May 13, 1952 V. A. HANSON 2,596,334

TOP ROLL STRUCTURE

Filed May 7, 1951 2 SHEETS—SHEET 1

FIG 1

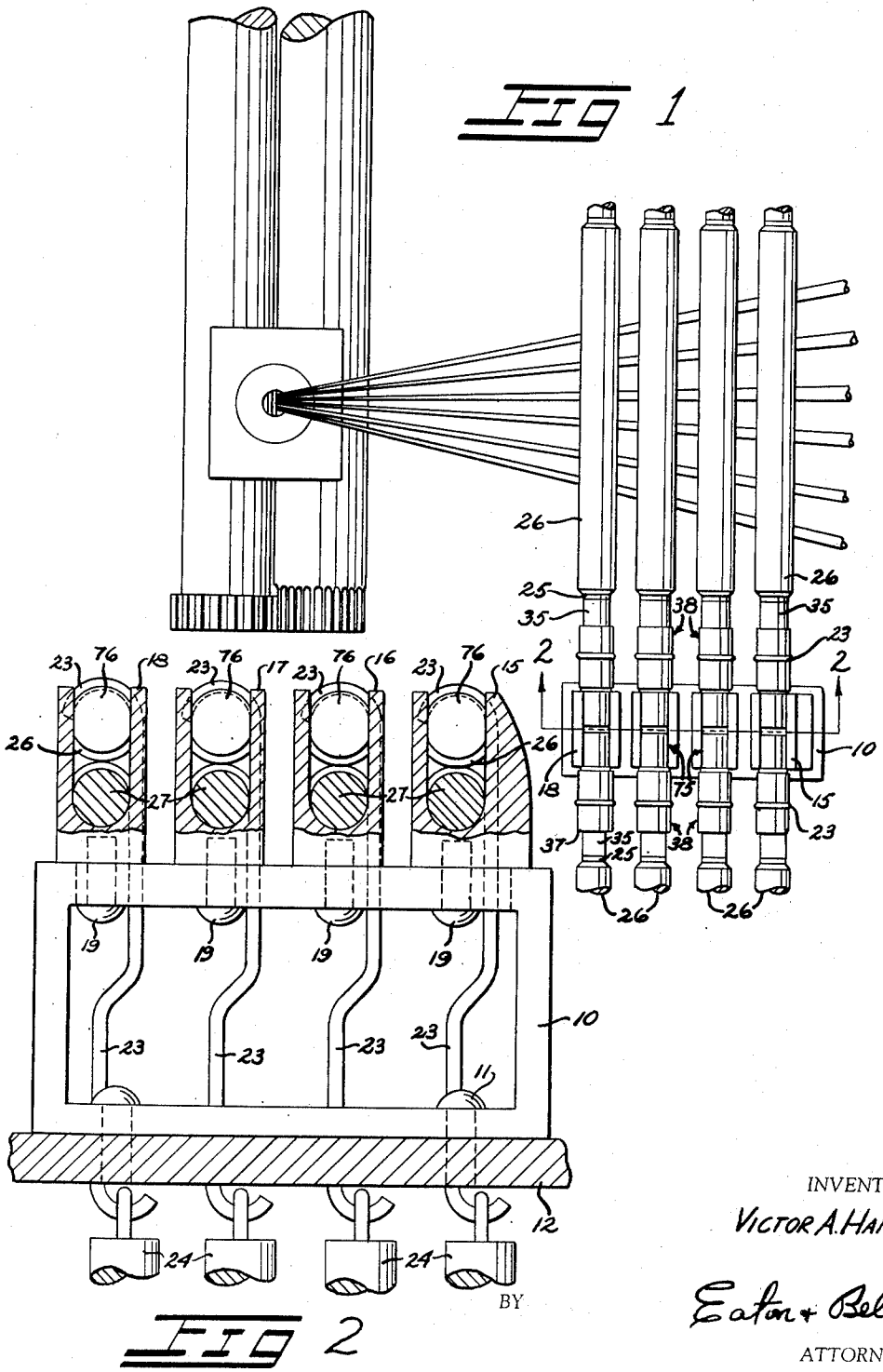


FIG 2

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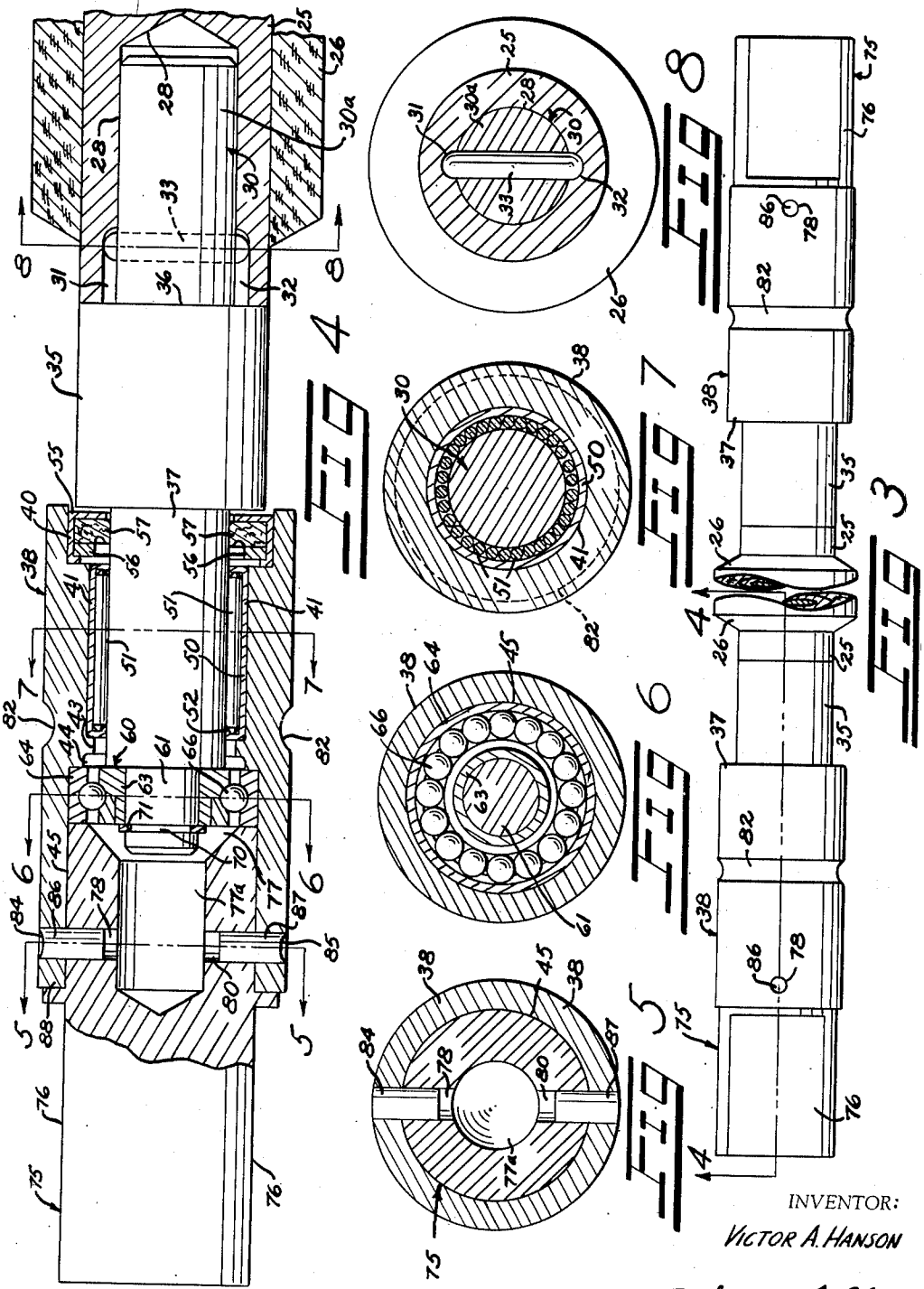


FIG 4

FIG 8

FIG 7

FIG 3

FIG 6

FIG 5

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TOP ROLL STRUCTURE

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7 Claims. (Cl. 19—142)

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This invention relates to an improved top roll structure for drawing frames, spinning frames and the like and is more especially related to an apparatus for joining sections of rolls together and at the same time providing an improved bearing for the ends of the sections of rolls at the point adjacent where the ends of the rolls are mounted in bearing stands.

It is an object of this invention to provide an improved top roll wherein each end of the top roll has a specific bearing structure to provide an anti-friction bearing and connection between the ends of the top rolls and a flattened member which has non-rotating movement in a bearing stand on a drawing frame and the like.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which—

Figure 1 is a top plan view showing a portion of a drawing frame and one of the sets of bearing stands therefor;

Figure 2 is an enlarged vertical sectional view taken along the line 2—2 in Figure 1;

Figure 3 is an elevation of a top roll section having the central portion thereof broken away and showing the two ends thereof in which the invention lies;

Figure 4 is an enlarged longitudinal sectional view taken substantially along the line 4—4 in Figure 3;

Figure 5 is a vertical sectional view taken along the line 5—5 in Figure 4;

Figure 6 is a vertical sectional view taken along the line 6—6 in Figure 4;

Figure 7 is a vertical sectional view taken along the line 7—7 in Figure 4;

Figure 8 is a vertical sectional view taken along the line 8—8 in Figure 4.

Referring more specifically to the drawings, the numeral 10 indicates a bearing stand, which is usually rectangular, and has its lower side suitably secured by screws 11 in a main frame 12 of a drawing frame and the like. This bearing stand has a plurality of bearing blocks 15, 16, 17 and 18 secured to the upper portion thereof by any suitable means such as screws 19 which are threadably embedded in the lower portions of the bearing blocks 15 to 18, inclusive.

The main frame 12 is slidably penetrated by suitable double-ended hook members 23 having suitable weights 24 releasably secured to their lower ends and their upper ends being adapted to be hooked over the ends of the top rolls in a suitable peripheral groove to be hereinafter described.

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Each of the top rolls comprises an elongated main portion 25 having an elongated cot of cork, synthetic rubber and the like, indicated at 26 which is adapted to be pressed against corresponding bottom rolls, indicated at 27, by the weights 24. The main portion 25 has a bore 28 milled in each end thereof (Figures 4 and 8) into which is secured, as by a pressed fit, a reduced end portion 30*a* of a shaft 30. The bore 28 has a pair of grooves or keyways 31 and 32 preferably disposed 180 degrees from each other and the portion 30*a* of the shaft 30 has a pin 33 fixed therein, as by a pressed fit, whose ends project beyond the periphery of the shaft 30 and are adapted to slide in the keyways or grooves 31 and 32 to prevent relative rotation between the main shaft 25 and the shaft 30 in the event the pressed fit of the portion 30*a* of the shaft 30 in the bore 28 should not be sufficient to prevent relative rotation between the shafts 25 and 30.

The shaft 30 also has integral therewith an enlarged circular portion 35 to provide a shoulder 36 which presses against the left-hand end of the shaft 25 in Figure 4 and limits inward movement of the shaft 30 into the bore 28.

The shaft 30 also has a portion 37 which is adapted to extend into a tubular bearing housing 38. The tubular bearing housing 38 has an enlarged bore 40 in the right-hand end thereof in Figure 4 and connecting with the bore 40 is a somewhat smaller bore 41 which terminates in a still smaller restricted bore providing a peripheral interior shoulder 43 adjacent which is another enlarged bore 44 which merges with another bore 45 extending in from the left-hand end of the tubular bearing housing 38 in Figure 4. The tubular bearing housing 38 is properly milled to provide said bores.

The shell 50 of a needle or roller bearing is placed in the bore 41 of the housing 38 by means of a pressed fit and the like, said needle or roller bearing having a plurality of rollers or needles 51 therein. The bearing shell 50 is bent downwardly and slightly inwardly at its two ends, as indicated at 52, to confine the rollers 51 therein.

After the roller bearing shell 50 has been placed in position, as shown in Figure 4, then an oil seal annular member 55 is pressed into the bore 40, as by a pressed fit. This member 55 has an annular ring 56 pressed therein to confine a fibrous annular washer, such as 57 and preferably of leather, between the end wall of the annular member 55 and the annular washer 56.

With the shell 50 of the roller bearing in position and with the annular member 55 with the sealing washer 57 placed in the position as shown

in the drawings, the portion 37 of the shaft 30 is then slid through the opening left by the washer 57 and slidably penetrates the roller bearing assembly 50. A radial thrust bearing member 60 is then pressed onto a smaller portion 61 of the shaft 30, this radial thrust bearing 60 having an inner portion or race 63 pressed onto the shaft portion 61 and an outer annular portion or race 64 is pressed into the bore 45 to thus confine the bearing member 60 in position. This bearing member has conventional balls 66 disposed between the portions 63 and 64 thereof. It is to be noted that the portion 61 of the shaft 30, being smaller than the portion 37, provides a shoulder to limit inward movement of the thrust bearing inner race 63. The portion 61 has a peripheral groove 70 milled therein in which a suitable snap ring 71 is snapped into position to confine the ball bearing 60 in position.

An end member 75 is provided which has its two sides flattened, as at 76, for fitting into the bearing blocks 15 to 18, inclusive, to prevent rotation of the member 75. The right-hand end of the member 75 has milled therein a tapering bore 77 communicating with an elongated bore 77*a*. Two radial alined bores 78 and 80 communicate with the bore 77*a*. The housing 38 has a peripheral groove 82 therein in which the upper ends of the hook members 23 are adapted to rest.

The bearing housing 38 also has radial bores 84 and 85 which are preferably disposed 180 degrees from each other and into the bores 84 and 78 and 85 and 80, respectively, are adapted to be driven pins 86 and 87 for holding the end member 75 within the bore 45. It is to be noted that the left-hand end of the end member 75, in Figure 4, is of greater diameter than the right-hand end which is pressed into the bore 45. This provides a shoulder indicated at 88 to limit relative movement between the members 38 and 75.

The bore 77 serves a double purpose in that it provides a spacious reservoir in which suitable lubricant or grease may be packed to lubricate the ball bearing and roller bearing 60 and 50, respectively, and also is of sufficient size to permit the pins 86 and 87 to be driven inwardly into the cavity 77*a* when it is desired to disassemble the bearing structure so as to permit removal of the end member 75 from within the bore 45 to render accessible the snap ring 71 to permit its removal and to permit the shaft 30 and all its parts to be removed from the housing 38.

In the drawings and specification, there has been set forth a preferred embodiment of the invention and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. An improved top roll mounting for spinning frames, drawing frames and the like, said frames having bearing blocks thereon provided with grooves in the upper ends thereof, said improved mounting comprising a shaft having a first and a second reduced end portion at opposed ends thereof, said top roll having a bore in each end thereof, the first of the reduced end portions being adapted to be pressed into the bore in the corresponding end of said top roll, a bearing housing surrounding the second reduced end portion of said shaft, said housing having a plurality of axially alined bores of varying diameter therein to form shoulders therein, a roller bearing pressed into an intermediate one of said bores in the housing, an annular sealing ring pressed into an outermost of said bores at the root of said second reduced end portion of the shaft, a radial bearing member pressed into an enlarged end bore at the opposite end of said housing from that in which the sealing ring is disposed, the inner diameter of the radial bearing being substantially less than that of said second reduced end portion of the shaft and against which the said second reduced end portion of the shaft is adapted to be disposed when the second reduced end portion is inserted in said housing, said shaft having a third relatively smaller reduced end portion projecting beyond the second reduced end portion and through the radial bearing member, means securing said third reduced end portion of the shaft in the radial bearing member, an end member fixedly mounted in the same bore in the end of the housing in which said radial bearing is disposed and projecting outwardly substantially therefrom, said end portion having flattened opposed sides thereon adapted to fit in the groove of the corresponding bearing block on the said frame whereby, said end member and the said housing will remain stationary as said shaft rotates in the bearing housing and as the top roll rotates therewith.

2. An improved top roll mounting for spinning frames, drawing frames and the like, said frames having bearing blocks thereon provided with grooves in the upper ends thereof, said improved mounting comprising a shaft having a first and a second reduced end portion at opposed ends thereof, said top roll having a bore in each end thereof, the first of the reduced end portions being adapted to be pressed into the bore in the corresponding end of said top roll, a bearing housing surrounding the second reduced end portion of said shaft, said housing having a plurality of axially alined bores of varying diameter therein to form shoulders therein, a roller bearing pressed into an intermediate one of said bores in the housing, an annular sealing ring pressed into an outermost of said bores at the root of said second reduced end portion of the shaft, a radial bearing member pressed into an enlarged end bore at the opposite end of said housing from that in which the sealing ring is disposed, the inner diameter of the radial bearing being substantially less than that of said second reduced end portion of the shaft and against which the said second reduced end portion of the shaft is adapted to be disposed when the second reduced end portion is inserted in said housing, said shaft having a third relatively smaller reduced end portion projecting beyond the second reduced end portion and through the radial bearing member, means securing said third reduced end portion of the shaft in the radial bearing member, an end member fixedly mounted in the same bore in the end of the housing in which said radial bearing is disposed and projecting outwardly substantially therefrom, said end portion having flattened opposed sides thereon adapted to fit in the groove of the corresponding bearing block on the said frame whereby, said end member and the said housing will remain stationary as said shaft rotates in the bearing housing and as the top roll rotates therewith, said end member having a cavity in its end adjacent said radial bearing member adapted to contain a lubricant which may be packed thereinto prior to the end member being secured in said bearing housing.

3. An improved top roll mounting for spinning frames, drawing frames and the like, said frames having bearing blocks thereon provided with grooves in the upper ends thereof, said improved mounting comprising a shaft having a first and a second reduced end portion at opposed ends thereof, said top roll having a bore in each end thereof, the first of the reduced end portions being adapted to be pressed into the bore in the corresponding end of said top roll, a bearing housing surrounding the second reduced end portion of said shaft, said housing having a plurality of axially alined bores of varying diameter therein to form shoulders therein, a roller bearing pressed into an intermediate one of said bores in the housing, an annular sealing ring pressed into an outermost of said bores at the root of said second reduced end portion of the shaft, a radial bearing member pressed into an enlarged end bore at the opposite end of said housing from that in which the sealing ring is disposed, the inner diameter of the radial bearing being substantially less than that of said second reduced end portion of the shaft and against which the said second reduced end portion of the shaft is adapted to be disposed when the second reduced end portion is inserted in said housing, said shaft having a third relatively smaller reduced end portion projecting beyond the second reduced end portion and through the radial bearing member, means securing said third reduced end portion of the shaft in the radial bearing member, an end member fixedly mounted in the same bore in the end of the housing in which said radial bearing is disposed and projecting outwardly substantially therefrom, said end portion having flattened opposed sides thereon adapted to fit in the groove of the corresponding bearing block on the said frame whereby, said end member and the said housing will remain stationary as said shaft rotates in the bearing housing and as the top roll rotates therewith, said end member having a cavity in its end adjacent said radial bearing member adapted to contain a lubricant which may be packed thereinto prior to the end member being secured in said bearing housing, at least one radially extending pin penetrating the wall of said housing and the end member and a bore communicating with said pin and the cavity in said end member whereby the pin may be pressed through the corresponding walls of the bearing housing and the end member and into said cavity for disassembling the end member from said housing and to provide access to the means securing the third reduced end portion of said shaft in the radial bearing to facilitate removal of the shaft from the bearing housing.

4. An improved top roll mounting for drawing frames and the like having spaced bearing blocks thereon, said improved mounting comprising a shaft for each end of the top roll having a reduced end portion on at least one end thereof, means securing the end of the shaft remote from the reduced end portion to the corresponding end of the top roll, a tubular bearing housing surrounding said shaft, a projection on the inner surface of said tubular bearing housing and disposed intermediate the ends of said housing, a needle bearing pressed into one end of said housing and engaging one side of said projection, said needle bearing surrounding the shaft adjacent the reduced end portion thereof, a ball bearing pressed into the other end of said housing and engaging the other side of said projection, the inner diameter of the ball bearing being substantially less than that of said needle bearing, the reduced end portion of said shaft penetrating said ball bearing and the ball bearing engaging the end of the shaft at its juncture with the reduced portion thereof, a snap ring on the free end of said reduced portion of said shaft and engaging the outer surface of the said ball bearing, an axially alined end member secured in the housing and engaging the opposite surface of the ball bearing from that which is engaged by said projection on the inner surface of the tubular bearing housing, means on the outer end of said end member adapted to fit in the corresponding bearing block on the drawing frame and means for preventing rotation of said end member in the bearing block whereby said end member and the tubular bearing housing will remain stationary as said shaft rotates in the bearing housing and as the top roll rotates therewith.

5. An improved top roll mounting for drawing frames and the like having spaced bearing blocks thereon, said improved mounting comprising a shaft for each end of the top roll having a reduced end portion on at least one end thereof, means securing the end of the shaft remote from the reduced end portion to the corresponding end of the top roll, a tubular bearing housing surrounding said shaft, a projection on the inner surface of said tubular bearing housing and disposed intermediate the ends of said housing, a needle bearing pressed into one end of said housing and engaging one side of said projection, said needle bearing surrounding the shaft adjacent the reduced end portion thereof, a ball bearing pressed into the other end of said housing and engaging the other side of said projection, the inner diameter of the ball bearing being substantially less than that of said needle bearing, the reduced end portion of said shaft penetrating said ball bearing and the ball bearing engaging the end of the shaft at its juncture with the reduced portion thereof, a snap ring on the free end of said reduced portion of said shaft and engaging the outer surface of the said ball bearing, an axially alined end member secured in the housing and engaging the opposite surface of the ball bearing from that which is engaged by said projection on the inner surface of the tubular bearing housing, means on the outer end of said end member adapted to fit in the corresponding bearing block on the drawing frame, means for preventing rotation of said end member in the bearing block whereby said end member and the tubular bearing housing will remain stationary as said shaft rotates in the bearing housing and as the top roll rotates therewith, means securing the end member in the corresponding tubular bearing housing comprising said housing and said end member each having at least one coinciding radially extending bore therein, a pin pressed into said bores, said end member also having an axially alined cavity in the end thereof adjacent the said ball bearing, said cavity being of such size as to permit the pin to be pressed through the coinciding radially extending bores in the housing and the end member and into the cavity to permit the end member to be disassembled from the housing and to permit access to the snap ring for removing the shaft from said housing whereby a suitable lubricant may be packed into said cavity in the end member for lubricating the ball bearing and the needle bearing after which the end member may again be assembled in said housing.

6. An improved top roll mounting for drawing

frames and the like having spaced bearing blocks thereon, said improved mounting comprising a shaft for each end of the top roll having a reduced end portion on at least one end thereof, means securing the end of the shaft remote from the reduced end portion to the corresponding end of the top roll, a tubular bearing housing surrounding said shaft, a projection on the inner surface of said tubular bearing housing and disposed intermediate the ends of said housing, a needle bearing pressed into one end of said housing and engaging one side of said projection, said needle bearing surrounding the shaft adjacent the reduced end portion thereof, a ball bearing pressed into the other end of said housing and engaging the other side of said projection, the inner diameter of the ball bearing being substantially less than that of said needle bearing, the reduced end portion of said shaft penetrating said ball bearing and the ball bearing engaging the end of the shaft at its juncture with the reduced portion thereof, a snap ring on the free end of said reduced portion of said shaft and engaging the outer surface of the said ball bearing, an axially alined end member secured in the housing and engaging the opposite surface of the ball bearing from that which is engaged by said projection on the inner surface of the tubular bearing housing, means on the outer end of said end member adapted to fit in the corresponding bearing block on the drawing frame, means for preventing rotation of said end member in the bearing block whereby said end member and the tubular bearing housing will remain stationary as said shaft rotates in the bearing housing and as the top roll rotates therewith, said housing having an enlarged bore in the end thereof adjacent said needle bearing and an annular lubricant seal pressed into said enlarged bore and having means thereon encircling said shaft and resiliently engaging the shaft to prevent lubricant from leaking out of the housing and around the exposed portions of said shaft and the top roll.

7. An improved top roll mounting for drawing frames and the like having spaced bearing blocks thereon, said improved mounting comprising a shaft for each end of the top roll having a reduced end portion on at least one end thereof, means securing the end of the shaft remote from the reduced end portion to the corresponding end of the top roll, a tubular bearing housing surrounding said shaft, a projection on the inner surface of said tubular bearing housing and disposed intermediate the ends of said housing, a needle bearing pressed into one end of said housing and engaging one side of said projection, said needle bearing surrounding the shaft adjacent the reduced end portion thereof, a ball bearing pressed into the other end of said housing and

engaging the other side of said projection, the inner diameter of the ball bearing being substantially less than that of said needle bearing, the reduced end portion of said shaft penetrating said ball bearing and the ball bearing engaging the end of the shaft at its juncture with the reduced portion thereof, a snap ring on the free end of said reduced portion of said shaft and engaging the outer surface of the said ball bearing, an axially alined end member secured in the housing and engaging the opposite surface of the ball bearing from that which is engaged by said projection on the inner surface of the tubular bearing housing, means on the outer end of said end member adapted to fit in the corresponding bearing block on the drawing frame, means for preventing rotation of said end member in the bearing block whereby said end member and the tubular bearing housing will remain stationary as said shaft rotates in the bearing housing and as the top roll rotates therewith, means securing the end member in the corresponding tubular bearing housing comprising said housing and said end member each having at least one coinciding radially extending bore therein, a pin pressed into said bores, said end member also having an axially alined cavity in the end thereof adjacent the said ball bearing, said cavity being of such size as to permit the pin to be pressed through the coinciding radially extending bores in the housing and the end member and into the cavity to permit the end member to be disassembled from the housing and to permit access to the snap ring for removing the shaft from said housing whereby a suitable lubricant may be packed into said cavity in the end member for lubricating the ball bearing and the needle bearing after which the end member may again be assembled in said housing, said housing having an enlarged bore in the end thereof adjacent said needle bearing and an annular lubricant seal pressed into said enlarged bore and having means thereon encircling said shaft and resiliently engaging the shaft to prevent lubricant from leaking out of the housing and around the exposed portions of said shaft and the top roll.

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