United States Patent

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[33] **Great Britain**
[31] **24451/67 and 5176/68**

[54] **DOCTORS FOR PAPER MAKING AND LIKE MACHINES**
3 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **15/256.51**
[51] **Int. Cl.** **D21g 3/00**
[50] **Field of Search** 15/256.5, 256.51, 256.53; 100/174; 165/91; 241/166, 167; 162/281; 118/261, 126, 119

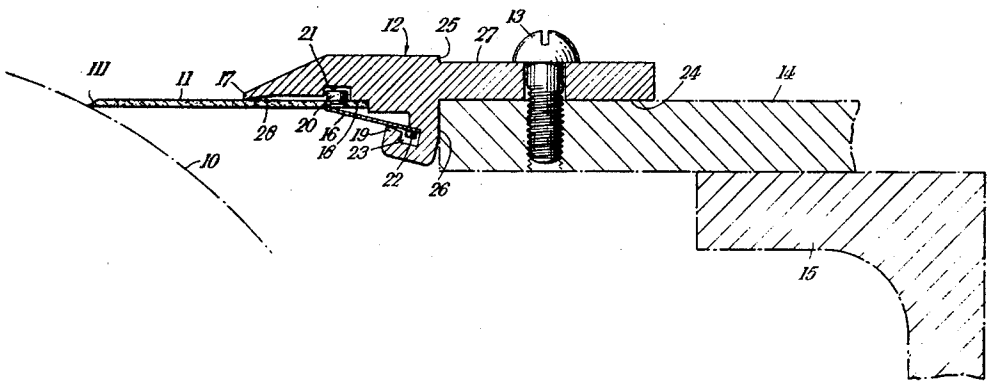
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ABSTRACT: A doctor for the roll of a papermaking machine having a pressure plate which bears against the face of the doctor blade which contacts the roll and at a location behind a nose on the holder of the doctor which bears against the other face of the blade.



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SHEET 1 OF 2

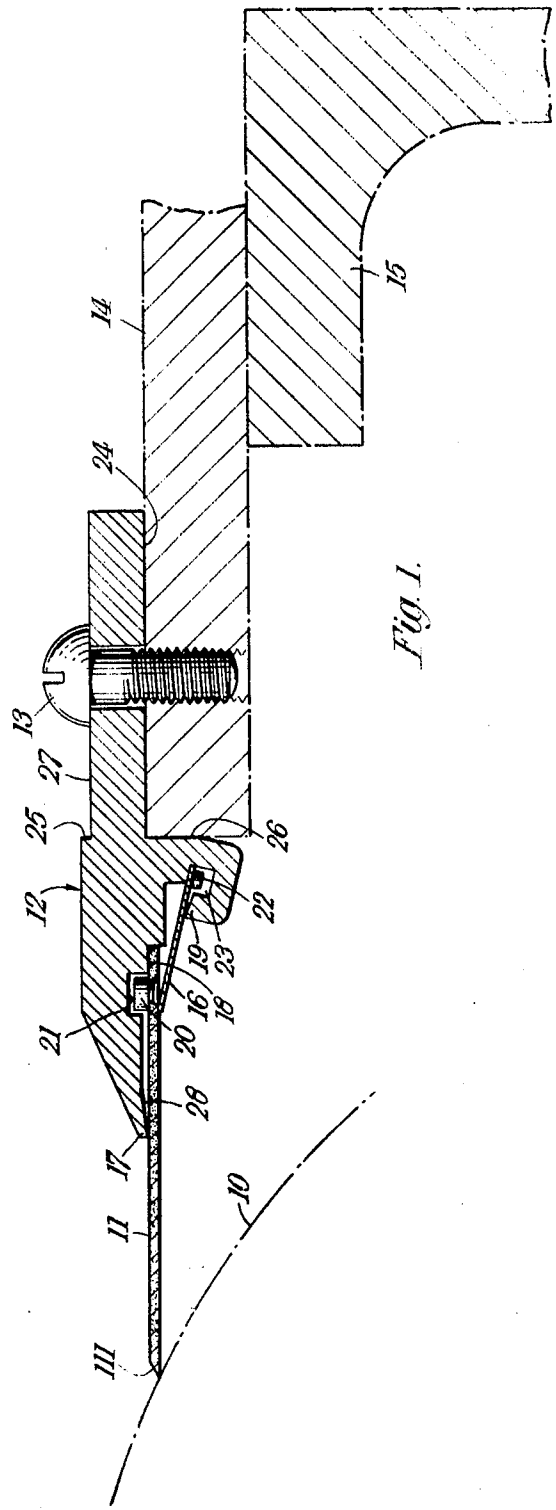


Fig. 1.

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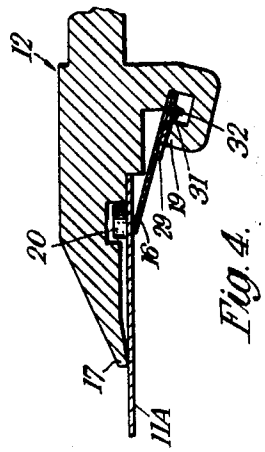


Fig. 4.

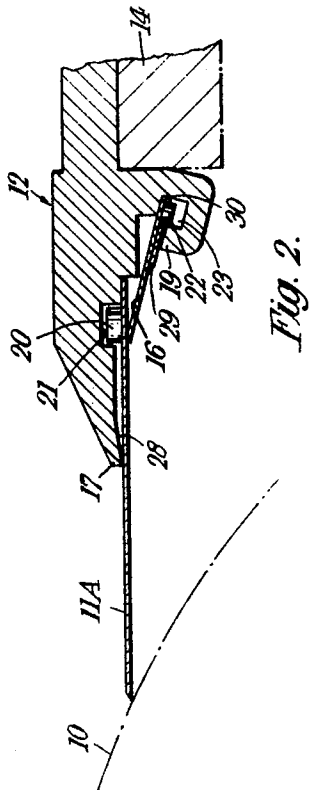


Fig. 2.



Fig. 3.

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DOCTORS FOR PAPER MAKING AND LIKE MACHINES

This invention relates to doctors for papermaking and like machines of the type comprising a holder, a doctor blade having its rear end accommodated in the holder and adapted to bear at its front end against a roll to be doctored and a resilient pressure plate also accommodated at its rear end in the holder and bearing at its front end against the doctor blade. In use, the holder is mounted on a support which is biased, by gravity or mechanical loading, so as to press the front end of the doctor blade against the roll.

In existing doctors of this type the pressure plate bears against the face of the doctor blade remote from the roll and at a location between the front end of the doctor blade and a forwardly extending nose on the holder against which the blade is pressed by the doctoring pressure. While such a doctor gives excellent service it suffers from two disadvantages. Firstly the middle or rear portion of the blade tends to lift from the holder under the doctor pressure leaving a gap into which dirt and/or liquid scraped from the roll by the blade can penetrate. Accumulation of such dirt can cause misalignment of the blade and render the blade difficult to remove from the holder and the dust may even fall onto the roll beneath the doctor. Secondly the load deflection characteristic, i.e., the graph relating deflection of the blade of the doctor to the load to which it is subjected, is nonlinear and of such a form that increase in load beyond a certain limit produces no substantial further increase in deflection.

The invention provides a doctor of the above type, in which the pressure plate bears against the face of the blade which contacts the roll and at a location behind a nose on the holder which bears against the other face of the blade. As the result a complete seal is provided against ingress of dirt into the holder, since the blade is sealed by the nose at the face remote from the roll and at its other side by the pressure plate while the rear end of the blade is pressed firmly against the holder by the pressure on the blade. The seal will also prevent the flow of liquid, such as water and coating material, through the doctor which, otherwise, could fall onto the roll beneath the doctor and nullify the benefits derived from doctoring the roll. Also since deflection underload is provided substantially by deflection of the pressure plate, and only to a very limited extent by joint deflection of the blade and of the pressure plate as in the known doctor, the load/deflection characteristic is substantially linear.

Doctors for papermaking machines are sometimes fitted with a metal doctor blade and sometimes with a thicker, so-called composition blade, made of synthetic resin.

The doctor according to the invention may be adapted for use only with a metal blade. Alternatively it may be adapted for use, at will, either with a metal blade or with a composition blade by the provision of a packing piece which, when the doctor is provided with a metal blade, is inserted between the pressure plate and a lip on the holder which faces the side of the pressure plate remote from the blade. The doctor may be fitted with a composition blade by removing the packing piece and substituting the composition blade for the metal blade.

The invention will now be further described, by way of example, with reference to the accompanying drawings in which:

FIG. 1 is a vertical section through a doctor according to the invention fitted with a composition blade,

FIG. 2 is a similar view showing the same doctor fitted with a thinner metal blade and with a packing piece fitted between the pressure plate and the holder,

FIG. 3 is a plan view showing part of the packing piece, and

FIG. 4 is a view similar to FIG. 2 showing a modified pressure plate and packing piece.

FIG. 1 shows the doctor applied to a roll **10**. The blade **11**, which has a bevelled front edge **111** bearing against the roll, is supported at its rear end in a holder **12** attached by screws **13** to an adapter bar **14** which, in turn, is fixed to a support **15** which is biased, (by conventional means not shown) so as to press the nose **111** of the blade against the roll **10**. A pressure plate **16** bears against the face of the blade **11** which faces the roll and presses the other face of the blade into contact with a nose **17** on the holder **12** located forwardly of the line of contact between the pressure plate **16** and the blade **11**. When the doctor is out of use the rear end of the blade is maintained by the pressure plate **16** in contact with a seat **18** on the holder. The portion of the nose **17** which faces the blade **11** is recessed, as indicated at **28**, so that the nose **17** makes line contact with the blade **11**. The pressure plate **16** makes line contact with a lip **19** on the holder.

The blade **11** is provided near its rear end with spaced projections **20**, which in the case illustrated are constituted by rivets but may be bentout tongues on the blade, and which engage a groove **21** in the holder to prevent the blade from falling out of the holder. These projections **20** are sufficiently small to allow the blade to be inserted readily into the holder from the front and removed forwardly from the holder. This can be done because the projections **20** can be sprung into and out of the groove **21** and the rear end of the blade **11** can move freely from its seat **18** against the pressure exerted by the pressure plate **16**. This freedom should be contrasted with that available on the conventional doctor in which the rear end of the blade fits into a groove in the holder. The pressure plate **16** also has projections **22** which, in the case illustrated, are rivets but may be bent tongues, and which engage in a groove **23** in the holder.

All joints between the blade **11**, the holder **12** and the pressure plate **16** are self-sealing and the greater the pressure applied by the doctor the more effective is the seal. Dirt cannot therefore enter the holder and cause misalignment of the blade. If desired, end plates (not shown) may be provided at the ends of the holder to complete the seal. When the doctor is working it makes line contact with the holder at **17** and with the tip of the pressure plate **16** and may also make contact with the holder at its rear end, but the blade is otherwise free to float. When out of service the rear end of the doctor bears against the seat **18** and the blade assumes a fixed datum position in which its top surface is in alignment with the face **24** of the holder. The holder has four register surfaces **24, 25, 26, 27** which facilitate mounting on any desired type of support. Due to the fact that the rear end of the blade is not captive, the blade can accommodate itself more readily to the camber of the roll.

As already noted, the doctor has a linear load/deflection characteristic. The heaviness of duty varies according to:

a. The thickness of the pressure plate **16** (duty varies in proportion to the cube of the thickness of the pressure plate, e.g., doubling the thickness of the pressure plate reduces deflection to one-eighth).

b. The effective length of the pressure plate, i.e., the length projecting beyond the line of contact with the lip **19** (duty varies in proportion to the cube of the effective length of the pressure plate, e.g., doubling the effective length of the pressure plate increases the deflection eight times).

The holder **12** may be fabricated as an extrusion from metal or plastics material and may be formed of sections abutting end-to-end on the support. In this case dowels and cooperating recesses or tongues and grooves can be provided on adjoining sections to facilitate alignment. The pressure plate is of metal and may also consist of sections abutting end-to-end. The blade may be of metal or plastics material.

The doctor illustrated in FIG. 1 is of extremely simple construction, consisting of three parts only, viz the blade, the holder and the pressure plate, no additional elements such as a keep plate being required.

While the doctor is illustrated in FIG. 1 as applied to the top of the roll, it can of course equally well be applied to the roll at the bottom or any other desired position.

FIG. 2 shows the doctor of FIG. 1 fitted with a thinner metal blade **11A** and with a packing piece **29** inserted between the pressure plate **16** and the lip **19** on the holder. The packing piece **29** is preferably of metal and it extends beneath the por-

tion of the pressure plate which extends rearwardly into the holder from the lip 19. The packing piece 29 has slots 30 (FIG. 3) in its rear end to accommodate the rivets 20 on the pressure plate 16. When the retaining projections on the pressure plate 16 are bentout tongues, as indicated at 31 in FIG. 4, the packing piece 29 is formed with corresponding tongues 32 which fit under the tongues 31 on the pressure plate 16.

The blade holder 12 is, of course, so proportioned that the pressure plate 16 acts effectively both on a composition blade, when the packing piece is removed, and on a metal blade with the packing piece in position.

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

1. A doctor for papermaking machines and the like comprising; a holder having a forwardly projecting nose, a doctor blade held in engagement with said holder with its rear end located rearwardly of said nose and its front end adapted to bear against a roll to be doctored, the face of said blade remote from said nose being in contact with said roll, a yieldable pressure plate, means in said holder for retaining the rear end of said pressure plate in the holder, the front end of said pressure plate being adapted to bear against said remote face of said blade at a location spaced rearwardly from said nose, said blade making line contact at the opposite face thereof with said nose and being free to pivot about said nose while the rear end of said blade moves with respect to the holder against the pressure exerted on the blade by said pressure plate.

2. A doctor as claimed in claim 1, in which the nose on the holder makes line contact with the blade and the holder has a lip which makes line contact with the side of the pressure plate remote from the blade.

3. A doctor as claimed in claim 1, which includes a removable packing piece extending for the full length of the blade and inserted between the pressure plate and a lip on the holder which faces the side of the pressure plate remote from the holder.