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F. W. LODDING

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DOCTOR BLADE FOR ROLLS AND CYLINDERS

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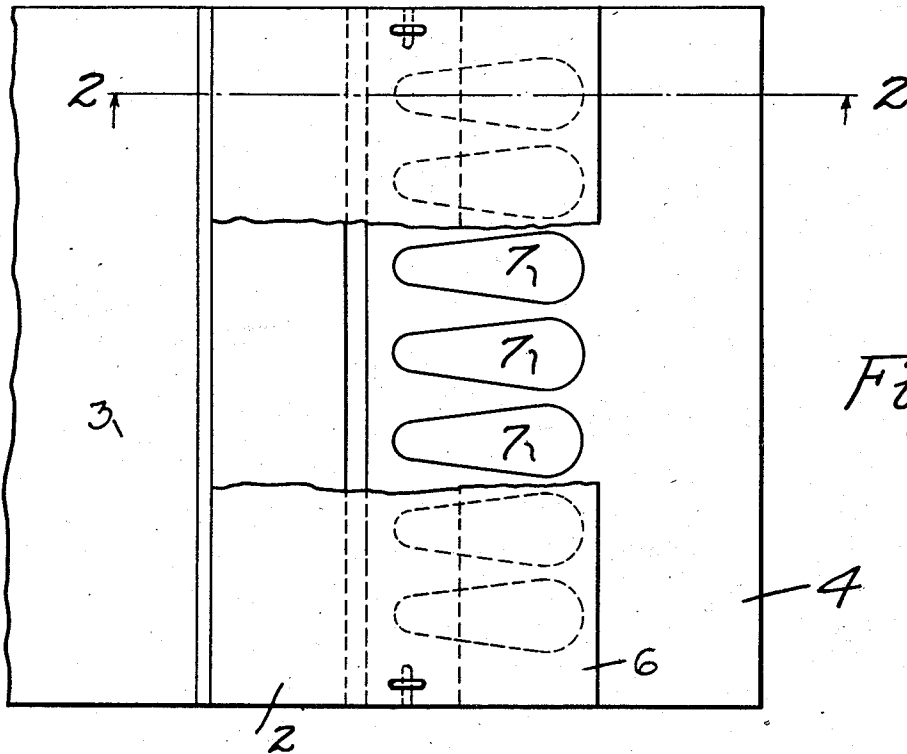


Fig. 1

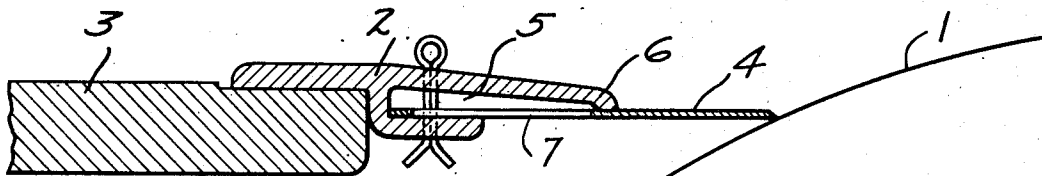


Fig. 2

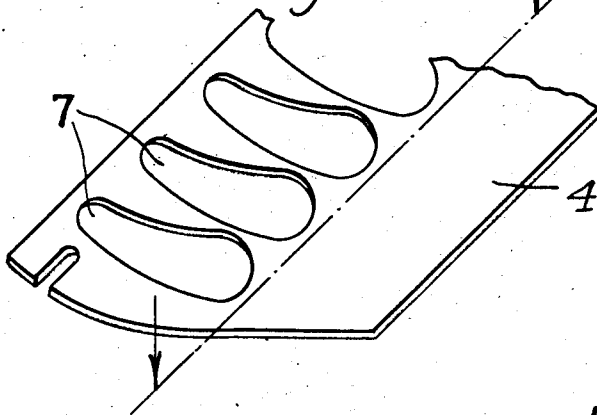


Fig. 3

INVENTOR
Frederick W. Loding
BY *Owen W. Kennedy*
ATTORNEY

UNITED STATES PATENT OFFICE

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DOCTOR BLADE FOR ROLLS AND CYLINDERS

Frederick W. Lodding, Worcester, Mass.

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3 Claims. (Cl. 92-74)

The present invention relates to devices known in the paper making art as doctors or scrapers, such devices being customarily employed in connection with rotating calender rolls, dried cylinders and the like, for the purpose of cleaning such rolls and cylinders.

In my Patent No. 2,117,032, issued May 10, 1938, there is shown and described a doctor mechanism of the above indicated type, characterized by the provision of a thin flexible doctor blade carried by a pivoted holder, which provides a pressure applying portion engaging the surface of the blade intermediate its edges. In operation, the holder is adapted to apply pressure between the edges of the blade, with the blade being practically self aligning on the doctored surface as it flexes, due to the fact that its entire surface is substantially unconfined except along its edges and along the zone of pressure as applied by the holder.

While the doctor mechanism covered by my aforementioned patent is entirely satisfactory in operation, as a result of the floating support of the blade in its holder, it has been found that there are certain limits to the degree of flexibility in the blades that are utilized with the holder. When any thin flexible doctor blade is subjected to pressure, it will bend to a certain curvature, which will be maintained as long as pressure is applied. For this reason, a normally flat blade having considerable flexibility lengthwise will, when flexed, become stiff in a lengthwise direction, due to the transverse arch effect, so that its edge will not conform itself readily to the surface being doctored. As a result, a blade exhibiting extreme lengthwise flexibility when in an unflexed condition, may entirely lose such lengthwise flexibility when subjected to sufficient pressure to obtain the desired doctoring action on a rotating surface.

According to the present invention, there is provided an improved doctor blade that will always possess sufficient flexibility lengthwise of its scraping edge, irrespective of the fact that the remainder of the blade assumes a curved or arched form, in response to the application of pressure. Briefly stated, the improved blade of the present invention is particularly characterized by the removal of predetermined areas of material from that portion of the blade remote from the scraping edge, to such an extent that deflection of the blade occurs entirely within the zone where the material has been removed, without affecting the lengthwise flexibility of the scraping edge when pressure is applied.

The above and other advantageous features of

the invention will hereinafter more fully appear from the following description, with reference to the accompanying drawing in which:

Fig. 1 is a plan view of a doctor mechanism provided with a blade embodying the present invention, with certain parts broken away.

Fig. 2 is a vertical sectional view along the line 2-2 of Fig. 1, looking in the direction of the arrows.

Fig. 3 is a perspective of the blade removed from its holder and showing the manner in which the blade bends in response to the application of pressure.

Referring to the drawing, a portion of the surface of a roll or cylinder is indicated at 1, and a blade holder 2 is carried by an arm 3 pivotally mounted with respect to the roll. The holder 2 is turnable about the pivotal axis of the arm 3, to bring a doctor blade 4 carried by the holder into engagement with the rotating surface of the roll 1, such turning movement of the holder being accompanied by the application of sufficient pressure to cause the free edge of the blade 4 to bear firmly on the rotating surface of the roll.

The holder 2 provides a slot 5 extending the length thereof, in which the rear edge of the blade 4 is received, and the holder also applies a forwardly extending pressure applying portion 6 adapted to engage the blade 4 between its edges, in order to apply pressure to the blade. As best shown in the broken-away portion of Fig. 1, the part of the blade that is received within the slot 5 is provided along its entire length with a series of transverse perforations 7, each having its greatest width near the mid-section of the blade, with the width decreasing towards the edge of the blade. It is to be noted that the perforations 7 are of such length as to be disposed entirely outside of the zone along which pressure is applied to the blade by the portion 6 of the holder 2.

As a result of the provision of the perforations 7, the blade 4 is more flexible lengthwise as compared to an unperforated blade of the same thickness. Furthermore, it has been found that when a turning force is applied to the holder 2 to press the outer edge of the blade 4 against the roll surface with considerable pressure, the blade will bend or arch into the form illustrated in Fig. 3, without affecting the lengthwise flexibility of the scraping edge. This is due to the fact that the bending due to the pressure applied by the holder portion 6 is localized entirely within the perforated portion of the blade, with the unperforated portion remaining straight, irrespective of the amount of pressure that is applied. As a result,

the scraping edge of the blade is adapted to adopt itself perfectly to the contour of the surface being doctored.

The net result of the provision of the perforations 7 is that the forward part of the blade adjacent the scraping edge is not permitted to bend or flex, other than longitudinally of the roll, by reason of the fact that such bending can occur much more readily within the zone of the perforations. By forming the perforations substantially as shown, of varying width, it is possible to obtain a true deflection curve of parabolic form for the blade where the bending occurs. Furthermore, by placing the perforations closer together or farther apart than as shown in Fig. 1, it is possible to obtain varied degrees of flexibility for a blade of given thickness, to meet different conditions of operation.

From the foregoing, it is apparent that by the present invention there is provided an improved doctor blade, characterized by extreme longitudinal flexibility of its scraping edge, irrespective of the fact that the remainder of the blade is adapted to assume a curved or arched form, upon the application of pressure to the blade.

I claim:

1. A doctor device for rolls and cylinders, comprising in combination a holder providing a slot extending longitudinally thereof, a thin flexible blade having one edge portion seated within said slot and having its opposite free edge in engagement with a rotating surface, with said holder providing a forwardly extending pressure applying portion relatively stiff with respect to the blade and adapted to engage said blade between its edges, and with said blade providing transverse perforations located entirely between the line of engagement of said pressure applying portion with the blade, and said holder slot, to limit transverse bending of the blade under pressure applied by said stiff portion to within the zone

of said perforations and without affecting the lengthwise flexibility of the scraping edge of said blade.

2. A doctor device for rolls and cylinders, comprising in combination a holder providing a slot extending longitudinally thereof, a thin flexible blade having one edge portion seated within said slot and having its opposite free edge in engagement with a rotating surface, with said holder providing a forwardly extending pressure applying portion of greater thickness than said blade and adapted to engage said blade between its edges, with said blade being entirely unconfined between said pressure applying portion and where it is seated in said slot and providing perforations extending across said unconfined area to limit transverse bending of the blade under pressure applied by said thicker portion to within the zone of said perforations, and with the lengthwise flexibility of the blade between said pressure applying portion and its scraping edge remaining unaffected.

3. A doctor device for rolls and cylinders, comprising in combination a holder providing a slot extending longitudinally thereof, a thin flexible blade having one edge portion seated within said slot and having its opposite free edge in engagement with a rotating surface, with said holder providing a forwardly extending pressure applying portion relatively stiff with respect to said blade and adapted to engage said blade between its edges, and with said blade providing spaced perforations of varying width entirely located between said pressure applying portion and said slot to restrict transverse bending of said blade under pressure applied by said stiff portion to within the zone of said perforations, and in accordance with a true deflection curve of parabolic form.

FREDERICK W. LODDING.