

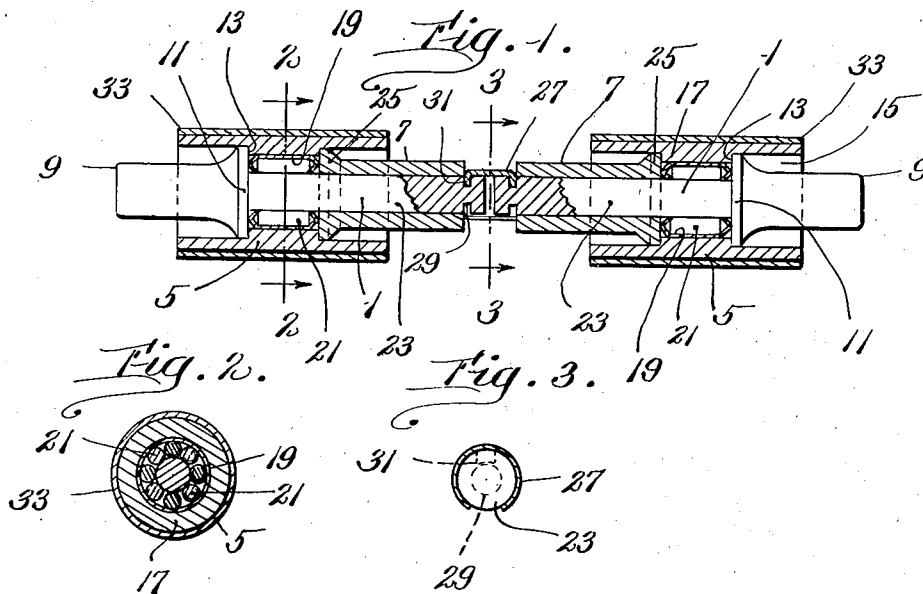
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DRAWING ROLL FOR SPINNING FRAMES

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DRAWING ROLL FOR SPINNING FRAMES

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5 Claims. (Cl. 19—142)

My invention relates to drawing-rolls for cotton spinning, drawing, roving and the like frames on the order of those shown in my prior U. S. Patent No. 1,286,936, granted December 10, 1918, and has among its objects the provision of a novel and improved double-boss top-roll of which the bosses can each rotate at its own speed independently of the other, so that the inevitable slight checks of the rotation of one boss caused by neps, pieces of boll or leaf, or other inequalities in one of the two strands being drawn by the roll will not be imparted to the other boss to cause it to hold back on its strand and introduce unevenness in the latter strand. Another object is to provide a roll in which the rise and fall of one boss over inequalities of the strand will not similarly lift one end or the other of the other boss on the roll. A further object is to provide a roll capable of being mounted in the usual slotted cap-bars of existing frames without modification thereof, which roll will be equipped with anti-friction bearings giving greater uniformity of draft, and to do so while providing a structure capable of being taken apart for servicing and of being put together again without the need for skilled labor and great care and precision in order to avoid error of adjustment preventing proper operation.

Other objects of the invention, and the manner of their attainment, are as set forth hereinafter in the specification.

An illustrative embodiment of the invention is shown in the accompanying drawing in which,

Fig. 1 is a view mainly in longitudinal axial section of the improved roll.

Fig. 2 is a transverse section on line 2—2 of Fig. 1.

Fig. 3 is a transverse section on line 3—3 of Fig. 1.

The improved roll comprises two spindles 1, which together form a central non-rotating arbor on which shell rolls 5 are mounted in independently rotatable relation and held in fixed spaced relation by bushings 7 on the reduced inward ends of the spindles 1. Thus, each spindle 1 is formed with an outward extremity 9 of the proper size to be received easily and work up and down freely in the customary open bearings of the usual type cap-bars of the spinning frame, the surfaces of these extremities 9 being cylindrical at first and thereafter expanding to form flanges 11 whose inward radially disposed faces bear against annular shoulders 13 formed at one end of the reduced middle portion of the central passage of the shells 5 comprising the two bosses

of the roll. Flange 11 is of such diameter that it will rotate freely within the enlarged end portion 15 of the passage through each shell 5. Spindles 1 are hardened and ground to size. Into the middle portion 17 of reduced diameter of the passage through each shell is driven with a press fit the cage 19 of a needle-bearing whose several rolls 21 bear against the reduced cylindrical shank 23 of spindles 1, so that each shell rotates freely upon such shank 23 by reason of the interposed needle-bearings. The bushings 7 fit snugly upon the reduced shanks 23 with their flanged outward extremities 25 received freely within the enlarged inward ends of the central passages through the shells and bearing against the shoulder at the inward terminus of the reduced portion 17 of such passages, so that the shells are held against axial movement along spindles 1 between the flanges 11 of the spindles and flanges 25 of the bushings.

The two spindles are connected together in slightly spaced relation at their inward ends by means of longitudinally-split cylindrical clips 27 of C-shape in section made out of spring steel and of an internal diameter slightly less than the diameter of the shanks 23 so that they will grip the latter tightly when the shanks are forced into the clip. Each shank is provided near its end with an annular rectangular groove 29 to receive a radially extending lug 31 formed at each end of the C-clip 27, the grooves 29 being accurately located so that the lugs 31 will enter grooves 29 just as flanges 25 of bushing 7 take close but free bearing against the shoulders on reduced portions 17 against which they bear within the shells 5. Thus, with the C-clip 27 uniting the inward ends of spindles 1 the whole assembly becomes a single top-roll unit comprising two bosses freely and independently rotatable in fixed axially-spaced relation upon an operatively rigid arbor the ends of which are received in usual manner in the open bearings of the cap-bars. The two bushings 7 and the intervening C-clip act as spacers determining the axial spacing of the two bosses.

Each shell 5 is equipped if desired with a covering 33 of cork, leather, or any other suitable or preferred material, cemented on after the usual manner.

The fit of the needle-bearings upon shanks 23 is made such as to allow .002 or .003 inch of radial play. This provides for free rotation of the shell. Further, it also provides for a slight amount of rocking action of each shell 5 for at least 3 degrees of angle out of exact axial align-

ment with the common axis of the two co-aligned spindles 1, this rocking action being amplified in effect because each needle-bearing is roughly only about one-third the length of its shell. The effect of this is that though both bosses of the roll are mounted to rotate on a common axis, yet when an inequality in one strand lifts the boss at one end of the roll and its corresponding end of the common axis, the boss at the other end of the roll can continue to rotate in correct and accurate parallelism with the surface of the opposing lower roll against which it is pressed and thus maintain its intended grip on all the fibers of the cross-section of the strand gripped between it and its underlying bottom roll. This self-leveling action avoids the fault, in prior rolls in which the bosses were forced to remain in exact axial alignment at all times, of having one boss tilted out of parallel with its underlying roll when the other boss was forced to rise by an inequality in its strand, thus permitting the fibers at the raised ends of the first boss to draw forward without restraint to throw the resulting drawn strand momentarily out of uniformity. Thus the fulcrum about which the top-roll swings when one boss is raised or lowered is no longer in the strand below the other boss, but in the axis of the latter boss at mid-length of its bearing.

The usual weighting means is applied to the improved top-roll when desired by applying the saddle of such means to the exposed portions of bushings 7 between the ends of the two shells 5, this pressure effectively holding the spindles and bushings from rotation in use, though the engagement of pintles 9 within the open bearings of the cap-bars normally accomplishes this retention from rotation since the anti-friction needle-bearings permit free rotation of the shells without motion of the parts desired to remain at rest.

Disassembling of the structure, for servicing or replacement of the needle-bearings or other parts, or to facilitate recovering the shells 5, is accomplished by merely springing the C-clips open far enough to get the lugs 31 out of grooves 29, the parts thereafter being separated by relative axial movement. This done, the bushing 7 and shell 5 with the needle-bearing in place are slid off from spindle 1. Re-assembly is effected with the utmost simplicity by a reversal of this operation, and there is no possibility for error on the part of the operator in getting an improper setting of the parts, because with accurate machining of the parts to close tolerances and with complete standardization the component elements can be put together only in a manner giving correct operation; there is no leeway for personal error.

As is obvious, any checking or pause in the rotation of one boss owing to obstacles encountered in its strand will have no effect in checking the rotation of the other boss, because they are mounted for rotation completely independently of each other.

With the needle-bearings located at mid-length of the shells 5, there is little or no opportunity

for lint and fly to enter or accumulate in the bearings; this freedom from clogging and the long life of the bearings makes it possible to run these rolls ordinarily for around two years under customary working conditions without having to take them apart for cleaning and oiling.

What I claim as my invention is:

1. A drawing-roll having in combination two shell rolls each having internal shoulders, a needle-bearing fixed within each shell roll and located between the internal shoulders, a spindle extending through each shell roll and needle-bearing and having a flange bearing against one of such shoulders, a spacer on the spindle engaging the other of such shoulders, and means joining the two spindles together between the two shell rolls.

2. A drawing-roll having in combination an arbor comprising two separate lengths each having an enlarged end-portion and a reduced shank having a groove, a shell roll on each length, means holding the shell roll against axial movement, and connector means fitting over the proximate ends of the shanks and having a portion entering the groove of each shank to hold the two lengths together in axial alignment.

3. A drawing roll having in combination an arbor composed of two separate lengths disposed end to end and each having an enlarged end-portion and a reduced shank, a shell roll on each length, a needle-bearing having its cage fixed within each shell roll and its rollers bearing against the arbor to support the shell rolls rotatably thereon, means coaxing with the enlarged end-portions to hold the shell rolls against axial movement, and means positively but detachably locking the proximate ends of the said lengths together in axial alignment.

4. A drawing roll having in combination an arbor composed of two separate lengths disposed end to end and each having an enlarged end-portion and a reduced shank, a shell roll on each length, a needle-bearing having its cage fixed within each shell roll and its rollers bearing against the arbor to support the shell rolls rotatably thereon, the enlarged end-portions retaining the shell rolls against outward axial movement, sleeves on the respective lengths forming the arbor and preventing inward axial movement of the shell rolls, and means positively but detachably locking the proximate ends of the said lengths together in axial alignment and also holding the sleeves against inward movement.

5. A drawing roll having in combination a non-rotating arbor, two shell rolls mounted in axially spaced relation to each other upon such arbor, and a needle bearing comprising rollers and a cage retaining the rollers against axial and inward or outward radial displacement and having its cage fixed in the interior of each shell roll at midlength thereof and thus removable from the arbor while remaining fixed in the shell roll when the latter is removed from the arbor, and bearing against the arbor to support each shell rotatably upon the arbor.

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