Apr. 10, 1923. 1,451,568

B. B. FARNHAM

VACUUM ROLL

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Fig. 1.

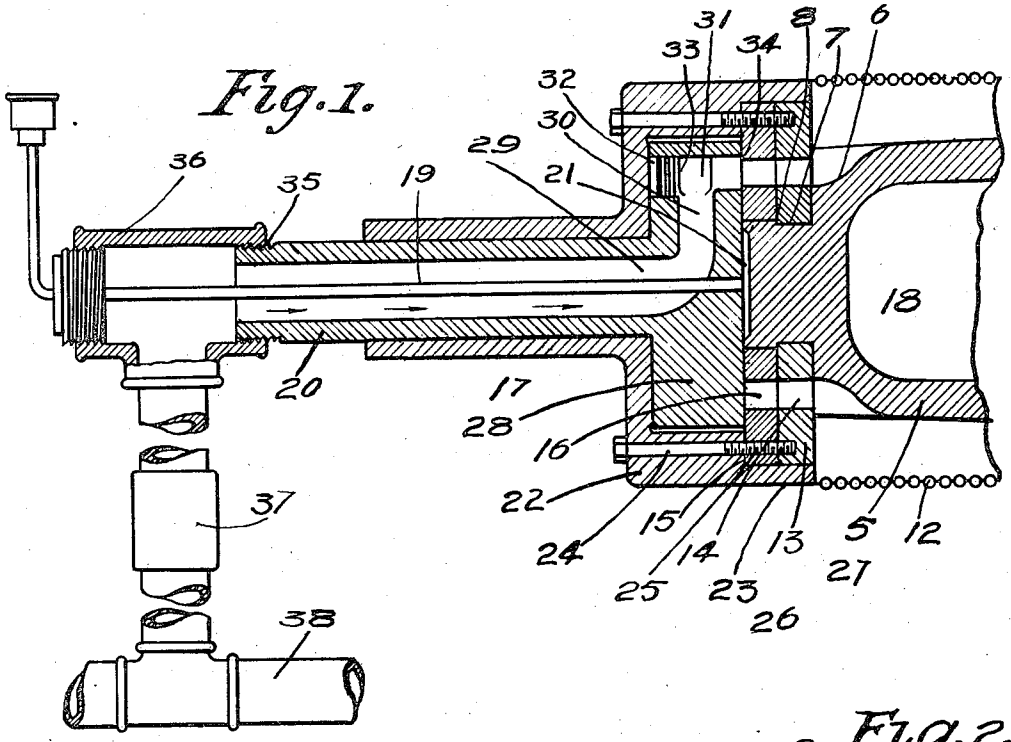


Fig. 2.

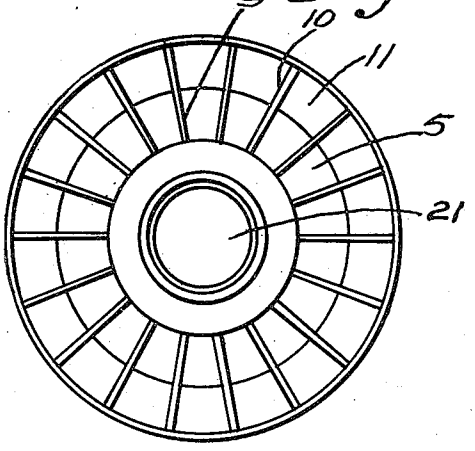
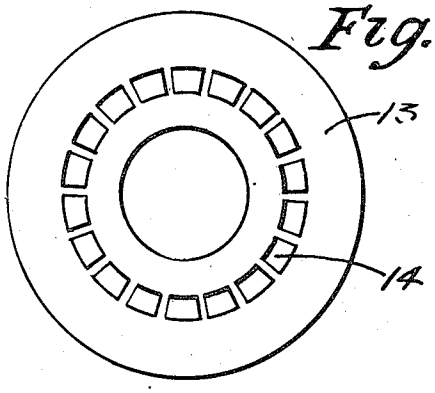


Fig. 3.



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Filed Aug. 11, 1919 2 sheets-sheet 2

Fig.4.

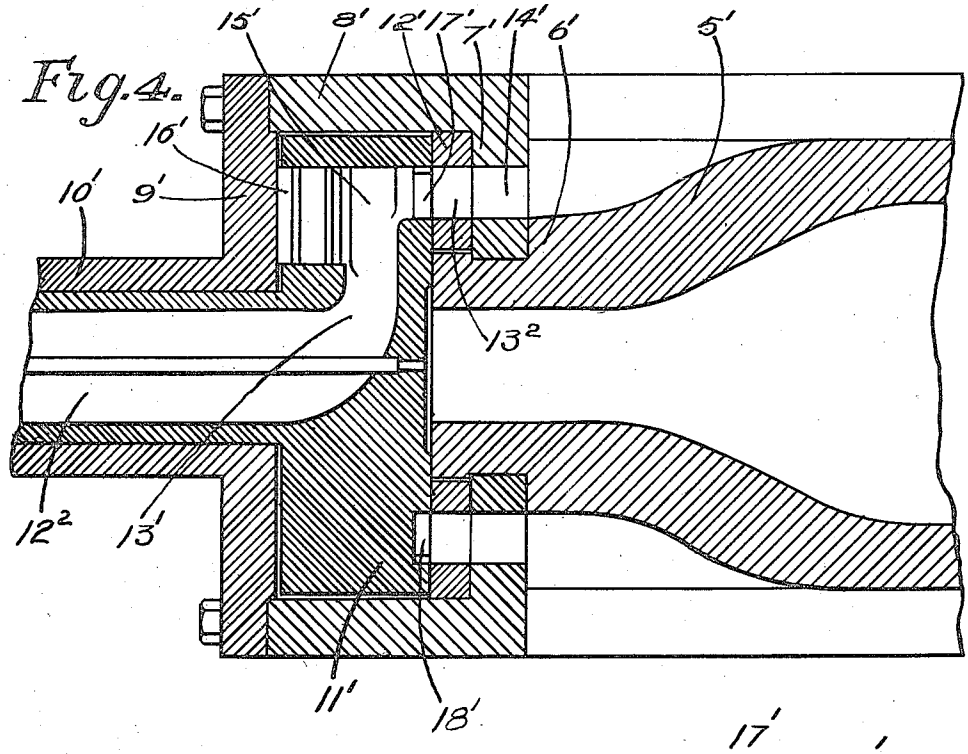


Fig.7.

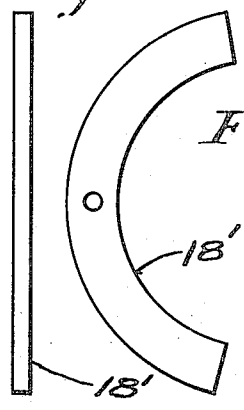
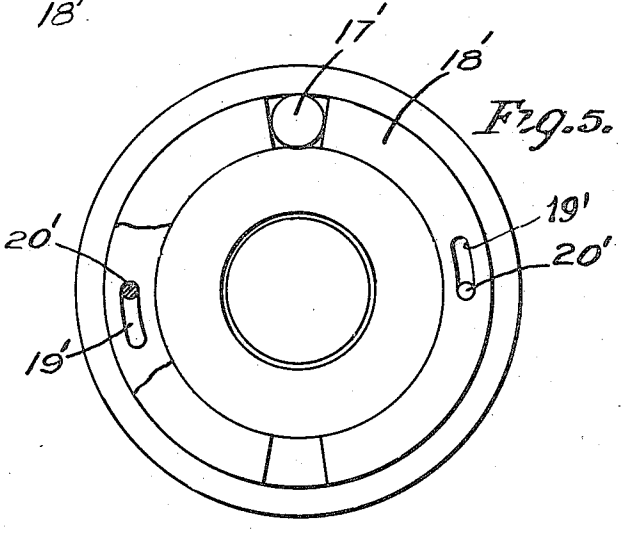


Fig.6.

Fig.5.



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UNITED STATES PATENT OFFICE.

BION B. FARNHAM, OF BUFFALO, NEW YORK.

VACUUM ROLL.

Application filed August 11, 1919. Serial No. 316,664.

To all whom it may concern:

Be it known that I, BION B. FARNHAM, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Vacuum Roll, of which the following is a specification.

This invention relates to paper making machines, the primary object of the invention being to provide means located adjacent the wet end of the paper machine, immediately to the rear of the last couch roll, for extracting the moisture from the paper, before it enters the press rolls, thereby preventing the crushing of the paper stock, and eliminating the felt marks.

Another object of the invention is to provide a device of this character wherein steam may be passed therethrough, in one direction to clean the felts of the machine.

A further object of the invention is to provide means for insuring a tight joint between the working elements of the roll, thereby guarding against the loss of steam by leakage.

A still further object of the invention is to provide a roller capable of use with either the steam or the vacuum, system, and one which will increase the production of paper machines, and accomplish this result with a lower steam pressure, consequently materially saving fuel used in generating steam.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed without departing from the spirit of the invention.

Referring to the drawings:—

Figure 1 illustrates a sectional view of one end of a roller constructed in accordance with the present invention.

Figure 2 is an end view of the roller with the valve plates removed.

Figure 3 is a side elevational view of a valve plate constructed in accordance with my invention.

Figure 4 is a sectional view of a modified form of the drying roll.

Figure 5 is an end view of the head with the valve and valve regulating means secured thereto.

Figure 6 is a side elevational view of one of the valve controlling means.

Figure 7 is an elevational view of one edge of the segmental valve controlling means.

Referring now to the drawings in detail, the reference character 5 designates the hub or core of the roll, which as shown, tapers towards its ends as at 6 and is provided with a reduced portion 7 having a shoulder 8 formed at one end thereof.

Extending longitudinally of the hub 5, are a plurality of grooves 9 disposed in spaced relation with each other around the periphery of the hub 5, to form seats for the partitions 10, which extend the entire length of the hub 5, and divide the same into a plurality of radial compartments 11 for purposes to be hereinafter more fully described.

Positioned on the outer edges of the partitions 10, and secured thereto by suitable means not shown, is a covering 12, which may be formed of a perforated sheet of metal, or wire mesh, to permit the passage of steam or air therethrough, during the drying operation.

Positioned on the reduced end 7 of the hub 5, is a plate 13, having openings 14 arranged therein in spaced relation with each other, and in such position that the same will register with the respective compartments 11 of the roll. This plate 13 abuts, at one of its edges with the circular plate 15, which also has openings 16, registering with the openings 14 of the plate 13. It is of course obvious that the reduced end 7 of the hub 5 moves with relation to the end or face of the valve 28, and is supplied with a lubricant by the pipe 19 extending through the steam supply pipe 20, one end of said pipe 19 terminating at a point adjacent the end of the hub 5 to discharge the lubricant to the pocket 21 formed in said hub 5.

The head 22 is provided with the flange 23, which embraces the plates 13 and 15, and is secured thereto by means of the bolts 24 passing through openings in the head 22, and the threaded portion 25 of the plates 13 and 15. It will therefore be seen that the plates 13 and 15 are stationary with the head 22, and prevented from rotary movement with relation thereto.

Positioned within the head 22, is the valve member 28, which is of a diameter equal to the interior diameter of the head 22, and is provided with a central opening 29 having one end thereof in communication with the opening 30, which has a right angled portion 31 adapted to register with the openings 14 and 16 of the plates 13 and 15, to supply a volume of steam thereto.

As shown, the opening 31 is of a diameter greater than the diameters of the openings 14 and 16, one end of said openings 31 being relatively large, and adapted to receive the sliding piston 32 one end of which operates against the stop 33 formed integral with the wall of said opening, thereby restricting movement thereof in one direction, said piston being capable of a slight movement between the stop 33 and inner wall of the head 22, so that when steam pressure enters the opening 31, the reaction of the steam contacting with the shoulders 34, adjacent one end of the openings 16, acts on the piston 32 to force the same against the inner wall of the head 22, with the result that the plate 15 is closely held against the face of the valve 28, and prevents leakage of steam between the plate 15 and valve 28.

The pipe 20 has a threaded extension 35, which has connection with the T 36, which in turn has connection with a steam supply, not shown, through the pipes 37 and 38.

In the modified form of my invention shown more particularly by Figure 4 of the drawings, the hub 5′, is also provided with a reduced extension 6′ which extension accommodates the right angled portion of the ring 8′, which has connection with the right angled portion 9′ of the hub 10′ and forms the head or casing for the valve 11′.

Mounted on the reduced end of the hub 5′, is a ring 12′, which has an opening 13^2 registering with the opening 14′ of the right angled end 7′, for providing communication between the various compartments of the roll, and the valve 11′.

The valve 11′, has communication with the supply pipe 12^2, by means of the opening 13′, which opening, has communication with the opening 13^2, of the ring 12′, to supply steam to the roll.

A relatively large opening 15′ is provided in the valve member 11′, and accommodates the piston 16′, which acts as before stated, to draw the plate 12′ into engagement with the face 11′ for creating steam tight connection between the plate 12′ and face of the valve 11′.

Disposed adjacent the opening 17′ of the valve 11′, are the segmental plates 18′, each of which is provided with a slotted portion 19′, to receive the threaded bolts 20′, whereby the segmental valve plates may be moved over the opening 17′ for enlarging or reducing the area of said opening 17′ to vary the quantity of steam passing therethrough which variation is necessary according to the material undergoing the cleaning operation.

The operation of the device is as follows:

When the device is to be used as a drying roll, a vacuum is produced in pipe 20 by drawing air therethrough. As the air contacts with the piston 32, it is obvious that the piston moves into engagement with the head 22. In connection with the foregoing it might be stated that suction created within the roller causes the steam passing therethrough to contact with the member 32 to force the same into engagement with the head 22, moving the head and plate 15 carried thereby into close engagement with member 28, the same as does pressure in the opening 31, thereby moving the head and sections of the roll connected thereto, with the result that a steam-tight connection is made between the plate 15 and member 28.

When the device is to be used to clean the felts passing over the roll, steam is forced into pipe 20 and into the roll. It is obvious that as steam passes by the piston 32, the piston 32 is forced into engagement with the wall 22, and since the piston area is greater than the port area to the roll, an unbalanced pressure is created in the direction of the arrow as indicated in Figure 1 of the drawing, which tends to force the member 15 into close engagement with the member 28.

Having thus described the invention, what is claimed is:—

1. In a drying roll, a hub having tapered ends, and having compartments formed on the surface thereof, a head movable with the hub, a valve member within the head and having an opening for supplying steam to the various compartments of the hub, means operated by the reaction of the steam in said opening of the valve member, for moving the head into close engagement with the valve member.

2. In a drying roll, a movable hub, partitions on the hub forming compartments around the surface thereof, said hub having a reduced end, a head having lateral opening and a central opening positioned over the reduced end, a stationary valve member within the head and having an opening terminating at the face thereof, a plate having openings therein registering with the lateral openings of the head, said opening of the rotary valve member adapted to register alternately with the openings of the plate, and means for providing a steam connection between the rotary valve member and hub.

3. In a drying roll, a hub, said roll having compartments formed on the surface thereof, a head mounted at one end of the roll, a valve member mounted between the hub and head, said valve member having a

central opening communicating with a lateral opening, said head having an opening communicating with the lateral opening, a piston moving in the last mentioned opening and contacting with the head, and said piston adapted to be forced into engagement with the head to move the cylinder, when steam passes through the openings.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

BION B. FARNHAM.

Witnesses:
FRANK L. BOUTET,
HELEN J. ENO.