Feb. 19, 1952 C. A. LITZLER 2,585,948

REEL

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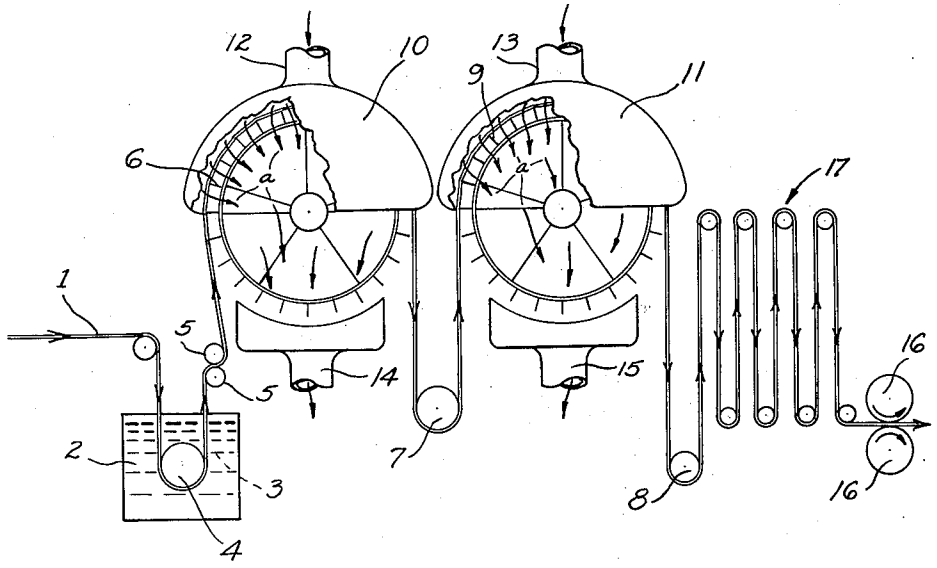


FIG. 1

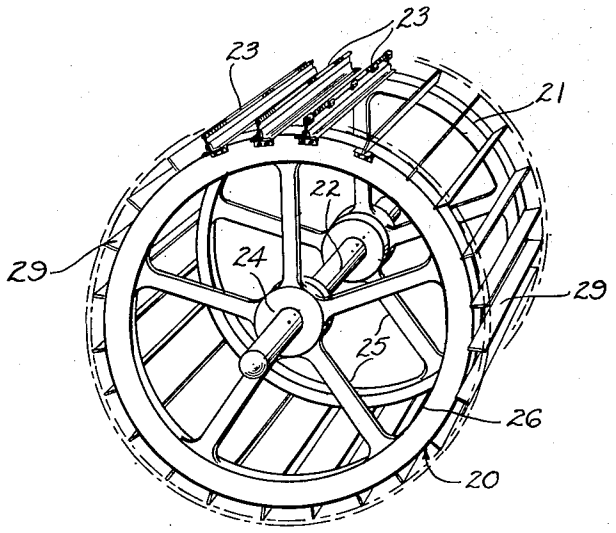


FIG. 2

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REEL

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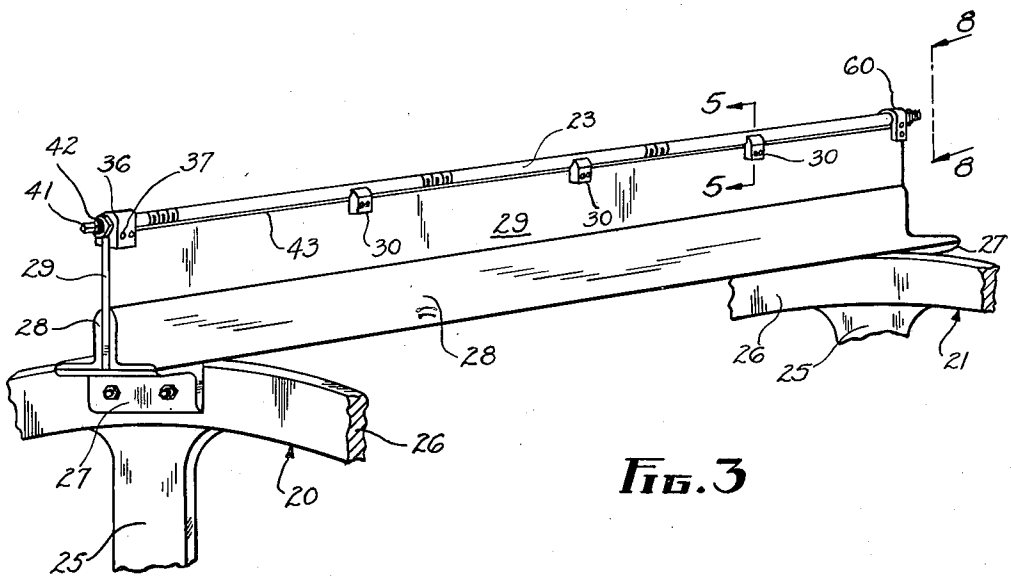


FIG. 3

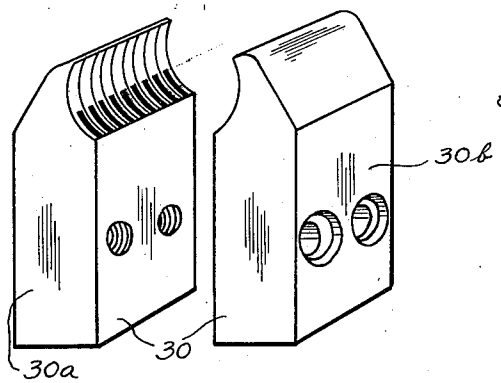


FIG. 4

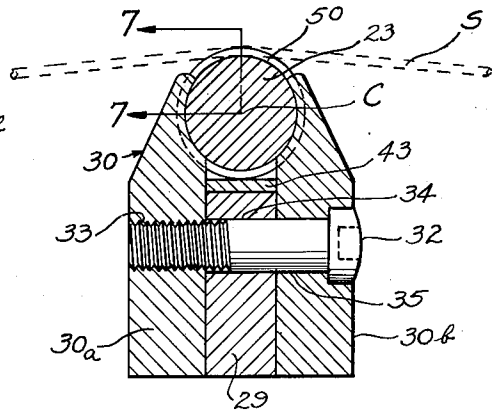


FIG. 5

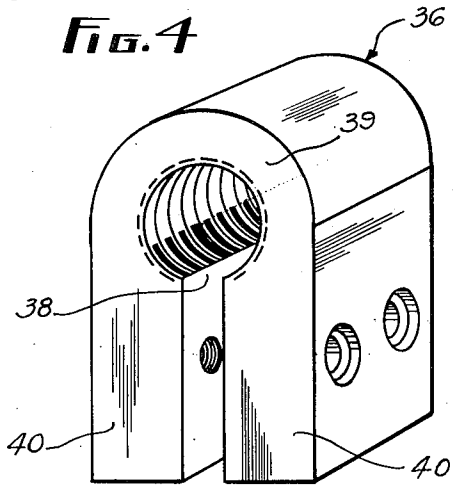


FIG. 6

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REEL

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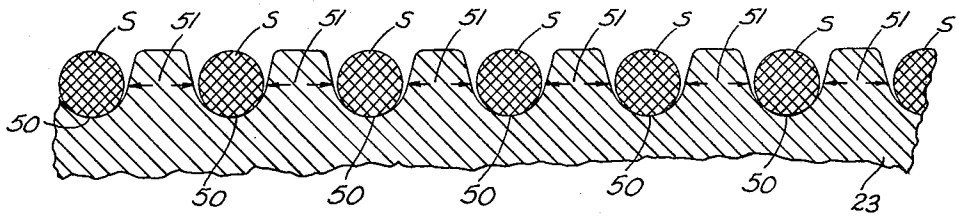


FIG. 7

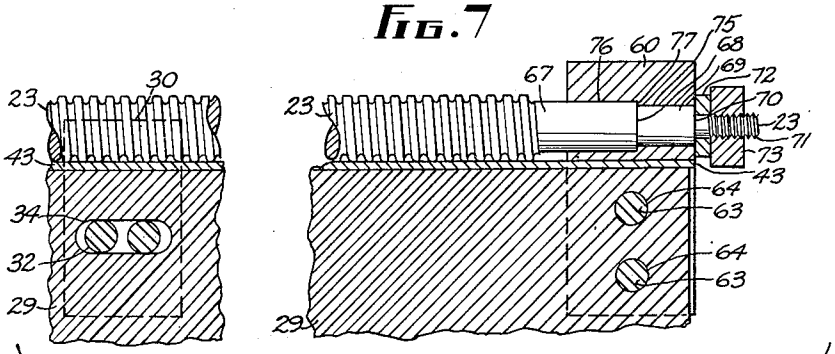


FIG. 8

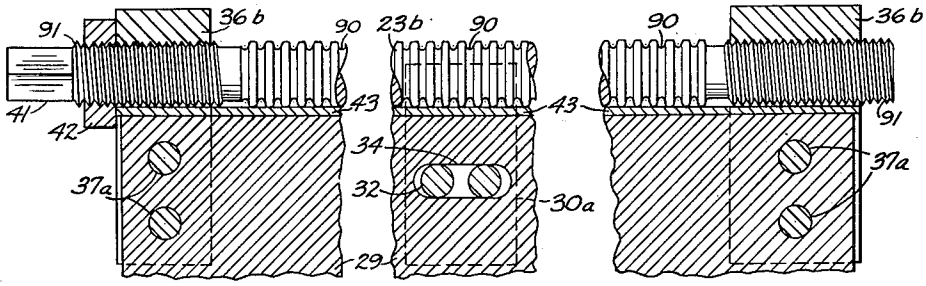


FIG. 11

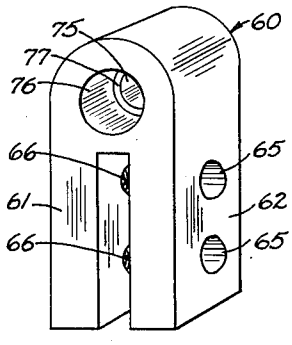


FIG. 9

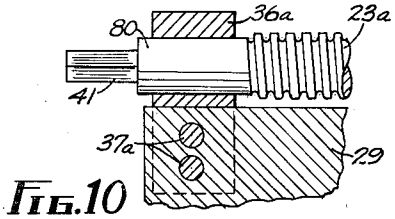


FIG. 10

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UNITED STATES PATENT OFFICE

2,585,948

REEL

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Application March 5, 1947, Serial No. 732,419

17 Claims. (Cl. 28—71.6)

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This invention relates to apparatus for solutioning, treating, handling and/or drying material such as a continuously moving weftless or warp beam fabric or a strand or plurality of strands desired to be moved in spaced parallel planes or lines, and more particularly to a reel and material supporting reel bars adapted to support and carry weftless fabric or other cords, monofilaments or strands in a manner to facilitate the treating and/or drying thereof.

By way of example, and not by way of limitation, this description will treat of my invention largely in the environment of the treatment of weftless tire ply cord fabric wherein the solution afforded by my invention to the problem heretofore existing may be conveniently illustrated.

The making of a tire ply consists in part in impregnating weftless fabric comprising a plurality of textile or monofilm cords or strands by passing the fabric through a dip tank containing a solution of latex or other impregnating material. After dipping it is necessary and desirable that the fabric be dried expeditiously, in a limited space and without impairing the desired impregnation of the cords so that it will be properly presented to the calender rolls where the rubber of the ply is forcibly worked thereinto. In the drying step it is important that the strands be spaced apart, advanced and dried at high speed, held under desirable tension, preserved from abrasive or deleterious contact with reel bars or other guiding instrumentalities, and widely exposed to a free circulation of air around and between strands and throughout substantially the whole unimpaired length of each strand.

For instance a drying reel in which my invention is employed to advantage may be about twelve feet in diameter and about six feet long and carry about fifteen hundred or so latex-wet strands each under tension depending on the material of which the strands are made. According to presently accepted practice latex-wet cotton threads or yarns may be carried over the drying reels at tensions from about ½ to 2 pounds per strand; rayon threads or yarns at tensions from about ¾ to 3 pounds per strand, and nylon monofilms and/or nylon strands from about 2 to 9 pounds per strand. Such reels so loaded may be run to have a peripheral speed of about 210 feet per minute whilst drying air or gases are blown radially around and between the spaced strands of the fabric at desirably high drying velocities and at temperatures of the order of about 300° F. Those skilled in the art will appreciate how important it is to prevent breakage of any of the strands, with consequent interruption of the progress of the work, and how important it is that the strands of the fabric are maintained in spaced relation to each other wherewith to prevent "webbing" or crossing or tangling of the strands with adhesion of the latex-wet strands to each other. Webbing and the incidents thereof, if not prevented, impairs the calendering of rubber between the strands of a ply and interferes with the desired independent bond between each strand or cord and the rubber of the ply with which it is associated.

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It is therefore among the objects of my invention to provide a drying reel adapted to support spaced strands as in weftless cord fabric or warp beam fabric at determinable laterally and longitudinally spaced points and to carry the strands comprising said fabric in uniformly spaced relationship whereby substantially the whole length of each of said strands is held and advanced substantially free in space and freely available to be dried or treated as may be desired.

Another object is to provide an improved drying reel adapted to support a web of latex impregnated weftless tire or warp beam fabric without webbing, fouling, marking, scoring or otherwise deleteriously affecting the fabric, the strands thereof or the impregnation and drying thereof. Another object is to provide a reel for drying weftless fabric or the like to facilitate rapid and uniform drying thereof under advantageous conditions of speed, tension and position.

It is also an object of my invention to provide a reel having notched strand supporting rods or bars adapted to carry a plurality of strands in uniformly spaced relationship; to support the strand on smoothly rounded limited points or areas of contact and to receive and release the strands with freedom from injurious effects thereupon.

Other and more specific objects are to provide for supporting the strands of weftless fabric or other load on a drying reel in a manner that facilitates accurate and adjustable alignment of the strands between supporting bars on the same reel as well as between bars on different reels over which the strands pass in succession; to provide strand supporting bars that are readily adjustable, replaceable and interchangeable and in which a wide range of desirable materials may be selectively employed for their respective chemical, thermal and physical properties; also to provide strand supporting reel bars having

effectively notched portions or edges, the contours of which may be economically and expeditiously formed and given a wide and desirable range of depth, width, curvature and spacing to facilitate by the replacement, adjustment and substitution thereof a wide range of shapes and sizes wherewith to accommodate strands of different sizes, qualities, character and material, whether metal, glass, plastic, textile or the like. A more specific object is to provide screw threaded strand supporting reel bars or rods, the character of the thread form of which defines the "notches" for receiving and supporting the strands. Another object is to provide a reel with a plurality of such threaded strand supporting reel bars and to support such reel bars about the periphery of the reels for adjustable rotation about their own axis wherewith to provide that the effective notch alignment between adjacent and successive bars may be made quickly and effectively by the threaded engagement of each reel bar with one or more threaded members carried by the reel. Another object is to provide a reel with threaded strand supporting reel bars and to support the reel bars securely throughout their length as against the high loads resulting from carrying the tensioned strands while preserving practicable and convenient facility of adjustment, substitution, replacement and repair of the several bars.

It is a general object to facilitate drying weftless or warp beam fabric and/or treating strands of textile and other material with economy of space, time and effort, with ease of operation, adjustment, replacement and repair and with wide facility of adaptation to different materials and conditions of operation.

Other objects and advantages of my invention will be more fully set forth in the following description of a preferred form of my invention reference being had to the accompanying figures in which Figure 1 is a diagrammatic representation of the disposition of reels embodying my invention in the environment of treating weftless cord fabric for making a tire ply or sizing warp beam fabric. Figure 2 is a perspective view of a drying reel embodying my invention. Figure 3 is an enlarged fragmentary view of a preferred form of such a reel showing one strand supporting reel bar supported on the reel. Figure 4 is a perspective view of one of the split half nuts which secure the reel bars to the reel; Figure 5 is a sectional view taken along the plane **5—5** of Fig. 3 transversely through a reel bar, supporting plate and half nut in assembled relation. Figure 6 is a perspective view of a threaded end nut in which one end of each of the reel bars is threadably engaged and supported. Figure 7 is an enlarged partial longitudinal section of a reel bar and the strands supported thereby taken along the line **7—7** of Figure 5. Figure 8 is a broken fragmentary section in a plane passing through the axis of the reel of Figure 3 and showing the disposition of one of the reel bars in one of the end bearing blocks and in an intermediate half nut. Figure 9 is a perspective view of the bar bearing block shown in Fig. 8. Figure 10 is a fragmentary sectional view taken in a plane of the axes of the reel and one of strand supporting bars at the leftward end of one of the bars as viewed in Figure 3 showing a modified form of bar and split nut. Figure 11 is a composite fragmentary section taken in a plane of the axes of the reel and one

of the reel bars showing a modified form of reel bar and coacting instrumentalities.

In Fig. 1 there is shown diagrammatically an illustrative layout including drying or treating reels embodying my invention in an illustrative installation for treating wefltess cord fabric for making rubber tires or treating any warp fabric. The weftless fabric **1** with the strands or cords comprising the same properly spaced is introduced at the left, moving first from left to right thence downwardly into a dip tank **2**, containing latex or other impregnating solution **3**, under and around a submerged roll **4**, and thence upwardly through wringer rolls **5** to a first drying reel **6**. The tension on the fabric and the strands thereof prior to their entering the bite of the wringer rolls **5** is controlled by means not shown ahead of the dip tank and is preferably rather light wherewith to let the fibers of the strands be relatively relaxed and susceptible of rapid impregnation. The wringer rolls perform at least the dual service of removing excess liquid from the strands and also providing the reaction or anchor for the tension to be applied to the fabric rightwardly of the drying reels as viewed in Figure 1, wherewith the strands may be carried over the drying reels at a desirably high tension as for example within the ranges mentioned above depending upon the material thereof. Leaving the wringer rolls **5** the fabric proceeds upwardly of and over the drying reel **6**, each strand being separately supported while in contact with the reel on the threaded reel bars **23**, see Figs. 2, 3, 5, 7 and 8. The fabric preferably has contact with the bars of the drying reel throughout the upper substantially semi-cylindrical portion of the reel passing downwardly to a floating tensioning roll **7** where its direction is reversed and, as shown by the arrows, again sent upwardly to the second drying reel **9**, similar to or identical with the reel **6**, over which it may pass in substantially the same way as it passed over the reel **6**, thence downwardly again to a second and preferably floating tensioning reel **8**, thence back upwardly into a festoon collector **17** and finally into the bite of the calender rolls **16** where the rubber of the ply is forced into intimate contact with and around each of the several strands of the fabric.

As also shown diagrammatically and incompletely in Fig. 1 illustrative hoods **10** and **11** overlie the upper substantially half portions of each of the drying reels **6** and **9**, which hoods preferably lie as close as practicable to the ends of the reels but are spaced radially therefrom sufficiently to provide arcuate chambers over each of the reels above and radially beyond the strands of fabric carried thereupon. Intake ducts **12** and **13** respectively convey hot dry air or gases to each of the hoods preferably at about the temperature mentioned above and with sufficient pressure to induce a rapid passage of the hot air or drying gases radially through the spaces between each of the strands of the fabric as suggested by the arrows *a*. Appropriate means such as the illustrative hoods or baffles associated with outlet ducts **14** and **15** are provided to convey away the gases burdened with the moisture or vapors of the solvent taken from the wet strands of fabric by the hot gases. As known in the art the gases may be appropriately re-circulated and dried with the not unusual provision for recovering the solvent, all with appropriate conduits, blowers, separators and the like not shown. By

whatever means the drying air or gases are circulated, handled or conveyed, my teaching is that I prefer to cause the drying gases to move transversely across the strands of the fabric, passing through the spaces between the strands whereby to take advantage of the feature of my invention by virtue of which the spacing between the strands is maintained to facilitate the drying thereof.

The drying reel, such as either the reel 6 or 9 above mentioned, embodying my invention may, and preferably does, as shown and suggested in Figure 2, comprise end members 20 and 21 spaced apart and fixedly secured to and rotatable with an axle 22 through which the reel as a whole is rotatably supported and may be driven or retarded as desired. By means presently to be described, there are supported a plurality of strand supporting screw threaded reel bars 23, see also Figures 3, 5 and 8, all of which preferably lie parallel with the axis of the reel and at equal radial distances therefrom; the axes of the several reel bars 23 when so positioned and secured on the reel defining a plurality of equally spaced lines lying in a common right circular cylinder whose axis is coincident with the axle 22.

Each of the end members 20 and 21 of the reel may be appropriately cast or otherwise constructed to comprise a hub 24 snugly fitting the axle 22 and preferably keyed thereto, from which spokes 25 radiate and terminate at their outer ends in an integral annular rim 26. As best shown in Figure 3, angled members 27 are secured to the rims 26 adjacent the peripheral edge thereof whereby to form flat load bearing platforms upon which may be securely mounted the means through which the reel bars 23 are removably and adjustably supported in their operative positions for carrying the strands or fabric. The angled members 27 are equally spaced around the peripheries of the rims 26 of the members 20 and 21 and are longitudinally aligned in pairs on the respective rims so that a line joining aligned pairs of angles 27 will lie parallel to the axis of the rim. Seated at their ends upon each pair of angles 27 and welded, bolted or otherwise fixedly secured thereto and supported thereby are a pair of longitudinally extending angled members 28. Between the radially outwardly extending legs of the members 28 are fixedly clamped and secured a flat load bearing plate 29, as viewed in Figure 3, the bottom or radially inward edge of which rests on the upper surfaces of the angles 27 and may also rest on the peripheral edge of the rims 26 as when the mid-portions of the angles 27 lie flush with the peripheral edge of the rims 26, as I prefer. The upper, i. e., radially outward, edge and adjacent portion of each of the plates 29 affords the support and place of attachment for each of the strand supporting bars 23.

The strand supporting bars 23, as mentioned above, are externally screw threaded throughout at least those parts of the lengths thereof with which the strands have contact, and each bar is supported radially outward of the outermost radial edge of each of the plates 29 largely in threaded supports or nuts whereby to have a threaded adjustable, rotatable and detachable relation to the plate 29. At desirably spaced intervals within and between the ends of the plates 29 there are provided pairs of half clamp nuts 30 each comprising two halves 30*a* and 30*b*, Figs. 4 and 5, the inner upper faces of which have female threads corresponding complementarily to the

external male threads of the bars 23 but extending in each half nut portion for a limited circumferential extent, as for about 90° in the form and proportions herein illustrated. The lower clamp portions of the clamp nuts have their inner juxtaposed faces arranged to lie snugly against the opposite faces of the upper part of the plate 29, as shown in Figure 5, whereby to be snugly and releasably grippable and engageable therewith when clamped thereto as by screws 32, as shown in Figure 5. When firmly clamped to the plate the half nuts will also have firm engagement with the threaded bars 23. Preferably the screws 32 have threaded engagement with the half 30*a* as at 33, Figure 5, passing through appropriate longitudinally elongated apertures 34, see also Figure 8, near the upper edge of the plate 29 and through appropriate close fitting apertures 35 in the other half 30*b* which apertures 35 are preferably counterbored to receive more or less the heads of the screws. Preferably a pair of longitudinally aligned screws 32 is provided for each clamp nut 30 wherewith to guide its sliding movement relative to the plate under the influence of the bar 23 when the screws 32 are released a little for this purpose.

As shown in Figure 5, the threaded nut parts of the clamp nuts 30 rise above or radially outward of the center C of the threaded bar 23 for a distance sufficient to restrain the threaded bar from outward radial movement as well as any other transverse movement relative to the plate 29. The amount by which the extreme radially outward ends of the clamp nuts 30 lie beyond the centers C of the bars is limited so that these outermost portions of the nuts will be well spaced inwardly of the strands S shown in broken lines in Figure 5 when the same are carried on the reel and lie in the grooves of the threads of the bars 23, see also Figure 7; the exact proportioning of the threaded parts of the clamp nuts 30 with respect to the threaded bars 23 will be governed in the design of any particular reel by the distance between adjacent bars 23 and the chordal relation of the strands S to the circle which passes through the radially outward grooves of the threads of the bar 23 with which the strands have contact in their tensioned relation to the reel.

Threadably supporting one end of each bar 23 and in turn supported by the outer end corner of each of the plates 29 are split nuts 36, see Figs. 3 and 6, which are removably clamped to the plates by pairs of screws 37 passing through elongated apertures like the apertures 34, see Figure 8, in much the same way that the clamp nuts 30 are secured to the plate, but the nuts 36 have substantially complete internal threads as shown in Figure 6 which correspond complementary to the external threads of the bar 23 save only for the gap 38 wherein the nuts 36 are split to receive the plate 29. The nuts 36 take a U-shaped form, the bend 39 of the U containing the internal threads above mentioned and the legs 40 thereof lying respectively on opposite sides of the plate 29 for releasable clamping and sliding engagement therewith. Preferably the bars 23 are squared or flattened as at 41 where they extend beyond the nuts 36 whereby they may be gripped by a wrench and turned as may be desired. Lock nuts 42 are preferably provided on the threaded parts of the bars 23 between the nuts 36 and the squared end 41 wherewith to lock the bars 23 in any desired position of rotation.

At the ends of the screws 23 and plates 29 op-

posite and remote from the nuts **36** and squared ends **41**, I provide bearing blocks **60**, see Figs. 8 and 9, which are removably and fixedly secured to the radially outward end corners of the plates **29** and which give pivotal support to the bars **23** while restraining such bars against movement in the direction of their axes. Each of the blocks **60** has a pair of depending legs **61** and **62** which straddle and snugly engage the top of the plate **29** and also straddle the end of the cushioning strip **43** as shown in Figure 8. Preferably provision is made for a pair of radially spaced clamp screws **63** passing through close fitting apertures **64** in the plate and close fitting apertures **65** in the leg **62** of the block and with screw threaded engagement with tapped holes **66** in the leg **61** of the block wherewith to positively though removably secure the block in fixed relation to the corner of the plate when the clamp or screws **63** are screwed home.

As shown in the right portion of Figure 8 the end of the screw **23** has a smooth cylindrical portion **67** of diameter equal to about the root diameter of the threads and which portion terminates in a square shoulder **68** beyond which extends a smooth cylindrical portion **69** of somewhat less diameter than the portion **67**; the cylindrical portion **69** terminating in a shoulder **70** beyond which a last portion **71** extends beyond the block for a sufficient distance to receive a bushing **72** and a nut **73**, the portion **71** being externally screw threaded sufficiently to provide threaded engagement for the nut **73**. The block **60** has a bore **75** of diameter corresponding to the portion **69** of the end of the bar wherewith to permit a close rotary fit therewith, and the block also has a counterbore **76** of diameter corresponding to the part **67** of the bar for a similar fit; a square shoulder **77** at the bottom of the counterbore affording a seat for the shoulder **68** of the bar restrains the bar against rightward axial movement as viewed in Figure 8. The bushing **72** bears on the shoulder **70** of the bar **23** and the length of the cylindrical part **69** is proportioned to the length of the bore **75** so that the bushing has a close sliding fit with the adjacent face of the block **60** when the nut **73** clamps the bushing against the shoulder **70** whereby to restrain the bar **23** against bodily leftward movement as viewed in Figure 8. Thus while the bearing block **60** permits rotation of the bar **23** about its own axis while restraining it from axial movement, turning the bar **23** about its axis will move the strands S which lie in the grooves **50** of the threads of the bar axially of the bar depending on the direction of the threads and the direction of rotation. By the same token the clamp nuts **30** and the split nut **36** will be moved in the same way and to the same extent along the axis of the bar when the bar is rotated and for that reason the apertures **34** through which the clamping screws **32** and **37** extend are elongated enough to permit the nuts to be moved axially a distance equal to at least one full pitch of the thread on the bar **23**.

An alternative form of the split nut **36** and adjacent end of the bar **23** is mentioned for a more complete disclosure of my invention with reference to Fig. 10. The split nut **36***a*, being otherwise similar to the nut **36** has a smooth bore **rotatably** receiving the smooth unthreaded end **80** of the bar **23***a*, otherwise the same as the bar **23**, wherewith the nut **36***a* may be fixedly secured as by screws **37***a* having a snug fit with corresponding apertures in the plate **29**. Locking the bar **23***a* against rotation may be done by the grip of the clamp nuts **30**. Rotation of the bar **23***a* would not require sliding movement of the nut **36***a*. Otherwise the coaction and operation of the parts would be substantially the same as my preferred form, i. e. the form illustrated in Figures 3–9.

When one strand S is first placed on the reel the lock nuts **42** and clamping screws **32** and **37** are appropriately loosened so that each of the bars **23** may be turned in the nuts **30** and **36** and block **60** and the nuts are free to slide on the plate then not substantially more than half a turn clockwise or counter-clockwise of each of the several bars will be required to align the outer parts **50** of the groove of all the threads in parallel planes normal to the axis of the reel. Thus the strand passing from one bar to another, i. e., passing from the outermost portion **50** of the groove of the thread of one bar to the corresponding part of the groove of the thread of the next bar will lie truly in a plane normal to the axis of the reel. Thus each strand will have no tendency to contact any of the bars **23** except in the aligned portions **50** of the grooves of all the bars on the reel. In the first instance the aligning of a single strand around the reel and the appropriate adjustment of each of the screws **23** will bring the strand receiving portions of all of the grooves of all the threads of each of the bars into proper alignment since the threads on all the bars are substantially identical size, form and pitch. Then when all the bars are clamped and locked in their proper positions by the screws **32** and **37** and lock nuts **42** and the reel is loaded all of the strands to be carried on the reel will each lie and travel in its respective and intended plane normal to the axis of the reel. Similarly by appropriate adjustment of the threaded bars **23** on each of a plurality of reels over which one or more strands S is intended to pass the strand engaging portions **50** of the grooves of the threads on all the bars of all the reels may readily, and/or from time to time, be brought into the desired and perfect alignment to guide the strands correctly in the desired planes of movement throughout their whole travel over a plurality of reels.

For the same reasons and in the same way the spacing between the strands will always correspond to the longitudinal thickness of the threads as at **51**, Figure 7, in the grooves of which the strands lie and have their guidance and support. As suggested in Figure 7 the shape of the thread form of the threads for the bars **23** may be chosen at will although I prefer that threads with rounded bottoms and tops substantially as shown in Figure 7 be employed whereby to more smoothly receive and support the several strands substantially as therein depicted.

Referring to Figure 5, the extend or length of contact between any strand and any reel bar **23** will depend principally on the degree to which the chordal lines in which the strands lie between adjacent bars depart from tangency at the point of contact between the strand and the bar on the one hand and upon the root diameter of the thread on the bar on the other hand; assuming the strands to be under such tension as to lie in substantially straight lines between bars. The former consideration will be governed by the peripheral size of the reel and the spacing between bars thereupon whilst the latter will be a matter of choice of the diameter of each of the bars **23** and the root diameter of the threads

thereof. Among these factors it will be appreciated that the closer the bars are spaced the greater will be the number of points of contact and support for each strand on a given reel thereby increasing the gross area of contact between the reel and the strands supported thereby on the one hand whilst the more widely the bars are spaced the greater will be the area of contact between the strand and each of the bars with which it makes contact on the other hand. Those skilled in the art will appreciate the nature of the algebraic or arithmetical computations required to design a reel according to the precepts of my invention wherewith to obtain desirable minimum areas of contact between the strands and and the bars consistent with good engineering practice balanced against the structural requirement of the reel as a whole and the loads to be imposed thereupon in relation to the desired tension to be maintained in the strands whilst the strands are supported by the reel.

The tension in the strands will largely measure the radial load imposed upon each of the reel bars **23**. Especially where for considerations such as those mentioned above it is desired that the bars **23** be of small diameter as for example ½", and thus having no great strength as beams, with relatively high tension in the strands and relatively wide spacing between clamp nuts, then I prefer to interpose a cushioning strip **43**, see Figure 5, between the radially outward edge of the plate **29** and the radially inward threads of the bar **23** so that this strip may transmit the radial loads from the otherwise unsupported parts of the bar directly to the plate. The cushion member **43** may take the form of a thin brass strip, the length and width of which may substantially correspond to the length and width of the outermost face of the plate **29** upon which it lies. The tops of the threads may thus bear forcibly upon the strip without hazard of deformation under load.

Assembly and removal of the bars **23** with and from a reel can be carried out with much facility as the above description suggests. To assemble a bar to a plate the end nuts **36** may be threaded onto the bars, the block **60** pivotally connected therewith, and then with the clamp nuts **30** opened up to receive the bar the latter may be placed in position whereafter positive locking of the block **60** to the plate and initial clamping of the nuts to the plate and to the bars, followed by such adjustment as occasion requires locates each bar in its desired radial, circumferential and axial position relative to the plate and to the reel. Final clamping of the nuts and application of the lock nut completes the assembly. Removal of a bar merely requires the reverse order of these simple operations.

One of the advantages of my invention is the facility with which the strand supporting bars may be removed and replaced whereby bars of different materials and of different chemical, thermal and physical properties may be substituted and interchanged for different requirement and conditions of service and use. Similarly where bars having different thread forms, pitch or size are desired to be substituted then the substitution will require merely the operations mentioned above plus the substitution of corresponding and complementary nuts and possibly bearing blocks as the case may be.

By the employment of threaded and threadably supported strand supporting bars I have in effect provided a reel with notched strand engaging bars or supports in which the notches are susceptible of a wide variety of choice of size, shape, contour and material as well as being capable of an infinite range of desirable adjustment to facilitate alignment of the strands upon the reel with the accompanying certainty that each strand being paid on to the reel will fall into the notch or groove intended for it without risk of being overstressed as by deleterious contact with the top edge or land of any such groove or notch. I appreciate that since the grooves of the threads which receive the strands are helical rather than circular with respect to the bars **23** the side walls of the grooves will depart a trifle from the line or plane of the straight paths of the strands. However this departure is so slight in view of the limited length of contact between the strand and the groove that it is easily compensated for by the roundness of the thread form and by giving the grooves a corresponding modicum more width, as of the order of a small percent of the diameter of the strand than would be theoretically necessary were each of the grooves on the bars **23** of circular rather than helical contour.

The employment of strand supporting bars having circular rather than helical strand supporting grooves is embraced in a modified form of my invention, Figure 11, and includes screw threaded means for moving the bars longitudinally as distinguished from restraining the bars against longitudinal movement as in the preferred form hereinabove illustrated and described.

As presently advised I believe that the cost of making strand supporting bars with circular strand supporting grooves would be greater than the cost of cutting threads therein since the threading may be readily accomplished on or upon bar stock of long length in continuously and progressively acting threading machinery well known in the art. In this form of my invention I provide circular grooves **90** throughout the strand supporting parts of the bars **23***b* and provide screw threads **91** on their ends, using internally screw threaded split nuts **36***b* at both ends of the bars to threadably receive and engage the threaded ends of the bars, and clamp "nuts" **30***a* in the middle; the clamp "nuts" **30***a* having female circular grooves corresponding to the circular male grooves **90** on the bar **23***b* rather than screw threaded grooves as in the clamp nuts **30**. The split nuts **36***b* are like the nuts **36***a* in respect to their legs and positive attachment to the plate **29** by screws **37***a* and are like the nuts **36** in respect to their internal threads and coaction with the threaded ends **91** of the bars. The clamp "nuts" **30***a* except as above mentioned, are like the clamp nuts **30** and are slidable along the plate **29** and releasably clamped to the plate **29** and bar **23***b* in the same way preferably with the same screws **32** passing through the elongated openings **34**. The bars **23***b* have the square or non-circular ends **41** and employ lock nuts **42** in the same way and for the same reasons as described in reference to the preferred form. Rotation of the bars **23***b* moves them axially and moves them and the clamp "nuts" bodily longitudinally of the plate, thereby shifting the strand engaging grooves **90** in much the same way and with much the same results as obtained in my preferred form.

While I have illustrated and described a preferred form and embodiment of my invention and have illustrated and discussed the same with especial reference to its utility in one advantageous environment I do not care to be limited in

the scope of my patent to the form or forms and environment herein specifically disclosed nor in any manner other than by the claims appended hereto.

I claim:

1. A reel bar for supporting a plurality of strands peripherally about a reel and in spaced relation to each other, said bar having external spaced grooves extending around the bar, at least certain of said grooves being adapted to receive and support such strands in any rotational angular position of the bar, at least certain of said grooves comprising screw threads, and means associated with said reel and coacting with said bar for supporting said bar whereby upon rotation of said bar new strand supporting surfaces are progressively brought into strand supporting position at points progressively advancing in an axial direction and means for locking said bar against rotation relative to the reel.

2. The combination of claim 1 with a member having internal grooves complementary to the grooves on said bar and interfittingly coacting therewith and having sliding engagement with said reel.

3. The combination of claim 2 in which the grooved part of said member extends less than 360° around said bar and exposes the radially outwardly disposed parts of said grooves to said strands.

4. The combination of claim 3 with means for releasably clamping said member in fixed relation to said reel.

5. The combination of claim 4 in which said first named means includes an internally threaded member threadably engaging said screw threads of said bar.

6. The combination of claim 1 in which said first named means includes an internally threaded member threadably engaging said screw threads of said bar.

7. The combination of claim 6 in which said member is fixed with respect to said reel and said bar is moved axially upon rotation thereof.

8. The combination of claim 7 in which the strand supporting grooves of said bar have different pitch than the said screw threads.

9. The combination of claim 8 in which said strand supporting grooves are annular.

10. The combination of claim 1 in which all of said strand supporting grooves comprise screw threads and said first named means supports said bar for rotation on its axis without movement in the direction of its axis.

11. In a reel for peripherally supporting a plurality of strands in uniformly spaced mutually parallel relation the improvement comprising round strand supporting bars disposed about the periphery of the reel and parallel to the axis thereof, each bar having grooves extending 360° about the exterior thereof at least certain of said grooves being adapted to support said strands and at least certain of said grooves taking the form of screw threads, the supported strands lying in the radially outwardly disposed parts of said grooves remote from the axis of the reel, and means supporting said bars whereby upon rotation of said bars about their own axis movement of said strands in the direction of the axis of the reel is induced, and means for locking said bars against rotation relative to the reel.

12. The improvement of claim 11 in which said bars are restrained from the same rate of axial movement as the pitch of said threads upon rotation of said bars about their own axes.

13. The improvement of claim 12 in which said bars are constrained against axial movement upon rotation thereof about their own axes.

14. The improvement of claim 11 in which said second named means have screw threaded engagement with the screw threads of said bars and said strand supporting grooves have a different pitch from the threads of said second named means.

15. The improvement of claim 14 in which said strand supporting grooves are annular.

16. The improvement of claim 11 with means underlying and supporting said bars against bending movement relative to the axis of the reel.

17. A reel for supporting weftless fabric comprising a pair of spaced end members secured to an axle, a plurality of externally screw threaded reel bars spanning the distance between said members at peripherally spaced points and adapted to uniformly space the strands of said fabric, each of said reel bars being releasably secured to and supported by a radially extending plate fastened to and connecting said members, and a strip relatively soft material interposed between each of said reel bars and its respective supporting plate, the strands of said fabric lying in the outwardly disposed parts of the grooves of the threads of said bars.

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