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TIRE YARN BEAM

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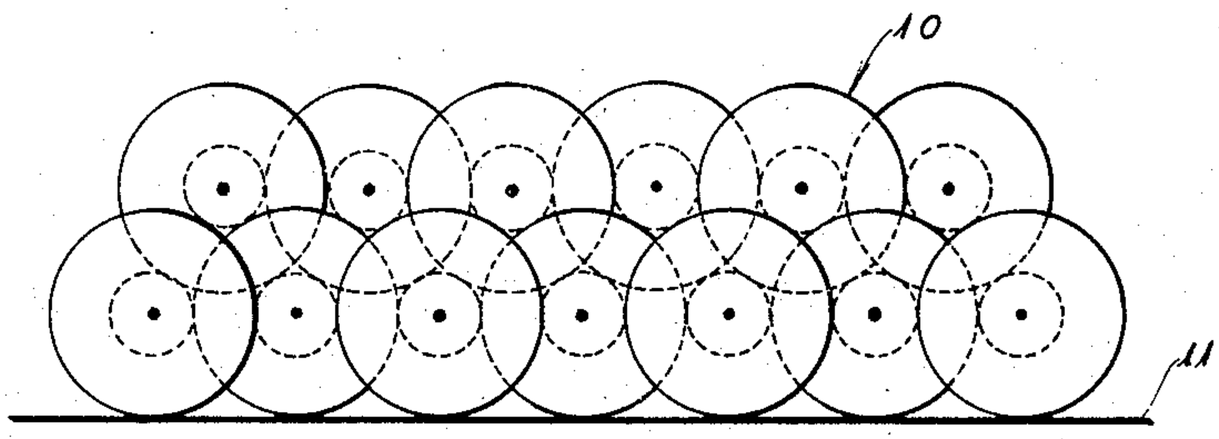

FIG. 1

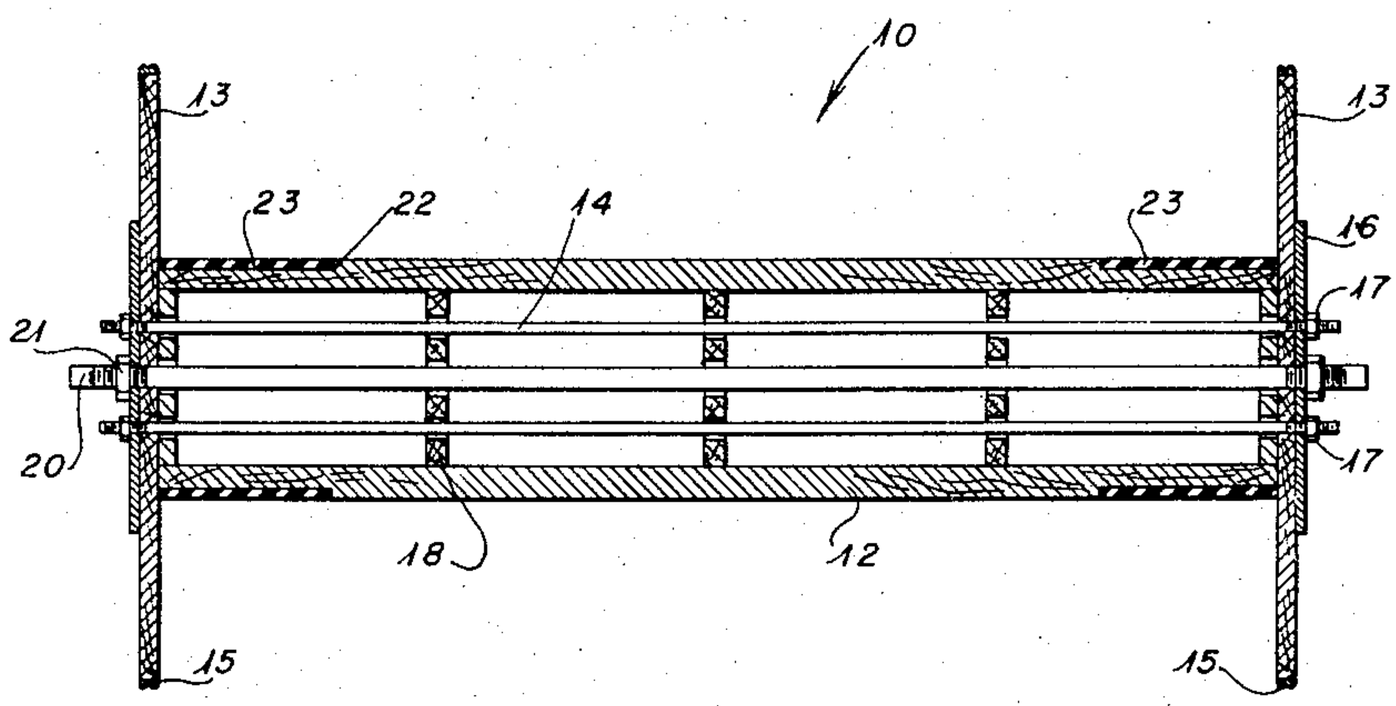

FIG. 2

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TIRE YARN BEAM

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This invention relates generally to beams, drums, spools or the like, hereinafter referred to as beams, for receiving yarn, wire or other strip material of indefinite length and more particularly to tire yarn beams provided with flanges or heads, hereinafter referred to as flanges, on the respective ends thereof.

Tire yarn beams in commercial use in the viscose rayon industry at the present generally comprise a wooden cylindrical portion, called the barrel, on which yarn is wrapped in package form and wooden flanges which define the ends of and which protect the package of yarn from soilage, abrasion, etc. Metallic rims are usually mounted on the peripheral edges of the flanges in order to protect the same against chipping or breakage during handling.

Tire yarn or yarn for other industrial purposes is usually wound in warp form upon a flanged beam such as discussed briefly above, in which condition the yarn is shipped from the place of manufacture to the customer for ultimate use. Upon removal of the yarn therefrom, the beam usually is returned empty to the yarn manufacturer for the storage of additional yarn and for subsequent reshipment.

The flanges on commercially available tire yarn beams usually are of a diameter about twice that of the barrel portion and therefore require considerably more shipping space than would be required merely for the barrel portions. It not being economically feasible or practical to disassemble the empty beams for each return shipment, they usually are stacked in a staggered relationship with the flanges of adjacent beams overlapping one another. In this manner it is possible to ship the greatest number of empty beams in the least amount of space.

While this method of shipment affords the obvious advantage of a reduction in shipping cost commensurate with the reduction in shipping space per beam, a concomitant disadvantage is that the flanges of any one beam bear directly against the yarn receiving outer surface of the barrel portion of adjacent beams. Since considerable vibration and bouncing of beams inherently occurs during shipment and inasmuch as an average tire yarn beam weighs on the order of 250 lbs. even when empty, it can readily be seen that a pounding force exists continuously between the metallic rim of any one beam and the wooden barrel of adjacent beams. It has been found that repeated shipment of empty tire yarn beams according to the above described method results in chipping and roughening of the outer surface of the barrels at the remote ends thereof and in extreme cases actually results in breaking through of the barrel at these sections. Since the barrel surface must be smooth throughout in order not to injure the yarn wound thereon, it has been necessary in the past to provide a maintenance crew for continually repairing time yarn beams damaged during shipment in this manner.

A primary object of the present invention is to provide a shipping beam not subject to the aforementioned disadvantage of known beams.

Another object of this invention is to provide a tire yarn beam which can be used repeatedly for shipping purposes without maintenance.

A furthe object of this invention is to provide tire yarn beams with resilient sleeves located in stragetic sections along the surface of the beam barrel to bear the load of adjacent beams when shipped empty in a conventional stacked relationship.

An additional object of the present invention is to provide a tire yarn beam having protected or reinforced barrel end surfaces which can be used for yarn collection without damage to the product stored thereon.

These and further objects and advantages will become apparent to those skilled in the art upon study of the following detailed description taken in conjunction with the accompanying drawings, in which

Figure 1 is an end view showing a plurality of empty tire yarn beams stacked in conventional overlapping relationship for shipment; and

Figure 2 is a longitudinal elevational view, partially in section, showing a tire yarn beam constructed according to the present invention.

In accordance with the teachings of the present invention, a tubular sleeve of resilient material is mounted in the outer surface of the beam barrel closely adjacent to the beam flange. Preferably, a sleeve is mounted at each end of the barrel with the outer surface thereof being flush or coextensive with the outer surface of the barrel, so as to form an unbroken yarn receiving surface extending the entire length between flanges.

Referring now to the drawings, Figure 1 shows a plurality of empty tire yarn beams **10** resting on the surface **11** of any suitable vehicle (not shown) which might be used for tranpsorting these beams from one place of use to another. As mentioned hereinabove, the accepted mode of grouping empty beams for shipment is in a stacked relationship with the flanges of one beam overlapping those of adjacent beams, and so forth, in order to conserve space. As the beams generally are substantially the same in dimensions, it can be seen that one flange of the first beam rests against the barrel of the second beam and that one flange of the second beam rests against the barrel of both the first and third beams, etc. One row of beams usually is stacked in this manner upon and supported by another row of beams, as shown in this figure.

With particular attention directed to Figure 2 of the drawings, a preferred embodiment of the present invention will now be described. The tire yarn beam indicated generally by reference numeral **10** comprises a cylindrical wooden barrel **12** and a wooden flange **13**, which extends normal to the longitudinal axis of the barrel, at each end thereof. The flanges are secured in position by a plurality of tie rods **14**, only two of which have been shown, and have secured to the peripheral edges thereof metallic rims **15**, which protect these outer edges from damage during handling. In order to distribute the tensional force exerted on the flanges by tie rods **14**, reinforcing end plates **16** may be mounted between the flanges and tie rod bolts **17**, as shown, and circular webs **18** of suitable material such as wood and of a suitable diameter are inserted within the tubular barrel in order to strengthen the same against collapse due to yarn shrinkage. These wooden webs may be secured to the barrel **12** by screws, nails or any other suitable means (not shown). A beam shaft **20** extends axially of the beam **10** and is secured in position by bolts **21**. Shaft **20** passes through suitable apertures provided in webs **18**, flanges **13** and end plates **16** and serves as a support for the beam during winding and unwinding and also as an expedient for lifting the same during handling.

A peripheral recess **22** is cut or otherwise formed in each end of barrel **12**. Within each recess there is

inserted a resilient tubular sleeve 23 of such thickness to completely fill the recess. As stated hereinbefore, the outer surfaces of the sleeves should be coextensive with the surface of the barrel so that injury to the yarn will not occur as a result of the interruptions in the barrel surface. It is preferred that the width of the sleeve be slightly greater than the width of the recess in order that tightening of the flanges by the tie rods will completely close the space between the sleeves and barrel. Moreover, in the preferred embodiment, the inner diameter of the resilient sleeve is slightly less than the diameter of the recess, whereupon the sleeve must be stretched to fit within the recess, which ensures a snug fit without the use of adhesive or other securing means.

As an illustration of a specific application of the present invention, a tire yarn beam having maple flanges of approximately 30" diameter, on which 16 gauge sheet iron rims had been mounted, and having a white pine barrel portion 54" in length and 11½" in diameter, was disassembled and modified by cutting a peripheral recess in each end of the barrel. Each recess was approximately ¼" in depth and 8$\frac{3}{16}$" in width. Within each of these recesses was mounted a tubular sleeve of soft rubber having a thickness of about ¼", a width of 8¼" and an inner diameter of approximately 10½". These sleeves were stretched in order to fit within the recess and protruded slightly over respective ends of the barrel. Upon reassembly of the beam and drawing in of the flanges by tightening the tie rod bolts, the sleeves completely filled the recesses, leaving no crevices into which yarn could accumulate. It has been found that a resilient material, such as soft rubber, having a durometer hardness of between 50 and 60 on Shore scale A works very satisfactorily to overcome the problem discussed herein.

Due to the fact that, during shipment, the overlapped flanges of adjacent beams rest very close to the respective barrel ends, chipping and/or breaking has been found to occur within a range of 8 to 10" measured axially from the barrel ends. The 8¼" sleeve discussed above represents a standard size resilient tube which has been found to be sufficiently wide to accommodate the flanges of three adjacent beams (see Figure 1) and protect the barrel against injury thereby. Obviously, wider sleeves could be used if found to be desirable or necessary. Moreover, other diameter sleeves are available to accommodate barrels of different size. While a sleeve of soft rubber was used in the specific example, it is clear that other resilient material having a comparable hardness, such as neoprene or butyl, could be used if desired. Additionally, adhesive or other means could be used, if necessary, to secure the sleeves within the recesses.

Beams modified in the manner indicated above have been used very successfully as a means for shipping tire yarn produced by the viscose rayon process. Upon return of a group of empty beams to the yarn manufacturer in stacked condition with the flanges overlapped, no chipping or rough barrel surfaces were found to exist. It appears that maintenance of these beams has been substantially reduced if not entirely eliminated and that the same may be used repeatedly without deleterious effects.

It is understood that the foregoing description is for purposes of illustration only and is not intended to limit the invention except to the extent defined in the following claims.

What is claimed is:

1. A shipping beam comprising an elongated cylindrical barrel, a circular flange supported by each end of the barrel and extending radially therefrom, a metallic rim secured to the outer periphery of each of said flanges, means defining a peripheral recess at each end of said barrel, and a soft rubber sleeve mounted under tension within each recess and compressed by a respective one of said flanges, the outer surface of said sleeves being coextensive with the outer surface of said barrel.

2. A shipping beam as set forth in claim 1 wherein the inner diameters of said sleeves are slightly less than the inner diameter of corresponding recesses.

3. A beam comprising a cylindrical barrel, a flange mounted at each end of the barrel and extending radially therefrom, means defining a peripheral recess in each end of the barrel, and a sleeve of resilient material mounted within each recess, the width of each sleeve being slightly greater than the width of a respective recess whereby the sleeves may be secured within the recess under compression, and the outer surface of the sleeves being coextensive with the outer surface of the barrel so as to form an unbroken yarn receiving surface.

References Cited in the file of this patent

UNITED STATES PATENTS

920,611	Mosley	May 4, 1909
2,363,744	Parker	Nov. 28, 1944
2,468,311	Te Grotenhuis	Apr. 26, 1949
2,468,985	Krotz	May 3, 1949
2,599,720	Prevost	June 10, 1952
2,733,022	Grody	Jan. 31, 1956
2,755,056	Hutton	July 17, 1956

FOREIGN PATENTS

367,780	Great Britain	Feb. 17, 1932