

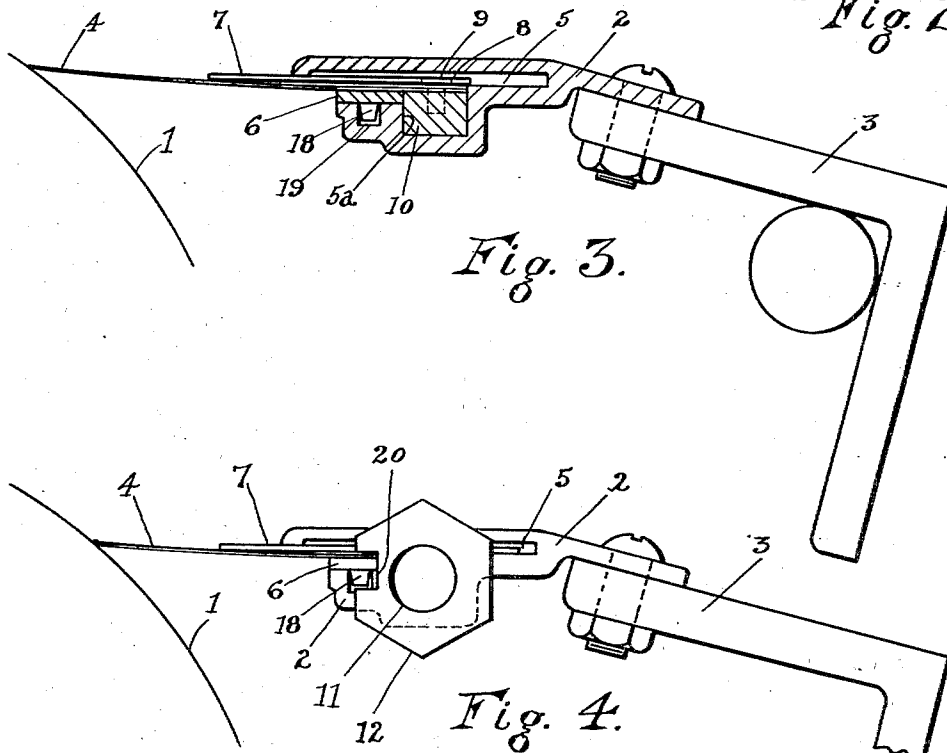
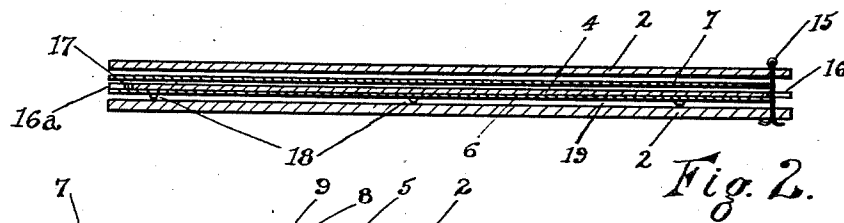
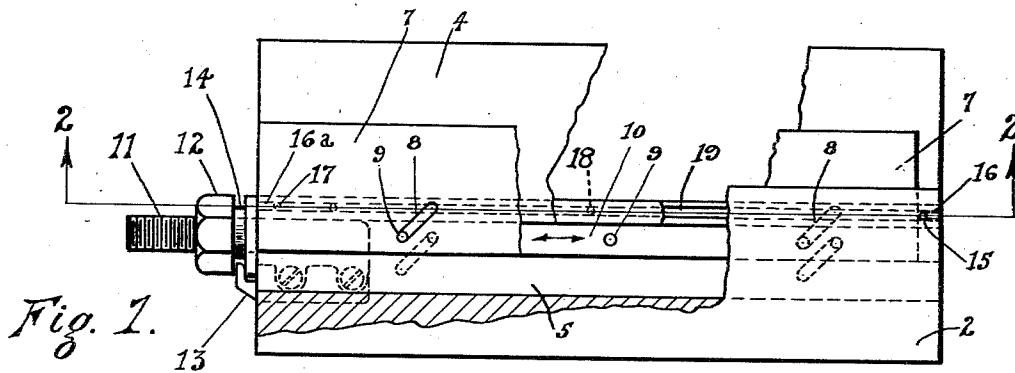
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DOCTOR MECHANISM FOR ROLLS AND CYLINDERS

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DOCTOR MECHANISM FOR ROLLS AND CYLINDERS

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4 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 calendar rolls, dryer cylinders and the like for the purpose of cleaning the surfaces of such rolls and cylinders.

In my Patent No. 1,892,214 issued December 27, 1932 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 relatively stiff holder. In operation, the holder is adapted to apply pressure between the edges of the blade in a direction opposite to the reactions set up along the edges of the blade by the surface which is being doctored and a portion of the holder, and the mechanism also provides means for feeding the doctor blade bodily, in order to compensate for wear of the blade.

While the doctor mechanism covered by my aforementioned patent is entirely satisfactory in operation, the object of the present invention is to provide certain improvements in the above described patented construction as regards the manner of supporting and applying pressure to the blade, as well as for compensating for wear of the same in use. 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 the doctor mechanism, with certain parts broken away to show the construction more clearly.

Fig. 2 is a vertical section along the line 2—2 of Fig. 1, looking in the direction of the arrows.

Fig. 3 is a view in vertical section on an enlarged scale, showing the improved doctor cooperating with a portion of a roll surface.

Fig. 4 is a view in end elevation of the parts shown in Fig. 1, on the same scale as Fig. 3, and illustrating the manner of compensating for wear of the blade.

Like reference characters refer to like parts in the different figures.

Referring to the drawing, a portion of the surface of a roll or cylinder is indicated at 1 and a holder 2 is carried by an arm 3 pivotally mounted with respect to the roll 1. Thus the holder 2 tends to swing about the axis of the arm 3 to bring a doctor blade 4 of thin flexible material into engagement with the rotating surface of roll 1. The blade 4 is made of any suitable thin flexible material such as steel, brass or bakelite, and is partially received in a slot 5 extending

longitudinally of the holder 2. The rear edge portion of the blade 4 rests on a filler plate 6 seated on the upper surface of the slot 5, and a pressure plate 7 cooperates with the filler plate 6 in retaining the blade in the holder 2 and in applying pressure thereto.

The pressure plate 7 fills the upper portion of the holder slot 5 and extends beyond the edge of the holder 2 to engage the blade 4 substantially midway between its edges. The filler plate 6 is of such thickness that the rear portion of the blade 4 is free to move to a limited extent between opposed surfaces of the plates 6 and 7, while the thickness of the pressure plate 7 is such that it is relatively stiff, as compared to the doctor blade 4. Consequently, when pressure is applied to the blade 4 by the plate 7 through the holder 2 as a result of a turning force exerted on the arm 3 about its pivotal axis, the blade 4 yields between its edges, as indicated to some extent in Fig. 3. This yielding of the blade in response to pressure applied by the plate 7 in a direction opposite to the reactions set up along the scraping edge of the blade and its rear portion, as freely supported within the slot 5, results in a most effective application of the blade to the surface being doctored. In fact, the blade 4 is practically self-aligning, due to the fact that the entire surface of the blade is substantially unconfined, except along its edges and the zone of pressure as applied by the plate 7, so that the resulting flexure of the blade 4, between its edges, causes its scraping edge to closely engage and adapt itself to any irregularities of the surface being doctored.

Since wear of the scraping edge of the blade 4 in doctoring results in a decrease in the distance between the scraping edge and the free end of the pressure plate 7, the invention contemplates adjustment of the position of the pressure plate 7 to compensate for such wear, without disturbing the blade 4. To this end, the plate 7 provides a number of slots 8 therein, which as shown in Fig. 1, are inclined with respect to the longitudinal axis of the plate 7. A series of pins 9 mounted on a bar 10 are freely received in the slots 8 and the bar 10 is slidable in an undercut portion 5a of the holder slot 5 which extends parallel to the plate 7. A portion of the bar 10 extending beyond the holder 2 is rounded and provides threads 11 cooperating with a nut 12. The nut 12 abuts the end of the holder 2 and is held against movement on the rod 10 by a finger 13 secured to the underside of the holder 2 and projecting into a groove 14 on the nut 12. Since

the nut 12 is thus held against movement on the bar 10, obviously turning of the nut 12 on the thread 11 will impart longitudinal movement to the bar 10 in accordance with the direction of turning of the nut 12.

5 Movement of the bar 10 causes relative movement of the pins in the slots 8 and since the bar 10 is constrained to move in a straight line within the slot portion 5a, the pins 9 are adapted to impart bodily movement to the pressure plate 10 7 transversely to the bar 10, owing to the angularity of the slots 8. Thus, turning of the nut 12 is adapted to shift the pressure plate 7 back and forth on the holder 2 to control the distance between the scraping edge of the blade 4 and the 15 line of engagement of the end of the plate 7 with the blade 4.

When the blade 4 is new, that is to say, when it is of maximum width, the pressure plate 7 is initially set in the position shown in Fig. 3, in which the pins 9 are located at the ends of the slots 8 nearest the bar 10, with the free end of the plate 7 substantially midway between the edges of the doctor blade 4. Then as the blade 4 wears as a result of its engagement with the surface being doctored, the nut 12 is turned from time to time in a direction to shift the bar 10 axially away from the nut 12. Since the pins 9 on the bar 10 are constrained to move in a straight line, the shifting of the pins to the dotted line position at the left of Fig. 1 causes the plate 7 to be drawn into the holder 2, the slots 8 then occupying the dotted line position. In operation, adjustments of the plate 7 are such as to maintain the free end of the pressure plate 7 substantially midway between the edges of the doctor blade 4. That is to say, for each increment of wear on the edge of the blade 4, the pressure plate 7 is drawn into the holder 2 a distance equal to substantially one-half the increment of wear. In this way, the original condition of the blade 4 as regards the application of pressure thereto is substantially maintained throughout the life of the blade, it being obvious that by the time the pressure plate 7 has been drawn within the holder to the extent 45 shown in Fig. 4, the blade has been worn to the point where it is no longer serviceable and must be replaced.

The withdrawal of a worn-out doctor blade from the holder 2 and its replacement by a new blade is readily accomplished, due to the simple manner of maintaining the blade 4 within the holder 2. As previously pointed out, the inner edge portion of the blade 4 is loose within the slot 5 of the holder 2, and in order to prevent movement of the blade 4 within the holder, a cotter pin 15 extends through the holder 2 near one end thereof, with the pin 15 received in a notch 16 provided on one edge of the blade 4. The pin 15, however, does not pass through the pressure plate 7 which terminates short of the pin 15, so that it is free to move back and forth in the manner previously described. The plate 7, however, is held against longitudinal movement with the bar 10 by the pin 15 and the nut 12. The opposite edge of the blade 4 provides a similarly located notch 16a, in which is received a pin 17 extending upwardly from the surface of the filler plate 6. The filler plate 6 also provides along its lower edge a number of lugs 18 freely received in a groove 19 extending along the bottom of the slot 5, so that the filler plate 6 cannot shift laterally of the slot 5. Furthermore, since the filler plate 6 is held against longitudinal movement in the slot 5 by the nut 12, it follows that

the cotter pin 15 and the filler plate pin 17 seated in the notches 16 and 16a of the doctor blade effectively serve to maintain the blade against withdrawal from the holder 2.

When it is desired to withdraw a worn doctor blade 4 from the holder 2, the nut 12 is turned to bring a radial slot 20 in one side thereof into register with the filler plate 6 and blade 4, as shown in Fig. 4, whereupon the filler plate and blade may be withdrawn endwise to a point where the plate notch 16 is free of cotter pin 15. Then by flexing the blade 4 free of the pin 17 on the plate 6, the withdrawal of a worn blade can be accomplished without disturbing the setting of the doctor mechanism with reference to the roll or cylinder being doctored. Replacement of a worn blade by a new blade is readily accomplished, with the slot 20 in the same position, the thickness of the filler plate 6 being determined by the thickness of doctor blade to be used, so that there will be just enough play of that portion of the plate in the slot 5 to permit proper flexure of the blade when pressure is applied.

From the foregoing, it is apparent that by the present invention there is provided an improved doctor mechanism characterized by the mounting of a doctor blade in such a manner that its scraping edge will adjust itself to the surface being doctored, with provision for compensating for wear of the blade so that the pressure is always applied thereto at the proper place.

I claim,

1. In a device of the class described, a thin flexible blade providing a straight scraping edge, a holder for pivotally supporting said blade with said edge parallel to the axis of a rotating surface with which the edge engages, a member of greater stiffness than said blade carried by said holder for engaging the surface of said blade intermediate its edges, and means for shifting said blade engaging member within the holder at right angles to the edges of said blade to vary its zone of engagement with said blade.

2. A doctor for rolls and cylinders, comprising a pivotally mounted holder providing a slot therein, a thin flexible blade having one edge portion received within said slot, a plate of greater thickness than said blade overlying said blade and extending beyond said slot, with one edge of said plate bearing on said blade intermediate its edges and means carried by the holder for shifting said plate bodily transversely to the longitudinal axis of said blade.

3. A doctor for rolls and cylinders, comprising a pivotally mounted holder providing a slot therein, a thin flexible blade having one edge portion received within said slot, a plate of greater thickness than said blade overlying said blade in the slot, with one edge of said plate bearing on said blade intermediate its edges a bar movable within said slot adjacent and parallel to the other edge of the plate, and means for converting longitudinal movement of said bar into movement of said plate at right angles to the edge of said blade.

4. A doctor for rolls and cylinders, comprising a pivotally mounted holder providing a slot, a blade having one edge portion thereof freely received in said slot, with the ends of said blade providing aligned notches, a filler plate underlying said blade in said slot, and means carried by said holder and by said filler plate, respectively, and cooperating with said blade notches for retaining said blade in said slot.

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