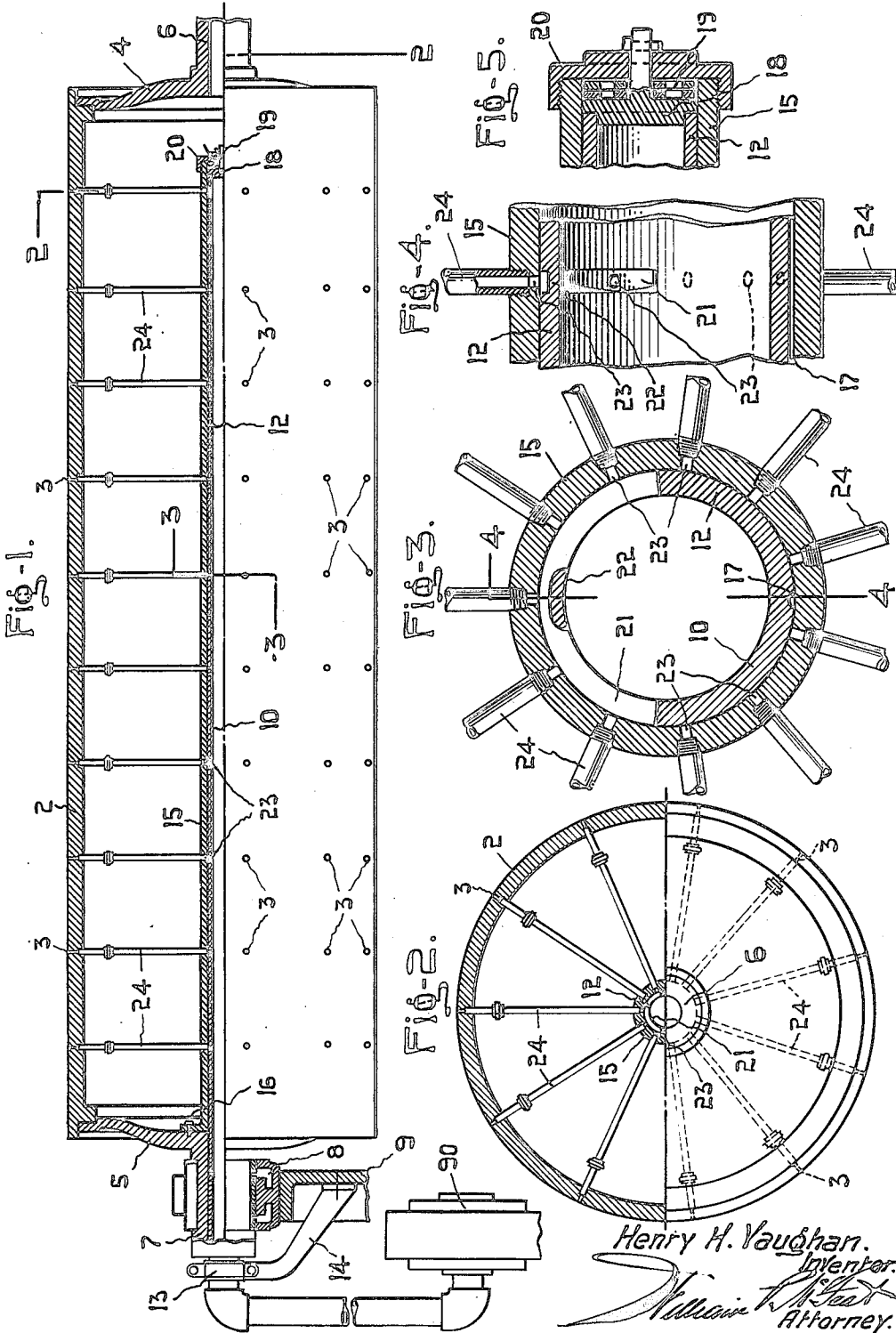


H. H. VAUGHAN,
 DRYING ROLL FOR PAPER MAKING MACHINERY.
 APPLICATION FILED APR. 3, 1920.

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UNITED STATES PATENT OFFICE.

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DRYING ROLL FOR PAPER-MAKING MACHINERY.

Application filed April 3, 1920. Serial No. 371,060.

To all whom it may concern:

Be it known that I, HENRY H. VAUGHAN, 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 Drying Rolls for Paper-Making Machinery; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to machinery for the drying of paper and mill board in which the paper or mill board is carried around a number of drums heated by steam or other suitable means. Heretofore it has been the practice to feed the paper to the drums and hold the same in position thereon by an endless belt usually of felt which in effect carried the paper or mill board while retaining it against the drying roll. The object of my invention is to overcome the necessity of using a belt or other carrying medium, while at the same time to provide an efficient means whereby the paper or mill board is retained in place and released as required.

Broadly stated my invention resides in a drying roll for paper, mill board and the like, and consists in the substitution for the usual felt carrier of a suction action taking place between the surface of contact between said paper, mill board and the like and the drying roll.

More specifically stated the invention consists of a perforated drum and means for causing suction through said perforations, said means consisting of a suction device, a valvular member connected to the suction device and located within the drum and extending longitudinally of the same, a second valvular member encircling the first mentioned member and pipes effecting communication between the second member and the perforations in the drum.

For full comprehension, however, of my invention reference must be had to the accompanying drawings in which similar reference characters indicate the same parts and wherein:

Figure 1 is a side elevation partly in section of a drying roll constructed according to my invention;

Figure 2 is a transverse sectional view taken on line 2—2 Figure 1;

Figure 3 is a transverse sectional view taken on line 3—3 Figure 1;

Figure 4 is a fragmentary longitudinal sectional view taken on line 4—4 Figure 3; and

Figure 5 is a detail sectional view of closure for the inner end of the valvular pipes within the roll.

In carrying out my invention each drum consists preferably of a hollow cylindrical member 2 perforated throughout its length as at 3, the perforations being arranged in circumferential series. The ends of the drum are closed by covers 4 and 5 seated upon annular flanges formed integrally with each end of the drum. Hollow trunnions 6 and 7 formed integrally with the covers 4 and 5 respectively, are journaled in bearings 8 carried in standards 9, the trunnion 6 being hollow for the purpose of admitting the necessary piping (not shown) for supplying steam to the interior of the drum and for the exhaust of the condensation water, while trunnion 7 accommodates piping constituting an element of the means for causing suction through the perforations for the purpose of maintaining the paper in position upon the drum during travel around the same.

This last mentioned means consists of a suction device illustrated diagrammatically at 90 which may consist of a fan or any preferred means. To this suction device is connected by a pipe line 10 a valvular mechanism for controlling the suction through the perforations. This valvular mechanism consists of a stationary pipe 12 passing through trunnion 7 and centrally of the drum to a point within close proximity of the cover 4, rotation and displacement of the pipe being prevented by a clamp 13 encircling the pipe immediately before it enters the trunnion 7, such clamp being carried by a bracket 14. Closely fitting over this stationary valvular pipe with a snug sliding fit is a second valvular pipe 15 which extends from the free inner end of the former to the inner face of the cover 5 to which it is rigidly fastened by screws 16. This second pipe is rotatable in

unison with the drum and around the stationary pipe and one of the pipes is provided with lubrication grooves 17. The free ends of the pipes are closed and relative displacement prevented by a plug 18 having a spindle carrying friction rings 19 and a cap 20 secured to the outer pipe.

In order to confine the suction to the perforations in the portion of the drum in contact with the paper a series of slots 21 are cut in the stationary pipe 12 the length of each of the slots in the embodiment illustrated being such that suction may be simultaneously effected through five perforations. This may be varied however, to suit requirements. Each slot is divided by a bridge 22 which serves as a brace. A number of circumferential series of perforations 23 are formed in the valvular pipe 15 and the perforations of each series are adapted to successively register with one of the slots 21 as the drum rotates. From each series of perforations in pipe 15 a plurality of pipes 24 radiate in the form of a spider, the outer ends of the pipes being screwed into the perforations 3 in the drum. These pipes 24 while effecting communication between the valvular mechanism and the perforations 3 also act as spokes uniting the valvular pipe 15 to the drum so that both rotate as one.

The invention may be embodied with equally advantageous results in the modified form illustrated in a companion application filed Apr. 3, 1920, under Serial 371,059 in which the valvular mechanism is located exteriorly and at one end of the drum and controls a series of longitudinal pipes located within the drum.

Operation.

As the drum rotates carrying with it the paper to be dried the suction device having been set in motion, it carries with it the valvular pipe 15 and radial pipes 24 the pipe 12 remaining stationary. The latter being connected to the suction device a vacuum is maintained within it so that as each perforation 23 registers with its respective slot 21 suction will take place through the perforation in the drum to which it is connected by pipe 24, causing the paper to adhere to the drum. The point at which suction takes place should occur immediately before the paper goes on the drum. This suction continues until the perforation has reached the opposite end of the slot 21 at which point it is cut off by the solid wall of the pipe 12. The valvular members should be so adjusted that the paper will leave the drum just before the perforation reaches the end of the slot.

What I claim is as follows:

1. In paper making machinery the combination with a hollow drum for drying pa-

per and the like; said drum having an inlet for admitting a heating medium to the interior thereof, of suction means for retaining the paper in position on the drum during travel on the periphery thereof.

2. In paper making machinery the combination with a hollow perforated drum for drying paper and the like, said drum having an inlet for admitting a heating medium to the interior thereof, and means for causing suction through said perforations for the purpose of retaining the paper in position on the drum during travel on the periphery thereof.

3. In paper making machinery the combination with a hollow perforated drum for drying paper and the like; said drum having an inlet for admitting a heating medium to the interior thereof; of means for causing suction through said perforations for the purpose of maintaining the paper in position on the drum during travel on the periphery thereof, said means consisting of a suction device, and valve controlled means effecting communication between the perforations and said device, whereby the suction is confined to the perforations in the portion of the drum with which the paper is in contact.

4. In paper making machinery the combination with a hollow perforated drum for drying paper and the like said drum having an inlet for admitting a heating medium to the interior thereof; of means for causing suction through said perforations, said means consisting of a suction device, means effecting communication between the device and said perforations, and valvular means for controlling the communication, said last mentioned means consisting of a stationary valvular member and a second valvular member rotatable in unison with the drum and coacting with said stationary member.

5. In paper making machinery the combination with a hollow perforated drum for drying paper and the like said drum having an inlet for admitting a heating medium to the interior thereof; of means for causing suction through said perforations, said means consisting of a suction device, a stationary pipe connected to the suction device and extending longitudinally of the drum and having a plurality of spaced circumferential slots, a second pipe rotatable in unison with the drum and encircling said stationary pipe, the second pipe having a plurality of circumferential series of perforations therein each series being in the circumferential plane of one of the slots and adapted to register therewith, and radial pipes effecting communication between the perforations in the second and the perforations in the drum.

6. In paper making machinery a cylindri-

cal drum for drying paper and the like, said drum being hollow to provide a heating chamber and a conductor extending through the said chamber and having no communication therewith, said conductor including a plurality of intakes communicating with the outer atmosphere through the periphery of the drum and means for causing suction through said conductor for the purpose of

retaining the paper in position upon the drum during travel therein.

In testimony whereof I have signed my name to this specification in the presence of two witnesses

HENRY H. VAUGHAN.

Witnesses:

GORDON G. COOKE,

WILLIAM J. C. HEWETSON.