Sept. 22, 1959 R. W. SMITH 2,905,241

CLEANING AND CONDITIONING DEVICE

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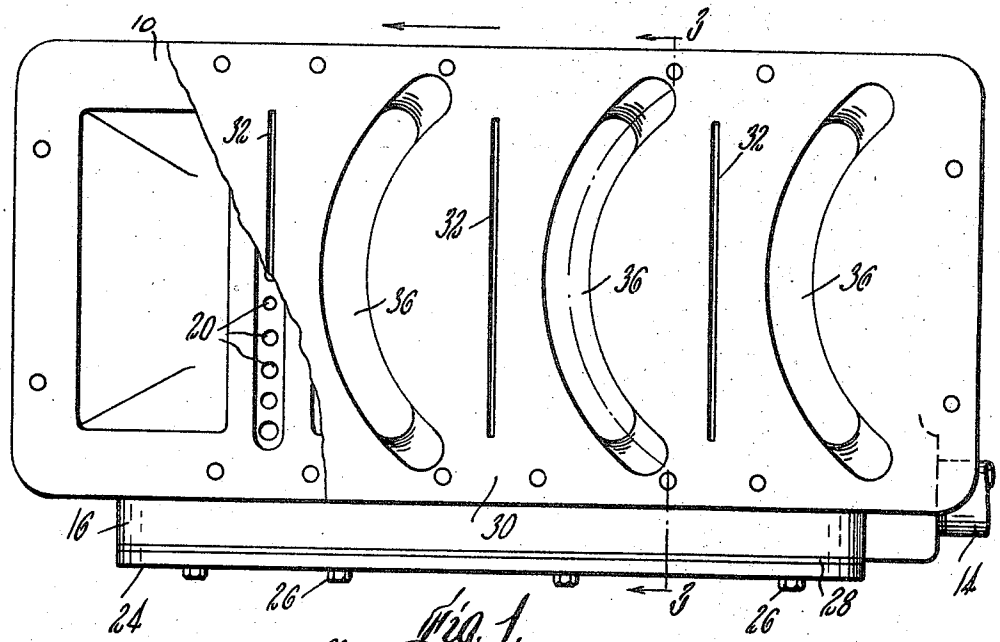


Fig. 1.

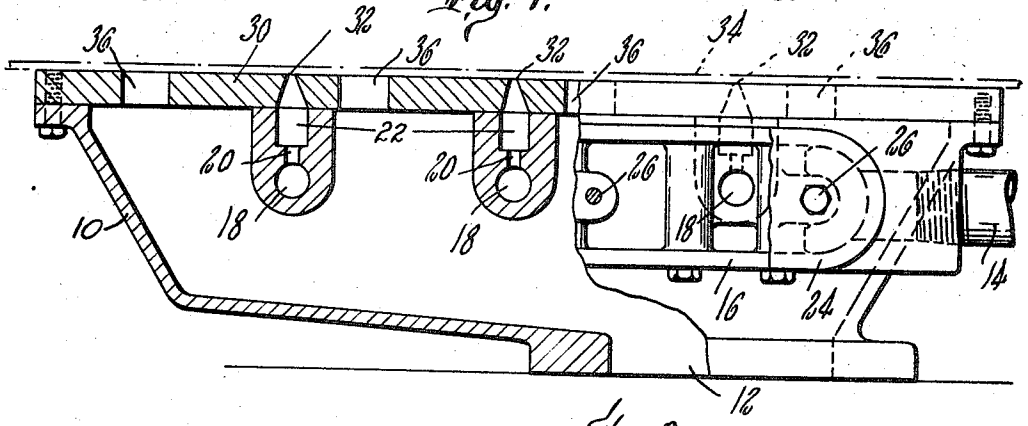


Fig. 2.

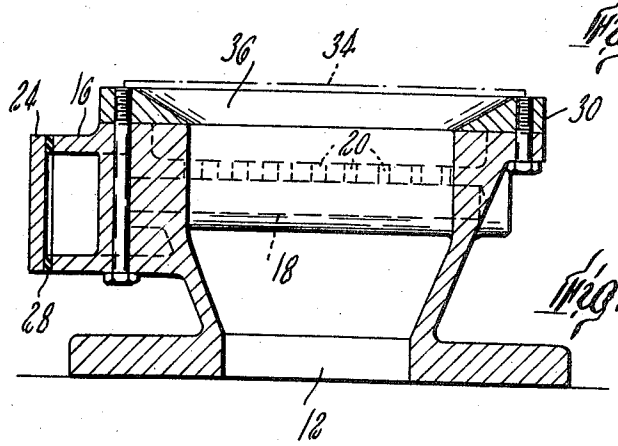


Fig. 3.

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CLEANING AND CONDITIONING DEVICE

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2 Claims. (Cl. 162—279)

This invention relates to apparatus for cleaning and conditioning a felt belt of a paper making machine and pertains more specifically to a suction box construction adapted for cleaning and conditioning such a belt while it is moving across the face of the box.

It has hitherto been proposed to provide suction boxes having a face plate with spaced apertures for directing a stream of cleaning fluid against the moving belt and for applying suction thereto to remove the fluid from the belt. In general, these prior constructions have required excessively large suction pumps to achieve the desired degree of cleaning and conditioning, and have suffered from the disadvantage that the face of the cover plate of the box, with which the belt comes in contact as it advances, has tended to become covered with an accumulation of deposits of pitch, tar, asphalt, etc., from the belt. Furthermore, the frictional forces between the moving plate and the face of the cover plate have tended to cause excessive wear of both the belt and the face of the plate itself.

One object of the present invention is to provide a suction box and cover plate therefor of improved construction which is substantially self-cleaning in operation.

Another object is to provide a suction box for the cleaning and conditioning of felt belts having a cover plate of improved design which exhibts greatly improved wear characteristics.

Other and further objects will be apparent from the drawing and from the description which follows.

In the drawing:

Fig. 1 is a plan view, partly broken away, of one embodiment of the present invention;

Fig. 2 is a view in side elevation, partly broken away and in section; and

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 1.

In the embodiment shown in the drawing, a suction box 10 is shown provided with an exit opening 12 in its bottom through which suction may be applied by means of a conventional suction pump (not shown). Box 10 is provided with an inlet 14 through which a cleaning fluid such as water, steam or the like may be supplied under pressure from any suitable conventional source. Inlet 14 communicates with a manifold or header 16 extending lengthwise of box 10 at one side thereof and which communicates in turn with a plurality of transversely extending passages 18, 18 which are formed integrally with box 10. Each passage 18 is provided with a row of aligned apertures 20, 20 in its upper wall which communicate in turn with a chamber 22 disposed above each passage 18 extending generally parallel to passage 18. Apertures 20, 20 are graduated in size, the largest diameter aperture being disposed adjacent the inlet end of passage 18 while the smallest is disposed adjacent the opposite end of the passage in order to equalize the velocity of fluid passing upwardly through chamber 22 along the length thereof.

In order to facilitate inspection and cleaning of the

interior of passages 18, 18 manifold 16 is provided with a cover plate 24 extending the full length thereof and secured by means of bolts 26, 26 threaded into box 10. A gasket 28 may be provided of any suitable material to insure a tight seal between cover plate 24 and manifold 16.

A cover plate 30 is bolted to the upper open face of box 10 and is provided with a plurality of elongated orifices 32, 32 each of which registers with a corresponding chamber 22 in box 10, thus permitting a sheet or stream of washing fluid to be forced upwardly through orifices 32, 32 against belt 34 as it advances across the face of cover plate 30 from right to left as seen in Figs. 1 and 2. Cover plate 30 is also provided with a plurality of elongated arcuate apertures 36, 36 which communicate with the interior of suction box 10 through the spaces between passages 18, 18. These arcuate apertures 36, 36 have their convex sides facing in the direction of travel of the belt, as seen best in Fig. 1, the distance between the opposite ends of each aperture being substantially equal to the distance between opposite ends of each orifice 32. In the preferred embodiment of the invention the number of arcuate apertures 36, 36 is one greater than the number of orifices 32, 32, the apertures and orifices alternating across the face of the cover plate 30 in the direction of travel of the belt.

In operation of the device felt belt 34 is advanced in conventional manner across the upper face of cover plate 30 from right to left as seen in Figs. 1 and 2. Suction applied to the interior of suction box 10 operates on the belt through apertures 36, 36 drawing the belt closely against the upper face of cover plate 30. In addition, it is found that the belt tends to travel in a direction perpendicular to each aperture 36 so that by reason of the arcuate shape of these apertures belt 34 tends to be spread laterally as it advances, and the interfelted fibers thereof are worked and kneaded, thus providing effective cleaning and conditioning action. As the belt advances, washing fluid is ejected thereagainst through orifices 32, 32 and penetrates into the belt to some extent as well as forming a film on the face of cover plate 30 between each orifice 32 and the succeeding aperture 36 in the direction of travel of the belt. This moving film of water or other cleaning fluid tends to sweep away impurities such as pitch, tar, asphalt, etc., which may be extracted from the belt and which normally tend to deposit upon the face of the cover plate. It should be noted that because of the fact that orifice 32 and apertures 36 are substantially commensurate in length the whole area of the face of the cover plate between each orifice 32 and the succeeding aperture 36 is effectively cleaned by this operation. Moreover, the film of water serves to lubricate substantially the entire operating face of cover plate 30, thus reducing very greatly the wear on both the plate itself and on the moving belt.

It has been found that the improved design of the cover plate of the present invention provides not only a highly effective cleaning action, but also reduces to a minimum the tendency of the belt to shrink laterally as it advances across the suction box and simultaneously provides an effective kneading and working of the felt and increases its effective life while reducing to a minimum the capacity of the suction pump required to maintain the suction within box 10.

Although specific embodiments of the invention have been described herein, it is not intended to limit the invention solely thereto, but to include all of the obvious variations and modifications within the spirit and scope of the appended claims.

I claim:

1. Apparatus for cleaning and conditioning a moving felt belt of a paper making machine comprising a plate

disposed adjacent the path of travel of said belt and having a face adapted to contact said belt, said plate having an elongated orifice in said face extending transversely of the direction of travel of the belt, means for forcing a stream of cleaning fluid through said orifice against said belt, said stream extending from end to end of said orifice, means for spreading the belt laterally as it advances over said plate and for drawing the belt closely against said plate and for withdrawing the cleaning fluid from the belt, said last mentioned means including an elongated arcuate aperture in said face extending generally transversely of the direction of travel of said belt with its convex side facing in said direction, a suction box in communication with said aperture and means for providing a suction in said box, said aperture being spaced beyond said orifice in the direction of travel of said belt, the distance between opposite ends of said orifice being substantially equal to the distance between opposite ends of said aperture, whereby said stream of cleaning fluid cleans and lubricates substantially the entire face of said plate between said orifice and said aperture.

2. Apparatus as defined in claim 1 in which said plate is provided with a plurality of said orifices and apertures alternating in the direction of travel of said belt.

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