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B. A. HANNEWALD ET AL

2,286,801

APPARATUS FOR APPLYING MOISTURE RESISTANT MATERIAL TO BAGS

Filed June 6, 1940

4 Sheets-Sheet 1

FIG. 1

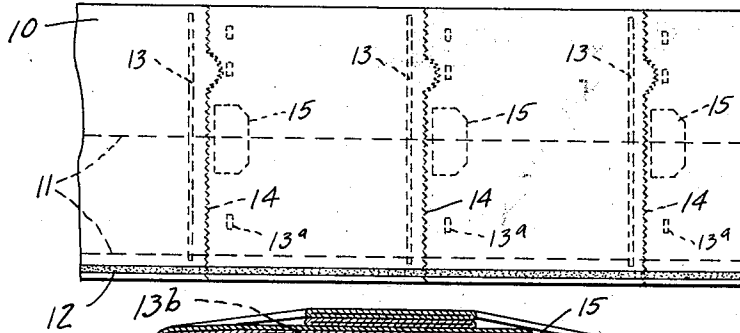


FIG. 3

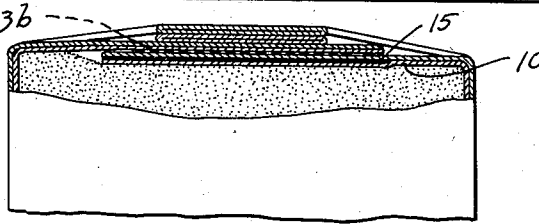


FIG. 6

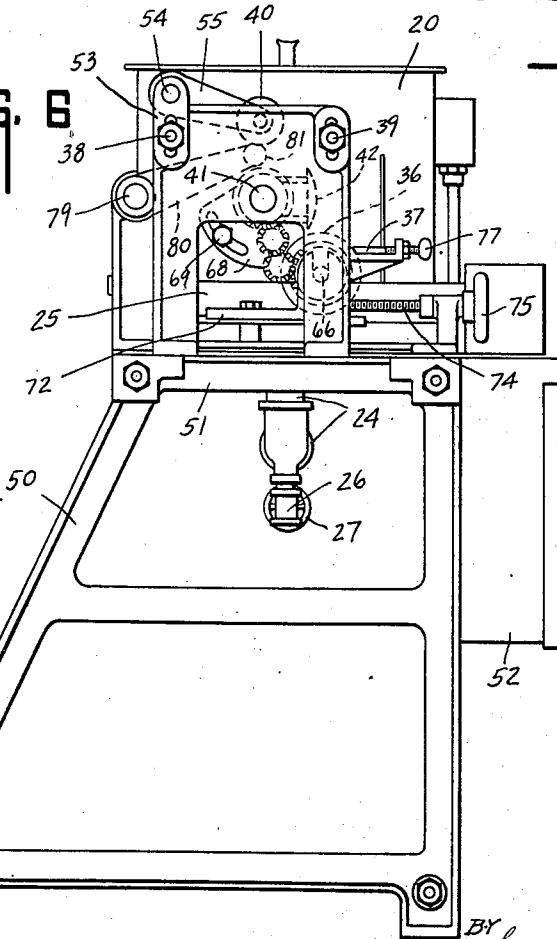
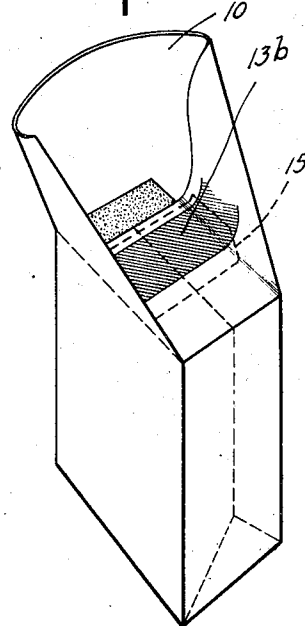


FIG. 2



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4 Sheets-Sheet 2

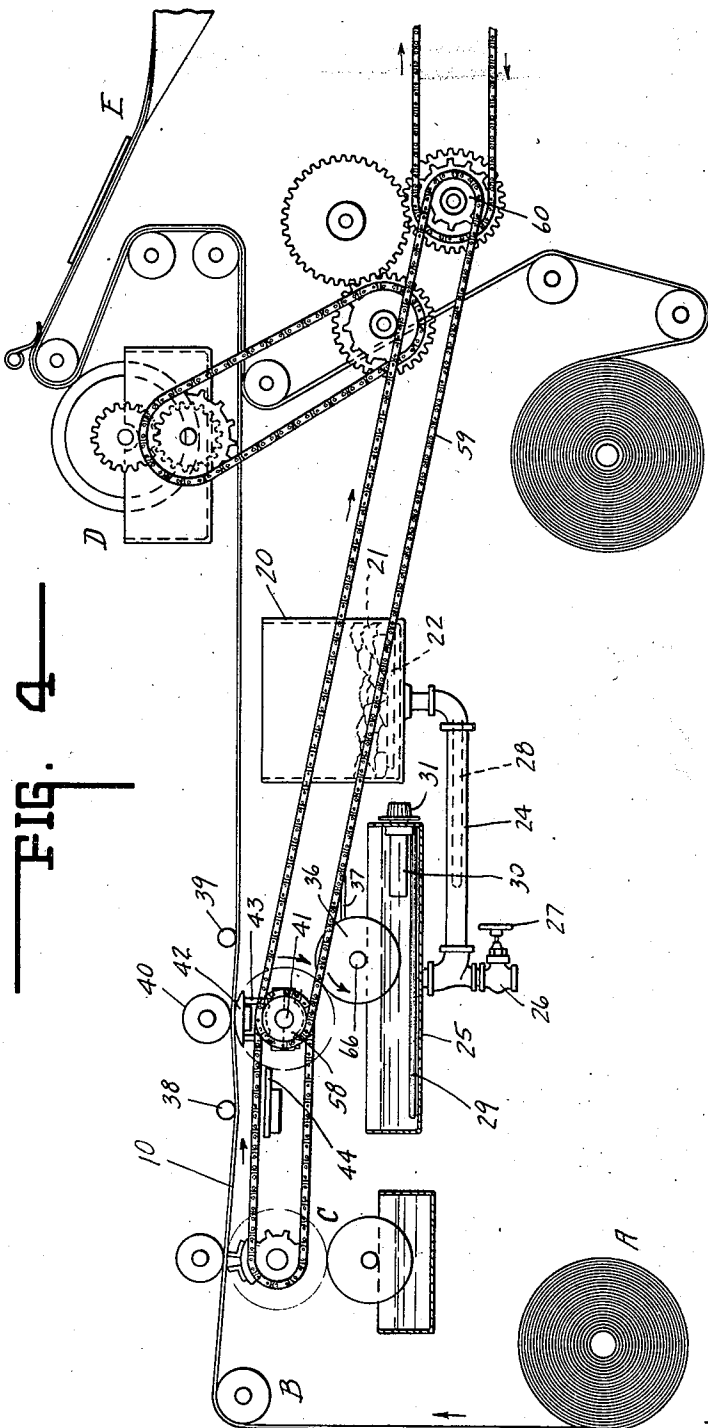


FIG. 4

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4 Sheets-Sheet 4

FIG. 7

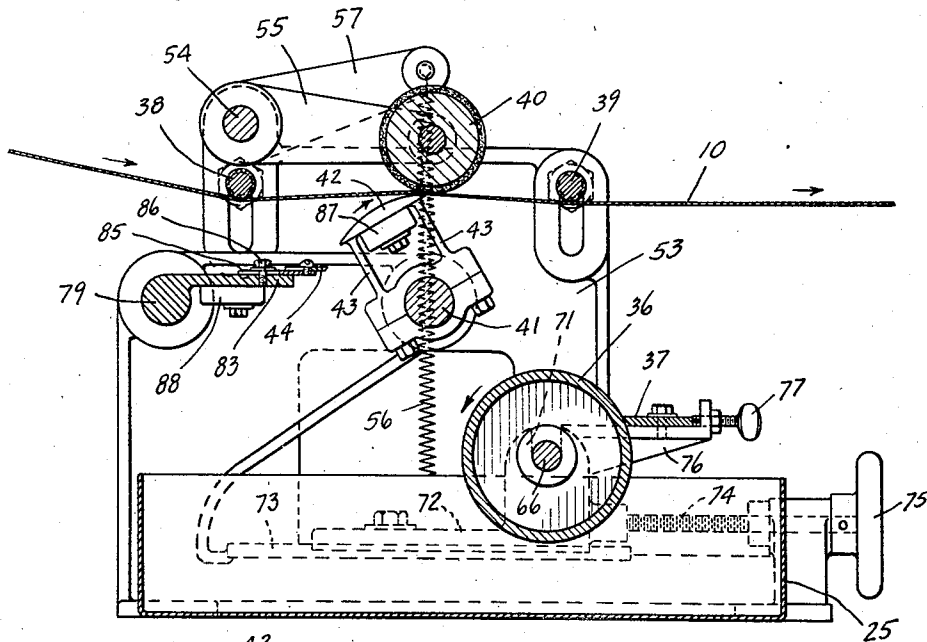
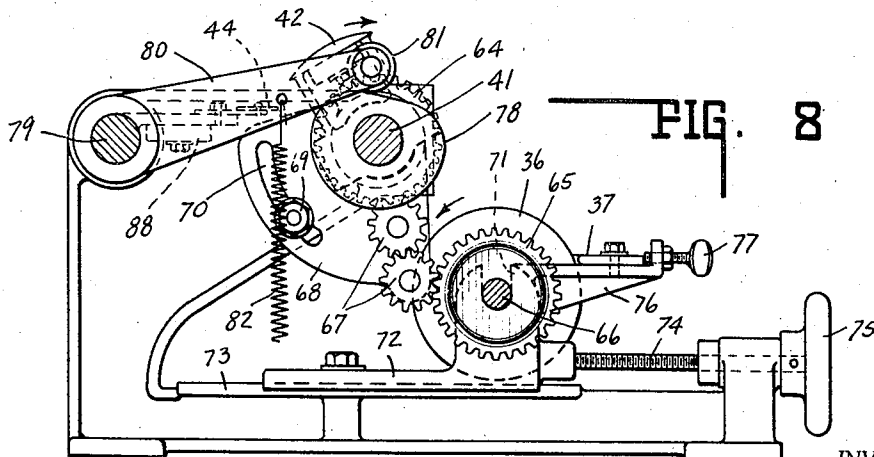


FIG. 8

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APPARATUS FOR APPLYING MOISTURE RESISTANT MATERIAL TO BAGS

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Application June 6, 1940, Serial No. 339,102

8 Claims. (Cl. 91—50)

This invention relates to an apparatus for applying a coating of moisture resistant material over a predetermined and limited area of a bag or similar container for hygroscopic materials, such as sugar or the like.

In the packaging of hygroscopic materials, of which sugar is perhaps the best example, a package, such as a paper bag, will permit moisture from the sealing paste to pass therethrough and be absorbed by the material, resulting in its caking or hardening adjacent the top of the package. This is highly objectionable, and it has heretofore been proposed that the material be protected by a coating of moisture resistant material applied over a surface extending through the area affected by the pasting and sealing operation.

It is the object of this invention to provide an apparatus for applying such coating of moisture resistant material to a predetermined limited area in the production of such packages, and particularly paper bags in the line of their production. The invention is particularly applicable to apparatus for rapidly producing said bags on continuous production machines in respect to the inner liners used in multi-ply paper bags.

In the production of such packages as paper bags, it is customary to seal their longitudinal edges by applying paste thereto, resulting in a tube. Similarly, the bottom of the bag or tube is sealed by the application of paste, leaving one end open for filling the finished bag with the material to be packaged. Thereafter, the open end is sealed by applying paste. It is, therefore, important in moisture proofing the bag for the purpose above mentioned, that the moisture resistant material be applied thereto over a predetermined and limited area only so as not to affect the application of paste to those portions required for spot pasting. It is also desirable that the moisture proofing be limited to the prescribed area so as not to affect the initial folding of the top in sealing. Furthermore, it is desirable, as a matter of economy, that the area over which the moisture resistant material is applied be limited to accomplish the desired results while effecting a saving in the amount of such material used. Thus, this invention is directed toward a method and apparatus which will spot moisture proof the container, limiting the application to a predetermined area for accomplishing the desired purpose while avoiding interference with pasting and folding, and effect

the desired saving in the moisture resistant material used.

One feature of the invention resides in apparatus for maintaining the moisture resistant material, such as wax, asphaltum, resins or the like, in a molten state to effect its ready application. This is accomplished by providing suitable thermostatically controlled heating elements applied to the containers for melting the material and maintaining the molten state thereof; and also to the applicator for preventing it from cooling during the application.

Another feature of the invention resides in apparatus for applying the moisture resistant material to a predetermined and limited area, so arranged that such area may be varied in extent, depending upon the size of the bag, and synchronizing its application to the various bag lengths and to the speed of travel of the paper through a continuous production machine. This is accomplished through the medium of interchangeable applicators of varying size and the adjustable positioning of the feeding cylinder.

Another feature of the invention resides in apparatus for controlling the film or amount of such material applied to the bag to prevent damaging results from excessive application, particularly at the end of the stroke of the applicator. This is accomplished by providing a doctor blade which is adjustable in respect to the feeding cylinder for controlling the amount of material delivered to the applicator, and a second doctor blade having timed cooperative movement with the applicator for removing excess material from the trailing portion thereof as it approaches its applying stroke.

Other features of the invention will be more fully set forth and described in the accompanying specification and drawings.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1 is illustrative of a continuous web of paper or the like indicating the prescribed areas receiving the moisture resistant material and the ply and seam paste. Fig. 2 is a perspective view of a paper bag showing the location of the moisture resistant spot. Fig. 3 is illustrative of the top portion of a paper bag with its sealed top shown in section. Fig. 4 is a diagrammatic illustration of the method and apparatus for applying the moisture resistant material as applied to a bag making machine. Fig. 5 is a front elevation of the spot applying apparatus. Fig. 6 is an end elevation thereof. Fig. 7 is a central

vertical section taken on the line 7-7 of Fig. 5. Fig. 8 is a central vertical section taken on the line 8-8 of Fig. 5.

For illustrative purposes the apparatus is herein shown and described as applied to a paper bag primarily designed to receive hygroscopic materials, such as sugar and the like, having an affinity for moisture, and wherein the bag is provided with an inner liner and known as a "multi-wall bag." Further, the method and apparatus as herein disclosed is primarily adapted to apply a coating of moisture resistant material to a predetermined and limited area of the liner while passing as a continuous web of paper from the feed roll and paste applying apparatus to that part of the continuous bag making machine which joins it with the printed and decorated cover, folds and seals the sides and bottom thereof.

In the drawings there is shown a web of liner paper 10 adapted to be folded longitudinally along the dotted lines 11 and receive a strip of adhesive material or paste indicated at 12 along one side thereof for sealing its edges and thereby form a tubular structure as it passes through a continuous bag forming machine in conjunction with the outer decorated cover. Said web is also spotted with paste as indicated at 13, and elsewhere as indicated at 13a, and is cut to proper lengths, as indicated by the dotted lines 14.

It is the purpose of this invention to apply a limited amount of moisture resistant material over a predetermined prescribed area on one side of the liner, as indicated at 15. The area 15 is preferably located at about a quarter of an inch from the top edge of the bag, which is indicated at 14, and between the spots of paste at 13a which secure the liner to the cover. Similarly, when the top of the bag is ultimately sealed by the application of paste thereto as at 13b, after being filled, said moisture resistant area will lie immediately thereunder for protecting the contents from moisture given off by the paste which would otherwise seep through the material to the contents, as best illustrated in Figs. 2 and 3.

The moisture resistant material is most effectively applied in a liquid condition, and may comprise paraffin wax, hot asphalt or the like. Wherein a molten material is employed it is essential that the containers therefor, feeding and applicator members be maintained within a prescribed range of temperature. This is accomplished by providing them with suitable thermostatically controlled electric heating elements.

Reference may be made to Fig. 4 illustrating diagrammatically elements of a continuous bag making machine and the method of applying the material to the continuously moving web of liner paper 10. Therein there is illustrated a container or melter 20 for receiving paraffin wax or the like, indicated at 21. Extending into the container for melting the wax, there is provided an electric heating element or melting unit 22. From the container molten wax passes through a conduit 24 to an applying pan 25, there being provided in the conduit 24 a drainage fitting 26 controlled by a cock 27. To prevent the molten wax passing through the conduit 24 from cooling and blocking its flow, an elongated heating element 28 is mounted to extend therethrough. Thus, in the travel of the molten wax from the sump of the container 20 to the applying pan 25, it is continuously maintained in its molten and fluid state. Again, in the applying pan, and

for continuing the wax in its molten state, there is a heating element 29 which is governed by a thermostat 30 having an adjustment 31.

Mounted for rotation within the applying pan and extending partially into the molten wax contained therein, there is provided a wax feeding cylinder 36; said cylinder being driven in the direction of the arrow. Associated therewith there is an adjustable doctor blade 37 extending longitudinally of the cylinder and adjacent the periphery thereof, said blade being adjustable to control the amount of wax picked up by the cylinder in passing through the wax bath. Spaced above the cylinder 36 the web of paper liner 10 to be treated is passed under the guide bars 38 and 39, respectively, moving in the direction of the arrows. The applicator as hereafter described operates between the cylinder and web. Above the web there is pivotally mounted for free rotation a pressure roller 40.

The moisture resistant spotting apparatus may be positioned in the usual bag making machine between the stock roll A, guide roller B and paste applying apparatus C on the left-hand side, as shown herein, and that portion of the machine on the right-hand side which feeds the cover material to the paper liner, and which applies paste at D, folds it as indicated at E, seals the paper in tubular form, cuts it to length, and seals the bottom (not shown).

For the purpose of locating the wax application with respect to the paste application and cutting to length, a shaft 41 is driven in timed relation with the machine above referred to, and particularly the rate of movement therethrough of the paper 10. Said shaft carries thereon an applicator shoe 42 supported by the arms 43. Said shoe is moved in a circular path by the shaft 41, in the direction of the arrow, and the length of the arms 43 is such as to cause the effective or applicator surface of the shoe to engage with the film of wax carried by the cylinder 36 and transfer it to the paper 10, pressing the paper against the pressure roller 40. Due to the synchronized drive of the shaft 41 with the travel of the paper 10, the shoe 42 will move with the paper, contacting it throughout the effective surface thereof. Thus, the spotting of the wax is governed in area by the effective surface of the shoe and as to location on the paper by the timed relation thereof and length of the arms 43.

The radius of the circular path of travel of the applicator shoe controls the spacing of the spots in accordance with the length of the bag being produced. Wherein the length of the bag is shortened, the arms 43 and, therefore, the radius of the applicator would be reduced, and wherein the length of the bag is increased, the length of the arms 43 would be extended. The synchronization of the shaft 41 with the paper feeding mechanism and the length cutting operation assures the positioning of the spot relative to the ultimate top edge of the bag. Therefore, the relative location of the spot on a bag of predetermined length, and the area of the spot is governed by the length of the arms 43 and the effective area of the shoe 42.

When the wax is applied to the paper by the shoe 42, a surplus of wax would normally be squeezed from the trailing portion or tail end thereof. This would be detrimental to the proper application of the wax, and to eliminate it there is provided a doctor blade 44 pivotally mounted adjacent the path of travel of the shoe as it

approaches the paper. Through suitable cam mechanism hereinafter described, said blade is moved away from the path of travel of the shoe until the tail end thereof approaches the blade whereupon the blade is moved sufficiently close to the passing shoe as to wipe any excess wax from the surface.

Referring more particularly to Figs. 5 and 6, there is shown a supporting frame 50 having a bed 51, the melting container 20 being mounted at the extreme end thereof and carrying an electric control panel 52 therebelow. The operating frame 53 is supported upon the table and carries at the top thereof a horizontally extending rock shaft 54 carrying the pressure roller 40. Said roller is pivotally mounted between a pair of spaced arms 55 secured to said rock shaft, their upward movement being yieldingly resisted by a spring 56 connected to an arm 57 secured to one end thereof, and their downward position limited by suitable adjustable stops.

The applicator shoe 42 is mounted on the shaft 41 to rotate therewith. Said shaft is driven by a sprocket wheel 58 which in turn is driven by a chain 59 from the driving sprocket 60 of the bag making machine or the adjacent paste applying apparatus generally indicated at C. As shown in Fig. 4, the shaft 41 is driven to make one revolution for each tube from which the bag is formed. Said shaft 41 is carried by the bearings 63 and is provided with a driving gear 64 which drives a driven gear 65 keyed to a shaft 66 carrying the feeding cylinder 36. As shown in Fig. 8, gear 65 is driven through the idler gears 67 carried upon a quadrant 68 which is adjustable about the shaft 41 and secured in adjusted position by a lock nut 69 operating in the arcuate slot 70.

The shaft 66 with its driven gear 65 and cylinder 36 is removably supported in the bearing cradles 71 mounted upon a carrier bracket 72 which is slidable upon the ways 73. The adjusting screws 74 which are operated by the adjusting handles 75, are connected to the carrier 72 for adjusting the position of the feeding cylinder within the wax bath to accommodate it to applicator shoes of varying radial length. In this manner, different applicator shoes may be mounted on the shaft 41 for spotting the web to provide tubes or bags of different length. The feeding cylinder may be adjusted thereto by the handles 75 and the adjustment of the idler gears 67 by the quadrant 68.

The carrier bracket 72 carries integrally therewith the forwardly extending arms 76 upon which a doctor blade 37 is slidably mounted and adjustable in respect to the surface of the feeding cylinder 36 by the adjusting screws 77. By adjustment of the blade 37 the amount of wax carried by the cylinder to the applicator shoe may be thereby controlled.

For intermittently operating the doctor blade 44, the shaft 41 is provided with a cam 78 (Figs. 7 and 8). Pivotaly mounted upon a rocker shaft 79 there is an arm 80 carrying a cam follower 81, said cam follower being maintained in engagement with the cam through the tension of a spring 82. Rigidly secured to the rocker shaft 79, as by welding or the like, there is a blade support 83 carrying the doctor blade 44. Said doctor blade is adjustable with respect to the blade carrier by means of the slots 85 and lock screws 86 operating therein. The shape of the cam 78 is such that the doctor blade is moved upwardly clear of the shoe 42 as the forward and major

portion thereof passes thereby, but is moved into close proximity of the tail end of the shoe for wiping off the excess wax just prior to its passing movement.

In the use of wax or asphaltum as a moisture resistant material, it is desirable to maintain it in a molten state during its feeding and application. To this end, not only is the container 20, conduit 24 and applying pan 25 provided with suitable heating elements, but the shoe 42, is electrically heated by securing an element 87 to the inner surface thereof and connecting it by a circuit passing along the shaft 41 energized by a suitable brush contact indicated at 87'. It is also desirable to heat the intermittent doctor blade 44 so as to prevent an accumulation of wax thereon. For that purpose the blade carrier 83 is provided with a heating element 88 which is connected in the circuit.

The level of the molten material in the applying pan 25 is maintained by the relative position of the container 20 and the level of molten wax therein, which in turn is controlled by the adjustable thermostatic control indicated at 31.

In operation, the apparatus is preferably set up in the usual bag making machine so that the continuous web of paper feeding the machine will pass under the pressure roll 40. Its relative position in the machine may be, as above mentioned, between the mechanism for applying paste to the ends of the bag and the remaining part of the machine, including the apparatus for applying paste along the seam, folding and cutting the tube to length.

The apparatus is adjustable to receive various weight or length of bag, the distance of travel by the shoe 42 through one cycle being equivalent to the tube length. To adjust the apparatus to a shorter or longer length bag, the length of the arms 43 carrying the shoe is changed, preferably by substituting a proper size shoe on the shaft 41. The area of the moisture proofing spot may likewise be controlled by varying or interchanging the shoes 42. In changing the shoe to vary the length of the arms 43, it may be noted that the curvature of the applicator surface is correspondingly varied to have the same radius of curvature as the path through which it travels. The relative position of the feeding cylinder 36 is accordingly changed by the adjusting handles 75 which are operated to slide its supporting carriage to a position wherein it is substantially tangential with the path of movement of the shoe. Such adjustment carries the doctor blade 37 therewith, which in turn may be adjusted relative to the feeding cylinder for varying the amount of moisture proofing material to be applied. The location of the spot is then determined by the relative positioning of the shoe 42 on the shaft 41.

Having effected adjustments of the machine to obtain the desired area of the spot, its location and the amount of material to be applied, the electric heating elements may be energized through manipulation of the switches on the panel board 52. After the material has become molten, the machine may then be started for continuous operation.

While reference is herein made to a paper bag, it is to be understood that said terms are employed in their broadest sense as pertaining to any similar container or packaging formed of equivalent materials, and spotted by a liquid substance having moisture resistant characteristics in the nature of wax or asphaltum. Fur-

ther, the wax may be applied while in a molten state as herein described, or if desired, in the form of a cold liquid mulch. Wherein the applicator has been described, for example, in the form of a shoe carried by arms, it may similarly be in the form of an intaglio cylinder or the like.

The invention claimed is:

1. An apparatus for spotting a continuous web of bag making paper with a moisture resistant material, including an applicator shoe having an effective surface of the shape and area of the spot to be applied, a rotating shaft, means for moving said web and rotating said shaft in timed relation, an arm secured to said shaft and carrying said shoe having a length determined by the length of the bag made from said web, a container for said material, means in said container for maintaining said material in a molten state, a feeding cylinder rotatable in said container and bath driven by said driving means in feeding relation with the surface of said shoe, a cam driven in timed relation with the said applicator shoe, a rock shaft actuated by said cam, a doctor blade, and means adapted to adjustably support said blade on said rock shaft adjacent the path of movement of said shoe as it approaches the paper web, said cam acting to rock said blade for moving it away from the path of the shoe while the fore part thereof passes and moving it to adjacent the trailing end of said shoe for removing excess material therefrom.

2. An apparatus for spotting a continuously moving web of bag making paper with a moisture resistant material including a container for the material, an electric element in said container for heating the material to a molten state, a pan for containing molten material at a predetermined level, an electric element in said pan for maintaining the material in its molten state, a conduit connecting said container with said pan, whereby molten material may be fed from the former to the latter, an electric element in said conduit for maintaining the material in a molten state while passing therethrough, thermostatic control means for regulating the heating of said material and maintaining a predetermined level of molten material in said pan, and means for transferring a film of molten material from said pan to said moving web of paper in timed relation therewith for applying a spot of said material thereto of predetermined location and prescribed area.

3. An apparatus for spotting a continuously moving web of bag making paper with a moisture resistant material including a container for the material, an electric element in said container for heating the material to a molten state, a pan for containing molten wax at a predetermined level, an electric element in said pan for maintaining the material in its molten state, a conduit connecting said container with said pan, whereby molten material may be fed from the former to the latter, an electric element in said conduit for maintaining the material in a molten state while passing therethrough, thermostatic control means for regulating the heating of said material and maintaining a predetermined level of molten material in said pan, a feeding cylinder rotatable in said pan partially immersed in said molten material, a rotating shoe movable to receive a film of material from said cylinder for transfer to the moving web of paper, means for driving said web and shoe in timed relation, the path of movement of said shoe having a

radius determined by the length of the bag, and means for removing excess material from the cylinder and the trailing portion of the shoe as it approaches the web.

4. An apparatus for spotting a continuously moving web of bag making paper with a moisture resistant material including a container for the material, an electric element associated with said container for heating the material to a molten state, a pan for receiving said molten material at a predetermined level relative to said container, a conduit connecting said container with said pan, whereby said molten material may be fed from the former to the latter, thermostatic control means for regulating said electric element adapted to maintain a predetermined level of molten material in said pan, and means for transferring a film of said material from said pan to said moving web of paper in timed relation therewith for applying a spot of material thereto of predetermined location and prescribed area.

5. An apparatus for spotting a continuous web of bag making paper with a moisture resistant material including a pan for containing said material, a carriage slidably mounted with respect to said pan, a feeding cylinder rotatably mounted on said carriage, an applicator having an effective surface of predetermined area, the radius of movement of said applicator being determined by the length of the bag produced from said web, means for adjusting the position of said carriage for moving said cylinder into feeding relation with said applicator surface, a shaft upon which said applicator is mounted, means for driving said shaft and cylinder in timed relation including a pinion, and means for adjusting said pinion to compensate for variations in the radius of movement of the applicator surface and the corresponding adjusted position of said cylinder.

6. An apparatus for spotting a continuously moving web of bag making paper with a moisture resistant material including a pan for containing a bath of said material in a liquid state, a feeding cylinder mounted for rotation in said bath, an applicator rotatable with said cylinder and having an effective surface of predetermined area movable in feeding relation thereto, the path of movement of said applicator surface extending into the path of the paper and being of a radius determined by the length of the bag produced from said web, means for adjusting said cylinder for feeding relation with applicators of varying radius of movement, a pressure roll mounted above the path of movement of the web against which said web is pressed upon engagement thereto by the applicator, an arm for rotatably supporting said pressure roll, a rock shaft connected with said arm, a lever mounted on said rock shaft, and yielding means connected with said lever for maintaining said roll and web in position to be yieldingly engaged by said applicator.

7. An apparatus for spotting a continuously moving web of bag making paper with a moisture resistant material including a pan for containing a bath of said material in a liquid state, a feeding cylinder mounted for rotation in said bath, an applicator rotatable with said cylinder and having an effective surface of a predetermined area movable in feeding relation thereto, the path of movement of said applicator surface extending into the path of the paper and being of a radius determined by the length of the bag produced from said web, a movable carriage for

carrying said cylinder, means for adjusting said carriage with respect to said applicator surface for accommodation to varying radii of the path of movement of said applicator, a doctor blade slidably mounted on said carriage, and means for adjusting the relative position of said doctor blade and cylinder for controlling the film of material carried thereby to said applicator.

8. An apparatus for spotting a continuously moving web of bag making paper of a moisture resistant material including a pan for containing a bath of said material in a liquid state, a feeding cylinder mounted for rotation in said bath, an applicator rotatable with said cylinder and having an effective surface of predetermined area movable in feeding relation thereto, the path of movement of said applicator surface ex-

5 tending into the path of the paper and being of a radius determined by the length of the bag produced from said web, means for adjusting the position of said cylinder with respect to said applicator surface for accommodation to varying radii of the path of movement of said applicator, a doctor blade extending adjacent the path of movement of said applicator for removing excess material therefrom, a blade carrier for adjustably supporting said blade for accommodation to varying radii of the path of movement of said applicator, and means for manipulating said blade carrier in timed relation with said applicator for removing said excess material from the 15 trailing portion thereof.

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