Jan. 17, 1939. W. DE W. LEINBACH 2,144,070

WARP BEAM

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Fig. 1.

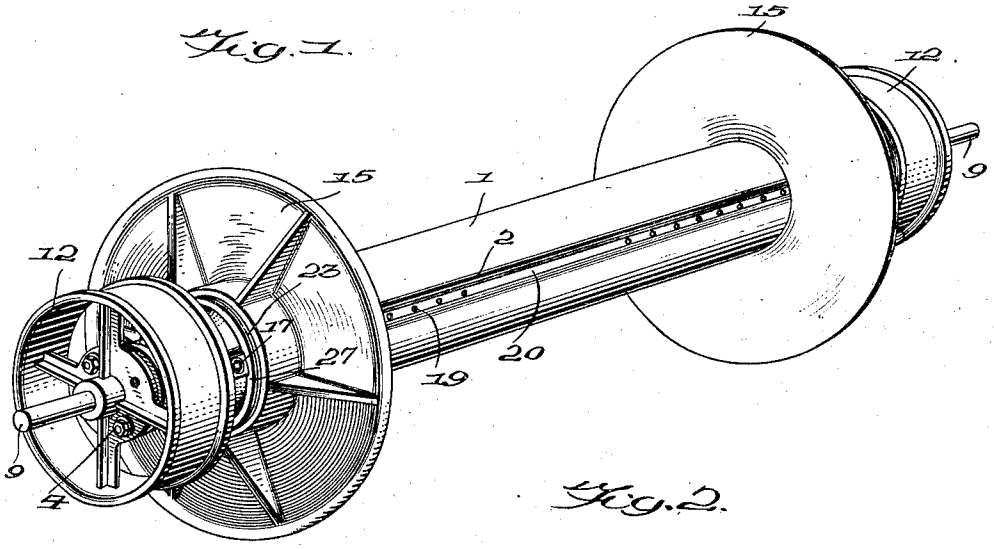


Fig. 2.

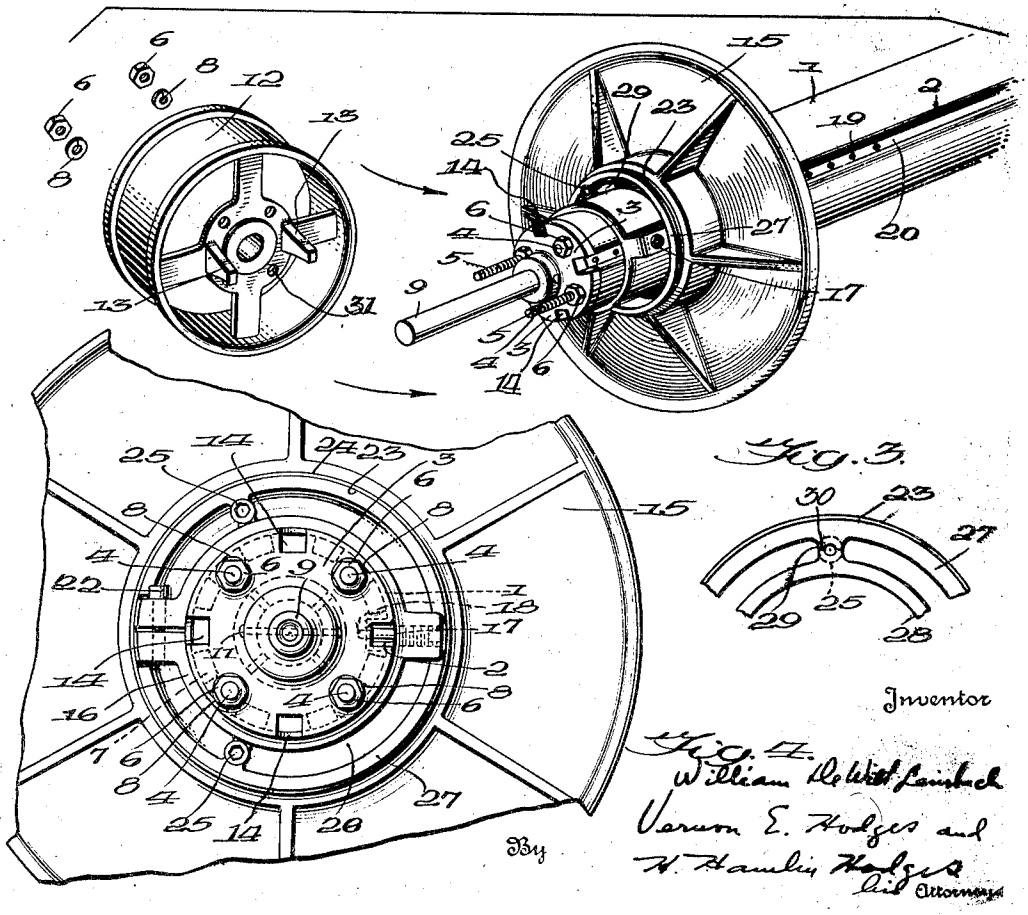


Fig. 3.

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Fig. 5.

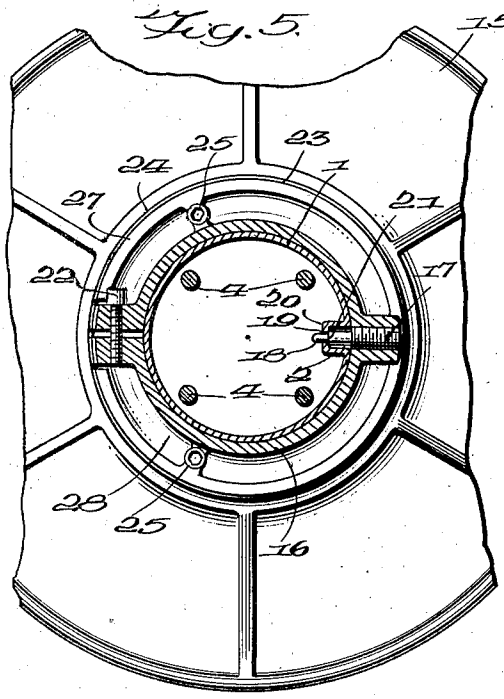


Fig. 6.

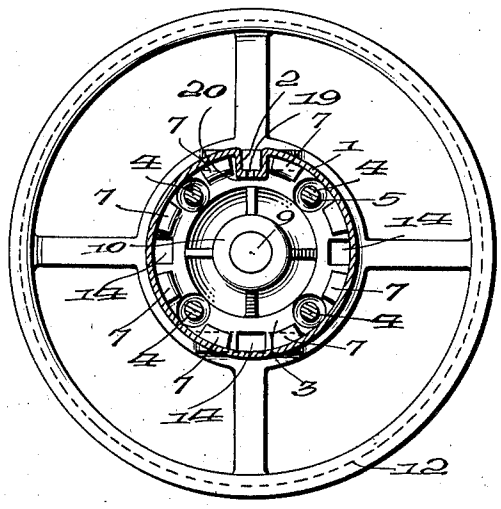


Fig. 8.

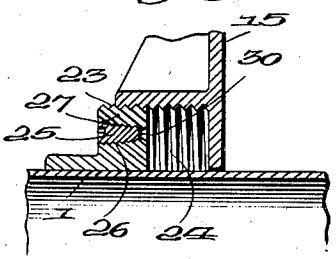


Fig. 7.

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UNITED STATES PATENT OFFICE

2,144,070

WARP BEAM

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Application June 16, 1936, Serial No. 85,571

8 Claims. (Cl. 242—124)

This invention relates to an improvement in warp beams.

In Letters Patent No. 1,915,233, granted to me June 20, 1933, the barrel of the beam was made of wood and externally threaded sleeves were secured to the ends of the barrel, and on the threads of these sleeves the flanges of the beam were adjustable lengthwise of the barrel and sleeves by turning them thereon and bringing them to the desired position where they were locked securely on the sleeves.

Spiders or castings were secured to the ends of the barrel and within the threaded sleeves, and the end shafts were fixed in these spiders or castings, and the usual friction drums were attached to the outer ends of the castings or spiders. Rods extended through recesses in the barrel and extended from drum to drum.

While this warp beam has proven very satisfactory, it is a desideratum to do away with exposed screw-threads, and one of the purposes of my present invention is to do just that.

Another accomplishment of my present invention is the production of an all-metal steel tubular barrel, made with a channel throughout its entire length pressed therein during the process of manufacture and as an integral part of the barrel itself to provide means for anchoring the silk to the beam.

Another object is to provide quick, simple and accurate means for the major and minor adjustments of the flanges on the barrel, and which will not only insure rigidity of adjustment but also perpendicularity with respect to the longitudinal axis of the barrel, irrespective of the adjusted position lengthwise of the barrel.

A still further object of this invention is to provide means for securely locking the flanges to the barrel without disturbing the perpendicularity of the flanges to the longitudinal axis of the barrel.

Still another object is to provide for the replacement of the end drum or drums without disturbing the remaining portion of the unit constituting the warp beam.

With these several objects in view, my present invention includes a tubular barrel having a channel extending throughout its length and providing means for anchoring the silk to be wound on the warp beam, in connection with an externally threaded split collar and means for locking the collar on the barrel by means of a screw extending through a hole formed in the channel.

This invention further consists in a tubular barrel having a channel pressed inwardly therein and extending longitudinally thereof, and in the floor of which holes are formed at predetermined distances apart, in combination with a split collar externally and circumferentially screw-threaded, a flange having internal threads which are adapted to turn on the threads of the split collar, means extending from the collar into one of the holes in the floor of the channel to provide major adjustments of the flanges, means for compressing the split collars and clamping them around the barrel, and means for expanding the threaded portions of the collars in the threads of the flanges whereby to provide a rigid circumferential frictional lock which grips uniformly throughout the entire circumference of the contiguous internal and external threads.

This invention further consists in a tubular barrel, casting heads fitted to the ends thereof, rods extending throughout the length of the barrel and having means thereon for fastening the casting heads securely to the ends of the barrel, bearing shafts secured within the hubs of these casting heads, and drums detachably and replaceably secured by certain of said rods to the ends of the barrel.

In the accompanying drawings:

Fig. 1 is a view in perspective;

Fig. 2 is also a perspective, but showing one of the drums detached;

Fig. 3 is a fragmentary view of a portion of the split collar;

Fig. 4 is an enlarged fragmentary end elevation looking toward the outside of one of the flanges with the drum removed;

Fig. 5 is a section on the line 5—5 of Fig. 7, looking toward the right as indicated by the right-hand arrows;

Fig. 6 is a section on the line 6—6 of Fig. 7, looking toward the left as indicated by the left-hand arrows;

Fig. 7 is a longitudinal sectional view; and

Fig. 8 is an enlarged fragmentary longitudinal section showing one of the expanding devices in section.

The numeral 1 represents a tubular barrel. This is preferably made of seamless steel tubing of special shape with a channel 2 pressed therein and extending longitudinally throughout the length of the barrel. This tubing can be provided with a channel 2 by welding the channel in place or this tubing could also be made by welding, fabrication, or any other manufacturing process which would produce the shape essentially herein described.

Heads 3, preferably in the form of castings, are

secured to the outer ends of the barrel where they are held securely in place by rods 4 extending within and throughout the entire length thereof, and through holes provided for them in the castings. The outer ends of these rods have screw-threads 5, and nuts 6 are screwed on the threads 5 of the rods 4 where they are held securely by lock-washers 8 to insure a tight connection between the casting and barrel.

To facilitate the placing of these casting heads 3, the centering lugs 7 are provided, and these enter the ends of the barrel and fit the inner wall thereof, as shown in Fig. 6. These lugs are spaced apart to leave ample clearance for the rods 4, and also to receive between any two of them the channel 2, as clearly shown in full lines in Fig. 6 and in dotted lines in Fig. 4.

The bearing shafts 9 are securely fixed in the hubs 10 of these castings 3 by pins or other means 11, as shown in Fig. 7, thus forming a unit which includes the barrel 1, casting heads 3, with shafts 9 secured to the heads, and the rods 4 extending from one casting-head to the other, in other words throughout the length of the warp beam.

The drums 12 are loosely mounted over these shafts 9 and are detachably and replaceably secured to the barrel by at least two of the four rods 4, which are longer than the other two, and extend through holes 31 in the webs of the drums adapted to receive them; and lock-washers and nuts 6 and 8, similar to those previously described, constitute the means which hold the drums securely in place. But by this arrangement, these drums are easily removable and replaceable by larger or smaller size drums if occasion should require without in any wise disturbing the rest of the unit, which unit includes barrel 1, casting-heads 3, with shafts 9 secured thereto, and the rods 4 which secure the casting-heads to the ends of the barrel.

The drums are held against turning by means of lugs 13, of which two only are shown opposite each other, see Fig. 2, and which are adapted to enter any two of the notches 14 in the casting-head 3. These drums are made replaceable, as it is frequently desirable to use drums of different sizes, and emphasis is laid upon the fact that the removability is without disturbing the unit comprising the barrel, castings and rods, and hence the shafts 9 at their ends remain undisturbed and true when it is desirable to remove a drum or drums, and in this way any other part such as a mechanical let-off cap may be substituted for a drum.

Referring to the rods 4, they provide a truss-like reinforcement for the entire unit of which they are a part, and thus make a sturdy structure which will withstand the excessive strain which these warp-beams have to resist.

The numeral 15 represents the flanges, it being understood, of course, that there is one on each end of the beam and that they are adjustable lengthwise of the beam to the width of the warp being wound on the beam.

As hitherto pointed out, one of the advantages of my invention is to provide two adjustments, namely a major adjustment for the larger adjustments lengthwise the barrel, and a minor adjustment for the more refined positioning of the flanges, and in providing this double adjustment the point to keep in mind is accuracy of adjustment, meaning that the flanges in every adjustment should maintain a position at right-angles or perpendicular to the longitudinal axis of the beam.

As the constructions are alike at both ends, the following description will be in the singular instead of the plural:

A split collar 16 is slidable lengthwise of the barrel and is held in the desired position by a screw 17, the reduced inner end 18 of which enters one of the holes 19 in the floor 20 of the channel 2. These holes are preferably located about an inch apart, and the screw 17 is provided with a shoulder 21, which, when the screw is turned in to the limit, bears against that portion of the floor of the channel immediately surrounding the hole, while the threaded portion of the screw backs off and presses against the threads in the hole in collar 16, thus making a tight and rigid connection.

The split collar 16 is clamped circumferentially and with uniform frictional engagement entirely around the barrel 1 and is held securely by the bolt or screw 22, as is clearly illustrated in Figs. 4, 5, and 7.

The screw 17 is the mechanical means of fastening the collar 16 positively locked along the barrel, and by its use the split collar is locked on the barrel against moving either circumferentially or lengthwise. I have the added means of fastening or clamping the split collar circumferentially around the barrel by the bolt or screw 22. Thus, after the split collar is moved lengthwise of the barrel to the approximately proper position, it is securely anchored by means of the two screws or bolts 17 and 22, so that it cannot possibly move in any direction independently of the barrel.

The split collar 16 is solid only at the point where the screw 17 passes therethrough. With the exception of this one point the collar 16 is divided into the two expansible rims 27 and 28. The portion 27 of the divided collar 16 has an external screw-thread 23. The outer flange 15 has an internal screw-thread 24, which turns on the thread 23, and in this way the minor or more refined adjustment of the flange is provided.

After having been adjusted to the exact desired point on the barrel to insure against the slightest movement of the flange, and to provide a dependable lock, any approved wedging means is provided for forcing the threaded rim of the split collar outwardly to effect a fixed and uniform relation between the screw-threads 23 and 24.

While I have tried several different schemes, perhaps the most effective is the tapering screw 25, of which two are preferably employed for a collar as shown in full lines in Figs. 2, 3, 5 and 8. These screws 25 are turned in a tapering threaded hole 26 provided for them in the frangible spacing webs 29 joining the two rims 27 and 28 of the split collar, see Figs. 3 and 8.

The threads 26 extend into or through the web 29 which connects these rims. The webs 29 of the rims 27 and 28 are easily broken apart as shown at 30 in Figs. 3 and 8, when the screws 25 are driven inwardly, thus causing an expansion or spreading of the outer rim 27 with its external threads 23 securely jammed against the internal threads 24 formed within the hubs of the flanges 15.

In other words, by turning the screws 25, which are of tapered construction, the connecting webs 29 are spread to breaking point, so that the outer rim 27 and inner rim 28 are separated from each other. This fracture of the webs 29 by the tapering screw action is merely a detail of manufacture as its severance could be made

by saw cut or in any other approved manner. When this severance of the webs is once made, and the inner rims 28 are clamped securely around the barrel 1 of the beam, further application of pressure through the screws 25 will expand the outer rim 27, so as to hold the flange 15 securely in place. In this way, a positive, dependable and uniform frictional and circumferential grip is attained between the split collar and the flange, sufficient to resist all pressure and punishment to which these parts are subjected in the operation of the warp beam.

I claim:

1. In a warp beam, the combination of a barrel, a collar adjustably secured thereupon, the collar having circumferentially screw-threaded expansible rims, a flange internally screw-threaded and adapted to be screwed on the threads of the collar, and means for expanding the threads of the collar into the threads of the flange, whereby to effect a rigid connection between the two.

2. In a warp beam, the combination of a barrel having holes formed therein at intervals at least throughout a portion of its length, a collar adjustable on the barrel, a screw threaded through a hole in the collar and having an end adapted to enter one of the holes and a shoulder adapted to bear upon the portion of the barrel in which the hole is formed, whereby to afford a locking means against the movement of the rim in any direction upon the barrel.

3. In a warp beam, the combination of a barrel having holes formed therein at intervals at least throughout a portion of its length, a split collar adjustable on the barrel, a screw threaded through a hole in the collar and having an end adapted to enter one of the holes and a shoulder adapted to bear upon the portion of the barrel in which the hole is formed, whereby to afford a locking means against the movement of the rim in any direction upon the barrel, and means for clamping the split collar circumferentially around the barrel.

4. In a warp beam, the combination of a barrel having holes formed therein at intervals at least throughout a portion of its length, a split collar adjustable on the barrel, a screw threaded through a hole in the collar and having an end adapted to enter one of the holes and a shoulder adapted to bear upon the portion of the barrel in which the hole is formed, whereby to afford a locking means against the movement of the rim in any direction upon the barrel, means for clamping the split collar circumferentially around the barrel, the collar having circumferential screw-threads, and a flange having internal screw-threads which screw on the threads of the collar, whereby the collar is capable of major adjustments and the flange of minor adjustments on the collar.

5. In a warp beam, the combination of a barrel, a split collar adjustable thereon, and means for securing the collar rigidly to the barrel, the collar externally screw-threaded and having expansible outer rims with a frangible web connecting them to the main portion of the collar, a flange adapted to screw on the threads of the collar, the frangible portion of the collar having tapering screw-threaded holes and tapering screws adapted to turn in said tapering threaded holes and to break the frangible connection when screwed home, whereby to create a wedging action against the expansible rims to effect a rigid frictional connection between the threads of the collar and the threads of the flange.

6. In a warp beam, the combination of a tubular barrel, casting heads fitted against rotation to the opposite ends of the barrel and having bearing shafts secured in the hubs thereof, rods extending through the tubular barrel and also through the holes in these casting heads, nuts adapted to turn on the rods and against the heads for fastening the casting heads securely at the ends of the barrel, replaceable drums loosely mounted on the shaft outside of and housing said nuts on said rods, and having holes to receive at least two of the rods which secure the casting heads to the ends of the barrel, and nuts screwed on the ends of the last-mentioned rods for replaceably fastening the drums on the ends of the beam.

7. In a warp beam, the combination of a tubular barrel, casting heads fitted against rotation to the opposite ends of the barrel and having bearing shafts secured in the hubs thereof, rods extending through the holes in these casting heads, nuts adapted to turn thereon for fastening the casting heads securely at the ends of the barrel, replaceable drums loosely mounted on the shaft and having holes to receive at least two of the rods which secure the casting heads to the ends of the barrel, nuts screwed on the ends of these rods for replaceably fastening the drums on the ends of the beam, and interlocking lugs and notches for preventing the drums from turning axially with respect to the barrel.

8. A warp beam including a barrel, casting-heads fitted to the opposite ends thereof, shafts held in the hubs of said casting-heads, bolts extending throughout the length of the barrel, with their ends protruding through holes in the casting-heads, and means on the protruding ends of the bolts for securing the casting-heads rigidly on the ends of the barrel, bolts extending through the barrel and holes in the casting-heads and drums with their ends protruding through the drums, and means on the protruding ends of the last-mentioned bolts for securing the drums on these last-mentioned bolts, the drums and casting-heads axially interlocked together.

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