Dec. 15, 1964 B. C. COLE 3,160,924

CRADLE ASSEMBLY FOR FIBER ATTENUATING APPARATUS

Filed April 9, 1962 2 Sheets-Sheet 1

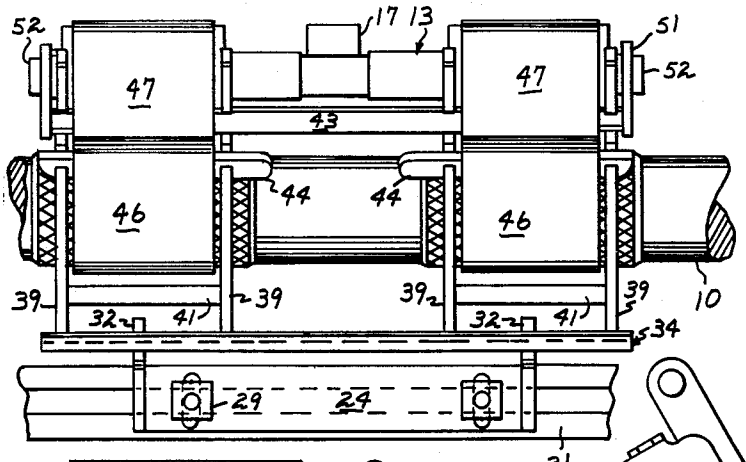

FIG-2

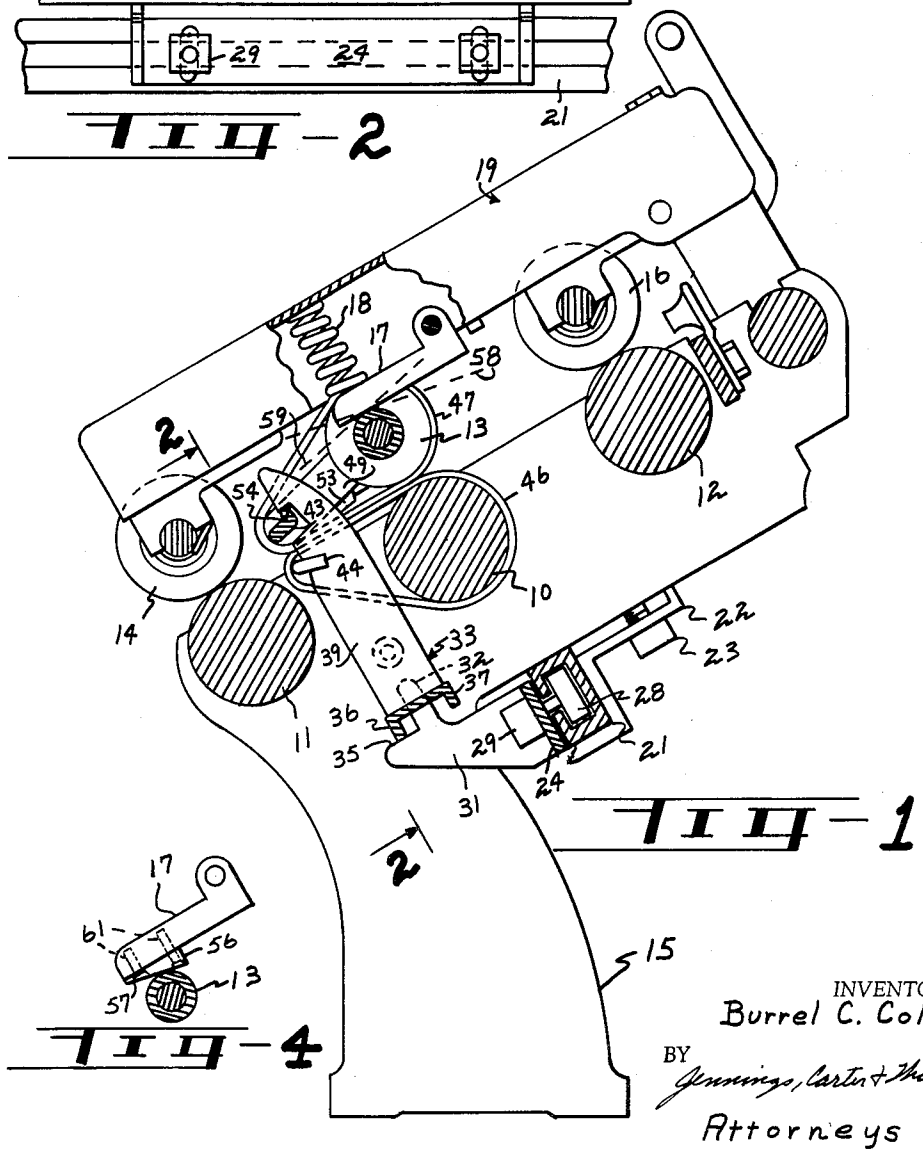

FIG-1

FIG-4

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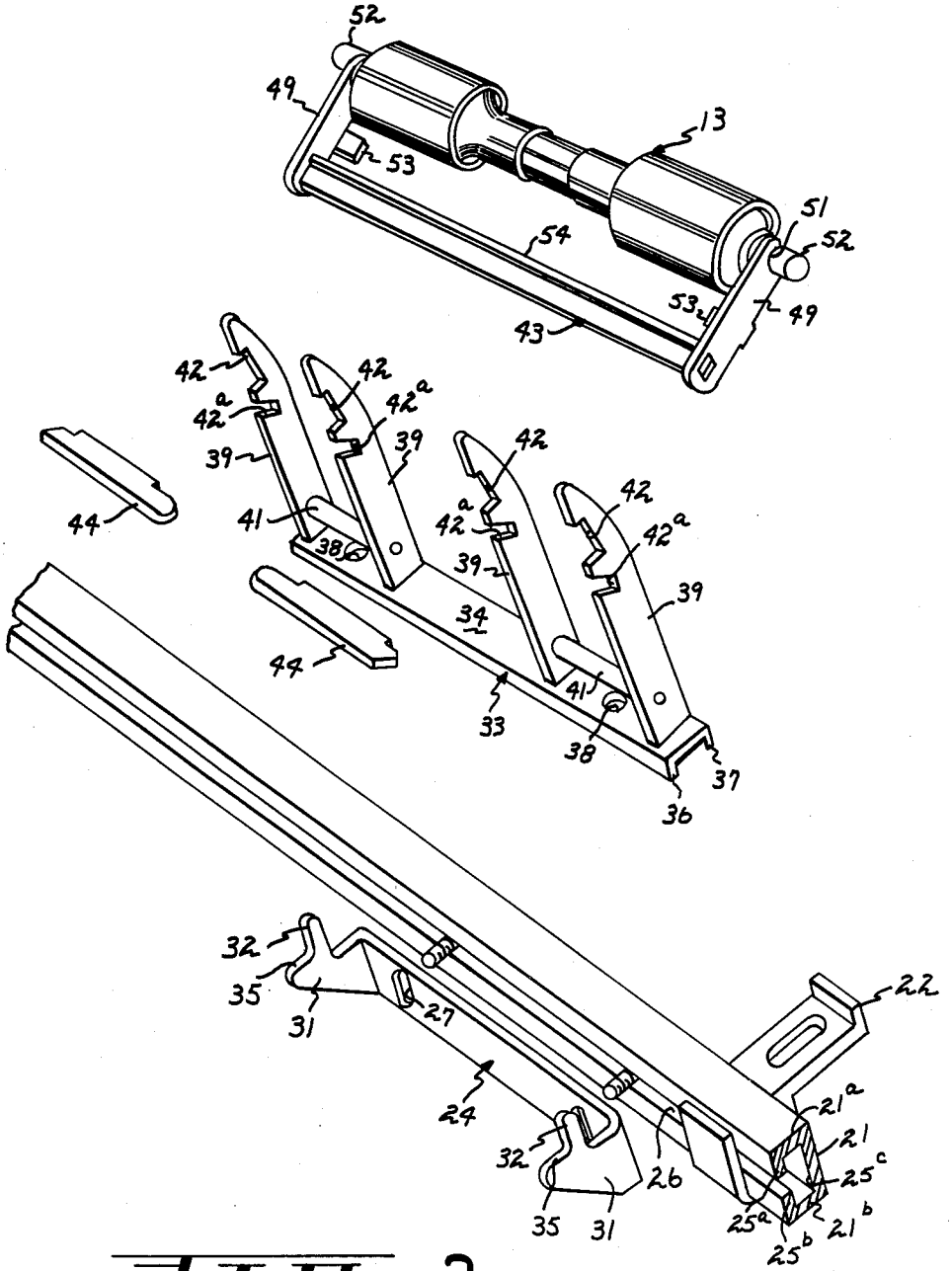

FIG. 3

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CRADLE ASSEMBLY FOR FIBER ATTENUATING APPARATUS

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This invention relates to a cradle assembly for fiber attenuating apparatus and more particularly to a double-boss frictionless cradle assembly.

An object of my invention is to provide an upstanding double-boss cradle assembly which is supported for pivotal movement completely out of contact with any rotating rolls, shafts, or the like.

Another object of my invention is to provide a double-boss cradle assembly of the character designated which shall position top and bottom nose bars with the top nose bar connected to the shaft of a top roll whereby the top roll and top nose bar are held in parallel relation to each other as a unit.

Another object of my invention is to provide a cradle assembly of the character designated which shall include a pair of relatively short bottom aprons which encircle a bottom line roll and bottom nose bars carried by the cradle whereby the aprons constitute the sole means of establishing forward position and parallel alignment of the bottom nose bars, top nose bar, and the associated top roll.

Another object of my invention is to provide a double-boss cradle assembly of the character designated in which the normal forward thrust on the top roll unit is imparted to the upper portion of a pivoted cradle unit of the cradle assembly to thereby tighten the relatively short bottom aprons.

Another object of my invention is to provide a cradle assembly of the character designated in which the angle at which weight is supplied to the top roll unit determines the amount of tension applied to the bottom aprons, thereby providing simple means for varying the tension established on the bottom aprons and at the same time eliminating the necessity for long bottom aprons and tension pulleys.

A further object of my invention is to provide a cradle assembly of the character designated which shall include simple means for varying the spacing between the top and bottom nose bars.

A further object of my invention is to provide a cradle assembly which shall include a removable top roll unit consisting of a double-boss top nose bar attached in spaced and parallel relation to the top roll and removable bottom nose bars whereby the cradle assembly may be removed or installed in a minimum of time.

A still further object of my invention is to provide a cradle assembly of the character designated which shall be simple of construction, economical of manufacture, and one which is adapted for use on practically any type drafting system.

As is well known in the art to which my invention relates, various cradle assemblies have been devised, such as single boss cradle units held in position by yokes around a bottom line roll and yokes around the shaft of a top roll. With such cradle assemblies, both nose bars are held in horizontal position by adjustable top roll

alignment members such as nebs. Since such cradles rotate around the bottom line roll there is no means of establishing or adjusting bottom apron tightness.

Briefly, my improved cradle assembly comprises an upstanding double-boss cradle unit which is mounted for pivotal movement on a stationary member below bottom line rolls. Means is provided for maintaining the upstanding cradle unit in substantial alignment with the bottom line rolls whereby the bottom nose bars and the top nose bar for the complete double-boss unit are adapted to pivot as a unit in a direction perpendicular to the axis of the bottom line roll associated therewith. The top roll is operatively connected to the top nose bar whereby it is held in parallel relation to the top nose bar. The top nose bar is detachably and pivotally connected to the upper end of the double-boss cradle unit whereby the top roll unit, including the top nose bar, top roll and the aprons associated therewith, may be removed as a unit. The bottom aprons encircle the bottom nose bars and the lower line rolls to restrict forward movement and thereby establish parallel alignment of the top and bottom nose bars and the top roll relative to the bottom line roll which assures uniform tension on the bottom aprons. In view of the fact that the downward pressure on the top roll is relatively light and the rotation of the top roll is relatively slow, the normal forward thrust on the top roll unit is very nearly perfect for tightening the bottom aprons. However, this normal forward thrust may be increased or decreased by varying the angle at which downward pressure is applied to the top roll and it will be uniform throughout the frame.

Cradle assemblies embodying features of my invention are illustrated in the accompany drawings, forming a part of this application, in which:

FIG. 1 is a side elevational view of typical dual apron type fiber attenuating apparatus in which the cradle assembly of the present invention is employed partly broken away and in section;

FIG. 2 is a fragmental, front elevational view taken generally along the line 2—2 of FIG. 1;

FIG. 3 is an exploded view showing the various parts of my improved cradle assembly in disassembled position; and,

FIG. 4 is a fragmental view, partly in section, showing modified means for applying pressure to the shaft of a top roll unit.

Referring now to the drawings for a better understanding of my invention, I show a roll stand 15 supporting a lower line middle roll 10, a lower line front roll 11, and a lower line back roll 12. The rolls 10, 11 and 12 are driven by suitable means in a manner well understood in the art.

Mounted above the lower line rolls 10, 11 and 12 are top rolls 13, 14 and 16, respectively. Pressure is applied to the top roll 13 by a lever 17 which is urged toward the top roll 13 by a spring 18. The overarm and means for applying pressure to the other two top rolls 14 and 16 is indicated generally at 19. In view of the fact that various forms of overarms and weighting means may be employed, no further description thereof is deemed necessary.

Mounted on the roll stand 15 and extending transversely thereof is an elongated support member 21. Suitable retaining means may be employed for securing the sup-

port member 21 to the roll stand 15, such as brackets 22 which are attached to the roll stands by cap screws 23, as shown in FIG. 1. The forward ends of the brackets 22 partially surround the support member 21 whereby the support member is secured rigidly to the roll stand 15. Continuous lengths of the support member 21 may be employed, and they may be joined at any roll stand without additional parts.

Mounted for adjustment in both horizontal and vertical directions adjacent the forward side of the support member 21 is a cradle supporting bracket 24. The elongated support member 21 is preferably in the form of a channel having longitudinally extending flanges 21^a and 21^b. Formed integrally with the flanges 21^a and 21^b are inturned flanges 25^a and 25^b which are spaced from each other to define an elongated slot or opening 26 and a centrally disposed opening 25^c which extends the length of the member 21, as shown in FIG. 3. The cradle support bracket 24 is provided with spaced apart, vertically extending openings 27 therein which are in register with the opening or slot 26. Passing through the aligned openings 26 and 27 and securing the cradle bracket 24 to the support member 21 are bolts 28 having retaining nuts 29. Preferably, the heads of the bolts 28 are square whereby they fit the inner opening 25^c to prevent rotation as the nuts 29 are tightened. The ends of the cradle support bracket 24 are turned forward as at 31 to provide forwardly extending cradle supports having upwardly projecting members 32.

My improved double-boss cradle unit indicated generally at 33 comprises an elongated base member 34 which is preferably in the form of a channel having depending legs 36 and 37. Longitudinally spaced openings 38 are provided in the base member 34 in position to receive the upstanding projections 32 with a loose fit whereby the cradle unit 33 is adapted for free pivotal movement on leg 36 of base 34 which rests on flat portions 35 of support members 31. According, the openings 38 are employed only to hold the base of the cradle in approximate position whereby the forward leg 36 rests on the flat portions 35 and pivots relative thereto. This permits the bottom aprons to have full control of cradle alignment. Secured to and projecting upwardly from the base member 34 are four upstanding arms 39 which are spaced longitudinally of the base member 34, as shown in FIGS. 2 and 3. There are two pairs of arms adjacent each end of the base member 34 and the individual arms of each pair are connected to each other by reinforcing bars 41, as shown in FIGS. 2 and 3.

Notches 42 are provided in the forward edges of the arms 39 adjacent the upper ends thereof for receiving a double-boss top nose bar 43. Other notches 42^a are provided in the forward edges of the arms 39 subjacent the notches 42 for receiving individual bottom nose bars 44. The flat portions 35 are so positioned relative to each other that a line passing through both flat portions extends in a horizontal plane parallel to the nose bars 43 and 44.

Surrounding the bottom line roll 10 and the bottom nose bars 44 are bottom aprons 46. Also, surrounding the top roll 13 and the double-boss top nose bar 43 are top aprons 47. As shown in FIG. 2, the bottom aprons 46 and the top aprons 47 move between the pairs of upstanding arms 39 whereby the upstanding arms serve as guides for the aprons.

Secured to opposite ends of the double-boss nose bar 43 are rearwardly extending arms 49 having rearwardly opening slots 51 therein disposed to receive reduced diameter end portions 52 of the shaft of top roll 13. Accordingly, after the apron 47 encircles the top roll 13 and the double-boss top nose bar 43, the double-boss top nose bar, arms 49, top roll 13 and the aprons 47 form a self-contained unit which may be removed as a unit. Inwardly extending stop members 53 are provided on the arms 49 in position to engage the upstanding arm 39 of the cradle at a point opposite the forwardly opening slots 42 whereby forward movement of the arms 49 relative to the arms 39 is limited.

The upper surface of the double-boss top nose bar 43 is provided with a longitudinally extending ridge or raised portion 54 which is adapted to engage the upper edge of the slot 42, as shown in FIG. 1, whereby the double-boss top nose bar is adapted for pivotal movement relative to the upstanding arms 39. Preferably, the upper portion of the upstanding arms 39 are of the general shape shown in FIGS. 1 and 3 whereby the top nose bar 43 must be within the forwardly opening slots 42 before the inwardly extending projections 53 will move to the position shown in FIG. 1, thereby assuring proper position of the top nose bar.

Since downward pressure on the top roll 13 is relatively light and the rotation of the top roll is slow, the normal forward thrust on the top unit is substantially that required for proper tightening of the bottom apron 46. However, this normal forward thrust may be increased by applying downward pressure on the top roll at a point rearward of the center line of the rolls 10 and 13. That is, rearward of a plane passing through the centers of rolls 10 and 13. Also, the normal forward thrust may be decreased by applying downward pressure on the top roll 13 at a point forward of a plane passing through the centers of the rolls 10 and 13. This application of downward pressure on the top roll 13 may be accomplished by machining the contact surface of pressure lever 17 at the desired angle or by providing a detachable insert 56 on the lower surface of pressure lever 17, as shown in FIG. 4. The insert 56 is provided with an inclined lower contact surface 57 which engages the top roll 13. With the contact surface of insert 56 at the angle shown in FIG. 4, pressure would be applied at a point rearward of a plane passing through the centers of the rolls 10 and 13 whereby pressure would be applied along the dotted line 58, as shown in FIG. 1. By reversing the insert 56, the inclined lower surface would apply pressure generally along the dotted line 59, as shown in FIG. 1, whereby pressure would be applied at a point forward of a plane passing through the centers of the rolls 10 and 13. As shown in FIG. 4, the detachable member 56 is secured to the lever member 17 by suitable securing means, such as screws 61.

From the foregoing, it will be seen that I have devised an improved cradle assembly. By providing a double-boss cradle assembly whereby all four upstanding arms are secured rigidly to an elongated base member, the entire cradle assembly is adapted for free pivotal movement in a plane substantially perpendicular to the axis of the bottom line rolls associated therewith. Also, by providing means for adjusting the position of the base member of the double-boss cradle unit, the nose bars of the cradle unit may be held at proper horizontal and forward positions and in parallel alignment with the associated bottom line rolls. Also, by providing means for attaching the top roll to the top nose bar whereby they are held in parallel relation to each other at all times the top roll remains in true alignment with its associated bottom line roll and the top roll assembly may be removed as a unit. Furthermore, by providing removable bottom nose bars and a removable, double-boss top nose bar which is adapted for pivotal movement relative to the upstanding arms of the cradle, the nose bars may be assembled and disassembled with a minimum of effort. It will also be seen that with the normal forward thrust on the top roll unit, the upright arms of the cradle are forced forward to tighten the relatively short bottom aprons which encircle the bottom nose bars and the bosses of the bottom line roll, whereby the bottom aprons establish forward position and also parallel alignment of both nose bars and the top roll with the bottom line roll.

While I have shown my invention in two forms, it will

be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In a drafting assembly for fiber attenuating apparatus including roll stands, cooperating pairs of top and bottom line rolls, and top and bottom aprons surrounding at least one pair of said cooperating top and bottom line rolls,

(*a*) a double-boss cradle unit having upstanding arms connected rigidly to each other and extending upwardly between adjacent pairs of said cooperating top and bottom line rolls and out of contact with said rolls,

(*b*) means pivotally supporting said cradle unit below said bottom line rolls for forward and rearward movement,

(*c*) a top unit having a double-boss top nose bar, a double-boss top roll and means connecting said double-boss top nose bar to its associated top roll and holding said top roll in spaced and parallel relation to said top nose bar,

(*d*) means pivotally attaching said top unit to at least two of said upstanding arms,

(*e*) means restricting forward movement of said top unit relative to said upstanding arms,

(*f*) removable bottom nose bars for said cradle unit attached to said upstanding arms in position for said bottom aprons to encircle said bottom nose bars, and

(*g*) means to apply pressure on said top roll to establish driving contact between said bottom and top aprons whereby said bottom aprons constitute the sole means of restricting forward movement of said bottom nose bars and said top unit associated therewith and at the same time establishes parallel alignment of said bottom nose bars and said top unit relative to said bottom line rolls.

2. In a drafting assembly for fiber attenuating apparatus as defined in claim 1 in which the double-boss cradle unit has an elongated base member and the means pivotally supporting the cradle unit comprises,

(*a*) an elongated support bracket connected adjustably to said roll stand,

(*b*) longitudinally spaced upstanding projections carried by said support bracket, and

(*c*) there being recesses in said base member in position to receive said projections with a loose fit.

3. In a drafting assembly for fiber attenuating apparatus as defined in claim 2 in which outstanding arms on the support bracket carry the upstanding projections and forward portions of said outstanding arms are in position to support a forward edge of said base member.

4. In a drafting assembly for fiber attenuating apparatus as defined in claim 1 in which the means pivotally supporting the double-boss cradle unit comprises,

(*a*) an elongated grooved member connected to the underside of the roll stands in substantial parallel alignment with a bottom line roll,

(*b*) a bracket having spaced vertical slots therein,

(*c*) flat-headed bolts slidably mounted in said grooved member and passing through said vertical slots in said bracket,

(*d*) and nuts on said bolts for securing said bracket to said grooved member at selected positions.

5. In a drafting assembly for fiber attenuating apparatus as defined in claim 1 in which means is provided to apply downward pressure directly on said top roll at a point forward of a plane passing through the centers of said top and bottom line rolls to decrease tension on the bottom aprons.

6. In a drafting assembly for fiber attenuating apparatus as defined in claim 1 in which means is provided to apply downward pressure directly on said top roll at a point rearward of a plane passing through the centers of said top and bottom rolls to increase tension on the bottom aprons.

7. In a drafting assembly for fiber attenuating apparatus as defined in claim 1 in which the upstanding arms of the cradle unit are in position to define guides for the pair of top and bottom aprons.

8. In a drafting assembly for fiber attenuating apparatus including roll stands, cooperating pairs of top and bottom line rolls, and top and bottom aprons surrounding at least one pair of said cooperating top and bottom line rolls,

(*a*) a double-boss cradle unit having upstanding arms connected rigidly to each other and extending upwardly between adjacent pairs of cooperating top and bottom line rolls and out of contact with said rolls,

(*b*) means supporting the lower end of said double-boss cradle unit for forward and rearward pivotal movement,

(*c*) a top unit having a double-boss top nose bar for said top aprons, a double-boss top roll and arms connecting said double-boss nose bar to its associated top roll and holding said top roll in spaced and parallel relation to said top nose bar,

(*d*) there being notches in the forward edges of at least two of said upstanding arms in position to receive said double-boss top nose bar to attach said top unit pivotally to said cradle unit,

(*e*) means restricting forward movement of said top unit relative to said upstanding arms,

(*f*) there being other notches in the forward edges of said upstanding arms at an elevation subjacent said first mentioned notches which receive said double-boss top nose bar,

(*g*) removable bottom nose bars for said cradle unit unit engaging said other notches and extending in parallel relation to said bottom line rolls in position for said bottom aprons to encircle said bottom nose bars, and

(*h*) means to apply pressure on said top roll to establish driving contact between said bottom and top aprons whereby said bottom aprons constitute the sole means of restricting forward movement of said bottom nose bars and said top unit associated therewith and at the same time establishes parallel alignment of said bottom nose bars and said top unit relative to said bottom line rolls.

9. In a drafting assembly for fiber attenuating apparatus as defined in claim 8 in which the double-boss top nose bar is provided with an upwardly extending ridge of a predetermined height in position to engage an upper edge of said first mentioned notches whereby the top nose bar is adapted for pivotal movement relative to said upstanding arms.

10. In a drafting assembly for fiber attenuating apparatus as defined in claim 8 in which the means restricting forward movement of said top roll unit relative to said upstanding arms comprises inwardly extending stop members on said arms connecting said top nose bar to its associated top roll intermediate the top nose bar and said top roll disposed to engage the opposite side of said upstanding arms from the side thereof engaged by said double-boss top nose bar.

11. In a drafting assembly for fiber attenuating apparatus as defined in claim 8 in which said arms connecting said double-boss top nose bar to its associated top roll are provided with slots in the rear ends thereof in position to engage end portions of said top roll.

12. In a cradle assembly for fiber attenuating apparatus including cooperating pairs of top and bottom line rolls and top and bottom aprons surrounding at least one pair of said cooperating top and bottom line rolls,

(*a*) a double boss cradle unit having a base with upstanding arms mounted thereon and extending upwardly in front of said one pair of cooperating top and bottom line rolls and out of contact with all of

said top and bottom line rolls in position to guide said top and bottom aprons,

(*b*) means to pivotally support said base for forward and rearward movement at an elevation below and forward of said one pair of cooperating top and bottom line rolls,

(*c*) top and bottom nose bars for said top and bottom aprons,

(*d*) means on said upstanding arms to support said top and bottom nose bars, and

(*e*) other arms connected at their forward ends to said top nose bar with the rear ends of said other arms being operatively connected to the top roll of said

one pair of cooperating top and bottom line rolls to hold said top roll in spaced and parallel relation to said nose bars, whereby said bottom aprons constitute the sole means of restricting forward movement of said nose bars and said top roll of said one pair of cooperating top and bottom line rolls.

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