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METHOD OF JOINING WOOD PIECES FOR MAKING ROLLS

Filed Dec. 14, 1926

2 Sheets-Sheet 1

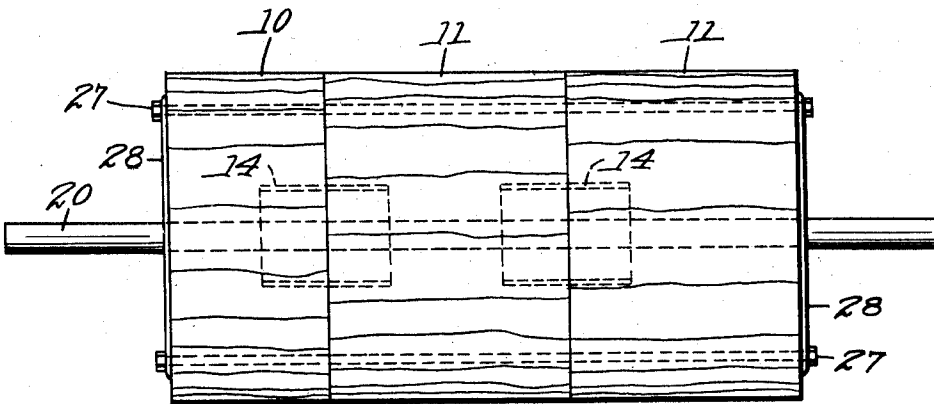


Fig. 1.

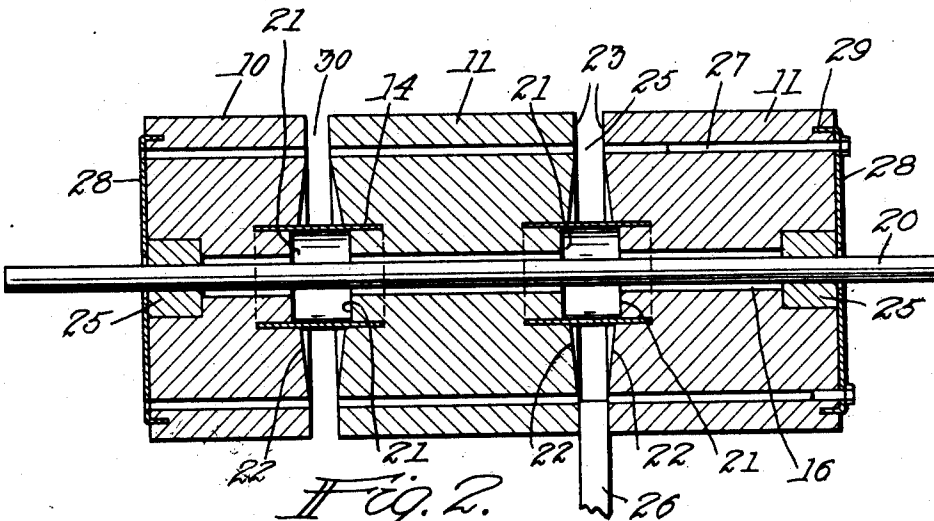


Fig. 2.

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2 Sheets-Sheet 2

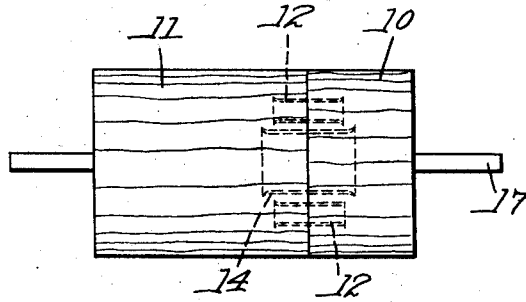


Fig. 5.

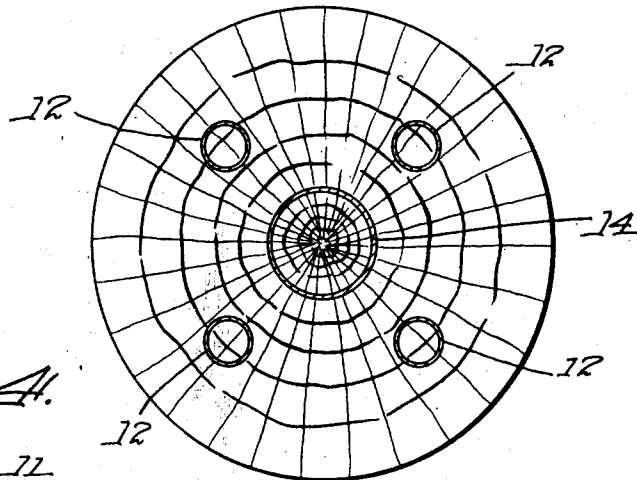


Fig. 4.

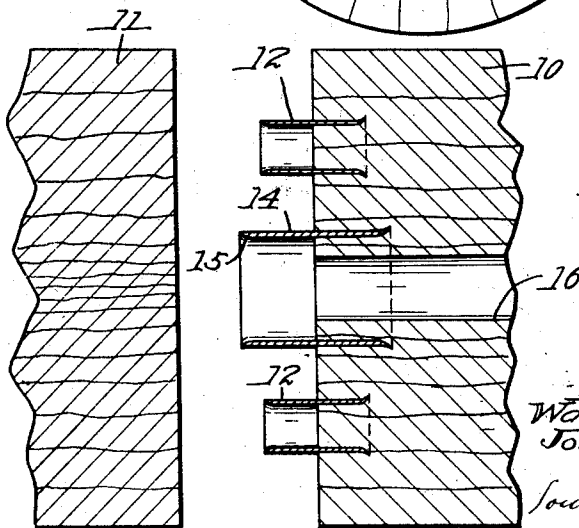


Fig. 3.

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UNITED STATES PATENT OFFICE.

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METHOD OF JOINING WOOD PIECES FOR MAKING ROLLS.

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This invention relates to the manufacture of solid wood rolls for various uses in the textile and allied industries.

The principal objects of the invention are
5 to provide a method of joining end to end, two or more blocks or discs of wood so that they will be permanently united with each other and can be treated and used as if the roll were made of a single integral piece;
10 to provide a construction in which the union of the pieces of wood can be effected in a simple manner without leaving any detrimental joint; to provide means for preventing the access of moisture to the shaft inside or the sulphur compound used therein, but principally to provide for the use for
15 solid rolls of shorter lengths of wood than can be used under present conditions, as well as to provide for the production of a roll without so many imperfections like knots, bark seams, and other hidden blemishes which have been unavoidable when made of solid logs, thus avoiding patching and even the discarding of whole logs.

25 Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which

30 Fig. 1 is a side view of the roll constructed of three discs or short pieces of wood in accordance with this invention;

Fig. 2 is a similar view, showing the roll at one stage in its manufacture;

35 Fig. 3 is a longitudinal sectional view of a modification showing the position of the parts before two pieces are united;

Fig. 4 is an end view of one of these pieces showing the fastening means in section; and

40 Fig. 5 is a side view of a roll made in this way.

Rolls for textile, paper and other industries formed of wood are presenting a more difficult problem as the supply of large logs
45 become more limited. This invention is made for the purpose of providing for the making up of such rolls of shorter sections, but of full diameter. Great wastage has been unavoidable heretofore in making the
50 solid log rolls owing to the fact that bark-seams and other hidden blemishes in the logs necessitate patching and in cases in which these are serious, the discarding of the whole log for this purpose after it has

been selected, and a good deal of labor expended upon it in finishing it.

Figs. 1 and 2 show a preferred embodiment of this invention, in which a series of discs or pieces of wood 10 and 11 are used. They are shown of two different lengths. 60 to illustrate the fact that a roll can be made up of such pieces irrespective of the lengths of the individual ones. The roll is shown in Fig. 2 in a condition in which it is semi-
65 finished and ready to be put into a lathe and turned up to uniform diameter. In the first place these different sections or discs are designed to be placed together end to end with the grain running longitudinally of the roll. The sections of the log are first
70 sawed off. Of course it is impossible to saw such pieces so that they will be of uniform thickness, but they are assembled on the shaft 20 as indicated in Fig. 2. The discs are counterbored, as for example, with
75 a six inch groove at 21 on each end of the discs between the end discs and on the inner ends of the end discs, and are provided with a tapered counterbore 22 extending from the counterbore 21 to an annular flat surface 23
80 at the periphery. Each section is formed in this way. The end sections are also counterbored at 24 to form a place for the gudgeon 25, as will appear later, which is forced in to unite the shaft with the end
85 discs.

The counterbore 21 is beyond the tapered counterbore 22 and is deeper. It is of a diameter to insure a very tight fit of a length 14 of six inch pipe which is to be
90 used to unite two of the sections by forcing it into the two registering recesses. These parts are preliminarily assembled on the shaft 20, as shown in Fig. 2, with the pieces 14 partially forced into each end of
95 the several discs, but leaving spaces between the several discs.

Before the discs are forced entirely together as shown in Fig. 1, the spaces 30 between the surfaces 23 not being perfectly
100 uniform, this partly assembled roll is put into a lathe and a turning tool 26 with cutting edges on both sides is moved into this space while the shaft is turned. This smooths off the surfaces 23 uniformly on
105 both sides and insures the clearance, that is, the space 30 between two of these surfaces to be absolutely uniform all around the roll.

As the surfaces 23 extend only part way in from the circumference, that is, until they encounter the conical inclined surface 22, it is not necessary to go in with the tool any further than to be sure to straighten up the surfaces 23. This insures a perfectly uniform fit completely around the disc.

Now the roll is put into a hydraulic press and the parts forced together under high pressure. It will be obvious that the joints between the surfaces 23 will fit absolutely and that the pressure will force the pipes 14, in the direction of the grain, into the two adjacent discs and hold the discs together firmly at the center as well as guide the same. These pipes also have the effect of protecting the shaft, or any filling that may be put in around the shaft, from the passage of water or other liquid through the joints at the surfaces 23. A permanent joint is assured by putting through the holding bolts 27 while the sections are still under pressure in the press. These also are put through the metal end plates 28 which are provided with flanges 29 forced into the roll in the direction of the grain under the pressure of the press, while all the rest of the work is being accomplished.

After the nuts are screwed on the through bolts 27 the whole device is held permanently under the pressure given it by the hydraulic press. It is then in the form shown in Fig. 1 and is put into a lathe again and turned down to a uniform surface. It can be turned down over and over again as its surface suffers from wear, almost down to the through bolts 27 and flanges 29. This provides a permanent construction in which the joints are absolutely tight.

These rolls are used in paper mills and in the textile industry as is well understood. On the average, a roll constructed in this way has a better surface than one made of a single log and it will hold up better and not be so liable to warp.

A similar way of achieving some of these results also constitutes part of this invention. In the second sheet of drawings, I have shown the invention in a simpler form as being applied to the joining of two blocks or discs 10 and 11 of wood. When uniting two pieces, such as those shown or any other pieces, a series of steel or iron tubes 12 are driven with the grain about one-half way into one of the sections 10 as indicated in Fig. 3. These may be arranged in any desired way, preferably around the center and spaced equally apart, although this is not essential. Furthermore the ends of these tubes are chamfered on the inside. I find that assists in guiding the tube in the assembling process and that the end of the tube tends to follow the grain of the wood better than if the tubes were left square at their ends. The thin edge tends to expand,

thus more firmly holding it in position. This produces a desirable locking element when the tubes are arranged symmetrically around the center and insures the locking of the two pieces of wood together permanently.

It will be noticed also that I have shown the central tube 14 chamfered at its ends as indicated at 15. The two pieces of wood can be secured together efficiently if a plurality of the tubes 12 are arranged at approximately equal distances from the central tube. Also in some cases the central tube 14 is all that is required to hold the block together. For additional strength I can combine both methods and this is what is shown in these figures.

The tube 14 at the center seals the joint between the two pieces of wood 10 and 11 so that a sulphur compound placed around the shaft will never leak out beyond the inner part of this tube. The sulphur therefore is sealed by this inner tube and all leakage to and from it is prevented.

The next step of the process consists in driving these two blocks together so as to embed the tubes in both blocks. This is done under a pressure of upwards of 75 tons. They extend far enough into each one to prevent lateral motion. Being driven in frictionally, they resist any efforts at separating the parts by pulling them apart.

At the present time many of these rolls are made of a single piece of log which on account of its size cannot be treated by any of the standard methods of preserving wood. Substitutes therefore have to be employed which are far from complete. Now by using a plurality of separate blocks or discs, each of them can be treated conveniently in the most approved methods of preserving and a roll of large dimensions can finally be obtained which is sufficiently subjected to the preservatives. It will be understood also that, by making up a roll of several discs, a careful selection of individual ones can be made so that the finished surface of the complete roll may be provided without knots or other blemishes. This is important because logs of high quality are growing more scarce every year and some wood rolls in the trade are required to have a substantially perfect surface. In this way we can utilize small ends of wood which would otherwise be wasted as far as use for rolls is concerned. The roll when completed is treated exactly like a single piece of wood and trimmed down to size as may be desired.

It will be understood, of course, that we prefer to use the method shown in Figs. 1 and 2 of the drawings. The two sets of tubes 12 and 14 can be used with that method or we can use either one exclusive of the other, without departing from the scope of this invention. Although we have

described only two examples of the method and two forms of the uniting means, we are aware of the fact that other modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore we do not wish to be limited to all the details of construction herein shown and described, but what we do claim is:—

1. The method of making up wood rolls out of a plurality of wood discs, which consists in assembling a series of these discs on a shaft with the grain all running parallel to the shaft, leaving the discs all spaced apart, squaring up each two adjacent end surfaces simultaneously, forcing the discs together on the shaft, and uniting them under pressure.

2. The method of making wood rolls of a plurality of pieces, which consists in cutting a series of discs with the grain all running in an axial direction, shaping the discs on the ends so that when placed end to end they will contact only at the edges, boring the discs centrally, centering them on a shaft or arbor, spaced apart, placing the shaft or arbor on a lathe, cutting inwardly to true up the edges of the discs at opposite sides of said spaces, and then forcing the discs together and uniting them, whereby a roll will be formed with the surfaces of the discs in contact with each other and with true joints between them.

3. The method of making up wood rolls out of a plurality of wood discs, which consists in cutting the discs with end surfaces flat at the edge with a central counterbore and a surface slanting inwardly from the flat surface to the counterbore, assembling a series of these discs on a shaft with the grain all running parallel to the shaft, leaving the discs all spaced apart, squaring up said flat surfaces, forcing them together on the shaft, and uniting them under pressure.

4. The method of making up wooden rolls out of a plurality of pieces of wood, which consists in assembling a series of discs on an arbor or shaft with longitudinal metal pieces of short length between the discs to hold them together, but with the discs spaced apart on the arbor, turning the edges

of the discs at their outer surfaces to true fitting surfaces, forcing the discs together on the arbor under heavy pressure to force the metal pieces into the several discs and bring the true edges into perfect contact all around, fastening the discs together by through bolts to hold them under the pressure, and then turning off the exterior of the roll to a uniform surface.

5. As an article of manufacture, a wood roll for textile and paper machines made up of a series of wood discs arranged with the grain running in the same direction and fitting each other perfectly all around so as to form perfect joints at their adjacent surfaces, pipes between each pair of adjacent ones projecting into the discs to hold them firmly together and protect the joint, a shaft running through the roll from end to end, and a gudgeon on each end of the shaft driven into the roll to hold the same.

6. As an article of manufacture, a wood roll made up of a series of wood discs arranged with the grain running in the same direction and fitting each other all around so as to form perfect joints at their adjacent surfaces, pipes between each pair of adjacent discs projecting into the discs to hold them firmly together and protect the joint, a shaft running through the roll from end to end, a gudgeon at each end of the shaft driven into the roll to hold the same, a metal plate on each end of the roll having a flange projecting into the roll, and through bolts extending from one plate to the other for securing the different pieces of wood together into a single roll.

7. A wooden roll made up of a plurality of solid wood discs all squared off at their ends and placed end to end with the grain of the same continuous from one end of the roll to the other, a shaft extending through the whole roll, and a metallic tube centered about the shaft and larger than the shaft for joining the discs together and sealing the joint.

In testimony whereof we have hereunto affixed our signatures.

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