

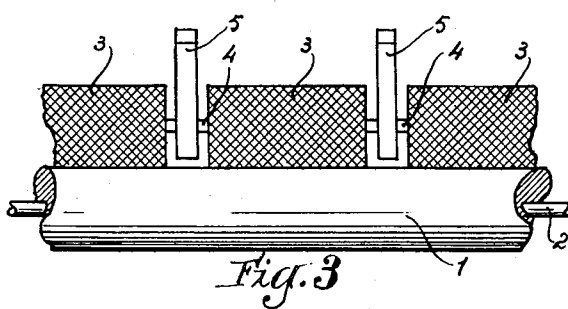
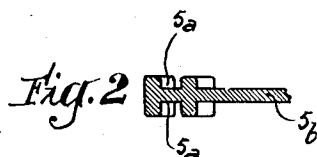
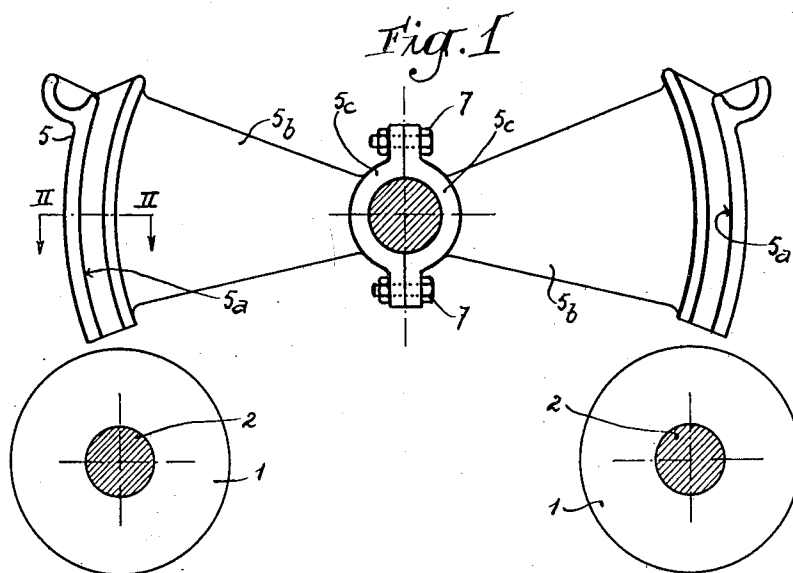
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GUIDE FOR YARN WINDING SPOOL

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GUIDE FOR YARN WINDING SPOOL

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This invention relates to the guides used to retain the ends of the spindles adapted to support the receiver tubes, spools or bobbins, in yarn winding, twisting or doubling machines.

In such machines the yarn package formed on a tube, spool or bobbin is generally driven by a rotating drum with which it is maintained in frictional engagement. The ends of the spindle which supports the yarn package may be rotatably carried by pivoted arms, but they are frequently merely guided in slots provided in lateral vertical guide members wherein they may rotate freely while being also free to move upwardly as the diameter of the yarn package increases.

Such winding machines should of course ensure a regular winding of the yarn in the form of a perfectly cylindrical mass or package. This requires that the geometrical axis of the spindle remain exactly parallel to the geometrical axis of the drum, which means that the guiding slots should be in one and the same plane parallel to the geometrical axis of the drum. Further the yarn should be evenly distributed along the length of the spool or package, which requires not only that the thread-guide of the machine be appropriately disposed and adjusted but also that the spindle itself remain substantially immovable in a longitudinal direction during the whole winding process, or in other words, that the axial play of the spindle between its guides be as reduced as possible for any position of the said spindle during the building up of the yarn mass or package.

Now in practice the conventional guides are in the form of cast iron members having a perforated arm which is engaged on a supporting rod of circular cross-section longitudinally secured onto the machine frame, the said arm being locked at the proper position by means of a set screw. With such an arrangement it is extremely difficult to obtain an accurate mutual disposition of the two guides corresponding to a given spindle, whereby the yarn tends to form a mass or package which is no more cylindrical, but hyperbolic. The linear speed of the yarn is then irregular for a given angular velocity of the spindle according as the said yarn is wound on a portion of smaller or of larger diameter of the mass or package and the density of the package becomes irregular. The spool or package finally obtained is unsatisfactory, the unwinding of the yarn therefrom being also irregular. Owing to the inaccurate disposition of the guides, which are not exactly situated in two parallel vertical planes, a substantial axial play should be left to the spindle which is not therefore properly retained axially and which moves more or less regularly towards one side and towards the other, in such a way that in the case of a package formed on a support without lateral retaining cheeks, when the yarn being wound reaches one of the ends of said package it may fall sideways from the edge of the package onto the spindle itself, whereby the package finally formed cannot be properly used.

Another disadvantage of the known guide members is that their exchange is long and tedious since they are threaded on a common supporting rod and therefore when one of them is to be removed, the rod itself should be taken down and the successive guide members disengaged therefrom, starting from one end of the rod, until the one under consideration is reached.

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The present invention has for its object to avoid the above disadvantages and to provide a guide member for yarn winding spindles which is not liable to cause a defective parallelism between the spindle and the axis of the driving drum.

Another object of this invention is to provide a guide member for yarn winding spindles which may be secured on or removed from a common supporting rod without having to disengage from the said rod all the guide members comprised between one end of the rod and the zone thereof where the member under consideration is to be disposed or wherefrom it is to be removed.

A further object of this invention is to provide a guide member for yarn winding spindles which may be accurately adjusted on a supporting rod to reduce to a minimum value the axial play of the spindle at any position of the latter in its guides.

In accordance with this invention in a guide member for yarn winding spindles, the slot is in the form of an arc of a circle so disposed as to be substantially concentric to the rod on which the said member is secured on the machine frame. With such an arrangement the angular setting of the guide member about the axis of the supporting rod has no effect whatever on the parallelism between the spindle and the driving drum, whereby the formation of a hyperbolic yarn mass or package is fully avoided.

The guide member according to this invention preferably comprises a supporting arm having at its end a semi-circular securing portion and two such guide members are disposed in the same transverse plane on each side of a supporting rod, the opposed semi-circular portions of the said members being clamped on the said rod by means of bolts, screws or the like acting on the said portions. This arrangement permits of using one and the same supporting rod for two rows of yarn winding units and it dispenses with any kind of set screw. Each pair of guide members may be readily removed from the supporting rod quite independently of the other pairs carried by the said rod.

In the annexed drawings:

Fig. 1 is a view in elevation showing a pair of guide members according to the invention, the common supporting rod being illustrated in section.

Fig. 2 is a detail section taken along line II—II of Fig. 1.

Fig. 3 is a fragmentary front view showing how the successive guide members are disposed along the length of the winding machine.

In a conventional yarn winding machine of the type under consideration, each winding unit comprises a drum 1 carried by a shaft 2 which is rotated at a constant speed. There may be provided a short individual drum for each unit or, as in the example illustrated, a single drum of relatively great length extending along the full length of the machine frame. The yarn package 3 of each unit rests on the said drum 1, this yarn package being formed on an appropriate spool or tubular support mounted on a spindle 4, the ends of each spindle 4 being guided by lateral slots provided in guide members 5. As above explained in the conventional constructions these guiding slots are rectilinear and vertical. It will be appreciated that the yarn packages 3 are thus free to rotate together with the corresponding spindles 4 under the frictional driving action of the rotating drum 1, the spindles rising progressively in the guiding slots as the diameter of each package increases. The winding proceeds at a constant speed of the incoming yarn, which ensures, for instance, the regularity of the twist imparted to the said yarn before it reaches the package. The machine of course comprises appropriate yarn distributing means which ensure an even distribution of the

yarn in the successive layers which form the package.

As aforesaid this arrangement requires an accurate parallelism between the two guiding slots corresponding to each winding unit, since otherwise the package formed is no more cylindrical but more or less hyperbolic. Also the spindles should be properly retained axially. These conditions are not easily fulfilled with the known arrangement wherein each guide member is supported by an arm having a perforated end which is engaged on a common supporting rod of circular cross-section and which is secured on the said rod by a set screw.

In accordance with the present invention the guiding slots 5a (Fig. 1) are in the form of an arc of a circle. As in the known constructions there is provided a guiding slot on each side of each member 5 to receive the adjacent ends of the spindles of two successive winding units. Each guide 5 is integral with a sector-shaped arm 5b which terminates in a semi-circular portion 5c forming a semi-circular collar (i.e. one half of a circular collar) adapted to fit against the supporting rod 6 of the machine frame. The arrangement is such that the arcuate guiding slots 5a are substantially concentric to the axis of rod 6, or to the axis of the semi-circular portion 5c.

The machine is besides so arranged as to comprise a single supporting rod 6 for two rows of winding units respectively disposed on one side and on the other of rod 6, the guide members which correspond to one row being disposed in the same successive transverse planes as the guide members corresponding to the other row, as clearly shown in Fig. 1. The semi-circular portions 5c of each pair of guide members 5 thus form a kind of split collar which is clamped on the supporting rod 6 by means of bolts such as 7 passed through appropriate lateral lugs provided at each end of the said portions.

It will be appreciated that with the arrangement described the spindle 4 of each particular unit is always parallel to the axis of the driving drum 1 irrespective of the angular setting of the corresponding guide member 5 about the axis of the supporting rod 6, since any angular displacement of such a guide member about the said axis is equivalent to the rotation of an arc of a circle about its centre. The unavoidable inaccuracies in the angular setting of the successive pairs of members 5 on the common supporting rod 6 are therefore without any influence on the building up of the yarn packages. It will besides be observed that each pair of guide members 5 is clamped on the supporting rod 6 by means of semi-circular bearing surfaces which may be so established as to fit accurately against the periphery of the said rod, which ensures that the guide members are exactly secured in a transverse plane, while with the conventional construction wherein the guide members are locked on the rod by means of set screws, such is not generally the case. Due to the fact that the guide members are disposed in pairs, only two bolts are required for two members.

It will be appreciated that when it is impossible to provide on the winding machine two rows of winding units with a single central supporting rod, the successive guide members 5 may be secured individually on the said rod by using appropriate semi-circular counter-collars adapted to receive the clamping bolts such as 7.

While the invention has been illustrated in the case wherein the yarn is wound in the form of a free package, as for instance on a tube without any lateral cheek, it may also be applied with advantage when the yarn is wound on a bobbin proper, the driving drum 3 of each winding unit then having a length equal to the distance apart of the cheeks of the bobbin. It is therefore to be understood that the term package used in the present description and in the appending claims applies to the mass of yarn carried by the spindle whatever may be the support of this mass.

I claim:

1. A yarn winding unit comprising a driving drum adapted to be rotated at a constant angular speed about

its axis; a spindle adapted to support a cylindrical yarn package maintained in frictional engagement with the periphery of said drum to cause winding of the yarn on said package at a constant linear speed of said yarn; a pair of guide members disposed above said driving drum to maintain the ends of said spindle along an axis parallel to the axis of said drum and to permit said package to increase in diameter as said yarn is being wound, while retaining said spindle against axial and lateral displacement, each of said guide members being formed with a slot to receive one of the ends of said spindle, said slot being substantially in the form of an arc of a circle with the chord of the arc substantially vertical; a supporting rod of circular cross-section to carry said guide members, said rod being disposed in parallel relation to the axis of said drum; and securing means to secure each of said guide members on said supporting rod with said arcuate slots substantially concentric to said rod.

2. In a yarn winding unit as claimed in claim 1, each of said guide members comprising an arcuate marginal portion wherein said slot is formed; and a sector-shaped arm integral with said arcuate portion; and said securing means being disposed at the end of said arm opposed to said marginal portion, and being adapted to fixedly engage said supporting rod concentrically with respect to the arcuate slot of said member.

3. In a yarn winding unit as claimed in claim 1, each of said guide members comprising an arcuate marginal portion wherein said slot is formed and a sector-shaped arm integral with said arcuate portion; and said securing means being in the form of a semi-circular collar at the end of said arm opposed to said marginal portion, said semi-circular collar being concentric to said arcuate slot to be clamped on said supporting rod.

4. A guide member assembly for yarn winding machines of the type having two parallel rows of winding units, each unit comprising a longitudinal driving drum adapted to frictionally engage a substantially cylindrical yarn package carried by a supporting spindle having its ends guided in slot formed on one side of each of two guide members disposed between each two successive units of each row, said assembly comprising two semi-circular collars adapted to be disposed on each side of a common supporting rod of circular cross-section; means to force said semi-circular collars against each other to clamp same on said rod; an arm integral with each of said semi-circular collars and extending radially therefrom, and an arcuate marginal portion carried by each of said arms, each of said portions being formed with a slot opening on each side thereof, said slots being in the form of an arc of a circle concentric to the corresponding semi-circular collar.

5. As a new article of manufacture a guide member for the ends of the yarn supporting spindles in yarn winding machines of the type wherein the yarn packages are frictionally driven by rotating drums on which they directly rest, said guide member comprising an arcuate portion formed with a slot on each lateral side thereof, said slots being in the form of arcs of a circle having the same radius and the same axis; an arm integral with said arcuate portion; and a semi-circular collar carried by the end of said arm opposed to said circular portion substantially co-axially to said slots.

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