Feb. 10, 1925. 1,526,094

W. SHEAHAN

FELT CLEANER

Filed Dec. 28, 1922 4 Sheets-Sheet 1

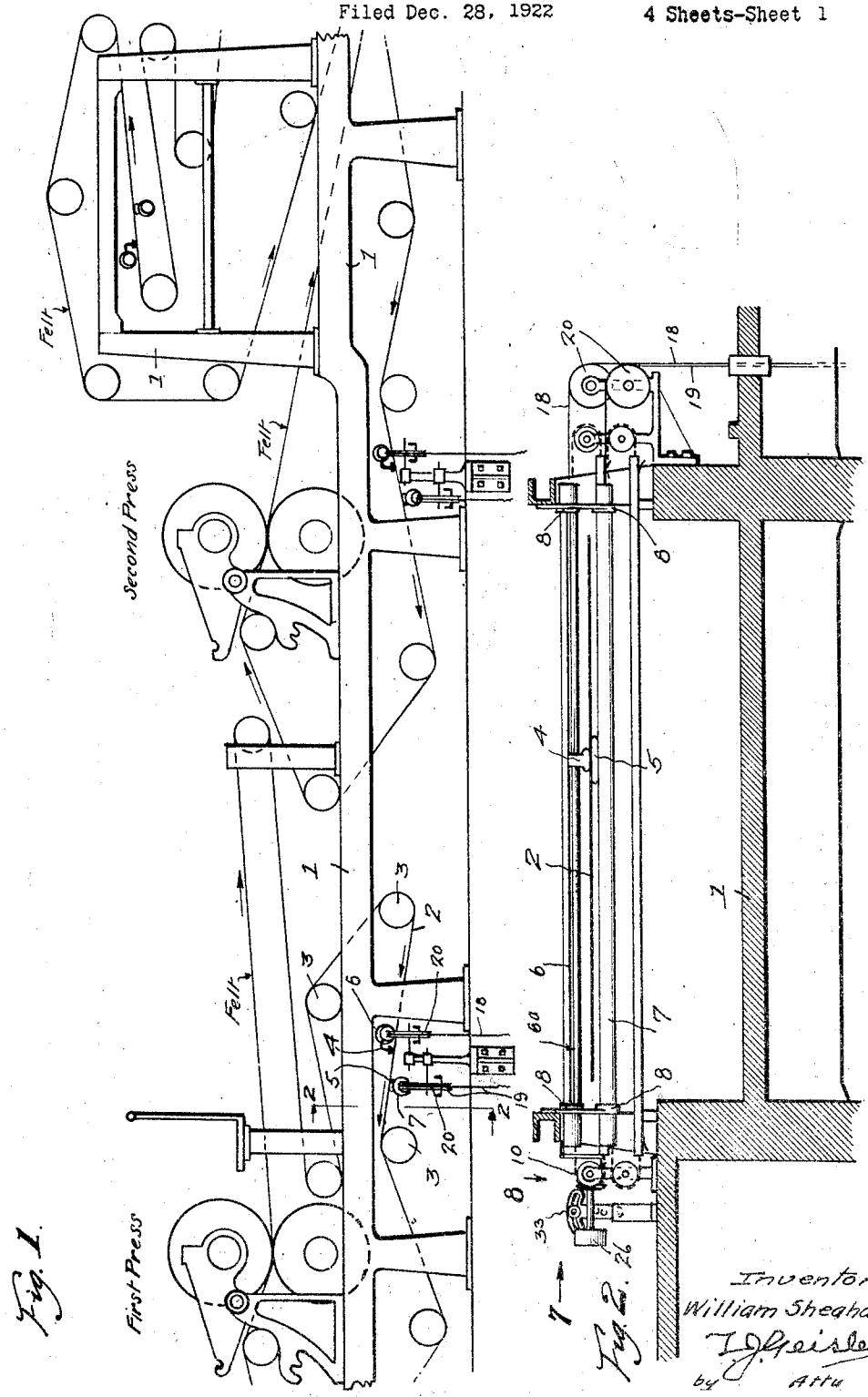


Fig. 1.

Fig. 2.

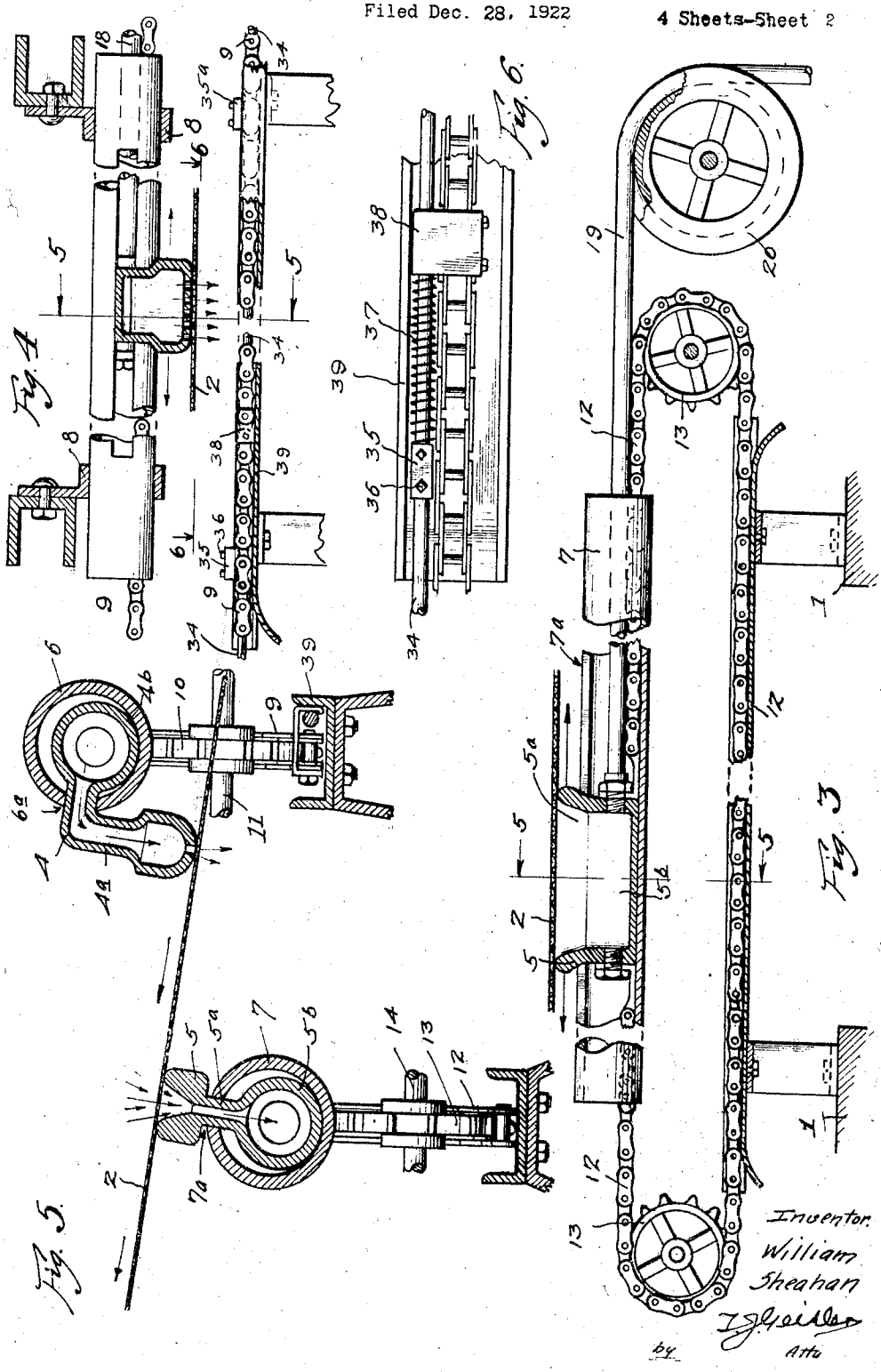
Inventor:
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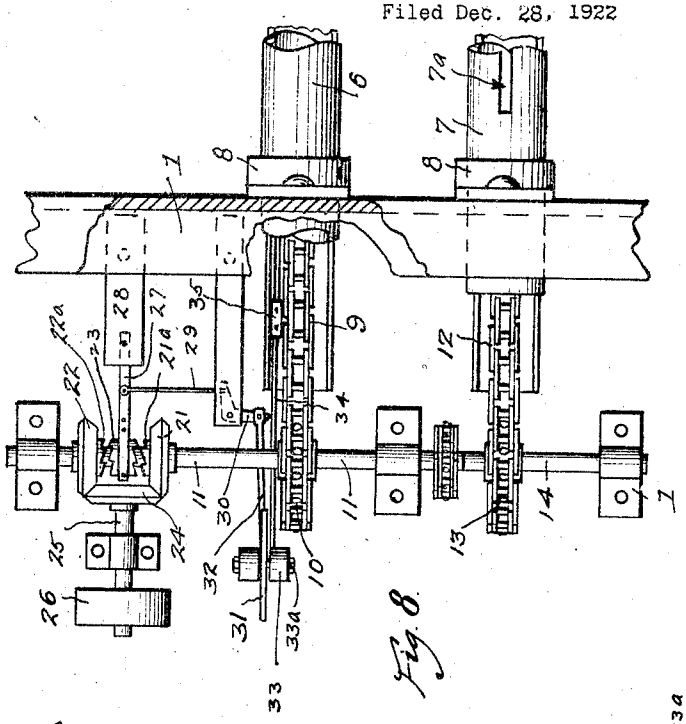


Fig. 8

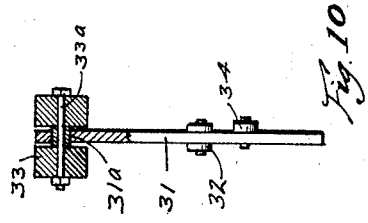


Fig. 10

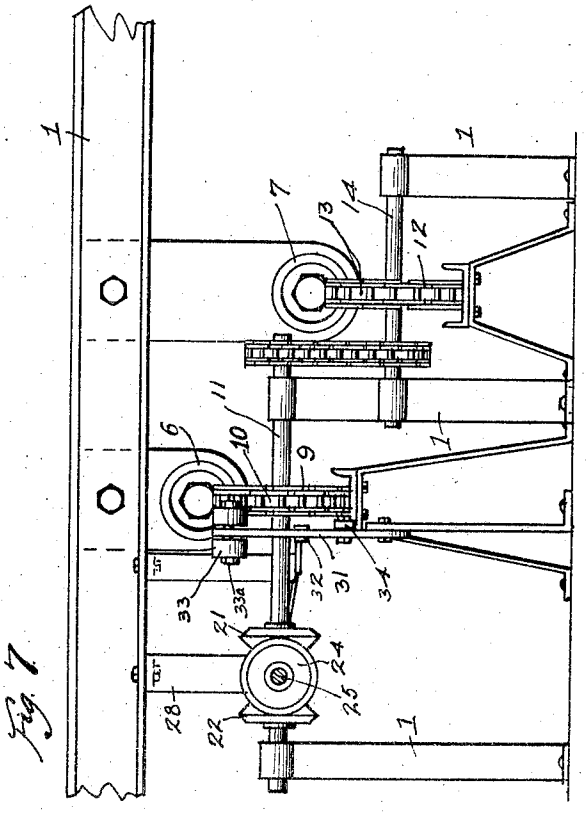


Fig. 7

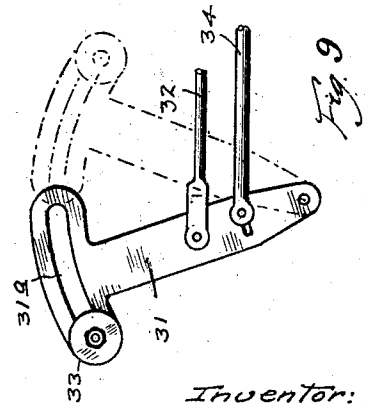


Fig. 9

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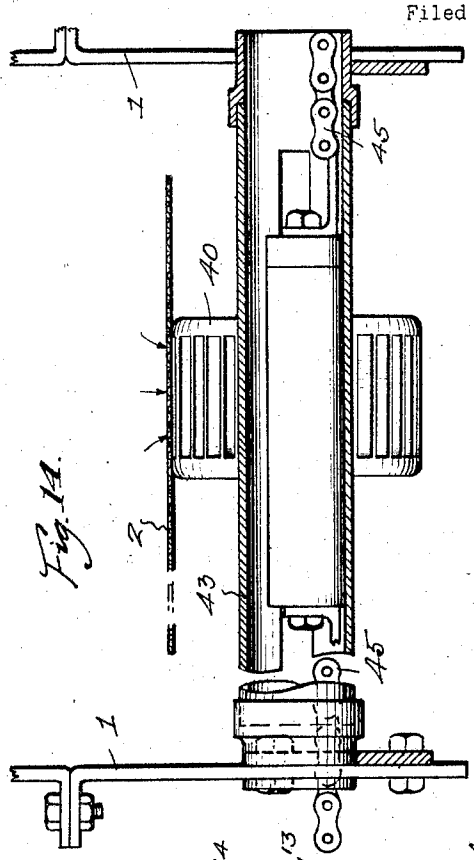


Fig. 14.

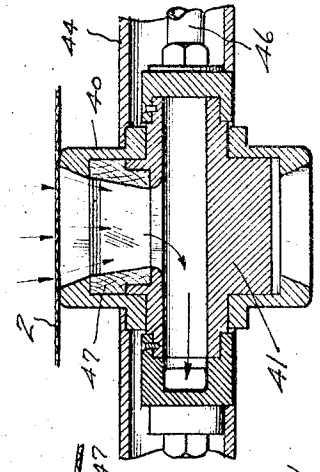


Fig. 16.

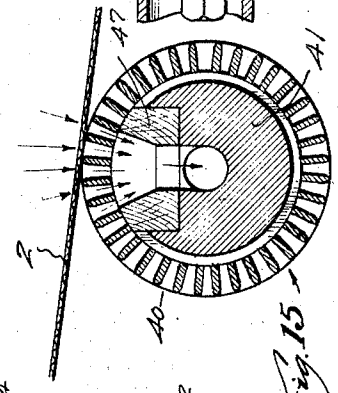


Fig. 15.

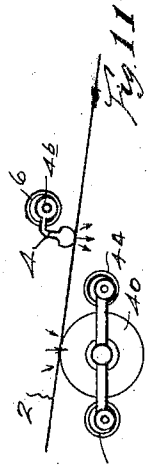


Fig. 11.

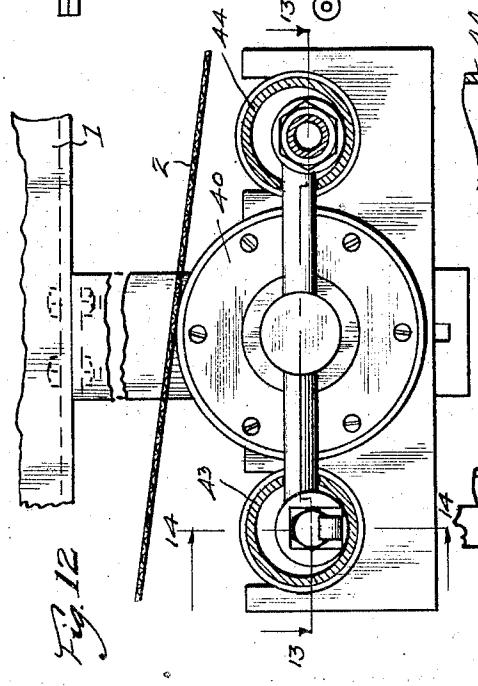


Fig. 12.

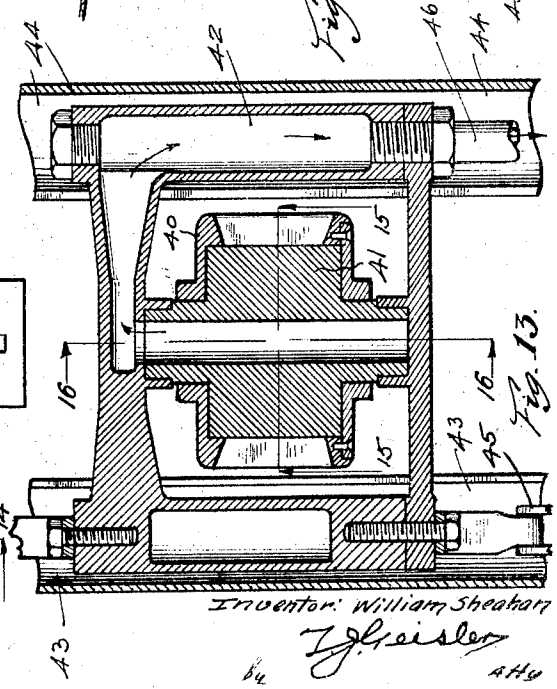


Fig. 13.

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Atty

Patented Feb. 10, 1925. 1,526,094

UNITED STATES PATENT OFFICE.

WILLIAM SHEAHAN, OF POWELL RIVER, BRITISH COLUMBIA, CANADA; LAMAR TOOZE, ADMINISTRATOR OF SAID WILLIAM SHEAHAN, DECEASED, ASSIGNOR TO JOSEPH W. SHEAHAN AND EDWARD K. SHEAHAN, BOTH OF LOS ANGELES, CALIFORNIA, MARIE B. TOOZE AND LOUISE M. SHEAHAN, BOTH OF EUGENE, OREGON.

FELT CLEANER.

Application filed December 28, 1922. Serial No. 609,504.

To all whom it may concern:

Be it known that I, WILLIAM SHEAHAN, a citizen of the United States, and a resident of Powell River, Province of British Columbia, Dominion of Canada, have invented a new and useful Improvement in Felt Cleaners, of which the following is a specification.

My invention has for its broad purpose the provision of efficient means for cleaning a travelling belt of fabric. The specific purpose of my invention is to provide such cleaning means adapted for cleaning the endless web of felt of a paper making machine. Said felt carries a sheet of wet paper, still in the stage of formation and the excess water, which is taken up by the felt, contains considerable foreign matter which tends to embed itself in the web and thus clog and cake the felt. This renders the felt unfit for use while in that condition, hence requires the shutting down of the machine to permit the removal of the same. The foreign matter tends to become tightly embedded in the felt and thus considerable force must be employed to remove the same. Heretofore the felt was removed from the machine and washed to remove this embedded material which necessitated the shut down of the machine, and this in turn materially decreased the output thereof.

The specific object of my invention, therefore, is to provide mechanism which will effectively clean the felt cloth while it is functioning in the paper machine, and which will clean said felt without interfering with its correct operation, and which will not necessitate a substantial increase in power to move the cloth.

A further object is to provide cleaning means which consist of both pressure and suction operating devices and the apertures through which said forces act, are relatively narrow and thus impose only a slight resistance to the movement of the felt, said devices moving in synchronism with each other across the felt thereby to effect a thorough cleaning of the felt with the minimum resistance to movement thereof.

These and other objects are shown in the accompanying drawings, in which:

Fig. 1 is a diagrammatic representation of the portion of the paper machine in which felts are used;

Fig. 2 is a section taken on the line 2—2 of Fig. 1 and shows the cleaning mechanism;

Fig. 3 is an enlarged view of the suction half of my cleaning device with parts broken away to show the mechanism covered thereby;

Fig. 4 is an enlarged detail view of the pressure half of my device;

Fig. 5 is a composite sectional view taken on the lines 5—5 of Figs. 3 and 4 and is slightly enlarged and shows the relative positions of the pressure and suction members to each other;

Fig. 6 is a view taken on the line 6—6 of Fig. 4 and shows a detail of construction;

Fig. 7 is an enlarged side elevation taken on the direction of the arrow 7 in Fig. 2;

Fig. 8 is an enlarged fragmentary plan view taken in the direction of arrow 8 in Fig. 2 of the same end shown in Fig. 7 and has parts broken away to show details of construction;

Fig. 9 is an elevation partially diagrammatic and shows a detail of construction;

Fig. 10 is a detail view partly in section showing the governor arm and governor weight;

Fig. 11 is a diagram showing the position of the nozzles in relation to each other;

Fig. 12 is a side elevation of a slight variation of a suction device embodying my invention and shows the web and supporting members in section;

Fig. 13 is a section taken on the line 13—13 of Fig. 12 and shows the direction of the flow of the fluid by arrows;

Fig. 14 is a section taken on the line 14—14 of Fig. 12, showing the limited portion of the web which is subjected to suction action;

Fig. 15 is a section taken on the line 15—15 of Fig. 13 and shows the suction surface is very limited, the arrows diagrammatically showing the direction of the suction action; and

Fig. 16 is a section taken on the line 16—16 of Fig. 13 and is a longitudinal section of the parts shown in Fig. 15 and shows how the air is drawn thru the web.

This cleaning device can be mounted to the frame 1 of a paper machine in any convenient position and is adapted to clean the moving endless felt 2 which passes

around the rollers 3 which are journaled in the frame 1. The cleansing device is made with two cleansing nozzles, the upper nozzle 4 using pressure and the lower nozzle 5 being tapped to a source of partial vacuum and exerting a suction force. The pressure nozzle is preferably positioned slightly in advance of the suction nozzle and thus the felt is first subjected to a force tending to blow the residual matter deposited by the passing paper downward and then the suction nozzle tends to remove the remaining portion of said matter which was not removed by the pressure nozzle downwardly from said felt. These nozzles are comparatively short as compared to the width of the felt and thus when they are acting they do not materially resist the forward motion of the felt. They are moved slowly across the width of the felt so as to cleanse all portions of the same and are moved synchronously in relation to each other so that the nozzles both affect the same portion of the felt consecutively. The cleansing nozzles are mounted and are guided by pipes 6 and 7, 6 being the guide pipe for the pressure nozzle 4, and 7 being the guide pipe for the suction nozzle 5. These pipes are rigidly mounted between brackets 8 which are affixed to the side frame 1 of the paper machine. The supporting pipes have slots 6^a and 7^a of substantially the same length as the width of the felt. The nozzles 4 and 5 are made with narrowed portions 4^a and 5^a and these portions ride in the slots 6^a and 7^a. The enlarged portions 4^b and 5^b rest on the bottom of the fixed pipe, thus preventing the nozzle from being removed during the cleansing operation and also tend to cause the nozzles to run smoothly across the felt.

A chain 9 is fastened to the pressure nozzle 4 and is run thru the fixed supporting pipe 6, and is mounted over the sprockets 10. These sprockets are mounted on a shaft 11 which is mounted in the frame 1. The endless chain 12 is attached to the suction nozzle 5 and is mounted over sprockets 13 which are journaled on shafts 14 which are also journaled in frame 1. Shafts 11 and 14 are connected by a chain 17 which meshes with the sprockets 15 on the shaft 11 and the sprocket 16 on the shaft 14. These sprockets being both of the same size will cause the sprockets 10 and 13 to rotate at the same rate, thus moving the nozzles at the same rate. A flexible air or steam hose 18 is connected to the pressure nozzle 4 and the hose 19 is connected to the pressure nozzle 5. These sections of hose are also run thru the supporting pipes 6 and 7 and are run over guide sheaves 20 and are always held taut by any suitable mechanism. Thus when the nozzles are moved towards the sheave 20 the weight on the hose tends to keep it always taut thus preventing buckling.

The chains and sprockets already described move the nozzles across the upper and under face of the felt and automatic reversing mechanism reverses the movement when the nozzles reach the edge of the felt. This mechanism consists of two bevel pinions 21 and 22 which are loosely journaled on the shaft 11 but are held against sliding on the shaft. These pinions are made with ratchet jaws 21^a and 22^a respectively, which are unitary with the pinions and are positioned spaced apart. A double faced ratchet 23 is keyed to the shaft 11 and mounted between these two faces and adapted to co-act with one or the other of the ratchet faces when it is moved into and out of operation. This double faced ratchet is slidable on the shaft but is keyed thereto. A beveled pinion 24 mounted on the drive shaft is provided with a drive pulley 26 over which a belt can be mounted and which is adapted to turn the drive shaft. Thus when the drive shaft is rotated bevel pinions 24 rotate the pinions 21 and 22 in opposite directions. A shifter yoke 27 grips the double faced ratchet and is adapted to throw the ratchet into co-action with either the ratchet face 21^a or the ratchet face 22^a. This shifter yoke is pivotally connected to the extension 28 which is in turn fastened to the frame 1. This shifter yoke is movable on its pivot in the base 28 and is moved by the rod 29 which is connected to the bell crank 30. The bell crank is also connected to the governor arm 31 thru the rod 32. Thus when the governor arm 31 is moved it throws the double faced ratchet into and out of connection with either of the ratchet faces 21^a and 22^a. The governor arm can be made with an arcuate slot 31^a in which is loosely mounted a governor weight 33. The governor weight 33 is made in two pieces connected by the pin 33^a and is adapted to slide loosely in the arcuate slot. The governor arm is also connected to the reversing rod 34 which has stops 35 and 35^a on the opposite ends of the travel of the cleaning nozzles. These are adjustable on the rod 34 and are attached by the screws 36 so that the length of travel of the nozzles can be adjusted by moving the stops in and out on the rod 34. Coil springs 37 are provided to be coiled about the rod 34 to act as bumpers so that the extension link 38 which is fastened to the sprocket chain 12 will not strike the stop with a jar but will act thru the spring and thus eliminate any sudden reversing in movement. The reversing rod is adapted to lie in the channel section 39 which also forms a groove in which the lower part of the sprocket chain 9 bears.

The operation of the governing mechanism is as follows: The nozzle 4, for ex-

ample, is drawn in the guiding pipe 6 to and fro in the slot 6ª. It is necessary that when the nozzle reaches the edge of the felt that it should be returned across the surface so as to have a continuous action on the felt and also to cover its entire width. The extension link 38 will strike either the stop 35 or 35ª, depending on which way it is traveling. If it strikes either of the stops the extension link will strike the spring bumper 37 and compress it until the action moves the reversing rod 34. The reversing rod 34 will push the governing arm over to its opposite throw which will be on the opposite side of the gravitational center and thus the governing arm will tend to remain in its new position. The double faced ratchet will then be thrown into contact with the opposite ratchet face thru the mechanism previously described, and thus will cause the shaft 11 to rotate in the opposite direction which will cause the sprockets and chains also to reverse which will in turn cause the nozzles to move in the opposite direction. It can be seen that the action of both nozzles will be controlled by a single governing mechanism and thus the nozzles will always tend to move in synchronism. In practice it may be desirable that the suction nozzle lag slightly behind the pressure nozzle so as to clean the same strip because it can be seen that because the pressure nozzle is advanced slightly and moving transversely across the web it will strike one section of the web before the suction nozzle will if alined with each other.

The structure shown in Figs. 11 to 16 inclusive is a device embodying my invention. In this device the felt 2 rests against a vented roller 40 which is fitted closely about the suction head 41 which is connected to a source of suction thru the pipe 42. The suction head is mounted between two guide pipes 43, 44. The chain 45 which moves the suction head is contained within the guide pipe 43. The flexible hose 46 which connects the suction head to the source of partial vacuum is contained within the guide pipe 44. The vented roller 40 is adapted to rotate easily about the suction head 41. Thus as the moving web passes over it rotates the roller 40 and thus there is no frictional drag on the felt so as to wear it out. The suction is prevented from acting over a wide surface because this roller is fitted very closely about the bearing block 47 and the opening is comparatively narrow. An thus the suction only acts on that portion of the traveling web which is in direct contact with the vented roller.

While the suction element 5 is shown in Fig. 2 as of short length, it may extend all the way across the felt if preferred; because, in my opinion, a partial vacuum is not difficult to maintain. But my experience has convinced me that the means for blowing the cleansing fluid thru said felt should have only a limited orifice and be moved across the felt in order to work on all sections thereof because it is a rather difficult matter to maintain a sufficient head of air to work effectively if the pressure element 4 extends all the way across the felt.

I claim:

1. In a felt cleaner of the character described, means for blowing fluid under pressure thru one side of the web and means for applying suction to the opposite side of the web, both said means moving to and fro in synchronism with each other, crosswise of the path of the web.

2. In a felt cleaner of the character described, means for blowing fluid under pressure thru one side of the web and means for applying suction to the opposite side of the web, both said means moving to and fro in synchronism with each other, crosswise of the path of the web, the suction means being arranged to follow the action of the blowing means.

3. In a felt cleaner of the character described, a guideway located on each side of the path of the web to be cleaned, a nozzle sliding in each guideway, one nozzle being connected with a fluid under pressure, and the other with a partial vacuum, and means for moving the nozzles, in synchronism with each other, to and fro across the path of the web.

4. In a felt cleaner of the character described, a guideway located on each side of the path of the web to be cleaned, one guideway being arranged in advance of the other relatively to the travel of the web, a nozzle sliding in each guideway, one nozzle being connected with a fluid under pressure, and the other with a partial vacuum, and means for moving the nozzles, in synchronism with each other, to and fro across the path of the web.

5. In a felt cleaner of the character described, a tubular, longitudinally slitted guideway located on each side of the path of the web to be cleaned, a nozzle sliding in the slit of each guideway, one nozzle being connected with a fluid under pressure, and the other with a partial vacuum, and means for moving the nozzles, in synchronism with each other, to and fro across the path of the web.

6. In a felt cleaner of the character described, a guideway located on each side of the path of the web to be cleaned, a nozzle sliding in each guideway, a flexible pipe connected with each nozzle, a pulley on which such pipe rests, and means for keeping the pipe taut, but adapted to permit the movement of the nozzle, one pipe being con-

nected with a fluid under pressure and the other with a partial vacuum, and means for moving the nozzles, in synchronism with each other, to and fro across the path of the web.

7. In a felt cleaner of the character described, a guideway located on each side of the path of the web to be cleaned, a nozzle sliding in each guideway, a flexible pipe connected with each nozzle, a pulley on which such pipe rests, and means for keeping the pipe taut, but adapted to permit the movement of the nozzle, one pipe being connected with a fluid under pressure and the other with a partial vacuum, sprockets and chains arranged cross-wise of said path, each of said chains carrying one of said nozzles, means for driving said sprocket chains, and automatic means for alternating the direction of said drive.

8. In a felt cleaner of the character described, a guideway located on each side of the path of the web to be cleaned, a nozzle sliding in each guideway, a flexible pipe connected with each nozzle, a pulley on which such pipe rests, and means for keeping the pipe taut, but adapted to permit the movement of the nozzle, one pipe being connected with a fluid under pressure and the other with a partial vacuum, the nozzle connected with the source of pressure being located in advance of the other nozzle relative to the travel of the web, sprockets and chains arranged cross-wise of said path, each of said chains carrying one of said nozzles, means for driving said sprocket chains, and automatic means for alternating the direction of said drive.

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