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DRIER ROLL CLEANING MEANS

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FIG. 1.

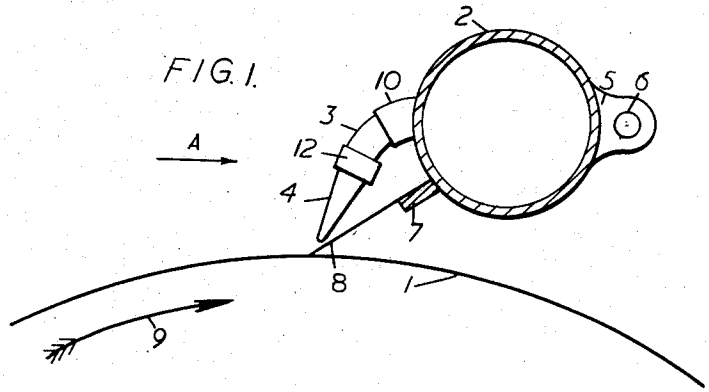


FIG. 2.

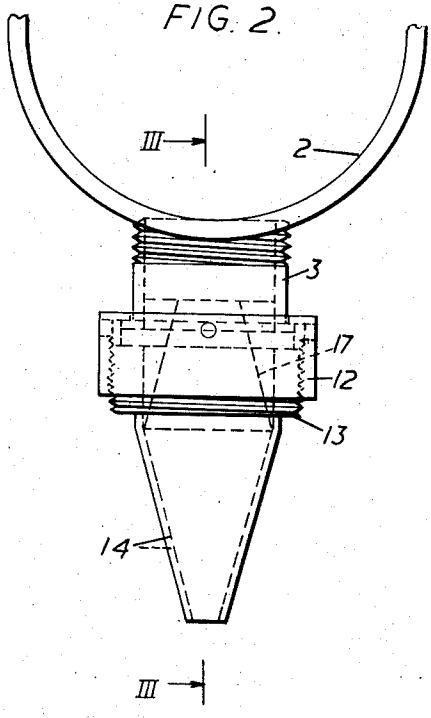
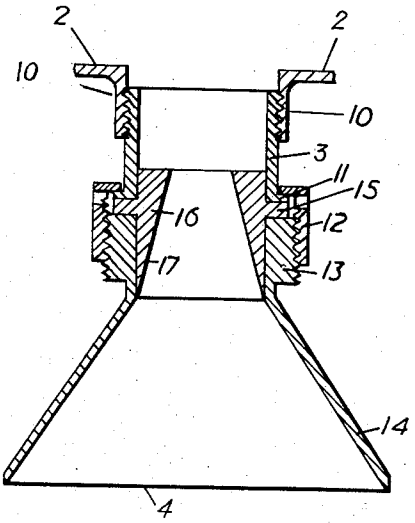


FIG. 3.



Inventor

ROBERT G. SANDS

By Inviss & Smiley

Attorneys

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FIG. 4.

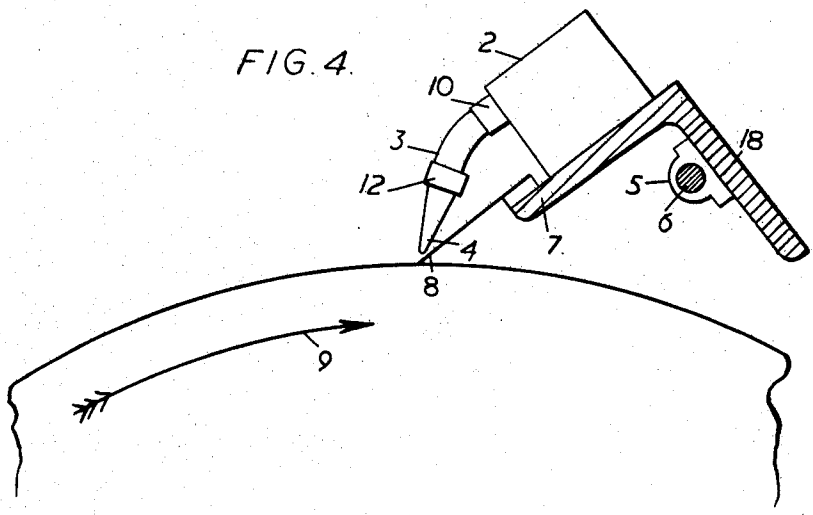
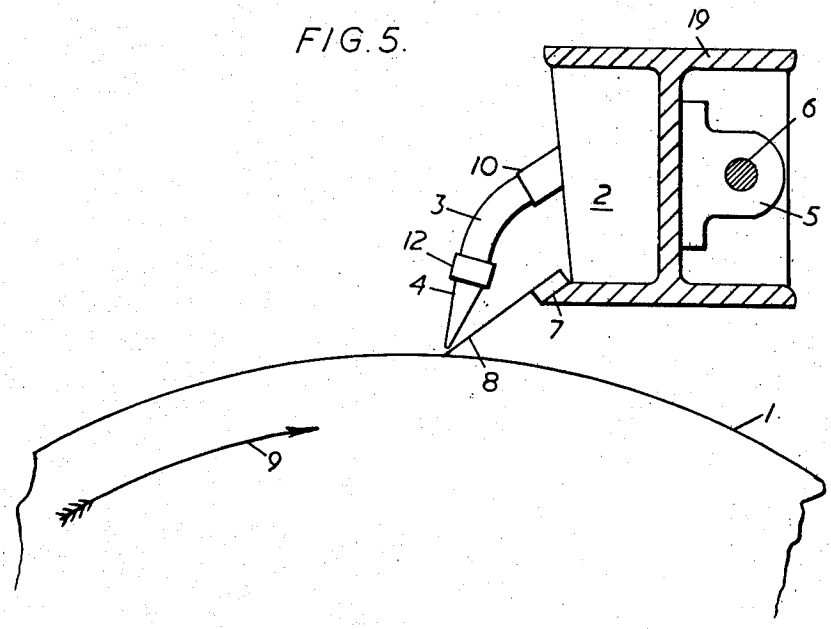


FIG. 5.



Inventor

ROBERT G. SANDS

By Smirie & Smiley

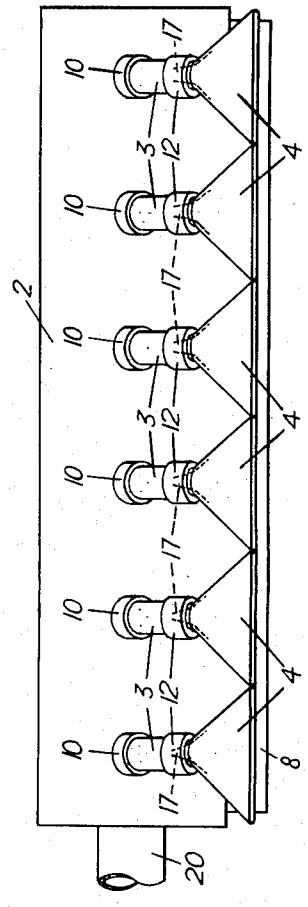
Attorneys

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Fig. 6.



Inventor
ROBERT G. SANDS

By Fairie and Smiley
Attorneys

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DRIER ROLL CLEANING MEANS

Robert George Sands, Orpington, England, assignor to Carrier-Ross Engineering Company Limited, London, England, a corporation of Great Britain

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1 Claim. (Cl. 15—308)

This invention relates to drier rolls. In the drying of materials in continuous web form by direct contact with drier roll, foreign matter tends to adhere to and build up on the roll surface and form a coating or scale which tends to reduce the drying effect or render it non-uniform.

In connection with heated drying rolls it has been proposed to avoid non-uniform drying and to maintain the intended drying effect prescribed for the roll by applying to the roll surface a doctor blade which, as the roll rotates, scrapes off the debris and by this cleaning action tends to produce uniform drying during the drying cycle. The main object of the present invention is to collect the debris as it is formed, thereby maintaining the material in web form being treated on the roll, free of contamination by the debris and at the same time maintain a general cleanliness for the drying machine.

Accordingly, the present invention comprises the combination of exhausting means, which are adjustable with respect to the roll surface for concentrating a sucking force on a zone on the roll parallel to the generatrices of the roll and extending over the length thereof, and means for mechanically detaching dried debris from the roll, as the roll rotates, operatively associated with the exhausting means whereby the roll may be continually cleaned by collecting the debris as it is detached from the roll.

The combination of exhausting means for a drier roll and mechanical means for detaching dried debris from the roll according to the present invention is preferably characterised in that the sucking force is applied through a series of interchangeable nozzles of varying cross-section mounted on a suction duct, forming part of an exhausting system, whereby on selecting suitable nozzles a uniform sucking force is applied along the zone of the roll from which detached debris is collected by the exhausting system. From this aspect the invention comprehends a suction duct incorporated in a mount for a doctor blade, which latter constitutes the mechanical means for detaching the debris, so that the blade and nozzles are movable as an entity with respect to the roll surface.

In order that the invention may be more clearly understood, several embodiments thereof will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which:

FIGURE 1 shows in elevation a doctor blade, mounted to scrape the roll surface at the top of the roll and an exhaust nozzle operatively associated in accordance with the present invention,

FIGURE 2 shows in elevation and to an enlarged scale, a preferred form of connecting nozzle to the suction duct,

FIGURE 3 is a sectional elevation thereof on the line III—II of FGURE 2, showing clearly the manner of providing an interchangeable ferrule,

FGURES 4 and 5 are views similar to FIGURE 1 showing modified means of forming a mounting of the suction duct for the nozzles, and

FIGURE 6 is a view in the direction of arrow A in FIGURE 1 indicating the grauated taper of ferrules for the nozzles.

In the drawings like reference numerals designate the same or similar parts.

Referring to the drawings, FIGURE 1 illustrates the crest portion of a roll 1 over which, and carried in suitable brackets (not shown) on each side of the roll, is a suction duct 2, the axis of which is parallel to the axis of the roll. The suction duct 2 is provided with a linear series of throats 3, FIGURE 6, to each of which is attached, as hereinafter described, nozzle 4, the duct 2 being connected to an exhausting system by a connection duct 20, and the mouths of the nozzles 4 being disposed in relation to the surface of the roll 1 along the roll, such that the exhaust system produces at the nozzles the desired suction force over a zone running lengthwise of the roll, that is, parallel to the generatrices of the roll, and extending for the length of the roll.

The duct 2 has a lug 5 at each end thereof and is supported by spindles 6 which are carried in suitable bearings (not shown) on each side of the roll and which engage in the lugs 5. The duct 2 also acts as a doctor back or support and to this end includes a doctor base bar 7 on which a doctor blade 8 is mounted.

The duct 2 and doctor blade 8 can, therefore, be swung away from the roll 1 as a unit, and because of the off-centre mounting of the duct on the spindles 6 the weight of the duct acts to maintain the blade 8 in contact with the surface of the roll. The nozzles 4 and the blade 8 are operatively associated in such a way that as the roll rotates in the direction of the arrow 9, the suction force applied to the roll assures that the latter is continually cleaned by collecting the debris as it is detached by the doctor blade from the roll.

In the embodiment illustrated in FIGURES 2 and 3, each throat 3 is threaded to a respective neck 10 formed on the duct 2 and is flanged on its lower part as indicated at 11 to support a clamping ring 12 which is in threaded engagement with the head 13 of the nozzle walls 14. Clamped between the flange 11 of the throat 3 and the head 13 of the nozzle is flange 15 of a ferrule 16.

Accordingly, by rotating the ring 12 the nozzle is released and the ferrule can be removed and exchanged for another ferrule, whereon the nozzle will be replaced and the ring reversely rotated to clamp the substituted ferrule in position.

The ferrule 16 has a tapering inner wall 17 and the taper of the inner wall determines the pneumatic depression in the respective throat and nozzle. By grading the internal taper 17 of the ferrules along the suction duct, as indicated diagrammatically in FIGURE 6 a constant air velocity along the length of the roll is achieved for the air entering the series of nozzles 4. Thus, the combined assembly of nozzles and suction duct can be adjusted to perform the required duty on the roll surface at the time of installation and the arrangement deters unauthorized interference with the setting of the nozzles. At the same time the manner of connecting the elements of the nozzle structure is such that a rigid construction is obtained, thereby preventing inadvertent slackening of the arrangement due to vibration or other cause.

From the foregoing it will be appreciated that a rigid nozzle structure is obtained in which the velocity of air entering the slots is uniform along the length of the zone to which suction is applied when the nozzle ferrules are appropriately graded to maintain a constant depression in the throats and the nozzle mouths.

In the construction as shown in FIGURE 1, the throat 3 is indicated as of arcuate form fitting into an arcuate neck 10, whereas in the construction as shown in FIGURE 2, the neck is shown as a cylindrical form radially disposed of the roll. In such case, the duct 2 will be

independent of the doctor back and disposed vertically above or below the axis of the roll, and the doctor suitably disposed with respect to the nozzle and the roll surface.

In the construction shown in FIGURE 4, the suction duct 2 is of rectangular form and is secured to a doctor back 18 of an angle bar form mounted at each side of the roll on spindles 6. The doctor blade 8 is mounted on the angle bar 18 and the assembly is such that it is movable as an entity from the roll surface. Thus, both the blade and the nozzle 4 can be retracted from the roll in one operation.

Referring now to FIGURE 5, in this construction the suction duct 2 is embodied in a beam 19 of I section and the lower flange 7 of the beam is utilised as the doctor back, that is, presents a support for the doctor blade 8.

By employing a means for immediately removing the debris from the vicinity in which it is detached from the roll, there is no opportunity for the debris to contaminate the web being dried on the roll or to become airborne and eventually settle on different parts of the machine, which may result in faulty lubrication and indeed constitute a potential fire hazard.

The suction duct 2, herein described, may be closed at one end and connected by a flexible connection at the other end to a main duct, but each end of the duct may be provided with a flexible connection to the main duct. The flexible connections are of a form sufficient to allow for the angular movement of the duct and doctor back as they are lifted from the roll, and are such as to withstand the suction pressure without collapsing.

I claim:

Apparatus for use on a drier roll intended for drying a continuous web of material by direct contact with the roll, comprising a doctor blade adapted to bear on the roll surface over the length of the roll, a suction duct for mounting lengthwise of the roll, means for applying

suction to the duct, a series of suction nozzles each formed with a slot-shaped intake opening, a corresponding series of throats respectively connecting the nozzles to the duct, said throats being so shaped and bent that the nozzles are downwardly directed toward the blade with said slot shaped intake openings alinged side-by-side above and spaced from the edge of the doctor blade to concentrate a uniform sucking force over the edge of the doctor blade and directed upwardly away from the doctor blade, a mount for the doctor blade arranged to mount the doctor blade behind the nozzles so that the edge of the blade extends under the nozzle intake openings, said mount incorporating the suction duct so that the mount, suction duct, nozzles and doctor blade are rigidly fixed together as a unit, and means on said unit for pivotally mounting the unit off-centre so that in use the weight of the unit maintains the edge of the doctor blade bearing on the roll surface and inclined forwardly against the motion of the roll surface whereby detached debris is directed upwardly towards the nozzle intakes by the blade and is immediately sucked upwardly away from the blade into the suction nozzles.

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