

Nov. 20, 1923

1,474,346

L. W. CAMPBELL
SPINNING AND DRAWING ROLL
Filed Aug. 30, 1922

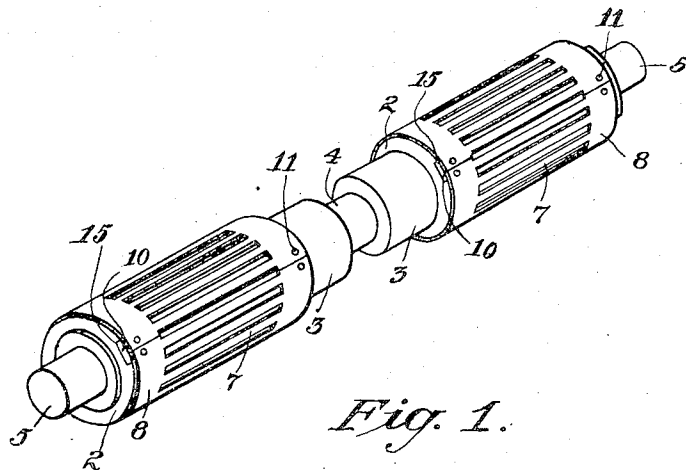


Fig. 1.

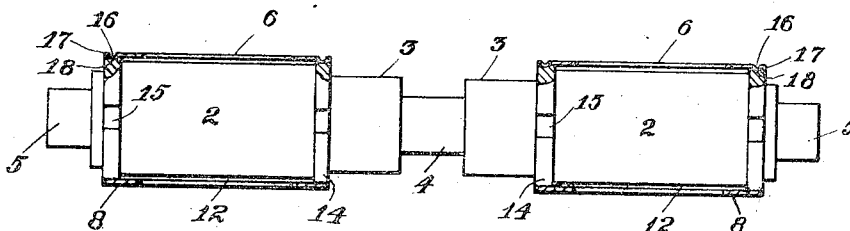


Fig. 2.

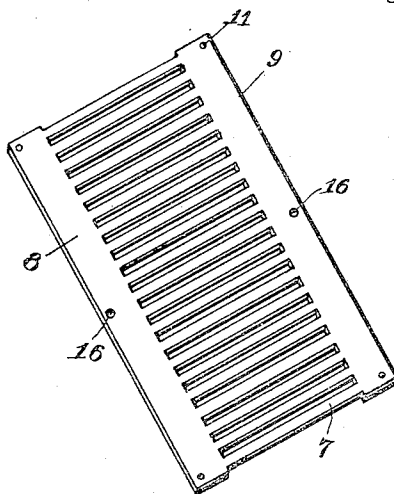


Fig. 4.

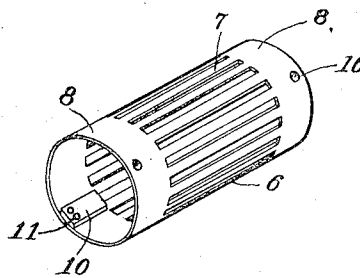


Fig. 3.

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UNITED STATES PATENT OFFICE.

LEON W. CAMPBELL, OF PROVIDENCE, RHODE ISLAND.

SPINNING AND DRAWING ROLL.

Application filed August 30, 1922. Serial No. 585,298.

To all whom it may concern:

Be it known that I, LEON W. CAMPBELL, a citizen of the United States, residing at Providence, in the county of Providence, State of Rhode Island, have invented certain new and useful Improvements in Spinning and Drawing Rolls, of which the following is a specification.

This invention relates to improvements in top-rolls for spinning-frames, drawing-frames, mules, speeders or like textile machines.

One object of the invention is to provide a spinning or drawing roll having the required resilient cushioning-surface embodied in the roll proper without requiring the use of a fabric covering and leather "cot" on the periphery of the roll.

Another object of the invention is to provide a roll having a resilient surface of wear-resisting material which gives the required cushioning effect without being subject to scoring, grooving or other deterioration in use.

Another object of the invention is to provide a roll capable of effecting the necessary frictional grip on the strand of sliver or roving without subjecting the material to undue chafing or abrasion.

Further objects of the improvement are set forth in the following specification which describes a preferred embodiment of the invention as illustrated in the accompanying drawings. In the drawings:

Fig. 1 is a perspective view of the improved roll;

Fig. 2, a side view of the same showing its outer resilient shell in section in an axial plane;

Fig. 3, a perspective view in detail of the outer resilient shell of the roll shown removed from its supporting hub or boss; and

Fig. 4, a view in perspective of the flat strip or blank from which the shell is formed.

Referring to Figs. 1 and 2 of the drawings, the top-roll as herein shown consists in general of a pair of cylindrical hubs or bosses 2, 2 connected by an axial spindle 3 which is reduced in diameter at its center to provide a bearing 4 similar to the outer bearings or trunnions 5 which project from the ends of the hubs. The roll may be turned up from a solid metal rod or shaft with the

bosses 2, 2 formed integral therewith, or in some instances the hubs or bosses may be constructed as separate elements rotatively mounted with respect to the bearing-spindle as shown and described in my United States Letters Patent No. 1,286,936, dated December 10, 1918.

The present type of top-roll is designed for use in cooperation with the lower drawing-rolls of a spinning- or drawing-frame and is arranged in parallel relation thereabove to adapt the strand of sliver, roving or other material to feed between the peripheries of the rolls whereby its fibers are drawn out thereby. It will be understood that the top-roll is weighted to adapt it to rest on and bear against the strand drawing between the rolls and its hubs or bosses are usually provided with resilient coverings to produce a cushioning effect when in contact with the material. Heretofore the common practice has been to cement a strip of fabric onto the peripheral surface of the boss, which acts to supply the yielding cushion, and to cover the fabric with a leather sleeve, or "cot" as it is termed, to provide a smooth exterior surface having a slight frictional, gripping action on the strand. The cushioning action of the top-roll is essential to its proper contact with the strand of sliver, roving or other material since without it there would be lost motion and slippage between the rolls, it being understood that the top-roll is driven solely by and from the positively rotated bottom-roll.

Various and sundry means and methods have been devised for holding the outer coverings or cots on the bosses of the top-roll to provide the necessary cushioning effect while preventing the cots from slipping. It has been found in practice, however, that the cushioning fabric becomes hardened and matted after continuous use and the outer cots stretch and become loose so that frequent recovering of the rolls is required. Furthermore, the coverings are subjected to greater wear at certain points and therefore are liable to become grooved or ridged on their exterior faces so that they will not contact properly with the material passing between the rolls. In fact, it is well known and recognized in the art that the usual type of top-roll covering as above described is far from satisfactory for the purpose in-

tended, but heretofore the problem of providing resiliency without sacrificing durability has never been solved.

It is therefore the purpose of the present invention to provide a roll for spinning, drawing and like processes having a resilient surface for contact with the material, and with that surface proof against wear or deterioration during long periods of use. With this end in view the present improvement contemplates a construction of roll having the usual bosses provided with outer shells or sleeves of wear-resisting material, preferably hardened steel, the sleeves being slitted or otherwise formed to render the surface of the roll of the required resiliency. In its simplest form the covering for the roll comprises a cylinder or sleeve 6 of relatively thin sheet-steel, see Fig. 3, which is slitted longitudinally to form numerous narrow ribs or bars 7 connected at their ends by the ring portions 8. The sleeve 6 may be constructed from a length of tubing slitted longitudinally as shown, or it may be rolled up from a flat strip or blank 9 of sheet-metal punched out to the form illustrated in Fig. 4. When constructed by the latter method the blank is rolled around a suitable arbor and its abutting edges fastened together by the overlapping strips or tabs 10 shown most clearly in Fig. 3. The tabs or strips 10 might be soldered or brazed in place across the seam in the sleeve 6, or the marginal edges of the sleeve may be riveted thereto as indicated at 11. It will be noted that the strips 10 are fastened on the interior of the sleeve 6 and are therefore adapted to serve as splines or keys for holding the outer shell rotatively of the hub 2 on which it is mounted.

Referring to Fig. 2, the hubs 2 are reduced in diameter at 12 throughout the greater portion of their length to form upstanding annular ribs or raised seats 14 at their ends. The shell 6 is proportioned to fit snugly over the rings 14 with the tabs or keys 10 engaging slots 15 cut into the periphery of the rings, as shown in Fig. 1. The keys 10 hold the shell 6 from turning on the boss 2, and to secure it from longitudinal displacement any suitable means may be employed such as next described. Referring to Fig. 3, the ends of the sleeve 6 may be indented or punched at 16 to force out teats or projections 17 on the interior thereof which are adapted to snap into small cavities or recesses 18 on the surface of the rings 14, see Fig. 2. In this manner the sleeves 6 are held securely in place on the bosses 2 with their ribs or bars 7 extending longitudinally thereof between the raised rings or seats 14 and spaced at a distance from the surface of the main body of the bosses. This construction provides that the ribs or slats 7 may yield or spring in-

wardly toward the axis of the roll to give the desired cushioning effect in the manner and for the purpose as hereinafter more fully explained.

If preferred the shell 6 may be constructed with its ribs 7 upset or raised above its end-portions 8, in which case the raised seats 14 on the bosses 2 would not be required to space the ribs away from the periphery of the roll.

The top-roll is applied to use by placing its trunnions 5 in the bearings which maintain it in floating relation with the bottom-roll arranged therebeneath on the spinning- or drawing-frame. The usual saddle is placed across its center-bearing 4 with weights applied thereto to hold the top-roll down against the bottom-roll in the manner as well known to those versed in the art and consequently not herein shown or described in detail. The strands of sliver, roving or other material are drawn through the rolls between the peripheries of their bosses and the bottom-roll is positively and continuously driven to feed the strands through the machine to effect the draft on the fibers. Usually the bosses on the bottom-roll are fluted or grooved to increase the frictional gripping effect on the strands whereby a positive draft is assured without slippage. With the improved form of top-roll herein shown the annular end-portions 8 of the shells or sleeves 6 will rest on the fluted peripheries of the lower bosses to prevent the ribs or bars 7 from interengaging with the flutes or corrugations on the bottom-roll and hence there will be no interference with the smooth running of the rolls. The strands draw between the rolls at points intermediate the ends of their bosses and hence the top-roll will bear upon the strands at the approximate center of the longitudinal ribs or bars 7 on the shells 6. That is to say, the top-roll makes contact with the strands at points midway between the ends of the ribs 7 and hence there will be a tendency for the ribs to yield or flex radially inward whereby the desired resiliency or cushioning effect is produced. This cushioning action provides for an increased gripping effect of the rolls on the strand, while also insuring that the delicate fibers of the material shall not be chafed or abraded during the drawing action. It has been determined in practice that the present improved form of roll increases the gripping effect to a very appreciable extent over that of the usual fabric and leather covered rolls, while providing the required cushioning action essential to the proper handling of delicate fibers. As a consequence, the improvement greatly increases the efficiency of the machine to which the roll is applied while also improving the quality of its product by insuring a smoother, more uniform and level yarn.

While only one embodiment of the invention is herein shown it is obvious that various modifications may be made in the form and structure of the device without departing from the spirit or scope of the invention. For instance, the shell or sleeve 6 may be constructed with end-rings having wires extending therebetween to provide the resilient contact ribs 7, and in some cases the ribs might be formed by irregular slashes or cuts in the sleeve whereby they would have a wavy or undulating contour on their lateral edges. In other cases the ribs may extend in a generally helical direction with respect to the axis of the roll. It is also to be understood that the invention is not limited to a roll having an outer resilient shell of metal such as steel, copper, brass, or composition, for other materials might be used to good effect in constructing the shell, such for instance, as hard fiber, vulcanized rubber, or a phenol condensation product. It is conceivable also that the improved flexible shell of the roll might serve as the support for an outer covering or cot of leather if desired, but for most purposes such a covering is unnecessary. Furthermore, the improvement may be applied to either a top-roll or bottom-roll, or both if desired.

Without limiting myself to the exact details of material, form and construction of the device as herein described, I claim:

1. An improved roll for the purpose specified provided with an outer cylindrical grill-structure having flexible spring-bars extending in a generally longitudinal direction on its periphery and adapted to yield to effect a cushioning action upon the material drawing across the face of the roll.

2. An improved spinning or drawing roll comprising an axial spindle and an outer hollow cylindrical grill-structure having flexible bars arranged concentric of the axis of the spindle and supported therefrom at their ends to adapt them to yield radially inward to effect a cushioning action upon the material with which the roll contacts.

3. An improved spinning or drawing roll provided with a plurality of relatively thin spring-bars arranged in parallel spaced-apart relation on its periphery extending longitudinally thereof and adapted to flex radially inward toward its axis to effect a cushioning action upon the strand of material with which the roll contacts.

4. An improved spinning or drawing roll comprising cylindrical bosses provided with a plurality of relatively thin spring-bars on their peripheries, said bars held in spaced relation with the outer surface of the bosses and supported therefrom at their opposite ends to adapt them to flex radially inward to produce a cushioning effect on the material with which the roll contacts.

5. An improved spinning or drawing roll

comprising axially aligned cylindrical bosses provided with series of closely spaced parallel spring-bars extending longitudinally thereof and arranged in spaced relation with respect to the circumference of the bosses while being supported therefrom at their ends to adapt them to yield to effect a cushioning action on the material with which the roll contacts.

6. In a spinning or drawing roll, the combination with cylindrical bosses, of tubular shells fitted to the exterior of the bosses and provided with parallel slits forming a plurality of flexible spring-elements arranged in spaced relation with the peripheries of the bosses to adapt them to spring inwardly with respect thereto to effect a yielding contact upon the material drawing across the roll.

7. An improved spinning or drawing roll comprising cylindrical bosses provided with upstanding annular seats at their extremities and relatively narrow spring-bars extending substantially longitudinally of the bosses and supported at their ends by the raised seats to adapt them to flex radially inward to effect a cushioning action on the material with which the periphery of the roll contacts.

8. In a spinning or drawing roll, the combination with cylindrical bosses having annular raised seats at their ends, of a tubular shell fitted to the periphery of the seats and slitted between its ends to provide a plurality of flexible ribs adapted to flex radially inward to effect a yielding contact upon the material passing across the circumference of the roll.

9. In a spinning or drawing roll, the combination with cylindrical bosses, of tubular shells enclosing the peripheries thereof and slitted between their ends to provide a plurality of flexible spring-elements adapted to yield upon contact with the material drawing across the roll, and means for securing the sleeves against displacement on the bosses.

10. In a spinning or drawing roll, the combination of cylindrical bosses provided with raised annular seats at their ends formed with key slots therein, tubular shells fitted to the peripheries of the seats and formed with flexible spring-elements extending longitudinally therebetween, and means on the interior of the shells engaging the slots in the seats to hold the shells from turning on the bosses.

11. In a spinning or drawing roll, the combination of cylindrical bosses, tubular grill-like shells fitted to the exterior of the bosses and provided with flexible spring-bars spaced away from the peripheries of the bosses to adapt them to yield radially inward, said shells provided with projections on their interior adapted to engage recesses in the bosses to hold the shells in position thereon.

12. As a new article of manufacture, a flexible covering for spinning or drawing rolls consisting in a tubular shell provided with slits forming a plurality of flexible sections adapted to make yielding contact with the material drawing across the roll. ing substantially longitudinally of the boss and spaced above its peripheral surface between their ends whereby they are adapted to yield individually and independently to effect a cushioning action on the material passing across the roll.
13. In a roll of the character specified, the combination of a cylindrical boss, and a plurality of relatively thin spring-bars extending substantially longitudinally of the boss and spaced above its peripheral surface between their ends whereby they are adapted to yield individually and independently to effect a cushioning action on the material passing across the roll.

In testimony whereof I affix my signature.

LEON W. CAMPBELL.