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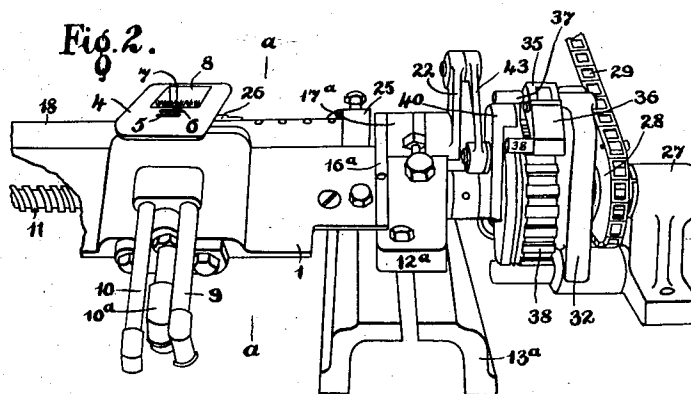
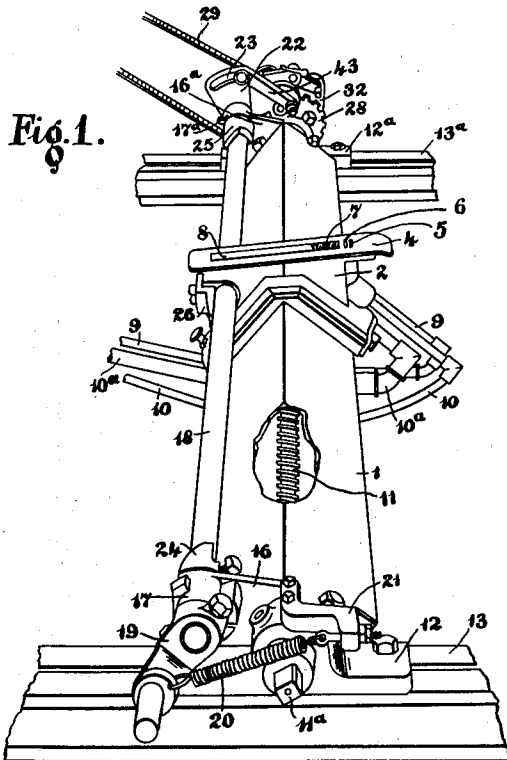
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F. W. VICKERY

MACHINE FOR CLEANING TRANSPORTING BANDS

Filed June 5, 1922

5 Sheets-Sheet 1



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Sept. 8, 1925.

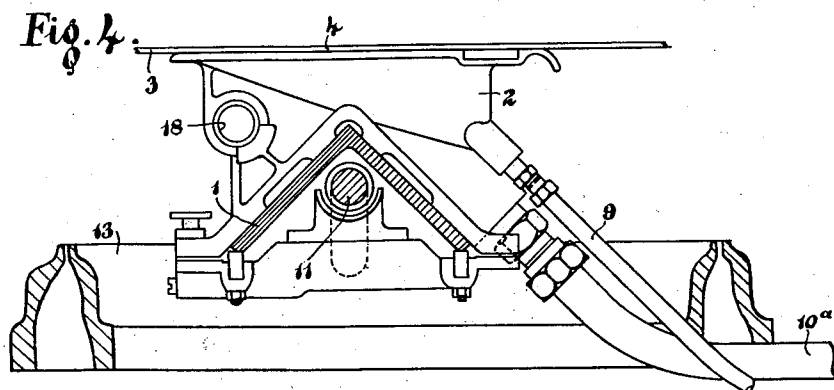
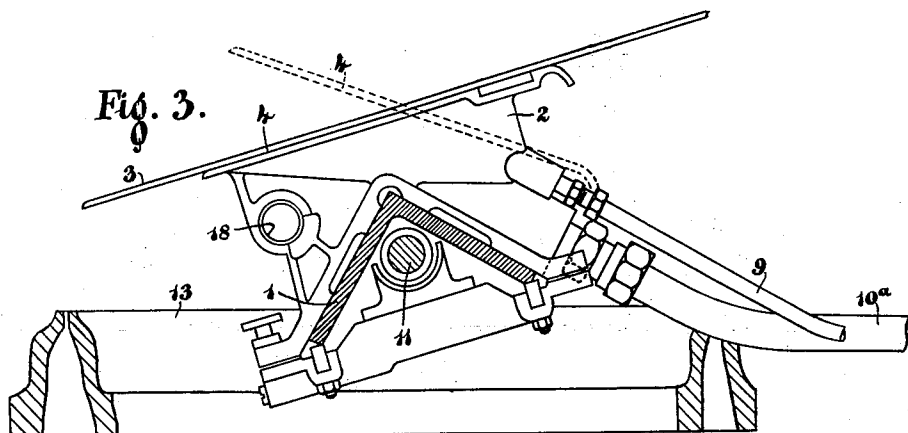
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MACHINE FOR CLEANING TRANSPORTING BANDS

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5 Sheets-Sheet 2



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5 Sheets-Sheet 3

Fig. 5.

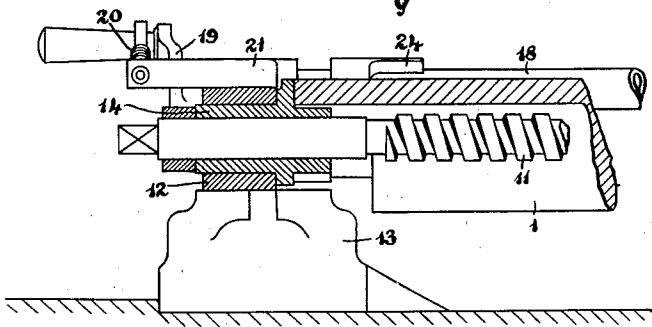
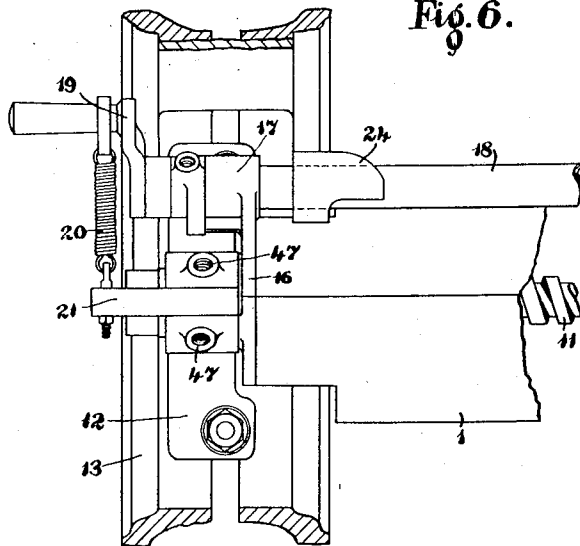


Fig. 6.



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Fig. 5^a

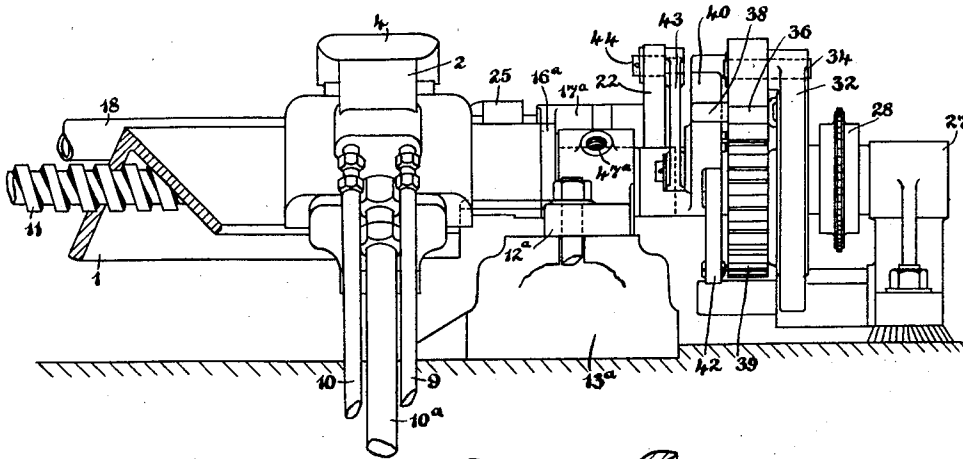
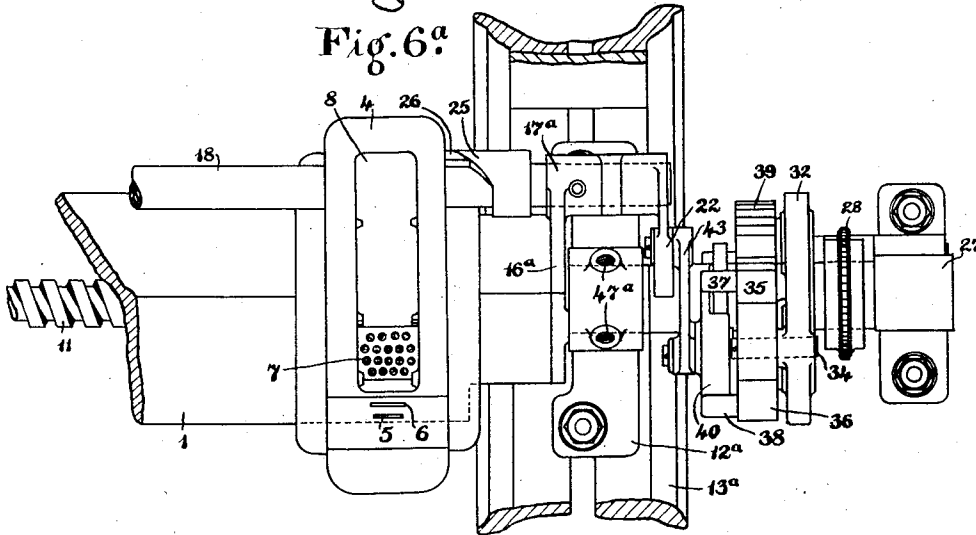


Fig. 6^a



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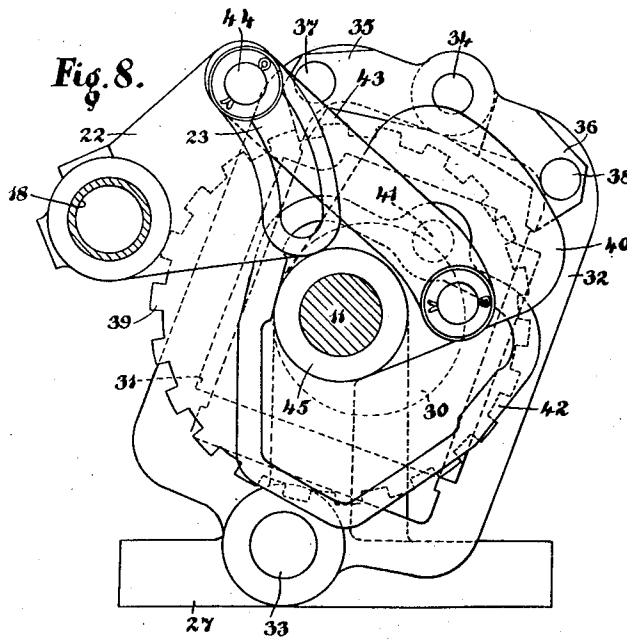
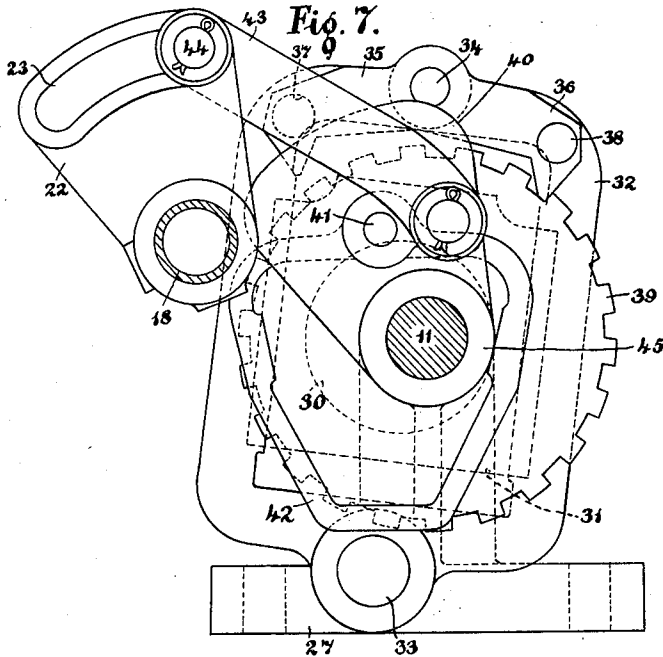
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MACHINE FOR CLEANING TRANSPORTING BANDS

Filed June 5, 1922

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UNITED STATES PATENT OFFICE.

FREDERICK WILLIAM VICKERY, OF LONDON, ENGLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO VICKERY LIMITED, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

MACHINE FOR CLEANING TRANSPORTING BANDS.

Application filed June 5, 1922. Serial No. 566,194.

To all whom it may concern:

Be it known that FREDERICK WILLIAM VICKERY, O. B. E., M. I. Mech. E., a subject of the King of Great Britain, residing at London, England, has invented certain new and useful Improvements in Machines for Cleaning Transporting Bands, of which the following is a specification.

Endless bands which are employed for transporting material of a semi-solid and/or macerated character have in many cases to be kept clean and the holes in the bands for ventilating or draining purposes kept open; for example, the endless felts and the endless "wires" in connection with paper making. For convenience I will restrict the description of my invention to paper-making felts, known as wet felts, although it is understood my invention can with modifications be applied to other class of bands or felts used for transporting materials of a semi-solid or macerated character.

An endless felt is employed for transporting the paper fibres when they are in a wet condition and a certain amount of this material adheres to the face of the belt and gets into the meshes affecting its porousness and cleanliness. The usual practice is to remove the felts from the paper-making machines when this clogging gets too bad and to clean them. Suggestions have been made for equipping the paper-making machine with devices for cleaning the felts while the machine is making paper and these suggestions have provided for mechanism cleaning the whole width of the felt at one time. Experience has shown serious objections to schemes of this nature, some of which are as follows:—

a. The felts are damaged in process of cleaning.

b. The character of the face of the felt and the meshes are changed so suddenly as to affect the paper being made.

c. Operators have to be depended upon to put the machines into operation at predetermined times and to operate in some cases a number of members in their correct sequence.

d. Where water, steam, air and/or vacuum are employed, such a large call is made that

the existing supply is unable to meet the demand although it may be for a comparatively short period, with the result that it has been found necessary to provide a duplicate set of machines of an expensive character to meet the periodical demand which duplicate set of machines are idle for the majority of the time.

e. The devices are too expensive to be commercially advantageous and the amount of room occupied by them is available only on a small percentage of paper-making machines and standardisation is impossible.

My invention broadly consists in constructing mechanism or apparatus for causing the cleansing medium to impinge and act upon the moving felt or band in sections or portions one after the other, such actions of the cleansing medium acting upon the felt or band more thoroughly and renovating the surface which comes in contact with the material carried with less cleansing medium than is the case when the cleansing medium is applied to the whole width of the felt or band at one time.

In other words I clean less than the full width of the felt or band at one time.

Many constructions of apparatus may be employed in carrying out the method of operating upon the moving felt or band in sections or small portions continuously or at short intervals and such action can be singly from one side to the other, or reciprocal so that the cleaning is effected in both directions. That is, the apparatus may be moved or operated so as to apply the cleansing medium continuously and progressively across the width of the band or so as to apply the medium to one section of the band for a time and after an interval, usually short, to apply the medium to another section of the width of the band, so that by intermittent action the whole width of the band is covered.

A convenient method is to employ suitable devices through which the steam or water or both is or are passed, such devices being movable along or around the steam or water pipe or both whereby the felt can be treated for the whole width by a progressive movement of the devices. Such devices may con-

sist of a series of sleeves fitted inside the tube enclosing portions of the opening therein, such sleeves being connected by skeleton appliances which are open to the holes adjacent same so that the steam or water can be forced on to the felt in sections across the felt consecutively or otherwise, or I may have a slotted or holed pipe surrounding which is a tube having spirally arranged slots so that on a revolving of the slotted tube, portions of the slotted or holed pipe are opened and closed consecutively and progressively along the pipe during a partial rotation of the sleeve, only one portion of the slot or holes in the pipe being opened at the time.

Another convenient way of carrying my method into effect is as hereafter described and shown in the annexed drawings in which:—

Figure 1 is a perspective plan view of an apparatus for continuously and automatically cleaning a felt.

Figure 2 is a perspective view of the change gear end of the apparatus.

Figures 3 and 4 are enlarged sections on the line *a a* of Figure 2 and showing the device in two positions to suit angles of the felt.

Figures 5 and 6 and Figures 5^a and 6^a are part sectional side elevation and plan (broken) respectively of the apparatus.

Figures 7 and 8 are elevations of the change over gear shown in the two positions.

I provide a beam 1 of suitable shape preferably of inverted V shape as shown, carrying a cleaner member 2 or members capable of sliding along the beam 1, such beam 1 being held at each end in a bearing and is capable of being placed at any angle as at Figures 3 and 4 to suit the run of the transporting band or felt 3. The sliding member 2 or members contain preferably a number of chambers having openings on the face thereof, the first 5 is preferably for water, the second 6 for steam, the third 7 for a brush, the fourth 8 for vacuum, and I may employ others, say the fifth for a brush, while a sixth if sometimes advantageous for air.

If one cleaning member 2 only is employed this is made to slide backwards and forwards on the beam 1 sufficiently to operate on the full width of the transporting band or felt. If two sliding members are employed each is made to slide backwards and forwards on the beam to operate on half the width of the felt.

The chambers are connected up by piping to the various sources of supply i. e. the chamber 5 by the pipe 9 to the water supply, the chamber 6 by the pipe 10 to the steam supply and the chamber 8 by the pipe 10^a to the vacuum pump.

The gearing for effecting the reciprocating motion of the member 2 along the beam 1 as shown on the drawings is constructed as follows:—

In the bearings 12, 12^a fitted to foundation plates 13, 13^a on each side of the machine are journals 14, 14 to which are fixed the beam 1, the centre of the journals acting as bearings to the screw 11. Attached to these journals 14, 14 are plates 16, 16^a which are provided with bearings 17, 17^a carrying the shaft 18. One end of the shaft 18 is provided with a crank arm 19 connected by a coiled spring 20 with a bracket 21 on the plate 16 and the other end of the shaft 18 is provided with an arm 22 having a slot 23.

Near each end of the shaft 18 are fitted cams 24, 25 and the member 2 on each side surrounding the shaft 18 I also oppositely arrange cams 26.

In a bearing bracket 27 fitted at the side or on to an extension of the foundation plate 13^a is fixed a sleeve or extended bearing upon the outside of which the eccentric 30 and sprocket wheel 28, which are fixed together, revolve the screw 11 using the inside of the sleeve as a bearing in which to revolve. The sprocket wheel 28 is driven by a chain 29 from any part of the paper making machine.

The eccentric 30 has action in a block 31 having parallel sides and capable of sliding in a rocking frame 32, such rocking frame being pivoted at 33 to the bracket 27 at its lower end.

The rocking frame 32 has pivotally connected to it at its upper edge 34 a pair of oppositely disposed and loosely connected pawls 35, 36 having projecting pins 37, 38.

Immediately disposed in the plane of the pawls 35, 36 is a toothed wheel 39 this being secured to the screw rod 11 and next to this and loosely connected to the plain end of the rod 11 is a sector 40 this having pivotally connected to it at 41 a skeleton balance weight 42 which surrounds the end of the screw rod 11.

The sector 40 is connected by a link 43 to the slotted arms 22 of the shaft 18.

The bearings of the brackets 12, 12^a are provided with screw holes in which screws can be engaged to tighten the journals 14, 14^a to the bearings so that by releasing the screws the beam 1 and member 2 can be adjusted to the angle desired for its face 4 to have proper contact with the felt 3 and by tightening the screws the beam and member will be held tight.

The action is as follows and assuming that the member 2 be at one side of the machine and the change over mechanism as at the Figure 5 with the pawl 35 lifted by the sector 40 clear of the teeth of the wheel 39. The sprocket wheel 28 is driven and the

eccentric 30 on the sleeve will in revolving move the block 31 up and down in the frame 32 and at the same time rock the frame 32 about its pivot 33 so that the pawl 36 will push the toothed wheel 39 the required distance and return to engage the next tooth and during the outward movement the screw rod 11 will be rotated by reason of the toothed wheel being fixed to it and this action continues until the member 2 has been completely moved along the beam 1 and when such member arrives at the other end the cam 26 on the member 2 will ride against the cam 24 on the shaft 18 and will revolve the shaft 18 at the same time putting tension on the spring 20, the slot 23 in the arm 22 riding over the pin 44 of the link 43 until such pin 44 reaches the end of the slot 23 when the anchorage of the spring 20 to the crank arm 19 will have passed the dead centre line between the shaft 18 and the anchorage of the spring 20 to the bracket 21 and with the assistance of the cams 26, 24 pushed on the sector 40 with it to engage the pin 38 of the pawl 36 and lift the pawl 36 clear of the toothed wheel 39 when the travel of the member 2 will be stopped. During this movement of the sector 40 the balance weight 42 will have swung over the vertical centre line of the sector 40 and such weight 42 will thereby assist in bringing over the sector 40, the sector being retained in the proper position by the inside edge of the balance weight on one side resting against a collar 45 on the screw rod 11. During this movement of the sector 40 the pawl 35 is released and engages the toothed wheel 39 and the onward movement of the sprocket wheel will now cause the frame 32 to compel the pawl 35 to act upon the toothed wheel 39 and move it in the reverse direction and thus reverse the movement of the screw rod 11 and at the end of this movement the same action but in an opposite manner with regard to the pawls 35, 36 takes place.

By the construction herein shown the cleaner member 2 operates on the face of the felt 3 as it passes over the top of the apparatus on the return or bottom run. Consequently the felt or band can be changed as quickly and easily as if the cleaner were not installed.

The face of the felt or band is lightly in contact with the face of the member 2. From the slot 5 water is forced through the transporting felt or band, and is heated by means of steam from slot 6. With the help of the scalding water, the brush 7 in the vacuum chamber 8 re-naps the felt. The vacuum chamber is of such a width and length as to enable it to extract all the moisture added to the transporting band for the purpose of cleaning. Thus water is passed through the transporting felt or

band twice, first cold in its upward course from slot 5 and again, after being treated, in its downward course into the vacuum chamber 8, when the dirt from the transporting band is carried away with it.

Water is supplied to slot 5 by a pipe 9, steam is supplied to slot 6 by pipe 10, while pipe 10^a is connected to the vacuum supply.

The mechanism provides for the slots 5 and 6, the brush 7 and the vacuum chamber 8, together with the pipes 9, 10 and 10^a, being continuously in motion backwards and forwards across the whole width of the transporting felt or band.

The speed at which the mechanism travels can be varied according to the speed of the paper machine and the length of the transporting felt or band.

The cleaner is entirely automatic in its action and requires no attention from the machine men.

With the cleaner member passing across the face of the transporting band at the required speed every hair of the nap and every pore in the same area of the transporting band is thoroughly cleansed for four complete revolutions of the transporting band every two hours, i. e. two revolutions on the forward travel and two revolutions on the backward travel.

Should a foreign substance such as grease cause a dirty spot on the transporting band, the cleaner can be quickly moved by hand, by turning the screw rod 11 by affixing a crank handle to the square end 11^a, and the cleaner allowed to remain stationary to concentrate on the place for a few moments until the spot has been removed.

The sliding cleaner member 2 may be reciprocated by any known mechanism.

For some work it may be necessary to employ a sliding member or members on each side of the felt, in which case I make provision for the mechanism on the inside to be movable for the convenience of removing and replacing the felts.

What I do claim as my invention and desire to secure by Letters Patent, is:—

1. The method of reconditioning the transporting felts or bands of paper-making and similar machines, which comprises successively subjecting different portions of the width of such felt or band, while the same is moving longitudinally in performing its duty, to the injection of a moist cleaning fluid into and through the felt or band and to the removal from the felt or band of the moisture so injected.

2. A method of reconditioning a transporting felt in paper-making and similar machines which consists in applying cleaning medium forcibly to a fraction of the width of the felt and substantially eliminating the cleaning medium from the felt at such a distance from the point where the

felt receives pulp that capillary action will equalize the condition of the cleaned and uncleaned portions of the felt before such point is reached.

3. A method of reconditioning felts for paper-making and similar machines which consists in impelling water upon and into a fraction of the working width of the felt and thereafter subjecting such portion to suction to remove excess moisture therefrom.

4. Mechanism for cleaning transporting felts or bands, comprising a cleaning member or members embodying fluid injecting and withdrawing means connected to the source or sources of supply of the cleaning medium, means for moving the member or members wholly or partially across the transporting band, means for reversing the movement of the cleaning member at each end of its travel.

5. Mechanism for cleaning transporting felts or bands, comprising a cleaning member having connection with water, steam and vacuum apparatus and provided with a brush, means for moving the cleaning member across the transporting band and means for reversing the movement of the cleaning member at each end of its travel.

6. The combination with a transporting band, of means operative on less than the full working width of the band at one time to deliver a cleaning medium upon the band to clear its pores and working surface, and suction means for removing the cleaning medium and refuse matter from the band so as to leave the band in condition to continue its normal duties.

7. The combination with a travelling transporting band, of mechanism for cleaning the same, comprising a member adapted to apply a cleaning medium to and to remove such medium and thereby freed refuse from a part at a time of the working width of said band to clear the pores and clean the working surface thereof, and means operative concurrently with the movement of said travelling band for reciprocating said member transversely to the direction of travel of said band.

8. In paper-making and similar machines, the combination with a transporting band, of means for applying a cleaning medium to a portion of the width thereof, means for withdrawing said cleaning medium and refuse freed thereby, and mechanism for shifting said cleaning and withdrawing means so that the latter operates subsequently to the former upon every part of the working surface of said band in turn.

9. In paper-making and similar machines, the combination with a transporting band,

of means for applying a cleaning medium progressively to different portions of the width of the band while the latter is travelling and air means for concurrently freeing said portions of the width of the band from the cleaning medium and refuse detached thereby.

10. In paper-making and similar machines, the combination with a transporting band, of means for applying a cleaning medium to a portion of the width thereof, a suction device for removing cleaning medium and refuse from a portion of the width of said band, and means for causing said suction device to act upon each portion of said band subsequently to the action on said portion of the means for applying cleaning medium.

11. In paper-making and similar machines, the combination with a transporting band, of a cleaning member embodying means for injecting a cleaning medium into the band and means for removing such cleaning medium therefrom, means for bringing the cleaning member into action successively upon different portions of the width of the band while the paper-making machine is in operation.

12. In paper-making and similar machines, the combination with a transporting band, of a cleaning member embodying adjacently located fluid injecting and suction means adapted to act upon a portion of the width of the band, and means operative concurrently with the movement of the band for traversing said cleaning member across the width of the band.

13. In paper-making and similar machines, the combination with a transporting band, of fluid injecting and suction means arranged to act on the same side of the band over a common area which is a portion of the width of the band, and means for moving the injecting and suction means in a direction transversely of the band to bring said injecting and suction means into action upon different portions of the working width of the band.

14. In a paper-making machine, the combination with a felt, of a support extending transversely across said felt, fluid injecting and withdrawing means upon said support, means operative concurrently with the paper-making machine for reciprocating said fluid injecting and withdrawing means upon said support, and independently hand-operated means for bringing said fluid injecting and withdrawing means to any desired position upon said support.

In testimony whereof I have hereunto set my hand.

FREDERICK WILLIAM VICKERY.