May 22, 1934. G. N. HOOVER, JR 1,960,154

DANDY ROLL

Filed Jan. 17, 1934

Fig. 1.

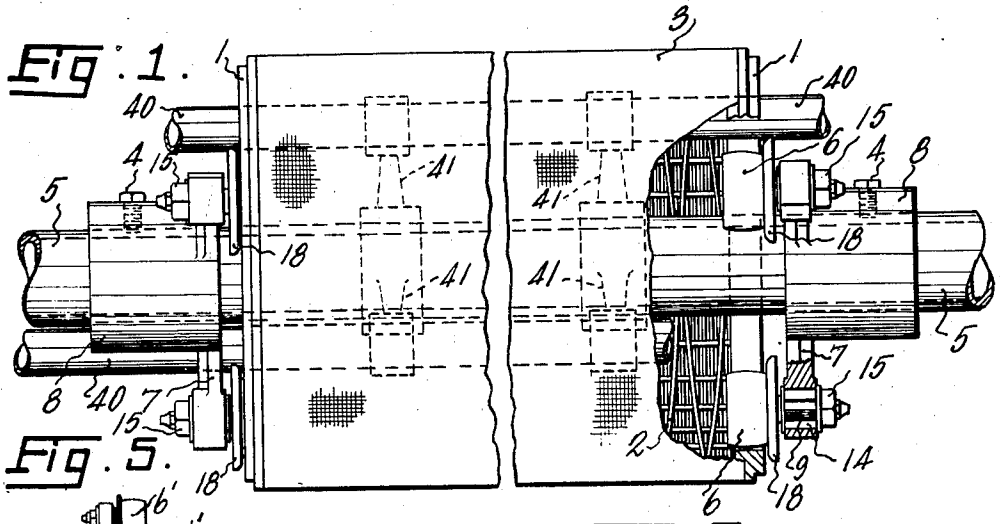


Fig. 5.

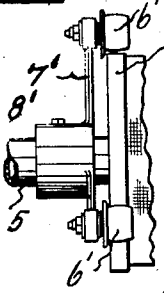


Fig. 3.

Fig. 2.

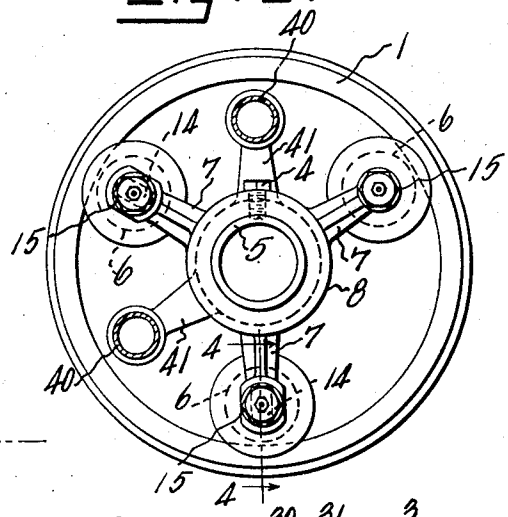


Fig. 4.

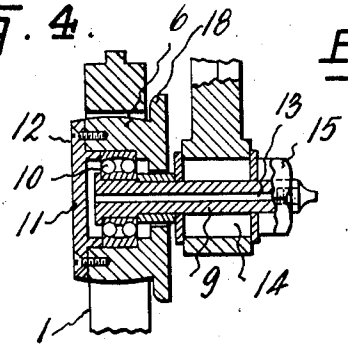
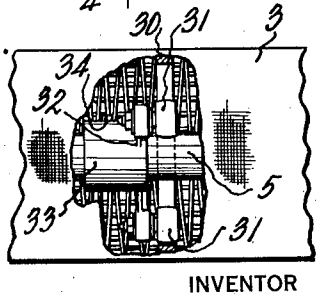


Fig. 6.



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DANDY ROLL

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Application January 17, 1934, Serial No. 706,939

5 Claims. (Cl. 92—48)

This invention relates to dandy rolls for paper making machines and more particularly to the manner in which such rolls are mounted.

Dandy rolls as commonly used rest upon the paper stock while being formed on the Fourdrinier wire of the paper machine and its journals revolve in supports either with or without ball bearings. The dandy roll is turned by the friction between its outer surface and the partially formed paper, and runs freely on the paper stock with no pressure but its own weight. The primary functions of the dandy roll are to close and help form the sheet, to help remove water from the sheet, and to give the top of the sheet a surface approximately similar to the bottom of the sheet. A dandy roll covered with fine wire cloth, similar in texture to the machine wire, produces what is called wove paper, while a dandy roll provided with a surface of wires so arranged as to produce parallel lines on the paper produces what is called laid paper. The lines are produced by a slight thinning of the paper rendering the lines more transparent than the remainder of the paper and watermarks are similarly produced by forming the desired design on the surface of the dandy roll with wire or other suitable material, or in the wire cloth itself. These are specific uses of the dandy roll in securing finish, but dandy rolls are generally used to improve the sheet of paper on all Fourdrinier paper machines in the making of virtually all grades of paper.

From the above brief outline of the function of the dandy roll it will be seen that to operate properly it must turn freely with the advancing paper, and with as little drag as possible on the paper. Furthermore, the meshes of the screen or wire forming the surface of the roll must be kept open to prevent its picking up material from the paper. For proper operation the dandy roll must be kept relatively light in weight and as this weight in the usual construction includes the journals the permissible diameter of the dandy roll is limited and this limits the speed of the paper web with which a dandy roll may be used.

Among the objects of the present invention is the provision of a construction which, by eliminating the journals as part of the weight of the roll, will permit larger diameter rolls with a consequent increase in surface speed without causing unusual vibration, thereby permitting dandy rolls to be used on higher speed paper machines. A further and important object is to provide a mounting which provides a greater freedom of movement for the dandy roll to permit it to freely follow the various movements of the paper. A further object is to provide a construction permitting steam, water or air sprays to be positioned within the dandy roll in substantially any desired position, for the purpose of keeping the mesh free from obstruction and for other purposes. A still further object is to provide a construction realizing the above mentioned objects without sacrifice of strength, or the accuracy with which the roll may be positioned and without requiring any change whatever in the structure of the paper machine itself or the parts with which the dandy roll is associated.

Other and further objects residing in the structural details of the invention will be apparent from the following specification and claims.

In the accompanying drawing, which illustrates one embodiment of the invention,

Fig. 1 is a side elevation, partly in section, of a dandy roll made according to the invention;

Fig. 2 is an end elevation of the roll shown in Fig. 1;

Fig. 3 is an end view showing a conventional form of dandy roll supporting bracket, with the dandy roll of the present invention mounted in operative position thereon;

Fig. 4 is a sectional view of one of the trunnion rolls taken substantially on line 4—4 of Fig. 2;

Fig. 5 is a fragmentary view on a smaller scale showing an alternative manner of positioning the trunnion rolls; and

Fig. 6 is a fragmentary view also on a smaller scale and partly in section showing a modified form of the invention.

Referring to the drawing, 1 indicates annular end frame members to and between which is secured the cylindrical frame 2 and wire mesh covering 3 of the dandy roll. Frame 2 and covering 3 may take any desired or conventional form.

The dandy roll is mounted to freely rotate about a shaft 5 by means of a plurality of trunnion rolls 6 engaging the inner surface of the annular members 1. The rolls 6 are rotatably supported by arms 7 formed on hubs 8 adjustably secured in spaced position on shaft 5 by means of set screws 4. As best shown in Fig. 4 the rolls 6 are each rotatably mounted on a spindle 9 by means of ball bearings 10, the ball bearing assembly being held in place by a cap plate 11 secured to the roll by machine screws 12. The spindles 9 are centrally bored as at 13 to facilitate oiling of the bearing. At least one of the spindles 9 is mounted for radial adjustment in its arm 7 by means of elongated slot 14, nut 15 holding the spindle in adjusted position. In the drawing two of the trunnion rolls at each end of the dandy roll are shown adjustably mounted in their respective supporting arms, and obviously one or all of the rolls may be made adjustable if desired. By means of this adjustment varying diameters of dandy rolls may be used and a slight "play" or free radial movement may be given the dandy roll with respect

to the trunnion rolls, which is desirable as later explained.

The rolls 6 are provided with flanges 18 adapted to engage the end faces of the annular end frames 1 to hold the dandy roll in proper position with respect to shaft 5. Hubs 8 are so adjusted on shaft 5 by means of set screws 4 that the dandy roll is allowed a slight freedom of movement longitudinally of the shaft between the flanges 18.

When the parts have been assembled as above described, and shown in Fig. 1, the dandy roll assembly may be handled as a unit and may be inserted in the usual manner in the conventional supporting brackets commonly provided at opposite sides of the paper machines. In Fig. 3 one form of bracket is shown comprising an open bearing or seat 20 secured to a collar 21 slidably mounted on a vertical standard 22. Collar 21 is secured to a second sliding collar 23 by means of screw 24 and the collar 23 is connected by a link 25 to one arm 26 of a bell crank 27. By raising free arm 28 of the bell crank the bearing 20 is raised, lifting the dandy roll clear of the paper. A fixed hook shaped bracket 29 is provided at the upper end of standard 22 for supporting the dandy roll when its operation is not desired. By adjusting screw 24 the operating position of the dandy roll may be adjusted to meet the various requirements of the paper making operation.

With the conventional dandy roll construction the journals of the dandy roll rotate in the bearings 20. In the present construction shaft 5 will, due to its weight, normally remain stationary in the bearings, although it may be positively fixed if desired as by a set screw 43, and the dandy roll runs freely and with a minimum of friction on trunnion rolls 6. The low friction trunnion eliminates whipping as well as stresses and strains on the dandy roll while in operation, and gives added life to dandy roll covers as well as to dandy frames.

Important features of the invention reside in the use of a shaft extending through the dandy roll as a support for the trunnion rolls, and the adjustability of the trunnion rolls with respect to the shaft. By adjusting the hubs 8, and the spindles 9 in arms 7 the desired amount of free play can be given the dandy roll so that it may "follow" the surface of the paper without slippage. Furthermore, the hubs 8 may be angularly adjusted to permit pipes 40 for steam, air or water sprays to be inserted into the interior of the dandy roll in any desired position, and since shaft 5 is stationary such pipes may be supported by brackets 41 secured directly to the shaft. If desired, the shaft itself may be used to conduct steam, water or air to the interior of the dandy roll. Since only the weight of the end frames and the dandy roll shell rests on the paper, dandy rolls of larger diameter may be used permitting substantially increased paper speeds.

If desired, the trunnion rolls may be arranged to operate on the outside surface of the end frame members of the dandy roll as shown in Fig. 5 where the trunnion rolls 6' are shown engaging the outer surface of ring 1', the rolls being mounted in arms 7' formed on hub 8', adjustably secured to shaft 5 in the manner previously described, all with substantially the same advantages in operation.

The present invention permits the use of one or more sets of intermediate trunnion rolls within the dandy roll if desired. Such a construction is shown in Fig. 6 where a ring 31 is provided on the interior surface of the dandy roll intermediate its ends, forming a guide or track for trunnion rolls 31 rotatably mounted in arms 32 of hub 33 adjustably secured on shaft 5 by set screw 34. This construction is of advantage where long dandy rolls are used or where the construction of the dandy roll shell does not afford sufficient rigidity for proper operation when the roll is supported at the ends only.

I claim:

1. A dandy roll assembly comprising a dandy roll in the form of a hollow cylindrical shell provided at least at its ends with annular frame members, a shaft extending longitudinally through said shell, and a plurality of anti-friction rolls supported from said shaft and engaging said frame members to support the shell for free rotation about the shaft.

2. A dandy roll assembly comprising a dandy roll in the form of a hollow cylindrical shell provided at least at its ends with annular frame members, a shaft extending longitudinally through said shell, and a plurality of anti-friction rolls supported from said shaft and engaging said frame members to support the shell for free rotation about the shaft, at least a portion of said rolls being provided with flanges permitting a limited degree of longitudinal play of the shell with respect to the shaft, the radial spacing of said rolls from the shaft being such as to provide a limited degree of free play of the shell radially with respect to the shaft.

3. A dandy roll assembly comprising a dandy roll in the form of a hollow cylindrical shell provided at its ends with annular frame members, a shaft extending longitudinally through the shell, hub members adjustably secured to the shaft, a plurality of arms extending radially from said hubs, trunnion rolls rotatably mounted in the free ends of said arms and engaging said annular frame members to support the shell for free rotation about the shaft.

4. A dandy roll assembly comprising a dandy roll in the form of a hollow cylindrical shell provided at its ends with annular frame members, a shaft extending longitudinally through the shell, hub members adjustably secured to the shaft, a plurality of arms extending radially from said hubs, trunnion rolls rotatably mounted in the free ends of said arms and engaging said annular frame members to support the shell for free rotation about the shaft, at least one of said trunnion rolls at each end of the dandy roll shell being mounted in its supporting arm for radial adjustment with respect to the shaft.

5. A dandy roll assembly comprising a dandy roll in the form of a hollow cylindrical shell provided at its ends with annular frame members, a shaft extending longitudinally through the shell, hub members adjustably secured to the shaft, a plurality of arms extending radially from said hubs, anti-friction rolls carried by the free end of said arms and engaging the inner surface of the annular frame members, and flanges formed on the outer edges of said anti-friction rolls to engage the end faces of the annular frame members to limit the freedom of movement of the shell longitudinally with respect to the shaft, at least one of said anti-friction rolls at each end of the dandy roll being mounted for radial adjustment with respect to the shaft.

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