

June 23, 1942.

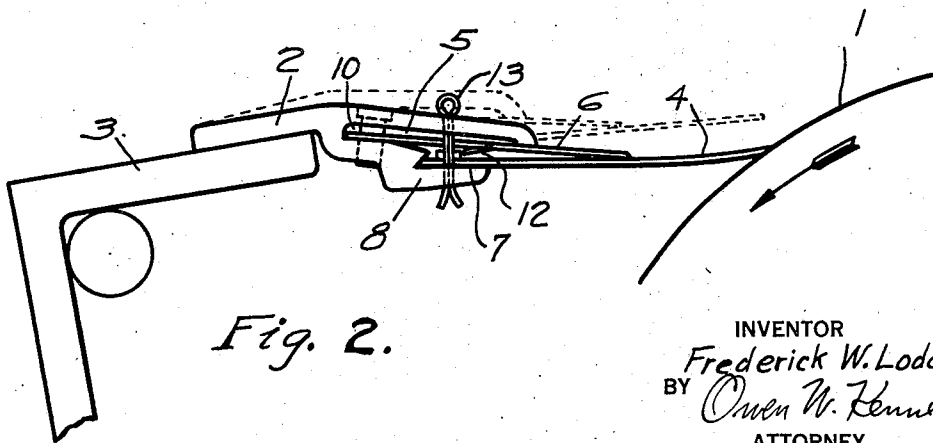
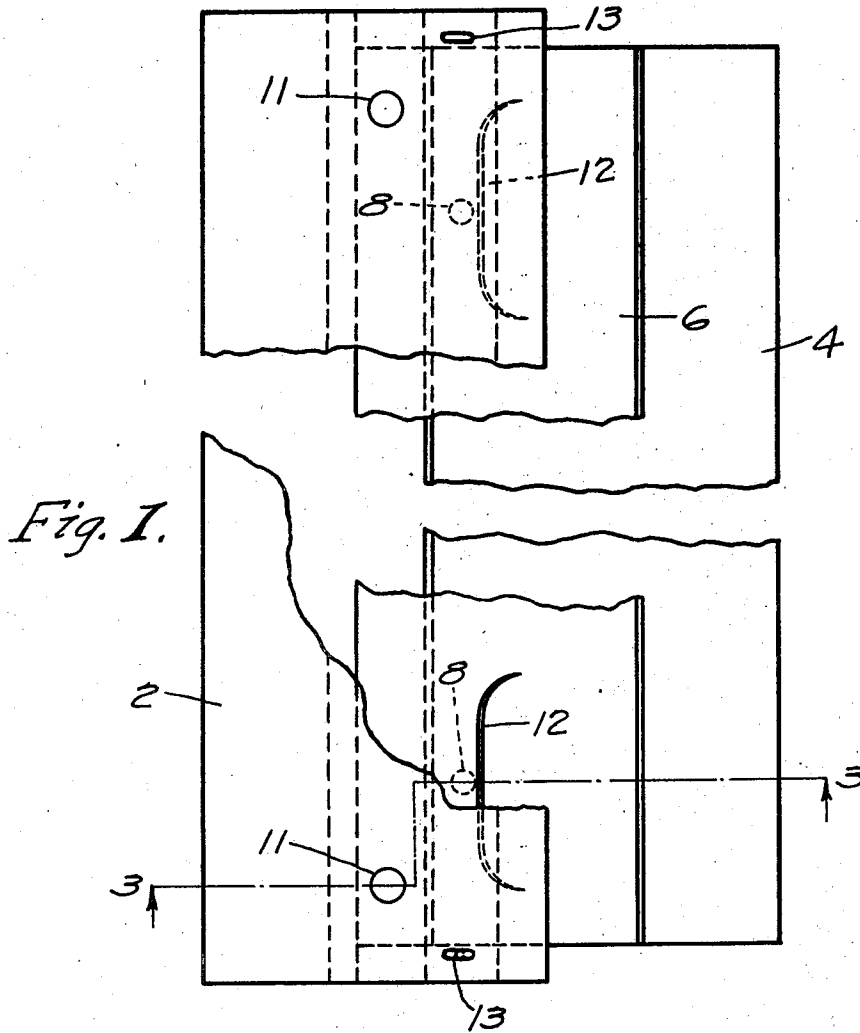
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DOCTOR MECHANISM FOR ROLLS AND CYLINDERS

Filed Nov. 8, 1938

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

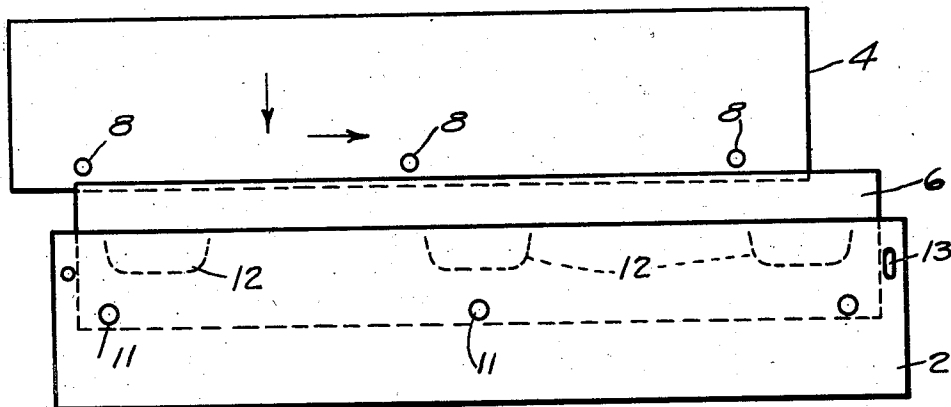


Fig. 5.

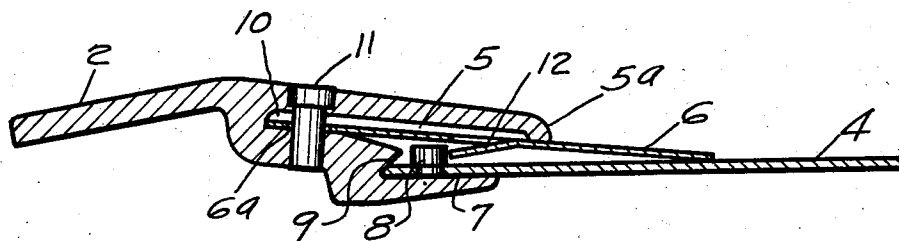


Fig. 3.

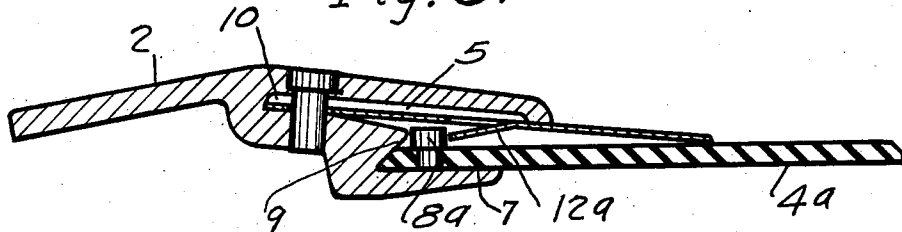


Fig. 4.

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DOCTOR MECHANISM FOR ROLLS AND CYLINDERS

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3 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 calender rolls, drier cylinders and the like, for the purpose of cleaning the surfaces of such rolls and cylinders.

In my patent, No. 2,117,032, issued May 10, 1938, 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 pivoted holder, with a pressure applying member engaging the surface of the blade intermediate its edges. In operation, the holder is adapted to apply pressure between the edges of the blade, through the pressure plate, with the blade being practically self aligning, due to the fact that its entire surface is substantially unconfined except along its edges, and along the zone of pressure as applied by the plate.

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 retaining the doctor blade in its holder, so as to permit ready withdrawal thereof for the purposes of replacement. A further advantage inherent in the present construction is that while the doctor blade is freely supported between its edges, the angle of the blade with its holder, will not change when the blade is lifted from the surface being doctored.

The above and other advantageous features of the invention will hereinafter more fully appear from the following description, with reference to the accompanying drawings, 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 view in end elevation of the mechanism of Fig. 1, and showing the blade cooperating with a portion of a roll surface.

Fig. 3 is a vertical sectional view, on an enlarged scale, along the line 3-3 of Fig. 1.

Fig. 4 is a sectional view similar to Fig. 3, showing a different type of blade mounted in the holder.

Fig. 5 is a plan view, illustrating the manner in which the blade is withdrawn from the holder.

Referring to the drawings, 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. Thus, the holder 2 is turnable about the pivotal axis of the arm 3 to bring a doctor blade 4 of thin flexible

material into engagement with the rotating surface of the roll 1. The blade 4 is made of any suitable thin flexible material, such as steel or brass, as indicated in Fig. 3, or the blade may be formed of a suitable synthetic composition, such as Bakelite, as indicated in Fig. 4. The blade 4 is partially received in a slot 5 extending longitudinally of the holder 2, and a pressure plate 6 cooperates with the blade 4 in retaining it in the holder slot 5, as well as in applying pressure thereto.

As best shown in Fig. 3, the holder slot 5 provides a flat seat 7, along its under side for receiving a marginal portion of the blade 4 that provides a series of positioning lugs 8 facing into the slot 5. The slot 5 also provides an inclined surface 9 overhanging the seat 7, beyond which the slot provides a contracted portion 10 of sufficient width to freely receive the pressure applying plate 6. The inner edge of the pressure plate 6 is secured within the slot portion 10 by pins 11, which pass freely through openings 6a in the plate. The pins 11 thus serve to hold the plate 6 within the slot, although permitting a certain amount of play of the plate between opposed walls of the slot.

The plate 6 extends beyond a lip 5a, formed at the upper edge of the slot 5, and the outer edge of the plate bears on the blade 4 substantially midway between its edges. Since the slot portion 10 is offset from the seat 7, the plate 6 makes an appreciable angle with the blade 4, and the plate 6 is spaced above that portion of the blade 4 carrying the lugs 8. For the purpose of holding the blade 4 in position, the plate 6 provides punched-out tongues 12 extending downwardly above the blade 4 so as to just clear the blade lugs 8, endwise movement of the blade being prevented by cotter pins 13 at the ends of the holder 2.

As best shown in Fig. 5, the tongues 12 correspond in number to the number of lugs 8, and each tongue 12 has a length several times the width of a lug 8. Therefore, when it is desired to remove a blade 4 from its holder 2, it is only necessary to remove one cotter pin 13 and then shift the blade 4 endwise within the holder a distance equal to substantially one half the length of a tongue 12 on the plate 6. The whole blade 4 may then be withdrawn from the holder 2 by moving it at right angles to the axis of the roll 1, it being noted that the thickness of a lug 8 is less than the distance between the plate 6 and the edge of the blade seat 7.

When inserting a new doctor blade 4 in place

of a worn out blade, it is only necessary to offset the blade slightly with respect to the ends of the holder 2, as indicated in Fig. 5, so that the lugs 8 will clear the fingers 12 as the blade is pushed into the slot 5. When the inner edge of the blade 4 engages the inclined surface 9, it is only necessary to shift the blade longitudinally of the slot until its end engages the cotter pin 13 that has been left in the holder 2. This insures registration of the lugs 8 with the fingers 12, after which the blade is completely locked in position by reinserting the cotter pin 13 that has been previously removed. Obviously, the above described operations of removing or inserting a doctor blade 4, can be performed readily without shifting holder 2 from its pivotal support, and in locations which would not permit endwise insertion of the blade.

When pressure is applied to the blade 4 by the plate 6, 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. 2. This yielding of the blade in response to pressure applied by the plate 6 in a direction opposite to the reactions set up along the edges of the blade, results in a most effective application of the blade to the surface being doctored. In fact, the blade is practically self alining, since the entire upper surface of the blade is substantially unconfined, except along its edges and zone of pressure, as applied by the plate 6.

Should the holder be turned to lift the blade 4 away from the surface of the roll 1, as indicated in dotted lines in Fig. 2, the angle of the blade with respect to the slot 5, remains substantially unchanged, due to the fact that the surface 9 overhangs the blade seat 7. Therefore, the blade when freed from the roll, will not tend to sag, as would occur if it were not for the inclination of the surface 9. As a result, when the blade 4 is reapplied to the surface being doctored, it will engage this surface at the same angle as before, which angle is always chosen as best suited for the purposes of doctoring the rotating surface. The maintenance of the original angle when the blade is reapplied is of importance when doctoring rolls or cylinders covered with a yieldable material, such as rubber, for should the angle of the blade change materially, its edge would dig into the roll covering, when again engaging the rotating surface.

Referring now to Fig. 4, the doctor blade 4 is shown as being composed of a composition, such as Bakelite, so that the blade 4a is considerably thicker than the metallic blade 4. However, the same holder 2 is adapted to receive the thicker blade 4a, due to the fact that the slot 5 is sufficiently wide to permit the plate 6 to engage the blade 4a at a somewhat lower angle than as shown in Fig. 3. It is also to be noted in Fig. 4 that the lugs 8a do not project from the surface of the blade as much as the lugs 8, and that the plate fingers 12a have a somewhat less inclination than in Fig. 3.

From the foregoing, it is apparent that by the present invention there is provided an improved doctor mechanism for rolls and cylinders, characterized by the provision of means for retaining the doctor blade in its holder, so as to permit ready withdrawal thereof for purposes of replacement, with the relation between the parts being such as to insure that the angle of the blade with

its holder, will not change when the blade is lifted from the surface being doctored.

I claim:

1. A doctor for rolls and cylinders comprising a pivotally mounted holder having a slot therein, a thin flexible blade having one edge thereof seated within said slot and providing a projection near said edge extending upwardly from the free surface of the blade and of less thickness than the entrance to said slot, a pressure plate overlying said blade within said slot, means for holding said pressure plate within said slot, with an edge of said plate extending beyond said slot to bear on said blade and providing a projection, intermediate its edges and extending downwardly towards said blade, for engaging said blade projection within said slot to prevent removal of said blade from the slot in the direction of the blade width, shifting of said blade lengthwise of the slot serving to disengage said projections and thereby permit removal of the blade from the holder by passage of said blade projection through the slot entrance.

2. A doctor for rolls and cylinders comprising a pivotally mounted holder having a slot therein, a thin flexible blade having one edge thereof seated within said slot and providing a projection near said edge extending upwardly from the free surface of the blade and of less thickness than the entrance to said slot, a pressure plate overlying said blade within said slot, means for holding said pressure plate within said slot, with an edge of said plate extending beyond said slot to bear on said blade at an angle thereto, and providing a projection extending downwardly toward said blade and of greater width than said blade projection but of less length than said slot for engaging said blade projection within the angle between said blade and plate, to prevent removal of said blade from the slot in the direction of the blade width, shifting of said blade lengthwise of the slot for a distance less than the width of the plate projection serving to disengage said projections and thereby permit removal of the blade from the holder by passage of said blade projection through the slot entrance.

3. A doctor for rolls and cylinders comprising a pivotally mounted holder providing a slot with offset seats, a thin flexible blade having one edge portion engaging one slot seat of said holder and providing a projection extending upwardly into the space between said seats, with said projection being of less thickness than the entrance to said slot, a plate overlying said blade within the slot, means for holding said plate within said slot with one edge bearing on the second slot seat and its other edge bearing on said blade at an angle thereto, with a portion of said plate intermediate its edges being deflected downwardly into the angle between said plate and blade for a distance greater than the width of said blade projection, engagement between said deflected plate portion and blade projection serving to prevent movement of said blade in said slot in a direction at right angles to the pivotal axis of said holder, while permitting its endwise shifting in said holder to disengage its projection from said plate, preparatory to withdrawal of the blade, by passage of its projection through said slot entrance.

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