

Aug. 9, 1960

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2,948,012

DOCTORS FOR PAPER-MAKING AND OTHER MACHINES

Filed Dec. 14, 1956

2 Sheets-Sheet 1

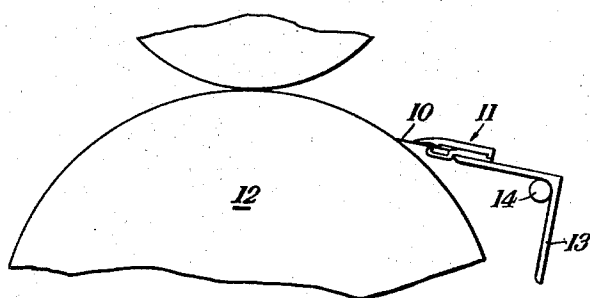


Fig. 1.

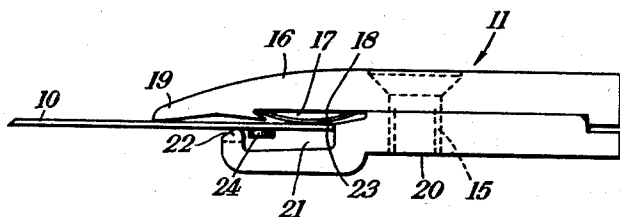


Fig. 2.

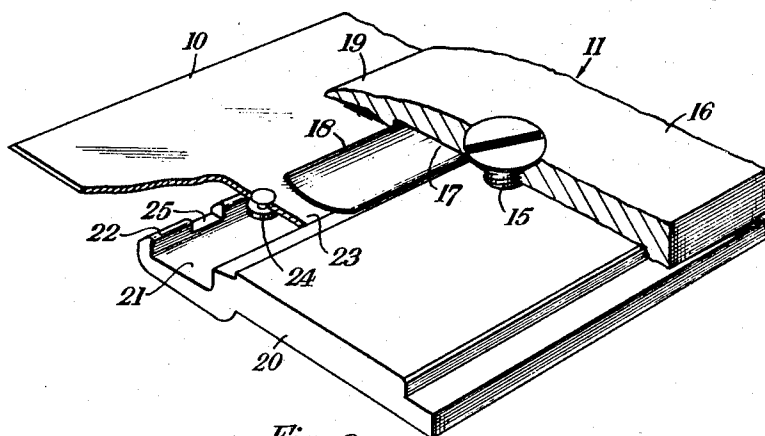


Fig. 3.

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2 Sheets-Sheet 2

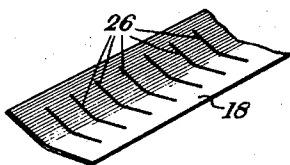


Fig. 4.

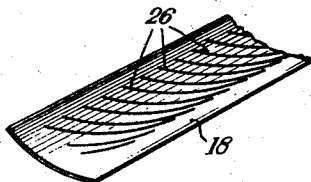


Fig. 5.

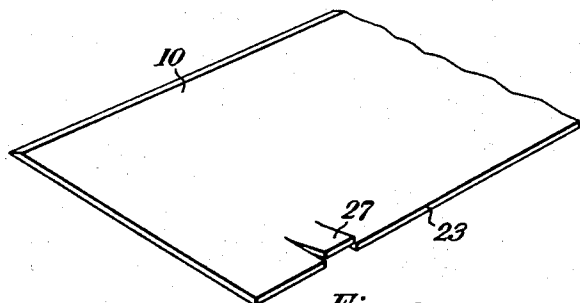


Fig. 6.

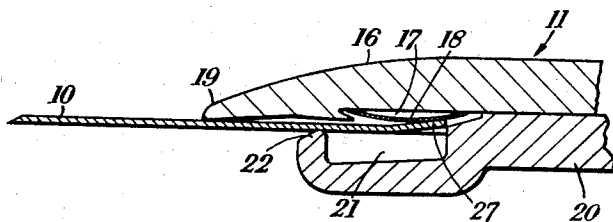


Fig. 7.

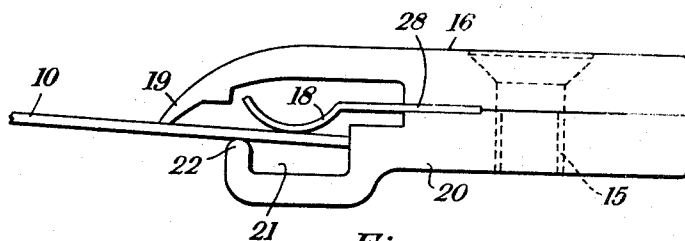


Fig. 8.

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2,948,012

DOCTORS FOR PAPER-MAKING AND OTHER MACHINES

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7 Claims. (Cl. 15—256.5)

This invention relates to doctors for papermaking and other machines which have rolls or cylinders which have to be kept clean and free from impurities which might damage the product being treated.

More specifically, the invention applies to doctors of the type comprising a blade holder and a relatively thin blade which has a free fit at its rear end in a longitudinal retaining recess in the holder so that it is free to expand in all directions when applied to a heated roll and is also free to float so that it may conform to any irregularity in the surface being doctored, the holder being biased by springs or gravity so as to maintain the blade in contact with the roll.

Doctors have been proposed with projections on the blade which fit into retaining slots in the holder to prevent the blade from accidentally falling out. These suffer from the defect that pulp or other matter gets into the retaining slots and makes it difficult to remove a worn blade. Doctors have also been proposed with spring or other attachments fixed to the blade and spaced at intervals along the length of the blade. This construction however has the disadvantages that the blade is not pressed evenly into contact with the blade holder and that the blade attachments are liable to become damaged or break away with the result that the Fourdrinier wire or other clothing of the paper-making machine may be damaged should the broken pieces fall thereon. Other doctors have been proposed, for example in my U.S. Patent No. 2,673,494, comprising a rotatable rod disposed in the recess in the holder and serving to lock the blade in position and allow the blade to be removed frontwise should the blade retaining groove in the rod become choked with pulp. It is difficult with this type of doctor to keep the blade in contact with the blade holder when the doctor is lifted away from the roll with the result that pulp or other matter may get between the blade and the blade holder. Then, when the doctor is reapplied to the roll, the lumps of pulp between the blade and the holder may cause uneven pressure to be exerted by the blade on the roll which could result in imperfect doctoring or scoring of the roll.

With a view to avoiding these various disadvantages, the invention provides a doctor of the above type comprising a spring member retained within the blade holder and bearing against the blade over substantially the whole of its length, the spring member maintaining the face of the blade remote from the roll in contact with one abutment on the holder and the face of the blade nearer the roll in contact with another abutment on the holder disposed between the first abutment and the spring member, both abutments extending for the whole or substantially the whole of the length of the blade.

In use of the doctor according to the invention, the spring member, which can be made in one continuous length or of a number of abutting or nearly abutting sections, keeps the blade in contact with both abutments on the holder, thus sealing the recess in the holder which

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receives the rear end of the blade against ingress of dirt. It also exerts friction on the blade to maintain it in position. Since the spring member is housed within the blade holder it is protected from damage.

5 Preferably the spring member is of arcuate shape with its convex portion bearing against the face of the blade remote from the roll. Alternatively it may be of quasi-arcuate shape, having one or more flat surfaces, e.g. of V shape with an arcuate formation at the base of the V where it bears on the blade.

Certain shape embodiments of doctor according to the invention will now be described in detail, by way of example, with reference to the accompanying drawings, in which:

15 Fig. 1 is an end view of one form of doctor showing it applied to the roll of the paper-making machine,

Fig. 2 is an end view on a larger scale of the blade and blade holder of the doctor of Fig. 1,

20 Fig. 3 is a corresponding perspective view, partly broken away and on a still larger scale,

Figs. 4 and 5 show alternative forms of spring member for use in the doctor of Fig. 1,

Fig. 6 is a view of an alternative form of doctor blade,

25 Fig. 7 is a section through a doctor, showing the blade of Fig. 6 accommodating in the holder, and

Fig. 8 is an end view of another form of doctor.

Like reference numerals indicate like parts throughout the figures.

As indicated in Fig. 1, the blade 10 of the doctor is 30 supported by a holder 11 which extends for the entire length of the roll 12 to which the doctor is fitted. The holder 11 is carried by a supporting bar 13, mounted on a rod 14 and gravity maintains the blade 10 in contact with the roll 12. As will be readily understood, the 35 blade can be maintained in contact with the roll by fluid pressure springs or other means instead of by the gravity if so preferred. As shown in Figs. 2 and 3 the blade holder 11 is formed of two parts joined together by screws 15, rivets or the like. The upper part 16 of the holder (i.e. the part remote from the roll) is formed 40 with a recess 17 accommodating a spring member 18 extending for substantially the whole length of the blade and has a forwardly projecting nose 19 bearing on the upper surface of the blade, i.e. the side thereof remote 45 from the roll. The lower part 20 of the holder has a groove 21 beneath the blade and a lip 22 in advance of the groove and bearing against the lower surface of the blade at a location in front of the spring member 18 and behind the nose 19. The rear end 23 of the blade 50 10 bears against the rear face of the groove 21. The spring member 18 has opposed front and rear edges bearing throughout its length against the holder and an arcuate portion bearing against the blade near its rear edge in such a manner as to keep the upper surface of 55 the blade in contact with the nose 19 and thus prevents the blade from dropping away from the blade holder when the doctor is lifted off the roll. The spring member 18 also provides a friction grip to maintain the blade in position without the use of projections or other 60 attachments to the blade and thus permits the blade to be inserted or removed laterally from the front of the holder as well as from the end thereof. The nose 19 and lip 22 thus constitute spaced abutments on the holder against which the opposite faces of the blade are respectively 65 maintained in contact by the spring member 18.

In order to assist in feeding in the blade longitudinally from one end of the doctor, a single rivet 24 or other projection can be provided at one end of the blade to coact with the groove 21 to guide the blade while it 70 is being fed longitudinally into the holder. Alternatively, the blade may be provided with a series of spaced rivets or other projections 24 which extend into the groove 21.

The front wall of the groove, which constitutes the lip 22, is formed with a gap 25 opposite each of the rivets 24, for the passage of the rivets to enable the blade to be removed laterally from the front of the holder. The gaps 25 are staggered in relation to the rivets 24 when the blade is in its normal working position. In order to remove the blade frontwise it will, therefore, be necessary to move it a short distance longitudinally until the rivets 24 are opposite the gaps 25.

The spring member 18 may be of arcuate shape as shown in Fig. 5 or, as shown in Fig. 4, it may be of V-shape with an arcuate formation at the base of the V where it bears on the blade. It will be noted that in both cases the spring member 18 presents to the blade in transverse planes normal to the blade a convex surface including an arcuate portion which bears throughout substantially the full length of the spring member against the surface of the blade remote from the roll. As the spring member does not take any of the doctoring pressure, it can be of a very flexible nature. Lateral (Fig. 4) or diagonal slots 26 (Fig. 5) can be cut in the curved portion of the spring member in order to make it more flexible. This assists in feeding in the blade on very long doctors.

The blade can, as shown in Fig. 6, be provided with short spring tongues 27 bent up outwardly from and spaced along its rear edge to fit, as shown in Fig. 7, behind the arcuate portion of the spring member 18, in order to provide an additional safety grip to hold the blade in position on very long doctors and on doctors which have to be installed with the blade in a downwardly working position. The height of these spring tongues 27 is such that they do not prevent the blade from being inserted and removed from the front but they are of sufficient height to form a guide behind the spring member 18 when the blade is being inserted from the end of the doctor.

The doctor according to the invention has the advantage that the spring member, in addition to preventing ingress of dirt into the blade holder, exerts an even pressure on the blade throughout its length. If desired and as shown in Fig. 8, the spring member may be formed with a rearwardly extending flat portion 28 which fits in a slot provided between the two parts 16, 20 of the holder.

What I claim as my invention and desire to secure by Letters Patent is:

1. A doctor for application to a roll of a paper-making or other machine comprising a blade, a blade holder extending for the full length of the blade, means securing said parts of the holder together, the part of said holder remote from said roll having a longitudinally extending recess and a forwardly projecting nose and the other part of said holder having a groove, the rear face of which constitutes an abutment for the rear edge of the blade, and a lip in advance of said groove, said nose and said lip both extending at least for substantially the whole length of said blade, and a spring member accommodated in said recess and extending for substantially the whole length of the blade, said spring member being in contact throughout its length with one face only of the blade remote from said roll and maintaining the opposite faces of the blade respectively in contact with said nose and with said lip.

2. A doctor according to claim 1, wherein said spring member has a rearwardly extending flat portion accommodated in a slot provided between the two parts of the holder.

3. A doctor according to claim 1, wherein said blade carries projections extending into said groove and said lip is formed with gaps for the passage of said projections to permit of forward withdrawal of said blade from said holder.

4. A doctor for application to a roll of a paper-making or other machine comprising a blade, a blade holder extending for the full length of the blade and having a longitudinal recess in which the rear end of said blade is accommodated, a spring member supported by said holder extending longitudinally of the blade for substantially the whole length of the blade, said spring member being in contact throughout its length with one face only of the blade and resiliently urging said blade into contact with an abutment on said holder which extends substantially for the full length of the blade, said blade having at its rear end spaced outwardly bent tongues engaging said spring member to retain said blade in position in said holder.

5. A doctor for application to a roll of a paper-making or other machine and comprising a blade, a blade holder extending for the full length of the blade and having, at the side of the blade nearer the roll, a longitudinal groove in which the rear end of said blade is accommodated and a lip at the front of said groove extending for at least substantially the full length of the blade, said blade holder also having, at the side of the blade remote from the roll, a longitudinal recess situated to the rear of said lip and a nose which projects forwardly beyond said lip and extends at least substantially the full length of the blade, and a spring member accommodated in said recess and extending longitudinally of the blade for substantially the whole length of the blade, said spring member having opposed front and rear edges bearing throughout its length against said holder and presenting to said blade in transverse planes normal to the blade a convex surface, including an arcuate portion which bears throughout substantially the full length of the spring member against the face of the blade remote from the roll, to maintain said remote face of the blade in sealing engagement with said nose and the other face of the blade in sealing engagement with said lip.

6. A doctor according to claim 5, wherein, for the purpose of increasing its flexibility, said spring member is formed with a plurality of slots extending transversely to its length.

7. A doctor according to claim 5, wherein, for the purpose of increasing its flexibility, said spring member is formed with a plurality of diagonally extending slots.

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