

April 7, 1931.

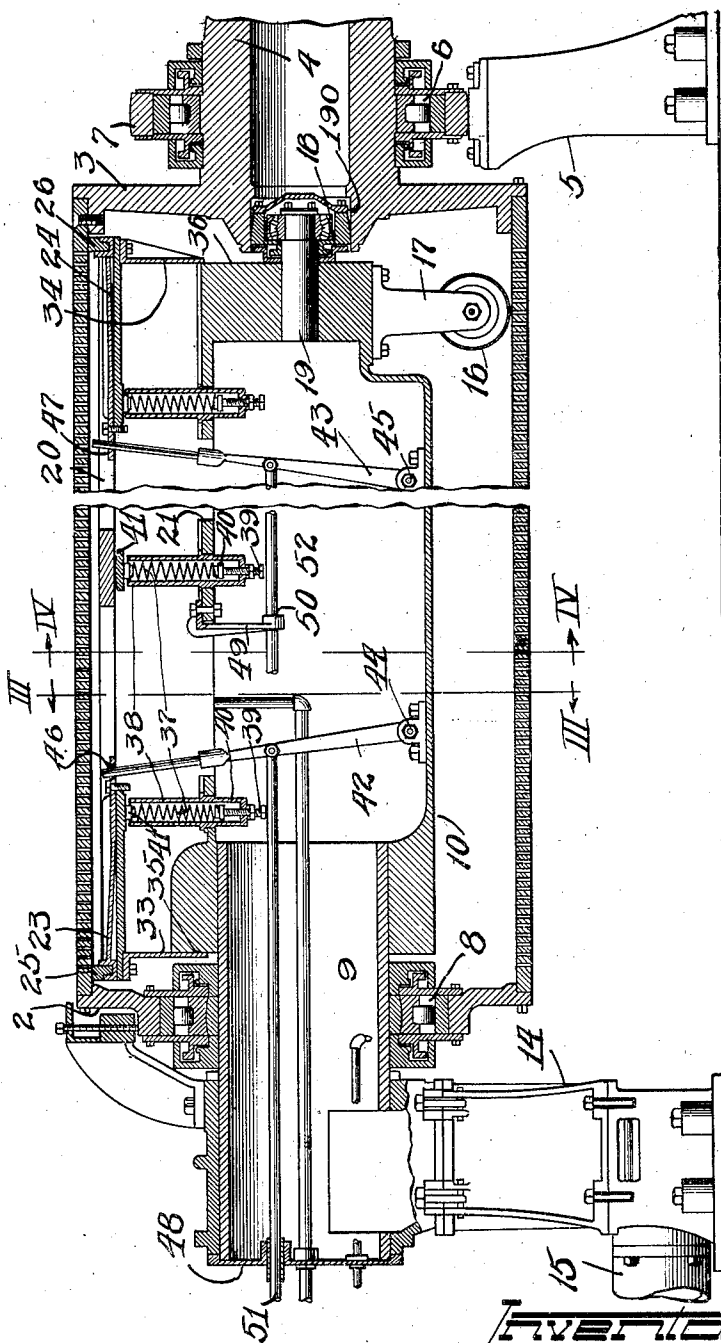
E. E. BERRY

1,799,775

SUCTION ROLL

Filed Oct. 26, 1928

3 Sheets-Sheet 1



Inventor:
Earl E. Berry

24: Charles Webb F.L.S.

April 7, 1931.

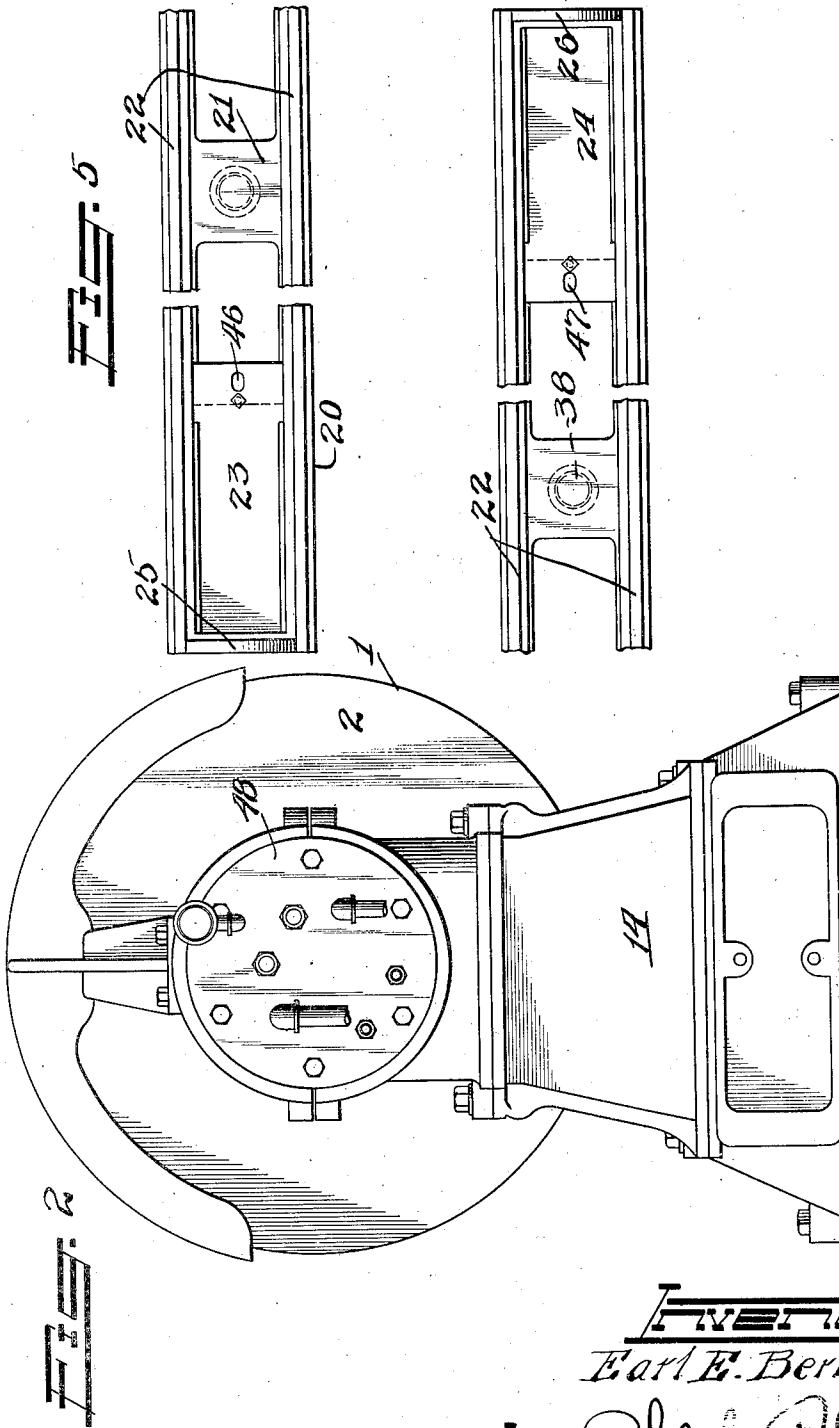
E. E. BERRY

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SUCTION ROLL

Filed Oct. 26, 1928

3 Sheets-Sheet 2



Inventor:
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April 7, 1931.

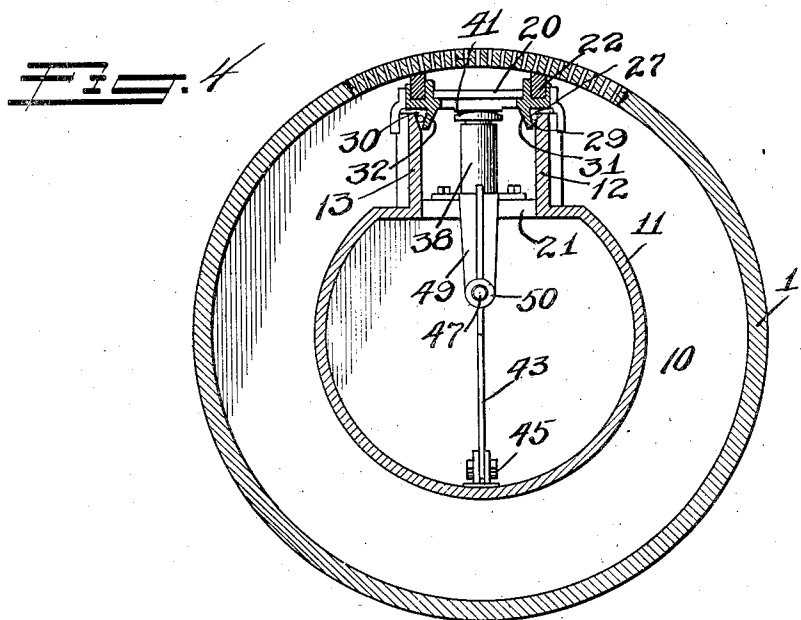
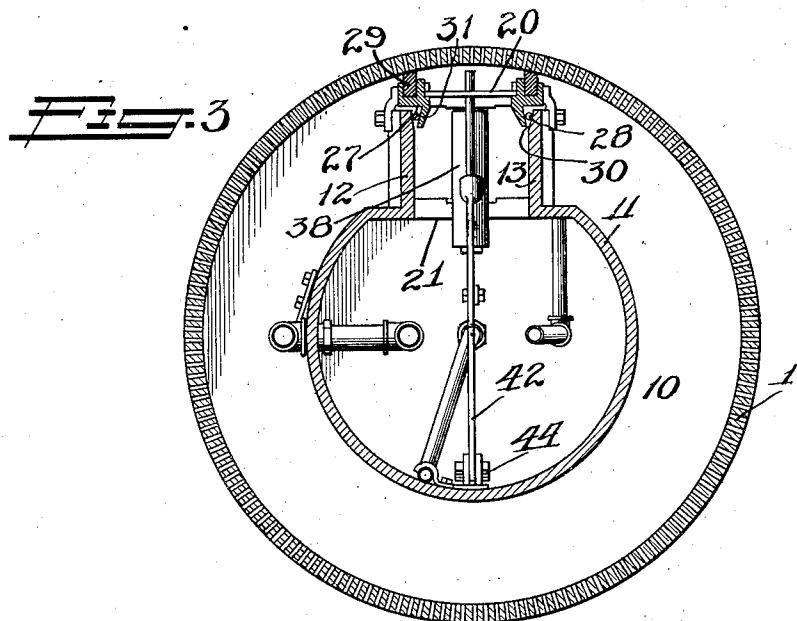
E. E. BERRY

1,799,775

SUCTION ROLL

Filed Oct. 26, 1928

3 Sheets-Sheet 3



Inventor:
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UNITED STATES PATENT OFFICE

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SUCTION ROLL

Application filed October 26, 1928. Serial No. 315,213.

This invention relates to suction rolls of the type used on paper machines as couch and press rolls.

It is an object of this invention to provide means for adjusting the tension of the packing between the suction box and the interior surface of the shell, the construction of the roll being such that further adjustment after the suction roll is put into operation is rendered unnecessary.

Other and further important objects of this invention will become apparent from the following description and appended claims.

On the drawings:

Figure 1 is a broken longitudinal sectional view of a suction roll embodying the features of this invention, with parts in elevation;

Figure 2 is a front end elevational view of the suction roll;

Figure 3 is a sectional view taken substantially on line III—III of Fig. 1;

Figure 4 is a sectional view taken substantially on line IV—IV of Figure 1; and

Figure 5 is a broken top plan view of the packing head.

The reference numeral 1 indicates a perforated cylindrical shell, to the ends of which are secured heads 2 and 3. The rear head 3 is formed with an elongated hollow trunnion 4 adapted to be mounted from a pedestal 5 for rotation upon roller bearings 6 enclosed within a bearing housing ring 7. The front head 2 is mounted upon roller bearings 8 for rotation about the stationary extended end 9 of the suction box 10.

Said suction box 10 comprises a substantially cylindrical body portion 11 (Figures 3 and 4) open at the top and provided with spaced, vertical side walls 12 and 13 extending to within a short distance of the inner surface of the shell 1. The front extension 9 of said suction box 10 is supported against rotation at its outer end upon a hollow sectional pedestal 14, said pedestal affording a communication between the interior of said suction box and a pipe 15 connected to a suitable source of vacuum (not shown).

At the rear end of said suction box 10 is positioned a roller 16 journaled in dependent brackets 17 and adapted to roll over the inner

surface of said shell 1 during the assembling of the roll. An anti-friction bearing housing 18 is mounted axially of said suction box 10 upon a stub-shaft 19 for positioning in the hollow journal 4 of the head 3. To facilitate the positioning of said bearing housing 18, the outer ring thereof is tapered as at 190, so that when the bearing housing is moved into place, the suction box 10 is elevated sufficiently to lift the roller 16 slightly above the inner surface of said shell 2.

The sealing means between the suction box 10 and the inner surface of the shell 2 consists of a floating packing head 20, best shown in Fig. 5, which comprises a flexible apertured plate 21 having grooves running the length thereof on each side thereof for receiving resilient packing strips 22. At the end of said packing head 20 are longitudinally slidable ends 23 and 24 carrying end packing strips 25 and 26 respectively (Fig. 1). This packing head 20 is adapted to be supported in full floating position from the walls 12 and 13 by means of elongated rods 27 and 28 formed of metal or other material such as rubber extending longitudinally of said packing head and adapted to be positioned between inclined faces 29 and 30 of said side walls 12 and 13 respectively, and the inversely tapered faces of flanges 31 and 32 formed on the under side of said packing head 20. The ends of said packing head 20 are sealed by means of dependent plates 33 and 34 (Fig. 1) adapted to slidingly engage the outer end faces 35 and 36, respectively, of said suction box 10.

The packing head 20 is thus free to move radially of said shell 1 and to confine an area of said shell within which suction may be applied to a web of material traveling over said roll through the perforations in said shell.

Because of the relatively great length of suction rolls on modern paper machines and the impossibility of obtaining an exactly true cylindrical inner surface, it is necessary that the packing head 20 be flexible and adjustable at spaced points throughout its length in order that it may form a perfect seal with the inner surface of said shell 1. According to

my present invention, the means for accomplishing this purpose comprise a plurality of helical coiled springs 37 enclosed within cylindrical housings 38 positioned at spaced intervals in transverse webs of the plate 21. Into the bottom of each of said cylindrical housings 38 is threaded an adjusting screw 39 having at its upper end a plate 40 adapted to press against the lower end of said helical springs 37. The upper end of each of said helical springs 37 is centered upon a plate or plunger 41 pressing against the under side of said packing head plate 21.

In practice, before the suction box 10 is inserted into the shell 1 of the suction roll, the adjusting screw 39 underneath each of the springs 37 is screwed up until the radius from the center line of the suction box to the rubbing surface of the packing strips 22, 25 and 26, is about one-eighth of an inch greater than the actual inside radius of the roll. The suction box is then run into the shell 2 on the roller 16 until the tapered surfaces 19 of the bearing housing 18 at the rear end of said suction box strike the hole in the rear journal 4. As said bearing housing 18 slips into place, the suction box 10 is raised slightly to cause the packing head 20 to spring down inside the side walls 12 and 13, and make a tight yielding contact between the packing strips 22, 25 and 26, and the inner surface of said shell 1.

After the initial adjustment of said adjusting screws 39 has once been made and the suction box 10 inserted in place, no further adjustments are, in general, either necessary or desirable. There is therefore no provision for external adjustment of said springs 37 after the suction box has once been put in place and the roll placed in operation. The advantage of this feature of my suction roll construction is that it eliminates subsequent adjustment by the operators of the suction roll and the possibility of their setting up too tight on the packing, thereby causing excessive wear. It has been ascertained that once the packing has been properly adjusted, it does not need any further attention, experience indicating that the packing slowly wears until it has relieved all the initial spring tension that was put onto it, after which the packing merely brushes the inside of the roll. This light brushing by the packing of the inner surface of the roll is made possible by the fact that the packing head is balanced as to air pressure upon the self-adjusting sealing rods 27 and 28.

The slidable end plates 23 and 24 carrying the end packing strips 25 and 26 are rendered longitudinally adjustable by means of lever arms 42 and 43 pivoted at their lower ends as at 44 and 45, respectively, to the bottom of said suction box 10, with their upper ends extending through elongated slots 46 and 47, formed in said end plates 23 and 24 respec-

tively. Control rods 51 and 52 pivotally connected to points intermediate the ends of said levers 42 and 43, respectively, and extending through the end 48 of said suction box 10 serve for external manual adjustment of the end plates 23 and 24 to narrow or widen the area confined by said packing head. A bearing bracket 49 secured to one of said transverse webs 21 supports the manual control rod 52 as at 50.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. In a suction roll, a perforated shell, a suction box mounted within said shell, a floating head for said box adapted to contact the interior of said shell and to confine an area thereof and separately functioning resilient means positioned at spaced points along the length of said suction box for supporting said head, said resilient means being adapted to be adjusted permanently prior to insertion of said box in said shell.

2. In a suction roll, a perforated shell, a suction box mounted within said shell, a floating head for said box adapted to contact the interior of said shell and to confine an area thereof, said head having longitudinally adjustable ends provided with elongated slots, lever arms pivotally connected to said box and extending through said slots and means pivotally connected to said lever arms intermediate their ends and extending through one end of said suction box for actuating said lever arms and thereby adjust said ends.

3. In a suction roll, a perforated shell, heads for said shell, one of said heads having a hollow extended journal, a suction box mounted within said shell, a packing head for said box adapted to contact the interior of said shell and to confine an area thereof, longitudinally spaced resilient means for supporting said head adapted to be adjusted prior to mounting the suction box in the shell until the radius from the center line of the box to the rubbing surface of the packing is slightly greater than the radius of the shell, a roller mounted on the inner end of the suction box, a bearing axially mounted on said inner end having tapered faces adapted when the box is inserted into said shell to engage the interior surface of said hollow journal and to elevate said box sufficiently to raise said roller off the surface of said shell and to spring the packing head down inside to make tight contact between the packing and the inner surface of said shell.

4. In a suction roll, a perforated shell, heads for said shell, one of said heads having a hollow extended journal, a suction box

mounted within said shell, a packing head
for said box adapted to contact the interior of
said shell and to confine an area thereof, lon-
gitudinally spaced resilient means for sup-
5 porting said head, lower adjusting screws for
each of said resilient means adapted to be ad-
justed prior to mounting the suction box in
the shell until the radius from the center line
of the box to the rubbing surface of the pack-
10 ing is slightly greater than the radius of the
shell, a roller mounted on the inner end of
the suction box, a bearing axially mounted
on said inner end having tapered faces adapt-
ed when the box is inserted into said shell to
15 engage the interior surface of said hollow
journal and to elevate said box sufficiently to
raise said roller off the surface of said shell
and to spring the packing head down inside
to make tight contact between the packing
20 and the inner surface of said shell.

5. In a suction roll, including a perforated
rotatable shell and a stationary suction box
therein, a flexible packing head for said box
adapted to contact the inner surface of said
25 shell to confine an area thereof, means sup-
porting said head from said box in full float-
ing position and separately functioning re-
siliant means positioned at spaced points
along the length of said suction box for ad-
30 justing said head, said resilient means being
adapted to be adjusted permanently prior to
insertion of said box in said shell.

In testimony whereof I have hereunto sub-
scribed my name at Beloit, Rock County, Wis-
35 consin.

EARL E. BERRY.

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