March 11, 1969 J. E. LEGER 3,432,117

MODULAR CREEL APPARATUS INCLUDING STRAND GUIDES

Filed May 24, 1967 Sheet 1 of 2

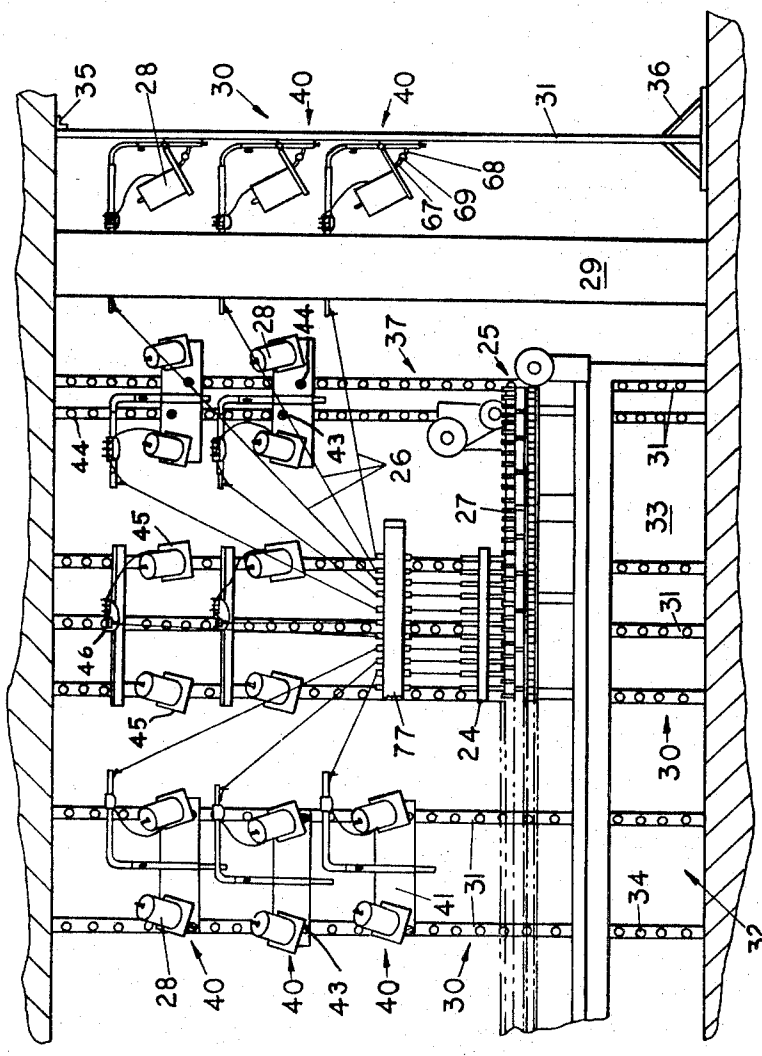


FIG. 1.

INVENTOR.
JOHN E. LEGER
BY
Pearson & Pearson
ATTORNEYS

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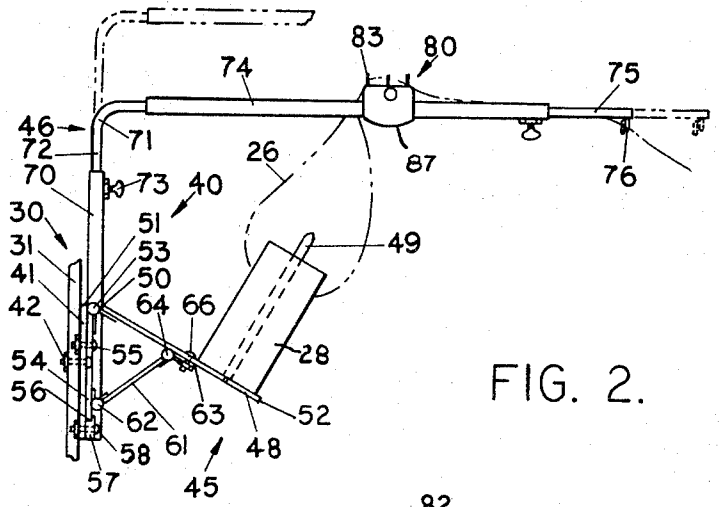


FIG. 2.

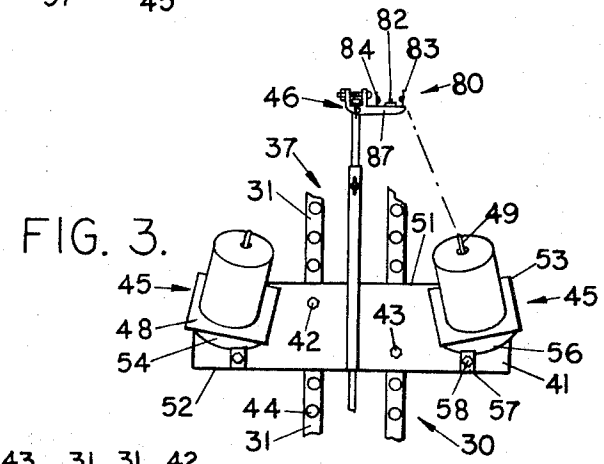


FIG. 3.

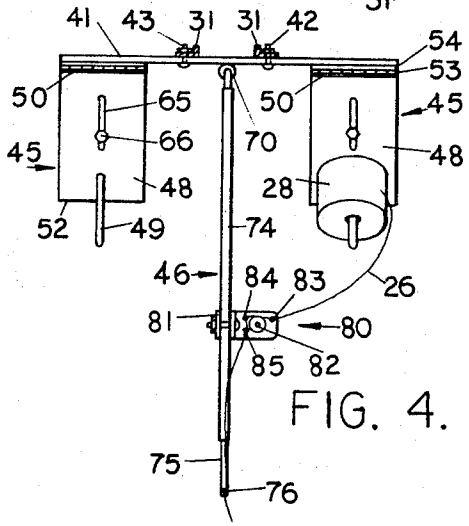


FIG. 4.

INVENTOR.
JOHN E. LEGER
BY
Pearson & Pearson
ATTORNEYS

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MODULAR CREEL APPARATUS INCLUDING STRAND GUIDES

John E. Leger, Nashua, N.H., assignor to Union Carbide Corporation, a corporation of New York

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U.S. Cl. 242—131 11 Claims
Int. Cl. D03j 5/10

ABSTRACT OF THE DISCLOSURE

A strand package support and spindle is combined with an elongated strand guide rod in a modular unit, the unit being mountable at any height on a creel frame and assembled in such quantity as is required by a strand consuming machine. The strand guide rod is horizontally and vertically adjustable to position its guide eye relative to the machine. The package support and spindle are tiltably adjustable in multiple directions to permit the spindle to be aligned for symmetrical end feed ballooning in conformity with the location of the strand guide.

Background of the invention

The modular creel apparatus of the invention is especially useful in the making of fabrics, nettings and the like, wherein it is desired to supply a multiplicity of strands from large individual packages simultaneously to a strand consuming machine, such as in knitting, weaving, or spinning. In the case of a well known type of high speed machine for making criss-cross woven netting, the machine may be simultaneously drawing strand from up to several hundred packages, each of which must have sufficient space around it to avoid fouling of the respective strands, such fouling being more likely when the strand is end fed in a balloon rather than merely unwound from a rotatable bobbin. Unlike a spinning frame, in a criss-cross netting machine there is usually insufficient space for such a collection of packages, plus an equal number of spare packages, above the machine in a conventional mill building. If a commercially available creel is used, the spindles are usually too close to each other, the number and location thereof is fixed, thus preventing respacing, and the cumbersome, creel rack is not only difficult to position relative to the point of use of the strands but often encounters floor supporting posts, making its use impractical.

As far as I am aware, there are no commercially available modular creels, and no movable package holders in the prior art which would be usable for assembling into a creel satisfactory for the above purposes. In U.S. Patent No. 2,545,203 to Head of Mar. 13, 1951, an end feed package support and guide eye are disclosed, but carried on a fixed frame with no tiltability, extensibility or other adjustable capabilities. In U.S. Patent No. 3,055,610 to Keyser of Sept. 25, 1962, a double package, single guide creel unit is disclosed for overhead use on a spinning frame, but there is no tiltability of the spindles, no extensibility of guide rods and no end pay-off capability in the apparatus.

Summary of invention

In this invention, a creel frame, or rack, is used, which does not require an unwieldly, relatively immovable frame but rather is formed of relatively light individual, vertical, perforated posts, which can be detachably affixed around the walls of a room in a mill building, or can be supported by any suitable, light weight, non-fixed base of a skeletonized nature. The upright metal posts, or a preforated sheet, are arranged around the strand consuming machine, at a spaced distance therefrom, to provide access by the

operator, and being sectional, can extend behind a floor post if necessary, while still supporting the movable creel and guide units of the invention.

While each package support and strand guide can be individually mounted in juxtaposition on the framework, preferably each modular unit consists of a backer plate which carries a strand guide rod located between a pair of package holders, so that a replacement strand package is available at all times for refilling, or so that two strands may be supplied simultaneously to the guide if desired. Each package holder includes a bottom support plate extending outwardly from the backer plate with a spindle upstanding therefrom, the plate and spindle being tiltable to conform to a desired direction of balloon end feed. Each strand guide member includes an extensible rod projecting outwardly from the backer plate at a level above the level of the package holder, so that the balloon from the free terminal end of the package spindle is unobstructed and symmetrical up to the tension control means or guide eye of the guide member. The guide rod is adjustable in height vertically, swingable in a horizontal plane, and extensible in a horizontal plane, so that it can, for example, be swung to one side or the other of a floor post to feed the machine. The modular units may be stacked one above the other by staggering the same, and may extend in horizontal rows in close proximity to accommodate the strand requirements of the machine.

Description of the drawing

FIGURE 1 is a somewhat diagrammatic side elevation of a portion of a machine showing the modular creel units in use,

FIGURE 2 is an enlarged side elevation,

FIGURE 3 is a front elevation, and

FIGURE 4 is a plan view of a preferred embodiment of the modular creel unit of the invention.

Description of preferred embodiment

In FIGURE 1, a strand consuming machine **25** is shown, which may be of the type for producing non-woven, criss-cross netting formed by alternately looping multiple strands, such as **26**, around a pair of advancing rows of pins **27**, such a machine being termed a "Scrimmaster," and commercially available from Union Carbide Corporation of New York, N.Y. There may be one hundred or more individual strands **26** being drawn off individual packages **28**, by the machine **25**, and it is desirable that the packages be located at a distance from the machine, to avoid obstructing the path of the looping mechanism **24**, or obstructing the view of the netting by the operator, and to minimize traffic at the machine in replacing depleted packages. The machine **25** is usually about ten feet in with and thirty feet in length, and therefore is likely to have one or more building posts **29** in the vicinity which would interfere with the installation of a conventional creel stand. In the textile art, creel stands holding up to one thousand large packages, called cheeses, stacked in vertical rows up to ten and extending horizontally to accommodate twenty vertical rows have been used to supply yarns to a warper for winding on a warp beam. However, it will be understood that such a warp beam exerts a relatively constant tension on the strands, it is not actually producing a web of material under constantly changing draft tensions, consumption of the strand is at relatively slow warp winding speed, and inspection of the warp is relatively easy. The creel of this invention is designed to supply multiple strands directly to a moving looper, by-passing any warping step, the looper travelling at high speed in short strokes, to produce netting at the rate of up to five hundred feet a minute while exerting varying tensions on the strand. It is also

desirable to be able to mount the packages and strand guide eyes at a level above the level of the looping zone of the machine and to deliver the strands at above head height, thereby enabling the operator to move freely around the machine.

The creel frame means **30** of the invention preferably comprises a plurality of spaced apart perforated metal posts **31**, which extend vertically, for example, at about ten inches apart to form a skeletonized creel frame **32**. The posts **31** may be secured to the room wall **33**, by suitable bolts **34**, may be secured to suitable horizontal headers **35**, or may have a lightweight skeletonized base **36**. The frame means **30** is sectional in the sense that it has no main horizontal frame, but may be assembled into any desired number of sub-frames **37**, each consisting of at least two posts **31**, each sub-frame **37** carrying one or more, and preferably three, modular creel units of the invention.

The identical, portable, modular creel units **40**, preferably include a horizontally extending backer plate **41**, which may be bolted as at **42** and **43**, at any desired height in the perforations **44** of any two posts **31** of any sub-frame **37** of frame means **30**. If desired, the backer plate **41** may be affixed to a single post **31** or the package holders and guide members may be individually secured each to a post **31**, all as shown in FIGURE 1. Each modular creel unit **40** includes at least one package holder **45** and at least one strand guide member **46**, and preferably there are a pair of holders **45** each on an opposite side of a member **46** to position a replacement package next to each package being depleted or to permit double feed if desired.

As best shown in FIGURES 2–4, each package holder **45** includes a package support plate **48**, having a package mounting spindle **49** upstanding centrally thereof. The plate **48** normally extends outwardly and downwardly from its edge **50**, proximate the upper edge **51** of backer plate **41**, to its free outer edge **52** at a spaced distance from the plate **41**. The spindle **49** is thus normally inclined from the vertical of the backer plate, for example at about 30°, thus assuring that the package **28** will not fall off the spindle while aiming the spindle upwardly and forwardly away from the frame means **30**. The upper edge **50** of support plate **48** is preferably hinge-pivoted at **53** to a base plate **54**, the base plate being flatwise and parallel against backer plate **41** and mounted to pivot on the horizontal axis of a bolt **55**. The bottom edge **56** of base plate **54** is semi-circular in configuration and lockable against backer plate **41** by a clamp **57** and a bolt **58**. Thus the support plate **48** and spindle **49** may be tilted to one side or the other on pivot **55**. A brace **61** is hinge-pivoted at **62** to base plate **54** and includes a tab **63**, hinge-pivoted at **64**, which is clampable in a slot **65** in support plate **48** by a suitable bolt **66**. The support plate **48** and spindle **49** are thus not only tiltable on a first, or longitudinally extending axis **55**, but also tiltable on a second, or laterally extending axis **53**, to fix the spindle **49** in a desired direction of alignment by locking means **57**, **58** and **66**. The brace means **61** and hinge-pivot means **62** may be in other forms if desired, for example a pair of arcuate slotted overlapping braces **67** and **68** of well known type adjustably connected by a wing nut **69** as shown in some of the units at the right of FIGURE 1.

The strand guide member **46** of each modular creel unit **40** includes a hollow cylindrical tube **70**, fixed vertically on backer plate **41**, by welding, or other suitable means, and preferably centrally between a pair of package holders **45**. A right angularly bent telescopable guide rod **71** is provided with a vertical leg **72** of circular cross section slidably and rotatably received in tube **70** and locked at any desired height or angle by set screw **73**. The horizontal leg **74** of rod **71** is of squared hollow cross section and an extensible rod **75** of square cross section is telescopably received therein. A strand guide eye **76** is provided at the terminal tip of rod **75** so that the guide

rod can be swung in a horizontal plane to position the guide eye relative to the distributor head **77** of machine **25**. The rod **75** can be extended or retracted in the horizontal plane, and the rod can be moved vertically to desired levels above the package holders. A tension control plate **80** is provided on rod **71**, including the bracket **81**, for slidably clamping the same at any intermediate location along the horizontal leg **74**, a pair of tension control plates **82** of known type and a plurality of pigtail guide eyes **83**, **84** and **85**.

The adjustable pivot means of each guide member **46**, together with the vertical and horizontal extensibility of the member, permits the guide eye **76** of each modular creel unit to be fixed at the optimum location relative to the machine **25**, distributor head **77** and any immovable obstructions for equalizing draft tension and minimizing strand sag. Upon fixing each guide eye in place, the slidable tension control plate is likewise moved to the optimum location for reducing and controllng tension while still being located above and sufficiently near the package holders to enable the formation of a symmetrical end feed balloon of strand. The adjustable tilt means of each package holder then permits its spindle to be moved into exact alignment with one of the pigtail guides such as **83** on control plate **80**, so that a balloon is formed which will not wrap itself around the parts or otherwise tend to fracture during the high speed extraction of the strand by the looper. The bottom face **87** of each control plate **80** is smooth, unobstructed, and preferably rounded to avoid any tendency of the end feed balloon to catch thereon and break the strand.

What is claimed is:

1. A modular creel for use in supplying a plurality of individual strands to a machine, said creel comprising

frame means, upstanding around said machine, independent of support thereby,

a plurality of identical package holders, each including a package support plate with an upstanding spindle, for end pay off of strand,

adjustable tilt means mounting each said package holder on said frame means for affixing said spindle at a selected angle of tilt thereto,

a plurality of identical, telescopable strand guide members, each associated with one of said holders, each including a terminal guide eye, and each including an intermediate tension control element, and

adjustable pivot means mounting each said guide member on said frame means for affixing said tension control element and guide eye at a selected angle relative thereto,

whereby each said guide member is movable on said frame means to a selected strand feed eye location relative to said machine and the spindle of each said holder is movable on said frame means into alignment with said tension control element for forming a symmetrical end feed balloon.

2. A modular creel as specified in claim **1**, wherein

each said strand guide member is mounted between a pair of said package holders, each holder on an opposite side and below the level of the guide eye of said member, one said holder carrying a package being depleted and the other said holder carrying a spare package, and

said frame means includes a horizontal backer plate carrying said guide member and said pair of holders and includes at least one vertical, perforated post detachably supporting said backer plate.

3. A modular creel as specified in claim **1**, wherein

each said strand guide member is mounted between a pair of said package holders, each holder on an opposite side and below the level of the guide eye of said member, one said holder carrying a package being depleted and the other said holder carrying a spare package; and

said frame means includes at least three spaced vertical

perforated posts, said guide member being mounted on the central post and each said package holder being mounted in juxtaposition therewith on one of the other said posts.

4. In combination with a strand consuming machine

a creel frame supported independently of, and at a distance from said machine to permit said frame and machine to be readily accessible,

a plurality of identical, portable, modular package holders, detachably mounted on said frame, each including a package support plate having a package-mounting spindle upstanding therefrom and adjustable tilt means mounting said plate on said frame for tilting on either its lateral or its longitudinal axis to fix said spindle at a desired angle for symmetrical end feed ballooning from said package,

and a plurality of identical portable modular strand guide members, detachably mounted on said frame, each including a bent, telescopable guide rod having strand tension control means intermediate of the length thereof and a strand guide eye at the terminal tip thereof, said rod being extensible vertically and horizontally to positon said guide eye at a predetermined location relative to said spindle and said machine,

and adjustable pivot means mounting each said guide rod on said frame means for moving said terminal tip in a horizontal plane on a vertical axis to fix the same in position to guide said strand to a selected location on said machine.

5. A modular creel unit for use with a plurality of identical creel units on a creel frame, said unit comprising

a backer plate detachably affixable at any desired height on said frame means,

at least one package holder including a package support plate with a package spindle upstanding therefrom,

adjustable tilt means mounting said package holder on said backer plate for affixing said support plate and spindle at selected angles of tilt,

at least one strand guide member, including an elongated, telescopable rod having a strand guide eye at the terminal tip thereof, said rod extending away from said backer plate in a horizontal plane above the level of said package holder, and

adjustable pivot means mounting said strand guide member on said backer plate for affixing said member at a selected angle in said plane and at a selected level above said package holder.

6. A creel unit as specified in claim 5, wherein

said adjustable tilt means includes a base plate on said package holder extending in parallelism with said backer plate and pivoted thereto to swing on a first axis normal thereto, hinge-pivot means connecting said support plate to said base plate for swinging on a second axis normal to said first axis, and locking means for affixing said plates at selected pivot locations.

7. A creel unit as specified in claim 6, wherein

said base plate includes a partly circular edge remote from the pivot thereof, and said locking means is a threaded clamp element affixed to said backer plate in the path of said circular edge for threadedly clamping said edge into locked position.

8. A creel unit as specified in claim 6, wherein

said locking means includes a brace element hinge-pivoted to said base plate and having a hinge-pivoted terminal tab, said support plate includes a slot along the centre line thereof and wing nut means is provided on said tab and in said slot for threadedly clamping said plates into locked position.

9. A creel unit as specified in claim 5, wherein

said telescopable rod includes a downwardly bent vertical portion of circular cross section and

said adjustable pivot means includes a hollow cylindrical tube fixed vertically to said backer plate and sleeved around said rod portion, and includes a set screw contacting said rod portion,

whereby said rod portion is movable vertically and rotatable in said tube.

10. A creel unit as specified in claim 5, wherein

said telescopable rod is right angular with a vertical portion of circular cross section and a horizontal portion of hollow squared cross section, said latter portion having a solid rod of squared cross section telescopable therein and carrying said guide eye at its terminal tip.

11. A creel unit as specified in claim 5, plus

a tension control element mounted for longitudinal sliding adjustment on said elongated rod, said element including a pair of tension plates and at least two spaced pigtail type guide eyes on the upper face thereof and having a smooth unobstructed lower face for contact by a ballooning strand without damage thereto.

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LEONARD D. CHRISTIAN, *Primary Examiner.*