

Nov. 24, 1931.

H. R. FARNSWORTH

1,832,974

SUCTION ROLL

Filed July 30, 1928

2 Sheets-Sheet 1

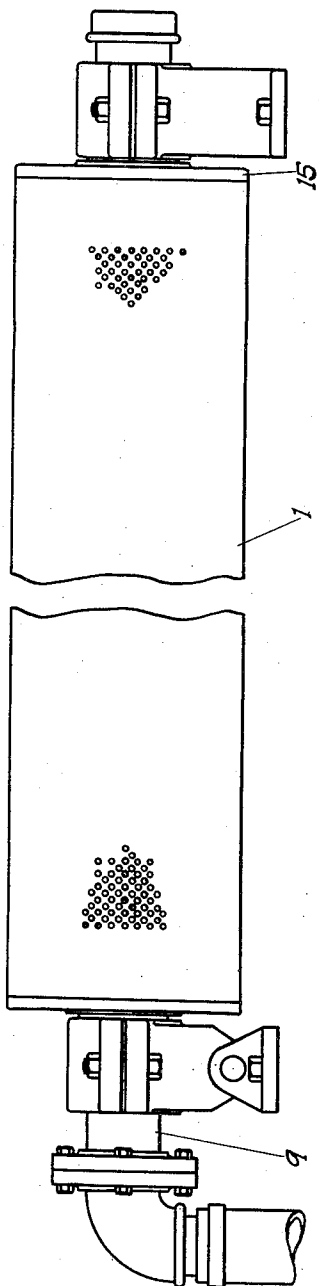


FIG 1

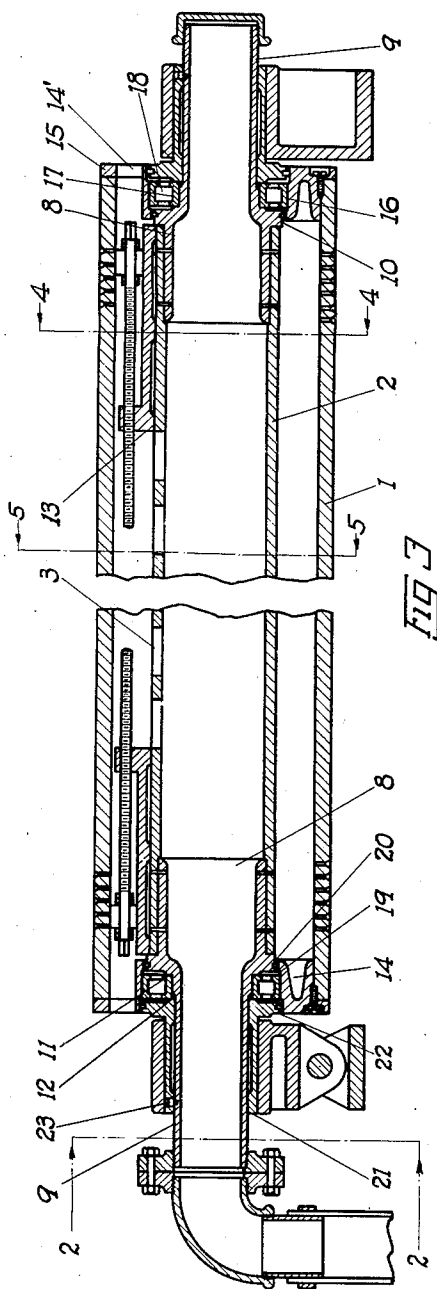


FIG 2

INVENTOR
Heland R. Farnsworth
BY *M. S. Babcock*
ATTORNEY

Nov. 24, 1931.

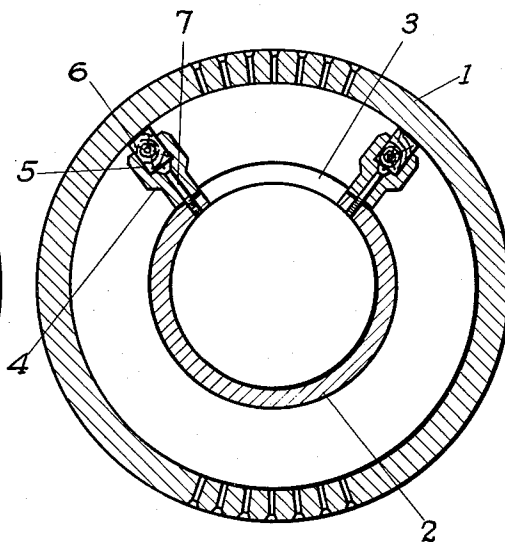
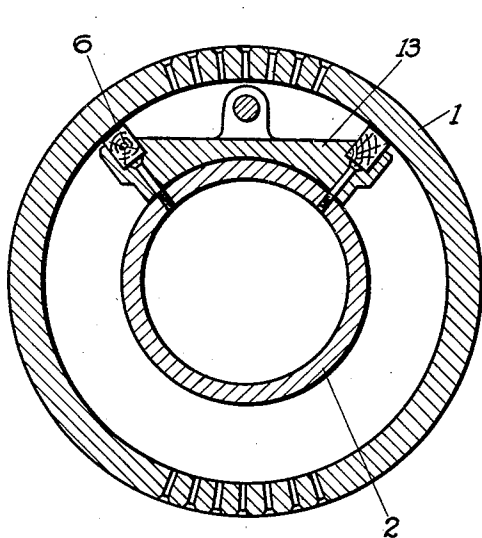
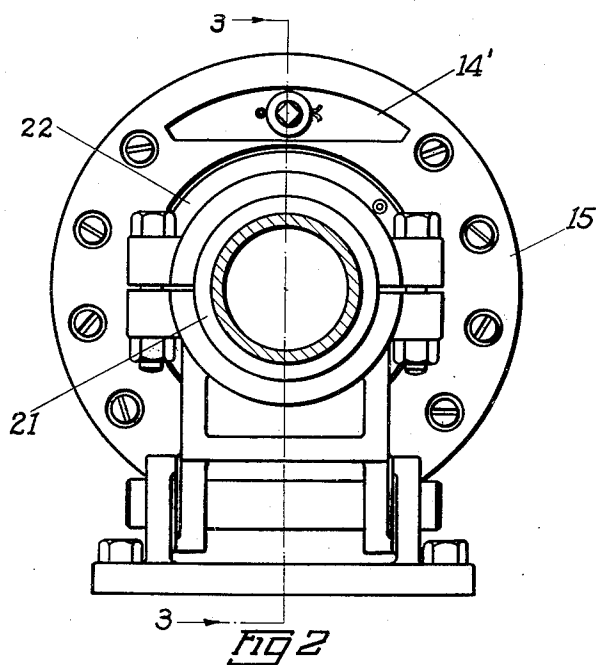
H. R. FARNSWORTH

1,832,974

SUCTION ROLL

Filed July 30, 1928

2 Sheets-Sheet 2



INVENTOR
Harland R. Farnsworth
BY
M. S. Balcock
ATTORNEY

UNITED STATES PATENT OFFICE

HILAND R. FARNSWORTH, OF SANDUSKY, OHIO, ASSIGNOR TO THE PAPER & TEXTILE
MACHINERY COMPANY, OF SANDUSKY, OHIO

SUCTION ROLL

Application filed July 30, 1928. Serial No. 296,198.

The invention to be hereinafter described relates to suction rolls and is intended for use either in the Fourdrinier or cylinder machine and for any place or position in the machine where a suction roll may be used.

5 The main objects of the invention are to provide a simply and quickly assembled roll which may be made as economically as possible and, yet, when assembled, will require least power for operation, while giving full
10 efficiency as a suction roll.

In the rolls of this general type it has been common practice, up to the present time to have a suction box or chamber cast for mounting inside the shell. Heretofore, this
15 box has been specially designed and constructed. It has been, regularly, made as a distinct part or special feature of the roll, as a whole. Briefly, standard material, available on the market, could not be used for the
20 suction box. One of the main objects of the present invention is to avoid these objections and provide a roll in which the box may be quickly, economically, and efficiently made from standard material available on the
25 market.

In order to more clearly disclose the construction, operation and use of the invention, reference should be had to the accompanying illustrative drawings forming a
30 part of the present application. Throughout the several figures of the drawings, like reference characters designate the same parts in the several views.

35 In the drawings:—

Fig. 1 is a side elevation of the invention;

Fig. 2 is a left hand end view;

Fig. 3 is a central vertical, longitudinal cross section on line 3—3 of Fig. 2;

40 Fig. 4 is a lateral vertical cross section on line 4—4 of Fig. 3; and

Fig. 5 is a lateral vertical cross section on line 5—5 of Fig. 3.

Referring to the drawings in detail 1 indicates the usual cylindrical suction roll shell of the general type found in suction-couch or suction-press rolls of practically all Fourdrinier paper making machines. The particular method of making or the material used in this shell are not of prime importance

in the present invention. This is the finished shell, ready for assembling. The felt, when used in a cylinder machine, or making wire, when used in a Fourdrinier machine, travels on and with this shell and extraction of water
55 from the pulp thereon is effected by suction through an arc of the shell, all as is well understood. The suction box through which suction is applied is mounted within the roll and has an opening or openings communicating with the effective arc of the shell. Such,
60 in general terms, is the well known suction roll at present widely used.

On the other hand, the only feature of the present invention, which is found also, in
65 such well known suction roll is the shell.

Instead of the specially designed suction box a cylindrical tube 2 is used. Preferably, this tube is simply a pipe of well known standard type readily obtainable on the market. It is cut to the desired length and has an opening, as a slot 3 or perforations or the like made in its upper surface along that portion through which suction is intended to act upon the effective arc of the shell. The
70 portion thus cut out, perforated, or provided with openings is defined by the continuous or uncut ends and by radially extending channel bars or plates 4. Preferably, the curved surface of the cylindrical box 2 is
75 planed off flat longitudinally along the two parallel lines against which the plates are to be seated. These plates have their cooperating faces or edges similarly planed to make an air tight fit of flat or plane surfaces.
80 Bars 4 are formed with suitable channels 5 of U or other well known cross section to receive packing strips 6 adapted to be seated in the channels to maintain an air tight sliding contact with the shell. Actually, there is
85 not a physical contact between shell and packing, when properly adjusted. The packing, instead, approaches very closely the shell, while a thin film of water between packing and shell, makes an air seal. To
90 securely clamp the bars or channel members 4 in place, screws 7 are provided. They are passed through suitable bores at intervals in the channel members 4 and threaded into perforations extending through the planed off
95
100

portions of the suction box. The heads are seated in counter sinks of the respective bores, and when they are turned in tight the channel members 4 will be drawn closely into air tight relation with the suction box, and will longitudinally define the area of the open or operative part of the suction box, the packing strips 6 at the same time similarly defining the effective suction area of the shell—assuming the box and shell to be operatively assembled.

The channel bars are readily obtainable on the market either with or without the bores for screws. Also, if not quickly available, they may be readily made, at low cost. The box thus made from simple, inexpensive standard material is adapted to be mounted concentrically within the shell, as will later appear.

Each end of the tubular box, preferably, though not necessarily, is slightly counter bored, to assure a perfectly cylindrical end bore. A tubular spindle 8 is snugly seated in each bore and provided with reduced extension 9 adapted to pass into a journal, as will later appear, such extension, at one end, protecting through and beyond such journal and being adapted to be coupled to a standard pipe connection leading to the suction line, in well known manner. Preferably, each spindle is formed with a radial extending rib or flange 10, and two radial shoulders 11 and 12, these shoulders being arranged in stepped relation between the rib 10 and reduced extension 9, for a purpose to be later disclosed. To assure a positive connection between spindles 8 and the respective ends of the suction box 2, screws or the like are passed through the suction box ends and into the spindle ends; making, practically, a solid unitary structure. The closed portions of the suction box, at the ends, and in line with the perforated portion, are each sufficiently machined to snugly receive a correspondingly machined casting 13 of usual and well known construction which may be screw-connected or otherwise suitably secured to the suction box end in the desired operative position. In each such casting is mounted the usual screw threaded deckle rod for operating the well known deckles in usual manner. Such construction being well understood needs no further description.

To properly support the shell on the box, so that it may rotate freely thereabout, an annular head 14 is provided at each end, having an outwardly extending radial flange 15 adapted to overlie and engage the corresponding end wall of the shell. Each head 14 has, also, a hand hole 14' through which to reach and operate the deckle rod. Suitable screws clamp these heads in place. Each such head, is counterbored, inwardly, to provide a seat for the outer race 16 of an anti-friction bearing comprising the said race 16,

an inner race 17, and rollers 18. The counter bore provides a radial shoulder 19, leaving a rib 20 presenting an opening of substantially the same diameter as the diameter of rib 10 which said opening receives. Preferably, the rib 10 is provided with a series of small circumferential channels to receive oil or suitable lubricant and, as far as practicable, eliminate possible friction between the contiguous surfaces. It will be obvious that the weight of the shell rests directly upon the anti-friction bearing which is mounted upon the spindle extending from the box. To retain the anti-friction bearing in operative position a sleeve bushing 21 is provided, having a radial flange 22. This bushing is adapted to snugly receive the extension 9 of spindle 8 and to be seated in the usual and well known standard sectional bearing. When in place, it is adapted to be securely fixed to the spindle extension 9 by a small set screw or the like 23. This prevents the bushing moving longitudinally of the extension, thereby positively maintaining its flange 22 in operative position relatively to the anti-friction bearing. The circumferential face of the flange 22 is, of course, provided with suitable packing to present a good running contact between 22 and head 14, while at the same time avoiding all possible friction. Of course, suitable oiling passages are provided through flange 22 for supplying lubricant to the adjacent bearing.

When properly assembled, the inner end of bushing 21 will engage the near face of the inner race 17 which extends very slightly beyond the shoulder 12 of the bearing seat and will lightly clamp that ring against the shoulder 11. On the other hand, the radial flange 22 on its inner face, is cut away so that, when so assembled, it will not engage any other part of the bearing. Likewise, it will be noted that the seat provided by counter-boring 14 is slightly wider than the outer race 16, leaving a clearance between shoulder 19 and the near face of the race similar to the clearance between flange 22 and the opposite face of said race 16. Thus, while the inner race will remain stationary with the box, the outer race will be free to rotate on the rollers, with the shell.

The bushings, of course, are simply clamped in the standard sectional bearings. The suction connections are well known and need not be illustrated or described.

The whole construction is very simple, readily and quickly assembled, inexpensive in construction, and easily and quickly repairable. The concentric relation of box and shell gives a strong well balanced and easy running mounting.

When finally trued up and assembled, the roll is ready to be mounted and used where ever its operation is desired.

The small diameter roll here illustrated

is designed for drum roll use on a cylinder machine. The invention is equally applicable in many other locations and for other purposes both in cylinder and in Fourdrinier machines, the type shown being merely a single arbitrary selection.

It is thought that the construction, operation and use of the invention will be clear from the preceding detailed description wherein only a single form has been disclosed by way of illustration. Changes may be made in the construction, arrangement and disposition of many parts of the invention without in any way departing from the field and scope thereof and it is meant to include all such within the present application, wherein only a single form has been disclosed.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:—

1. In a suction box for suction rolls, a tubular member provided with suction openings and having longitudinally extending flat-planed surfaces bordering the area of said openings, and packing strip members carried by said tubular member and seated on said planed surfaces and circumferentially defining the effective area of said box.

2. In a suction box for suction rolls, a tubular member provided with suction openings and having longitudinally extending flat-planed surfaces bordering the area of said openings, packing strip members provided with surfaces planed to cooperate with the aforesaid surfaces of said tubular member and adapted to circumferentially define the effective area of said box, and means for securing said strips in operative position with said planed surfaces closely contacting.

3. In a suction box for suction rolls, a tubular member provided with suction openings and having longitudinally extending flat planed surfaces bordering the area of said openings, packing strip members provided with surfaces planed to cooperate with the aforesaid surfaces of said tubular member and adapted to circumferentially define the effective area of said box, means for securing said strips in operative position, and supporting spindles secured in said box ends and projecting beyond the ends of the aforesaid shell.

4. A suction roll comprising, a cylindrical shell, a tubular suction box therein with suction openings and having longitudinally extending flat-planed surfaces bordering said openings, packing strips carried by said tubular member and seated on said planed surfaces and circumferentially defining the effective area of said box, tubular spindles carried by the opposite ends of said box, and bearings between said spindles and the aforesaid shell.

5. A suction roll comprising, a cylindrical shell, a tubular suction box therein of substantially uniform cross sectional area from

end to end and of tubular material readily obtainable in the open market, said box being provided with suction openings and having longitudinally extending flat-planed surfaces bordering said openings, packing strips carried by said tubular member and seated on said planed surfaces and circumferentially defining the effective area of said box, tubular spindles carried by the opposite ends of said box, and bearing between said spindles and the aforesaid shell.

Signed at Sandusky, Ohio, this 26th day of July, 1928.

HILAND R. FARNSWORTH.