer roll is brought into driving contact with delivery roll 26 which is then rotated, the delivery roll picking up a surface layer of the treating material in tank 18. The layer is carried past doctor device 32 where it is leveled to the desired thickness and then delivered to transfer roll 28 which in turn transfers it to the mat on the drum and forces it into the interstices of the layers of the mat.

The outward spring pressing of the bearings of the transfer roll provides a cushioning effect when the roll is brought into contact with the mat which greatly reduces breakage of the fine filaments of the mat. Also, this arrangement permits rotation of the transfer roll before it is brought into driving contact with the delivery roll, thus reducing the abruptness of power transfer.

The instant applicator apparatus permits the application of various treating materials, such as solutions or emulsions of resins, rubber latices, starches, polystyrene and other liquid or

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plastic solutions suitable for the purpose of treating glass fiber filaments as they are drawn at high speed from a glass melting furnace. Vegetable or mineral oils and waxes are further examples of treating media which may be applied. A substantial saving of material results from the fact that the material is delivered directly to the mat and is not affected by air currents set up by rotation of the drum. Also, more viscous materials may be applied than is the case with the conventional spray gun. The application is even and uniform and the operation may be under automatic control where desired.

Having thus described my invention in rather full detail, it will be understood that these details need not be strictly adhered to but that various changes and modifications may suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claims.

What I claim is:

1. In an apparatus of the class described including a rotatable drum for collecting filamentary material as a layer thereon, the improvement comprising, an applicator for applying a treating agent to the layer of filamentary material on the drum, said applicator including a transfer roll, bearings for said roll, said bearings being movably mounted in the applicator means yieldingly pressing said bearings toward the drum, mounting means for said applicator permitting the positioning of said transfer roll in contact with the layer of filamentary material, and means for applying a treating agent to the transfer roll.

2. In an apparatus of the class described including a rotatable drum for collecting filamentary material as a layer thereon, the improvement comprising, an applicator for applying a treating agent to the layer on the drum, said ap-

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plicator including means for supplying a treating agent, a delivery roll supported to receive the treating agent, a transfer roll mounted for movement out of and into driving contact with the delivery roll, means yieldingly pressing said transfer roll out of contact with the delivery roll, and mounting means for said applicator permitting movement of said transfer roll into and out of contact with the layer on the drum.

3. In an apparatus of the class described including a rotating drum for collecting filamentary material as a layer thereon, the improvement comprising, an applicator for applying a treating agent to the layer collected on said drum, said applicator including a tank for the treating agent, a delivery roll, means mounting the delivery roll for rotation with its peripheral surface in contact with the treating agent in the tank to pick up a layer of the agent thereon, an adjustable doctor blade for controlling the thickness of the layer on said delivery roll, a transfer roll, means yieldingly pressing the transfer roll out of contact with the delivery roll, and means for mounting said applicator for positioning the transfer roll in driven contact with said drum.

HARRY E. HOLCOMB.

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