Sept. 18, 1951

I. L. GRIFFIN

2,568,446

METHOD AND MEANS FOR INTERMITTENTLY TREATING SIZED YARN

Filed Aug. 26, 1947

6 Sheets-Sheet 1

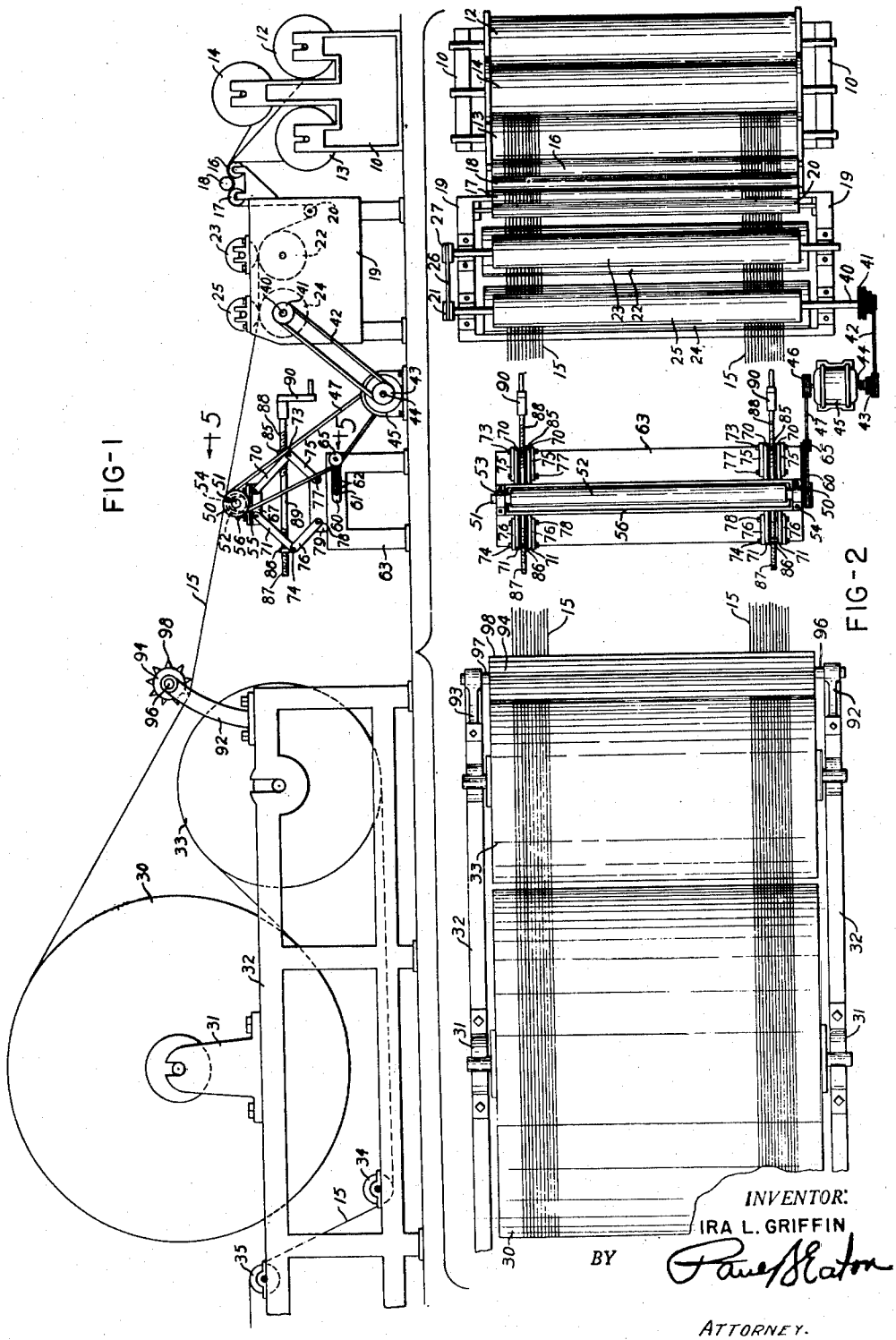


FIG-1

FIG-2

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METHOD AND MEANS FOR INTERMITTENTLY TREATING SIZED YARN

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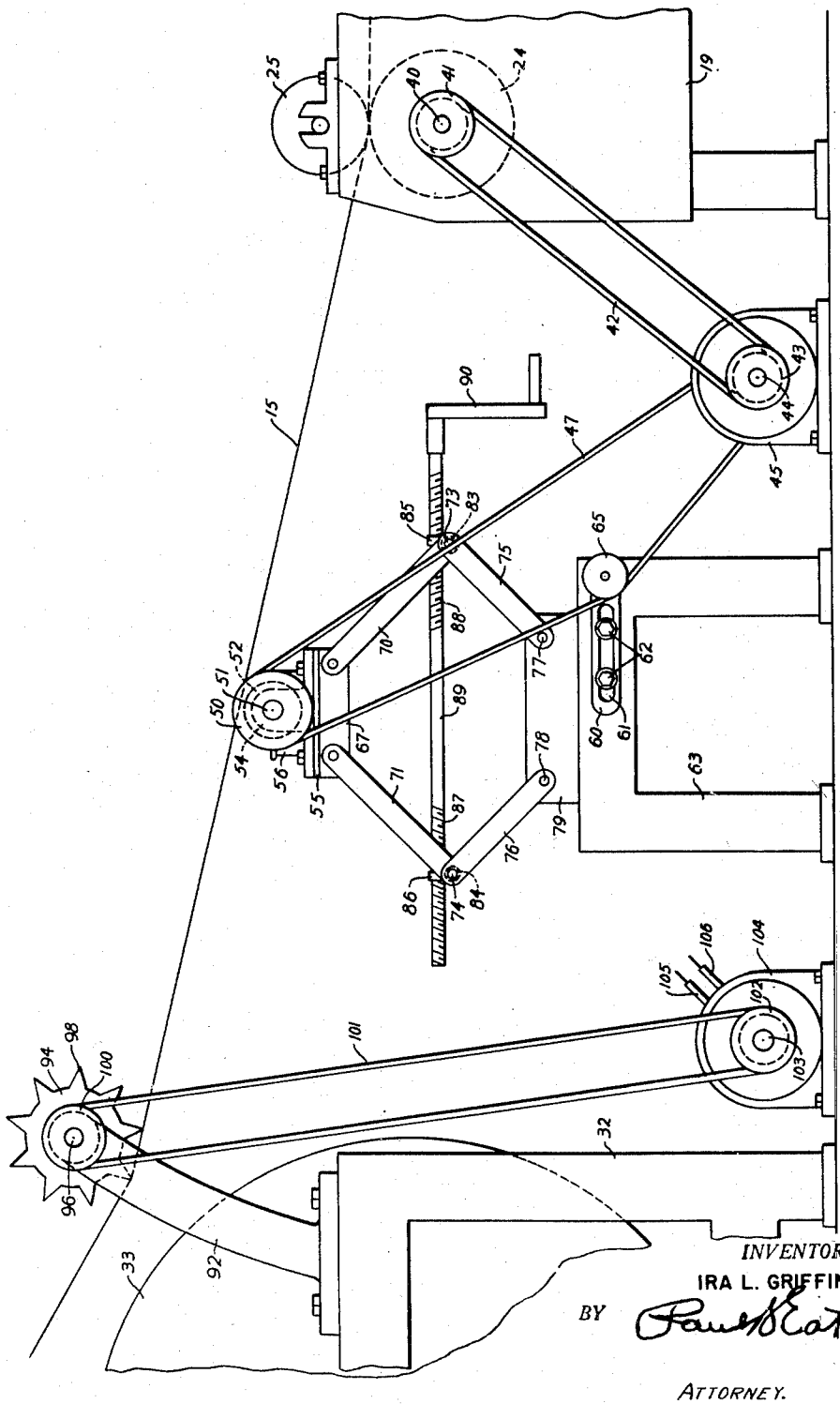


FIG-3

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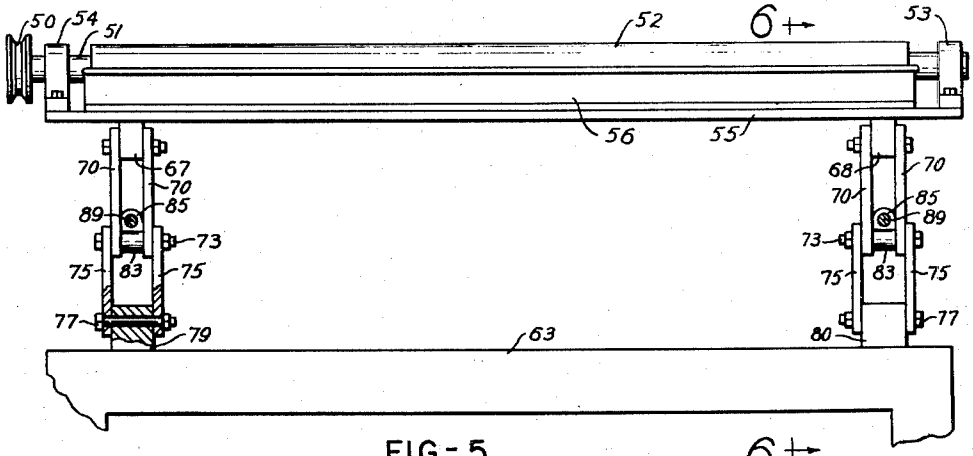


FIG-5

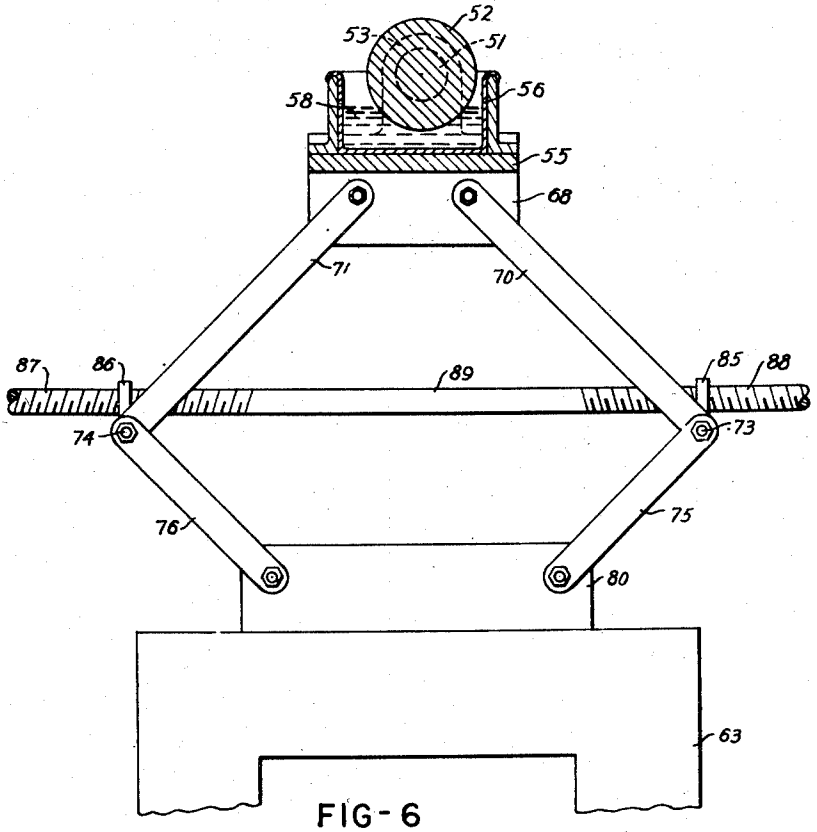


FIG-6

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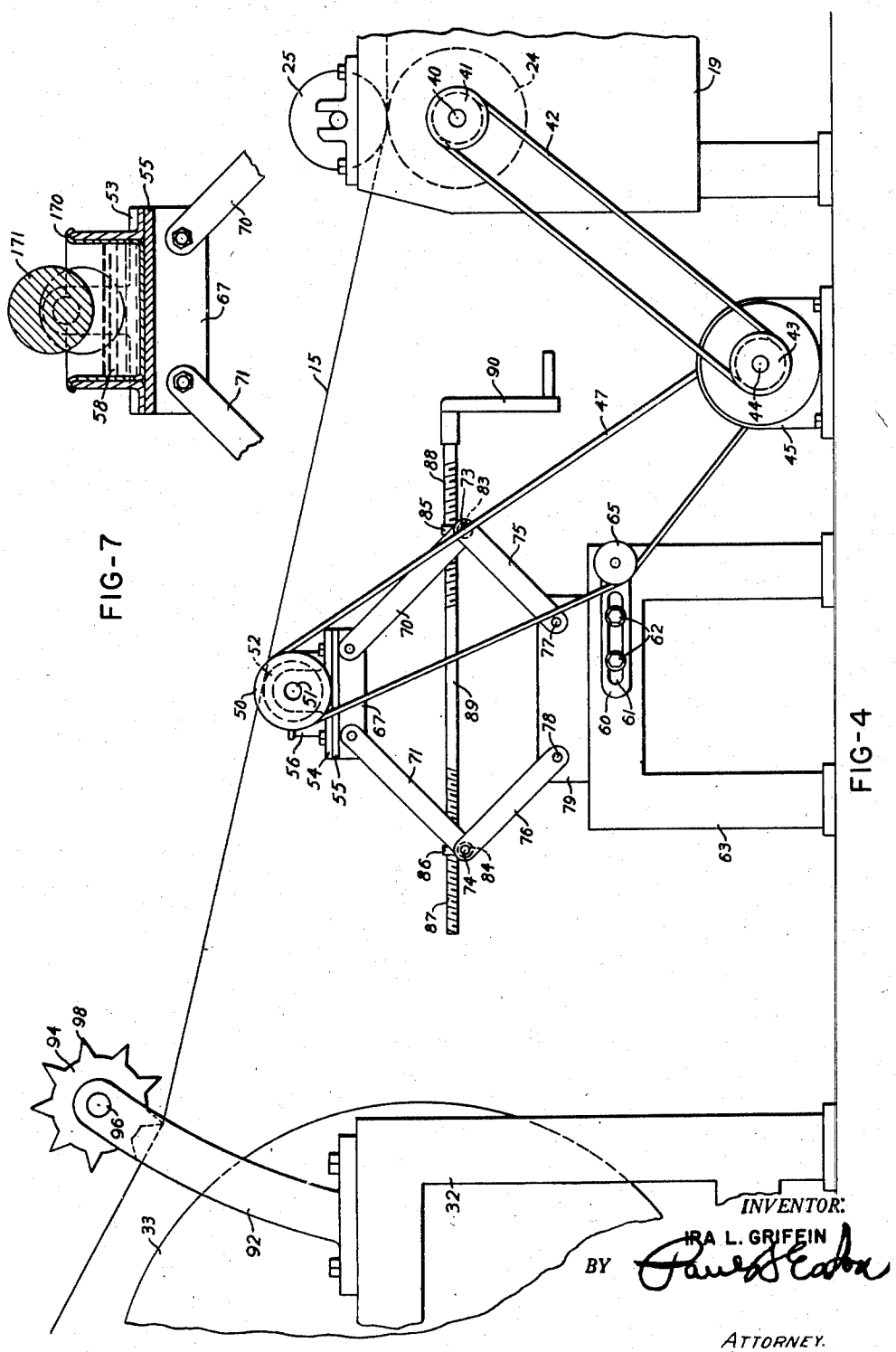


FIG-7

FIG-4

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METHOD AND MEANS FOR INTERMITTENTLY TREATING SIZED YARN

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FIG-8

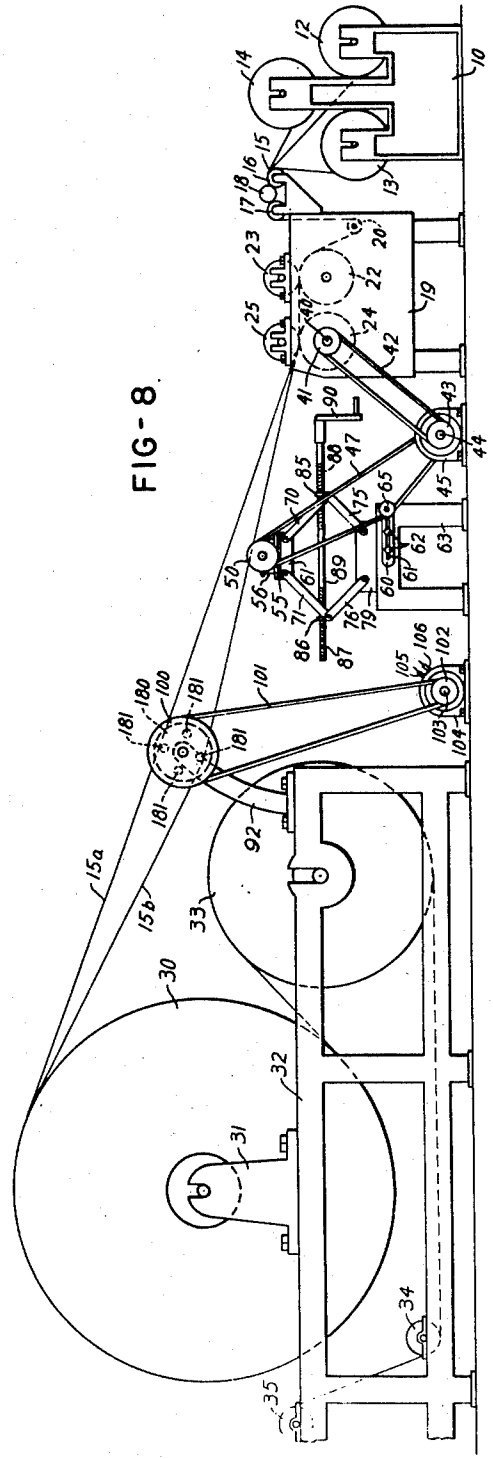


FIG-10

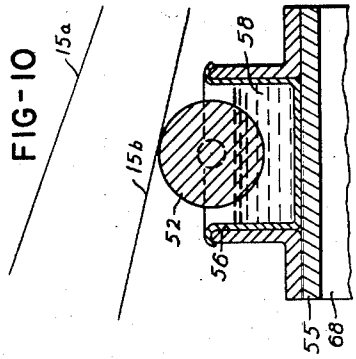
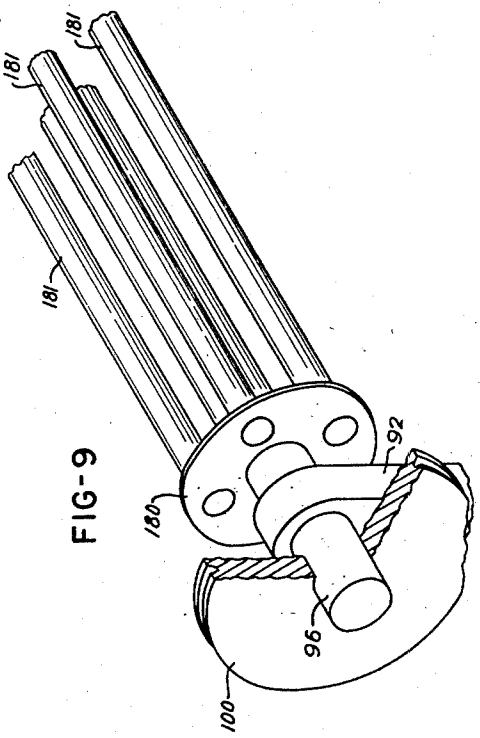


FIG-9



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Sept. 18, 1951 I. L. GRIFFIN 2,568,446

METHOD AND MEANS FOR INTERMITTENTLY TREATING SIZED YARN

Filed Aug. 26, 1947 6 Sheets-Sheet 6

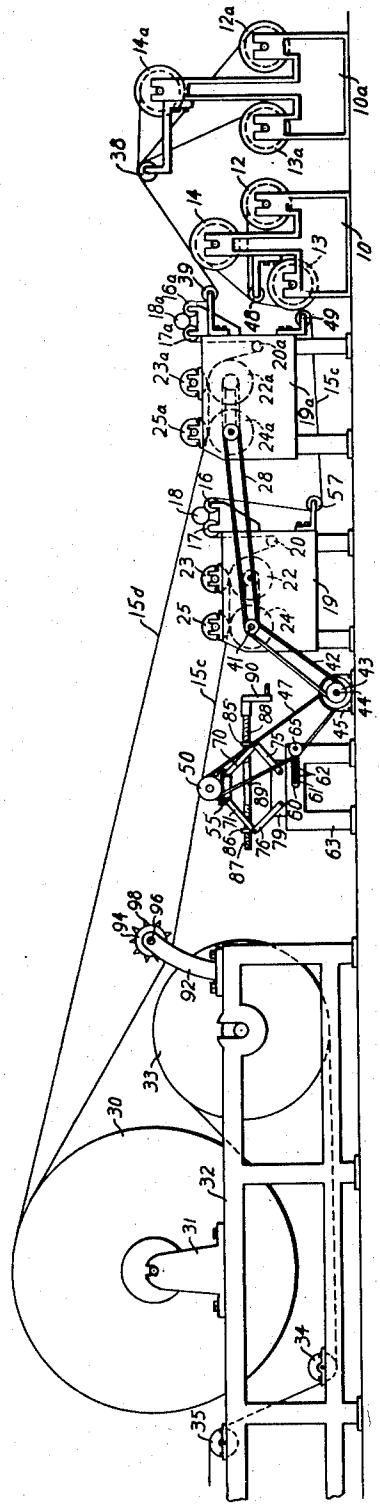


FIG-11

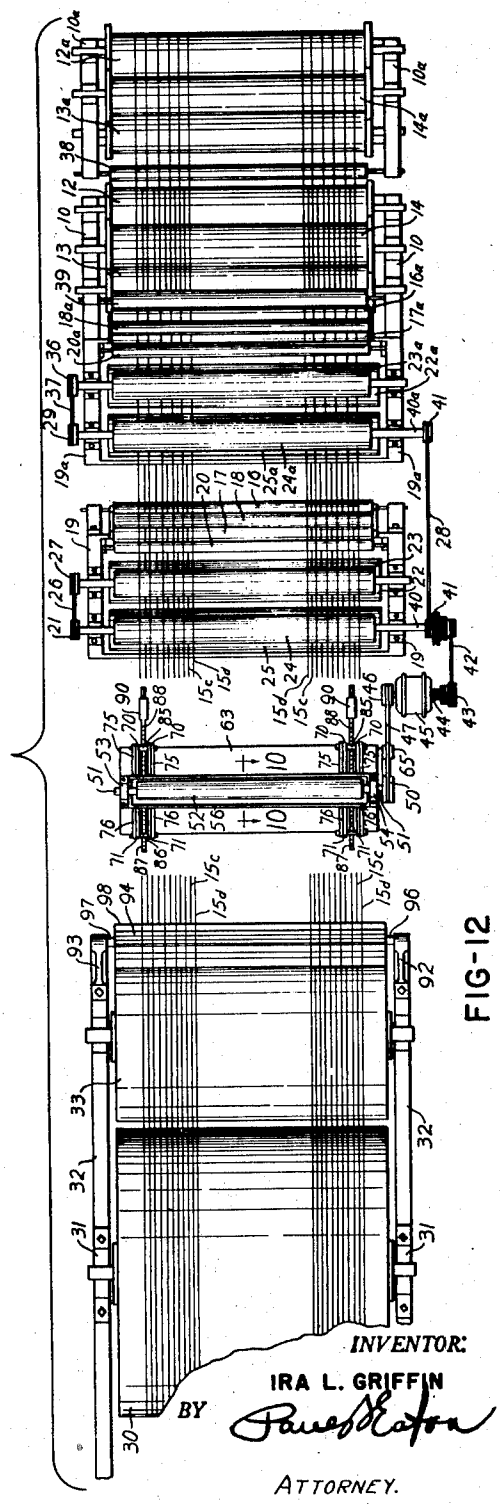


FIG-12

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Patented Sept. 18, 1951 2,568,446

UNITED STATES PATENT OFFICE

2,568,446

METHOD AND MEANS FOR INTERMITTENTLY TREATING SIZED YARN

Ira L. Griffin, Charlotte, N. C.

Application August 26, 1947, Serial No. 770,584

24 Claims. (Cl. 28—28)

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This invention relates to apparatus and method for treating yarn while the same is being sized and is an improvement over and above my prior Patent No. 2,074,745, of March 23, 1937.

In my former patent a treating liquid such as a suitable lubricant was sprayed onto the web of sized yarn after it left the size box and before it reached the drying cylinders of a sizing machine. This application of the lubricant was substantially continuous and I have found by experimentation that it is not necessary to apply the lubricant continuously but better results can be obtained by intermittent application of the treating solution or liquid such as a lubricant.

It is another object of this invention to provide means for intermittently causing contact between a treating liquid applying means and a sheet of yarn traveling from a size box to the drying cylinders in a sizing machine for applying a treating liquid thereto and which liquid is in turn deposited on the surface of the drying cylinder and is eventually applied to all portions of the web of yarn even though originally applied at intermittent intervals, say about an inch apart on the web of yarn.

By use of the intermittent application of the treating solution I find that a very great saving is effected in the amount of liquid applied to the yarn and better results are obtained than in my aforesaid patent. By applying the liquid to the yarn at spaced intervals, the liquid, is in turn, deposited on the cylinder and produces a film of liquid which then covers the complete sheet of yarns which have been sized and are being dryed on the drying drums of the sizing machine.

By the use of this apparatus and method, I find that it is so efficient that practically all of the softeners can be left out of the sizing solution and only enough fat is necessary in the sizing solution to prevent foaming in the size box or to act as a control to regulate absorption of humidity by the yarn in the weave room. I find that good results can be obtained in applying the liquid to the sheet of sized yarn before it is dried by running the slasher at the rate of say about 40 yards per minute in the sizing of No. 12 yarn with about 2500 ends in the warp sheet and using only about 2 quarts of the liquid or treating solution in an 8 hour operation. In such an instance the sheet of yarn would not be separated but if it were separated into two different sheds the amount of liquid picked up would be somewhat smaller.

I have also found that it is not necessary to dilute the treating liquid, such as oil, with water and I find a good treating solution to be a mixture of thin mineral oil like No. 10 motor oil and sulphonated mahogany mineral oil products. By the application of this mixture as will hereinafter be explained, the oil in the oil pan will not be diluted by the water but is brought up on the oil applying roll as a very thin film. The principal action is that as the oil from the pan is

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brought up and applied to the sheet of warp it tends to form into a jelly-like emulsion when contacted with the sheet of wet sized yarn in the whipping action of its vibration and this particular type of oil forms a jelly-like emulsion in the presence of small amounts of water. The oil absorbs water from the wet sized yarn and as a result of this vibrating, as will be hereinafter explained, small amounts of the emulsified oil will be picked up by the yarn leaving small mounds of this emulsion on the oil applying roll as it continues to turn thus giving stipple effect to the roll and thus prevents the warp from actually contacting the oil applying roll itself. The top surface of the lubricant applying roll may, if desired, be driven in a direction opposite to the direction of travel of the yarn.

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 side elevation of a sizing apparatus such as a slasher and showing my invention applied thereto;

Figure 2 is a top plan view of portions of Figure 1;

Figure 3 is an enlarged detail view of the right-hand portion of Figure 1 and showing the sheet of yarn out of contact with the lubricant applying roll;

Figure 4 is a view similar to Figure 3 but showing the sheet of warp in contact with the lubricant applying roll;

Figure 5 is a vertical sectional view taken along the line 5—5 in Figure 1 and omitting the driving belt;

Figure 6 is a vertical sectional view taken along the line 6—6 in Figure 5;

Figure 7 is a vertical sectional view through the lubricant applying trough and an eccentrically mounted lubricant applying roll;

Figure 8 is a side elevation of a slasher and showing still another modified form of lubricant applying and warp vibrating means associated therewith;

Figure 9 is an isometric view with portions broken away of the portion of the lubricant applying means nearest the observer in Figure 8;

Figure 10 is a vertical sectional view taken substantially along the line 10—10 in Figure 12 with warp shown as in Figure 8;

Figure 11 is an elevation showing the invention in use when two or more size boxes are employed;

Figure 12 is a top plan view of Figure 11.

Conventional methods and processes now in practice comprise the sizing of a warp on several different types of slashers. Contributing to the warp is warp beam and generally in practice more than one beam, ranging from one to ten and sometimes even more. The number of ends to the beam and the number of beams governing directly the total number of ends com-

prising the warp itself, the warp thus comprised is introduced into the size box so as to adequately contact a suitable sizing mixture and is thereafter dressed between suitable rolls prior to the drying operation. The drying operation in most cases consists of a direct transfer of the sized warp yarn to drying cylinders commonly known as "cans."

A warp sizing mixtures is generally composed of starch, starch derivatives such as thin boiling starches, dextrines and in some cases natural gums and glues are used. Also, dry milled starch flour, such as is produced from wheat and rye, and containing all the gluten natural to such flours, may be used to advantage with my method of lubrication because the usual adhesion of the gluten to the drying cylinders is prevented. These materials are used for the purpose of binding together the fibers comprising the thread and to provide a surface coating necessary to withstand the tension and friction of the yarn during the weaving operation. In addition to the materials mentioned above, various oils, fats, waxes and hygroscopic agents, such as glycerine are used. Oftentimes these materials are combined in various proportions and are known as "compounds."

The incorporation of oils, fats and lubricating agents in the sizing mixture in the size box, has a tendency to give a broken film and lessen the adhesive qualities of such material in respect to binding the fibers together and producing a continuous surface coating.

The ideal method would be to size the warp with a solution or mixture of adhesive material and water. The elimination of such fatty materials in the mixture provides the maximum degree of adhesion, added tensile strength, and continuous size film. The purpose is to accomplish this result by either eliminating entirely all fats, lubricating materials and non-adhesive materials in the size mixture, and apply the necessary lubrication to the surface of the size film after it is applied to the yarn and prior to the drying operation or intermediate in the drying operation. This method of surface lubrication of the size film will to a greater degree prevent adhesion to the drying cans or other contacting surfaces such as guide rolls or separating contrivances.

When dried in combined sheets, the ends must be torn apart and separated one from another by means of lease rods arranged in the frame following the drying operation. When this operation of separating the various ends is effected, the size film which has been placed upon the yarn is ruptured and torn off the yarn in places, thereby weakening the strength and protecting properties of the size film. This causes what is known as shedding at the slasher and in the loom. The light contact of the yarn to the oil carrying roll prevents smearing or flushing of the starch film on the yarn while wet, such light intermittent contact also makes possible development of an emulsion which minimizes penetration of the oil into the starch film. Two size boxes are often used now, so lubricant would be applied to lower sheet only in such cases.

Referring more particularly to the drawings, the numeral **10** denotes suitable supports for rotatably supporting the ends of a plurality of warp beams such as **12**, **13** and **14** around which yarn is wound. When it is desired to treat the yarn with a sizing solution, the beams are placed in the supports and the combined warp **15** is drawn

therefrom over rolls **16** and **17** with a suitable weighted roller **18** resting thereon, which rolls **16** and **17** are rotatably supported on top of a sizing vat **19**. The combined sheet of warp threads is then drawn beneath an immersion roller **20** to immerse the sheet of yarn in the sizing solution. Then between the squeeze rolls **22** and **23** and also between another pair of dressing rolls **24** and **25**, suitably mounted in the sizing vat **19**. The dressing roll **24** has a pulley **21** mounted on one end thereof which has a belt **26** thereon. Roll **22** has a pulley **27** on which belt **26** is also mounted.

The sheet of warp **15** is then usually led directly to a large drying cylinder **30** mounted in suitable brackets **31** disposed on each side of framework **32** of the slasher and is brought completely around the drying can **30** and then brought around a smaller drying can **33** and then passes beneath an idler roller **34** and over an idler roller **35** where it is passed between suitable lease rods, not shown, to the take-up end of the sizing machine. This part of the apparatus is conventional.

The lower dressing roller **24** has a shaft **40** extending therefrom at one end on which is mounted a V pulley **41** having a belt **42** mounted thereon which extends downwardly and is secured on a step pulley **43** mounted on an input shaft **44** of a gear reduction housing **45** which has extending therefrom an output shaft on which a pulley **46** is mounted having a belt **47** thereon which is adapted to be also mounted on a V pulley **50** secured on the projecting shaft **51** of an oil applying roller which is rotatably mounted in bearings **53** and **54** on a plate **55**, said plate having mounted thereon an oil or lubricant trough **56** into which a portion of the roller projects, the trough **56** being adapted to contain a suitable treating solution such as a lubricant **58**. If desired, the pulleys **41**, **43**, **46** and **50** could be sprocket wheels and the belts **42** and **47** could as well be sprocket chains and in which event an idler or adjusting pulley would not be necessary, but where a belt is used, it is necessary to provide a bracket **60** slotted as at **61** having a pair of bolts **62** penetrating the slot and fixedly secured to a framework **63** suitably supported by the floor, the bracket **60** having an idler pulley **65** thereon adapted to maintain tautness in the belt **47** regardless of the vertical adjustment of the plate **55**.

The dressing rolls **22** and **24** of the size box are driven by any suitable means, not shown, such as the conventional drive shaft extending longitudinally of the slasher and size box or boxes.

The plate **55** has projecting downwardly therefrom a pair of rib members **67** and **68** to which are pivotally secured pairs of links **70** and **71**, the lower ends of said links being pivoted by means of pivot bolts **73** and **74** to the upper ends of pairs of bars **75** and **76** whose lower ends are pivoted as at **77** and **78** to uprising projections **79** and **80**, projecting upwardly from the framework **63**. The pivot bolts **73** and **74** have mounted thereon and between the lower ends of links **70** and **71**, sleeve members **83** and **84** which have rising upwardly therefrom projections **85** and **86** respectively which are threadably penetrated by oppositively threaded portions **87** and **88** of rods **89** and having a removable handle member **90** disposed on one end thereof. By rotating the threaded shafts or rods **89**, the lubricant trough **56** can be moved upwardly or downwardly with

respect to the sheet of warp 15 passing thereabove.

I have found that best results are obtained by intermittently applying the treating solution such as a lubricant to the sheet of warp 15 and not continuously applying it to the warp. And I have found that by providing brackets 93 and 92 on the framework 32 of the slasher that I can mount a cylinder 94 in the upper ends of these brackets by the cylinder being provided with stub shafts 96 and 97 projecting from each end thereof and rotatably mounted in the upper ends of the brackets 92 and 93, and providing on this cylinder a plurality of spaced ribs 98, passing the warp 15 beneath this cylinder 94, the pull of the warp will rotate the cylinder and the ribs will vibrate the warp and move it upwardly and downwardly and cause it to intermittently engage the lubricant applying roll 52 and thus cause intermittently spaced portions of the warp 15 to have the treating solution applied thereto, which in turn is transferred to the surface of the drying cylinder 30 when the warp sheet 15 engages the cylinder 30.

If desired, positive rotation can be imparted to the cylinder 94 by any suitable means such as by mounting a pulley 100 on an extended portion of shaft 96 and mounting a belt 101 thereon and leading this belt to a pulley 102 disposed on output shaft 103 of a variable speed electric motor 104 which is supplied with electric current from any desired source by means of wires 105 and 106.

In Figure 3 the parts are shown in a position where the warp sheet 15 is engaging two of the projections 98 and thus the tension of the warp allows the warp to be raised upwardly so that it will not engage the lubricant applying roller 52. In Figure 4 the parts are identical except that it is there shown that only one of the projections or ridges 98 is engaging the warp sheet 15 which moves it downwardly to cause it to touch momentarily the lubricant applying roller 52. This causes a strumming of the warp sheet 15 by having it intermittently contact the projections or ridges 98 and thus moves it up and down in a vibratory manner to not only separate the warp threads one from the other but also to cause spots on the warp sheet located approximately one to two inches apart to have the lubricant applied thereto. The lubricant of course applied in spots to the lower side of the warp sheet when it reaches the drying cylinder 30 is applied to the drying cylinder and thus in turn is equally applied to the whole of the warp sheet, contacting the cylinder.

In Figure 3, the cylinder 94 is driven, and by varying its revolutions per minute, the warp sheet 15 can be caused to engage the roller 52 as often as desired, to thus space the lubricated spots at any desired distance apart from each other. In Figure 3, by varying the distance between the projections 98, the contact intervals may be changed.

In Figure 7, a slightly modified form of the invention is shown which is similar to the structure shown in Figures 1, 2 and 3 except that the warp sheet 15 will not be raised and lowered but will travel in a straight line from the size box to the drying cylinder. In this form of the invention, a lubricant trough 170 has disposed therein an eccentric lubricant applying roller 171 which is mounted at its ends in bearing similar to bearings 53 and 54 in Figure 2, and the method for raising and lowering this apparatus is identical to that shown in Figures 1 and 3.

The lubricant applying roller 171 has stub shafts extending from each end thereof and on one of these stub shafts is mounted a pulley 172 on which is mounted a belt such as belt 47 in Figure 3 which imparts rotation to the lubricant applying eccentric roller 171 and thus causes the roller to contact the lubricant in the trough 170 and then to intermittently contact the warp sheet 15 to apply lubricant thereto at intermittent spots therealong.

In Figures 8 and 9 like reference characters will apply to like parts except that in the brackets 92 and 93 there is mounted a warp divider and vibrator to form warp sheets 15*a* and 15*b*. The warp divider and vibrator comprises end disks 180 having fixed therebetween a plurality of rods or pipes 181 which move the warp sheets 15*a* and 15*b* up and down which intermittently moves the lower warp sheet 15*b* into contact with the roller 52 to apply lubricant thereto as the roller is rotated by means of the belt 47.

Like reference characters will apply in all of the figures where like parts are indicated.

In Figures 11 and 12 a slightly modified form of the invention is shown in which like reference characters apply, the main difference in Figures 11 and 12 being that it is quite frequently a practice in mills to have two size boxes through which the warp is passed in divided form so that it is not necessary to split the warp after it is sized, and in addition to the size box 19 there is provided an additional size box 19*a* and in which similar reference characters apply as to the size box 19 with the suffix *a* added, and the dressing roll 24*a* is driven by means of a belt 28 extending from a suitable pulley mounted on shaft 49 to a pulley mounted on shaft 40*a*, and shaft 40*a* at its other end has a pulley 29 thereon and dressing roll 22*a* at its other end has a pulley 36 thereon with a belt 37 connecting the same so as to drive the dressing rolls 24*a* and 22*a* in the additional size box. The dressing rolls in both size boxes are driven by a longitudinally extending shaft as previously described.

Likewise, there is an additional set of stands 10*a* with additional warp beams 12*a*, 13*a* and 14*a* mounted therein which pass their warps over a suitable roller 38 and then they are passed beneath a roller 39 before entering the size box 19*a*. The sheet of warp 15*c* extending from the warp rolls 12, 13 and 14 in Figures 11 and 12 is guided over a suitable idler roller 48 and then beneath idler roller 49 secured on the lower portion of size box 19*a* and then beneath an idler roller 57 secured to a lower portion of size box 19 before the warp 15*c* passes into the size box 19. The upper warp 15*d* emanating from warp beams 12*a*, 13*a* and 14*a* passes through the size box 19*a*.

In Figures 11 and 12 the lower warp sheet 15*c* is vibrated to cause it to intermittently engage lubricant applying roller 52 by cylinder 94, as has been already fully described.

Throughout the specification and claims, the terms, "lubricant," "oil," "treating solution," "treating liquid," "liquid" and "mixture" have been used. It is to be understood that these terms are to include any suitable treating liquid.

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. That method of applying a controlled amount of a treating solution to a sheet of yarn which comprises passing the yarn through a sizing box to apply a coating thereto and then intermittently applying to spaced portions of the sheet of yarn a controlled amount of treating liquid before the yarn is dried and then drying the yarn.

2. Apparatus for treating warp yarn comprising a sizing machine having a size box and a series of heated drums for drying the warp yarn after it has passed through the size box, a container for holding a treating solution a roller partially submerged in a treating solution, means for rotating the roller, means for adjusting the position of the roller towards and away from the path travelled by the sheet of yarn, and means for moving intermittently the sheet of yarn up and down to cause it to intermittently engage the treating roller to thereby apply the treating solution to spaced portions of the sheet of yarn before it reaches the heated drums of the sizing machine.

3. In combination, a slasher having a sizing box and at least one drying drum and having means for supporting a plurality of warp beams, the warp yarn on which beams being adapted to be passed through the sizing box, a lubricant applying apparatus, means for dividing the warp into upper and lower layers after it has passed through the sizing box and before it reaches the drying drum, means for intermittently moving the lower layer of yarn into contact with the lubricant applying apparatus to thereby cause a lubricant to be applied to spaced portions of the lower sheet of yarn before it reaches the drying drum to be re-united with the upper layer of yarn.

4. In combination, a slasher having a sizing box and a drying drum, means for passing warp yarn from a plurality of packages through the sizing box, means for dividing the warp into upper and lower spaced layers after it has passed through the sizing box, lubricant applying means, means for rotating the yarn dividing means to impart up and down movement to the two layers of the sheet of yarn to cause the threads of the two layers to be separated from each other and to move the lower layer into contact intermittently with the lubricant applying means to thereby apply a lubricant to spaced portions of the lower layer of yarn.

5. The combination of a slasher having a size box and a drying cylinder, means for passing warp yarn from a plurality of packages through the sizing box, means for dividing the warp into upper and lower spaced layers after it has passed through the sizing box, a rotary member having an uneven periphery adapted to be placed between upper and lower layers of the sheet of yarn as it passes from the size box to the drying cylinder to impart up and down movement to the two sheets of yarn, lubricant applying means for contacting the lower side of the lower layer of the yarn as it is moved up and down by the rotary member to thus cause intermittent spaced portions of the lower layer to have a lubricant applied thereto.

6. The combination of a slasher having a size box and a drying cylinder and means for supporting a plurality of creels for passing their warps through the size box in a composite sheet, rotary means for dividing the composite sheet after it is sized into upper and lower spaced layers, the rotary means serving to move the two layers up and down on their travel from the size box to the drying cylinder, lubricant applying means engageable by the lower sheet as it is moved up and down to apply lubricant thereto at spaced intervals thereon and before the two layers are joined into one layer on the drying cylinder.

7. That method of sizing warp yarn and applying a treating solution to the warp which comprises passing a plurality of warps through a sizing operation, then dividing the warp into upper and lower layers, then vibrating the upper and lower layers and applying a lubricant to one of the layers and then joining the two layers and subjecting the combined layer to a drying operation.

8. That method of sizing warp yarn and applying a lubricant thereto which comprises subjecting the yarn to a sizing operation, then dividing the yarn into upper and lower layers, then imparting vibratory up and down movement to the two layers, applying a lubricant to the lower side of the lower layer while it is being vibrated, then converging the two layers into one layer and then drying the composite layer.

9. Apparatus for treating warp yarn comprising means for holding a plurality of rolls of warp yarn, a sizing box through which the warp yarn from said rolls is passed to apply a coating of sizing thereto, a drying cylinder over which the yarn is passed, means for separating the yarn into upper and lower sheets after it has been sized and for imparting up and down vibratory motion to the two sheets of yarn, and means disposed below the lower sheet of yarn for applying a lubricant thereto at intermittent portions therealong before the layers of yarn are converged into one sheet on the drying cylinder.

10. Apparatus for treating warp yarn which comprises a sizing box through which the yarn is passed to apply a coating thereto, a drying cylinder over which the yarn is passed to dry the coating thereon, means disposed between the sizing box and the drying cylinder for splitting the yarn into upper and lower layers, and for imparting up and down vibratory motion to the upper and lower layers, and lubricant applying means adapted to be contacted by one of the layers of yarn at intermittent portions thereof to apply a lubricant to spaced portions of one of the layers while traveling from the size box to the drying cylinder.

11. Apparatus for treating warp yarn which comprises a sizing box through which the yarn in sheet form is passed to apply a coating of sizing thereto, a plurality of drying cylinders over which the yarn is passed to dry the coating thereon, constantly driven means for applying a lubricant onto the lower surface of the sheet of yarn by wiping contact, means for imparting up and down vibratory movement to the sheet of yarn to cause it to intermittently engage the lubricant applying means to thereby apply a lubricant to intermittently spaced portions along the sheet of yarn.

12. That method of treating yarn which comprises sizing the yarn and splitting the web into upper and lower layers, and applying a lubricant to the lower layer at spaced intervals therealong and then converging both layers together and drying the yarn.

13. That method of treating yarn which comprises sizing the yarn, splitting the web into upper and lower layers, vibrating the webs and intermittently contacting one of the webs with a

treating solution to apply intermittent spots of treating solution to one of the webs.

14. That method of treating yarn which comprises applying sizing to the yarn, then dividing the yarn into upper and lower layers, vibrating both upper and lower layers while they are still wet with the sizing, applying a treating solution to spaced portions of one of the webs and then converging the two webs into a single web and drying the sizing and treating solution thereon.

15. Apparatus for treating a web of yarn which comprises sizing apparatus for applying a coating to the yarn, a container for holding a treating solution, a roller partially submerged in the treating solution in the container, means for rotating the roller, means for intermittently engaging the web and moving it upwardly and downwardly to vibrate the same and to cause the web to intermittently engage the roller having the treating solution thereon to apply a treating solution to intermittently spaced portions of the web of yarn.

16. Apparatus for treating yarn which comprises a slasher having a size box and heating drums for drying the yarn, a treating solution trough disposed between the size box and the drying drums, a roller mounted in the trough and projecting above the upper edge of the trough, the trough being adapted to contain a treating solution, means for dividing the warp into upper and lower spaced layers after it has passed through the size box, a rotary member disposed between upper and lower webs of the yarn and having a plurality of spaced transversely extending rods means for applying rotation to the rotary member to cause it to vibrate the upper and lower sheds upwardly and downwardly and to thus cause the lower shed to intermittently engage the roller having the treating solution thereon.

17. Apparatus for treating yarn comprising a slasher having a size box and a drying drum, a treating solution container disposed between the size box and the drying drum, a driven roller mounted in the container and projecting above the upper edge of the container, means for feeding a plurality of yarns in sheet form through the size box and onto the drying drum, a rotary member having spaced ribs thereon adapted to engage the web of yarn and to move it upwardly and downwardly to vibrate the same and to also cause the web of yarn to intermittently engage the roller for applying a treating solution to spaced portions of the web of yarn.

18. That method of treating warp yarn which comprises forming the warp yarn into a plurality of sheets of unsized yarn, then introducing each sheet into a separate size box and passing each sheet through its separate size box to apply sizing thereto, then providing a lubricating means normally out of touch with the two sheets of warp, then imparting vibratory up and down movement to one of the sheets of warp to cause it to intermittently contact the lubricant applying means and then joining the two sheets of sized warp together on a drying cylinder of a slasher.

19. That method of treating yarn which comprises applying sizing to the sheet of yarn, intermittently forming spaced transverse rows of lubricated spots on all strands of the sheet of yarn, and controlling the length of the lubricated spots on the strands of yarn.

20. Apparatus for treating sheets of yarn which comprises means for applying coating material to the sheet of yarn, a trough containing a treating solution mounted below the path travelled by the sheet of yarn, a constantly driven roller mounted in the trough and having its lower portion submerged in the treating solution and having its upper portion projecting above the upper edge of the trough, means for causing relative intermittent movement between the sheet of yarn and the roller, to thereby apply the treating solution to spaced portions of the sheet of yarn.

21. Apparatus for treating sheets of yarn which comprises means for applying coating material to the sheet of yarn, a trough containing a treating solution mounted below the path travelled by the sheet of yarn, a constantly driven roller mounted in the trough and having its lower portion submerged in the treating solution and having its upper portion projecting above the upper edge of the trough, means for causing relative intermittent movement between the sheet of yarn and the roller, to thereby apply the treating solution to spaced portions of the sheet of yarn, and means for regulating the distance between the roller and the normal path of the sheet of yarn, to thereby regulate the amount of contact between the yarn and the roller.

22. Apparatus for treating yarn comprising a slasher having a size box and a drying drum and means for feeding a sheet of yarn through the size box and onto the drying drum, a trough disposed between the size box and the drying drum for containing a treating solution, a rotary roll mounted in the trough and means for moving the roll upwardly and downwardly intermittently to cause it to engage the lower side of the web of yarn at spaced intervals to apply a treating solution thereto.

23. Apparatus for treating yarn comprising a slasher having a size box and a drying drum and means for feeding a sheet of warp through the size box and onto the drying drum, a treating solution trough disposed between the size box and the drying drum and below the sheet of warp, a roller eccentrically mounted in the treating solution trough and means for imparting rotation to the eccentrically mounted roller to cause it at spaced intervals to engage the lower side of the web of yarn to apply a treating solution to the web of yarn.

24. Apparatus for applying a lubricant to a sheet of yarn during a sizing operation which comprises a sizing box through which the sheet of yarn is passed, a drying cylinder onto which the yarn is placed for drying the same, a lubricant containing trough disposed between the size box and the drying cylinder, an eccentrically mounted roller rotatably mounted in the lubricant trough, means for imparting rotation to the eccentrically mounted roller to cause it to intermittently engage the sheet of warp on its lower side and thus to apply a lubricant intermittently to portions of the sheet of sized yarn.

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The following references are of record in the file of this patent:

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