L. W. CAMPBELL.

TOP ROLL.

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1,286,936. Patented Dec. 10, 1918.

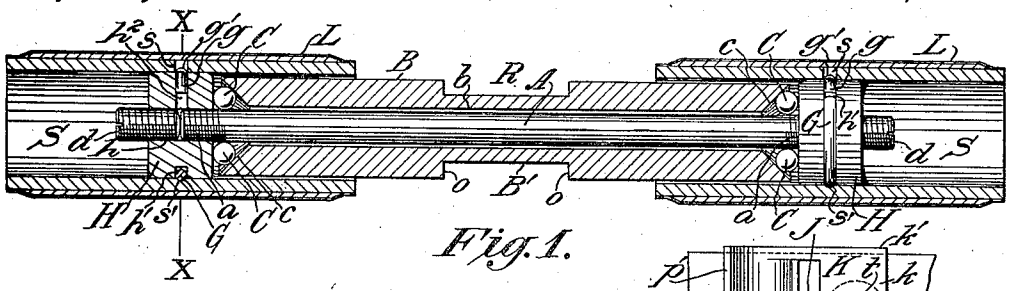


Fig. 1.

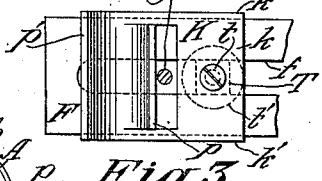


Fig. 3.

Fig. 2.

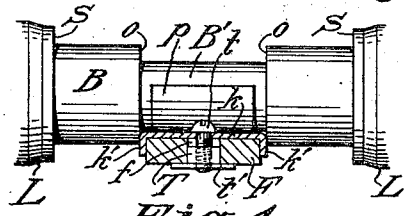


Fig. 4.

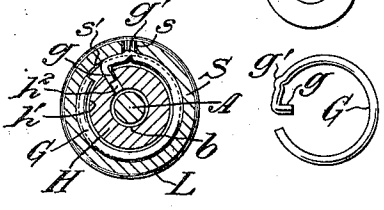


Fig. 5. Fig. 6.

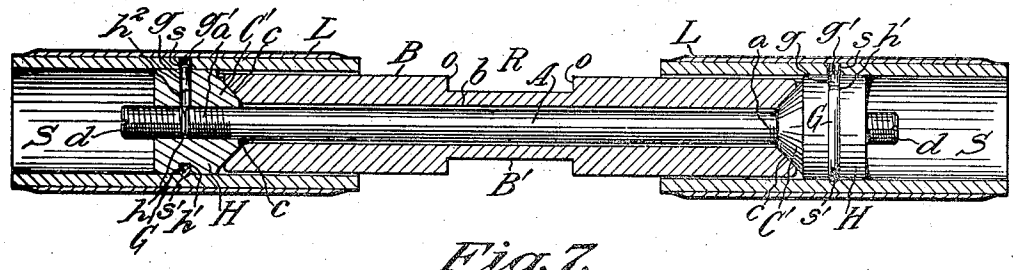


Fig. 7.

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TOP ROLL.

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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 Top Rolls, of which the following is a specification.

My invention relates to top-rolls for spinning-frames, drawing-frames, mules, speeders or other like textile apparatus, and consists of improvements in the construction and method of operation of the same. The object of my improvement is to provide a top-roll comprising spaced-apart, cylindrical end-shells connected by a rotary spindle or arbor journaled in anti-friction, oilless bearings. The essential feature of the improvement is the arrangement for connecting both end shells to rotate together through the means of the axial spindle journal in anti-friction bearings in a central support which carries the pressure-weights. Through this arrangement the peripheries of the shells are maintained in better contact with the lower driving-rolls against which they bear, and both shells are rotated together at a uniform speed without slippage or lost motion.

The manner and means for carrying out the improvement are fully described in the following specification, illustrated by the accompanying drawings, in which like reference characters designate like parts. In the drawings:—

Figure 1 is a longitudinal, sectional view of a top-roll illustrating one embodiment of the invention;

Fig. 2, a transverse, sectional view of a plurality of the rolls arranged in series and illustrating the improved means for supporting their central bearing-members;

Fig. 3, a plan view in detail of one of the roll-bearing supports or sockets;

Fig. 4, a transverse, sectional view of the same;

Fig. 5, a cross-sectional view through the end-shell of the roll taken on the line X—X of Fig. 1 and illustrating the means for frictionally clutching the shell to its supporting hub;

Fig. 6, a detail view of the spring-ring or clutch-device for the shell; and

Fig. 7, a view similar to Fig. 1 showing a modification in the construction of the roll-bearings.

Referring first to Fig. 1, my improved top-roll comprises essentially a central, stationary bearing-member or support B and two spaced-apart, cylindrical end-shells or rotary elements S, S which are adapted to be driven from the lower rolls of the machine through peripheral contact therewith. The member B is of cylindrical form and has a reduced section B′ at its center to adapt it to fit the socket in which it is held, as more fully described hereinafter. Extending longitudinally through the member B is an axial bore *b* of a size to adapt it to receive the spindle or arbor A with a slight clearance around its sides. The ends of the spindle A are screw-threaded at *a*, *a* to adapt them to be inserted in the threaded bores *h*, *h* of two cylindrical hubs H, H. After the hubs H have been screwed onto the ends of the spindle A, suitable set-screws *d*, *d* are screwed into the bores *h* from the opposite side to lock them in place by binding against the ends of the spindle. Between the inner faces of the hubs H, H and the ends of the member B are series of anti-friction balls C, C. The balls C are adapted to revolve in conical recesses *c*, *c* at the ends of the member B and are thereby held in place to provide a three-point bearing of usual arrangement. By releasing the set-screws *d* the hubs H may be adjusted longitudinally of the spindle A to provide the proper relation between their sides and the ends of the member B, and to compensate for wear on the bearings.

Each hub H is scored on its periphery with an annular groove *h′* in which is inserted the locking-ring or friction-clutch member G for the shell S. As shown in Figs. 5 and 6 the ring G is constructed of spring-wire having one end bent inwardly at *g* and inserted in a radial hole h^2 in the hub H. Adjacent the end *g* the wire is bent or crimped outwardly in an abutment *g′* which is adapted to snap into an opening or depression *s* on the interior of the shell S for a purpose as later explained.

The shells S, S are of cylindrical, sleeve-like form having coverings L of leather or other suitable material on their peripheral surfaces, as usually employed in this art. On the interior of each shell S is a relatively shallow, annular groove *s′* arranged centrally of its ends, and leading radially outward from the groove is the depression or hole *s*, previously referred to.

The shells S are fitted to the exterior of the hubs H surrounding the ends of the bearing-member B with a slight clearance

therebetween so as to permit them to rotate free thereof. As they are slid into place on the hubs H the rings G spring into their grooves s' to secure them longitudinally in place thereon. For this purpose the rings G are made slightly larger in diameter than that of the hubs H, but are adapted to contract radially into their grooves h' to allow for the insertion of the hubs into the sleeves S. After the sleeves S have thus been applied to their hubs H they are turned into position to bring the abutments g' on the rings G into register with the holes s in the shells. The spring-tension of the rings G will then cause the abutments g' to snap into the holes s to effect a friction-grip or clutch-action whereby the shells will be connected rotatively with the hubs. In this manner the shells S are both connected rotatively with the axial shaft or spindle A to turn therewith as the latter revolves in its bearings on the member B.

It is the usual practice to employ a plurality of top-rolls in series, spaced apart in parallel alinement in accordance with the setting of the lower, driving-rolls. These latter are spaced at varying intervals on different types of machines and I have provided an improved arrangement for adjusting the top-rolls in relation thereto as required. Fig. 2 illustrates three top-rolls R, R', R^2 set in accordance with the spacing of the lower drive-rolls D, D', D^2 which are represented by dash lines in this view. To provide for this adjustable setting of the top-rolls R, I employ a support or separator-bar F having spaced sockets K arranged along its top. The bar F is preferably of rectangular shape in cross-section and is supported at one end by an arm E which projects upwardly from a rod or other fixed part of the machine, not here shown. The bar F may be secured on the arm E by a bolt e or supported in any other suitable manner, and is formed with a central, longitudinal slot f extending substantially its whole length, see Figs. 3 and 4. The socket-members K are preferably constructed of sheet-metal with a plate k extending across the top of the bar F and bent down around its sides in the ears k', k', see Fig. 4. Cut away from the center of the plate k is a portion p bent upwardly into a rounded lip which forms one half of the socket to which the upwardly curved end p' of the plate k is the complement. In this manner the two sides p, p' provide a semi-cylindrical seat or bearing for receiving the central, reduced section B' of the member B, the shoulders o, o of which abut the sides of the socket to hold it against longitudinal displacement therein.

The socket-members K are secured to the bar F by means of screws t reaching down through the slot f and screwed into nuts T. The nuts T have square bodies fitted to the slot f to prevent them from turning therein, and flanges t' which abut the under side of the bar F in binding engagement therewith to clamp the members K, K in position thereon. By releasing the screws t the socket-members K may be slid along the bar F to adjust the position of the top-rolls R in relation to their respective, lower drive-rolls D. For holding the members B in their sockets K a wire hook J is employed arranged with its end hooked over the top of the member B and with weights, not herein shown, at the bottom acting to draw the top-rolls R down into driving contact with the lower rolls D.

In Fig. 7 I have illustrated another embodiment of the invention in which the ball-bearings for the end-hubs H are dispensed with. In this modification the central bearing-member B is constructed of wood or composition, specially treated to provide oilless bearings for the parts which rotate thereagainst. Such a form of bearing-material generally used in the mechanical arts is known as "Arguto" and has been found well adapted for the present purpose. With this construction the ends of the member B are provided with conical recesses c, c, as shown in Fig. 1, but the balls C, C are displaced by cones C', C' formed on the sides of the hubs H, H. The cones C', C' rotate freely within the recesses c, c as the hubs H, H turn with the spindle A under the driving action of the shells S, S carried thereby. No lubricant is required for the bearings, but to compensate for any slight wear after long use the hubs H may be adjusted inwardly on the spindle A as in the case with the ball-bearings shown in Fig. 1.

In applying my improved top-roll R to use the shells or sleeves S, S are slipped on over their hubs H, H until the clutch-rings G seat in their interior grooves s'. The shells S are then adjusted to allow the abutments g' on the rings G to enter their openings s, and in this manner they will be clutched to their hubs H to connect them rotatively with the shaft or spindle A. This form of connection allows for convenient removal of the shells S for recovering or replacement. The bearing-members B are next seated in their sockets K and the latter adjusted in position along the separator-bar or support F in accordance with the relation of the lower rolls D with which the top-rolls R coöperate. After the sockets K have been clamped in place on the bar F, in the manner as previously explained, the weighted hooks J are applied to the bearing-members B and the whole mechanism is then ready for operation. When the machine is started the lower rolls D are rotated to drive the rolls R, through the frictional contact of their peripheries, and the sliver

or other fiber is drawn through them in the usual manner as well known in the art. The two end-shells S, S rotate freely on their antifriction bearings and it is to be particularly noted that both shells must rotate together since they are positively connected by the axial spindle A. Through this provision a much smoother and more uniform movement is given to each top-roll, since if the driving contact at one end is lessened the opposite shell will still act to drive its companion without slippage or lost motion. At the same time the bearing-member B, being supported at its center only, allows the roll to tilt or rock slightly under its load to provide for variations in the thickness of the material passing under the rolls at their opposite ends. Another important feature of the improvement resides in the fact that the load which acts to hold the top-rolls down against their drive-rolls is not supported on the axial spindle or arbor, but by the member B, the thrust being taken through the widely separated end-bearings which are of such a type as to prevent friction or binding. For this reason my improved roll is much easier running than the usual type, although it requires no oil or other lubricant for its bearings. This latter feature is important as guarding against soiling the yarn fibers or injuring the surface of the rolls. It will also be noted that the roll-bearings are completely protected from the insinuation of dirt, lint, or other accumulations liable to interfere with their action, and hence the whole roll is much more efficient and durable in use. My improved means for adjusting the relative position of the rolls is exceedingly simple in construction and economical to manufacture, while providing a maximum of convenience to operate.

Various modifications might be made in the form and structure of the parts of my improved device without departing from the spirit or scope of the invention; therefore, without limiting myself to the exact embodiment shown and described, what I claim is:—

1. An improved top-roll comprising a cylindrical bearing-member formed with an axial bore, a spindle extending through the bore free from the sides thereof, hubs fixedly secured to the ends of said spindle to rotate therewith, anti-friction bearings between the hubs and the ends of the bearing-member, and cylindrical shells detachably mounted on the hubs to adapt them to rotate therewith while allowing them to be removed therefrom.

2. An improved top-roll comprising a central fixed bearing-member, bearings at the opposite ends of said member, an axial spindle journaled in said bearings, hubs fast on the ends of said spindle to rotate therewith, cylindrical shells fitted to the peripheries of the hubs, and resilient-means for engaging the shells with their hubs to hold them rotatively therewith and longitudinally thereof while allowing them to be removed therefrom.

3. An improved top-roll comprising a cylindrical bearing-member formed with an axial bore and conical seats at its opposite ends, a spindle extending through the bore free from the sides thereof, hubs on the ends of the spindle, means for adjusting the hubs longitudinally of the spindle, balls revoluble between the hubs and the end-seats on the bearing-member, and cylindrical shells fitted to the peripheries of the hubs.

4. An improved top-roll comprising a central fixed bearing-member, an axial spindle journaled in bearings in said member, hubs fast on the ends of said spindle, shells fitted to the peripheries of said hubs, and expansible spring-rings held in circumferential grooves on the hubs to adapt them to engage interior annular grooves on the shells to connect the latter rotatively with the spindle.

5. The combination with a top-roll comprising a central bearing-member, a spindle journaled in bearings in said member and cylindrical shells connected rotatively to the ends of the spindle, of a supporting-bar, a socket-member adjustable along the bar and formed with a seat for receiving the bearing-member, and a weight-hook suspended from the bearing-member to hold it in the socket.

6. The combination with a top-roll comprising a central cylindrical bearing-member, a spindle journaled in bearings in said member and rotary shells carried at the ends of said spindle, of a supporting-bar, a socket-member slidable along the bar and formed with a semi-cylindrical seat for the bearing-member, means to clamp the socket-member in position on the bar, and a weight-hook suspended from the bearing-member to hold it in its socket.

7. The combination with a top-roll having spaced-apart rotary elements supported by a central fixed bearing-member of a supporting-bar, a socket-member having a seat for receiving the bearing-member and fitted to the bar to slide therealong, and means for clamping the socket-member in different positions on the bar.

In testimony whereof I affix my signature.

LEON W. CAMPBELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."