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DOCTORS

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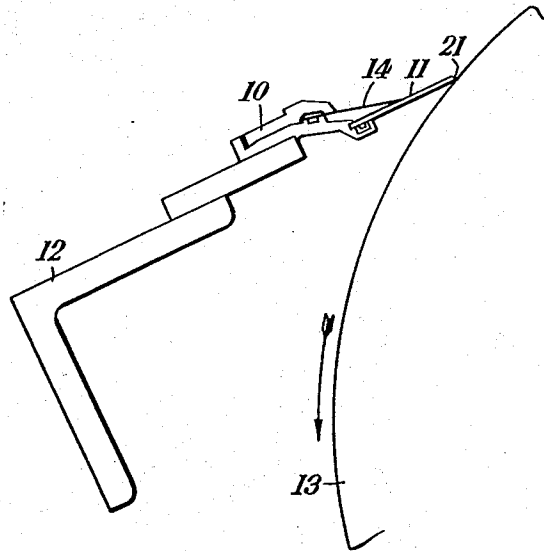


Fig. 1.

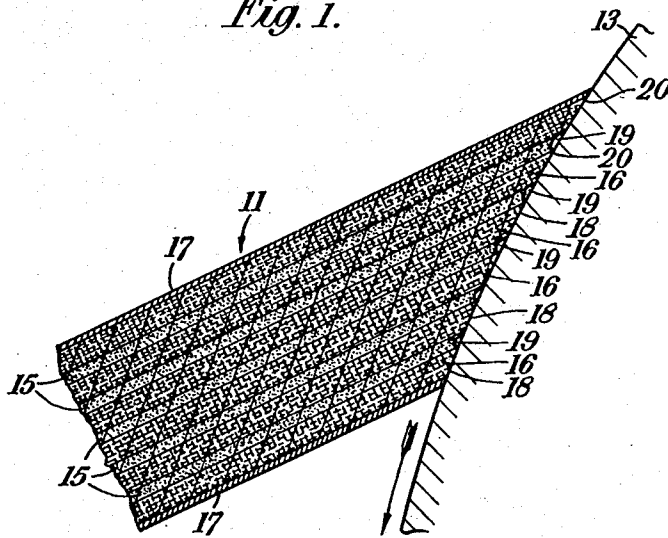


Fig. 2.

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4 Claims. (Cl. 51—204)

This invention relates to doctors for paper making and other machines, including rolls or cylinders which have to be kept clean, e. g. board making machines, pulp making machines, milk driers, metal foil rolling mills and gluing, crimping or combining machines.

The doctor blades at present in general use in paper making machines are made either of metal or of layers of fabric impregnated with and bonded together by synthetic resin. Such blades have but a single scraping edge, this being located at the leading edge of the heel of the blade, the heel being the portion of the blade in contact with the roll. The function of the blade is to remove from the roll particles of pulp or other impurities deposited on the roll by the paper, but any such particles which may pass the leading edge are not removed from the roll.

The object of the invention is to provide a doctor which, in use, will develop a number of scraping edges and which will also exert a mildly abrasive action on the roll.

The invention provides a doctor blade composed of alternate frangible and wear resisting laminations, the former consisting of fibres of mildly abrasive material of hardness from 3 to 7 on Mohs' scale, and the latter of non-abrasive material, said lamination being presented edgewise to the heel of the blade and being impregnated with and bonded together with synthetic resin.

The wear-resisting laminations preferably consist of cloth. The other laminations are of material which exerts a mildly abrasive action on a cast iron roll and which can be prepared in a thread-like form, as distinct from crystalline form, so that they may be woven or felted into a sheet or web, constituting a coherent lamination, or deposited direct onto the surface of the wear-resisting laminations. I prefer to use for these laminations spun or drawn glass having a hardness of 6 Mohs, but other suitable materials are asbestos, of hardness about 3 Mohs, and quartz of hardness 7 Mohs.

In use of the doctor blade according to invention, fibres of the mildly abrasive material break off from their respective laminations and exert an abrasive action on the roll. As the result, recesses are provided in the heel of the blade, giving it a corrugated surface and providing it with scraping edges at the leading edges of each of the wear-resisting laminations. The recesses tend to retain the broken away abrasive fibres, so enabling them to exert an effective polishing action on the roll, and the formation of a number of scraping edges improves the ability of the blade to remove particles of impurities from the roll.

I prefer to use, as the outer laminations at the top and bottom surfaces of the blade, finely woven cloth, having about 100-120 threads per linear inch. It is difficult to impregnate threads thoroughly with synthetic resin and unless the threads are fine, thorough impregnation will not occur. The result is that fluffy threads will be exposed at the leading edge of the blade, with the result that the roll will not be effectively polished by the doctor and the paper pulp or other material will not be effectively scraped from the roll. The provision of a finely woven

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lamination at each outer surface of the blade ensures that the leading edge of the blade can be given, and will retain during operation, a fine sharp edge in whichever direction the blade is bevelled.

The inner cloth laminations may, however, be of coarse weave, having about 40-60 threads per linear inch.

The type of synthetic resin used is chosen according to the duty required of the blade. Thus phenol-formaldehyde resin or epoxy resin are suitable for average duties and silicone resin for high temperature work.

One embodiment of a doctor blade fashioned according to this invention will now be described in detail, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a side elevation showing the doctor in position on a roll of a paper making machine and,

Fig. 2 is a greatly enlarged cross section through the blade.

As shown in Fig. 1, the doctor comprises a holder 10, carrying a doctor blade 11 and supported on a bracket 12 which is biased, by a spring or by gravity, to cause the blade to bear on the roll 13. Also mounted in the holder is a pressure plate 14 which applies pressure to the blade 11. The front end of the blade is provided with a bevel 21.

As shown in Fig. 2, the blade 11 comprises five laminations 15 of woven or felted glass fibres interleaved with six laminations 16 of coarsely woven fabric with upper and lower laminations 17 of finely woven cotton fabric, the laminations being presented edgewise to the heel 18 of the blade. The several laminations are individually impregnated with a synthetic resin chosen, as described above, to suit the duty required of the blade and are bonded together under heat and pressure to produce a blade of the desired thickness, e. g. $\frac{1}{8}$ or $\frac{3}{16}$ inch.

The inner layers 16 of cotton fabric provide a wear-resisting surface on the heel 18 of the blade while the frangible, mildly abrasive layers 15 break up, liberating fibres of glass, when in contact with the surface of the roll and cause a gentle abrasive action between the roll and the blade which gives the surface of the roll a high polish. The breaking up of the frangible material causes slight depressions 19 to be formed below the general surface and thus gives a corrugated surface to the heel of the blade. This corrugated surface in contact with the roll surface gives an improved cleaning and polishing action due to the fact that a scraping edge is rendered available at the leading edge 20 of each of the laminations 16.

Normally, except in the case of the breast rolls of paper making machines, the blade is initially presented to the roll, as shown in Fig. 1, with the bevel 21 facing away from the surface of the roll. During the early stages of use the edge of the blade is worn away to form the heel and during this initial period the edges of the glass laminations 15 will not be presented to the roll. As the edge is worn down, however, the glass laminations are brought progressively into action on the roll to produce the above-described polishing action.

I claim:

1. A method for simultaneously doctoring and polishing the cylindrical surface of a rotating roll comprising: subjecting the surface of said roll, along substantially parallel lines extending substantially parallel to the axis of said roll, to successive applications of abrasive action and doctoring action, all of said actions being confined within the thickness of a single doctor blade.

2. A thin, narrow, elongated doctor blade having one edge adapted to be pressed against the surface of a moving roll, said blade being formed of material capable of being shaped by wear to bring said edge into arcuate conformity with the surface of the roll throughout the thick-

ness of said edge, said material comprising a lamination of a plurality of layers, each coextensive with the length and width of the blade, said layers being alternately of more and less wear resistant substance so that said edge when worn into said arcuate conformity presents spaced, consecutive doctor edges to the surface of the roll. 5

3. A doctor blade as set forth in claim 2 in which said lamination of a plurality of layers are alternately of glass and fabric.

4. A doctor blade as set forth in claim 3 in which the outermost plies are of fabric of finer weave and mesh than those of the inner plies. 10

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