Feb. 21, 1933. N. CROSSLEY 1,898,941

MANUFACTURE OF YARNS OR THREADS

Filed June 13, 1932

FIG. 1.

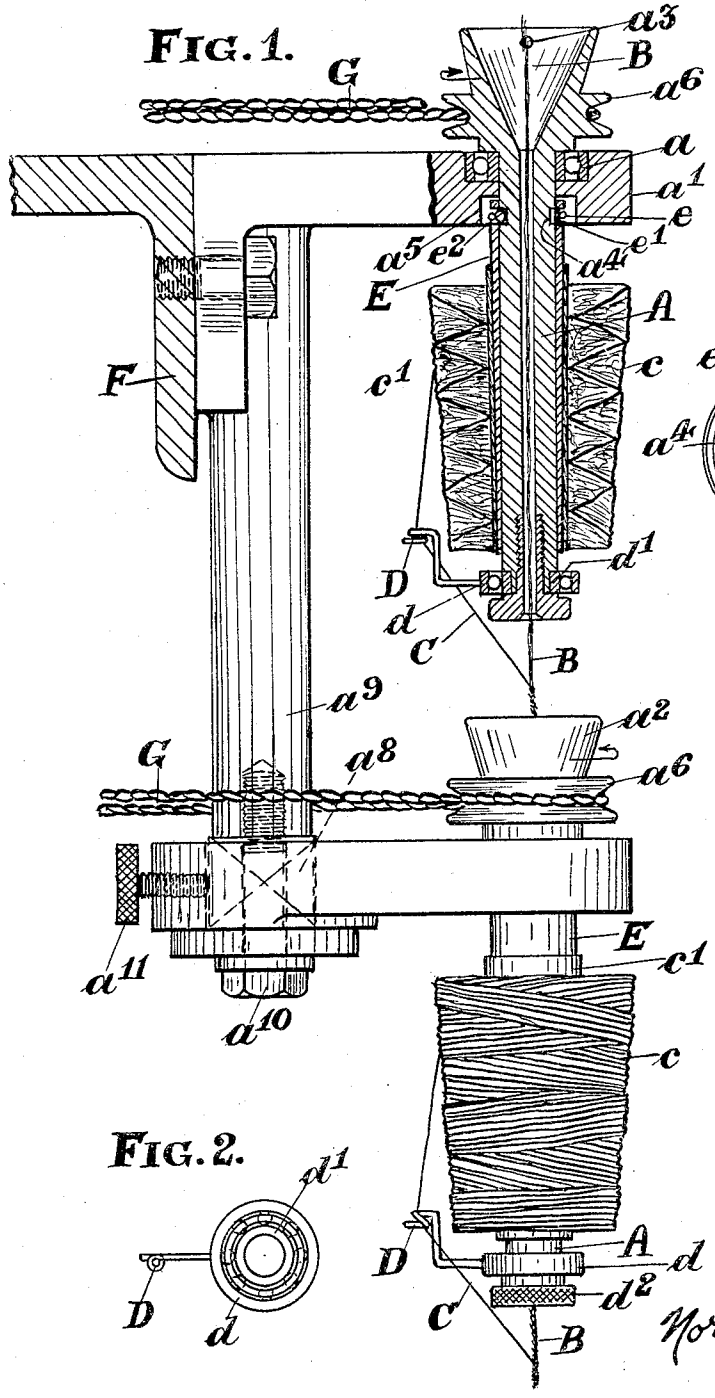

FIG. 3.

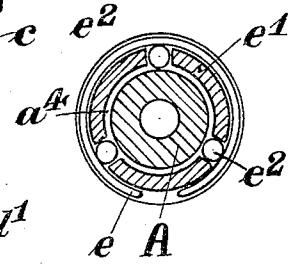

FIG. 2.

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UNITED STATES PATENT OFFICE

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MANUFACTURE OF YARNS OR THREADS

Application filed June 13, 1932, Serial No. 616,975, and in Great Britain March 4, 1931.

An application for patent on said improvements was filed in Great Britain on Mar. 4, 1931, Serial No. 6,650.

This invention relates to apparatus for use in the manufacture of yarns or threads comprising rings or cores of fibrous substances of a springy or elastic nature, such for example as hair, or the like, which are encircled or bound into a thread by winding around them a binding or retaining thread, and the present invention has for its object to introduce an improved construction of yarn or thread of this type and also of mechanism for manufacturing it.

For this purpose the fibrous substance in the form of a slightly twisted roving or core with or without a carrying thread is caused to pass through a revolving funnel formed at the top of a tubular spindle through which the twisted roving or core passes, a binding yarn being wound around the core by means of a yarn carrier which is detachably and rotatably mounted on the spindle and takes the binding yarn from a cop, bobbin, or cheese that is rotatably mounted on the spindle.

According to this invention a metal tapered sleeve forms a permanent fitting on the tubular spindle and is rotatable thereon and adapted to receive a tapered tube on which the binding yarn is wound, a yarn carrier preferably being detachably and rotatably mounted on the spindle for wrapping the binding yarn around the slightly twisted roving, or core.

A preferred construction of yarn carrier comprises an eyelet fixed to or forming a part of a ball bearing that is detachably secured to the spindle in such a manner that it can be readily removed for the replacement of a cardboard or other tapered tube that fits on the metal tapered sleeve and carries the cheese or other supply of binding yarn.

In the accompanying drawing:—

Fig. 1 is an elevation partly in section of revolving spindle apparatus constructed in accordance with this invention for use in the manufacture of yarns or threads of the kind specified.

Fig. 2 is a plan of the revolving carrier for the binding yarn.

Fig. 3 is a transverse section drawn to a larger scale showing the means for retaining the tapered metal sleeve upon the spindle.

A indicates the revolving tubular spindle, B the twisted roving which passes through it, C the binding yarn, D the revolving yarn carrier, and E the metal tapered sleeve. In the example shown the tubular spindle A is rotatably mounted in a ball bearing a in a bracket a^1 that is bolted to a rail F on the machine frame. The upper part of the tubular spindle A terminates in a funnel a^2 which is situated in proximity to a pair of drawing rollers not shown. This funnel may have a bar extending across its mouth through diametrically arranged holes a^3 and such bar may have a diamond shaped boss in the centre to shake the fibrous substance and prevent it from running continuously in one position, or the bar may be dispensed with. Rotatably mounted on the tubular spindle A is the tapered metal sleeve E which forms a permanent fitting on the spindle and is retained in position thereon by a spring retaining ring e which is sprung into a groove e^1 in the tapered sleeve and exerts pressure upon balls e^2 which project through holes formed in the sleeve and enter an annular groove a^4 formed in the tubular spindle A. The end portion of the tapered sleeve E that occupies a position between the ends of the retaining ring e may be indented to prevent the retaining ring from turning round in its groove. The pressure that the retaining ring e exerts upon the balls e^2 may be used for regulating the amount of friction that exists between the tapered sleeve E and the spindle A. The upper end of the tapered sleeve E with the retaining ring and ball friction device occupy a position in a cavity a^5 formed in the underside of the bracket a^1 so as to be out of the way of fluff that collects during the running of the machine. The binding yarn C is wound in the form of a cheese c on a paper or other perforated tube c^1 which is pressed on to the tapered metal sleeve E. The yarn carrier D comprises an eyelet formed in a piece of wire

that is fixed to the outer ring d of a ball bearing of which the inner ring d^1 fits on a reduced portion of the spindle A and is retained in position by a tubular screw d^2 which is screwed into the end of the spindle A. The eyelet of the yarn carrier comprises a coil which is so twisted that the yarn automatically threads itself when allowed to come in contact with the eyelet during the running of the machine. The tubular spindle A is driven in the required direction by a band G passing round a whorl a^6 on the spindle. The spindle arrangement above described is shown used in combination with a second spindle apparatus situated below and co-axially with it, the lapped core from the first spindle apparatus passing through the second one and being subjected to a second lapping action in the opposite direction after issuing through the spindle. The second spindle apparatus is mounted in a similar manner to the first one on a bracket a^7. The latter is loosely mounted on a square portion a^8 that is clamped to an extension a^9 of the bracket a^1 by a screw a^{10}. The bracket a^7 can be fixed in its operative position on the square portion a^8 by a hand screw a^{11}. When the latter is slackened the bracket a^7 can be lifted above the square portion a^8 and turned out of line with the upper spindle apparatus for enabling the tube c^1 to be removed when empty and replaced by one carrying a cheese c of binding thread.

What I claim as my invention and desire to secure by Letters Patent in the United States is:—

1. In spindle apparatus for winding a binding thread around a core of fibrous substance, the combination of a positively driven tubular spindle, a sleeve rotatably mounted on the spindle and driven by frictional contact with the spindle, means for retaining the sleeve in position on the spindle the said means comprising an annular groove formed in the spindle holes formed in the sleeve, balls situated in the holes and a spring retaining ring encircling an annular groove on the sleeve and arranged to exert pressure on the balls, a yarn carrier detachably mounted on the sleeve and a thread guide rotatably and detachably mounted on the spindle and pulled around by the binding yarn as the latter is pulled off the spool.

2. In spindle apparatus for winding a binding thread around a core of fibrous substance, the combination of a positively driven tubular spindle, a sleeve rotatably mounted on the spindle and driven by frictional contact with the spindle, a yarn carrier detachably mounted on the sleeve, a thread guide rotatably mounted on the spindle and rotated by the binding yarn as the latter is pulled off the spool, a duplicate spindle apparatus situated below and coaxially with the first one, the lapped core from the first spindle apparatus passing through the second one and being subjected to a second lapping operation in the opposite direction after issuing through the spindle and means whereby the second spindle apparatus can be moved out of line with the first spindle apparatus for enabling the empty spool to be removed and replaced with a full one.

In testimony whereof I affix my signature.

NORMAN CROSSLEY.