Nov. 16, 1965 A. P. WAGENKNECHT 3,218,228

SUCTION PIPE COVER

Filed Sept. 5, 1963 2 Sheets-Sheet 1

FIG. 1.

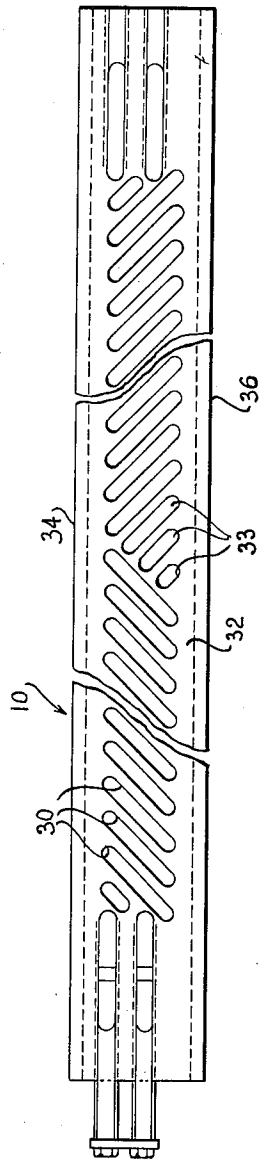
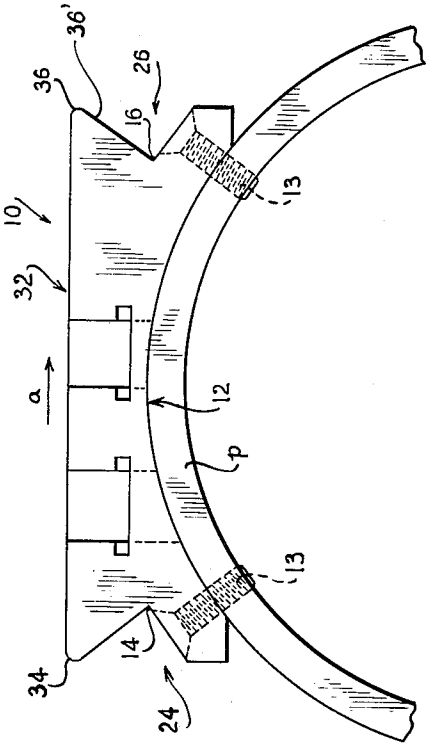


FIG. 2.



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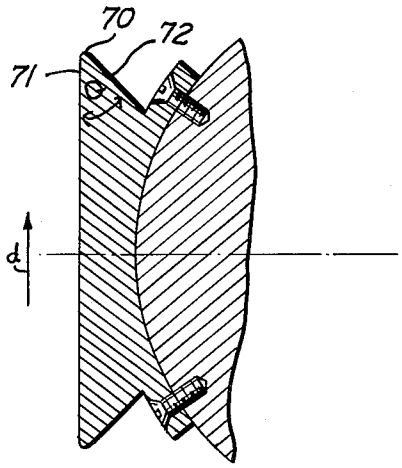


FIG. 3

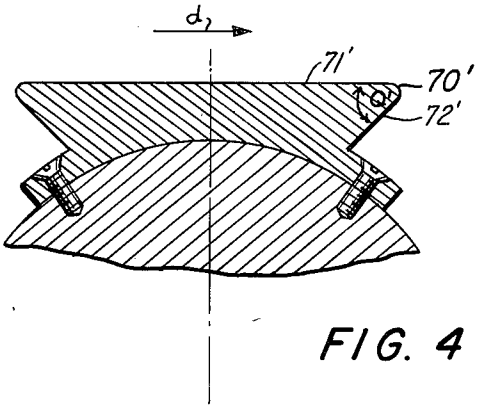


FIG. 4

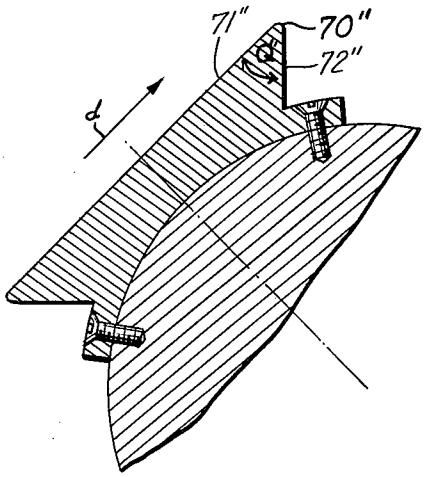


FIG. 5

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SUCTION PIPE COVER

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Filed Sept. 5, 1963, Ser. No. 306,955
8 Claims. (Cl. 162—274)

This application is a continuation-in-part of my abandoned application Serial No. 23,937 which was filed April 22, 1960, entitled "Suction Pipe Cover."

My invention has for its broad purpose the provision of an efficient suction pipe or suction box cover for supporting and cleaning a traveling felt.

The high speed operation of paper making machinery coupled with the advent and increased utilization of "needled" felts and conveyors has presented problems heretofore not encountered in the utilization of the paper making machinery. The increase in speeds requires quicker acting, more effective drainage and cleaning of felts while the "needled" felts require cleaning and draining devices of greater capacity and devices which readily and quickly remove undesirable objects taken from the felts to a position or place away from the felt itself. It has been found that the "needled" felts have an increased tendency to shed fibres and that with the use of conventional and heretofore accepted cleaning devices the shed fibres are often reimbedded in the rapidly moving felt.

The specific purpose of my invention is to provide means adapted for cleaning the endless web of felt of a paper making machine in an improved manner.

It is a principal object of my invention, therefore, to provide mechanism which will effectively clean the felt cloth while it is functioning in the paper machine, and which will clean the felt without interfering with its correct operation.

It is another of the objects of the present invention to provide a cleaner of the class described which will improve the formation of sheets of paper by keeping the felt of a Fourdrinier or cylinder machine clean at all times and preventing the formation of large spots on the surface of the felt from any source such for example as chemicals in the felt, loose felt fibers or paper web.

It is an object of the present invention to provide such a device having a supporting surface formed with a unique rounded trailing edge which serves to prevent the buildup of foreign matter on the surface of the device which can become imbedded in the felt.

With the foregoing and various other novel features and advantages and other objects of my invention as will become more apparent as the description proceeds, the invention consists in certain novel features of construction and in the combination and arrangement of parts as will be hereinafter more particularly pointed out in the claims hereunto annexed and more fully described and referred to in connection with the accompanying drawings wherein:

FIG. 1 is a top plan view of a suction pipe cover embodying my invention;

FIG. 2 is an end elevational view of the cover shown in FIG. 1 in association with a suction pipe;

FIG. 3 is a diagrammatic side view of a cover in the vertical position;

FIG. 4 is such a view of a cover in the horizontal position; and

FIG. 5 is such a view of a cover in a slanting position.

Referring to the drawings, and particularly to FIGS. 1 and 2, the paper making machine envisioned for use herewith is of the well known Fourdrinier or cylinder types including an endless felt upon one end of which there may be fed a sheet or web of fibrous pulp in a water-saturated state.

Adjacent the felt, a suction pipe such as indicated by P in FIG. 2 may be connected with a conduit system in which there is maintained a vacuum.

The pipe P is provided with a cover plate generally indicated in FIGS. 1 and 2 by the reference numeral **10**, which cover plate is positioned to bear against the under side of the felt.

The cover plate is provided with a plurality of vertically-disposed suction openings therethrough through which the reduced pressure inside of the pipe is communicated through the felt to the web of pulp through which the atmospheric pressure acting on the upper side thereof causes the moisture to be forced downwardly into the pipe below.

The bottom surface **12** of cover plate **10** is complemental to the curved periphery of the pipe P so as to be seatable thereon.

The cover plate **10** may be secured to the pipe P by means of bolts or screws or similar securement means **13** threadedly engageable with the plate and with the pipe through aligned openings, said bolts being receivable in the cover plate through appropriate insets **14** and **16** machined in the leading and trailing sides of the cover plate generally indicated by numerals **24** and **26** respectively.

Instead of the circular suction pipe such as shown, a suction box which may be square or rectangular or otherwise configured may be employed.

The cover plate **10** is of greater longitudinal length than transverse width and is generally of such length as to be extendable across the transverse width of the felt which it serves.

It will be understood that, in operation, the felt, in its movement, is drawn across the upper surface or face of the cleaner transversely in a direction as indicated by arrow *a* in FIG. 2.

A row of suction slots or openings **30** is provided which extend through the cover plate **10** from the lower curved surface **12** to the upper planar surface **32** thereof in planes perpendicular to the plane of the upper or working surface **32**.

The slots in the embodiment shown are extended across the major portion of the cover plate and may be arranged in two sets to form a grated covering, one set covering the right hand side of the plate and the other set covering the left hand side, as viewed in FIG. 1.

The slots of the right hand set are arranged in parallelism and extend diagonally toward the left and the slots of the left hand set are arranged in parallelism and extend diagonally toward the right so as to offer a modified herringbone effect.

To carry out this arrangement at the midsection of the plate, one or more relatively short slots or openings **33** may be employed so as to provide equal drainage area throughout the cover plate.

In order to provide for complete coverage and yet avoid continuous lines in the direction of motion of the felt, the slots **32** are disposed in two groups and are echeloned in each of these groups oppositely so that, for example, as in FIG. 1, the slots of one group are echeloned to the left and the slots in the other group are echeloned to the right. The purpose of this opposite echeloning is to neutralize any lateral thrust upon the felt. Furthermore, the smaller slots **33** are disposed intermediate the two groups.

The elongated leading edge **34** and trailing edge **36** adjacent the planar or working surface **32** are each suitably provided with a radius to provide a properly trimmed edge as by an appropriate grinding operation.

The leading edge **34** is of such design as to allow hair or other materials on the felt to drop off without getting onto the sheet in the process of being formed.

The rounded trailing edge **36** is of particular importance in this invention. It is noted that the rounded leading and trailing edges are disposed parallel to the ends of the elongated openings in the cover. The leading and trailing edges are adjacent the upper planar or working surface of the cover and each merges with an individually extending V-shaped inset disposed therebelow providing an undercut which is joined to the surface by the rounded edge.

Such a configuration of trailing edge **36** and undercut is provided to prevent the build-up at the trailing edge of loose felt fibers and such other undesirable material as may be disposed between the felt surface and the surface **32** of the cover. It has been found in the art that with the configurations of trailing edges the loose fibers have a tendency to cling to the felt as the felt passes over and away from the upper surface of the cover. Many attempts have been made to eliminate this problem. By providing herein a surface joined by a radius rounded trailing edge to a V-shaped undercut or inset portion the fibers are readily and quickly disposed of.

It has been found that the radius of the rounded trailing edge and angle of the undercut portion such as indicated by the numeral **36'** with respect to the upper horizontal surface **32** is of critical dimension to provide the proper withdrawal and removal of undesirable fibers and other particles. It is believed that with the present high speed felt movement a rounded trailing edge such as that provided herein allows the creation of a vacuum at the trailing edge immediately beneath the felt surface as it leaves the horizontal surface and the provision of a radius of the proper value with an undercut of the proper dimension allows the fibers to be removed from the undersurface of the felt by vacuum as well as by inertial forces. In the absence of a rounded trailing edge and undercut within the critical limits set forth herein the tendency of the fibers to cling to the undersurfaces of the felt and be further imbedded therein at the trailing edge is well known in the art.

It has been found that with a cover in the vertical position such as that shown in FIG. 3 a rounded trailing edge **70** joining the surface **71** which is in abutment with the felt traveling in the direction of the arrow "*d*," and the undercut portion **72**, a 1/32 inch radius is most desirable and the angle of undercut as indicated by the angle Q should be 45° or less.

It has been found that with the cover shown in FIG. 4 and the felt traveling horizontally a rounded trailing edge **70'** of 1/8 inch radius joining undercut portion **72'** to surface **71'** and an angle of undercut Q' of 60° or less is most desirable. With the cover in an intermediate or angled position as shown in FIG. 5 a trailing edge **70''** having a radius from 1/32 inch to 1/8 inch is required to join undercut portion **72''** to surface **71''** and the angle of undercut Q'' should be sufficient to allow for drop off of felt fibers. This angle of undercut would depend upon the angle of disposition of felt supporting surface between the vertical and the horizontal. It has been found that the upper limit of Q'' should be between 45° and 60°.

It is seen, therefore, that in FIG. 3 the radius of the trailing edge is small whereas in FIG. 4 the radius is larger and FIG. 5 utilizes a radius between the limitations of the radius of FIG. 3 and the upper limit of the radius of FIG. 4. Such a configuration acts to prevent the felt fibers from building up and hanging at the trailing edge of the cover.

By such configuration of the leading and trailing edges, the objectionable material such as fiber carried by the felt is cleansed therefrom so as not to fill up upon and cling to the felt, said edges serving to cause same to drop off.

Without further analysis, the foregoing is intended to so fully reveal the gist of my invention and its construction and operation that others can, by applying current knowledge, readily adapt it for various applications without omitting features which, from the standpoint of prior art, fairly constitute essential characteristics of its generic and/or specific aspects. The substitution of equivalents and other changes, modifications and alterations as circumstances may suggest or render expedient, are contemplated since the invention is susceptible of such without departing from its real spirit or underlying principles. Stated otherwise, it is not desired to limit this invention to the exact construction shown and described as the objects hereof may be attained by the use of constructions different in certain respects from that disclosed.

Obviously, numerous changes in construction and rearrangement of the parts may be made without departing from the scope of the invention as defined by the claims.

What is claimed as new and useful is:

1. A cover for a suction pipe for aiding in the cleaning of the felt of a papermaking machine comprising an elongated plate like member having a multiplicity of openings throughout communicating with the suction pipe, said plate like member having a surface over which said felt travels and a rounded trailing edge adjacent said surface extending in a direction at a right angle to the direction of travel of said felt and an undercut portion joined by said rounded trailing edge to said surface.

2. A cover for asuction pipe in accordance with claim **1** in which the radius of said rounded trailing edge is within the range of 1/32 inch to 4/32 inch.

3. A cover for a suction pipe in accordance with claim **1** in which said surface is disposed vertically and said rounded trailing edge is provided with a 1/32 inch radius.

4. A cover for a suction pipe in accordance with claim **1** in which said surface is disposed horizontally and said rounded trailing edge is provided with a radius of 4/32 inch.

5. A cover for a suction pipe in accordance with claim **1** in which said undercut portion includes a wall adjacent said rounded trailing edge and disposed at an angle with said surface constructed and arranged so as not to interfere with fibers being thrown off said rounded trailing edge by the movement of said felt.

6. A cover for a suction pipe in accordance with claim **5** in which said surface is disposed vertically and said angle is in the range of 45° or less.

7. A cover for a suction pipe in accordance with claim **5** in which said surface is disposed horizontally and said angle is in the range of 60° or less.

8. A cover for a suction pipe in accordance with claim **5** in which said surface is disposed between the vertical and the horizontal and said angle has an upper limit in the range between 45° and 60°.

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