

Sept. 16, 1941.

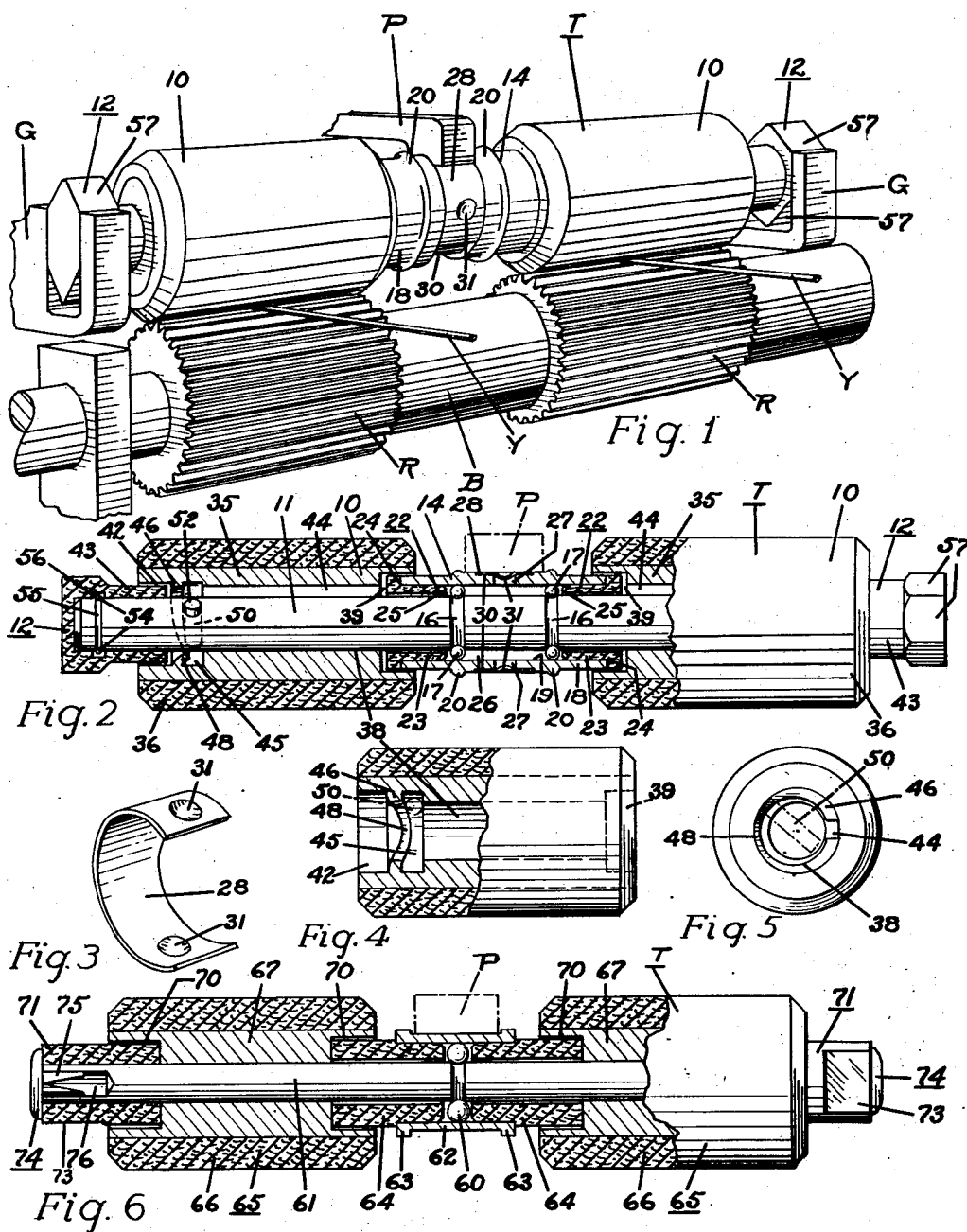
L. D. COBB

2,256,193

TOP ROLL

Filed Aug. 10, 1939

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

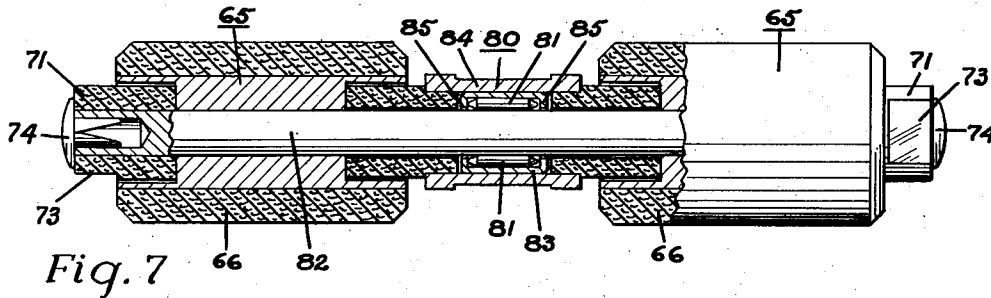


Fig. 7

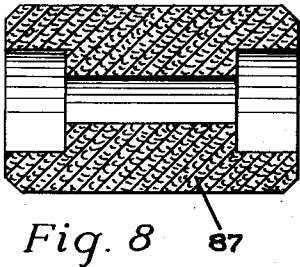


Fig. 8

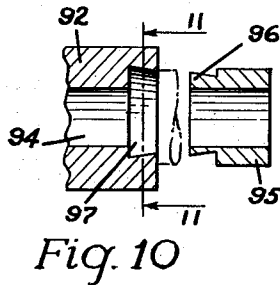


Fig. 10

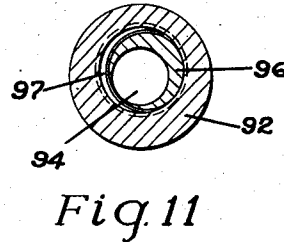


Fig. 11

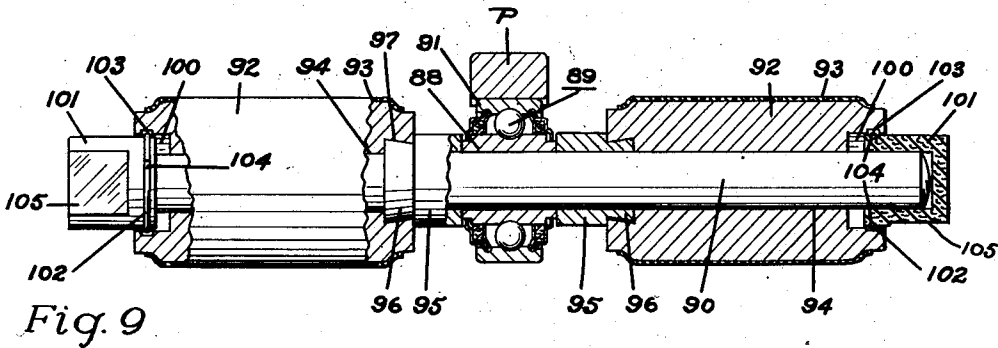


Fig. 9

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UNITED STATES PATENT OFFICE

2,256,193

TOP ROLL

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Application August 10, 1939, Serial No. 289,332

11 Claims. (Cl. 19—142)

This invention relates to top rolls for spinning frames, drawing frames and other like machinery wherein a thread of yarn is stretched and reduced in size by passing it between top and bottom rolls that are urged into rolling contact.

One object of this invention is to provide an improved top roll of simple construction that has easily demountable interchangeable roll members. Another object is to provide a top roll wherein the roll members are supported by a single antifriction bearing so constructed that lubricant cannot escape from the bearing onto the work engaging surfaces of the rolls.

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 drawings:

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

Figure 2 is a longitudinal section through the top roll.

Figure 3 is a perspective view showing the oil hole closure member;

Figure 4 is a fragmentary view partly in longitudinal diametrical section through a roll hub;

Figure 5 is an end view of the roll hub;

Figure 6 is a longitudinal section through another embodiment of my top roll;

Figure 7 is a longitudinal section through another embodiment of my invention;

Figure 8 is an enlarged sectional view of a different roll member;

Figure 9 is a fragmentary longitudinal section showing another embodiment of my invention;

Figure 10 is a fragmentary sectional view showing the structure for demountably securing the roll member of Figure 9 in position; and

Figure 11 is an enlarged cross section taken along the line 11—11 of Figure 10 and looking in the direction of the arrows.

Generally stated, in the embodiments here illustrated, a top roll unit, as T, has quickly and easily demountable, interchangeable roll members, as 10, spaced on a shaft, as 11, rotatable in the end caps, as 12, that non-rotatably engage and vertically slide in the slotted guides G which prevent skewing of the top roll T with respect to a driven bottom roll B with which the top roll T is normally urged into rolling engagement. An antifriction bearing, as 14, located on the shaft 11 between the roll members 10, is engaged under suitable yieldable pressure by an arm P so that a uniform controlled pressure may be applied to the thread or yarn Y that is fed between each

of the top roll members 10 and the similarly positioned bottom roll members R. The antifriction bearing is so constructed that lubricant cannot escape therefrom and onto the yarn engaging faces of the top and the bottom rolls or into the guides G where it would rapidly collect lint and interfere with the top roll operation.

Referring in detail to the embodiment shown in the Figures 1 and 2 of the drawings, the shaft 11, which forms the inner race member of the antifriction bearing 14, has the spaced raceways 16 in which roll the balls 17 that are also in rolling engagement with the inner cylindrical wall 19 of the annular outer race member 18 that has the spaced peripherally disposed ribs 20 at each side of the pressure arm P. A pair of similar stepped sleeves 22 surround the shaft 11 in closely spaced relation to the shaft and have their opposed, reduced inner ends 23 pressed into the outer ends of the race ring 18 with their intermediate locating shoulders 24 abutted against the ends of the race ring 18 and their inner end faces 25 adjacent to the balls 17. This construction provides a simple and efficient unit-handling shaft and bearing structure wherein the sleeves 22 effectively close the ends of the ball chamber 26 which may be charged with a suitable lubricant through one of the oil holes 27 that extend through the member 18 between the ball races. A resilient C-shaped closure member 28, slidably fitted in the peripheral groove 30 in the outer race ring 18, may be turned to provide convenient access to one of the oil holes 27, and the member 28 has a pair of inwardly directed depressed portions 31 arranged to slidably snap into seated sealing engagement with these holes 27.

The sleeves 22 are preferably composed of any suitable lubricant impregnated material, such, for example, as a molded fibrous material commonly known under the trade name of "Textolite" and impregnated with graphite. For clarity of illustration, the annular space between the sleeves 22 and the shaft is exaggerated, but this spacing is sufficiently small to normally preclude lubricant leakage therethrough. In the event that the antifriction bearing should break due to lack of lubrication, the sleeves 22 would act in the capacity of well lubricated plain bearings so that the shaft 11 and the rolls 10 would continue to freely turn until the antifriction bearing could be repaired.

The interchangeable roll members 10 have annular hubs 35 upon which are secured the replaceable tubular cots 36 that may be composed of rubber, leather, cork or other suitably yield-

able material. I preferably removably secure the hubs 35 to the shaft 11 at each side of the bearing 14 so that these hubs may turn as a unit with the shaft. A bore 38 that axially extends through each hub 35, slidably receives the shaft 11, and the inner and outside ends of this bore respectively terminate in the counterbores 39 and 42 which are of such size that each hub 35 closely overlies in spaced relation the end of the bearing 14 and the reduced portion 43 of the cap 12. A keyway 44 extends between the counterbores 39 and 42, and the outer end of the hub 35 has a peripheral groove 45 spaced from the bottom of the counterbore 42 by an annular wall 46 through which the keyway passes. A portion of the wall 46 is struck into the groove 45 at 48 and a locating pin 50, pressed into a transverse bore in the shaft 11, has a head 52 extending from the shaft and receivable in the groove 45 to axially position the roll member 10. To demountably assemble the rolls on the shaft 11, each hub 35 is slid over the shaft with the keyway 44 receiving the head 52, and when this head is received within the groove 45, the roll is turned on the shaft until the head enters into wedged driven engagement with the struck-in portion 48. It will be appreciated that if it is desired to permit relative rotation of the roll members 10 on the shaft 11, the pins 50 need not be used.

The end caps 12, which are generally cup-shaped to rotatably receive the ends of the shafts 11, are preferably composed of a suitable, lubricant impregnated material, such as "Textolite," and a C-shaped snap ring 54 removably engages within a ring groove 55 in the shaft and in an annular groove 56 in the end cap 12. One of the ends of the snap ring 54 is preferably straightened so that the ring will resiliently engage the groove 56 and stay in this groove 56 when the cap is pulled off of the shaft 11. The outer end of the cap 12 is enlarged and shaped as a polygon having the parallel opposed faces 57 that slidably engage the side walls of the guides G. With this construction, in the event that two of the faces 57 become worn, the cap 12 may be lifted from its seated position and turned to locate two other faces in slidable engagement in the guide G.

Figure 6 shows another embodiment of my invention wherein the antifriction bearing of Figure 2 is replaced by a generally similar bearing construction which has only a single row of balls 60 rolling in a substantially centrally disposed raceway of the shaft 61 and in an outer race ring 62 that receives the pressure arm P between the end flanges 63. The stepped sleeves 64 composed of a suitable lubricant impregnated material and generally similar to the sleeves 22 of Figure 1, close the ends of the bearing and surround the shaft 61 in closely spaced relation. The rolls 65 are provided with the usual tubular cots 66 mounted on the annular hubs 67 that are removably journaled on the shaft 61 at each side of the antifriction bearing, and these rolls, which are interchangeable and reversible, have the similar end counterbores 70 that respectively receive the inner ends of the end caps 71 and the ends of the sleeves 64. The end caps 71, which may be composed of a suitable lubricant impregnated material as "Textolite," are respectively journaled throughout their lengths on the ends of the shaft 61 and have the flat faces 73 for engagement with a side face of each guide G to prevent rotation of these caps 71 while they are

freely slidable in the guides G. Each cap is removably held on the shaft end by a stud 74 provided with a head that overlies the end of the cap 71, and a split post 75 on the stud extends into frictional engagement within an end bore 76 in the shaft 61.

Figure 7 shows a slightly different embodiment wherein my top roll construction differs only from the structure of Figure 6 in that the central antifriction bearing 80 is of the so-called "needle type." In this structure, a large number of cylindrical rollers 81, which are of a very small diameter as compared to their lengths, are in freely rolling contact with the shaft 82 and with a tubular casing 83 upon which the outer race sleeve 84 is mounted. The ends of the casing 83 are curled over at 85 to axially restrict the rollers 81, and these rollers are preferably provided with tapered ends to reduce their end frictional engagement with the casing. The sleeve 84 is flanged at its ends and the pressure arm P is received between these flanges.

Figure 8 shows a different roll member 87 which may replace the roll member 65. In this construction the roll 87 is shaped generally similar to the combined hub 67 and cot 66 but is entirely composed of a yieldable material such as cork, rubber or other suitable material that will meet the requirements of the cot 66. If desired, the interior of the roll member 87 may be coated with a phenolic condensation product, such as "Bakelite," or a similar material which will strengthen the member and aid its bearing properties on the shaft.

Figures 9, 10 and 11 illustrate another embodiment of this invention wherein the inner race ring 88 of a unit-handling sealed ball bearing 89 is pressed onto the substantially central portion of the shaft 90. This sealed bearing, which may be generally similar to that disclosed in the United States patent to Large, No. 1,917,988 and issued on July 11, 1933, has the pressure arm P bearing upon the outer race ring 91 to urge the top roll unit into the desired position. A pair of interchangeable roll members 92, provided with the usual yieldable tubular cots 93 are axially bored at 94 to demountably and respectively fit over the shaft 90 at each side of the bearing 89.

A pair of locking sleeves 95, respectively pressed over the shaft 90 in driving engagement therewith at each side of the bearing 89, are each provided with an annular eccentric dovetailed portion 96 that is matingly received in demountable interlocking engagement within a generally similarly shaped eccentric annular recess 97 at the inner end of each roll member 92. Each recess 97 is of a sufficiently large size so that the dovetailed portion 96 may be entered therein when the eccentric mating portions 96 and 97 are coaxially aligned, and a relative turning of these interfitted parts enters them into a tightly wedged interlocked relation wherein the roll members 92 are constrained to turn as a unit with the shaft 90.

The outer ends of the roll members 92 are counterbored at 100, and the end caps 101, journaled on the shaft ends, extend into the counterbores 100 in spaced relation to the roll members 92. Snap rings 102 removably fit in the grooves 103 and 104 in the caps 101 and in the roll members 92 to secure the caps 101 in position, and each cap has a flat face 105 slidably engageable with the side of the guide member G to prevent cap rotation when the top roll is mounted in position. These end caps 101 are preferably composed

of a suitable lubricant impregnated molded material, such as "Textolite."

I claim:

1. In a top roll for textile machinery, a shaft, an antifriction bearing arranged to be handled as a unit with the shaft, roll members removably mounted on the shaft at each side of the bearing, and end caps demountably locked in journalled engagement with the ends of said shaft which project out of said rolls.

2. In a top roll for textile machinery, a pair of spaced rolls, a shaft axially extending completely through the rolls, means demountably locking said rolls against relative rotation and in predetermined positions on said shaft, an antifriction bearing arranged to be handled as a unit with the shaft between said rolls, and end caps demountably locked in respectively rotatable engagement with the ends of said shaft.

3. In a top roll for textile machinery, an antifriction bearing comprising an outer race ring, an inner race member extending through said outer race ring, rolling elements between said rings, and roll members removably mounted on said inner race member at each side of the outer race ring.

4. In a top roll for textile machinery, an outer race member, an inner race member extending therethrough, rolling elements in rotatable engagement with said members, and lubricant impregnated sleeves respectively carried by the ends of the outer race ring and in closely spaced surrounding relation to said inner race member, said sleeves substantially closing the ends of the space between said race members.

5. In a top roll for textile machinery, an outer race ring, a shaft extending therethrough and having a ball groove, balls in said groove and in rolling engagement with the outer race ring, and sleeves pressed into the ends of the outer race ring, said sleeves holding all of said members assembled for handling as a unit.

6. In a top roll for textile machinery, an outer race ring, a shaft extending therethrough and having a peripheral ball groove, balls in the groove and rotatably engaging the race ring and said shaft, stepped lubricant impregnated sleeves pressed into the ends of the outer race ring and in closely spaced annular relation to the shaft, and rolls demountably secured on the shaft at each end of said outer race ring.

7. In a top roll for textile machinery, an outer race ring, projections on the ring for locating engagement with a pressure member, a shaft extending through the race ring, rolling elements between the shaft and said ring, lubricant impregnated sleeves pressed into the ends of the race ring and surrounding said shaft, and closure means providing for access of lubricant through the race ring to said rolling elements.

8. In a top roll for textile machinery, an outer race member, an inner race member laterally projecting therefrom, rolling elements between and in rotatable engagement with said race members, and a non-metallic lubricant impregnated sleeve pressed into each end of the outer race member adjacent said rolling elements, the sleeve closely surrounding the inner race member and providing an emergency bearing in the event of breakage of said rolling elements.

9. In a top roll for textile machinery, a shaft, a pin laterally protruding from the shaft, a roll member demountable on the shaft and having a keyway and an annular groove for receiving said protruding portion of the pin, and an annular wall in the roll at one side of said groove and having a portion bent into the groove for wedged engagement with the pin, whereby the roll is removably locked in shaft-driving relation.

10. In a top roll for textile machinery, a pair of spaced rolls, a shaft extending therethrough, lubricant impregnated cap members journalled on the ends of the shaft and extending within said rolls, means removably securing the caps on the shaft, and parallel opposed faces on the outer ends of the caps.

11. In a top roll for textile machinery, an outer race ring, a shaft extending therethrough and having a pair of spaced ball grooves, rows of balls in said grooves and in rolling engagement with said race ring, sleeve members substantially closing the space between the outer ends of the race ring and said shaft, said race ring being peripherally and externally grooved between the rows of balls and having a transverse bore extending from the groove into the ball chamber, and a C-shaped resilient member slidable in the groove and provided with a depressed portion for removably seating in and closing said bore.

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