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[54] **DEVICE FOR APPLYING A COATING LAYER**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 222,527, Feb. 1, 1972, abandoned.

[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** **118/126**

[51] **Int. Cl.** **B05c 11/04**

[58] **Field of Search** ..... 118/117, 118, 119, 123, 118/124; 117/64 R, 102 L, 102 M

[56] **References Cited**

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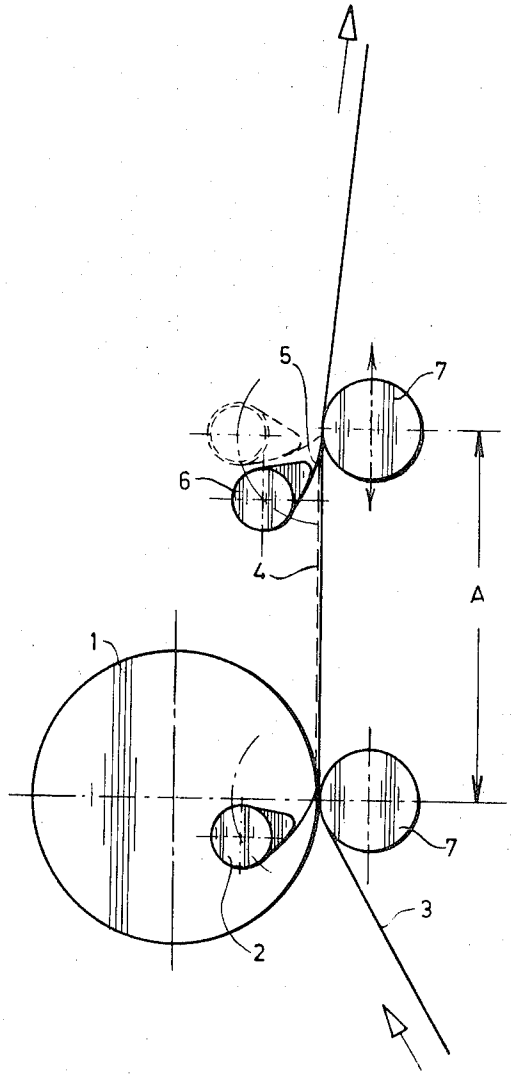
Primary Examiner—Morris Kaplan

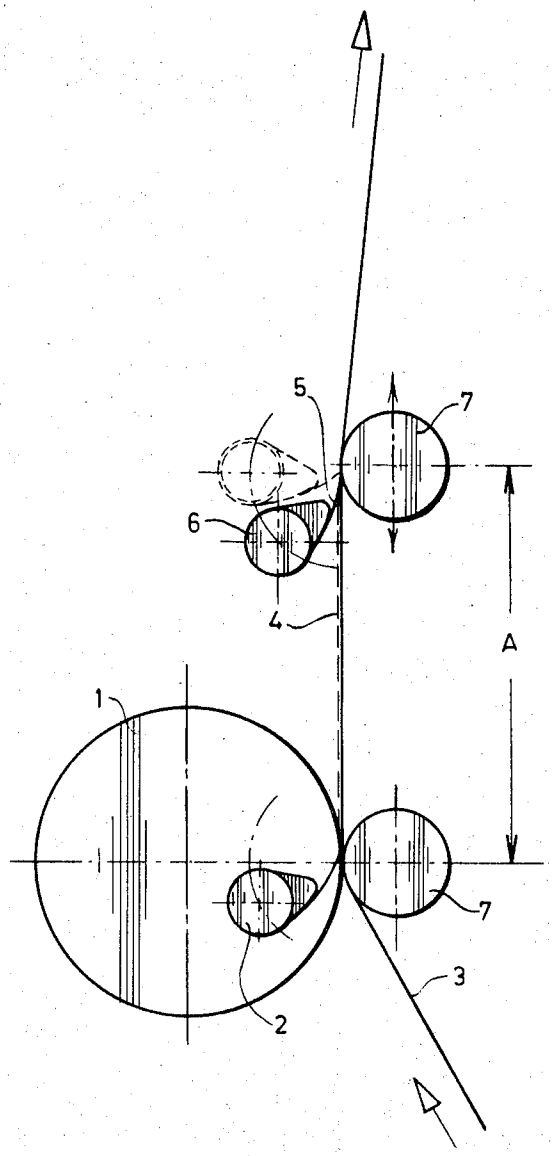
Attorney, Agent, or Firm—Edmund M. Jaskiewicz

[57] **ABSTRACT**

A device for coating a travelling web constituted by the combination of two elements: an apparatus for uniformly applying a coating substance upon the web and a thin flexible doctor blade resting with little pressure upon the substance applied on the web.

2 Claims, 1 Drawing Figure




5
7
6
4
A
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DEVICE FOR APPLYING A COATING LAYER

RELATED APPLICATION

The present application is a continuation-in-part of the copending application Ser. No. 222,527 filed Feb. 1, 1972, now abandoned, by the same-named applicant.

DISCUSSION OF THE PRIOR ART

My invention relates to a device for applying a uniform coating layer to an advancing web, consisting of an apparatus for applying the coating substance combined with a member for accurately striking off the applied material.

It is known to apply a coating to a web or sheet by means of a doctor, that is to say, a heavy knife mounted on a heavy supporting structure. This knife should then strickle the coating substance, applied to the web before the location where the knife is positioned, to obtain a layer of the desired thickness and smoothness. The supporting structure should be very heavy and exactly constructed with a view to the shearing stress produced in the coating mass. The doctor should be very exactly adjusted in order to ensure that on the entire width of the web the applied layer has a uniform thickness and a smooth surface. So far it has often been attempted to provide a lighter and consequently cheaper construction, which however inevitably resulted in a loss in perfection of the evenness of the layer.

SUMMARY OF THE INVENTION

It is an object of my invention to provide a device which is very light but nevertheless operates very exactly. To this end I propose to select the coating application apparatus such that it allows a uniform application of the coating substance and to use a doctor blade which consists of a very thin flexible blade contacting the coating substance on the advancing web at a minor pressure and at a very small angle.

The invention is based on the understanding that the uniform application of the coating substance and the smoothing of the layer can be effected by separate operations. For that purpose a device is used which achieves a regular distribution of the coating substance on the surface of the web. Thereafter it is only necessary to smooth the surface of the applied substance.

Most surprisingly it has been found that the forces required therefor are so small that a suitable construction may consist of a comparatively thin doctor blade which in the indicated way bears on the layer applied.

An essential feature of the invention is that the angle of the doctor blade with the web is very small and the pressure is so reduced that in no case a roll of coating substance is produced in the wedge-shaped space (nip) between the upper side of the layer and the underside of the doctor. No measurable shearing of the boundary layer is produced.

My invention is hereinafter clarified with reference to the accompanying drawing in which the essential part of the device is depicted.

DESCRIPTION OF A PREFERRED EMBODIMENT

The device is provided with a non-designed cylindrical stencil **1** (a so-called plain-mesh stencil) with inner squeegee **2.** These elements constitute the apparatus for applying a coating substance, roughly indicated by **4,** to an advancing web **3.**

The device is further provided with a member for exactly evenly striking off the applied substance, which member consists of a thin flexible doctor blade **5** mounted in a holder **6.** The web **3** moves in an upward direction and is supported in the coating track A by several rollers **7** which are arranged above each other. The blade of the doctor **5** contacts at a slight pressure and at a very small angle the layer **4.** The supporting roller **7** provided in front of the doctor blade **5** is situated slightly beyond the area in which this blade contacts the web **3.** The position of the holder **6** is adjustable for modifying the angle and/or the pressure of the doctor blade **5,** on the layer **4.** The position of the supporting roller **7** cooperating with the doctor **5** is also adjustable in a direction parallel to the web **3.**

I have found by experiment that due to the separate application of the coating substance through a cylindrical stencil, the force required for smoothing the coating mass applied is so small that a very thin doctor blade of, e.g., 0.05–0.20 mm and a free width of the blade amounting to, e.g., 20–50 mm suffices to achieve by a slightly resilient pressure and a very small compressive force produced thereby an exact evenness and uniform thickness of the applied layer.

In the preferred embodiment of the device shown in the drawing the web moves upwards in the coating path and is supported by some rollers which are disposed above each other, the supporting roller in front of the doctor being situated beyond the area in which the blade edge of the doctor touches the web.

It should be noted that the coating application device could also consist of a spray device, provided a uniform quantity of material can be applied thereby per unit of surface. It is even possible to use a conventional heavy knife cooperating with a web, which moves too fast to allow a proper smoothing. In the two cases the application of a very thin doctor results in the desired uniform smooth surface of the coating layer.

Thus it can be seen that the present invention discloses a combination of the plain-mesh stencil with a squeegee therein for applying a coating substance upon the web and a flexible blade doctor contacting the coating substance on the advancing web to smooth the coating. By applying initially the coating by the plain-mesh stencil the forces subsequently required to smooth the surface of the applied substance are quite small. Therefore, for the smoothing of the applied substance it is only necessary to provide a relatively thin doctor blade having a relatively light weight supporting structure.

It will be understood that this invention is susceptible to modification in order to adapt it to different usages and conditions, and accordingly, it is desired to comprehend such modifications within this invnetion as may fall within the scope of the appended claims.

What I claim is:

1. A device for applying a uniform smooth surface coating layer to an advancing web consisting of an apparatus contacting an advancing web for applying the coating substance to said web, and a vertically disposed

doctor blade member for accurately and evenly striking off the applied coating material, said application apparatus comprising a cylindrical mesh stencil having an inner squeegee therein to provide a uniform distribution of the coating substance upon the web in contact with said stencil, said member comprising a very thin flexible blade contacting the coating substance on the web under a slightly resilient pressure and disposed at a very small angle relative to the web, the coated web moving in an upward direction, a plurality of vertically aligned rollers guiding said advancing web, one of said guide rollers being operatively associated as a backup member with respect to said doctor blade, and said one roll being adjustable, in its back-up position, between a location just in front of to a location just in back of the point of said blade contact.

2. A device according to claim **1** wherein said doctor blade has a thickness of approximately 0.05 – 0.20 mm. and the width of the projecting portion of said blade is approximately 20–50 mm.

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