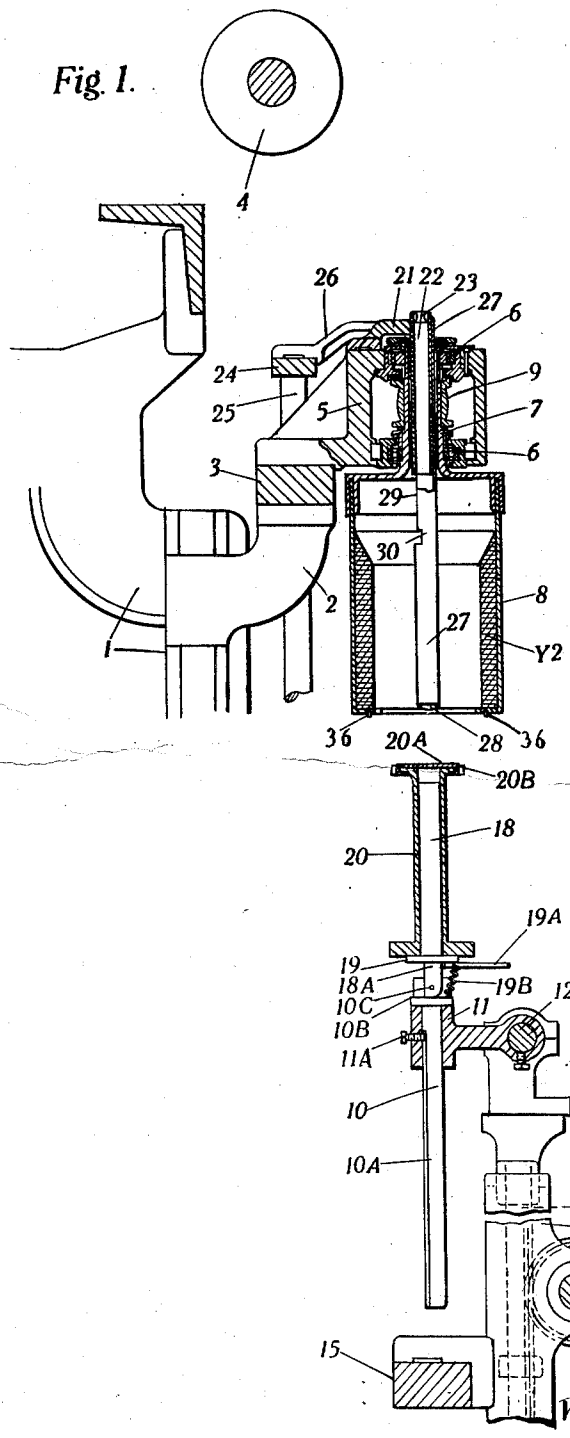
Feb. 18, 1941. W. PRINCE-SMITH. 2,232,491

CENTRIFUGAL SPINNING, TWISTING, AND ANALOGOUS MACHINE

Filed May 25, 1940 4 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

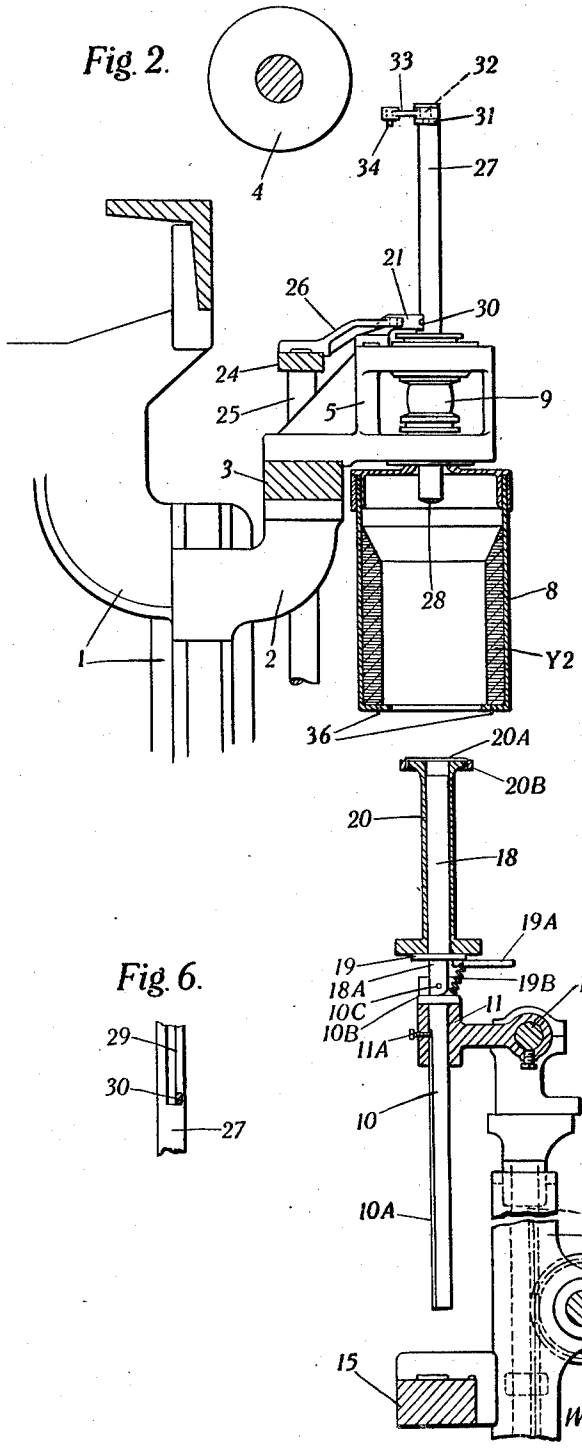


Fig. 6.

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Fig. 3.

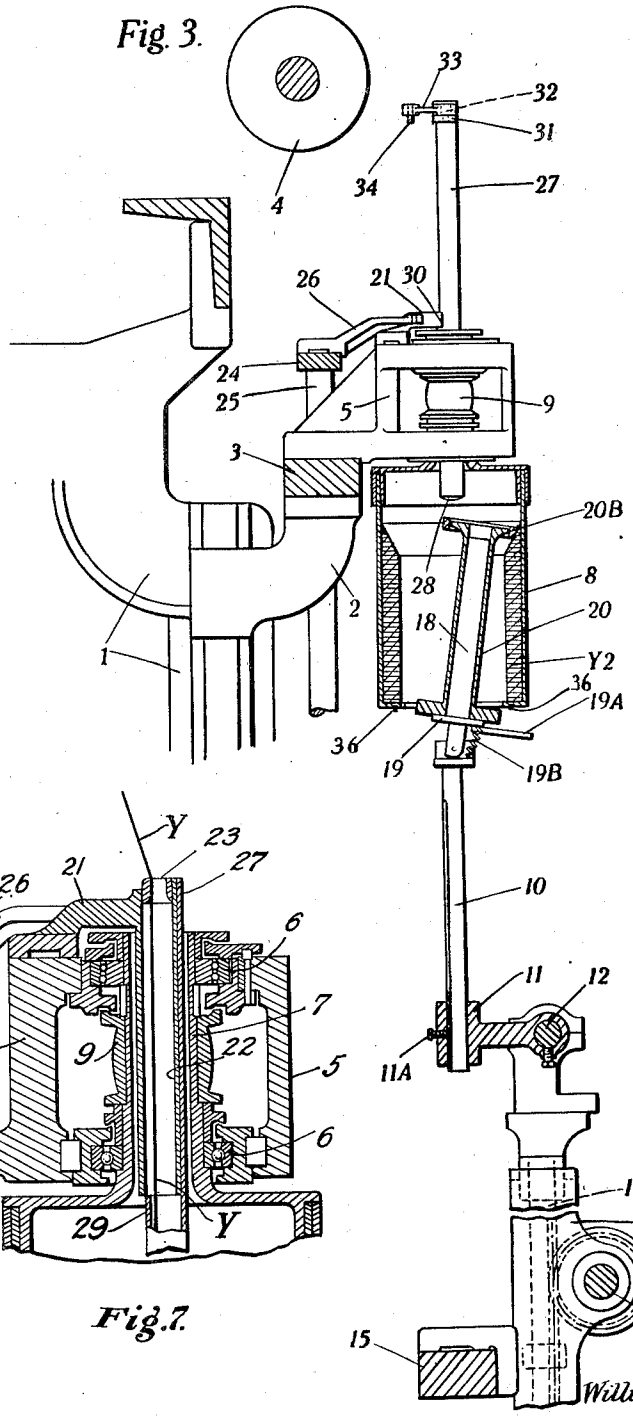


Fig. 7.

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Filed May 25, 1940 4 Sheets-Sheet 4

Fig. 4.

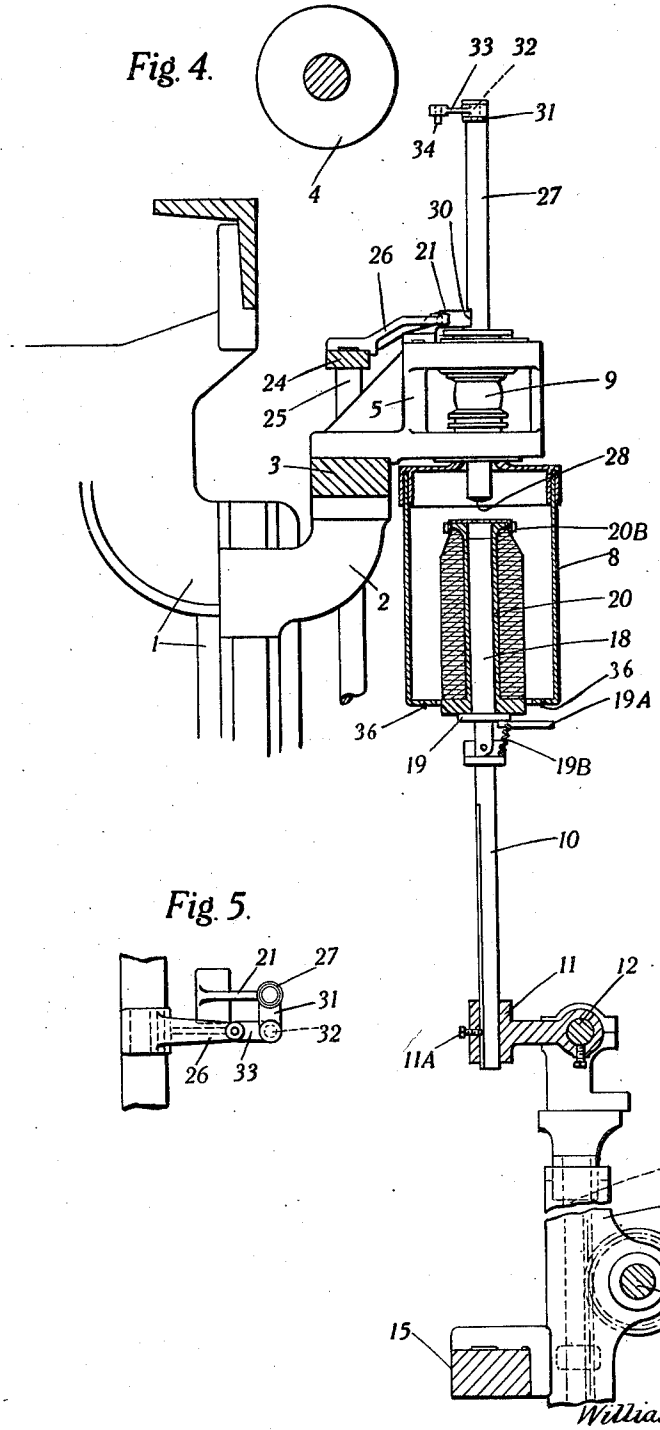


Fig. 5.

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UNITED STATES PATENT OFFICE

2,232,491

CENTRIFUGAL SPINNING, TWISTING, AND ANALOGOUS MACHINE

William Prince-Smith, Keighley, England

Application May 25, 1940, Serial No. 337,299
In Great Britain May 15, 1939

2 Claims. (Cl. 57—34)

This invention relates to spinning, twisting, and analogous machines, and in particular to machines for the centrifugal spinning, twisting, or the like, of yarns, threads and similar fibrous materials, wherein each yarn is traversed vertically by a reciprocating guide within a revolving yarn holder upon the inner surface of which the yarn is laid centrifugally and from which yarn holder it is subsequently caused automatically to be wrapped on to a bobbin or like externally wound package inserted thereinto from below and provided with means to engage the yarn in order to initiate its transfer to the bobbin, the yarn delivery means being automatically stopped for that purpose and the yarn holder continuing to revolve.

The invention has for its object to enable, in the event of the breakage of a yarn due, for example, to a weak place or to faulty piecing, the recovery to be effected of such yarn as has already been laid in the yarn holder concerned and spinning, twisting or the like to be recommenced in that holder with as little loss of time as possible.

According to the invention, in the event of the breakage of a yarn during the operation of a centrifugal spinning, twisting, or like machine of the kind referred to, the location of an end and the recovery of the yarn already laid in a yarn holder are brought about by the manipulation of the appropriate bobbin into frictional contact with the yarn mass within the holder concerned, whereafter the bobbin is caused to assume a symmetrical position within the holder.

For this purpose the bobbins are supported in such manner that individual axial movement into and angular movement within a yarn holder can be imparted to a bobbin, and the means for traversing the yarns within the yarn holders are mounted so as to be movable individually.

In accordance with one constructional embodiment of the invention, a spinning, twisting or like machine may be provided with a series of individually driven yarn holders into each of which a stationary tubular yarn guide and a reciprocable tubular traverse guide may project axially, and a series of bobbin supports may be located below said series of yarn holders and may be so constructed and arranged as to enable bobbins or like externally wound packages to be introduced axially into said yarn holders and also to be moved angularly with respect thereto, both externally and internally thereof.

The individually driven yarn holders may be supported in overhead bearings carried by the machine frame which may also support the stationary yarn guides; and the reciprocable traverse guides, into which the yarns are directed from the drawing rollers by said stationary yarn guides, may be non-rotatably disposed concentrically of the yarn guides in respect to which they may be moved collectively by means of a traverse rail and suitable traversing mechanism. In addition, each traverse guide may also be so constructed and so connected to said traverse rail as to be capable of having individual axial movement imparted to it.

For the purpose of disengaging an end from the yarn mass within a holder, whereby to initiate the rewinding after a breakage of the yarn, the upper flange of each bobbin may be provided with a resilient peripheral covering to be brought into frictional contact with the yarn mass, and in order to enable the requisite axial and angular movement to be imparted to the appropriate bobbin, each of the bobbin supports may be mounted so as to be capable of individual axial movement and may be constructed with a hinged and spring-controlled flanged upper end constituting a bobbin peg which may be provided with means for tilting it after its introduction into the yarn holder in which the breakage has occurred.

The invention is illustrated by way of example in the accompanying drawings which show, in sectional elevation, a portion of a machine frame and so much of a spindle unit and its associated parts as are requisite to the understanding of the invention as applied to the known type of centrifugal spinning machine embodying inverted cup-shaped yarn holders.

In Figure 1 the parts are shown in the spinning position with a partially completed yarn mass laid within the yarn holder by reciprocating yarn traversing means at the bottom of its traverse; it being assumed for the purpose of this description that the yarn leading to this particular yarn holder has become broken.

Figure 2 shows the yarn traversing means elevated individually, as a preliminary step towards the recovery of the broken end of the yarn mass in the yarn holder.

Figure 3 shows the yarn traversing means in the elevated position and the bobbin also elevated individually and tilted into frictional contact with the surface of the yarn mass.

Figure 4 shows the bobbin restored to vertical position within the yarn holder after the con-

tents of the holder have been re-wound thereonto.

Figure 5 is a fragmentary plan view showing the connections to the yarn traversing means, Figure 6 is a fragmentary rear elevation of part of the yarn traversing means, and Figure 7 is an enlarged detail sectional view.

In the practical application of the invention selected for illustration, apparatus of the following construction and means as hereafter described for guiding and traversing the yarns in the yarn holders may conveniently be adopted, but the invention is not necessarily limited thereto.

1 represents part of the main framework of one side of the machine to which is secured a plurality of brackets 2 supporting a fixed horizontal continuous rail 3. 4 indicates one of the lower front rollers by which the yarn is delivered to the respective spindle units.

Secured at intervals along rail 3 is a number of overhead brackets or cages such as 5, each carrying upper and lower ball bearings 6, 6, whereof the inner races are fast on the tubular stem or neck 7 of an inverted cup-shaped yarn holder 8 supported by the cage 5 and adapted to be driven through the medium of the usual or appropriate mechanism by means of a tape (not shown) passing around a whorl 9 fixed to the tubular stem or neck 7.

Located below and co-axially with each yarn holder 8 is a spindle 10 grooved longitudinally at 10A and secured adjustably in a bracket 11 by means of a set-screw 11A, the end of which beds in the groove 10A. The bracket 11 is fixed to a continuous rockshaft 12 supported at intervals by rack pillars such as 13 mounted so as to be slidable vertically in guides such as 14 fixed to a stationary continuous rail 15, the rack pillars 13 being actuated by pinions such as 16 keyed to an operating shaft 17 extending along the machine and deriving motion from known or appropriate mechanism not shown.

At the upper end of each spindle 10 there is a bifurcated head 10B wherein a bobbin peg 18 is articulated at 10C by means of a short blade 18A rounded at its forward lower edge and projecting downwardly from a flange 19 upon which a bobbin 20 rests.

Secured to and projecting forwardly from the flange 19 there is a trigger arm 19A and between the flange 19 and the base of the bifurcated head 10B a compression spring 19B is confined.

At its upper end the bobbin 20 is provided with a flanged metal cap 20A peripherally of which a rubber ring 20B is located.

21 is a bracket secured to the top of the cage 5 and projecting forwardly so as to maintain a guide tube 22 concentrically within the tubular neck 7 of the yarn holder 8; the lower extremity of said guide tube 22 terminating slightly above the top of the yarn holder 8, and the upper end of said tube 22 being fitted with a pot-eye 23 constituting a stationary yarn guide.

24 is a traverse rail supported at intervals as usual by pokers such as 25 and adapted to be operated in the well understood manner by builder or traversing mechanism, and to this traverse rail 24 is secured adjacent to each spindle unit a forwardly projecting bracket 26 which supports a slidable tube 27 concentrically with and externally of said stationary guide tube 22.

This slidable tube 27, which is fitted at its lower end with an eyelet 28, and which constitutes a tubular traversing guide, is formed from its upper end to below the middle of its length with a vertical slot 29 disposed rearwardly of the tube and terminating in an off-set recess or notch 30 at its lower end, and the tube 27 is connected to the bracket 26 detachably by means of a lug 31 projecting from the tube and having articulated to it at 32 a link 33 the free end of which is formed with a depending peg 34 receivable by a recess or an aperture formed in the forward end of the bracket 26. The width of the slot 29 in the tube 27 is greater than the width of the forwardly extending portion of the bracket 21 at its junction with the stationary guide tube 22.

During the operation of the machine, yarn is delivered by the roller 4 to and through the stationary pot-eye 23 and tube 22, and emerges through the eyelet 28 in the tube 27 whence it is laid centrifugally upon the inner surface of the revolving yarn holder 8 wherein an annulus Y2 of yarn is gradually built up by the reciprocable movement of the tube 27 actuated by the traverse rail 24 and known builder mechanism.

If, during the process of spinning the annulus Y2 in the yarn holder 8, the yarn should break for any reason, it is desirable that the yarn already spun in the yarn holder should not be wasted, and it is recoverable in the following way.

Referring to Figure 1 of the drawings, it is assumed that the yarn has just broken, and it is therefore necessary to locate the loose end of the yarn mass Y2 and to transfer the yarn to bobbin 20.

The first step is for the operative to disconnect the traversing yarn guide 27 from the traversing rail 24 by lifting the tube and withdrawing the peg 34 on link 33 from the bracket 26, the tube 27 being elevated by hand until the offset recess 30 is level with the neck of the bracket 21 with which it is then engaged by slightly rotating tube 27 towards said bracket, thus the yarn guide is held in an elevated position within the yarn holder 8.

The spindle 10 is then released by unscrewing the set-screw 11A and the spindle is raised upwardly of the bracket 11 until the bobbin 20 is at the correct height axially within the yarn holder 8 and the set-screw 11A is then tightened.

By pressure of the finger on the trigger arm 19A the operative then tilts the bobbin 20, into the position shown in Figure 3, so as to bring the rubber ring 20B lightly, and for a short period, into contact with the surface of the annulus of yarn Y2, the yarn holder 8 rotating meanwhile, the result of which is to cause a few coils of yarn to be retarded and the winding of the yarn on to the bobbin to be initiated. Directly pressure on the trigger arm 19A is released, the spring 19B causes the bobbin to assume a vertical position in which the transference to the bobbin of the remainder of the yarn in the holder is completed, as shown in Figure 4. The spindle 10 is then dropped in the bracket 11 and the bobbin is removed from the peg 18 and replaced by an empty bobbin.

It is to be understood that while the above described operation of recovering the yarn from the yarn holder to which the supply of yarn has become broken is being effected, all the other yarn holders have continued spinning.

Spinning has now to be re-started in the yarn holder in or to which the yarn has broken, there being no length of yarn between the front roller 4 and the yarn holder 8, and the procedure is as follows:

The yarn holder 8 is rotating continuously and

the first step is for the operative to detach the traversing tube 27 from the bracket 21 and lower the tube until the eyelet 28 is below the level of the bottom edge of the yarn holder 8. A short length of yarn is passed by hand through the tube 27, for example by clipping a small weight to the end of this short length of yarn so that it will drop by gravity through the eyelet 28. The yarn extending below the eyelet 28 is then caused to be caught up by the pegs 36, 36, and the tube 27 is then raised into the spinning position, the peg 34 being engaged with the bracket 26.

The short length of yarn is now centrifugally controlled by the yarn holder 8 and is held by hand above the pot-eye 23, being pieced up to the yarn being delivered by the roller 4 in the ordinary manner, and spinning is then proceeded with.

It will be obvious that unless the mass of yarn, which has a broken end, is recovered from the yarn holder as described, the annulus will collapse directly the yarn holder ceases to rotate and will become waste.

What I claim is:

1. A centrifugal spinning, twisting or like machine wherein, in the event of the breakage of a yarn during the operation of the machine, the location of an end and the recovery of the yarn already laid in a yarn holder are brought about, comprising a revolving yarn holder, a bobbin to receive yarn from said yarn holder, and means for manipulating the appropriate bobbin into frictional contact with the yarn mass within the yarn holder concerned or causing said bobbin to assume a symmetrical position within the yarn holder, as required.

2. A centrifugal spinning, twisting or like machine as claimed in claim 1, embodying a series of individually driven yarn holders within which operate reciprocable traverse guides, a series of spindles located co-axially with and below said series of yarn holders, a series of bobbin pegs articulated to said spindles, means to move said series of spindles axially with respect to said yarn holders, a series of bobbins each fitted with a resilient peripheral covering on its upper flange and means for moving any individual bobbin peg angularly so as to manipulate the appropriate bobbin into frictional contact with the yarn mass within the holder concerned.

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