Aug. 5, 1924. 1,504,179

P. W. BIDWELL

ROLL FOR PAPER MANUFACTURING MACHINES

Filed Aug. 2, 1922

Fig. 1.

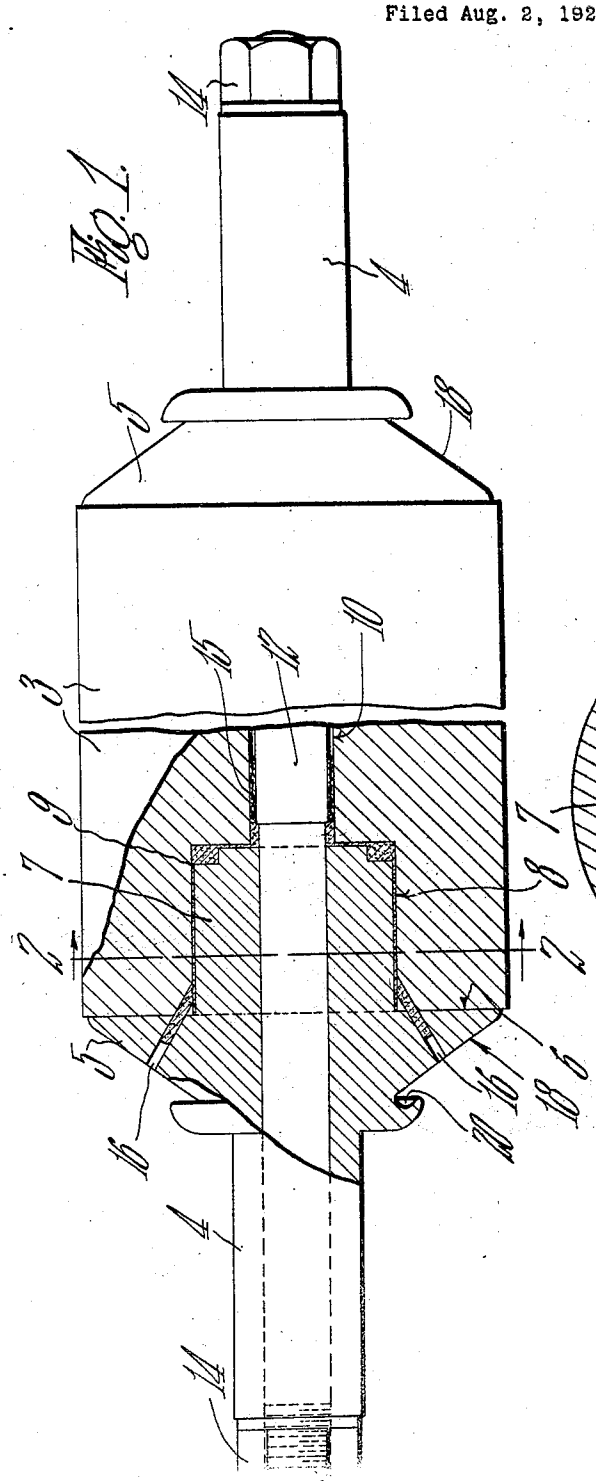
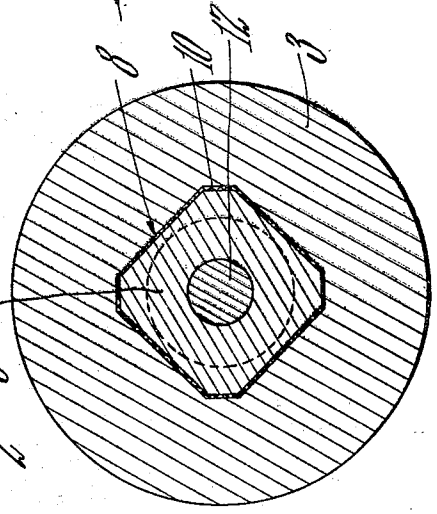


Fig. 2.



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Patented Aug. 5, 1924. 1,504,179

UNITED STATES PATENT OFFICE.

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ROLL FOR PAPER-MANUFACTURING MACHINES.

Application filed August 2, 1922. Serial No. 579,162.

To all whom it may concern:

Be it known that I, PAUL W. BIDWELL, citizen of the United States, residing at Easthampton, in the county of Hampshire and State of Massachusetts, have invented new and useful Improvements in Rolls for Paper-Manufacturing Machines, of which the following is a specification.

The present invention relates to rolls and more particularly to heavy granite rolls such as may be used in paper manufacturing machinery.

It has been customary, heretofore, to adapt granite rolls for mounting in paper manufacturing machinery by providing separate metal trunnions for the opposite ends of the rolls, the trunnions being flanged at their inner ends and the flanges being secured to the rolls by means of expansion bolts. This method of securing the trunnions in place has proved to be generally unsatisfactory, however, inasmuch as the expansion bolts fail to provide adequate support for the rolls and in the use of the rolls the great weight of the latter inevitably causes the bolts to become loosened permitting the rolls to sag away from their trunnions. As a result, the rolls do not run true and become incapable of properly performing their required functions.

One object of the present invention is to overcome the above mentioned difficulty and to provide certain new and useful improvements in and relating to rolls and the mounting thereof for the purpose of providing adequate and permanent support for the rolls when they are installed in a machine with which they are used.

With the above and other objects in view, as will appear from the folowing description, the invention consists in the features of construction and combinations and arrangements of parts hereinafter described and claimed, the advantages of which will be apparent to those skilled in the art.

The invention will be explained with reference to the accompanying drawings which illustrate the preferred embodiment of the invention and in which:—

Fig. 1 is a fragmentary view, partially in side elevation and partially in section, of a roll constructed in accordance with the present invention; and

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1.

Referring to the drawings, the roll therein shown comprises an elongated cylindrical body portion 3 which is made of granite, and metal trunnions 4 which are secured to the opposite ends of the roll body.

Each trunnion 4 is provided with a transverse, annular flange 5 having a smooth flat side face 6 for engagement with the end of the roll body. In accordance with the present invention, each trunnion 4 is also provided with a non-cylindrical extension 7 which projects axially from the flanged or inner end of the trunnion and is adapted to be received within a correspondingly shaped axial recess 8 in the end of the roll body and to be firmly secured within said recess by means of grout or cement 9, as will hereinafter appear. Furthermore the trunnions 4 are made hollow, i. e., they are axially apertured from end to end, and the roll body is likewise axially apertured from the base of one recess 8 to the base of the other recess 8, as shown at 10, for the reception of a shaft or axle 12. The axle 12 extends throughout the length of the roll body and through both hollow trunnions. The opposite ends of the axle 12 are screw-threaded to receive nuts 14 which serve to clamp the trunnion flanges 5 tightly against the roll body and thus rigidly and positively secure the trunnions in place and to adapt them to adequately and permanently support the roll body.

As shown in Fig. 2, the trunnion extensions 7 and the recesses 8, into which said extensions project, are substantially square in cross-section, and the recesses are of greater diameter than the trunnion extension thus affording an annular space between the side walls of said extensions and the adjacent side walls of the recesses for the reception of grout or cement. The depth of the recesses 8 is made slightly greater than axial length of the trunnion extensions 7 thereby affording a space between the end face of each extension and the adjacent base of the respective recess 8, which space is to be filled with cement. As shown, the opposite end portions of the axle 12 fit snugly within the respective hollow trunnions but the intermediate portion of the

axle extends loosely through the aperture 9 in the roll body. When the parts are being assembled, and space between the axle 10 and the roll body at opposite ends of the axial aperture 9 is filled with packing material, as shown at 15. After all of the parts have been assembled, the trunnion flanges 5 are drilled diagonally with respect to the axes of the trunnions, as indicated at 16, the drill being passed completely through said flanges and also through portions of the roll body so as to provide inclined passages terminating in the side walls of the recesses 8. These passages 16 constitute filling openings through which grout or cement is poured to fill the space between the trunnion extension and the roll body. The packing 15 serves to prevent the cement, while soft, from filling the space between the axle 12 and the walls of the aperture 10 and thus the axle and the roll body are enabled to expand and contract freely under changing temperature conditions. The square shape of the trunnion extensions 7 and the recesses 8 prevent relative turning of the roll and its trunnions. Obviously the trunnion extensions may be variously modified in shape without departing from the spirit of the invention.

As shown, the trunnion flanges 5 are preferably formed with bevelled annular faces 18 at their outer sides and with annular grooves or troughs 20 adjacent the inner peripheries of said annular faces. This bevelled and grooved construction of the trunnion flanges provides so-called water ends for the rolls which function in a well known manner to prevent water that is supplied to the surface of the roll from entering the bearings in which the trunnions 4 are journaled.

In the above described construction the trunnions are prevented from turning relatively to the roll body by the complemental non-cylindrical contours of the trunnion extensions 7 and the extension receiving recesses 8 in the roll body. The cement 9 serves to anchor the trunnion extensions in the roll body, while the use of the axle 12 as hereinbefore described holds the trunnions against possibility of displacement relatively to the roll body and thus insures that the roll body will be at all times adequately supported and maintained in axial alinement with its trunnions. The advantageous features of applicant's construction above pointed out serve to greatly lengthen the life of the roll and inasmuch as heavy granite rolls such as herein described are very expensive to manufacture, the practical importance of applicant's invention will be readily appreciated.

The invention has been disclosed herein for illustrative purposes in an embodiment at present preferred but the scope of the invention is to be determined from the appended claims rather than from the foregoing description.

What is claimed is:

1. A roll comprising a cylindrical body having an aperture extending therethrough; said aperture being enlarged at opposite ends thereof to form recesses, an axle extending through said aperture and projecting beyond the ends of said body, hollow trunnions fitting the projecting ends of said axle, said trunnions having an unflanged substantially flat face for engaging the ends of said body, trunnion extensions projecting into said recesses and having cross-sectional contours corresponding to that of said recesses, and nuts threaded upon the extremities of said axle and bearing against said trunnions for binding together said body and trunnions.

2. A roll comprising a cylindrical body having an aperture extending axially therethrough, said aperture being enlarged at opposite ends thereof to form recesses of non-circular cross-section, an axle extending through said aperture and projecting beyond the ends of said body, hollow trunnions fitting the projecting ends of said axle, said trunnions having annular shoulders for engaging the ends of said body, trunnion extensions projecting into said recesses and having cross-sectional contours corresponding to that of said recesses, and nuts threaded upon the extremities of said axle and bearing against said trunnions for binding together said body and trunnions.

3. A roll comprising a cylindrical body having an aperture extending axially therethrough, said aperture being enlarged at opposite ends thereof to form recesses of non-circular cross-section, an axle extending through said aperture and projecting beyond the ends of said body, hollow trunnions fitting the projecting ends of said axle, said trunnions having annular shoulders for engaging the ends of said body, trunnion extensions fitting loosely within said recesses, means interposed between said extensions and the walls of said recess for securing said extensions to the roll body, and nuts threaded upon the extremities of said axle and bearing against said trunnions for binding together said body and trunnions.

4. A roll comprising a cylindrical non-metallic body and metallic trunnions therefor, the trunnions having polysided inner ends and the roll body having axial recesses at its opposite ends corresponding in shape to that of the inner ends of the trunnions into which said trunnions extend, and means for rigidly securing said trunnions in said recesses.

5. A roll comprising a cylindrical non-metallic body and metallic trunnions therefor, the trunnions having polysided inner

ends and the roll body having axial recesses at its opposite ends corresponding in shape to that of the inner ends of the trunnions into which said trunnions extend, and within which the same are cemented, a shaft extending axially through said roll body and said trunnions and nuts threaded upon the opposite ends of said shaft and bearing against the outer ends of said trunnions for binding together said trunnions and said roll body.

6. A roll comprising a cylindrical body having an aperture extending axially therethrough, said aperture being enlarged at opposite ends thereof to form recesses of non-circular cross-section, an axle extending through said aperture projecting beyond the ends of said body, hollow trunnions fitting the projecting ends of said axle, said trunnions having annular shoulders for engaging the ends of said body, trunnion extensions projecting loosely into said recesses and having cross-sectional contours corresponding to that of said recesses, a cement filling for the space between said trunnion extensions and the walls of said recesses, said trunnion flanges having openings extending inwardly and downwardly from the outer faces thereof for the introduction therethrough of the cement filling.

In testimony whereof I have affixed my signature.

PAUL W. BIDWELL.