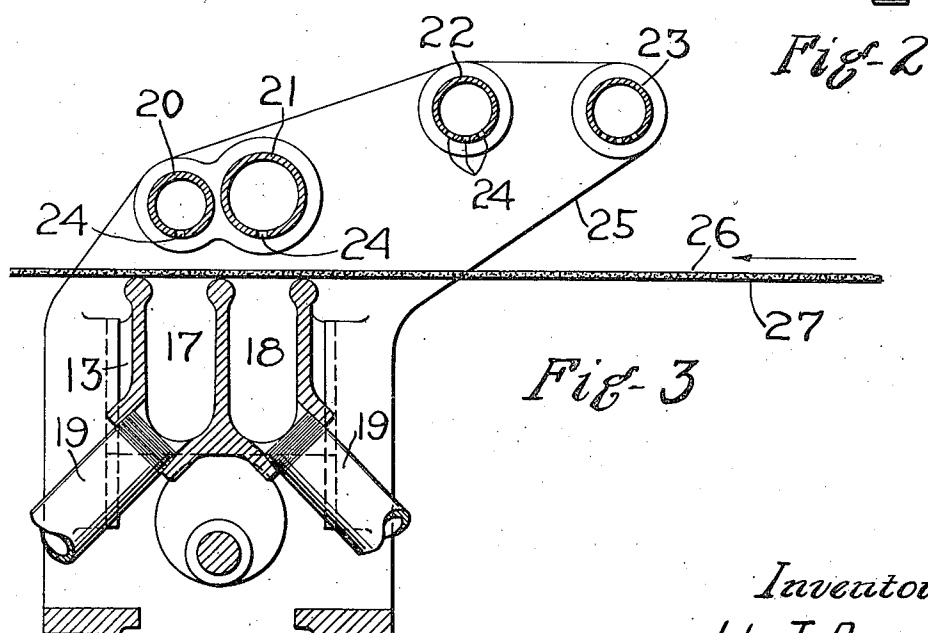
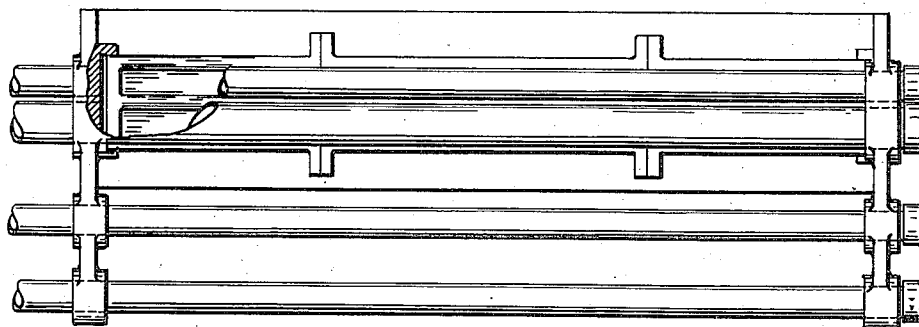
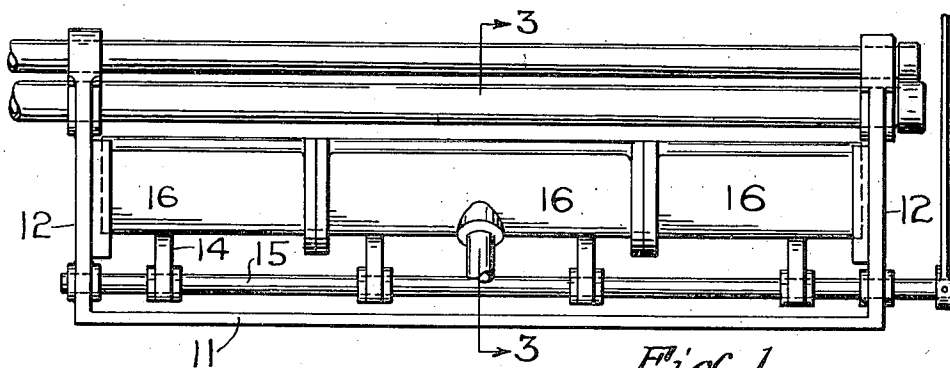


J. T. AYERS.
 PROCESS OF AND APPARATUS FOR WASHING PAPER MACHINE FELTS.
 APPLICATION FILED APR. 29, 1921.

1,438,286.

Patented Dec. 12, 1922.



Inventor
 John T. Ayers
 By *Arthur H. Haugh*
 Attorneys

UNITED STATES PATENT OFFICE.

JOHN T. AYERS, OF MONTREAL, QUEBEC, CANADA.

PROCESS OF AND APPARATUS FOR WASHING PAPER-MACHINE FELTS.

Application filed April 29, 1921. Serial No. 465,530.

To all whom it may concern:

Be it known that I, JOHN T. AYERS, a subject of the King of Great Britain, and resident of the city of Montreal, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Processes of and Apparatus for Washing Paper-Machine Felts, of which the following is a full, clear, and exact description.

This invention relates to a process of and apparatus for washing paper machine felts, and the object is to provide means applicable to a paper machine, by means of which the felts may be washed, while the paper machine is running and without breaking the paper, thereby increasing not only the quantity of paper produced but also the quality.

A further object of the invention is to keep the felt clean, so that considerable accumulations of foreign matter do not result as with present practice.

The invention consists briefly in providing cleaning apparatus which may be located at any suitable point in a paper machine in proximity to an idle portion of the felt, that is to say, the portion of the felt which has been relieved of a layer of paper stock and is travelling to the loading point where it will receive fresh stock. In this idle portion the felt travels in inverted position, that is to say, with the pulp contacting surface down. The apparatus for putting the invention into practice comprises essentially a vacuum box, which may be raised or lowered relatively to the felt, and a series of fluid conducting pipes disposed on the opposite side of the felt from said box.

In the drawings which illustrate the invention:—

Fig. 1 is an elevation of the apparatus.

Fig. 2 is a plan view showing parts of the apparatus broken away.

Fig. 3 is a cross sectional view on the line 3—3, Figure 1.

Referring more particularly to the drawings, 11 designates a framework of any suitable form, which may be separate from the frame of the paper machine or may be incorporated in the paper machine frame as an integral or as an attached part thereof. The frame includes end members 12 between which a vacuum box 13 is vertically slidable, the position of the box being controlled by cams 14 mounted on a rotatable shaft 15 journaled in the frame. The vacuum box

may be of any suitable construction and is therefore not limited to the sectional construction illustrated in Figures 1 and 2, in which the box is built up of sections 16 connected end to end. Preferably, the vacuum box is of duplex construction, that is to say, includes two entirely separate vacuum chambers 17 and 18, each of which has an independent outlet pipe, through which the fluid contents of the chamber may be exhausted. A pair of pipes 20 and 21 are provided above the respective vacuum chambers 17 and 18. A suitable distance to one side of the pipes 20 and 21, further pipes 22 and 23 are provided. All these pipes are provided on their lower surface with perforations 24 in any suitable number and arrangement. The pipes 20 and 21 are preferably supported in the end members 12 of the frame, and the pipes 22 and 23 may be supported independently of the frame at any suitable distance therefrom. The apparatus is so disposed with relation to the paper machine and the felt 26 that the felt passes between the suction box and the pipes 20 to 23, as clearly shown in Figure 3, the felt travelling in the normal operation of the machine in the direction of the arrow. The apparatus is so disposed in the machine that the lower or idle portion of the felt passes through it, with the result that the paper carrying surface 27 of the felt is turned downwardly.

The operation of the device is extremely simple. The pipe 20 is connected to a source of air under pressure, the pipe 21 to a steam supply, the pipe 22 to a cold water supply and the pipe 23 to a washing solution or soap supply, and the pipes 19 are connected to an exhausting device. The suction box normally occupies a depressed position out of contact with the felt. When it is desired to wash the felt, the shaft 15 is rotated, so that the cams 14 lift the suction box into contact with the felt, as shown in Figure 3. The exhausting apparatus is then rendered operative, so that a partial vacuum is created in both the chambers 17 and 18 tending to draw air down through the felt and to remove particles of foreign matter from the surface 27 of the felt. Compressed air is then admitted to the pipe 20 and blows in jets against the back of the felt, thus assisting the action of the suction in the chamber 17. Steam is next admitted through the pipe 21 and blows through the felt in the same manner as the air, the passage through

the felt being induced by the suction in the chamber 18. Cold clean water is next admitted to the pipe 22 and allowed to play in jets on the back of the felt. During these operations the felt is of course in movement in the direction indicated by the arrow, Figure 3, and all three fluids are allowed to continue discharging against the felt for a suitable length of time, usually three or four minutes. It will thus be seen that the felt is next washed with water and later with steam, which is drawn through the felt by the action of the suction chamber 18, so that foreign matter lodged on the surface of the felt is drawn off in place of being driven deeper into the felt. The felt is then subjected to the further cleaning and drying effect of the air jets. When the felt is sufficiently washed, the water supply is first shut off, then the steam, then the air, and lastly the suction, after which the vacuum is lowered out of contact with the felt. By operating in this manner the felt is brought to a substantially dry condition so that its water absorbing qualities when in use are much improved. The cleaning thus described is the ordinary cleaning which is given once or oftener every day. Once or oftener each week a cleaning solution such as hot soapy water is supplied through the pipe 23. In operating to give a soap wash, the use of cold water may be omitted in the earlier part until the whole felt has been treated with the soapy water and the cold water then supplied to rinse the soapy water out of the felt, or both the hot soapy water and the cold clean water may be supplied together. It will be understood that the term "cold water" is used largely for the purpose of distinguishing from the hot water supplied through the pipe 23, and that the term "cold" is purely a relative one as the water supplied through the pipe 22 may be quite warm to the skin. The soap or cleaning solution serves to wash the felt and loosen foreign matter therein, while the cold water serves to rinse out the cleaning solution. The function of the steam, combined with the suction in the chamber 18, is to remove a large portion of the moisture from the felt and also foreign matter which has not been dislodged by the washings. The combined air blast and suction operating on the warm felt extract nearly all the moisture and substantially dry the felt. By continuing the air and suction treatment for a few minutes after the washing and steaming treatments have stopped, the felt may be completely dried.

Both the apparatus and the method of using same in cleaning felts are extremely simple. Their use enables frequent washings of the felt without stopping the paper machine, so that the felt may be kept clean and accumulations of foreign matter therein en-

tirely prevented. This method of operation eliminates the present arduous cleaning operations and furthermore prolongs the life of the felt and improves the quality of the paper, at the same time eliminating loss of time necessary to clean felts, so that the output of the paper machine may be increased. The suction box is movable into and out of contact with the felt in a moment of time by partial rotation of the shaft 15, so that there is no tendency on the part of operators to slight the cleaning or to leave the suction box in contact with the felt. The chambers of the suction box under the air and steam supply pipes are entirely independent, so that different degrees of vacuum may be produced in the two chambers if desired.

Having thus described my invention, what I claim is;—

1. A process of cleaning paper machine felts, which comprises successively treating the same portion of the felt with a washing solution, with steam under pressure, and with air under pressure.

2. A process according to claim 1, in which the treatments are applied to one side of the felt in combination with additionally treating the opposite side of the felt by applying suction thereto.

3. A process according to claim 1, in which the treatments are applied to the back of the felt in combination with treating the front or paper carrying surface of the felt by suction.

4. A process of cleaning paper machine felts, which comprises successively treating the back of the felt with a hot cleaning solution, a cold rinsing water, with steam under pressure and with air under pressure, and exposing the face of the felt to suction simultaneously with the steam and air treatments.

5. A process according to claim 4, in which the suction treatment is continued longest, the air treatment next longest, the water treatment next longest, and the cleaning solution treatment shortest in point of time.

6. A process of cleaning paper machine felts, which comprises successively applying a series of cleaning fluids to the back of the felt, and drawing said fluids through to the face of the felt by suction applied to the face of the felt.

7. Apparatus for cleaning paper machine felts comprising a suction box disposed for engagement with the face of a felt, means for directing washing fluids against the back of the felt at a point adjacent the suction box, and means for directing drying fluids against the back of the felt at a point in register with the suction box.

8. Apparatus for cleaning paper machine felts comprising a pair of independent suction chambers disposed for engagement with

the face of a felt, means for applying washing fluids to the back of a felt adjacent said chambers, and means for applying separate drying fluids to the back of the felt in register with said suction chambers.

5 9. Apparatus for cleaning paper machine felts comprising a framework, a suction box slidable therein, a shaft rotatably mounted in the framework, cams on said shaft engaging the suction box to slide the same, and
10 a perforated pipe disposed opposite the mouth of the suction box, the perforations of said pipe being directed toward the suction box.

10. A device according to claim 9, in which the suction box comprises a pair of independent suction chambers, opposite one of which the perforated pipe is located, and a second similar perforated pipe located opposite the other chamber from the suction box.

11. In combination with a device according to claim 9, a perforated pipe located adjacent and to one side of the suction box.

In witness whereof, I have hereunto set my hand.

JOHN T. AYERS.