Sept. 5, 1939. R. W. MONCRIEFF ET AL 2,171,631

DEVICE FOR CLEANING ROTATING CYLINDERS

Filed June 23, 1936

FIG. 1

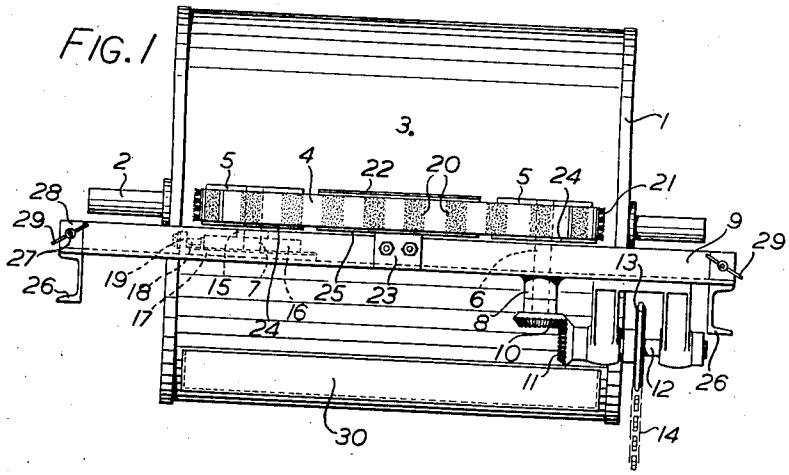


FIG. 2

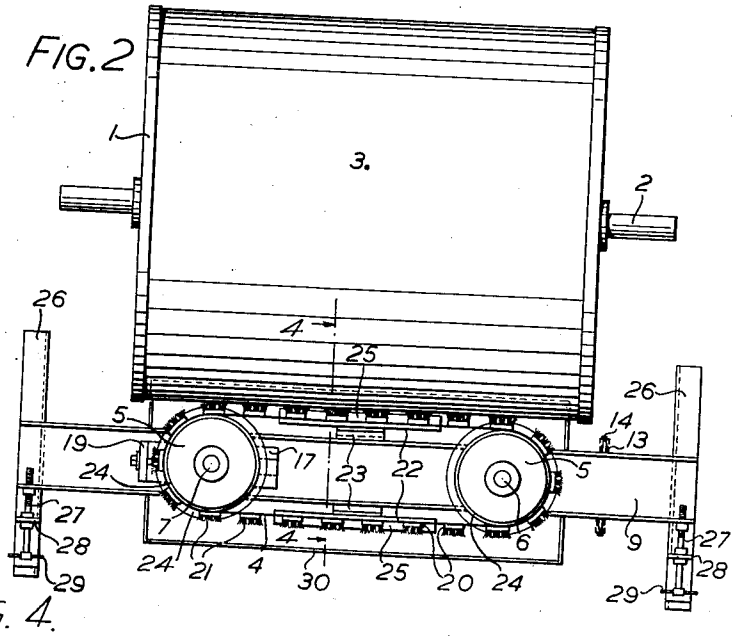


FIG. 4.

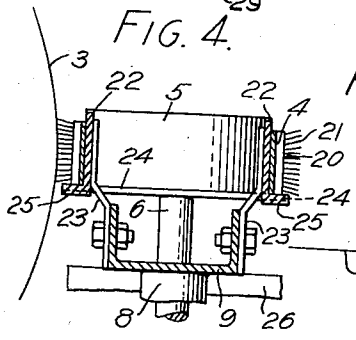
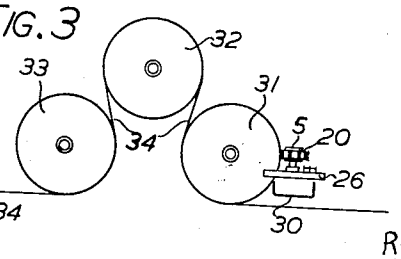


FIG. 3



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DEVICE FOR CLEANING ROTATING CYLINDERS

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1 Claim. (Cl. 15—21)

This invention relates to the cleaning of rotating cylinders, especially cylinders used in textile operations such as the drying of yarns after they have been submitted while travelling to the action of a treating liquid.

For example, a common method of drying yarns comprises causing the yarns to run over and in contact with large drying drums which are internally heated with steam, hot air or other heating medium. The drums, however, are apt to be contaminated with solid materials from the liquids carried by the yarns, and as the drum rotates these solid materials are brought into contact with fresh portions of the yarn coming to the drum and may exert a detrimental influence on them. It is an object of the present invention to provide means for cleaning the drying cylinder as it rotates in order to overcome this disadvantage.

According to the present invention a rotating cylinder such as a drying cylinder is cleaned by means of a number of brushes carried upon an endless belt and contacting over a run of said belt with the cylinder, the belt running from end to end of the cylinder so that between the brushes and the cylinder there is a relative motion that has a component parallel to the axis of the cylinder as well as a circumferential component due to the rotation of the cylinder. Yarns contacting with the cylinder do not pass completely round the cylinder although they may contact with it along a large part of its periphery. The brushes act on the cylinder at a part of its periphery between the point where the yarns leave the cylinder and the point where the fresh yarns meet it.

By way of example, a form of apparatus according to the invention will now be described in greater detail with reference to the accompanying drawing, in which:

Fig. 1 is a front elevation of a drying cylinder provided with cleaning means according to the invention;

Fig. 2 is a plan view of the drying cylinder shown in Fig. 1;

Fig. 3 is a diagrammatic side elevation of the complete drying machine of which the cylinder shown in Figs. 1 and 2 forms a part; and

Fig. 4 is a cross-sectional view taken on line 4—4 of Figure 2.

The drying cylinder 1 rotates about a horizontal axis 2. The cleaning device according to the present invention acts upon the surface 3 of the cylinder 1 and comprises an endless leather belt 4 mounted upon two pulleys 5 near the ends of the cylinder 1. The pulleys are mounted upon two shafts 6, 7, mounted upon a transverse channel member 9. The shaft 6 is carried in a bearing 8 on the channel member 9 and carries a bevel wheel 10 engaging with a bevel wheel 11 mounted upon a shaft 12, the shaft 12 being driven by means of a sprocket 13 and chain 14 from the main drive of the drying machine. The shaft 7 is mounted in a bearing 15 carried on a block 16 sliding in a track-way 17 in the channel 9. A screw 18 passing through a block 19 secured to the track-way 17 is provided to adjust the position of the block 16 along the track-way and so adjust the tightness of the belt 4.

Mounted on the belt 4 are a number of small brushes 20 disposed at regular intervals, the bristles 21 of the brushes making a firm contact with the cylinder surface 3 along one run of the belt 4. The brushes 20 are held firmly against the surface 3 by means of a backing member 22, one of which is provided on each run of the belt, being mounted on a bracket 23 on the channel 9. The pulleys 5 are provided at their lower edges with flanges 24 in order to retain the belt and the base of each of the backing members 22 terminates in a flange or fender 25 in order to prevent sag in the belt, this being important along the working run nearest the cylinder 1. The flanges 24 and fenders 25, while they support the belt along its whole length, and prevent sag, do not impede the removal of the belt when the bristles on the brushes are worn right down, and it is desired to replace the belt with a new one.

In order to allow for wear in the bristles, the channel 9 is slidably mounted upon two members 26 forming part of the machine frame, and is held in position by means of screws 27 mounted in bearings 28 secured to the members 26. The screws 27 may be rotated by their heads 29 in order to adjust the position of the channel 9 along the length of the members 26. In this manner, fine adjustment can be made in the distance between the brushes 20 and the surface 3 of the cylinder 1 so as to allow for wear in the bristles 21 of the brushes 20. Beneath the belt 4 and brushes 20 is provided a tray 30 to receive any deposit brushed off the surface of the drum or dropping from the bristles 21 of the brushes, so that such deposit does not fall on to the yarns.

The general arrangement of a drying apparatus according to the invention is shown in Fig. 3 in which three drums 31, 32, 33 are shown, the yarns 34 being dried passing in warp form under the drum 31, over the drum 32 and under the drum 33. It is generally sufficient that one only

of the drying drums in a machine of this kind should be provided with cleaning means according to the invention, as is shown in Fig. 3, wherein only the first drum 31 is provided with cleaning means, but more may be so provided if desired.

The device according to the invention is effective in removing contamination on the surface of the cylinder, and the effect of wear on the surface of the cylinder is negligible. At the same time the flexibility of the bristles of the brush readily allow for any slight irregularity in the surface of the cylinder so that every portion thereof is cleaned. On account of the axial motion of the brushes in relation to the drying cylinder the effect of friction in retarding the rotation of the drum is small, the frictional force being directed largely in an axial direction and having only a small circumferential component.

The invention is of particular advantage in connection with the saponification of artificial yarns containing cellulose acetate or other cellulose ester. The invention is especially useful when saponification is effected intermittently along the length of the yarn. In this case any contamination of the cylinder by a saponified portion of the yarn would be apt on the next revolution of the cylinder to come in contact with an unsaponified portion of the yarn and destroy the predetermined design of the intermittent effect. Saponification may be effected by treating the yarns, intermittently if desired, with an aqueous or alcoholic solution of caustic soda or other saponifying agent. Examples of cellulose esters which may be saponified in this manner are the cellulose acetate referred to above and cellulose formate, propionate and butyrate.

While the invention is of especial importance in connection with the saponifying of cellulose ester yarns it may also be employed in connection with other liquid treatments, especially intermittent treatment, such as dyeing, mordanting, sizing and the like.

Having described our invention what we desire to secure by Letters Patent is:

In a drying machine for warps or like materials, the combination with a rotating cylinder in contact with which the warps pass during the drying operation in such a manner that the warps leave the drying cylinder at the bottom of the same, of an endless belt having a run which is close to the surface of said cylinder and is parallel to and at substantially the same height as the axis of said cylinder, a number of cleaning brushes carried along the length of said belt and adapted to contact, over the said run, with the surface of said cylinder so that material cleaned from said surface of said cylinder falls directly away from both said surface and said brushes, means disposed beneath said brushes and above the warps leaving the cylinder and adapted to receive said material, and means for driving said belt and said cylinder with a relative motion between them that has a component parallel to the axis of the cylinder as well as a circumferential component due to the rotation of said cylinder.

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