United States Patent [19]

Honsel

[11] **3,926,148**

[45] **Dec. 16, 1975**

[54] **APPLICATION OF ADHESIVE TO A MOVING WEB**

[76] Inventor: **Karl-Heinz Honsel,** Heidelberger Weg 15, 48 Bielefeld, Germany

[22] Filed: **Mar. 9, 1973**

[21] Appl. No.: **339,943**

Related U.S. Application Data

[62] Division of Ser. No. 230,817, March 1, 1972, abandoned.

[30] **Foreign Application Priority Data**

Mar. 5, 1971 Germany 2110491

[52] **U.S. Cl.** **118/247;** 118/50; 118/262

[51] **Int. Cl.**[2] **B05C 1/08;** B05C 1/16

[58] **Field of Search** ..... 156/540, 541, 543, 546, 156/547, 548, 549, 578, 538, 356; 117/111 H, 119; 118/247, 204, 261, 249, 262, 253, 263, 50, 77; 93/61 R

[56] **References Cited**

UNITED STATES PATENTS

2,674,974	4/1954	Guinn et al.	118/247 X
2,984,342	5/1961	Smith	118/212
3,033,702	5/1962	Fenselan	117/119
3,230,106	1/1966	West	117/111 X
3,333,568	8/1967	Przybilla	117/111 X
3,383,234	5/1968	Nikkel	117/111 R

OTHER PUBLICATIONS

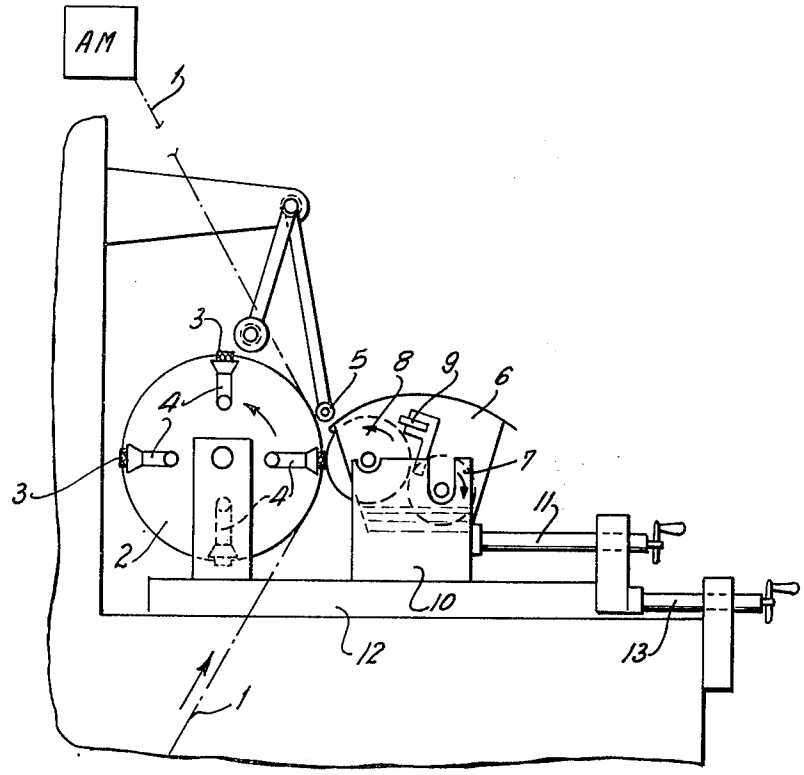
Booth, Coating Methods, Modern Plastics, Vol. 36, Sept. 1958, No. 1, pp. 91–93.

Primary Examiner—Douglas J. Drummond
Assistant Examiner—Michael W. Ball
Attorney, Agent, or Firm—Michael S. Striker

[57] **ABSTRACT**

Adhesive is applied to a carrier moving in a first direction, and a web is advanced across the carrier in an opposite second direction. The web is intermittently contacted with the carrier so that transfer is achieved of adhesive from the carrier to spaced increments of the moving web.

8 Claims, 2 Drawing Figures



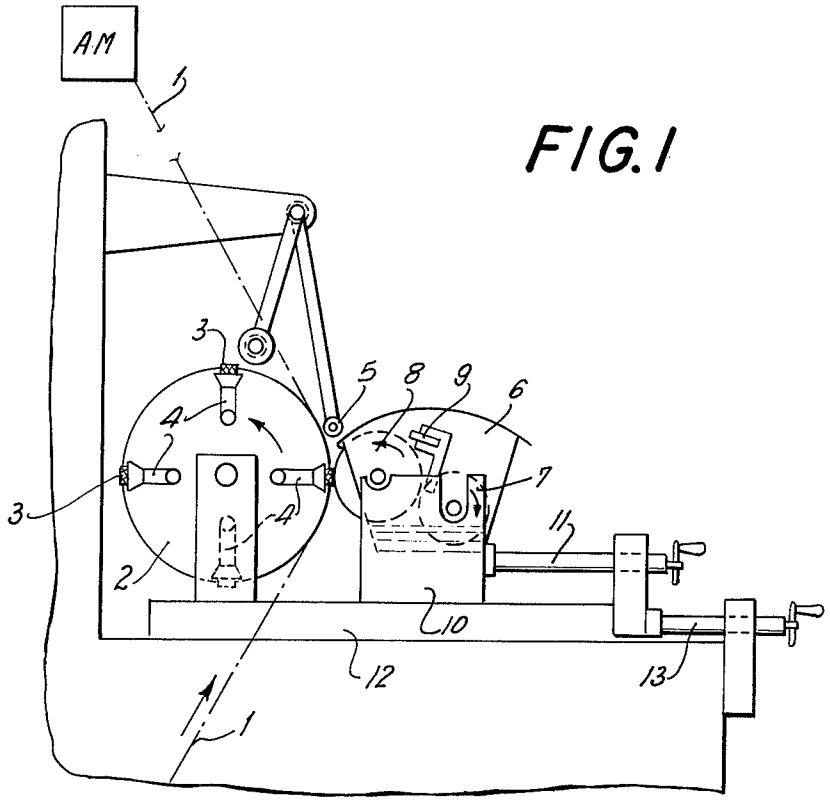


FIG. 1

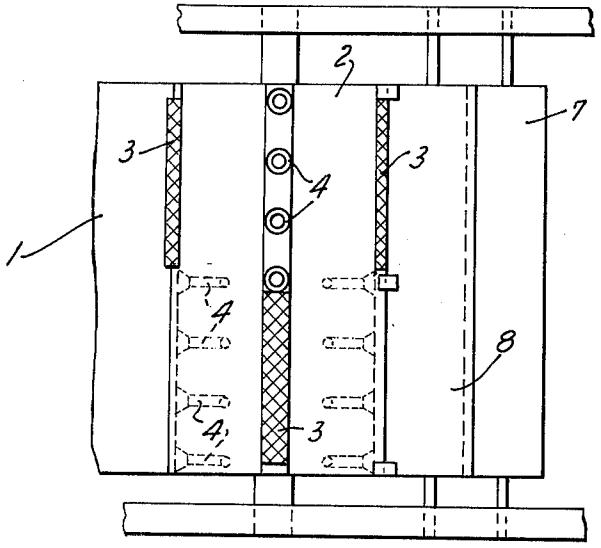


FIG. 2

APPLICATION OF ADHESIVE TO A MOVING WEB

BACKGROUND OF THE INVENTION

This is a division of my copending application, Ser. No. 230,817, filed on Mar. 1, 1972.

The present invention relates generally to the application of an adhesive to a moving web, and more particularly to an apparatus for applying adhesive to spaced increments of the moving web.

There are many instances where adhesive must be applied to a web, and for this purpose the web is usually advanced with respect to the applicator mechanism. To provide for such application the prior art proposes an arrangement in which adhesive is applied from a source onto a carrier which is usually of cylindrical or roller-shaped configuration, and which rotates in the same direction in which the web advances. The surface of the applicator roller is patterned according to the pattern in which adhesive is to be applied to the web so that when the latter comes into contact with the patterned surface, adhesive will be applied to the web. The web and the roller are advanced at the same speed, and at the side opposite the applicator roller there is provided a counterpressure roller which engages the web at the other side and prevents it from moving out of contact with the applicator roller.

Basically this construction operates for the intended purpose, except that it has the disadvantage that adhesive tends to build up on the applicator roller. This build-up takes place in a definite pattern, in that the adhesive tends to become deposited and to build up on the edge of the raised portions which are provided on the circumferential surface of the roller and which are intended to apply a pattern of adhesive to the web. This build-up of the edges of these raised portions results over a relatively short period of time in an unsharp "fuzzy" application of adhesive, that is adhesive areas applied to the web are not clearly delimited. As a result of this it has heretofore always been necessary to stop the apparatus quite frequently in order to clean the applicator roller, and aside from causing undesirable down-time such cleaning is difficult because of the problems involved with clearing the applicator roller surface where the adhesive also tends to become deposited in the recesses between the raised projections.

The problem is particularly important when the adhesive to be applied is one of the so-called self-adhesive materials, adhesives on caoutchouc basis which are becoming more and more widely used. These materials have, as is well known, the ability to adhere and provide a bond without having to be moistened or acitivated, as long as both objects or surfaces which are to be bonded are provided with such self-adhesive material. One of the areas in which the use of these self-adhesives has become particularly important is the manufacture of self-sealing envelopes.

The trouble with the use of such self-adhesive materials is the fact that they have particularly strong tendency to form a build-up between the adhesive carrier or applicator roller and the advancing web. This makes it impossible to apply these self-adhesive materials at intermittent spaced areas of the web with the apparatus known from the art, because quite soon after the apparatus is started up the adhesive material will have built up to such an extent that it will actually deflect the web out of contact with the raised applicator portions of the applicator roller, so that it is only in contact with the

counter roller and a gap exists between the web and the applicator portions. This then results in the application of a continuous layer of adhesive to the web, and makes impossible the application of intermittent adhesive portions, that is the application of adhesive to spaced increments of the web. Aside from this disadvantage there is the further one that the adhesive applied to the web will not dry properly and fast enough so that in the machines to which the web is subsequently supplied sufficient of the adhesive will come off the web to completely contaminate these machines and require their shut-down for cleaning purposes.

SUMMARY OF THE INVENTION

Accordingly, it is a general object of the present invention to overcome the disadvantages of the prior art. More particularly it is an object of the invention to provide an improved apparatus for applying an adhesive, particularly a self-adhesive material, to spaced increments of an advancing web.

An additional object of the invention is to provide such an apparatus which permits a very even and precise application of the adhesive.

Another object of the invention is to provide such an apparatus in which the build-up of adhesive —which causes the problems in the prior art— is avoided.

In contradistinction to what may be thought at first sight, and what in fact has always been the assumption of the prior art, it is not necessary that the web and the applicator or carrier roller move in one and the same direction. I have found, rather, that by moving the web and the applicator roller in mutually opposite directions there is obtained an excellent adhesive-transfer effect, resulting not only in very good transfer of the adhesive from the carrier onto the web, but also in a "stripping off" of the adhesive by the moving web which entirely prevents the build-up of adhesive. This is particularly pronounced in the use of self-adhesive materials where the difficulties mentioned above with respect to the prior art are entirely overcome by resorting to the novel method. The advantages of the present method can be accentuated by advancing the web and the carrier at differential speeds.

My novel apparatus comprises in one embodiment a carrier which is movable in a first direction, applying means for applying adhesive to the carrier, and advancing means for advancing a web past the carrier in an opposite second direction. I further provide transfer means for effecting intermittent contact of the moving web with the moving carrier whereby to obtain transfer of adhesive from the latter to spaced increments of the web.

The apparatus thus is not only simple in its construction, and therefore reliable in operation and inexpensive in production, but it has an additional and very significant advantage. The projections which govern the application of the adhesive to the web, that is which dictate the outline and area of each adhesive "spot" or layer which is applied to the web, can be provided on the transfer means which is usually in form of a counterpressure roller engaging the web on a side remote from the carrier. This means that these projections are entirely out of contact with the adhesive and therefore cannot become contaminated and no build-up can occur on them.

It is again advantageous to provide means for advancing the carrier at a speed which is different from the speed of advancement of the web, preferably greater

than the advancement of the web.

Adhesive may be applied to the carrier by a transfer or applicator roller which at least in part dips into a reservoir containing a body of the adhesive and contacts the periphery of the carrier, which is advantageously also constructed as a roller. It is advantageous to rotate the transfer roller at a lesser speed than the carrier roller, and to have a gap between them which can be rather small and in which the adhesive is transferred. The relatively low angular velocity of the transfer roller has the advantage that foaming of the adhesive —which occurs if the transfer roller dipping into the body of adhesive is rotated at a high speed— is avoided, and this on the one hand greatly facilitates the proper application of the adhesive and on the other hand avoids the substantial olfactory annoyance which is caused the operators due to the development of odors which occurs when foaming takes place.

The carrier preferably has associated with it a doctor or stripper blade which equalizes the thickness of the layer of adhesive on it, by stripping off excess adhesive.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a diagrammatic side view of an apparatus according to the invention; and

FIG. 2 is a simplified plan view of the apparatus in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Discussing now the drawing in detail it will be seen that reference numeral 1 identifies a web, for instance a web of paper, textile or the like, which is advanced in the direction of the arrow by the only diagrammatically illustrated advancing means AM. As the web 1 advances it contacts a counterpressure roller 2 under some tension, and the counterpressure roller 2 constitutes the transfer means, having in its circumferential surface grooves or recesses into which pressure projections 3 are inserted which project beyond the circumferential surface. In the illustrated embodiment each of the projections 3 extends only over one half of the axial length of the roller 2 and is of strip-shaped configuration, as shown in FIG. 2. The arrangement of the projections 3 is such that they are circumferentially spaced on the roller 2 and are alternately located on the left-hand and on the right-hand half of the roller 2. With this arrangement it is possible to apply adhesive to two laterally adjacent webs, one simultaneously or two halves of a single web which is later to be severed in the middle. It will be appreciated, of course, that the number, arrangement and configuration of the projections 3 may differ from what has been illustrated in the exemplary embodiment without departing in any sense from the invention.

It is advantageous and illustrated in the drawing —but not necessary under all circumstances— to provide a plurality of suction devices 4 in the roller 2 and in the illustrated embodiment these devices 4 are each located on a line constituting a longitudinal extension of the respective projection 3. Each of the devices 4 is located in that half of the roller in which the associated projection 3 is not located and the devices 4 are to be operated only when the application of adhesive to the web 1 takes place with the aid of their respective associated projection 3. In other words, once such a projection 3 has applied adhesive to an increment of the web 1, and moves out of engagement with the web, the device 4 associated with the projection 3 will be switched off, and remain off until the next time that the projection 3 contacts the web. However, it is to be understood that the devices 4 could also operate continuously. The purpose of the devices 4 is to provide a proper engagement of the web 1 with the respective projection 3, with an angling of the web over a corresponding of the projection 3, thereby assuring that the area of adhesive applied to the web 1 will have precisely the contour which is desired to be imparted in accordance with the configuration of the projection 3. This is further aided by the fact that in the region of the adhesive transfer there are shiftably mounted or pivotably mounted pressure rollers 5 which can be moved into and out of engagement with the roller 2 and deflect, as shown in FIG. 1, the adhesive so that it will form a bend over the longitudinal edge of the projection 3 which is respectively in contact with the web 1.

The adhesive itself is applied onto a carrier 8 which is here also configurated as a cylinder or roller. The application takes place via a roller 7 which dips completely or partially into a body of adhesive accommodated in a closed housing or reservoir 6. The roller 8 extends partially through a slot out of the housing 6 and transfers the adhesive to the web 1 when the latter is incrementally and intermittently pressed by one of the projections 3 against the roller 8. The latter is so rotated that it advances in a direction opposite to the direction of advancement of the web 1, a consideration which is most important in accordance with the invention. The circumferential speed of the roller 8 is advantageously greater than the speed of advancement of the web 1 whereby the frictional transfer and wiping-off effect exerted by the advancing web on the adhesive on the roller 8, is further enhanced and the build-up of adhesive in the region of adhesive transfer from roller 8 to web 1 is entirely precluded.

The drawing shows, of course, that the roller 8 which constitutes the carrier for the adhesive, does not itself ever dip into the adhesive accommodated in the housing or reservoir 6. It receives the adhesive exclusively from the roller 7 which advantageously rotates at much lower circumferential speed than the roller 8. To make this differential rotation possible the rollers 7 and 8 define with one another a slight gap which evidently need only be very narrow in view of the fact that only a film of adhesive has to be transferred from the roller 7 to the roller 8, with the latter additionally having a doctor blade or stripper member 9 associated with it in order to equalize and smooth the film of adhesive transferred to it from the roller 7, and to strip off excess adhesive.

It is advantageous, as shown in the drawing, if the reservoir or housing 6 with the associated rollers 7 and 8 is mounted on a carriage 10 which can be adjusted with reference to the roller 2 via an adjusting spindle 11, so that the spacing between the roller 2 and the roller 8 can be selected with great exactness. In addition it is also advantageous to mount the carriage 10 together with the reservoir 6 and the rollers 7 and 8 on

the one hand, as well as the roller **2** with its journalling arrangement on the other hand, on a further carriage **12** which can be moved via an adjusting spindle **13** and which permits in this most simple manner an adjustment of the tension of the web **1** as the latter passes through the apparatus.

The present invention thus achieves the aforementioned objects and overcomes the disadvantages of the prior art, thus providing a contribution to the art, especially (although not exclusively) where a self-adhesive material is to be applied.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the types described above.

While the invention has been illustrated and described as embodied in the application of adhesive to a web, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by letters patent is set forth in the appended:

1. Apparatus for applying a self-adhesive material to a flat web, particularly to envelope blanks, comprising advancing means for advancing a flat web having two opposite major surfaces, in one direction; an adhesive carrier adjacent one of said major surfaces; transfer means, comprising a pressure-applying transfer roller located adjacent the other major surface and having a circumferential face and at least one pressure-exerting projection extending from said face for intermittent contact with the advancing web so as to press spaced portions of said one major surface into adhesive-transferring contact with said carrier; applying means, including an applying roller for applying to said carrier a self-adhesive material which tends to form a build-up on said adhesive carrier in the region where said one major surface is pressed against said adhesive carrier by portions of said projection; and moving means for moving said adhesive carrier in an opposite direction to, and at a speed higher than the speed of said web so as to prevent the formation of such build-up and consequent uneven transfer of said adhesive onto said major surface of said flat web.

2. Apparatus as defined in claim **1**, wherein said carrier is a carrier roller.

3. Apparatus as defined in claim **1**, wherein said carrier is a carrier roller; and wherein said carrier and applying rollers define with one another a slight gap.

4. Apparatus as defined in claim **1**, further comprising a wiper member associated with said carrier for wiping excess adhesive off the same.

5. Apparatus as defined in claim **1**, further comprising pressure rollers movable into and out of pressure-exerting contact with said transfer roller.

6. Apparatus as defined in claim **1**, said projection having an outwardly directed contact face whose contour corresponds to the shape desired for the respective web increments to which adhesive is to be transferred.

7. Apparatus as defined in claim **6**; further comprising a plurality of additional projections similar to the first-mentioned projection, all of said projections being strip-shaped; and wherein each of said projections extends over substantially half the axial length of said transfer roller and said projections are spaced circumferentially of the transfer roller and alternately located in opposite axial halves of said transfer roller.

8. Apparatus as defined in claim **7**; further comprising a plurality of suction means in said transfer roller each located on a line constituting an extension of a respective projection but in the half of said transfer roller which is opposite to that in which the projection is located.

* * * * *