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TOP ROLL

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Fig. 1.

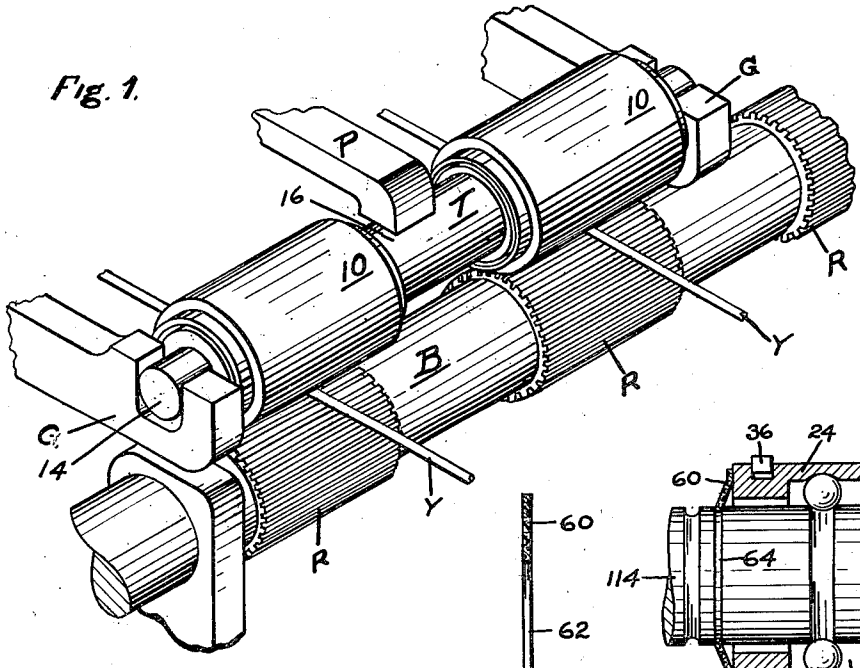


Fig. 4.

Fig. 3.

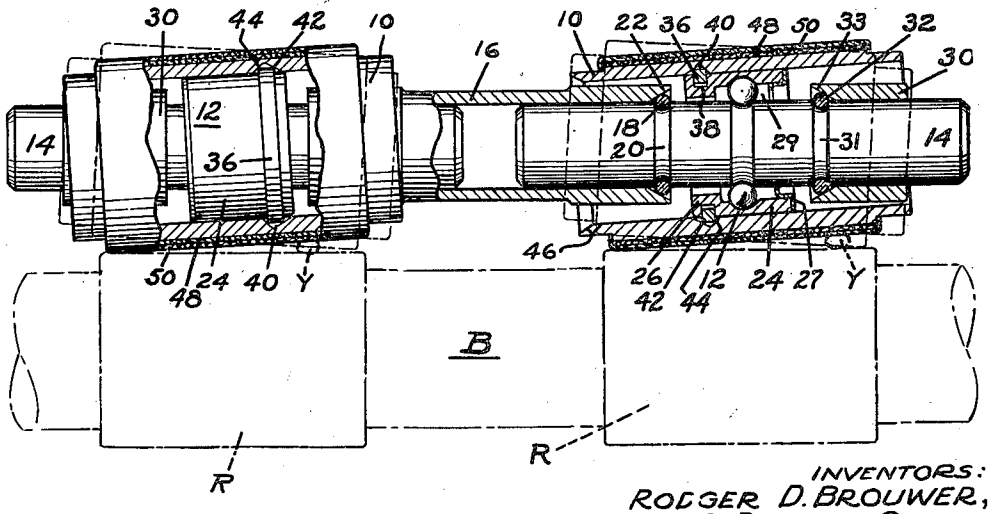


Fig. 2.

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TOP ROLL

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10 Claims. (Cl. 19—142)

This invention relates to top rolls for attenuating machinery in the textile industry, and particularly to top rolls for spinning frames, drawing frames and similar machinery wherein a plurality of strips of yarn are simultaneously stretched and reduced in size by passing the yarn between top and bottom rolls urged into rolling contact.

One object is to provide an easily assembled, simple top roll construction that has quickly removable, interchangeable roll shells which automatically and individually adjust themselves to apply uniform pressures to strips of yarn of varying thickness, and a further object is to provide a top roll in which the roll shells are supported by antifriction, precision bearings so constructed that lubricant is kept in the bearings and will not crawl out onto the yarn engaging faces of the roll shells.

To these ends, and also to improve generally upon devices of the character indicated, the invention consists in the various matters hereinafter described and claimed.

In the accompanying drawing:

Figure 1 is a perspective view illustrating an application of this invention;

Figure 2 is an enlarged side elevation of the top roll which has parts broken away and illustrated in longitudinal section to show the construction;

Figure 3 is a fragmentary showing in longitudinal section of another embodiment; and

Figure 4 is an enlarged diametrical section through the seal employed in the embodiment shown in Figure 3.

Generally stated, in the embodiments here illustrated the top roll T has spaced interchangeable roll shells 10 detachably mounted on the ball bearings 12 for individually rotating and longitudinally rocking movements, the inner race rings 14 of the bearings being rigidly connected by a sleeve 16 and slidably received at the outer ends of the roll for vertical movements in the guides G, so that a pressure arm P engaging the sleeve 16 will urge the top roll T into rolling contact with a driven bottom roll B, and strips of yarn Y, respectively fed between the roll shells 10 and the bottom roll portions R, will be subjected to uniform pressures, even when variations in size of one of the strips are encountered, since the roll shells 10 will individually rock and adapt themselves to the changes in yarn thickness.

The top roll T, which is similarly constructed at each side of the pressure arm P with the corresponding parts mounted in reversed relation, has the inner ends of the non-rotatable shafts 14, forming the inner race rings, tightly pressed in the sleeve 16, and the snap-rings 18 supported in the race ring grooves 20 are wedged against the internally bevelled ends 22 of the sleeve bore to locate the inner race rings 14 in the sleeve 16. The bushings 30, pressed onto the race rings 14 near their outer ends, are located between the guides G to substantially prevent endwise movement of the top roll T, and the inner ends of these bushings have conical reentrant faces 33 which compressively engage the snap-rings 32 mounted in the grooves 31 to locate the bushings.

The antifriction bearing 12 is a unit-handling, factory assembled, precision ball bearing provided with an outer race ring 24 upon which the roll shell 10 is slidably and substantially centrally received with its ends overlying the end of the sleeve 16 and the bushing 30 in spaced relation to provide for ample individually rocking movements of the roll shells as shown, it being understood that the raceways of the ball bearing are so shaped as to allow for rocking movements of the outer race ring 24 on the bearing balls. With this construction the roll shells 10 will independently rock and accommodate themselves to variations in the yarn thickness, and an enlarged portion of yarn which passes between one roll shell 10 and a bottom roll portion R will not alter the effective engagement or pressure applied to another strip of yarn simultaneously engaged by the other roll shell 10. The outer race ring 24 is substantially closed at one end by a flange 26 and at its other end by an annular shield 27 pressed into position so that a non-fluid lubricant will be kept in the bearing chamber 29, it being understood that the flange and shield are sufficiently spaced from the inner race ring 14 to permit the necessary rocking movements.

The roll shell 10 is removably locked in position by an expansible snap-ring 36 of substantially rectangular cross section and slidably mounted in the external peripheral groove 38 in the outer race ring 24, this groove being substantially rectangular in cross section and of such depth that the snap-ring 36 may be compressed to lie completely within the groove 38. Internally of the roll shell 10 is a peripheral V-shaped groove 40 provided with a camming face 42 and an abutment face 44, these faces cooperatively engaging the outer edges of the snap-ring 36 to demountably lock the roll shell 10 on the bearing. The cam face 42, which forms the side of the groove 40 nearer the inner end of the roll shell 10, has such an inclination that a sudden outward pull on the roll shell will cam the snap-ring 36 completely into the groove 38 after which the roll

shell may be easily withdrawn from the outer race ring 24, and the abutment face 44 is of a sufficiently steep inclination to prevent further inward movement of the roll shell after the snap-ring 36 is received in the groove 40. The inner end of the roll shell 10 is internally bevelled at 46 so that as a roll shell is pushed onto the outer race ring 24 the snap-ring 36 will be compressed sufficiently to allow the roll shell to be easily slid over the snap-ring to the locking position.

The roll shell 10 may be provided with a yieldable outer covering such as a peripherally wound cloth backing strip 48 over which is wound a leather covering strip 50, these strips being cemented in position. These coverings wear rapidly and may be quickly and easily replaced with a minimum loss of machine operating time by interchanging freshly covered roll shells for the roll shells having worn coverings.

Figures 3 and 4 show another embodiment which differs from that previously described in that a pliant sealing ring 60 is also applied between each end of the outer race ring 24 and the inner race ring 114 to completely seal the lubricant chamber 29. These rings 60 preferably consist of thin annular discs of yieldable material, such as leather, fitted over the inner race ring 114 and received in the inner race ring grooves 64 spaced from the ends of the outer race ring 24. The bore 62 through each sealing ring 60 is of lesser diameter than the diameter at the bottom of the groove 64 so that when the initially flat sealing rings 60 are stretched into their respective grooves 64, they will laterally deform into peripheral, wiping, sealing contact with the inner end of the race ring 24 and with the outer flanged end 28 of the shield 27 which tightly seats against the end of the race ring 24.

We claim:

1. In a device of the character indicated, a bearing having relatively rotatable inner and outer race rings, the outer race ring being also arranged for longitudinal rocking movement, a roll shell slidably mounted on the outer race ring, and means on the outer race ring for removably fastening the shell to said outer race ring for movement therewith; substantially as described.

2. In a device of the character indicated, a pair of opposed shafts, a sleeve receiving the ends of the shafts, means locking said elements together, and interchangeable roll shells demountably and respectively supported on said shafts for independently rotatable and rocking movements; substantially as described.

3. In a device of the character indicated, a pair of shafts, a sleeve receiving the opposed ends of the shafts, means locking said elements together, spaced race rings respectively mounted for individually rotatable movements about said shafts, and interchangeable roll shells demountably fastened to the race rings; substantially as described.

4. In a device of the character indicated, a pair of shafts, a sleeve receiving the inner ends of the shafts, snap-rings on the shafts and engageable with the sleeve for locking said elements together, rotatable members respectively mounted on the shafts intermediate the shaft ends and arranged for longitudinal rocking movements, and roll shells respectively demountably secured to said rotatable members; substantially as described.

5. In a device of the character indicated, a pair of shafts, a sleeve coaxially receiving the inner ends of said shafts, bevelled faces on the ends of the sleeve, snap-rings carried by the shafts and wedged against said faces for locking the elements together, and roll shells demountably supported about the shafts for individual rotational and tilting movements; substantially as described.

6. In a device of the character indicated, a pair of shafts, a sleeve rigidly interconnecting the inner ends of the shafts, bushings secured about the shafts near the outer ends of the shafts, members rotatably and tiltably mounted on the shafts between the sleeve and said bushings, and interchangeable roll shells slidably and demountably fastened to said members; substantially as described.

7. In a device of the character indicated, a pair of opposed shafts, a sleeve rigidly interconnecting the inner ends of the shafts, bushings respectively secured about the shafts near the outer ends of the shafts, snap-rings mounted on the shafts and respectively securing the elements together in predetermined positions, race rings respectively mounted on the shafts between the bushings and said sleeve ends for individually rotating and rocking movements, and roll shells demountably secured to said race rings and overlying the sleeve and bushings; substantially as described.

8. In a device of the character indicated, a shaft, a sleeve member arranged for rotational and longitudinal rocking movements about said shaft, flexible sealing means between said member and the shaft, and a roll shell demountably secured on the sleeve member; substantially as described.

9. In a device of the character indicated, a shaft, a race ring about the shaft and arranged for rotary and longitudinally rocking movements, said shaft having peripheral grooves near the respective ends of said race ring, yieldable sealing members respectively seated in said grooves and peripherally engaging the race ring, and a roll shell demountably secured on the race ring; substantially as described.

10. In a device of the character indicated, a shaft, a race ring mounted on the shaft intermediate of the ends of the shaft for rotary and longitudinally rocking movements, said shaft having peripheral grooves respectively adjacent the ends of the race ring, and a yieldable annular member seated in each groove, said members having bores of lesser diameter than the diameter of the respective grooves in which they are received, whereby the members will be laterally deformed into peripheral sealing engagement with the race ring; substantially as described.

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