

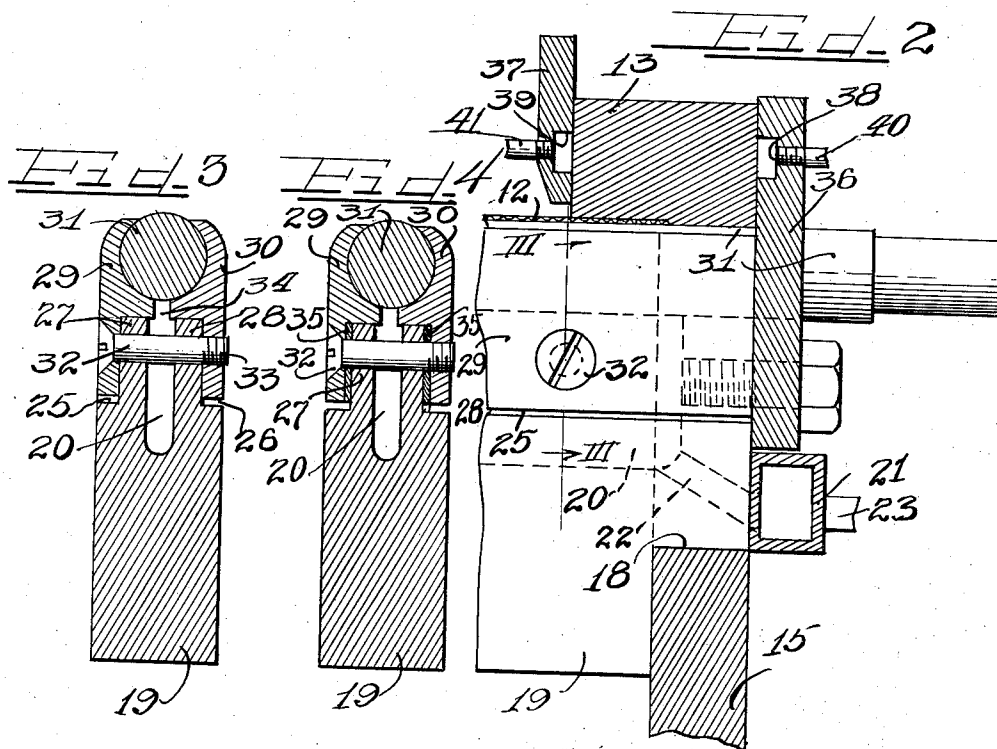
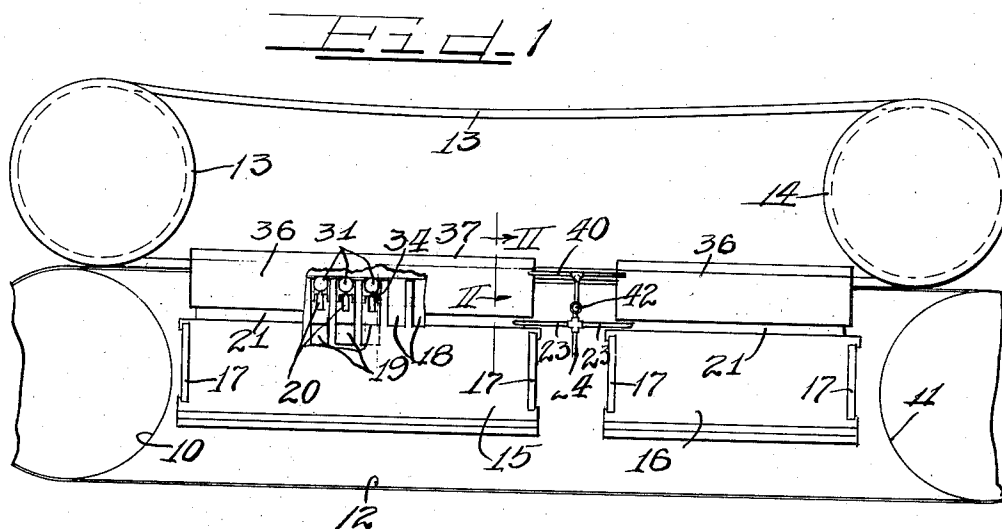
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E. E. BERRY

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PAPER MACHINE TABLE ROLL STRUCTURE

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INVENTORS  
Earl E. Berry  
*Charles E. Berry*  
ATTORNEYS

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## PAPER MACHINE TABLE ROLL STRUCTURE

Earl E. Berry, Beloit, Wis., assignor to Beloit Iron Works, Beloit, Wis., a corporation of Wisconsin

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8 Claims. (Cl. 92—51)

This invention relates to table roll bearing supports or journals that can be adjusted in size along the length of the rolls.

More specifically this invention relates to table roll structure for paper machines wherein small diameter rolls are rotatably supported around more than 180° of their peripheries for substantially their entire length in adjustable bearing supports and includes a hydraulic seal for a forming wire supported by the rolls.

In my copending applications entitled: "Table roll structure for paper machines", Serial No. 55,753, filed December 23, 1935, and "Pressure and vacuum forming paper making machine", Serial No. 71,109, filed March 27, 1936, I have described and claimed table roll structure for paper machines in which suction boxes are mounted under the upper run of the forming wire and contain a plurality of small diameter table rolls for supporting the wire. These rolls are rotatably mounted for their entire length or substantially so in bearings carried by the suction boxes. The bearings can be supplied with a liquid such as water to lubricate the rolls and to overbalance the weight of the wire on the rolls by hydraulic pressure.

I have now provided improvements in the bearings for the small diameter rolls wherein variations in the diameters of the rolls or in the bearings themselves, due to inaccuracies in machining or uneven wear of the parts, can be compensated to maintain the rolls properly seated by adjusting the size of the bearings along the length of the rolls. I have also improved the hydraulic sealing of the deckle straps along the edges of the forming wire to prevent leakage of air into the suction boxes and have furthermore provided slots in the side walls of the suction boxes to snugly receive the ends of the members carrying the bearings for the rolls.

It is then an object of this invention to provide bearings for table rolls that can be adjusted in size along the length of the rolls.

It is a further object of this invention to rotatably mount small diameter rollers for substantially their entire length in adjustable bearings and to supply water under pressure to said bearings for lubricating or overbalancing the rolls.

A further object of this invention is to provide suction boxes for paper machines with slots in the sides thereof for carrying supports having passageways therein for liquids.

Another object of this invention is to provide bearings for small diameter table rolls to sup-

port the rolls for more than 180° of their diameter along their entire length or substantially their entire length and to provide means for varying the size of the bearings along their length.

Another object of this invention is to provide a hydraulic seal cooperating with the deckle straps of a paper machine for sealing the suction boxes of the machine.

Other and further objects of this invention will be apparent from the following detailed description of the annexed sheet of drawing which illustrates preferred embodiments of the invention.

On the drawing:

Figure 1 is a fragmentary side elevational diagrammatic view of the web forming section of a paper machine having suction boxes mounted under the upper run of the forming wire and containing a plurality of small diameter table rolls rotatably mounted in adjustable bearings according to this invention.

Figure 2 is an enlarged cross-sectional view, with parts in elevation, taken substantially along the line II—II of Figure 1.

Figure 3 is a cross-sectional view, with a part in elevation, taken substantially along the line III—III of Figure 2.

Figure 4 is a cross-sectional view, similar to Figure 3, illustrating a modified form of adjustable bearing for small diameter table rolls according to this invention.

As shown on the drawing:

In Figure 1, the reference numeral 10 indicates a breast roll of a Fourdrinier type paper machine. The reference numeral 11 indicates a couch roll of the paper machine. The rolls 10 and 11 have trained therebetween a Fourdrinier forming wire 12.

Deckle straps such as 13 are mounted on each side of the upper run of the wire 12 and are trained between the usual deckle wheels 13 and 14.

According to this invention suction boxes such as 15 and 16 are mounted under the upper run of the forming wire 12 and are slidably carried on the tracks 17 which extend through the loop of the forming wire 12 and in turn are supported on standards (not shown) outside of the loop of the forming wire. The suction boxes 15 and 16 can thus be moved outside of the loop of the forming wire when it is desired to change the wire.

The side walls of the suction boxes 15 and 16 contain a plurality of slots 18 for receiving therein in airtight relation therewith the ends of bars 19 each of which have an elongated passageway 20 extending along substantially the entire length

of the bars except for the end portions thereof as shown in Figure 2.

A header 21 for water or other lubricant is provided along one or both sides of each of the suction boxes 15 and 16. The passageway 20 in each bar 19 communicates with a header 21 through an opening 22 (Figure 2) drilled in the end portion of each of the bars.

The headers 21 receive water through branch pipes 23 from a pipe-line 24 which may be connected to a source of water under pressure or to a water pump.

As best shown in Figures 2 and 3 each bar 19 is recessed on both sides thereof as at 25 and 26 to define wall portions 27 and 28 of reduced thickness at the top of the bar. These wall portions are somewhat flexible.

Bearing segments 29 and 30 are seated in the recesses 25 and 26 and extend up over the top of the portions 27 and 28 to define a cylindrical housing extending around more than 180° of a small diameter table roll 31 for substantially the entire length of the table roll 31.

Clamping screws such as 32 extend through the bearing segments 29 and 30 and also extend through the reduced portions 27 and 28 of the bar 19. These clamping screws are spaced along the length of the bearing segments at desired intervals. If desired, one of the bearing segments such as 30 can be threaded for receiving in threaded relation the threaded ends 33 of the clamping screws 32. Obviously, however, a bolt can be used in place of the clamping screws and a nut separate from the bearing segments can be used to tighten up these segments around the rolls 31.

The bearing segments 29 and 30 do not contact each other so as to provide a passage 34 communicating with the passageway 20 of the bar 19. In this manner water or other fluid supplied from the header 21 to the passageway 20 of the bar can be forced up through the bearing segments around the table rolls 31.

Any inaccuracies in machining the bearing surfaces of the segments 29 and 30 or the diameter of the table roll 31 can be compensated along the length of the roll by tightening or loosening the clamping screws 32. Since the reduced portions 27 and 28 are somewhat flexible the bearing segments can be drawn together by means of the clamping screws 32.

In the event that the portions 27 and 28 of the bars are not flexible, a desired adjustment of the bearing segments 29 and 30 can be made, as shown in Figure 4, by inserting resilient gaskets 35 between the bearing segments and the reduced portions of the bars. The clamping screws such as 32 can then be tightened to compress the gaskets and move the bearing segments into the desired bearing relation with the table rolls 31.

As best shown in Figure 2, the bearing segments 29 and 30 and the top ends of the bars 19 terminate flush with the side wall of the suction box 15. This side wall has bolted thereon a plate or board 36 which extends above the top of the deckle strap 13 which rides partly on the edge of the forming wire 12 and partly on the table rolls such as 31. The board or plate 36 is apertured opposite each table roll 31 to allow the table roll to extend therethrough if it is desired to couple the roll with a driven member such as is described in my above referred to applications.

A second board or plate 37 extends along the other side of the deckle strap 13 for the full length of the suction box 15.

Both of the members 36 and 37 have grooves 38 and 39 respectively cut therein opposite the mid-portion of the deckle strap 13. These grooves or recesses 38 and 39 extend substantially the full length of the members 36 and 37 but are closed at the ends of the members.

Water is admitted to the chambers defined by the recesses 38 and 39 through pipes 40 and 41 which pipes, as shown in Figure 1, can be connected through a valve 42 to the main pipe-line 24 which supplies the table rolls with water.

With the supplying of water to the chambers defined by the recesses 38 and 39, the deckle strap 13 is sealed along both edges thereof by a hydraulic seal and suction from within the suction boxes 15 and 16 can be maintained without difficulty since the edges of the forming wire 12 are completely sealed against leakage of air into the boxes.

According to this invention the diameter of the housing formed by the bearing segments will be slightly larger than the diameter of the table rolls supported by the segments and the segments will then be pulled up into the proper bearing fit with the table rolls by tightening the clamping screws. Any inaccuracies in machining or uneven wear of the parts can thus be compensated to insure the proper bearing fit for the table roll along its entire length. When it is desired to operate the table rolls by overbalancing the same with water under pressure supplied through the passageways of the supporting bars the rolls will actually ride the upper half of the bearing supports so that these supports will doctor or scrape the surface of the roll and prevent any foreign substance from entering into the bearing surface. It is thus desirable that a true bearing fit be maintained throughout the entire length of the roll so that leakage of water from the roll will be uniform throughout its entire length.

The table rolls of this invention are preferably of very small diameter. Diameters of the rolls are preferably less than one-sixtieth of the length of the roll and rolls having a diameter of one inch or smaller can be satisfactorily operated on wide wire machines, since the same are fully supported along substantially their entire length in bearings which extend around more than 180° of the diameter of the rolls. This prevents the roll from sagging or bowing upwardly.

According to this invention the suction boxes having the small diameter rolls mounted therein are efficiently sealed against leakage of air around the edges of the forming wire by hydraulic seals provided on both sides of the deckle strap.

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 60 hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. An elongated supporting bar adapted to be mounted under the forming wire of a paper machine having an elongated chamber formed in the top portion of the bar, spaced opposed bearing segments mounted on the sides of the bar and extending over the top thereof to define an open topped cylindrical bearing along the length of the bar, resilient gaskets disposed between the bearing segments and the bar and a plurality of clamping screws spaced along the segments, each of said screws acting on the segments to compress the gaskets for moving the segments to-

gether and thereby reduce the size of the bearing at any point along the length thereof.

2. A suction box for a paper machine comprising an airtight box having end walls, side walls and a bottom, said side walls having spaced slots formed in the top thereof, bars snugly seated in said slots and extending transversely across the width of the box, said bars having open top chambers formed along their length, segmental cylindrical bearing segments carried on top of said bars in spaced opposed relation, elongated table rolls rotatably mounted in said bearings, a plurality of clamping screws spaced along the length of the segments engaging said segments, each engaging said segments to draw the segments together for properly seating the rollers therein and means for supplying water under pressure to the chambers in the bars for flowing outwardly around the rollers.

3. In a roll structure for supporting a web forming wire, a journal for rotatably supporting a roll intermediate its ends comprising a pair of elongated spaced opposed bearing segments defining together an open topped cylindrical journal, and a plurality of means spaced along the lengths of the segments, each of said means acting on both bearing segments to draw the same together as desired whereby the journal is adjustable in size along its length.

4. Table roll structure for paper making machines comprising a bar adapted to be mounted transversely under a forming wire having a slot extending longitudinally along the top thereof, a pair of elongated spaced opposed bearing segments on top of said bar defining together an open topped cylindrical journal, said segments having portions extending down along the sides of the bar, and bolts extending through said portions and the top of the bar for drawing the bearing segments together and for holding the segments on the bar.

5. Table roll structure for paper machines comprising an elongated supporting member adapted to be mounted transversely under a forming wire, elongated spaced opposed bearing segments carried on top of said member defining together an open topped cylindrical journal along

the length of the member, and a plurality of means acting on the supporting member and said segments and spaced along the lengths thereof to move the segments together as desired whereby the journal is adjustable in size along its length.

6. Table roll structure for paper making machines comprising an elongated longitudinally slotted member adapted to be mounted transversely under a forming wire, said member having the sides thereof recessed near the top to define somewhat flexible wall portions of reduced thickness for the slot, elongated bearing segments carried in spaced opposed relation on top of said member to define together an open topped journal for a table roll along the length of the roll, said segments having portions extending down along the recessed sides of the member, and clamping screws spaced along the lengths of the segments, each of said screws extending through said segment portions and flexible wall portions to draw the segments together as desired along their length.

7. Table roll structure for paper making machines comprising an elongated supporting member adapted to be mounted transversely under a forming wire, an elongated bearing segment carried on top of the member at each side thereof, said bearing segments defining together an open topped table roll journal, a resilient gasket interposed between a segment and the member and a plurality of means spaced along the segments, each of said means acting on both segments to compress the gasket and draw the segments together.

8. Table roll structure for paper making machines comprising an elongated supporting member adapted to be mounted transversely under a forming wire, said member carrying at the top thereof a pair of spaced opposed bearing segments defining together an open topped journal and a plurality of clamping means spaced along the length of the member through one of the segments and acting thereagainst to draw said segment toward the other segment for adjusting the size of the journal.

EARL E. BERRY.