Jan. 2, 1940. I. L. GRIFFIN 2,185,747

METHOD AND MEANS FOR TREATING YARN

Filed Nov. 15, 1937 4 Sheets-Sheet 1

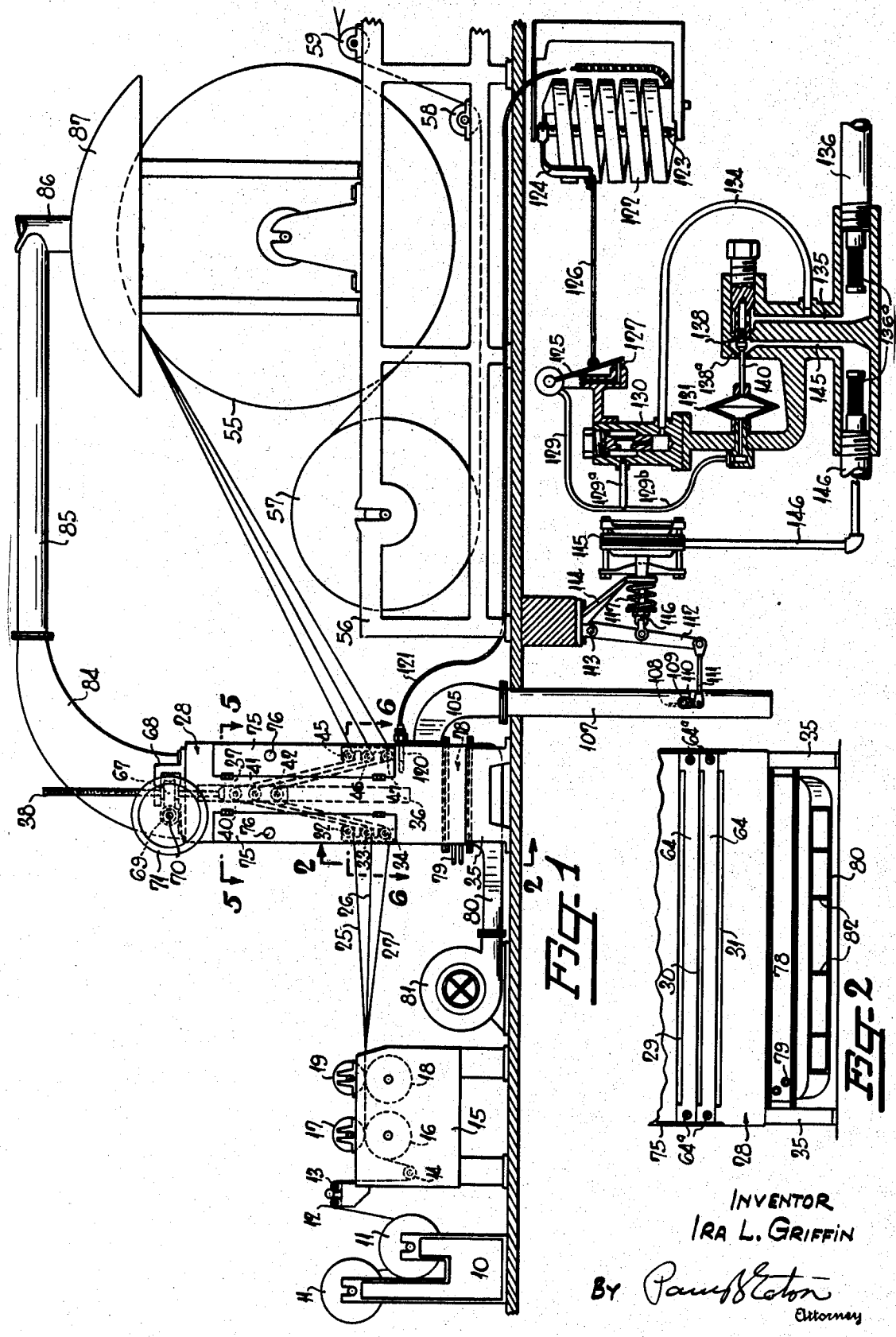


FIG-1

FIG-2

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METHOD AND MEANS FOR TREATING YARN

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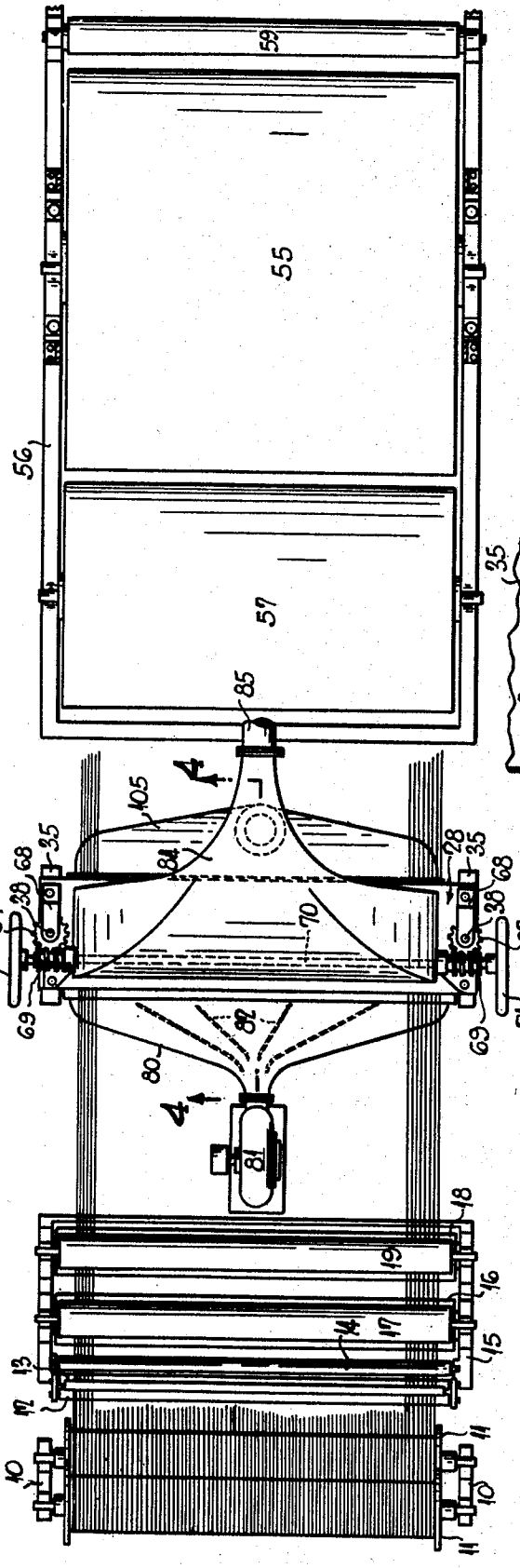


Fig-3

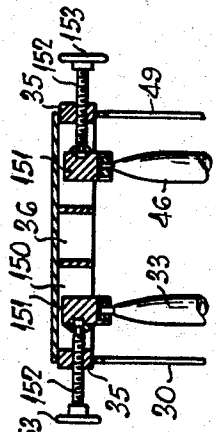


Fig-10

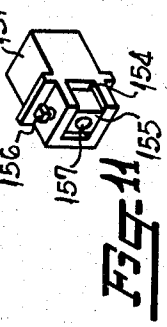


Fig-11

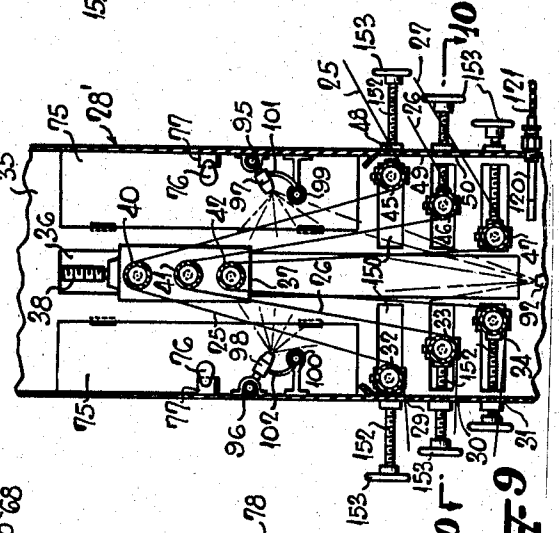


Fig-9

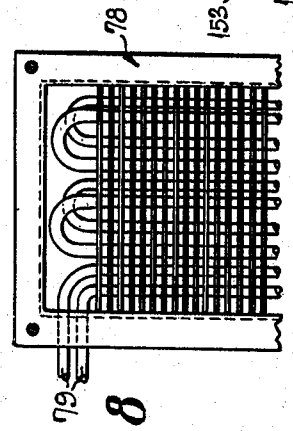


Fig-8

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METHOD AND MEANS FOR TREATING YARN

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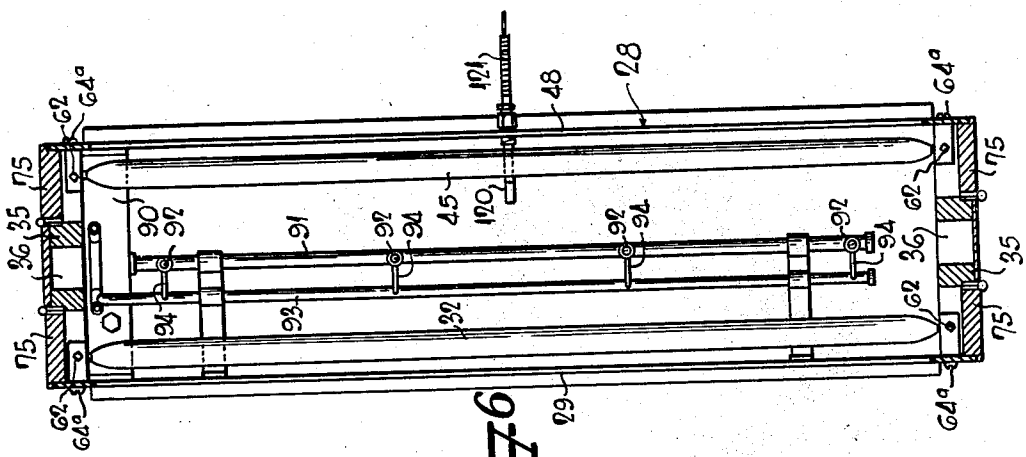


Fig. 6

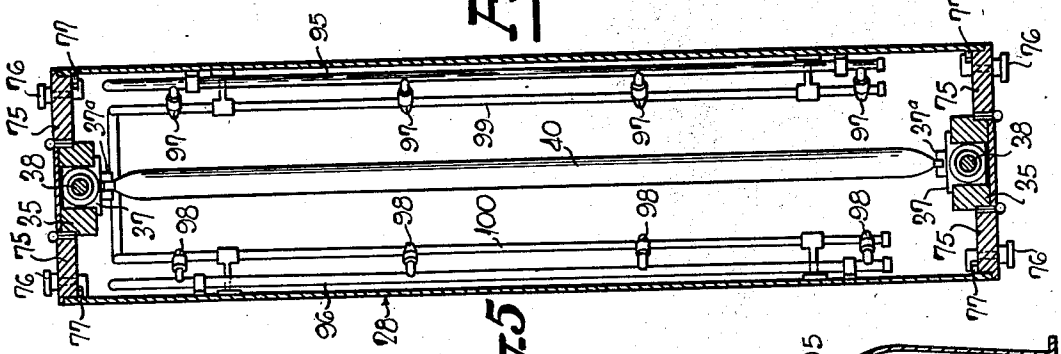


Fig. 5

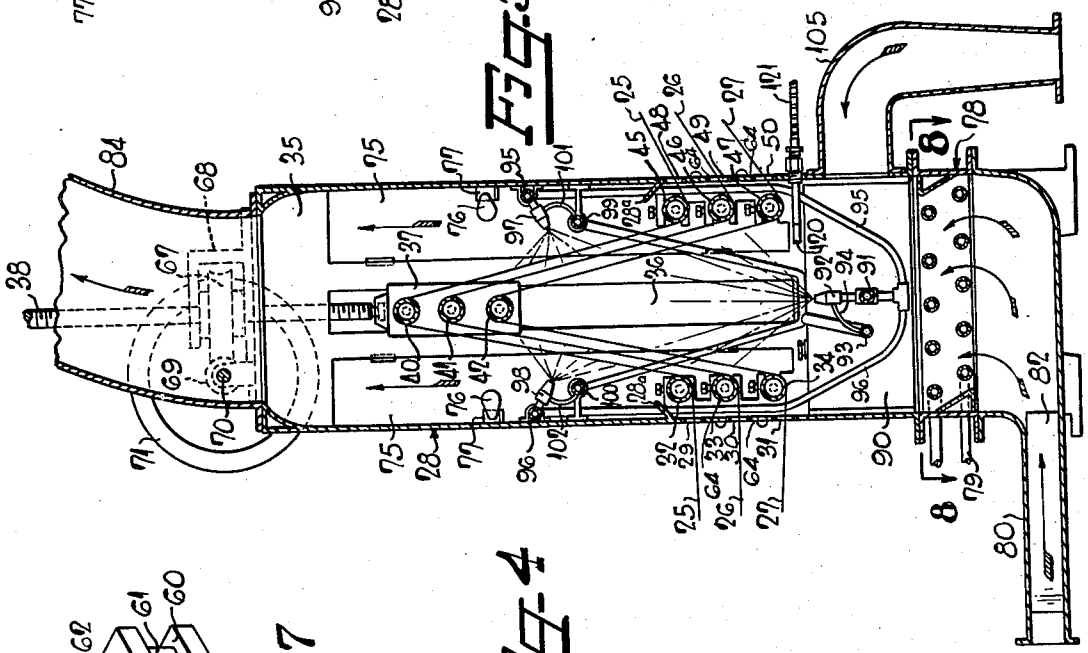


Fig. 4

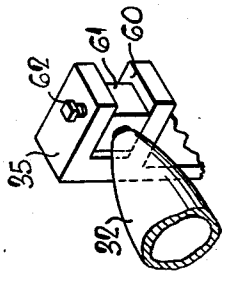


Fig. 7

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METHOD AND MEANS FOR TREATING YARN

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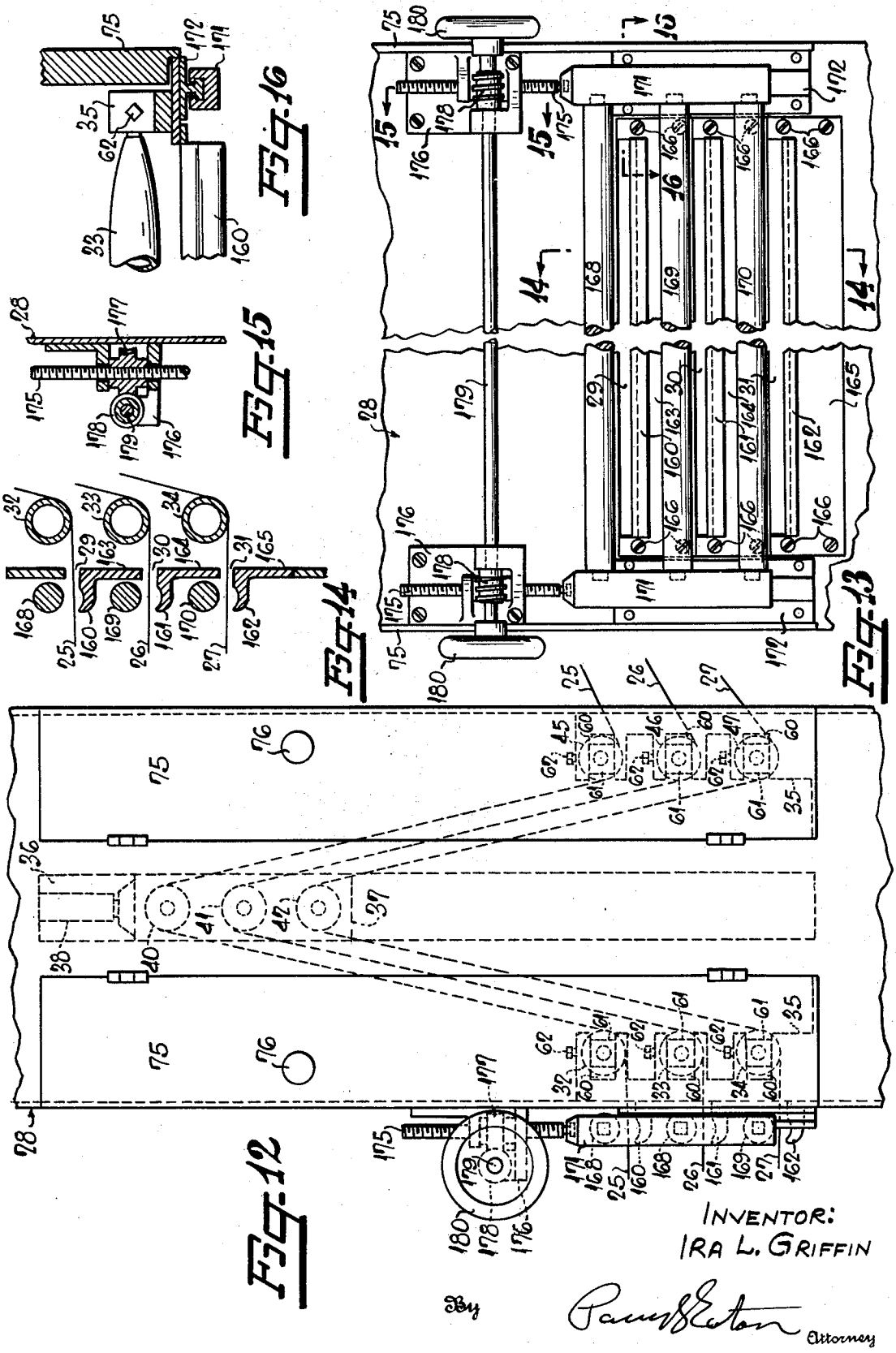


FIG-16

FIG-15

FIG-14

FIG-13

FIG-12

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Patented Jan. 2, 1940 2,185,747

UNITED STATES PATENT OFFICE

2,185,747

METHOD AND MEANS FOR TREATING YARN

Ira L. Griffin, Charlotte, N. C.

Application November 15, 1937, Serial No. 174,687

17 Claims. (Cl. 28—28)

This invention relates to a method and means for drying yarn and more especially to that method and means which is adapted to operate in conjunction with a sizing apparatus.

When a warp sheet of yarn is being sized, a plurality of yarn ends ranging from a few hundred to several thousand, are passed through a sizing box. These ends are usually drawn through in a composite sheet from several warp beams which are placed in a creel. When they pass through the sizing box, a suitable sizing solution is deposited thereon, after which it is necessary to dry the same.

In order to more effectively dry the sheet of yarn, I propose to divide the composite sheet into a plurality of layers of a lesser number of sized warp ends. This may be done by placing a lease string between the sheets of yarn from the several respective beams and maintaining the identity through the size box and then dividing the sheet by means of rollers at different points as it passes through a drying chamber. This number of divided sheets may be the same as the number of beam sheets originally comprising the composite warp or they may be combined into groups of two or more.

Heretofore great difficulty has been experienced in maintaining a uniform tension on all of the divided sheets of yarn during the drying operation. Theoretically, the correct manner in which to separate the individual layers would be in such a manner that the length of each individual layer or sheet between the size box and the drying drum would be the same. In my present invention, I have provided a suitable drying compartment with several sets of adjustably mounted rollers therein over which the individual layers of the yarn are adapted to pass. The distance between the yarn contact points on each set of rollers is the same. Since the apex rollers are adjustable, the length of each layer passing through the compartment can be varied in order to control the interval of time that the layer will be disposed therein while the yarn is passing from the size box to the drying can. This compartment has a heating means disposed therein which is used to partially dry the yarn prior to its reaching the drying cylinder. If the rollers are not disposed within the compartment so that the length of each individual layer is identical, then the tension on one layer will necessarily be greater than the tension on the others. Such a differential in tension will create a very undesirable result due to an uneven stretch in the material. The disadvantages of an uneven stretch in yarn ends is well known in the textile trade, therefore, it is not deemed necessary to discuss this feature at this time.

It is, therefore, an object of this invention to provide a drying compartment disposed between the size box and the drying cans with means disposed in the drying compartment for dividing a composite sheet of sized material into a plurality of individual sheets, said dividing means being so arranged within the box that the length of each individual divided sheet will be identical, thereby eliminating a differential in tension.

It is a further object of this invention to provide a sizing machine in combination with an intermediate drying compartment of the class described with means disposed therein for dividing a composite sheet of sized material into a plurality of individual sheets, a further means for simultaneously varying the length of the sheets disposed within the drying compartment a like amount as they pass through the drying compartment.

By the separation of the yarn and partially drying it before it reaches the drying cylinder, a film is formed due to partial evaporation and consequently the yarn will dry more easily on the drying cylinders. For this reason, it is not necessary to maintain the steam at as great heat in the cylinders as would otherwise be necesary. Also when the yarn is partially dried the evaporation on the drying cylinders will be minimized and the condensate on the hood thereabove will be reduced. By thus reducing the condensate on the hood, the dropping of the same onto the yarn as it passes over the cylinder will be practically eliminated.

This intermediate drying compartment is particularly useful on slashers which have worn drying cylinders and cannot have a normal steam pressure. With the yarn partially dried before it reaches the cylinder, it is not necessary for the normal amount of heat to be present in order to completely dry the yarn as would be the case were the yarn drawn directly from the slasher and onto the drying cylinder.

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 my invention with portions in section shown in conjunction with a slasher;

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

Figure 3 is a plan view of Figure 1;

Figure 4 is a vertical, sectional view taken along the line 4—4 in Figure 3;

Figure 5 is a sectional plan view taken along the line 5—5 in Figure 1;

Figure 6 is a sectional plan view taken along the line 6—6 in Figure 1;

Figure 7 is an isometric view showing the means for removably mounting the rollers in the lower portion of the drying compartment;

Figure 8 is a plan view taken along the line 8—8 in Figure 4, showing a portion of the heating unit;

Figure 9 is a vertical sectional detail view similar to the central portion of Figure 4, but showing a slightly modified form of the invention;

Figure 10 is a sectional plan view taken along the line 10—10 in Figure 9;

Figure 11 is an isometric view of one of the adjustable end blocks in which the ends of rollers in the lower portion of Figure 9 are mounted;

Figure 12 is an enlarged view similar to the central portion of Figure 1, but showing my invention used in combination with a warp clamping device;

Figure 13 is a view looking at the left-hand side of Figure 12;

Figure 14 is a vertical sectional view taken along the line 14—14 in Figure 13;

Figure 15 is a vertical sectional detail view taken along the line 15—15 in Figure 13;

Figure 16 is a sectional plan view taken along the line 16—16 of Figure 13.

Referring more specifically to the drawings, the numeral 10 denotes suitable creel supports for rotatably supporting the ends of warp beams 11, around which yarn is wound. When it is desired to treat the yarn, a plurality of such beams are placed in supports 10 and the individual layers of each beam are merged into a single sheet. These sheets are drawn over rollers 12 and 13, beneath immersion rollers 14, which rollers are rotatably secured to sizing vat 15. The combined layers are then drawn between squeeze rollers 16 and 17 and then between dressing rollers 18 and 19, which rollers are likewise rotatably mounted in the size vat.

As heretofore stated, it is very desirable to separate the composite sized sheet into a plurality of layers in order to more effectively dry the same and to prevent the warp ends from sticking or adhering one to another when they are finally reunited and dried. In the drawings, I have shown this combined sheet divided into three layers 25, 26 and 27, and these layers are adapted to pass into drying compartment 28 through slots 29, 30 and 31, respectively (see Figures 2 and 4). These same layers then pass beneath rollers 32, 33 and 34 which have their ends rotatably supported by frames 35 of the compartment 28.

Each of the end frames 35 of the compartment 28 has a vertically disposed slot 36 therein, in which is mounted for vertical sliding movement a block 37, said block having the lower end of a suitable threaded rod 38 secured thereto, which, in turn, penetrates the upper portion of the end frame 35.

Rotatably mounted in the blocks 37 are the ends of rollers 40, 41 and 42 over which the sheets 25, 26 and 27 pass after leaving the rollers 32, 33 and 34. Also removably mounted within the compartment 28 and at the same level as the rollers 32, 33 and 34 is another set of rollers namely 45, 46 and 47, which guide the sheets 25, 26 and 27 prior to their emerging from the drying chamber. A second set of slots 48, 49 and 50 are disposed in the sidewall of the compartment and adjacent the rollers 45, 46 and 47 so that the layers of yarn may pass therethrough and onto a drying cylinder 55 which is rotatably mounted in framework 56.

After leaving the drying cylinder 55, the combined sheet of yarn passes over a second cylinder 57 from whence it passes beneath roller 58 and above roller 59 to a suitable take-up beam, not shown. All of the members 57, 58 and 59 are supported in the framework.

It will be seen by referring to Figure 7, the manner in which the rollers 32, 33, 34, 45, 46 and 47 have their ends removably secured in the end frames 35 of the drying compartment. This frame has a plurality of horizontally disposed slots 60 therein which are adapted to accommodate bearing blocks 61, in which the ends of said rollers are mounted. When these blocks 61 have been properly positioned within the slots, suitable set screws 62 are screwed home to securely fasten the blocks and rollers in proper position relative to end frame 35.

It will also be noted that the rollers 40, 41 and 42 are likewise removably mounted within the compartment, since their ends are adapted to fit into suitable open ended slots or bearing portions 37a of blocks 37 (see Figure 5). The purpose of making all of the rollers removable is to facilitate the separation of the composite sheet into the desired number of individual layers.

The composite sheet is first drawn through the drying compartment in a single sheet and then the proper division is made according to previously inserted lease threads and the rollers inserted at the proper points. The rollers 40, 41 and 42 are lowered to substantially the same level as the rollers 32, 33, 34, 45, 46 and 47 so that the proper division can be made without producing any tension upon the individual layers.

It will be further noted by referring to Figures 2 and 4 that the side walls of the compartment 28 have plates 64 removably secured thereon by means of suitable screws 64a, between which the slots 29, 30, 31, 48, 49 and 50 appear. It is very evident that these plates also should be removed when the composite layer is drawn through the drying compartment. After the proper division has been made, that is when the rollers are placed at the proper positions, the plates 64 may be repositioned upon the opposed side walls of the compartment so that the heat therein will be prevented from escaping.

The compartment 28 has suitable troughs 28a disposed on opposed side walls and directly above the slots 29 and 48. These troughs collect any condensation which might have accumulated upon the side walls of the compartment and conduct this condensate to the side. By thus conducting the condensate, it is not allowed to fall upon the layers of yarn as they pass through the drying chamber. To allow the condensate to drop upon the layers of yarn would spot the same and produce a defective product. The rollers within the drying compartment have their ends tapered so that they may be easily inserted between the layers when a lease is formed. Also these rollers are of a hollow construction thereby cutting down the weight of the same.

The upper ends of the rods 38 are threadably mounted in suitable gears 67 which in turn are rotatably mounted in bearings 68 on the top of the compartment. These gears are adapted to mesh with suitable worms 69, said worms being

fixedly secured upon a transversely disposed shaft 70. This shaft is likewise mounted in bearings 68 and has hand wheels 71 fixedly secured on each end thereof which may be turned when it is desired to raise or lower the threaded rods 38 and the rollers 40, 41 and 42.

The end walls of the compartment 28 are provided with doors 75 which may be opened when it is desired to remove or insert any of the rollers. Each of these doors is held in a closed position by means of a suitable latch 76 which is adapted to engage projection 77 extending from the interior of the compartment. A heating unit 78 is disposed in the lower portion of the compartment 28 in which is mounted a continuous coiled pipe 79. This pipe is adapted to have steam or some other suitable heating agent circulating therethrough so that the proper heat will be furnished to the layers 25, 26 and 27 as they pass through the upper portion of the compartment 28.

In order to force this heat upwardly and away from the coiled pipe 79, a suitable duct 80 has been provided which duct has one end thereof connected to the lower portion of the heating unit 78 and its other end connected to the exhaust side of a suitable fan 81. By observing Figures 2 and 3 it will be seen that this duct, has suitable divergent plates 82 disposed therein so that the air will be properly distributed throughout the lower portion of the heating compartment and therefore direct substantially an equal amount of air through all portions of unit 78.

Another duct 84 has one end thereof secured to the upper portion of the compartment 28 and its other end is connected to a suitable pipe 85, said pipe 85 being adapted to communicate with the outlet pipe 86. This pipe 86 is adapted to carry off the vapors collected by the hood 87 from the drying drum 55.

Special attention is called to the position that the rollers 32, 33, 34, 45, 46 and 47 occupy relative to the rollers 40, 41, and 42. The rollers 32, 33, 34, 45, 46 and 47 are mounted in a stationary position and at substantially the same level. But the rollers 40, 41 and 42 may be adjusted as to height. It will be noted that there is the same vertical distance between each of the rollers 40, 41 and 42 as the vertical distance between each of the rollers 32, 33, 34, 45, 46 and 47; consequently, the length of the layer 25 between the rollers 32 and 45 is identical to the length of the layers 26 between the rollers 33 and 46. Also the length of the layer 27 between the rollers 34 and 47 is the same as the above mentioned lengths. In other words, the rollers 32, 40 and 45 form an isosceles triangle which is identical to the triangle formed by rollers 33, 41, and 46 or the rollers 34, 42 and 47; and these triangles will remain identical to each other regardless of the position occupied by the rollers 40, 41 and 42. Therefore, we must conclude that since the length of the layers 25, 26 and 27 while disposed within the compartment 28 are always equal, the tension of each individual layer will remain the same.

The length of the top layer of yarn between roller 45 and the drying cylinder 55 is less than the length of the second layer between roller 46 and the cylinder 55, and the length of the third layer between roller 47 and the cylinder 55 is still more. Therefore, when the apparatus is first threaded, compensation must be made at the take-up roll of the slasher. This compensation causes a scattering of defects such as hard size streaks, blanket marks and the like, for side by side portions of the layer when it leaves the squeeze rolls will be deposited at different places on the take-up roll.

It may be necessary to vary the elevation of the rollers 40, 41 and 42 in order to vary this length, because some sheets of yarn must be dried more than others.

When desired, a suitable lubricant may be applied to the individual layers, 25, 26 and 27 while in a separated form. I have secured a suitable lubricant supply tank 90 in the lower portion of the compartment 28 and near one end thereof. This tank is disposed above the heating unit 78 so that a uniform viscosity of the lubricant may be maintained at all times. Leading from this tank is a suitable pipe 91 which supplies a lubricant to nozzles 92, said nozzles 92 having an air supply line 93 parallel thereto for supplying compressed air to the nozzles so as to break up or atomize the lubricant and at the same time draw the lubricant from the tank 90. The nozzles 92 receive their air from the pipe 93 through suitable flexible tubes 94. Supply pipes 95 and 96 lead from the lubricant supply pipe 91, said pipes 95 and 96 being adapted to furnish lubricant to nozzles 98 and 97, respectively. Likewise these nozzles have air supply pipes 99 and 100, respectively parallel thereto for supplying lubricant to these nozzles. Suitable flexible connecting pipes or tubes 101 and 102 connect pipe 99 to nozzle 97 and pipe 100 to nozzle 98 to furnish the necessary air to atomize the lubricant as it passes through the nozzles and to force it onto the layers 25, 26 and 27.

Although I have shown means for spraying the lubricant upon the layers of yarn within the compartment, it is to be understood that this lubricant may be placed in the size box 15, in many instances and obtain good results as compared to spraying the yarn while passing through the compartment.

As long as an equal tension is maintained on the individual layers during this intermediate drying operation, an equal amount of stretch will be obtained, resulting in a uniform package of yarn, as all of the layers are wound upon a single warp beam.

Means have also been provided whereby the temperature within the compartment may be automatically maintained at a uniform or predetermined point. In order to effect this automatic means for regulating the temperature, a suitable cold air duct 105 communicates with one side of the compartment 28 at a point disposed above the heating unit 78. This duct has a suitable pipe 107 secured to its other end in which a damper 108 is pivotally mounted, as at 109. An arm 110 is secured to pivot 109 said arm having it lower end pivotally secured to a link 111, which in turn is pivoted to the lower end of operating lever 112. The lever 112 is pivoted as at 113 to a bracket 114 and this lever is operated by means of a suitable diaphragm motor 115, mounted on this same bracket. Extending from the motor 115 is a rod 116 whose end is pivoted to the intermediate portion of the downwardly extending lever 112. A compression spring 117 normally forces the lever 112 and its associated damper 108 to the position shown, that is, when no air is admitted into the motor 115. When the heat drops below a predetermined temperature within the compartment 28 then air is introduced within the diaphragm mo-

tor 115 to cause the lever 112 to rotate in a counter-clockwise manner from the position shown and thereby rotate the damper 108 to prevent cold air from being introduced up through pipe 107, duct 105 and into the lower portion of the compartment 28.

A vapor pressure bulb 120 is also disposed within tube 121 which tube is connected to helical tube 122. As the temperature rises the corresponding gas or vapor pressure in the bulb 120 is transmitted through the tubing 121 to the helical tube 122 which unwinds.

The tube 122 is also connected to a vertically disposed shaft 123 upon which a lever 124 is fixedly mounted. Secured between the free end of this lever and a flapper leaf 125 is a link 126. This leaf is adapted to close nozzle 127 when the temperature reaches a predetermined high point within the housing 28. Air is supplied to this nozzle by means of a tube 129 which tube has forks 129a and 129b, the fork 129a being adapted to communicate with reducing valve 130 whereas the fork 129b communicates with diaphragm 131. Leading from the lower portion of pressure reducing valve 130 is a tube 134. This tube has its other end connected to a suitable bore 135, said bore being adapted to communicate with air supply pipes 136, which have air strainers 136a therein. The upper end of the bore 135 has communicating therewith an adjustable valve seat 138 said valve seat being adapted to be contacted by valve cap 139. This valve cap is disposed on a suitable rod 140, which in turn is secured to the diaphragm 131. The valve cap 139 is located in the upper portion of bore 145 and the lower end of this bore communicates with pipe 146 which leads to the diaphragm motor 115.

The operating air enters through the pipe 136 and passes through bores 135, adjustable valve seat 138, bore 145, and to the diaphragm motor 115, which when operated will cause the lever 112 to rotate in a counter-clockwise manner in Figure 1 to close the damper 108 and prevent the cold air from being introduced into compartment 28. When the temperature has reached a predetermined high point and it is desired to operate the damper 108 to allow cold air to enter, the gas or vapor pressure in the bulb 120 transmitted through the tubing 121 unwinds the helical tube 122. This motion is transmitted by a link 126 to the flapper valve or leaf 125. When the control temperature is reached, this valve covers the orifice of the nozzle 127 and prevents the further escape of air at this point, causing a pressure to build up in the diaphragm 131. This diaphragm expands under pressure, and when expanded it will move to the right and cover seat 138. This motion unseats the cap 139 from seat 138a and seats it at 138, and cuts off the air to the diaphragm motor 115 at which time the air in the motor 115 will leak out through pipe 146 bore 145 and around rod 140 into space. Consequently, the spring 117 will cause the damper 108 to return to normal open position as shown. The temperature then begins to drop. The gas or vapor in the bulb 120 decreases; the helical tube 122 contracts and draws the flapper valve away from the nozzle 127. The diaphragm 131 returns to its normal position and valve cap 139 seats as at 138a, thereby allowing the air to flow from port 145 to the diaphragm motor 115 to close the damper 108.

Briefly the operation is as follows: When predetermined high temperature is reached in compartment 28, the vapor pressure in bulb 120 causes the tube 122 to expand and unwind, and thus close orifice 127; diaphragm 131 is expanded which stops flow of operating air through bores 135 and 145, air is released from diaphragm motor 115 and spring 117 then forces damper 108 to normal open position to admit cold air to compartment 28 through pipe 107. When a predetermined low temperature is reached, the tube 122 is contracted, orifice 127 is opened thus allowing diaphragm 131 to contact and place cap 139 on seat 138a; operating air enters motor 115 pulling rod 116 to the right and rotating the damper 108 transversely of the side 107 to cut off the flow of cold air into compartment 28 through pipe 107.

Figures 9, 10 and 11 show a slightly modified form of the invention, in which like reference characters will apply to like parts, and a description will be made of the parts which differ from those of the preceding form. It will be noted that the bottom rollers 32, 33, 34, 45, 46 and 47 are adjustable in a horizontal plane so that a greater spread may be obtained between the layers of yarn 25, 26 and 27. The rollers 40, 41 and 42 are mounted in an identical manner as in the preceding form. The bottom rollers are made adjustable by means of suitable slots 150 which are cut in each end frame 35 of the compartment 28'. In each of these slots a suitable block 151 is slidably mounted, said block having rotatably secured in one side thereof the end of a threaded screw 152. This screw is threadably secured in the end frame 35 of the compartment and when it is desired to vary the horizontal position of the blocks within the slots 150 the head portion 153 of the threaded screw 152 is turned. These blocks have suitable slots 154 cut therein in which bearing blocks 155 are adapted to be removably secured by any suitable means such as set screws 156. Each of the bearing blocks 155 has a hole 157 therein for the accommodation of the ends of the rollers which are disposed in the lower portion of the compartment.

Although it is not possible to maintain exactly the same tension on each individual layer when using this form of the invention unless the rollers 32, 33 and 34 lie in a plane parallel to a plane occupied by the rollers 45, 46 and 47, it is very desirable nevertheless to have this adjustable feature, especially where a greater spread is desired between the layers and the difference of tension between the individual layers is not so important. By providing these adjustable rollers it is seen that they may be placed in almost any desired position relative to each other, thereby providing a greater or a lesser distance between the individual layers of the warp while within the drying compartment.

It is, therefore, seen that I have provided a method and a means for drying yarn and applying a lubricant if desired, which will enable one to draw a plurality of layers of yarn through a drying compartment and at the same time, direct the yarn out of its general direction of travel so that a greater length will be disposed within the compartment and be subjected to a greater period of drying time. Also I have provided an apparatus which will provide for the variation of the length of yarn of the individual layers while passing through the drying compartment, without producing a differential in the tension between the individual layers.

Figures 12 to 16, inclusive, show a slightly modified form of the invention, in which a clamping

means is employed for the individual layers or sheets of yarn 25, 26 and 27. After all of the yarn from a set of warp beams has been drawn through the slasher, it is often desired to tie in the ends of another set of warp beams to the trailing ends of the preceding set. In other words, upon the exhaustion of the yarn from one set of warp beams, another set is placed in their stead, and the leading ends of this new set are tied onto the corresponding trailing ends of the exhausted set. The most convenient place for effecting this tying-in operation is prior to the entrance of the yarn into the drying chamber 28. By so tying these ends in at this point, the rethreading of the yarn through the drying chamber 28 and the remaining parts of the machine is eliminated.

Before this tying operation is effected, however, it is desirable to clamp the trailing ends of the sheets 25, 26 and 27 in fixed position before they pass the squeeze rolls 19. Therefore, I have provided a plurality of stationary jaws 160, 161 and 162 directly below the point where the sheets of yarn 25, 26 and 27 enter the drying chamber 28. The jaws are integral with plates 163, 164 and 165, respectively, said plates being fixedly secured to the exterior side wall of the chamber 28 by any suitable means such as screws 166. These plates are spaced apart so as to provide slots 29, 30 and 31 as in the preceding form, through which the layers 25, 26 and 27 are adapted to pass prior to entering the chamber 28.

It will be noted that the stationary jaws 160, 161 and 162 are disposed on the lower side of the slots 29, 30 and 31, the upper edge of said jaws being flush with the lower edge of said slots. Disposed directly above the jaws 160, 161 and 162 are shafts 168, 169 and 170, respectively. Each end of the shafts 168, 169 and 170 has a mortised block 171 secured thereto, each of said mortised blocks being adapted to slide over a T-shaped tongue 172. This tongue is fixedly secured to the sidewall of the chamber 28. Normally the lower edge of the shafts 168, 169 and 170 are disposed slightly above the upper edge of slots 29, 30 and 31, but when it is desired to tie in a new set of ends to an exhausted set, it is necessary to lower the shafts 168, 169 and 170 until they rest on the stationary jaws 160, 161 and 162, respectively. When in this position, the sheets 25, 26 and 27 will be clamped.

Each of the blocks 171 has the lower end of a threaded rod 175 rotatably mounted therein, said rods extending upwardly and being adapted to loosely penetrate a bracket 176 which in turn is secured to the side wall of chamber 28 (see Figure 15). Each of the brackets 176 has a pinion 177 mounted therein said pinion being threadably secured around the intermediate portion of rod 175. This pinion is adapted to mesh with a worm 178 which in turn is fixedly secured on transversely disposed shaft 179. The shaft 179 is also rotatably mounted in the brackets 176. Fixedly secured on each end of the shaft 179 is a hand wheel 180 which is turned by the operator when it is desired to raise or lower the blocks 171 and their associated shafts 168, 169 and 170 to clamp or release the sheets 25, 26 and 27.

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 the purposes of limitation the scope of the invention being set forth in the appended claims.

I claim:

1. 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, means for partially drying the yarn before it reaches the heated drums comprising a casing disposed between the size box and the heated drums, means for heating the interior of the casing, and means within the casing for splitting the sheet of warp yarn into a plurality of sheets while it passes through said compartment on its way from the size box to the heated drums.

2. In combination, a slasher having a size box and at least one drying drum and having a creel for supporting a plurality of warp beams from which the warp is withdrawn and passed in a single sheet through the size box, a drying compartment disposed between the size box and the drying drum, means in the drying compartment for dividing the sheet of warp into a plurality of spaced sheets and holding the spaced sheets in spaced relation while they are passing through the compartment, and means for automatically regulating the temperature within the compartment.

3. In combination, a slasher having a size box and a drying drum, means for guiding warp yarn from a plurality of warp beams through the size box, means for dividing the warp after it has been passed through the size box into a plurality of spaced layers, a casing surrounding the said spaced layers of yarn, means for heating the interior of said compartment and means for varying the length of the spaced layers of yarn in said casing.

4. The combination of a slasher having a size box and a drying cylinder, a plurality of spaced rollers for forming the sheet of sized warp after it leaves the size box into a plurality of superposed layers, a casing surrounding said layers and means for supplying heat to the interior of the casing to partially dry the yarn on its travel to the drying cylinder.

5. In a slasher apparatus having a size box through which a sheet of warp yarn is adapted to be passed and a drying cylinder over which the sized yarn is adapted to be passed to dry the same, a casing disposed between the size box and the drying cylinder through which the sized yarn is passed, a series of rollers in said casing for forming sheds in said warp, and heating means disposed in said casing for partially drying the yarn as it passes through said casing.

6. Apparatus for drying yarn on its travel from the size box to the drying cylinders of a slasher, comprising a casing provided with a plurality of superposed horizontally disposed slots on opposed sides thereof, a plurality of rollers disposed inside the casing adjacent said slots for forming sheds in the yarn, a plurality of other rollers disposed above said other rollers in said casing and over which the sheets of yarn formed by said sheds are adapted to pass to thereby increase the total length of yarn in the casing, and heating means disposed in said casing.

7. In a slasher having a size box and drying cylinders, apparatus disposed between the size box and the drying cylinders for drying sized sheet yarn comprising a casing having a plurality of slots in opposed sides, a roller associated with each slot, a plurality of rollers disposed one above the other centrally of the casing and at a higher

point in the casing than the other rollers, whereby the yarn can be formed into a plurality of sheets and conducted into said casing while wet with size and upwardly over the last-named rollers and then downwardly past the other rollers, and means for heating the interior of the casing while the yarn is being passed therethrough.

8. In a slasher having a size box and drying cylinders, apparatus disposed between the size box and the drying cylinders for drying sized sheet yarn comprising a casing having a plurality of slots in opposed sides, a roller associated with each slot, a plurality of rollers disposed one above the other centrally of the casing and at a higher point in the casing than the other rollers, whereby the yarn can be formed into a plurality of sheets and conducted into said casing and upwardly over the last-named rollers and then downwardly past the other rollers, means for heating the interior of the casing while the yarn is being passed therethrough, and means for adjusting the said centrally disposed rollers vertically in the casing to thereby regulate the total length of yarn in the casing at a time.

9. That method of treating yarn in a slashing operation which comprises applying a controlled amount of lubricant to a sheet of yarn while wet with size, while passing the sheet of yarn through a closed, heated compartment after it emerges from a sizing box.

10. That method of treating a sheet of warp yarn while it passes from a size box in a slasher to the drying cylinders which comprises passing the sheet of yarn through a heated casing, dividing the sheet of yarn into a plurality of layers while it passes through the casing, applying lubricant to the yarn while it is passing through the casing and then passing the yarn over a drying cylinder in a sizing machine to finally dry the same.

11. 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 compartment disposed between the size box and the heated drums, means for heating the interior of the compartment, means within the compartment for splitting the sheet of warp yarn into a plurality of sheets while it passes through said compartment on its way from the size box to the heated drums, and means disposed between the size box and the compartment for clamping the yarn when it is desired to tie in a new set of ends.

12. In combination, a slasher having a size box and at least one drying drum and having a creel for supporting a plurality of warp beams from which the warp is withdrawn and passed in a single sheet through the size box, a drying compartment disposed between the size box and the drying drum, means in the drying compartment for dividing the sheet of warp into a plurality of spaced sheets and holding the spaced sheets in spaced relation while they are passing through the compartment, means for automatically regulating the temperature within the compartment, and means disposed between the size box and the compartment for clamping the yarn when it is desired to tie in a new set of ends.

13. In combination, a slasher having a size box and a drying drum, means for guiding warp yarn from a plurality of warp beams through the size box, means for dividing the warp after it has been passed through the size box into a plurality of spaced layers, a casing surrounding the said spaced layers of yarn, means for heating the interior of said casing, and means for varying the length of the spaced layers of yarn in said casing, and means disposed between the size box and the casing for clamping the yarn when it is desired to tie in a new set of ends.

14. The combination of a slasher having a size box and a drying cylinder, a plurality of spaced rollers for forming the sheet of sized warp after it leaves the size box into a plurality of superposed layers, a casing surrounding said layers, means for supplying heat to the interior of the casing to partially dry the yarn on its travel to the drying cylinder, and means disposed between the size box and the casing for clamping the yarn when it is desired to tie in a new set of ends.

15. In a slashing apparatus having a size box through which a sheet of warp yarn is adapted to be passed and a drying cylinder over which the sized yarn is adapted to be passed to dry the same, a casing disposed between the size box and the drying cylinder through which the sized yarn is passed, a series of rollers in said casing for forming sheds in said warp, heating means disposed in said casing for partially drying the yarn as it passes through said casing, and means disposed between the size box and the casing for clamping the yarn when it is desired to tie in a new set of ends.

16. In a slasher having a size box and drying cylinders, apparatus for drying yarn on its travel from the size box to the drying cylinders of a slasher, comprising a casing provided with a plurality of superposed horizontally disposed slots on opposed sides thereof, a plurality of rollers disposed inside the casing adjacent said slots for forming sheds in the yarn, a plurality of other rollers disposed above said first rollers in said casing and over which the sheets of yarn formed by said sheds are adapted to pass to thereby increase the total length of yarn in the casing, heating means disposed in said casing, and means disposed between the size box and the casing for clamping the yarn when it is desired to tie in a new set of ends.

17. In a slasher having a size box and drying cylinders, apparatus for drying sized sheet yarn comprising a casing having a plurality of slots in opposed sides, a roller associated with each slot, a plurality of rollers disposed one above the other centrally of the casing, and at a higher point in the casing than the other rollers, whereby the yarn can be formed into a plurality of sheets and conducted into said casing and upwardly over the last-named rollers and then downwardly past the other rollers, means for heating the interior of the casing while the yarn is being passed therethrough, and means for automatically maintaining a predetermined temperature in the casing.

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