June 2, 1925. 1,540,588

H. G. ALEXANDER

SECTIONAL ROLL

Filed Dec. 15, 1923

Fig. 1.

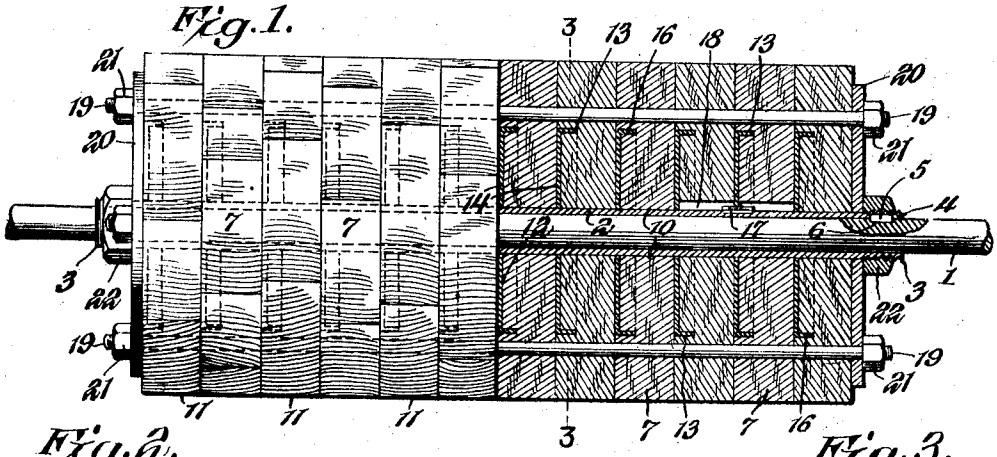


Fig. 2.

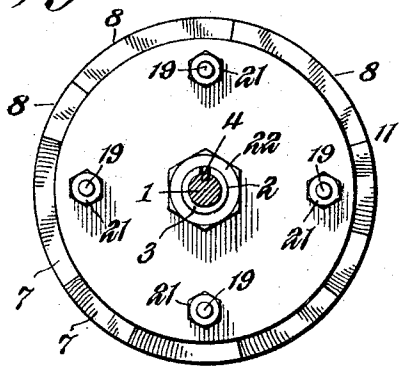


Fig. 3.

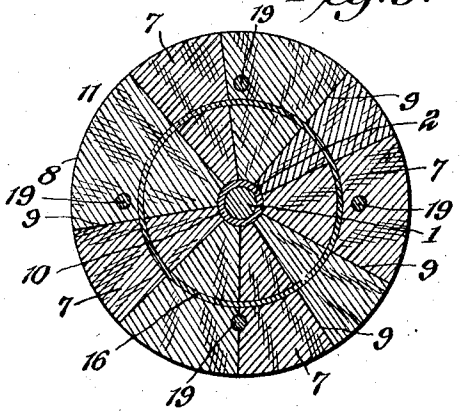


Fig. 4.

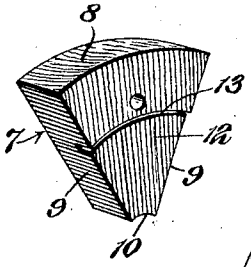


Fig. 6.

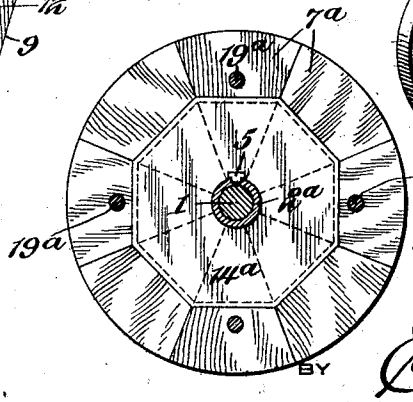
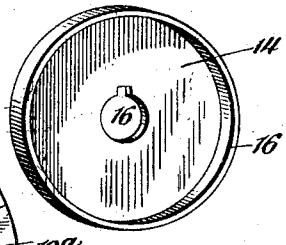


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

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SECTIONAL ROLL.

Application filed December 15, 1923. Serial No. 680,871.

To all whom it may concern:

Be it known that I, HORACE G. ALEXANDER, a citizen of the United States, residing at South Londonderry, in the county of Windham and State of Vermont, have invented a new and useful Improvement in Sectional Rolls, of which the following is a specification.

This invention relates to sectional rolls for use in textile and paper mills.

The object is to provide a built-up or laminated roll which may be constructed of pieces of wood of different sizes so utilized and placed, that the grain of the wood is arranged radially to the roll, thus producing a roll wherein the wear of the passing fabric, threads or belt is reduced to a minimum, and a great saving in cost is effected in the manufacture.

Another object is to provide a roll which, when immersed in water or other liquid, as is often necessary in the arts stated, will not swell, warp or become otherwise distorted during its operation.

A further object is to provide a roll which may be built of any diameter and length desired, as the latter may be increased or decreased by the addition or omission of more layers, or sections of wooden segments; and to provide means for clamping the several layers of segments together, to hold the roll from longitudinal movement upon the shaft, and to prevent any of the segments from movement outwardly or radially to said shaft.

A full and complete understanding of the invention may be obtained from a consideration of the following detailed description, taken in connection with the accompanying drawing forming a part of this specification, it being understood that while the drawing shows a practical form of the invention, the latter is not to be confined to strict conformity with the showing thereof, but may be changed or modified, so long as such changes or modifications mark no material departure from the salient features of the invention, as specifically pointed out in the appended claims.

In the drawing, in which similar reference characters designate corresponding parts throughout the several figures:—

Figure 1 is a combined side elevation and longitudinal section of a roll constructed in accordance with the invention.

Figure 2 is an end view of the same.

Figure 3 is a vertical, transverse sectional view, taken on the line 3—3 of Figure 1.

Figure 4 is a detail perspective view of one of the wooden segments used in the roll.

Figure 5 is a detail perspective view of one of the segment-retaining discs.

Figure 6 is a transverse sectional view through a slightly modified form of roll.

The ordinary method employed in the manufacture of rolls for use in textile mills or paper mills, is to place a solid maple log in a lathe and turn the same to the desired diameter, cutting off the same to the desired length, and, by the use of metallic end heads secure the same to the shaft in proper position. Such solid roll soon shows signs of wear by the passing fabric, threads, conveyor or drive belt, some of the longitudinal grain of the wood being softer than others, and the said roll must then be dismounted and turned again to preserve its shape. Logs of large enough diameter are hard to find and, as a result, are expensive, and their upkeep in proper form, is also expensive, and in addition to this, the solid form of roll is quickly distorted or warped when partially or wholly immersed in liquids so that they soon become useless.

The present invention is designed to overcome these defects by providing a roll that will not swell or warp, that will show little or no signs of wear after long continued operation, and which enables the manufacturer to utilize small pieces of the proper wood in constructing the same, which would otherwise be wasted.

Referring to the drawing, there is shown a shaft 1. which is adapted to be mounted for rotation in any form of machine wherein wooden rolls are used. Mounted on the shaft is a tubular sleeve 2 which is of a length somewhat greater than the length of the roll, and has each end exteriorly threaded, as at 3, and provided in its ends with slots 4, for the reception of keys or splines 5, having their inner portions seated in longitudinal slots 6 formed in the shaft. Each end of the sleeve is thus secured to the shaft and is prevented from longitudinal movement thereon.

Pieces of wood, preferably maple and of uniform thickness are then formed into segments 7, as shown in detail in Figure 4 of the drawing, each of said segments comprising an outer arcuate surface 8 struck on a

radius substantially equal to the desired diameter of the roll, and having inclined or tapering sides 9 which extend along lines exactly radial to the center from which said arc was struck. The inner or narrow end of each segment is provided with a suitable seat 10, curved to fit the aforesaid tubular sleeve 2, and the said segment is cut from the wood in a manner to have the grain thereof run as near as possible from the center of the small seat 10 to the center of the outer arcuate face 8 as indicated in Figure 4. This brings the ends of the grain on the outer active surface of the roll, and since wood does not expand longitudinally of the grain when subjected to moisture, nor contract when dried, to any appreciable extent, it will be seen that the finished roll may be used either in or out of water or other liquids without bad effects.

The widths of the several segments, forming one complete ring or layer 11 of the roll, may vary, depending on the stock of pieces of timber on hand, as clearly shown in Figure 3, but of course their lengths must be uniform or nearly so. Each segment is provided on one face with a countersunk portion or seat 12 extending substantially to half its length and from side to side thereof, the outer end of said seat terminating in an arcuate groove 13, formed in the wood and struck from the same center as the outer active face of the roll. When sufficient segments of different or uniform widths are placed together to form a complete ring or layer 11, the same is placed upon the tubular sleeve 2, after first placing in position thereon a retaining plate or disc 14 shown in detail in Figure 5. This disc is of relatively thin pressed steel having a central aperture 15 of a diameter to slide onto the tube 2, and is provided with a marginal outstanding flange 16 extending entirely around the same. When the disc is seated in the countersunk portion 12, with the said flange seated in the groove 13, the outer face of the disc and the several segments are flush, and it will be seen that the said segments are prevented from radial displacement.

When the desired number of layers or rings are thus assembled and placed upon the tubular sleeve, each with a retaining disc therein, a complete, solid, cylindrical roll is provided, the number of rings depending upon the length of the roll desired.

At, or near the ends of the roll, one or more of the retaining discs 14, may be keyed or splined to the sleeve 2, as indicated at 17, in which case the segments are slightly shorter at their inner ends to provide a space 18 for applying said spline, which cause the entire series of rings comprising the roll to rotate uniformly with the shaft through the medium of longitudinally disposed tie-bolts 19, traversing suitable alined apertures formed through the entire series of rings outside of the flange of the retaining disc.

Circular discs or clamp plates 20 of smaller diameter than the rings are mounted on the ends of the sleeve 2 and bear against the outer faces of the outermost rings or layers 11, and said plates are likewise bored for the reception of the ends of the tie bolts, which have suitable nuts 21 applied thereto to bear against said plates and to bind all the rings tightly together, and holding the retaining discs in place to prevent the several segments from moving outwardly or in any other direction.

The ends of the sleeve 2 are equipped with suitable nuts 22 which further serve to bind the parts together, and when tightened up are adapted to overlie the aforesaid keys or splines 5 and prevent the same from dislodgment from their seats in the slots in the shaft. If desired, the use of the sleeve 2 may be dispensed with and the discs 14, the segments 7, and the clamping plates 20 may be mounted directly on the shaft 1, in which case the latter will be threaded for the reception of the nuts 22, as will be understood.

After a roll of the desired diameter and length has thus been assembled, the same may be placed in a lathe and turned to a smooth and perfect circumference and, by reason of the end grain of the wood comprising the segments being uniformly exposed to the surface, the roll will not be materially affected by continued use, and the effects of moisture or heat will not be noticed on the surface of the roll.

In Figure 6, there is shown a slightly modified form of the invention, in which all of the segments 7^a are of uniform length, width and shape, there being eight of such segments shown to complete one ring or layer, mounted on the sleeve 2^a in the same manner and held by similar tie-bolts 19^a. In this form, the retaining plate or disc 14^a is octagonal in form and is provided with a marginal flange 16^a seated in a corresponding groove and for the same purpose. Any other number of segments of uniform size and shape may be employed, together with a corresponding shaped retaining disc, but the first described form, wherein irregular sizes are employed with the circular retaining disc, is preferred.

From the foregoing it will be seen that a simple, easily assembled, and durable wooden roll has been provided, which may be used to advantage in textile machines, or in paper mills, or as pulleys for belts or conveyors in other machines, and that a great saving in the cost is effected by the utilization of small pieces of material, thus avoiding the necessity for the employment of a solid log of

wood, and that a practically indestructible, non-warping, non-expanding or contracting roll is provided.

What is claim is:—

1. A sectional roll comprising a series of circular layers of wood having rounded outer surfaces conforming to the roll and formed of segments having abutting radial side edges, each layer of segments having on one face only a central depressed seat, said seat terminating in an outer, marginal groove extending part way through the segments, a plate mounted between each of the layers and seated in each of said seats, said plates each having a marginal flange extending into its corresponding groove to allow the layers to abut and to prevent outward movement of the segments, clamping plates bearing against the ends of the roll, tie rods traversing the layers outside of the interposed plates and also traversing the clamping plates, and nuts mounted on said rods to hold the layers together.

2. A sectional roll comprising a continuous axial bearing tube having threaded ends extending beyond the ends of the roll and having means for splining the same to a shaft, a series of circular layers of wood having rounded outer surfaces conforming to the roll and formed of segments, each having the grain of the wood running radially of the roll and having abutting radial side edges, each layer of segments having on one face a central depressed seat, said seat terminating in an outer, marginal groove extending part way through the segments, a plate mounted between each of the layers and seated in each of said seats, said plates each having a marginal flange extending into its corresponding groove to allow the layers to abut and to prevent outward movement of the segments, means for splining certain of the discs to the tube, clamping plates arranged on the tube and bearing against the ends of the roll, tie rods traversing the layers outside of the interposed plates and also traversing the clamping plates, nuts mounted on said rods to hold the layers together, and nuts mounted on the ends of the tube and bearing against the clamping plates and covering the splines holding the tube to the shaft.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature.

HORACE G. ALEXANDER.