March 25, 1941. R. U. THORNTON 2,236,188

DRIVE FOR WARPER BEAMS

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Fig. 1.

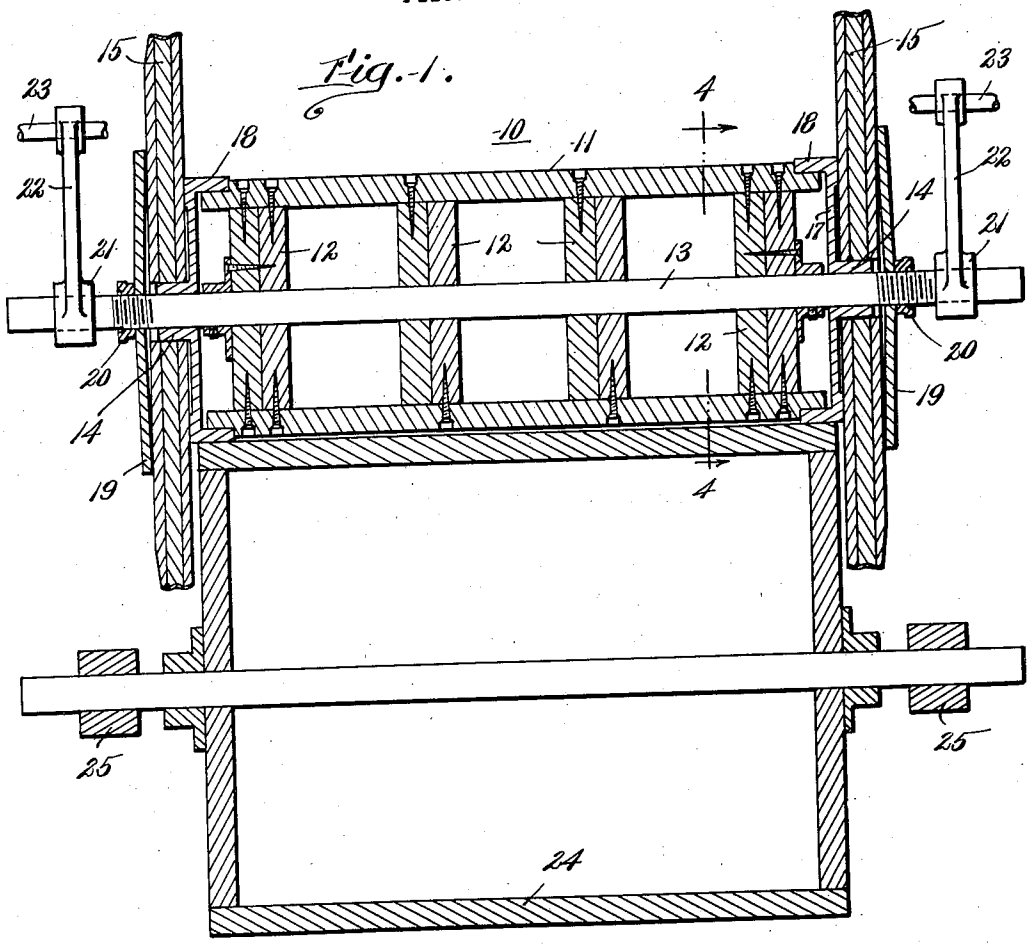
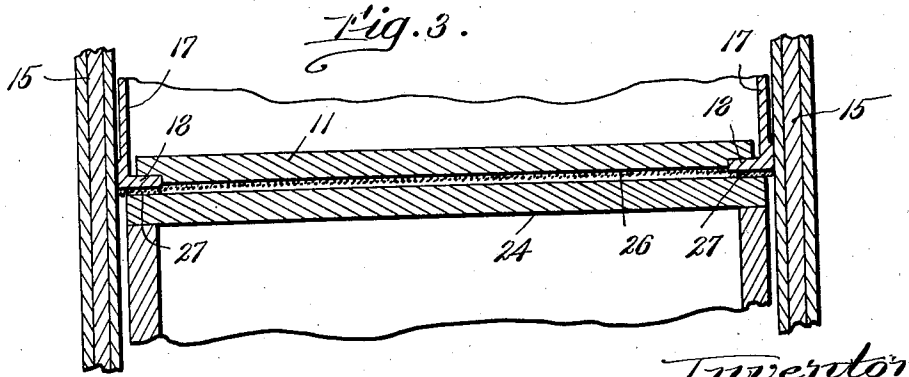


Fig. 3.



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Fig. 2.

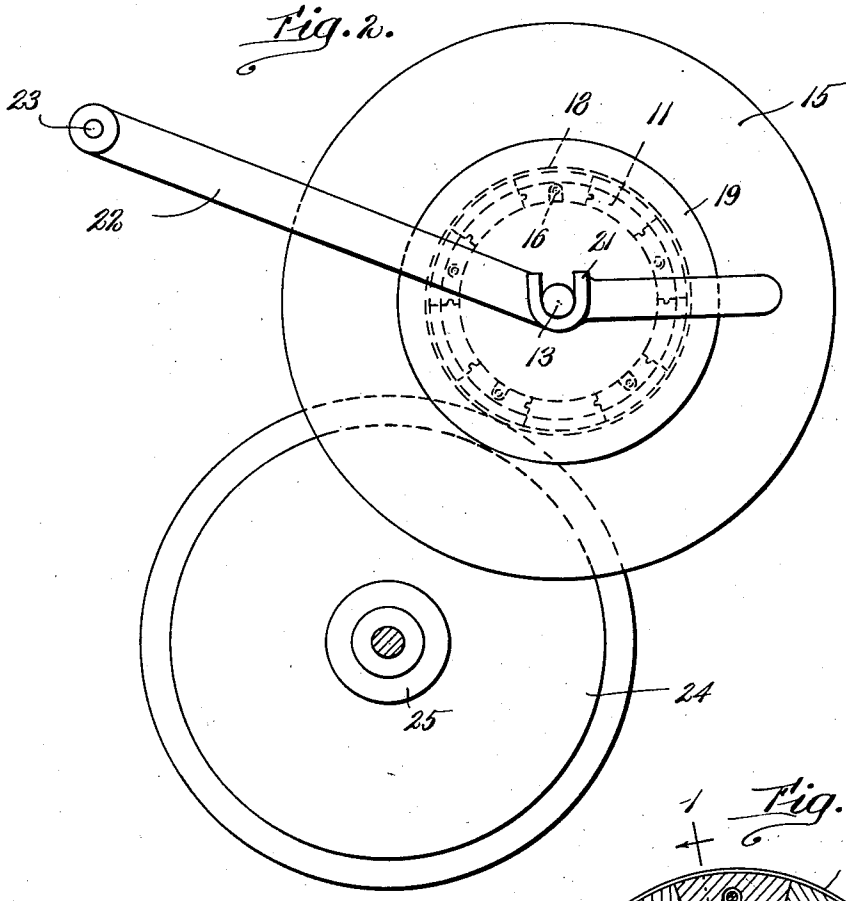


Fig. 4.

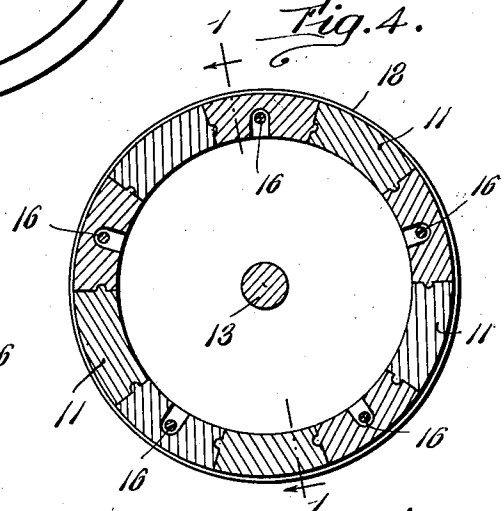
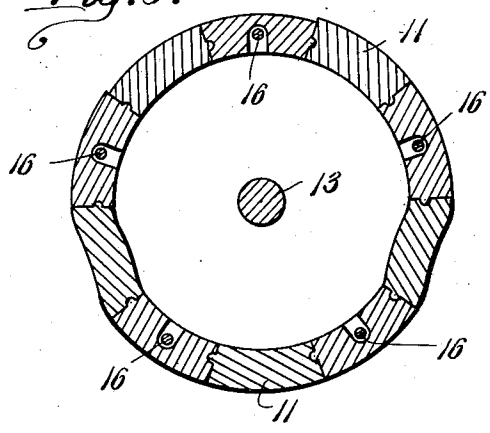


Fig. 5.



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Fig. 6.

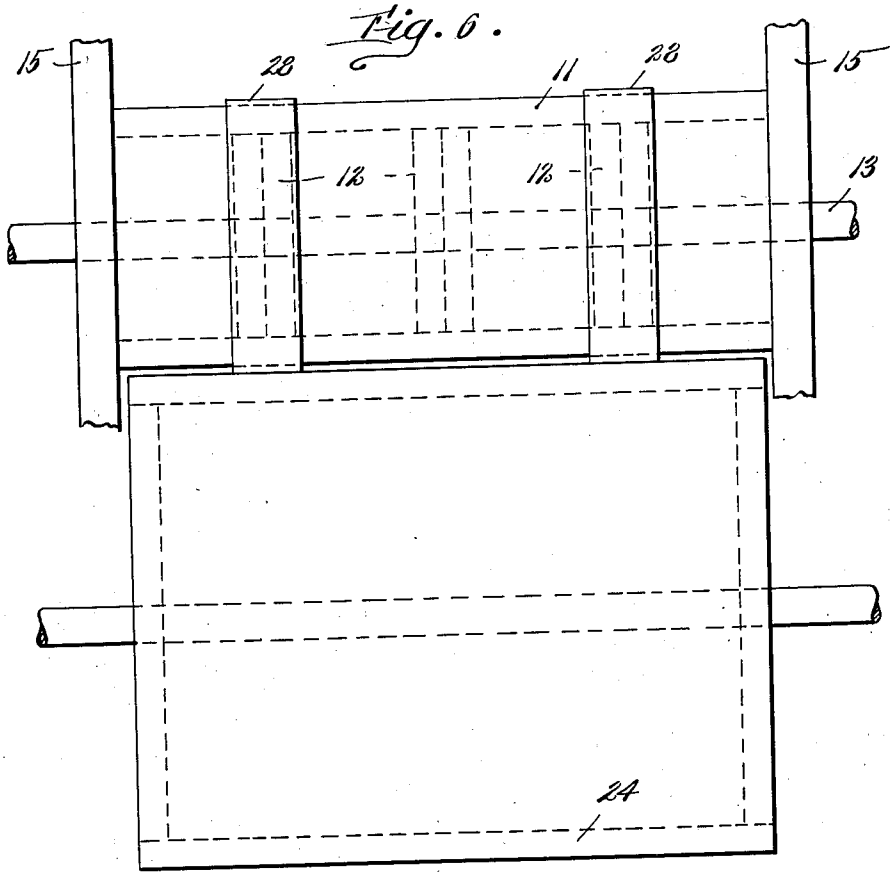
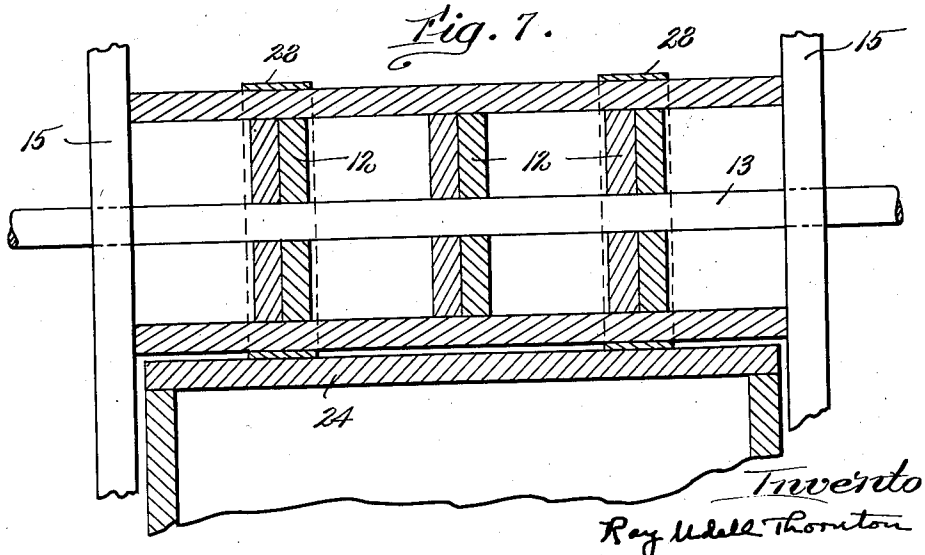


Fig. 7.



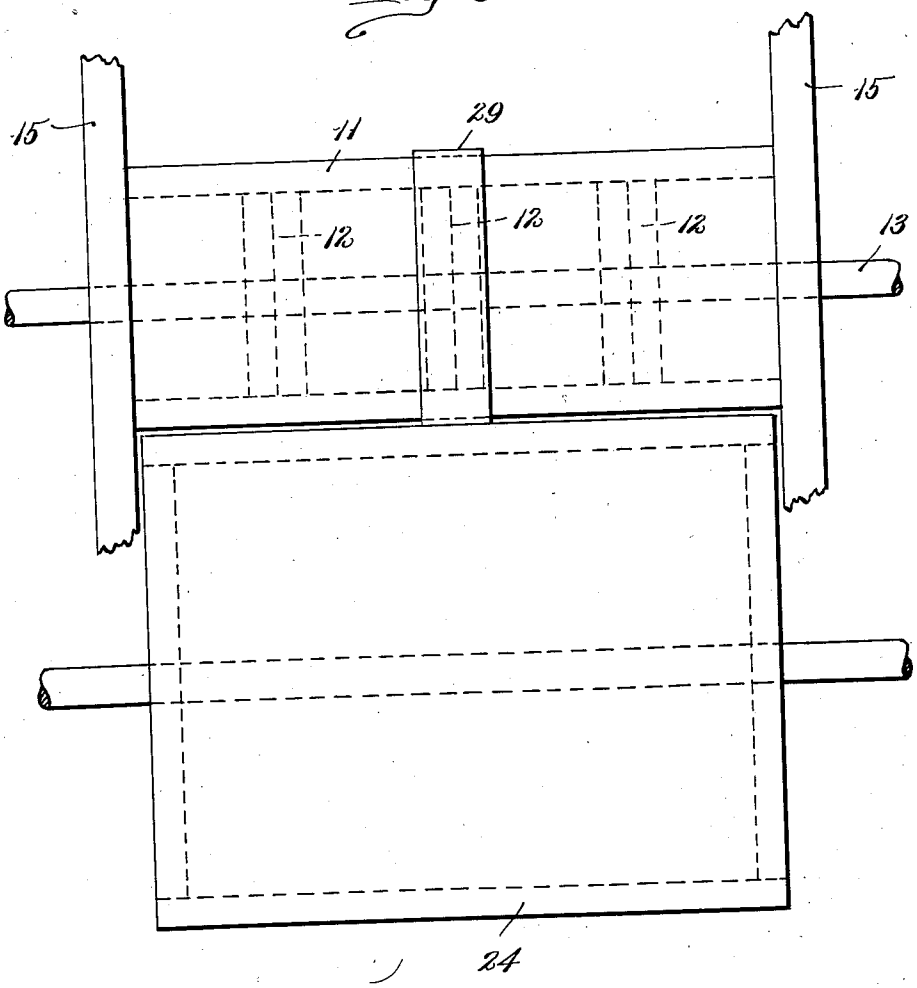
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Fig. 8.



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Patented Mar. 25, 1941

2,236,188

UNITED STATES PATENT OFFICE

2,236,188

DRIVE FOR WARPER BEAMS

Ray Udell Thornton, New Bedford, Mass.

Application November 9, 1939, Serial No. 303,579

2 Claims. (Cl. 28—39)

This invention relates to warper beams, and more especially to such beams that are to be used with acetate rayon, although it is not limited to such use.

As is well understood by those skilled in the art, it is essential that a warper beam, which is rotated at very high peripheral speeds during the winding operation by a winding drum, should run smoothly and evenly. Such smooth and even running is rendered impossible by distortion of the beam barrel which is in frictional contact with the warper drum at the beginning of the winding operation and immediately thereafter is moved away from said drum by the building up of the wrap. Obviously the contour of the outer periphery of the yarn mass wound on a beam, the contour of which has been distorted by use or rough treatment, will follow that of the beam and therefore the frictional contact between the drum and the periphery of the yarn mass will be uneven.

It has been found that such contour distortion frequently results when a beam is wound with rayon acetate, which exerts a pressure on the beam that varies with the water content of such yarn, and sometimes this distortion in parts of the beam will be as large as one quarter of an inch measured radially.

It is therefore the object of my invention to provide a warper beam which is driven by frictional contact, first, with an unyieldable annular portion of the beam that projects beyond the outer periphery of the barrel, and thereafter, as the winding builds up, by frictional contact with the yarn wound over such unyieldable portion so that smooth and even running may be obtained without regard to the barrel contour distortion.

To effect this end, I may conveniently provide the beam with end caps having annular flanges overlying the respective ends of the beam and projecting slightly beyond the outer periphery thereof, the winding drum driving the beam immediately after the winding operation has been started by frictional engagement with the yarn mass wound over the cap flanges; or I may provide the beam with an annular metallic member surrounding the barrel and placed over that portion thereof which overlies one of the inner heads or discs around which the barrel staves are placed. Obviously, two or more annular members may be employed.

In the drawings accompanying and forming a part of this specification, Figure 1 is a sectional view of a warper beam taken on the line 1—1 of Fig. 4 embodying my invention, unnecessary details being omitted for clarity.

Fig. 2 is an end view somewhat diagrammatic in nature showing the relative positions of the beam and warper drum.

Fig. 3 is a fragmentary section similar to that of Fig. 1 showing the position of the beam with respect to the drum immediately after the winding operation has started.

Fig. 4 is a transverse section taken on the plane of the line 4 of Fig. 1.

Fig. 5 is a similar section showing in a somewhat exaggerated manner an example of barrel contour distortion.

Fig. 6 is an elevation of a modification of my invention.

Fig. 7 is a longitudinal section of the structure shown in Fig. 6.

Fig. 8 is a longitudinal section of a further modification.

In the particular drawings selected for more fully disclosing the principle of my invention, 10 is a warper beam of the type disclosed in my Patent No. 2,148,394, February 21, 1939, said beam comprising a barrel composed of staves 11 spaced around the inner heads or discs 12 which are mounted on the shaft 13. Mounted on the shaft at the ends of the barrel are hub members 14 and on the latter are mounted the beam heads 15 secured to the barrel, in the present instance, by the means disclosed in detail in said patent, viz., the rods 16 (Fig. 4) which pass through grooves in alternate staves and through the heads, suitable means being provided, as more fully described in said patent, for properly tensioning said rods and drawing the heads against the ends of the barrel. Each hub member comprises a metallic disc 17 abutting a head and an annular flange 18 intermediate the heads 15, the outside diameter of which is slightly greater, say about one sixteenth of an inch, than the outer periphery of the barrel and overlies an end thereof. In the present instance, each end of the barrel is shouldered to receive the inner portion of the flange 18, which with the disc 17 forms a cap for the end of the barrel. The discs 19, shown as threaded to the shaft and locked in adjusted position by the nuts 20, engage the outer faces of the heads and prevent the spreading thereof by the outward pressure of the yarn wound on the barrel.

For winding the beam the ends of the shaft are placed in the bearings 21 of the arm 22 mounted on the warper by the pin 23.

Mounted for rotation at a point below the beam

is a winding drum **24**, the shaft of which is journalled in the bearings **25**. When said drum is rotated the frictional engagement between its outer periphery and the annular flanges **18** disposed intermediate the beam heads will drive the beam.

The relative position of the beam and drum before the winding operation is started is shown in Fig. 1, the periphery of the drum being in contact with the outer periphery of said flanges instead of being in contact with the entire outer periphery of the beam, as heretofore. Immediately after the winding operation begins, the yarn wound over the flanges **18** will cause the beam to move in the orbit determined by the distance between the centers of the pin **23** and the shaft **13**. In Fig. 3 the yarn wound on the periphery of the beam between the flanges **18** is indicated at **26**, and the yarn wrapped around the flanges, at **27**, the yarn mass **26** following the contour of the barrel shown in said Fig. 3 as even and regular but which may be quite uneven and irregular, as indicated in Fig. 5, and the yarn **27** wound over the flanges being invariably even and regular because the flange by virtue of the metal of which it is formed and the shape and construction of its supporting members is unyieldable to any force that may be exerted thereon by the yarn mass.

It is to be understood, of course, that the outline of the periphery of a distorted barrel shown in Fig. 5 applies only to those portions of the barrel lying between a pair of inner heads **12**, and that such distortion elsewhere will be prevented by the resistance to centrally exerted pressure imposed by said inner heads.

In the modification shown in Figs. 6 and 7, one or more annular metallic members **28** are tightly fitted to the outer periphery of the barrel at a point or points overlying one or more of the inside heads **12**. As indicated in said figures, two such annular members are employed, although it will be obvious as shown by Fig. 8 that by means of one such member **29** disposed at the central portion of the beam, the object of my invention may be accomplished. The inner heads or discs being practically undistortable by any pressure that might be exerted on the beam, it follows that the annular metallic members, **28** (Fig. 6) and **29** (Fig. 8) will maintain their respective shapes irrespective of the pressure of the yarn on the barrel.

Having thus disclosed illustrative embodiments of my invention without, however, limiting myself thereto, what I claim and desire to secure by Letters Patent is:

1. In combination, a warper beam having heads at the respective ends thereof and a warper drum for driving said beam by frictional engagement, and an unyielding annular member disposed on the outer periphery of said beam intermediate the heads thereof and interposed between said beam and said drum whereby the engagement between said drum and beam is first between said drum and annular member and then between said drum and the yarn wound on the outer periphery of said annular member immediately after the beginning of the winding operation.

2. In combination, a warper beam having heads at the respective ends thereof and a warper drum for driving said beam by frictional engagement, and means unyieldable to any pressure exerted thereon by the yarn mass wound on said beam, such means being intermediate the heads of the beam and interposed between said beam and drum and projecting slightly beyond the outer periphery of the drum, whereby the engagement between said drum and beam is first between said drum and said means and then immediately after the beginning of the winding operation between said drum and the yarn wound on said means.

RAY UDELL THORNTON.