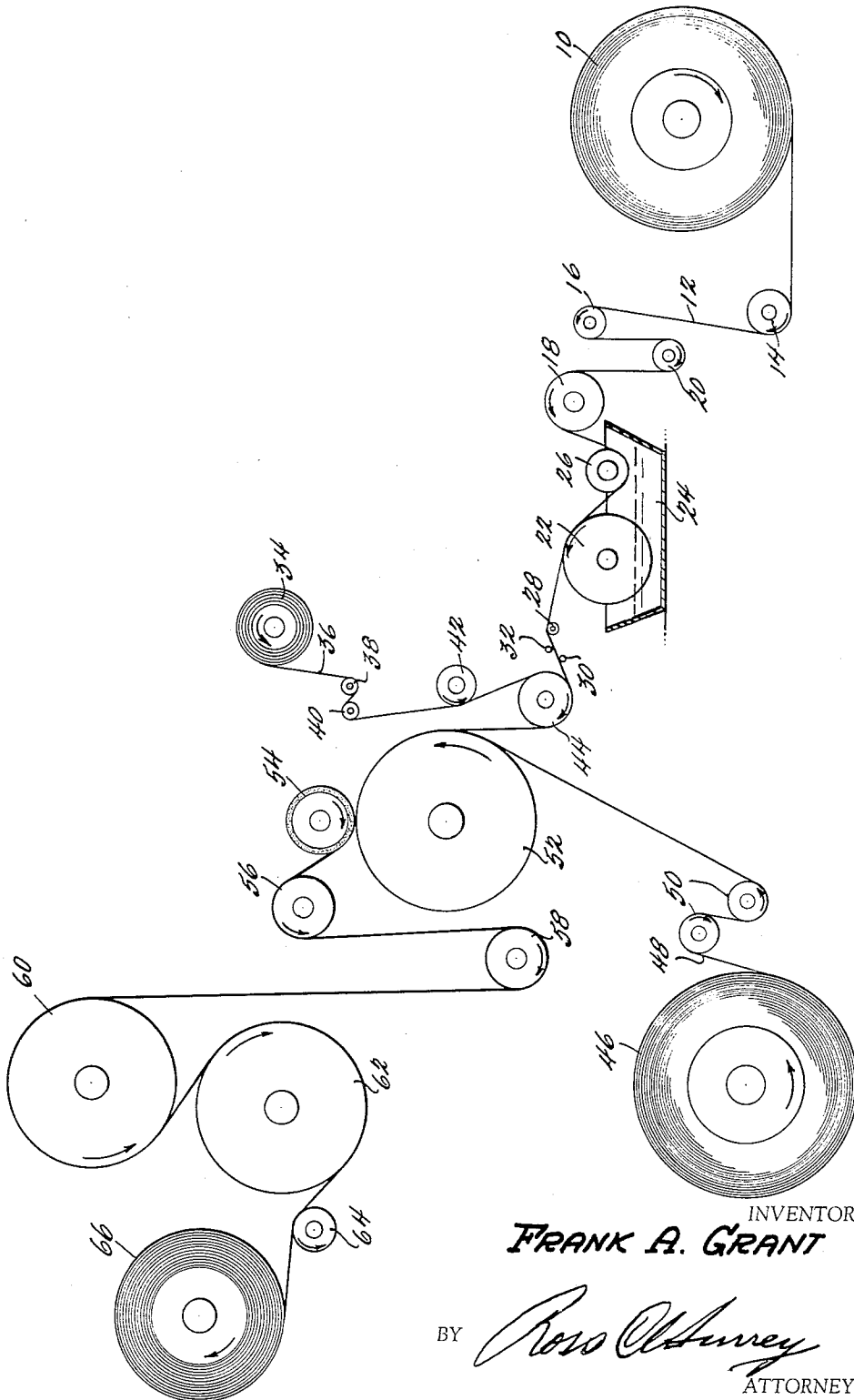


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METHOD OF LAMINATING
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METHOD OF LAMINATING

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3 Claims. (Cl. 154—129)

It is an object of this invention to provide a method and apparatus for laminating at least three webs by a single continuous operation, the method and apparatus being especially useful where one of the webs is of highly impervious barrier material.

It is a further object of this invention to provide a method and apparatus as aforesaid in which the laminating agent is applied to only one intermediate web.

It is a further object of this invention to provide a method and apparatus as aforesaid in which the job of threading and rethreading is extremely simple.

It is a further object of this invention to provide a method and apparatus as aforesaid in which there are available a variety of controls permitting the application of the method and apparatus to webs of greatly varying strength, caliper and porosity.

The above and other objects will be made clear from the following detailed description taken in connection with the annexed drawing.

A laminated sheet which has developed considerable utility in the last few years comprises a ply of metallic foil laminated to a ply of tissue by means of micro-crystalline wax. A second ply of tissue is laminated to the first tissue ply by means of micro-crystalline wax which does not, however, completely penetrate the second ply. The laminated web accordingly presents wax-free surfaces on both sides but when the web is formed into bags and the bags are subjected to heat and pressure the wax bleeds through the outermost tissue lamination and forms an excellent heat seal.

The present invention takes advantage of the penetrating power of micro-crystalline wax on tissue to effect a one-step lamination by the application of wax to one side only of the intermediate sheet.

Referring now to the drawing, there is shown a supply roll 10 of tissue paper from which a web 12 is fed over a vertically adjustable guide roll 14, thence over a guide roll 16 to a guide roll 18. The web 12 forms a loop between the rolls 16 and 18 and a dancing roll 20 is supported in the loop and assures uniform tension on the web. A coating roll 22 revolves partially immersed in a vat 24 of molten micro-crystalline wax.

A guide roll 26 presses the web 12 into contact with the roll 22 and is vertically adjustable to determine the extent of contact between the web 12 and the coating roll 22. From the coating roll 22 the web is drawn over a doctor wire 28 which removes excess wax. A smoothing bar 30 receives the web from the doctor wire 28 and the extent of pressure between the web 12 and the wire 28 and the smoothing bar 30 is determined by a spreader bar 32.

The supply roll 34 delivers a web of foil 36 to a straightening roll 38, thence to a guide roll 40 and thence to a laterally adjustable guide roll 42. The lateral adjustment of the roll 42 determines the extent of wrap of the foil web 36 around a controlled temperature roll 44 which is made vertically adjustable for the purpose of

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regulating the extent of wrap of the superimposed foil web 36 and coated tissue web 12.

The supply roll 46 delivers a second tissue web 48 to a pair of tensioning rolls 50 and thence to a combined roll 52 which also receives from the controlled temperature roll 44 the superimposed coated tissue web 12 and foil web 36.

The temperature of the roll 44 is such that the wax applied to the web 12 will penetrate through that web and effect a bond between it and the foil web 36. The temperature of the combining roll 52 is controlled so that the wax on the web 12 will penetrate only partly into the second tissue web 48 and effect a bond but will not provide a waxy exterior surface to the final lamination.

A rubber pressure roll 54 bears on the combining roll 52 and assures a proper meeting and lamination of the three webs.

From the knit of the rubber roll 54 the combined web passes over a first chilled or refrigerated roll 56 then to a second chilled or refrigerated roll 58 from which the laminated webs pass to a first tempering roll 60, a second tempering roll 62, a guide roll 64 and a rewind roll 66.

A typical laminating operation involves the web 36, being made of .00035" foil with the webs 12 and 48 formed of smooth tissue weighing 10½ lbs. per ream with the coating roll 22 applying about 15 lbs. per ream of micro-crystalline wax containing a small amount of colloidal matter. In such an operation the wax is maintained in the vat at about 195° F. In practice the vat temperatures may range between 180 and 210 depending on the job to be done. The surface speed of the coating roll 22 does not necessarily match the lineal speed of the web 12. The roll 22 is rotated at a speed sufficient to ensure that it will pick up an adequate supply of wax somewhat in excess of the amount intended to remain on the web 12, the excess being removed by the doctor wire 28.

The tempering rolls 60 and 62 are necessary where the lineal speed of the whole operation is high and where it is desired not fully to chill the wax on the relatively small diameter rolls 56 and 58. In such case the final chill is applied by the tempering rolls of relatively large diameter, thus tending to avoid the formation of pin-hole cracks in the wax.

It will be clear from the foregoing that the apparatus may be made quite compact, that the threading and rethreading job is much simplified and that the controls, though simple, are sufficiently varied to enable the apparatus to meet any laminating problem apt to be encountered.

While certain specific embodiments of the invention have been illustrated and described, it is not intended to limit the invention to the precise details disclosed but only as set forth in the subjoined claims which are to be broadly construed.

I claim:

1. A method of laminating comprising: coating one side only of a single pervious web with molten micro-crystalline wax; causing said wax to penetrate through said pervious web while superimposing an impervious web on the side of said pervious web opposite that to which the coating was applied; superimposing a pervious web on the original coated side of the first named pervious web, causing said wax to penetrate said second pervious web while limiting the penetration to less than the thickness of said second pervious web.

2. A method of laminating comprising: continuously and simultaneously advancing a web of metallic foil, a first tissue web and a second tissue web; applying a coating of molten, micro-crystalline wax to one side only of said first tissue web; superimposing the uncoated side of said first tissue web on the web of metallic foil at a tem-

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perature sufficient to cause penetration of the wax through the tissue to cause adhesion between the foil and the tissue; thereafter superimposing said second tissue web on the coated side of the first tissue web at a temperature sufficient to cause partial penetration by the wax of the second tissue web and adhesion between the two tissue webs.

3. A method as set forth in claim 2 in which the weight per ream of wax applied exceeds the weight per ream of the first tissue web.

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