J. T. WOOD.

BEAM FOR USE IN DYEING.

APPLICATION FILED FEB. 6, 1915.

1,151,917.

Patented Aug. 31, 1915.

2 SHEETS—SHEET 1.

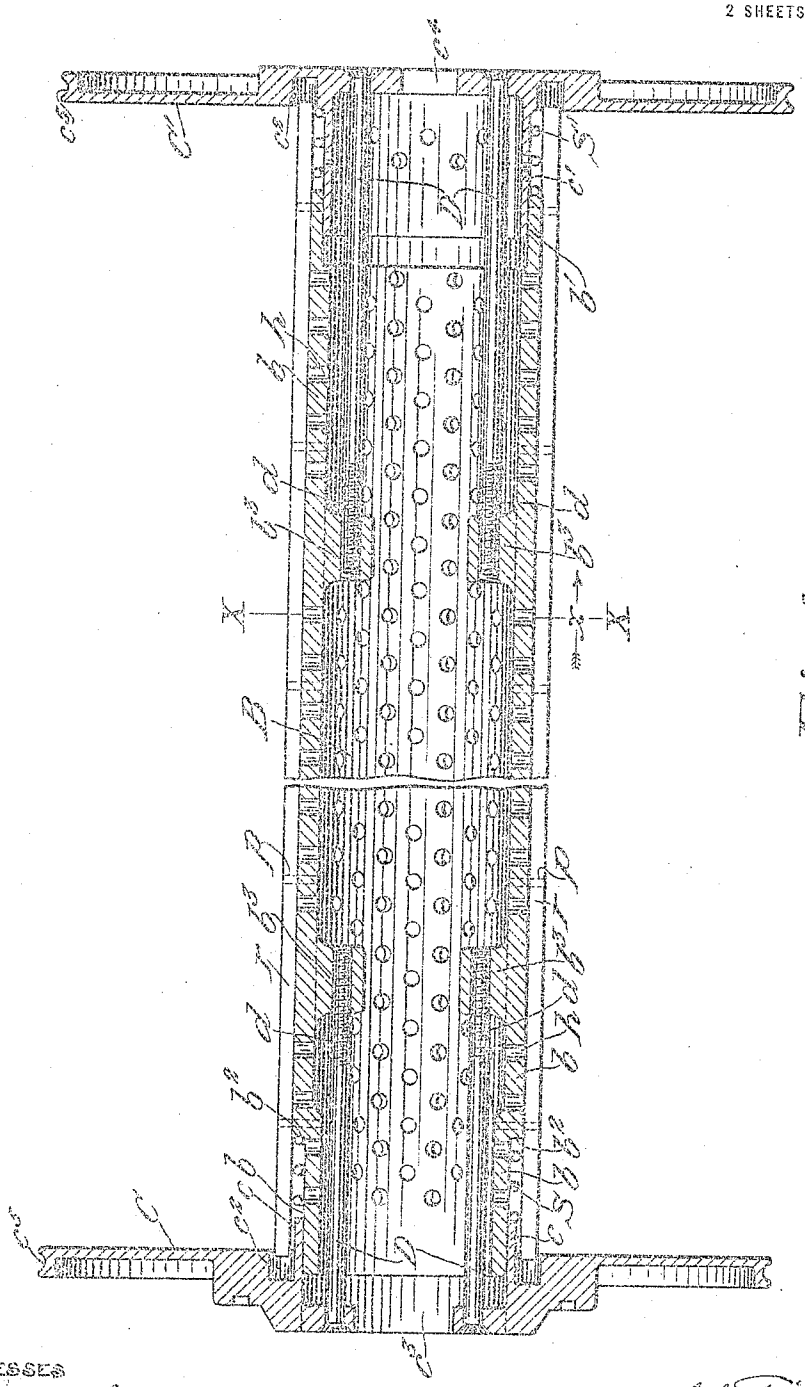


Fig. 1.

WITNESSES

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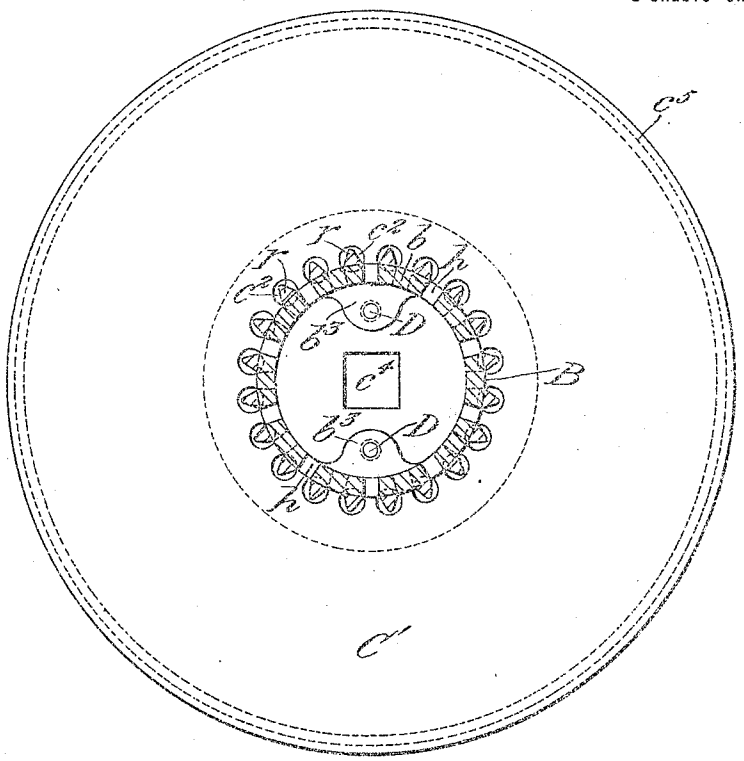


Fig. 2.

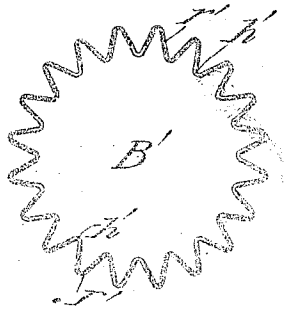


Fig. 3.

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BEAM FOR USE IN DYEING.

1,151,917. Specification of Letters Patent. Patented Aug. 31, 1915.

Application filed February 6, 1915. Serial No. 6,471.

To all whom it may concern:

Be it known that I, JOHN T. WOOD, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Beams for Use in Dyeing, of which the following is a specification.

My invention is an improved beam for use in dyeing or similarly treating yarn, thread or other textile materials.

The object of my improvement is to provide a beam or spool for the purpose specified having a tubular, perforated barrel, and heads at the ends of the barrel adapted to be adjusted longitudinally thereon.

My invention consists particularly of improvements in the structure and arrangement of the device whereby the heads or end-flanges of the beam are normally maintained in their extreme positions at the ends of the barrel while being easily adjustable to slide them toward each other. The purpose of this adjustment of the heads is to provide for contracting and compressing the mass of yarn or other material wound onto the beam-barrel to compensate for the shrinkage of the latter when the material is subjected to the dyeing or other bath.

The invention is fully set forth in the following specification, illustrated by the accompanying drawings, in which like reference characters designate like parts.

In the drawings:—Figure 1 is a sectional view of my improved beam or spool taken longitudinally of its axis; Fig. 2 is a transverse, sectional view of the same taken on the line X—X of Fig. 1, looking in the direction indicated by the arrow *x*; and Fig. 3 is a sectional view showing a modified form of barrel adapted for use with the beam.

Referring to the drawings, B designates the axially-arranged tubular barrel of the beam and C, C′ are the two adjustable end-flanges or heads. The barrel B is preferably constructed in the form of a cylindrical casting cored out on its interior to provide a relatively thin, tubular wall *b*. Throughout substantially its whole length the wall of the barrel B is perforated with circumferentially arranged holes *h*, *h*, etc., which are provided to allow the egress of fluids pumped through the central opening in the barrel. When one end of the barrel B is closed and the fluid, which may be either liquid or gas, is forced or drawn into the opposite end it will seek a means of egress through the openings *h* and will thence be forced radially outward into the mass of material surrounding the barrel. In order to provide for a free circulation of the fluid through the walls of the beam and into the surrounding material, I prefer to provide the barrel B with a fluted or corrugated surface as shown more particularly in Fig. 2. One method of constructing the barrel in this form is to apply longitudinal ribs or strips *r* to its exterior, and as illustrated in Fig. 1 these may be fastened in place by pins or rivets *p*, *p*, or through any other suitable means. In some cases the ribs *r* might be cast as a part of the main portion of the barrel B or they can be formed by planing or milling grooves in its surface. It will be noted from Fig. 2 that the ribs *r* are tapered outwardly to a point, or, in other words, made triangular in cross-section and the holes *h*, *h* are arranged in the spaces between the ribs. This provides that when the yarn or other material is wound onto the beam it will have only a relatively slight contact with the periphery of the barrel B and consequently there will be a greater surface exposed to the fluid emanating from the openings *h*. That is to say, as the fluid is forced through the holes *h* in the walls of the barrel B it will have free vent to flow along the channels between the ribs *r* and hence will have easier access to the yarn-mass surrounding the barrel so that the material will be permeated more freely and completely in all of its parts.

Fig. 3 shows a modification of the beam construction in which the corrugated barrel B′ is formed of sheet-metal bent up in the required shape. With this construction the corrugations *r*′ are also preferably of wedge shape with their outer, pointed ends adapted to support the yarn-mass with a minimum contact therebetween. The holes or openings *h*′ are punched through the metal of the barrel B′ and are spaced to lie between the projecting ribs *r*′. Such a form of barrel B′ may be fitted to the beam to surround the main, tubular barrel-portion B or any other suitable means could be provided for connecting it with the end-heads C, C′.

Referring again to Fig. 1, the heads C, C′

may be connected to the barrel B to slide thereon in any manner preferred, the construction here shown being in accordance with a convenient form. In the drawing the head C is illustrated as having a hub or flange c fitted to the reduced end b of the barrel B; while the other head C′ has its hub c' arranged to slide within the enlarged bore b' at the opposite end of the barrel. Where the end of the barrel B is reduced in diameter at b a shoulder is formed at b^2 and between this and the end of the hub c is a coiled spring S surrounding the barrel B and tending to force the head C outwardly thereon. At the opposite end of the beam a similar spring S′ is arranged between the end of the barrel B and the flange of the head C′ and acts to force the latter outwardly away from the head C. It will be noted that the ends of the ribs r project beyond the ends of the main portion of the barrel B and the springs S and S′ are arranged beneath these overlying extensions of the ribs. It is also to be noted that the heads C and C′ are provided with suitably spaced recesses or openings c^2 into which the ends of the ribs r project to afford a clearance space to allow the heads to be slid toward each other on the barrel B. This arrangement provides for winding the yarn on the barrel B to its full length, clear up to the inner faces of the flanges C and C′, without obstructing the sliding movement of the heads or interfering with the action of the springs S and S′. In other words, the yarn can be wound to the full extent of the space between the flanges C and C′ and the mass will be supported at the ends by the ribs r to prevent it from constricting upon the hubs c and c'.

To adapt the heads C and C′ for adjustment toward and away from each other on the barrel B, I provide the means now described: Extending through suitable holes in the heads C and C′ are bolts D, D, etc., preferably having their heads countersunk into the outer faces of the flanges to give a smoother and more finished appearance. The inner ends of the bolts D D are threaded at d to enter the screw-threaded holes of the lugs b^3, b^3 which project inwardly from the walls of the barrel B. Any suitable number of bolts D may be used for drawing the heads C and C′ together on the barrel B or any equivalent means may be substituted in their place. It will be noted that the head C is formed with a relatively large axial opening c^3 while the opposite head C′ has a smaller square hole c^4 as illustrated more particularly in Fig. 2. The square hole c^4 is provided to receive a squared shaft from which the beam is rotated in the machine which operates to wind the yarn onto its barrel. Usually one or both of the end-heads or flanges C, C′ has its rim formed with a circumferential groove c^5 adapted to receive the brake-band of the tension or let-off device through which the unwinding of the beam is controlled.

My improved beam is adaptable for various and sundry purposes in the textile art as applied particularly to dyeing, bleaching, oxidizing, steaming, washing and similar processes of treating yarn or other materials. It may be employed either as a jack-spool or a warp-beam and is applied to use in the following manner. Referring to Fig. 1, this shows my improved beam with the heads C and C′ in their extreme, outward positions at the ends of the barrel B and with this adjustment the beam is ready to receive the yarn or other material to be wound thereon. The yarn may be wound onto the barrel B in any usual manner to fill the space between the heads C, C′ and when the winding is completed the material is next compacted and compressed to take care of the natural shrinkage that ordinarily takes place during the dyeing or other process. This compression of the material is accomplished most easily and conveniently by simply turning up the screws or bolts D to force the two heads C, C′ toward each other on the barrel B. Through this means the yarn-mass surrounding the barrel of the beam is compacted and rendered more dense so that when the material is saturated it will not shrink away from the heads C, C′. After the material has thus been compressed longitudinally of the support or barrel B the beam is applied to the dyeing machine and one of its ends is connected to the supply-pipe thereof while the opposite end is closed by a suitable stopper or cap. Now, when the dye-liquor or other fluid is pumped into the opening in the barrel B the pressure will force it radially outward through the openings h, whence it will permeate the whole mass of the yarn or other material surrounding the barrel. As before explained, the projections or ribs r on the periphery of the barrel B serve to hold the material away from the openings h so that the fluid will have a freer flow along the length of the beam and will consequently have easier access to all parts of the mass surrounding its barrel.

I am aware that it has before been proposed to employ spools or beams with tubular, porous barrels for dyeing material wound thereon. Heretofore, however, such beams have usually been constructed with rigid barrels having fixed heads without any provision for compressing the material longitudinally of the barrel. Under these conditions, after the material becomes immersed or saturated with fluid, the mass will shrink away from the end-heads or flanges of the beam and will then fall down onto the ends of the barrel and become tangled

and matted together so as to prevent it from unwinding after the dyeing operation is completed. This causes uneven dyeing and waste of the material which cannot be unwound from the tangled mass at the ends of the beam. In some cases, to avoid this difficulty, it has been proposed to employ a spool or beam having removable heads which can be slid along the barrel, but without some efficient means for the adjustment of the heads such a beam has been found to be crude and unwieldly. That is to say, it is necessary in compressing the yarn-mass longitudinally of the barrel of the beam to provide a relatively powerful yet conveniently operated means to draw the beam-heads together, and it is to accomplish this purpose that my present improvement was devised. It will be seen that my improved beam is not only simple in structure and easy to operate for the purpose intended, but also it has a maximum efficiency particularly as to the arrangement for exposing the material wound on its barrel to the action of the dye-liquor or other bath.

It will be understood that I do not herein claim broadly the arrangement of a beam or spool having end-flanges or heads adjustable longitudinally of its barrel, but

What I do claim is:—

1. In a beam or spool for use in dyeing or similar processes, the combination with a tubular, ribbed, barrel having perforated walls, of end-heads mounted to slide on said barrel, and manually-operable means to adjust the heads toward each other longitudinally of the barrel to compress the mass of material wound thereon.

2. In a beam or spool for use in dyeing or other similar processes, the combination with a tubular, porous barrel having radially-projecting, longitudinal ribs on its periphery, of heads mounted on the ends of the barrel and adapted to slide over the ribs, springs for maintaining the heads in their extended relation on the barrel, and manually-operable means for sliding the heads toward each other on the barrel against the action of the springs.

3. In a beam or spool for use in dyeing or similar processes, the combination with a tubular barrel formed with longitudinal ribs on its periphery and openings leading from its interior into the spaces between the ribs, end-heads formed with hubs adapted to slide on the barrel, coiled springs underlying the ribs on the barrel and arranged to maintain the heads in extended relation at the ends of the beam, and manually-adjustable means for forcing said heads toward each other against the action of the springs.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN T. WOOD.

Witnesses:
HERBERT K. ALLARD,
GEO. A. WHITE, Jr.