

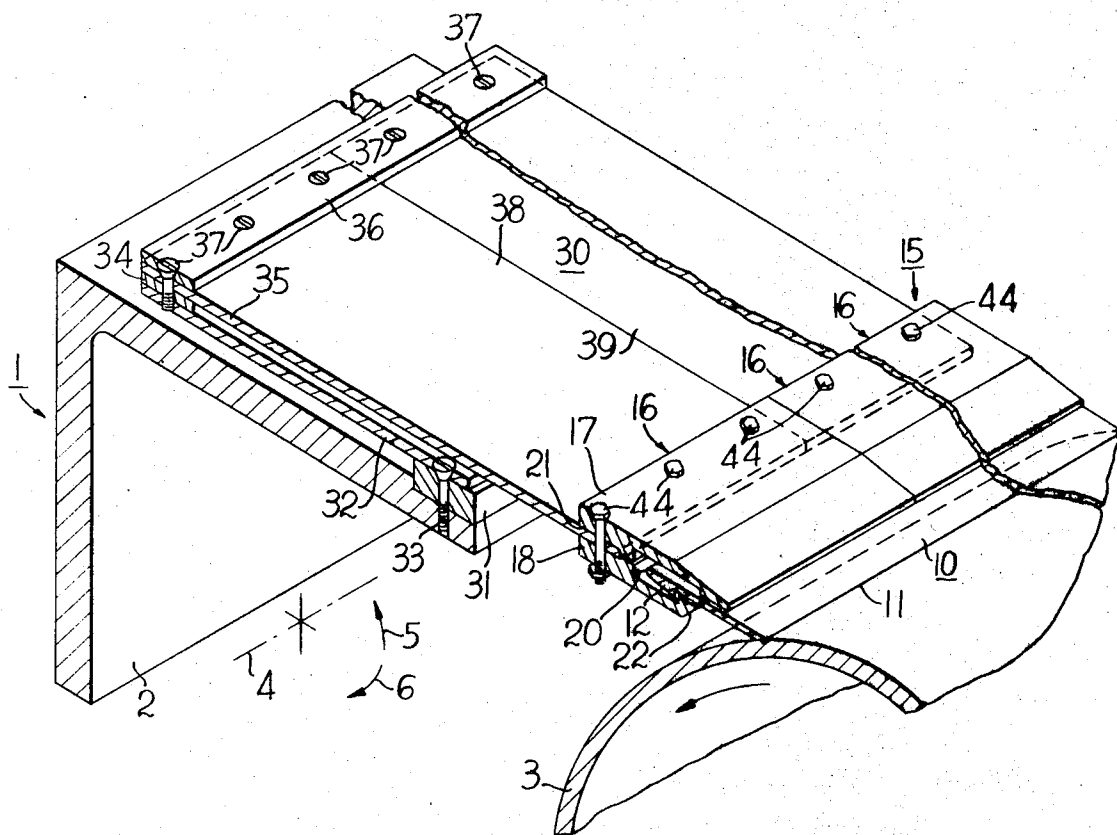
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DOUBLE CANTILEVER SUPPORTED DOCTOR BLADE

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DOUBLE CANTILEVER SUPPORTED DOCTOR BLADE

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2 Claims

ABSTRACT OF THE DISCLOSURE

A doctor is disclosed having a pivotable doctor back parallel to and spaced from a roll of a paper making machine. A blade carried by a blade holder is connected to the back by resilient means comprising a first cantilever connected to the doctor back and projecting away from the roll, and a second cantilever connected to the free end of the first cantilever with the free end of the second cantilever projecting toward the roll. The second cantilever supports on the free end thereof a blade holding assembly to carry the blade. The blade is thus carried by a double cantilevered resilient means for supplementing the resiliency of the blade for contour following engagement of the blade with the roll.

CROSS REFERENCE TO RELATED PATENT APPLICATIONS

I have copending patent applications related to the type of apparatus disclosed herein and entitled "Doctor Assembly" Ser. No. 785,199 and "Doctor Blade Holding Assembly," Ser. No. 785,198 which were both filed concurrently with this application.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates generally to apparatus used in paper making machines and in particular to doctors which are used to scrape pulp and water from breast rolls in Fourdriniers or forming cylinders in cylinder machines, wet broke and water from press rolls, and web crumbs from rolls and drums in web drying assemblies.

Description of the prior art

Arrangements for applying doctor blades to the surfaces of rolls in paper making or calendaring machinery have been disclosed in many prior art patents beginning perhaps with U.S. Pat. 242,753 of 1881. Although U.S. Pat. 2,191,366 of 1940 disclosed a flexible strip doctor blade yieldably held against a roll surface by a resilient blade holder, it remained for my own U.S. Pat. 3,387,317 of 1968 to disclose a roll and a flexible strip doctor blade held in blade holders for endwise insertion and removal along a path parallel to the roll, with resilient rods of substantial length connecting each blade holder to a doctor back, so that the flexibility of the rods supplemented the flexibility of the blade itself to provide improved contour following and uniform pressure characteristics of the blade on the roll surface. As paper making machines have continued to become larger and wider rolls 300 to 400 inches wide are now needed where rolls of much less width were used in the past. Continued innovation in the field of this invention is therefore necessary in order to provide satisfactory doctoring of such wide rolls. The objects of the present invention such as are herein-after set forth are directed to further improvements and advances in the state of the art illustrated by these prior art patents and in particular my own U.S. Pat. 3,387,317.

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SUMMARY OF THE INVENTION

An object of the present invention is to provide a doctor assembly with improved roll contour following and pressurized scraping characteristics.

Another object of the present invention is to provide a doctor assembly with an improved cantilever support for a blade holder and blade, which will eliminate a need for preloading blade holders in order to insert blades and eliminate a need for protective covering structure such as has been required with certain commercially popular prior art structures including my own U.S. Pat. 3,387,317 in order to prevent water or crumbs traveling over the blade holder and landing back on the roll from which such water or crumbs have been removed.

Another object of the present invention is to provide a new and improved doctor assembly in which a doctor back may be arranged in close proximity to a roll but nevertheless provide a flexible support means for a blade holder of greater length than the distance between the doctor back and the roll.

According to a preferred embodiment of the present invention a doctor blade is carried by a blade holder which is in turn connected to a doctor back by resilient means comprising a first cantilever connected to the doctor back and projecting away from the roll, and a second cantilever connected to the free end of the first cantilever with the free end of the second cantilever projecting toward the roll. The second cantilever supports on the free end thereof a blade holding assembly to carry the blade. The blade is thus carried by a double cantilevered resilient means for supplementing the resiliency of the blade for contour following engagement of the blade with the roll.

Other features and objects of the invention that have been attained will appear from more detail description of the invention to follow with reference to an embodiment of the present invention shown in the drawing.

BRIEF DESCRIPTION OF THE DRAWING

The accompanying drawing shows a fragmentary perspective view of a paper making machine roll and doctor assembly according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing a doctor assembly 1 is provided with a doctor back 2 parallel to and spaced from a roll 3 of such as a paper making machine. The back 2 is mounted on means (not shown) to pivot about the axis 4. An actuating means (not shown) is connected to the back to selectively rotate the back clockwise or counterclockwise as indicated by the arrows 5 and 6.

The assembly 1 is provided with a resilient blade 10 extending along the entire width of roll 3 and having a first portion 11 of the blade, i.e., its leading edge engageable with the surface of roll 3. The blade 10 has a second portion 12, i.e., its trailing edge, with a particular cross sectional configuration, in part thicker than the first portion 11 of blade 10, for a purpose that will appear as this description proceeds.

A blade holder assembly 15 is provided with a width corresponding to the width of blade 10. The blade holder assembly 15 comprises a plurality of segments 16 each having an upper jaw 17 and lower jaw 18. The jaws 17 and 18 define a forward facing slot 20 and rearward facing slot 21. The lower jaw 18 is provided with an unturned lip 22 for engaging the thicker part of the trailing portion 12 of blade 10. The blade 10 is inserted into the cavity 20 by sliding the blade in slot 20 along a path of movement parallel to the axis 4. End caps (not shown) may cover the open ends of slot 20 and retain the blade 10 therein while the lip 22 prevents the blade 10 falling out of slot 20 toward roll 3. The lip 22 also limits move-

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ment of the blade 10 relative to the blade holder assembly 15.

Resilient means 30 are provided to connect the doctor back 2 to the blade holder assembly 15. The resilient means 30 may include a strip 31 on the doctor back 2 with a first end of a mounting member 32 connected to the strip 31 and doctor 2 as by screws 33. A second end of mounting member 32 projects as a first cantilever away from the roll 3. The second end of mounting member 35 is arranged to sandwich strip 34 between the second end of member 32 and the first end of member 35. A flat strip 36 is arranged on the side of member 35 opposite to and aligned with strip 34 and screws 37 passing therethrough connect together the second end of mounting member 32 and the first end of connecting member 35 projects from strips 34, 36 in parallel spaced alignment with mounting member 32 as a cantilever toward roll 3. The cantilever members 32, 35 may be of any length desired in order to provide the degree of flexibility and resiliency desired regardless of the spacing between doctor 2 and roll 3 desired or necessitated by other design or construction considerations. The connecting member 35 may extend the entire width of the roll 3 or may be an assembly of abutting segments 38, 39 to provide along with blade assembly 15 and blade 10, a cover over the space between doctor 2 and roll 3.

The second end of member 35, or segments 38, 39 thereof, projecting as a second cantilever and toward roll 3, may be inserted into the rearward facing slot 21 defined in blade holder segments 16 and secured therein by bolts 44. The segments 38, 39 of the connecting member 35 and the segments 16 of the blade holder assembly 15 are arranged relative to each other to provide for adjacent edges of segments 38, 39 being overlapped by a segment 16 of the blade holder assembly 15.

In the assembly and operation of the described apparatus, with the resilient means 30 attached to doctor back 2 and the blade holder segments 16 attached to resilient means 30, the doctor back may be rotated about axis 4 in the direction of arrow 5 to raise the blade holder assembly 15 above roll 3 for convenient insertion or removal of blade 10. A blade 10 can be inserted endwise, that is along a path of motion parallel to the axis 4, into the slot 20 without preloading the blade holder segments 16, as the overlapped and overlapping relationship between the segments 38, 39 and the blade holder segments 16 will maintain at all times the slot 20 in each holder segments 16 in alignment for insertion of a blade 10. With a blade 10 inserted in slot 20, doctor back 2 may be rotated about axis 4 in the direction indicated by arrow 6 until blade 10 contacts the surface of roll 3 with a pressure such as may be selected by the machine operator. With blade 10 making pressure contact with roll 3 the double cantilevered resilient means 30 is free to flex and this resiliency supplements the resiliency of the blades 10 to provide for improved performance in the blade following the contour of roll 3 and applying pressure uniformly thereto across the entire width of roll 3.

From the foregoing detailed description of the present invention, it has been shown how the objects of the inven-

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tion have been attained in a preferred manner. However, modifications and equivalents of the disclosed concepts such as readily occur to those skilled in the art are intended to be included within the scope of this invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A doctor assembly for a roll in a paper making machine, the doctor assembly comprising:

(A) a doctor back adapted for mounting in parallel spaced arrangement to a paper machine roll;

(B) a resilient blade having a first portion along the entire width thereof for engagement with the surface of the roll;

(C) resilient means connecting the blades to the back;

(D) the resilient means comprising a mounting member and a flexible connecting member, the mounting member having a first end connected to the doctor back and a second end projecting as a first cantilever away from the roll;

(E) the flexible connecting member being spaced from and parallel to the mounting member on a side of the mounting member remote from the doctor back, with a first end of the flexible connecting member being connected to the second end of the mounting member and with a second end of the flexible connecting member projecting as a second cantilever and toward said roll;

(F) the second end of the flexible connecting member terminating with an edge in a vertical plane between the first end of the mounting member and the roll, and with the second end and the terminal edge of the flexible connecting member being connected to the blade; and

(G) the flexible connecting member is an assembly of segments arranged with adjacent edges of adjacent segments in abutting relation and normal to a central axis through the roll with the assembly of segments providing a continuous imperforate surface between the second end of the mounting member and the terminal edge of the flexible connecting member of a width corresponding to the width of the roll whereby the flexible connecting member and the blade connected thereto cover the space between the doctor back and the roll and the blade is carried by a double cantilever resilient means for supplementing the resiliency of the blade for contour following engagement of the blade with the roll.

2. An apparatus according to claim 1 in which the segments are bonded together along the abutting edges to provide an integral assembly of segments forming the flexible connecting member of a total width corresponding to the width of the roll.

References Cited

UNITED STATES PATENTS

2,191,366 2/1940 Buccicone et al. 15—256.51

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