July 6, 1926. 1,591,921

R. B. HEYS

SUCTION CYLINDER OR ROLL OF MACHINES FOR MAKING PAPER, PAPER BOARD, MILL BOARD, AND THE LIKE

Filed August 20, 1925 2 Sheets-Sheet 1

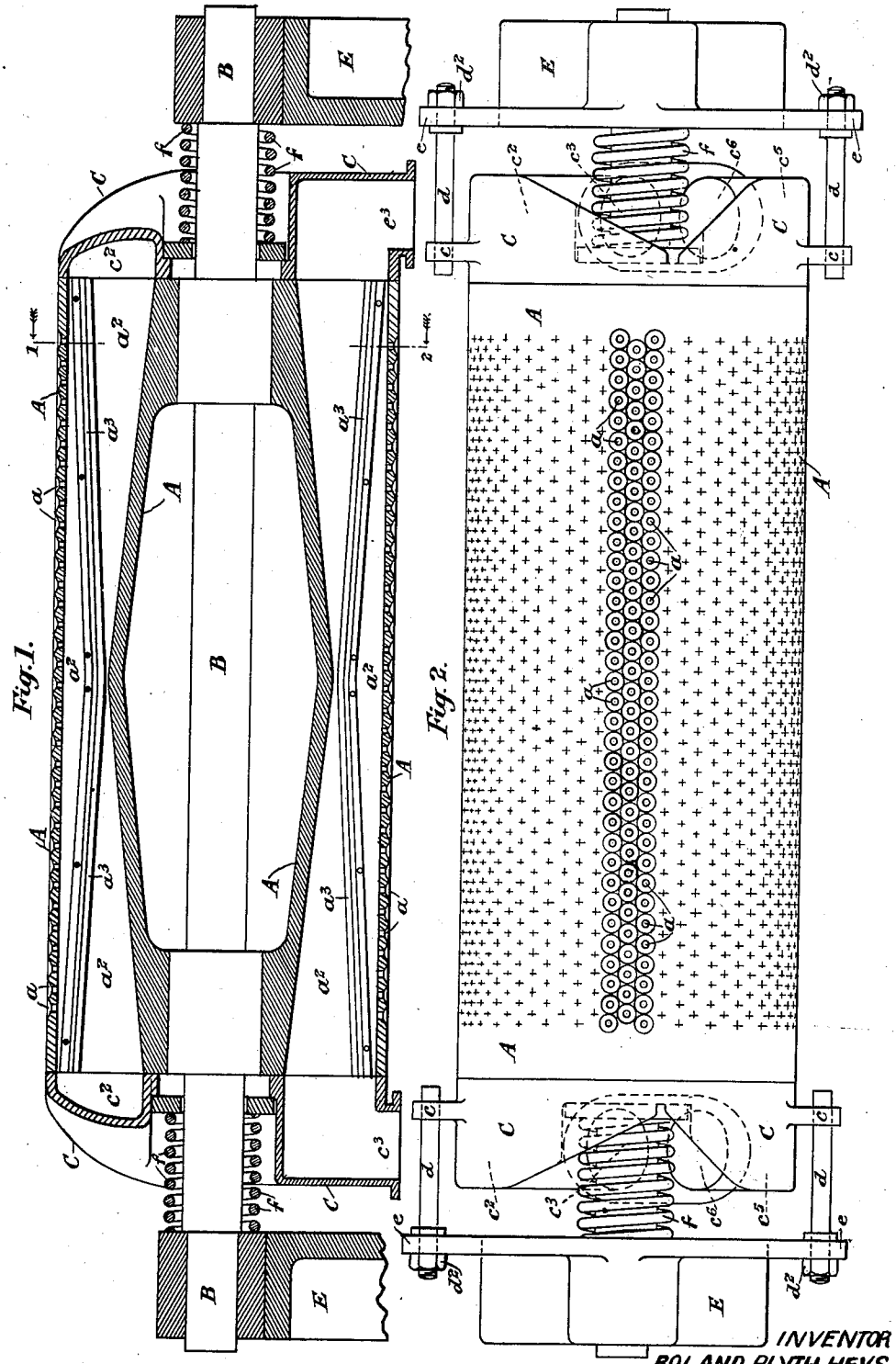


Fig. 1.

Fig. 2.

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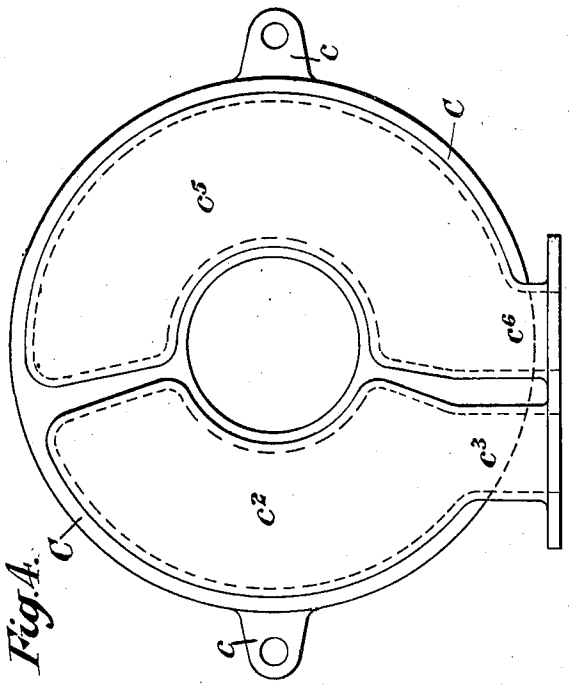


Fig. 4.

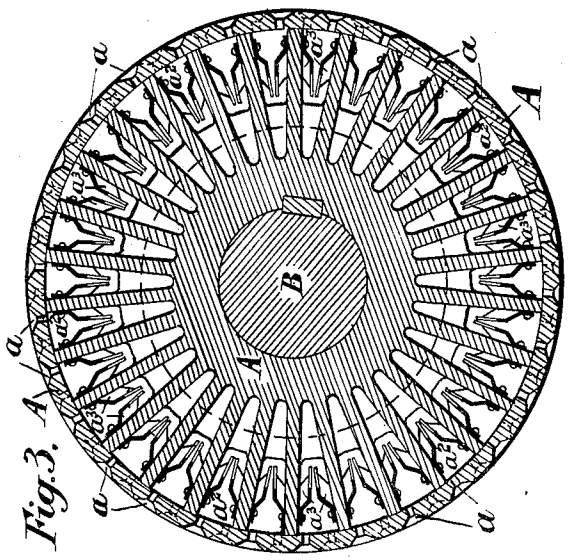


Fig. 3.

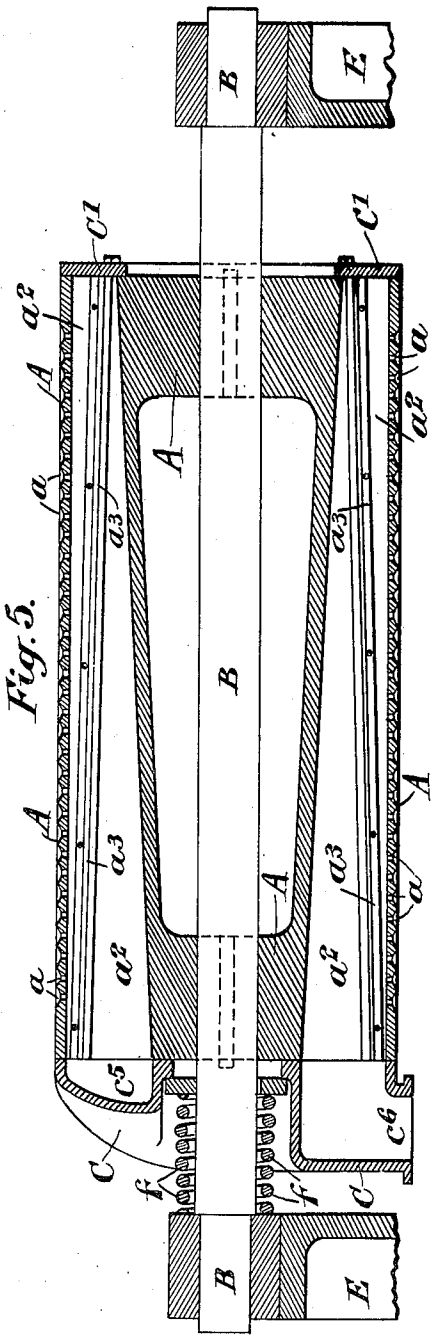


Fig. 5.

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UNITED STATES PATENT OFFICE.

ROLAND BLYTH HEYS, OF BRISTOL, ENGLAND, ASSIGNOR TO ST. ANNE'S BOARD MILL COMPANY LIMITED, OF BRISTOL, ENGLAND.

SUCTION CYLINDER OR ROLL OF MACHINES FOR MAKING PAPER, PAPER BOARD, MILL BOARD, AND THE LIKE.

Application filed August 20, 1925, Serial No. 51,306, and in England March 25, 1925.

This invention relates to rotatable suction cylinders or rolls, of machines for making paper, paper board, mill-board, and the like, over which cylinder, or roll, the wet pulp, or fibre, from which liquid is to be drawn is carried upon an endless band of felt, or other permeable material; the said cylinder, or roll, being of the kind having perforations formed in its periphery which communicate with draw-off longitudinal channels within the said cylinder, or roll, extending from end to end thereof, the said longitudinal channels communicating with a recess provided in a non-rotatable end-cover at one, or at each, end of the said cylinder, or roll, which recess in turn communicates with a suction device. The recess in the non-rotatable end-cover, or in each non-rotatable end-cover, is so adapted that only those longitudinal channels in the cylinder which have, for the time being, their perforations covered by the endless band, of felt, or other permeable material, are in communication with the said recess, so that, as the cylinder is rotated, the longitudinal channels are successively brought into the position which gives communication between the suction device and the perforations covered by the said endless band so that liquid is then drawn from the wet pulp, or fibre, through the endless band and the perforations into the said longitudinal channels from which it passes into the said recess and is discharged.

This invention has for its object to provide an improved suction cylinder, or roll, of the aforesaid kind, and mainly consists in providing means whereby any liquid which may have remained in the said longitudinal channels, after they have passed the recess in the end-cover, or in each end-cover is caught and retained in the channels until by the further rotation of the cylinder, or roll, the said channels are brought into communication either with the above suction recess or with a second recess in the said end-cover, or in each end-cover, into which second recess the liquid then flows by gravity and passes therefrom through any suitable outlet (which may be open to the atmosphere) in the said end-cover, or in each end-cover.

I will describe my invention with reference to the accompanying drawings, (but without limiting ourselves to the precise arrangements therein illustrated) in which Figure 1 shews in longitudinal section and Figure 2 in plan a suction cylinder, or roll, constructed in accordance with our invention having both of its ends in communication, through non-rotatable end-covers, with a suction device. Figure 3 is a transverse section on the line 1, 2, Figure 1. Figure 4 shews in elevation one of the end-covers and Figure 5 shews in longitudinal section a modified construction of cylinder, or roll, having one end only in communication, through a non-rotatable end-cover, with a suction device, the other end thereof being closed by a plain end-cover rotatable therewith.

Referring to Figures 1, 2, 3 and 4, the suction cylinder or roll A (which we will refer to as the roll) over which the pulp, or other material (hereinafter referred to as the pulp) is carried upon an endless band of felt, or other permeable material (hereinafter referred to as the band of felt) has formed therein a number of perforations a which communicate with longitudinal channels a^2 formed in the body-part of the said roll and parallel with its axis, the said channels preferably being of such width that two lines of perforations a in the periphery of the said roll, communicate with each channel a^2, although if desired the channels may be wider and more than two lines of perforations may communicate with each of the said channels. The perforations a are preferably counter-sunk as shewn, so as to present wide mouths to the felt and give an enlarged area of suction, and the said perforations should be as close together as is convenient and should also be arranged so that all the pulp on the felt covering a sufficient segment of the said roll will be subjected to the suction. In Figure 2 only a few of the perforations a are shewn, the rest being indicated by the small crosses. The channels a^2 increase in cross-sectional area from the mid-part of the roll A towards the ends (as shewn in Figure 1) so as to accommodate the increasing volume of air and liquid towards the ends of the said channels and they are also formed as deep as practicable. The roll A is secured to a shaft B which can be supported in ball or any other suitable bearings and be rotated by any suitable means. End-covers C bear against each end of the roll

A and are held stationary as regards rotation which can be done by slidably mounting them, by means of lugs c, upon short pegs, or studs d, each secured by nuts d^2 to the extension piece e from the standards E which carry the bearings for the shaft B. The springs f press the end-covers C against the ends of the roll A to ensure a practically air tight closure.

Each end-cover C may be provided with two semi-circular or approximately semi-circular recesses c^2 and c^5, and each recess c^2 is in communication, by the passage c^3 with a suction pump, so that, as the longitudinal channels a^2 in the roll A come into communication with the said recess c^2, the suction pump draws liquid out from the pulp which is on the roll through the perforations a into the said longitudinal channels from which longitudinal channels the liquid, or the greater portion of the said liquid, passes into the passage c^3 and is discharged by the suction pump through any suitable outlet.

Each wall of each of the longitudinal channels a^2 is provided with a gutter a^3 so arranged and adapted that any liquid which may be left in the said channels after they have passed, by the rotation of the roll A, the suction recess c^2 in each end-cover will be caught and retained in the said gutters until, by the further rotation of the said roll the channels are again brought into communication either with the said suction recess c^2 or with the second semi-circular or approximately semi-circular recess c^5 in each end-cover into which recess the liquid then flows from the said gutters and passes therefrom through an auxiliary outlet passage c^6 preferably open to the atmosphere. In order to facilitate the discharge of the liquid from the gutters a^3 into the second recess c^5 in each of the end-covers C the said gutters slope from near the axis at the longitudinal centre of the roll A towards the periphery at the ends (as shewn in Figure 1) so that as each gutter is in succession brought, by the rotation of the said roll, towards, or into its lowermost position, the liquid therein flows by gravity into the said second recess c^5 to the outlet passage c^6.

In apparatus in which the roll A rotates slowly one of the gutters in each of the longitudinal channels a^2 will catch the liquid not extracted by the suction pump, and in apparatus in which the roll A rotates quickly the said liquid will, by centrifugal action, be thrown into the other gutter in each of the said channels. In apparatus in which the roll A is intended to always rotate slowly in the same direction one of the gutters (that is the gutter on the leading wall of each channel relatively to the direction of rotation of the roll) in each of the channels may be dispensed with.

When it is desired that the suction roll communicates at one end only with a suction device, the said roll may be constructed as shewn, by way of example, in Figure 5, wherein one end of the roll A only is provided with a non-rotatable end-cover C in communication with a suction device, the other end of the said roll being closed by a plain end-cover C^1 secured to the said end. In this modified construction the channels a^2 in the roll A increase in cross sectional area from the end of the said roll which is closed by the plain end-cover C^1 to the discharge end of the said roll so as to accommodate the increasing volume of air and liquid towards the outlet of the said channels. Each channel a^2 is provided with a gutter, or gutters, a^3 as in the suction roll described with reference to Figures 1, 2, 3 and 4, but the said gutters in this modified suction roll slop from near the axis at the end of the said roll which is closed by the end-cover C^1 towards the periphery at the other end of the said roll. In other respects this modified suction roll operates similarly to the herein first described suction roll and similar parts are marked with like letters of reference.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In a suction roll, a roll periphery having openings therein, longitudinal channels extending from end to end of the roll in communication with the periphery through the openings therein, and a non-rotatable end cover for the roll having suction recesses communicating with a suction apparatus and with the ends of said channels in combination with gutters in the channels adapted to catch any liquid remaining therein after said channels have passed a suction recess.

2. In a suction roll, a roll periphery having openings therein, longitudinal channels extending from end to end of the roll in communication with the periphery through the openings therein, and a non-rotatable end cover for the roll having suction recesses communicating with a suction apparatus and with the ends of said channels, in combination with gutters in the channels adapted to catch any liquid remaining therein after said channels have passed a suction recess, said gutters sloping from near the axis at the longitudinal center of the roll toward the periphery at its ends.

3. In a suction roll, a roll periphery having openings therein, longitudinal channels extending from end to end of the roll in communication with the periphery through the openings therein, and a non-rotatable end cover for the roll having suction recesses communicating with a suction apparatus and with the ends of said channels during

only part of their revolution, in combination with gutters in the channels adapted to catch any liquid remaining therein after said channels have passed a suction recess.

4. In a suction roll, a roll periphery having openings therein, longitudinal channels extending from end to end of the roll in communication with the periphery through the openings therein, and a non-rotatable end cover for the roll having suction recesses communicating with a suction apparatus and with the ends of said channels during only part of their revolution, in combination with gutters in the channels adapted to catch any liquid remaining therein after said channels have passed a suction recess, and a second recess in said end cover communicating with the ends of said channels during another part of their revolution, adapted to receive liquid from said gutters by gravity, substantially as described.

5. In a suction roll, a roll periphery having openings therein, longitudinal channels extending from end to end of the roll in communication with the periphery through the openings therein, and a non-rotatable end cover for the roll having suction recesses communicating with a suction apparatus and with the ends of said channels during only part of their revolution, in combination with gutters in the channels adapted to catch any liquid remaining therein after said channels have passed a suction recess, and a second recess in said end cover communicating with the ends of said channels during another part of their revolution adapted to discharge liquid received from said gutters by gravity, substantially as described.

In testimony whereof I have signed my name to this specification.

ROLAND BLYTH HEYS.