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COATING APPLYING APPARATUS

2 Sheets-Sheet 1



Fig. 2.

Fig. 3.

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2 Sheets-Sheet 2

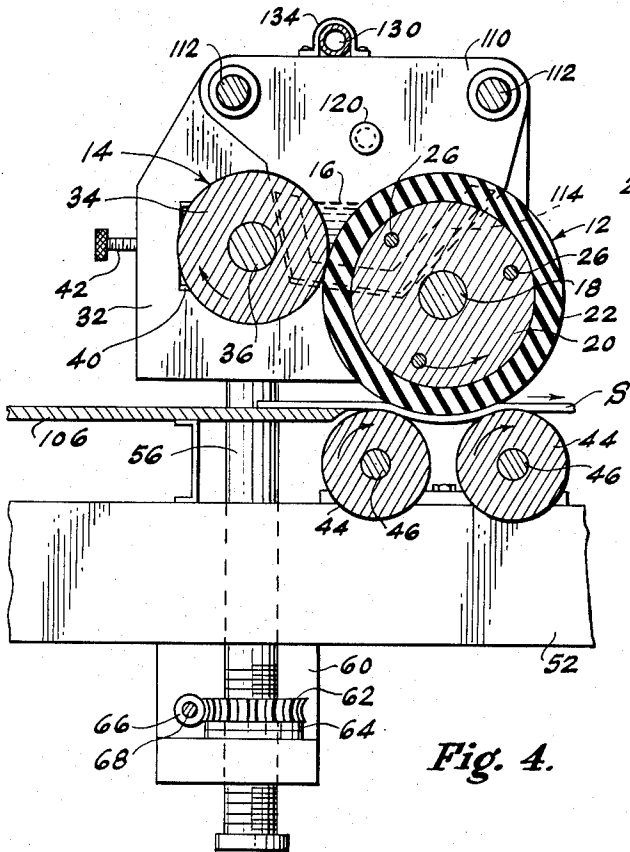


Fig. 4.

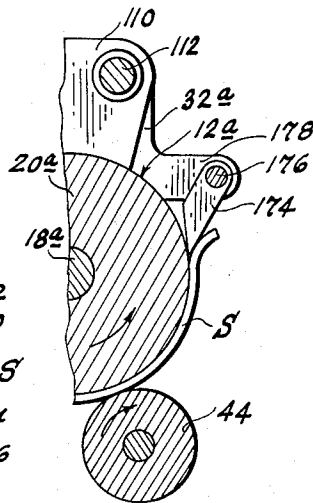


Fig. 5.

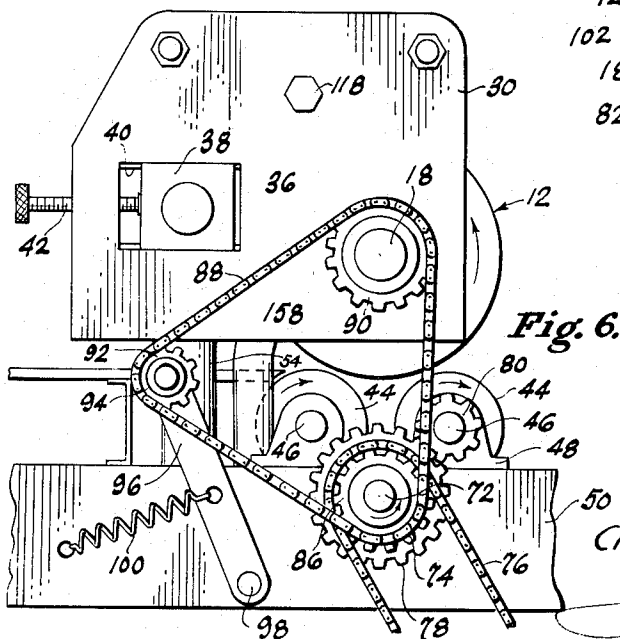


Fig. 6.

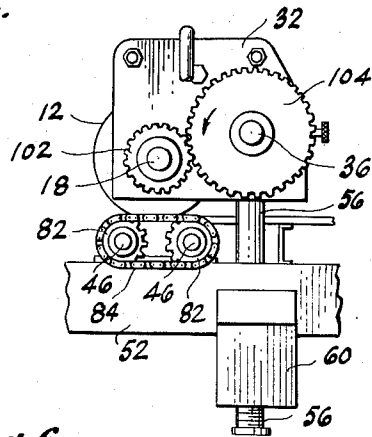


Fig. 7.

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COATING APPLYING APPARATUS
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9 Claims. (Cl. 118—259)

This invention relates generally to apparatus for applying coatings, such as, adhesives, particularly rubber and other cements containing solvents, to sheet or slab materials.

Coating applying machines exist in which a coating roller and a coating control roller are rotatably mounted side-by-side, and the supply of adhesive or other coating substance is contained between the coating and coating control rollers above the line of rolling contact therebetween so that, as such rollers are rotated, the surface of the coating roller picks up a film of adhesive from the supply for transfer to the sheet or slab material conveyed past the rotated coating roller. A machine of the described character has the advantage of eliminating the adhesive holding tank or reservoir which is normally provided in addition to the coating and coating control rollers, but difficulties are experienced in containing the supply of the adhesive or other coating substance at the ends of the rollers, particularly when fluid liquid adhesives are employed. Some existing machines have radially outward extending flanges at the ends of the coating control roller which closely engage the end surfaces of the coating roller to act as scrapers and as dams at the opposite ends of the supply of adhesive. However, such flanges do not provide a permanently effective seal for containing the supply of adhesive at the ends of the rollers by reason of the wear of the flanges and of the end surfaces of the coating roller, particularly when the latter is formed of rubber. Other existing machines have steel plates disposed against the ends of the rollers, but such plates are also subject to excessive wear and thus are ineffective to prevent dripping of the supply of adhesive between the rollers and the end plates.

Further, the space between the coating and coating control rollers above the line of rolling contact therebetween can only contain a limited quantity of adhesive, so that frequent refilling of such space is required. Attempts to increase the capacity of the space for the supply of adhesive by increasing the diameters of the rollers are not satisfactory by reason of the increased cost of such large diameter rollers, and further by reason of the fact that, if the adhesive is in a solvent, the large surface areas of the large diameter rollers expose correspondingly large quantities of the adhesive solution to evaporation of the solvent, so that the adhesive in the supply tends to thicken. It then becomes necessary to add solvent to the supply of adhesive contained between the rollers and, since the solvent does not readily mix with the adhesive, the adhesive applied to the sheet or slab materials will be of non-uniform consistency.

The problem of evaporation of the solvent from the adhesive solution contained between the rollers cannot be conveniently solved by the provision of an airtight hood enclosing the rollers because of the need to frequently add adhesive to the supply contained between the rollers.

Accordingly, it is an object of this invention to provide an adhesive applying apparatus of the type having a supply of adhesive contained in the space above the line of rolling contact between a coating roller and a coating control roller, and wherein improved means are provided for containing the adhesive within such space at the ends of the rollers.

Another object is to provide an adhesive applying apparatus of the described character wherein a constant

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quantity of adhesive solution is maintained in the space between the coating and coating control rollers by the continuous circulation of adhesive solution between that space and a relatively large capacity storage tank or container.

A further object is to provide an adhesive applying apparatus of the described character wherein the adhesive solution in the storage tank or container is continuously mixed or agitated and solvent can be added thereto, as required, so as to maintain a uniform consistency of the adhesive solution as solvent evaporates therefrom during exposure to the atmosphere at the surfaces of the rollers and at the supply contained between the rollers.

In accordance with an aspect of this invention, an adhesive applying apparatus has end plates pressed towards the end surfaces of the coating roller and the coating control roller, and such plates carry sealing members which may be formed of any suitable material, preferably Teflon, that is, polytetrafluoroethylene, or the like, and which engage the end surfaces of the rollers to provide an effective seal against the leakage of adhesive out of the space between the rollers even when the adhesive is of relatively low viscosity.

In accordance with another aspect of the invention, one of the end plates has an overflow opening therein to determine the level of the adhesive solution in the space between the rollers, and the adhesive solution is continuously supplied to such space by way of a supply pipe extending from a relatively large capacity tank or reservoir to which adhesive solution is returned after overflowing from the space between the rollers.

In accordance with another aspect of the invention, means are provided for adding solvent to the adhesive in the large capacity tank or container in which the added solvent and adhesive can be thoroughly mixed so as to ensure that the adhesive applied by the coating roller is of uniform consistency.

In an adhesive applying apparatus embodying this invention, the coating roller, when formed with a rubber or other resilient surface, is further provided with metal end disks of the same diameter as the roller and which are slidably engaged by the sealing elements carried by the end plates so as to maintain the uniform axial lengths of the coating and coating control rollers necessary to the effective sealing of the ends of the space containing the supply of adhesive between the coating and coating control rollers.

The above, and other objects, features and advantages of the invention, will be apparent in the following detailed description of adhesive applying apparatus embodying this invention which is to be read in connection with the accompanying drawings forming a part hereof, and wherein:

FIG. 1 is a front elevational view of an adhesive applying apparatus embodying the present invention;

FIG. 2 is an enlarged vertical sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is an enlarged detail view showing a modification of the apparatus illustrated in FIG. 1;

FIG. 4 is an enlarged vertical sectional view taken along the line 4—4 of FIG. 1;

FIG. 5 is a fragmentary detail view showing a modification of a portion of the structure illustrated in FIG. 4;

FIG. 6 is an enlarged side elevational view of the apparatus shown in FIG. 1; and

FIG. 7 is a side elevational view of the apparatus shown in FIG. 1, but as viewed from the end opposite to that shown in FIG. 6.

Referring to the drawings in detail, it will be seen that an adhesive applying apparatus embodying the invention and there generally identified by the reference numeral 10 includes a coating roller 12 and a coating control roller

14 (FIG. 4) which are rotatably supported in side-by-side relationship and with their axes spaced apart so that the surfaces of rollers 12 and 14 are substantially in rolling contact with each other along a horizontal line to define a space 16 thereabove for accommodating a supply of adhesive or other coating substance.

In the apparatus 10, the coating roller 12 includes an axle 18 having a rigid metal body 20 thereon and a rubber or other resilient cover 22 extending around body 20. Stainless steel or other hard metal disks 24 (FIG. 1) having the same diameter as the outer surface of rubber cover 22 are disposed at the opposite ends of roller 12 and secured to the body 20 thereof, for example by screws 26 (FIG. 4). The end portions of axle 18 extend substantially beyond end disks 24 of roller 12 and are journaled in suitable fixed bearings 28 (FIG. 2) provided in support members 30 and 32.

The coating control roller 14 preferably has a diameter substantially smaller than the diameter of coating roller 12 and may include a metal body 34 (FIG. 4) fixed on an axle 36. The opposite end portions of axle 36 project substantially beyond body 34 and are journaled in bearing blocks 38 which are slidable along horizontal guideways 40 formed in support members 30 and 32 so that coating control roller 14 may be moved toward and away from coating roller 12 by displacing the bearing blocks 38 along the related guideways 40. In order to effect adjustment of bearing blocks 38, each of the support members 30 and 32 has an adjusting screw 42 extending threadably through a tapped bore in the support member into the related guideway 40 and being rotatably connected to the bearing block 38 in the latter so that rotation of screw 42 causes displacement of the related bearing block along the guideway 40. It will be apparent that the adjusting screws 42 provide means by which the parallelism of the axes of rotation of rollers 12 and 14 may be adjusted, and also by which the contact pressure of coating control roller 14 against the rubber surface of coating roller 12 may be adjusted.

As is represented by the arrows on FIG. 4, rollers 12 and 14 are rotated in opposite directions so that the surfaces of such rollers move downwardly past the supply of adhesive in space 16, thereby to pick-up films or coating of adhesive from such supply, and the film or coating of adhesive picked up by coating roller 12 is then transferred to sheet or slab material S which is conveyed past the bottom of roller 12. The rotational speeds of rollers 12 and 14 are preferably related to each other so that the surface speed of roller 12 is substantially greater than the surface speed of roller 14, thereby providing a wiping action which prevents the build-up of an excessive thickness of adhesive on coating roller 12. Further, the thickness of the film or coating of adhesive picked up from the supply by coating roller 12 and transferred from the latter to the material S is controlled by varying the contact pressure of roller 14 against roller 12, for example, by manipulation of adjusting screws 42.

The apparatus embodying this invention further includes at least one pressure or back-up roller disposed below coating roller 12 to support the material S during the application of adhesive to the latter. The illustrated apparatus 10 has two pressure or back-up rollers 44 on axles 46 which project beyond their opposite ends and are journaled in bearing blocks 48 carried by side frame members 50 and 52. In order to accommodate material S having different thicknesses, coating roller 12 and pressure or back-up rollers 44 are vertically adjustable relative to each other. Such adjustment may be effected by vertically adjusting the pressure or back-up rollers 44 while coating roller 12 and coating control roller 14 are vertically fixed, or, as in the apparatus 10 illustrated in the drawings, the axes of pressure rollers 44 may be fixed, while coating roller 12 and coating control roller 14 are vertically adjustable as a unit. In apparatus 10, support members 30 and 32 have jack screws 54 and 56, respec-

tively, depending therefrom and being vertically slidable in bores formed in side frame members 50 and 52 and in guide brackets 58 and 60 depending from the side frame members. An adjusting nut 62 is screwed on each of the jack screws 54 and 56 and rests on a suitable thrust bearing 64 carried by the related guide bracket 58 or 60 so that the jack screws 54 and 56, and the related support members 30 and 32 are vertically displaced in response to rotation of adjusting nuts 62. In order to effect the joint vertical movement of jack screws 54 and 56, each adjusting nut 62 has a worm wheel formed in the outer peripheral surface thereof and meshing with a worm 66 (FIGS. 2 and 4) secured on a common laterally extending shaft 68 which has its opposite end portions journaled in bearings carried by guide brackets 58 and 60. A hand crank 70 (FIG. 1) is secured on one end of shaft 68 at the outside of the adjacent frame member 50 to permit manual rotation of shaft 68. Thus, the adjusting nuts 62 may be simultaneously rotated to effect either raising or lowering of support members 30 and 32, thereby to either increase or decrease the spacing between coating roller 12 and pressure rollers 44 for accommodating either thicker or thinner materials S.

In order to drive the rollers 12, 14 and 44 of apparatus 10, the latter further may have a stub shaft 72 projecting from the outside of side frame member 50 and journaled in a suitable bearing carried by the latter, with a drive sprocket 74 on shaft 72 being rotated by a suitably driven drive chain 76 (FIGS. 1 and 6). A spur gear 78 is also mounted on shaft 72 for rotation with the latter and meshes with a gear 80 secured on the adjacent end of the shaft 46 of one of the pressure rollers 44. The pressure rollers 44 are made to simultaneously rotate in the same direction by sprockets 82 (FIGS. 1 and 7) which are secured on the ends of both shafts 46 adjacent side frame member 52 and which are engaged by a drive chain 84.

Shaft 72 further carries a sprocket 86 (FIG. 6) which drives a chain 88 running around a sprocket 90 on the adjacent end of shaft 18 of the coating roller and also around a tensioning sprocket 92. As shown in FIG. 6, tensioning sprocket 92 is freely rotatable on a pin 94 carried by an arm 96 which is pivoted, as at 98, on side frame member 50, and which is yieldably urged by a spring 100 in the direction for maintaining the desired tension in chain 88, whereby coating roller 12 is also driven from shaft 72 while permitting vertical adjustment of the coating roller relative to the pressure or back-up rollers 44. The rotation of coating roller 12 is transmitted to coating control roller 14 by means of a relatively small spur gear or pinion 102 fixed on the end of shaft 18 adjacent support member 32 and meshing with a relatively larger diameter gear 104 fixed on the adjacent end of shaft 36 of coating control roller 14. By reason of the above-mentioned relationship between the pitch diameters of gears 102 and 104, the surface speed of coating control roller 14 is substantially less than the surface speed of coating roller 12, thereby achieving the previously mentioned wiping action.

As shown in FIG. 4, the axis of control roller 14 is elevated relative to the axis of coating roller 12 so that the material S to be coated may be advanced over a support table 106 extending under coating control roller 14 and terminating adjacent the rearmost of pressure rollers 44 where the sheet or slab material S is engaged by the rotated coating roller 12 and pressure rollers 44 for feeding movement through the apparatus while a film or coating of adhesive is applied to the upper surface of the sheet or slab material.

It will be apparent that the space 16 defined between rollers 12 and 14 above the line of rolling contact therebetween can be employed for containing a supply of adhesive only if the space 16 is effectively closed at the ends of rollers 12 and 14. In accordance with the present invention, end plates 108 and 110 are mounted between the ends of rollers 12 and 14 and the adjacent support mem-

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bers 30 and 32, respectively (FIGS. 1, 2 and 4). In the illustrated adhesive applying apparatus 10, parallel cross rods 112 extend between the upper portions of support members 30 and 32, and end plates 108 and 110 are slidably suspended from the cross rods 112. As shown in FIGS. 2 and 4, end plates 108 and 110 are shaped to project downwardly between the adjacent end portions of shafts 18 and 36, and the inner surface of each of the plates 108 and 110 carries a generally U-shaped sealing element 114 formed of any suitable sealing or gasket material, preferably Teflon, that is, polytetrafluoroethylene, or the like which is suitably secured to the related end plate, for example, by countersunk screws 116. The sealing elements 114 are shaped and dimensioned so that they extend across the end surfaces of rollers 12 and 14 at the line of rolling contact between the latter. Further, plates 108 and 110 are pressed axially toward the adjacent ends of rollers 12 and 14 so that sealing elements 114 intimately engage the end surfaces of the coating and coating control rollers, thereby to act as scrapers for such end surfaces and to prevent dripping of the adhesive from the ends of space 16.

The end plates 108 and 110 may be pressed towards the adjacent end surfaces of rollers 12 and 14 by screws 118 and 120 (FIGS. 1, 2, 4 and 6) which extend threadably through suitably tapped holes in support members 30 and 32 and which have their inner ends rotatably connected to plates 108 and 110, respectively, so that screws 118 and 120 can be turned to move the end plates along rods 112 toward the end surfaces of the coating and coating control rollers.

Alternatively, as shown in FIG. 3 with respect to end plate 108, each of the end plates 108 and 110 can be urged toward the adjacent ends of rollers 12 and 14 by means of a helical compression spring 122 which bears, at one end, against the end plate 108 or 110 and has its other end abutting against a nut 124 adjustable along a threaded pin 126 projecting from the adjacent support member 30 or 32. A pin 128 may also project outwardly from end plate 108 or 110 to locate the adjacent end of spring 122.

It will be apparent that, with the arrangement of FIG. 3, the end plates 108 and 110 have their sealing elements 114 urged yieldably against the end surfaces of rollers 12 and 14 with forces that may be varied by adjusting the related nuts 124 along threaded pins 126.

In order to ensure the effective sealing action of end plates 108 and 110 and the related sealing elements 114, it is necessary that rollers 12 and 14 be of the same axial length and have their end surfaces lying in the same planes. More specifically, it has been found that the adjacent end surfaces of rollers 12 and 14 must not depart from the same vertical plane by more than .005 inch if the sealing elements 114 are to function effectively in scraping the end surfaces of the rollers and in preventing dripping of adhesive from space 16. Where the coating roller 12 has a rubber cover 22, as in the described embodiment of the invention, the metal end disks 24 of the coating roller resist wearing away of the ends of roller 12 by frictional contact with sealing elements 114 and thereby ensure the maintenance of the above mentioned equiplanar end surfaces.

It will be apparent that the space 16 for containing the supply of adhesive has a relatively limited capacity unless rollers 12 and 14 are given large diameters. However, large diameter rollers are undesirable both by reason of the cost thereof and also by reason of the fact that the large surface areas of such rollers expose relatively large quantities of the adhesive to the atmosphere for evaporation of solvent therefrom, whereby it becomes necessary to repeatedly add solvent to the supply of adhesive in the space 16 in order to maintain a uniform consistency of the adhesive applied to the sheet or slab material S. Further, since the solvent and adhesive do not mix readily, the addition of solvent directly to the supply of

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adhesive in the space 16 results in the coating of the slab or sheet material S with adhesive of non-uniform consistency. On the other hand, if rollers 12 and 14 have relatively smaller diameters, resulting in a space 16 of relatively small capacity for containing the supply of adhesive and which must be more frequently refilled, the evaporation of solvent from the adhesive still constitutes a problem which cannot be solved by the provision of an airtight hood covering rollers 12 and 14 in view of the necessity for frequently adding adhesive to the limited supply thereof in the space 16. It is also noted that the frequent manual refilling of the space 16 is undesirable as it often results in the deposit of an excess quantity of adhesive in such space which spills over onto adjacent parts of the apparatus and also onto the material S therebelow.

In accordance with the present invention, the supply of adhesive in space 16 is maintained at a substantially constant level, thereby making it possible to employ rollers 12 and 14 which have relatively small diameters, and thus are relatively inexpensive, since the capacity of space 16 is then of little consequence, and a continuous circulation of adhesive is maintained to and from space 16 with the necessary additions of solvent to the circulated adhesive being made at a location outside of the space 16 where the solvent and adhesive can be thoroughly mixed so as to ensure the coating of the sheet or slab material S with adhesive of uniform consistency.

In the embodiment of the invention illustrated in FIG. 1, adhesive is continuously supplied to the space 16 between rollers 12 and 14 by way of a supply pipe 130 which terminates in a valved outlet 132 at a location above space 16. Supply pipe 130 may be secured to the support member 32, for example, by a clamping bracket 134 (FIGS. 1 and 4), and extends from a flexible supply conduit 136 connected to the outlet pipe 138 of an agitator pumping apparatus which is generally identified by the reference numeral 140. The agitator pumping apparatus 140 may be of the kind that is commercially available from the Graymills Corporation, Chicago, Illinois, under the designation Model H-5-4504KE, and which generally includes a motor 142 mounted on a lid 144 adapted to be supported on a tank or container 146 holding a relatively large supply of adhesive solution. The motor 142 drives a pump 148 which is submerged in the supply of adhesive solution in container 146 and includes an inlet 150 and an outlet 152 connected to the output pipe 138 and also connected to a curved nozzle 154 from which a jet of pumped adhesive issues in order to produce a swirling agitation within tank or container 146. Thus, the mixture of solvent and adhesive in tank or reservoir 146 is continuously agitated in order to maintain the uniform consistency thereof while adhesive solution is pumped through outlet pipe 138, conduit 136 and supply pipe 130 to the valved outlet 132 opening above space 16.

The maximum height of adhesive solution in space 16 is determined by an overflow opening 156 (FIG. 2) formed in end plate 108 and having an overflow pipe 158 extending therefrom. The overflow pipe 158 is, in turn, connected to a return conduit 160 which extends through an opening in lid 144 and is secured to the latter by a clamp 162. The pump 148 is effective to pump adhesive solution into space 16 at a rate that is greater than that at which the adhesive solution is drawn from space 16 by coating roller 12 for application to the sheet or slab material S passing between roller 12 and pressure rollers 44, so that the level of adhesive solution in space 116 always reaches at least to the bottom of overflow opening 156 through which the excess adhesive solution overflows into pipe 158 for return to container or tank 146 by way of return conduit 160.

Since an excess of adhesive solution is continuously supplied to space 16 from supply pipe 130, the capacity of space 16 can be relatively small, that is, space 16 can be defined between rollers 12 and 14 of relatively small di-

ameters which have the advantage of being relatively inexpensive and also of presenting relatively small surface areas at which the solvent can evaporate from the adhesive. However, since some solvent evaporation will occur, an automatic solvent feed unit 164 is also preferably provided on the lid 144 and may be of the kind that is commercially available from the Graymills Corporation, Chicago, Illinois, under the designation Model A12175. This solvent feed unit generally includes a solvent reservoir 166 provided with an off and on valve control 168 and communicating by way of a pipe 170 with an adjustable metering valve 172 which controls the rate of flow or drip of solvent into container or tank 146 from reservoir 166. The metering valve 172 is adjusted to provide addition of solvent to the adhesive solution in container 146 at a rate that is equivalent to the rate of evaporation of the solvent from the circulated adhesive. Since the solvent is added to the relatively large body of adhesive solution in container 146 and is there thoroughly mixed with the adhesive prior to being pumped through the supply pipe 130, the uniform consistency of the adhesive in space 16 which is applied to the sheet or slab material is ensured.

If the coating roller has a rigid surface, as in the case of the coating roller 12a of FIG. 5, where the metal body 20a forms the surface of the coating roller, so that the coated sheet or slab material S may adhere to the surface of the coating roller, then the adhesive applying apparatus may be further provided with stripping fingers 174 engaging the surface of coating roller 12a and being suspended from a laterally extending rod 176 having its opposite ends supported by arms 178 projecting from the support members, for example, the support member 32a appearing in FIG. 5.

It will be apparent that, in adhesive applying apparatus embodying the present invention, a continuously replenished supply of solvent adhesive is maintained in the space 16 between rollers 12 and 14 with the opposite ends of that space 16 being effectively closed by end plates 108 and 110 and by the Teflon sealing elements 114 on such end plates. Further, as appears in FIG. 2, the end plates 108 and 110 are spaced from the adjacent ends of rollers 12 and 14 by the thickness of the sealing elements 114 so that the adhesive solution can circulate within the space between the plates 108 and 110 and the adjacent end surfaces of the rollers to avoid drying or stringing of the adhesive which prevents the effective scraping operation of elements 114.

The adhesive applying apparatus embodying this invention further facilitates the cleaning thereof in that water or solvent can be added to the adhesive in space 16, or a tank of water or solvent can be substituted for the tank or container 146 containing the adhesive, whereupon operation of the apparatus causes the solvent or water to be circulated for effecting automatic cleaning of rollers 12 and 14 and of the end plates 108 and 110. After such automatic cleaning of the apparatus, it is only necessary to effect a final minimum washing and drying of the parts of the apparatus normally in contact with the adhesive.

Although adhesive applying apparatus embodying this invention have been described in detail herein with reference to the drawings, it is to be understood that other coating substances may be applied by such apparatus, and that the invention is not limited to those precise embodiments, but that various changes and modifications may be effected therein without departing from the scope or spirit of the invention, except as defined in the appended claims.

What is claimed is:

1. In an apparatus for applying a liquid adhesive coating substance to sheet or slab material; the combination of a coating roller and a coating control roller of the same length and mounted rotatably side-by-side with their axes extending horizontally and being spaced apart so as to substantially establish rolling contact therebetween

along a horizontal line, end plates at the opposite ends of said rollers and extending above said line of rolling contact, at least one of said end plates having an overflow opening therein with the bottom of said overflow opening at a level above said line of rolling contact, a generally U-shaped sealing element having a substantial thickness and being secured to the inner surface of each of said end plates, means acting on said end plates to cause the sealing elements of the latter to slidably bear against the adjacent ends of said rollers, each of said sealing elements having an inner periphery that extends across the adjacent end of said line of rolling contact and then upwardly across said adjacent ends of the rollers at the opposite sides of said line of rolling contact thereby defining an upwardly opening recess between said inner surface of the adjacent end plate and the adjacent ends of the rollers so that, when liquid adhesive coating substance is supplied to the space between said rollers above said line of rolling contact, the liquid coating substance circulates in each recess to prevent hardening of the coating substance on said ends of the rollers and said end plates and sealing elements effectively contain the supply of liquid adhesive coating substance at the ends of said rollers.

2. In an apparatus for applying a liquid adhesive coating substance to sheet or slab material; the combination as in claim 1; wherein said coating roller has a resilient outer surface portion and wear resistant metal disks at the opposite ends of the latter for slidable engagement with said sealing elements.

3. In an apparatus for applying a liquid adhesive coating substance to sheet or slab material; the combination as in claim 1, further comprising means rotatably driving said rollers with the surfaces of the latter moving downwardly at said line of rolling contact so that the surface of said coating roller picks-up a film of liquid adhesive coating substance from the supply in said space above the line of rolling contact, and support means below said coating roller for supporting the material to be coated as the latter is fed under the coating roller to receive the film of liquid adhesive coating substance from said coating roller.

4. In an apparatus for applying a liquid adhesive coating substance to sheet or slab material; the combination as in claim 3, wherein said means acting on said end plates to cause the sealing elements to bear against the adjacent ends of the rollers include screw members which are adjustable to maintain close sealing engagement between said sealing elements and said ends of the rollers when the contacting surfaces thereof are subject to wear.

5. In an apparatus for applying a liquid adhesive coating substance to sheet or slab material; the combination as in claim 3, wherein said means acting on said end plates to cause the sealing elements to bear against the adjacent ends of the rollers include springs which exert yieldable forces against said end plates in the directions toward said adjacent ends of the rollers.

6. In an apparatus for applying a liquid adhesive coating substance to sheet or slab material; the combination as in claim 3, wherein said means rotatably driving said rollers rotates said coating roller with a greater surface speed than said coating control roller so that the surface of the latter exerts a wiping action on the surface of said coating roller.

7. In an apparatus for applying a liquid adhesive coating substance to sheet or slab material; the combination as in claim 3, wherein said coating roller and coating control roller are fixed in the vertical direction relative to each other, and further comprising means for vertically adjusting the clearance between said coating roller and support means so as to accommodate material of different thicknesses in said clearance.

8. In an apparatus for applying a liquid adhesive coating substance to sheet or slab material; the combination as in claim 1, further comprising a container for liquid

adhesive coating substance, supply conduit means extending from said container to said space, pumping and agitating means operative to mix the liquid adhesive coating substance in said container and to pump the same through said supply conduit means from said container to said space, and return conduit means extending from said overflow opening back to said container.

9. In an apparatus for applying a liquid adhesive coating substance to sheet or slab material; the combination as in claim 8, further comprising means operative to add solvent to the liquid adhesive coating substance in said container to compensate for the solvent loss by evaporation at said space and the surfaces of the rollers and to ensure thorough mixing of the added solvent with the

liquid adhesive coating substance by said pumping and agitating means.

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