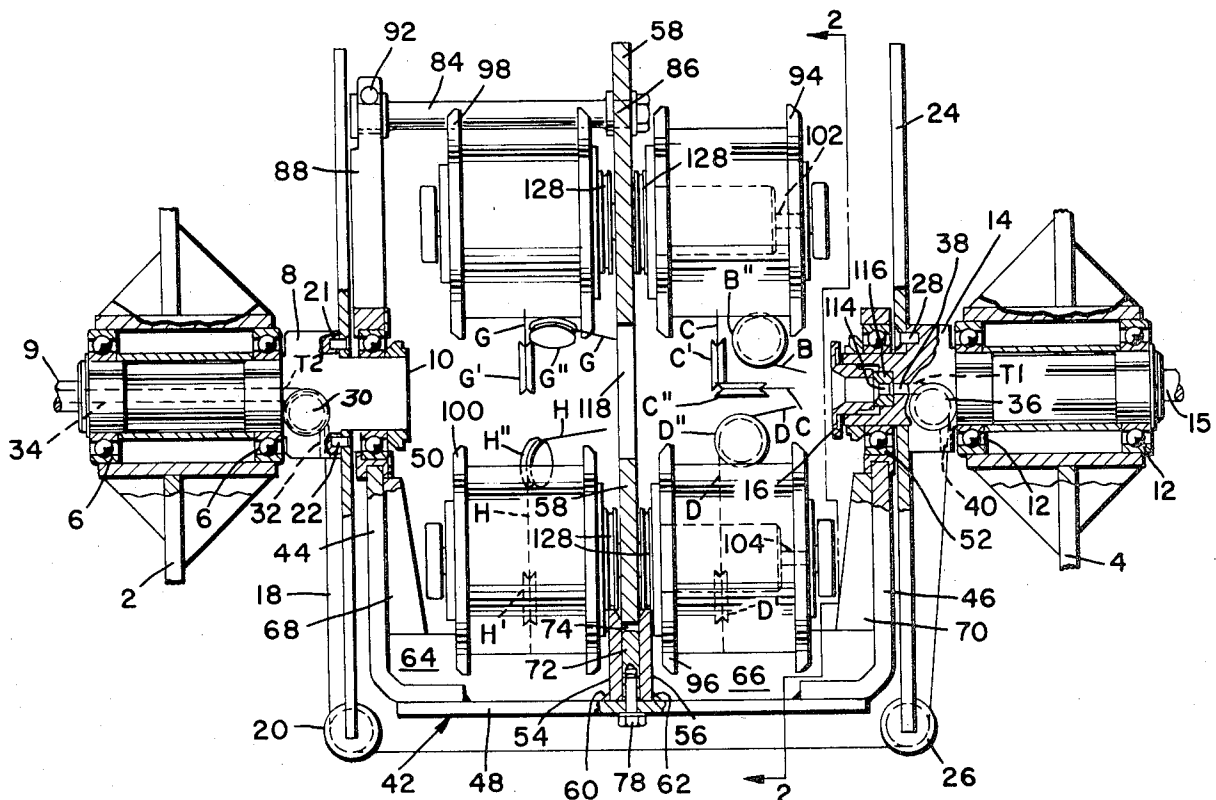
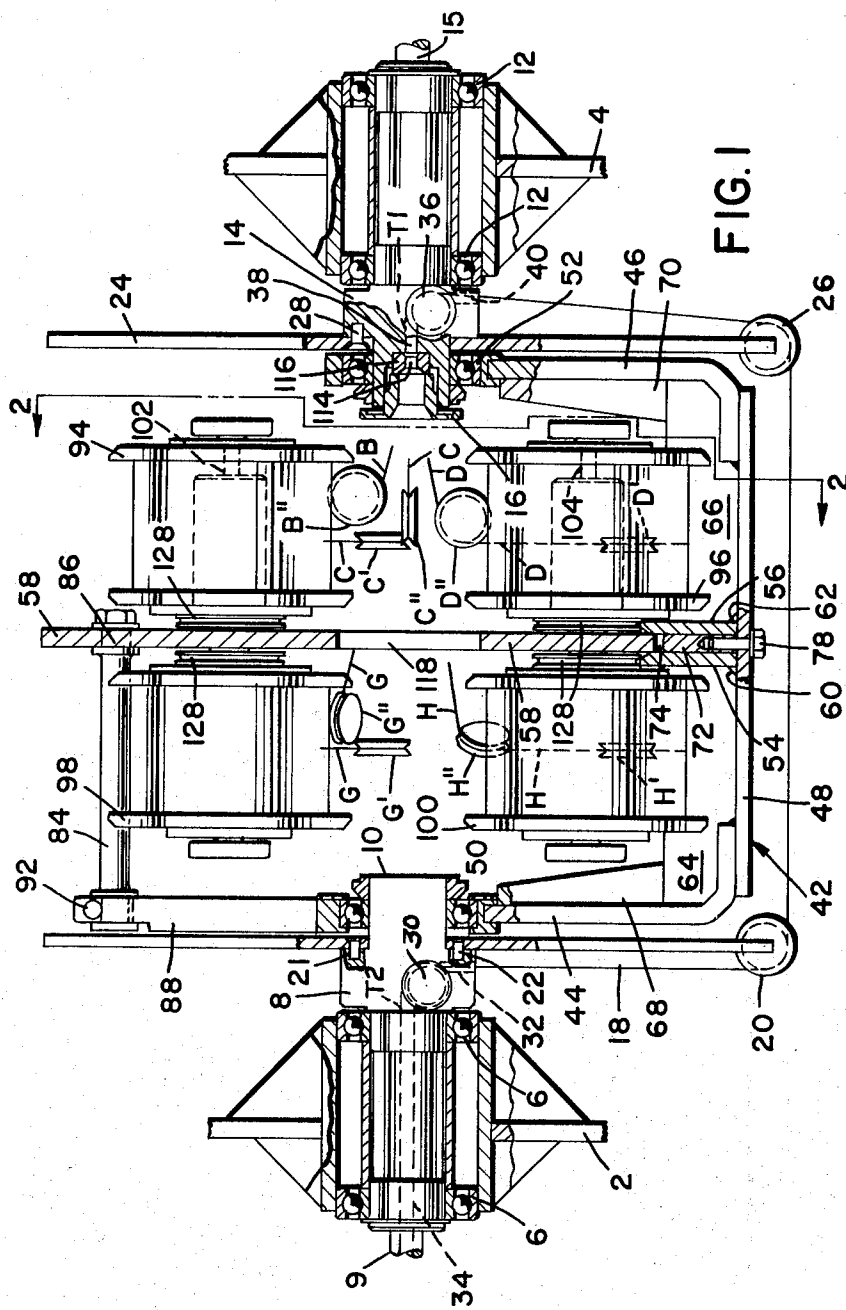
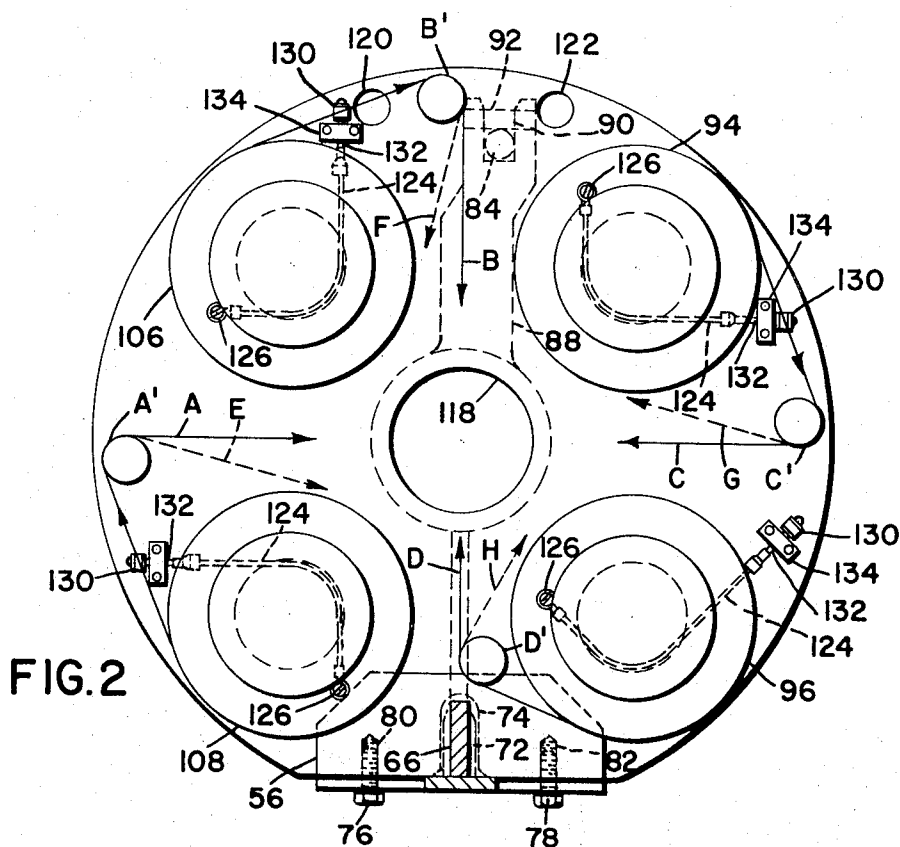
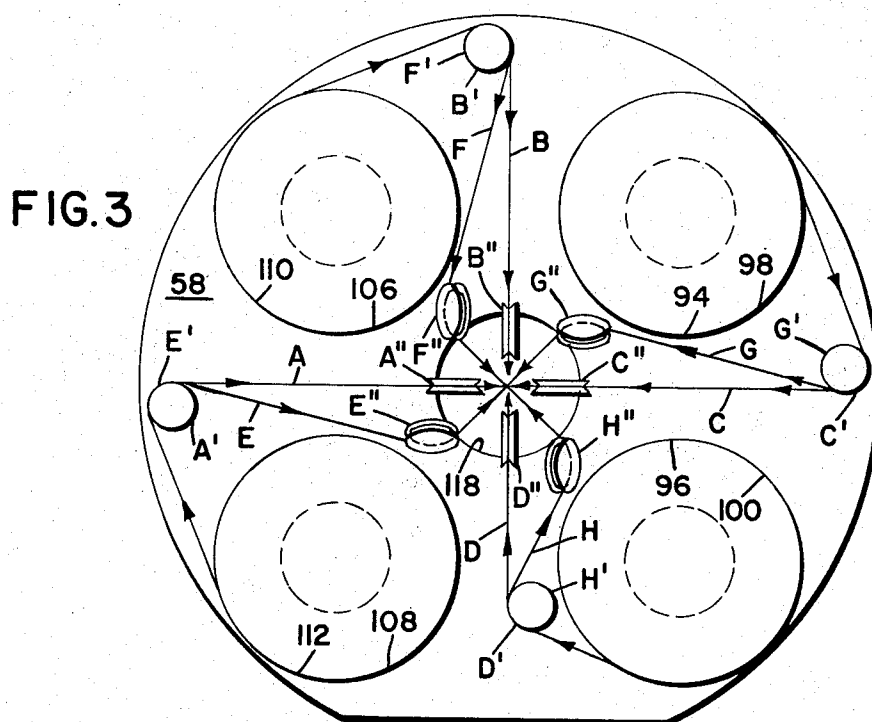


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8 Claims, 3 Drawing Figures







DOUBLE TWIST WIRE STRANDING MACHINE WITH REMOVABLE CREEL ASSEMBLY

BACKGROUND OF THE INVENTION

Machines for twisting wires or strands together to form strands or wire rope respectively are old and well known. There are two principal types of stranders, a tubular strander and a doubletwist strander. In the tubular strander, the spools of wire are mounted in a rotating frame. The wires from the spools are fed to a twisting head where the wires are twisted together to form the rope. All of the twisting is accomplished at a single twisting position. Since the speed of rotation of the frame carrying the supply spools is necessarily limited, the number of turns of twist applied per minute is correspondingly limited. Thus, in small sized ropes, the rate of production is slow.

The machine known as a doubletwist strander in which the wire spools are mounted on a stationary creel is commonly used in the production of small sized strands, ropes or cords. The twist is continuously applied at two successive positions. That is to say, half of the twist is put in at a first position and the remaining twist at a second position. This effectively doubles the rate of production over that of the so-called tubular strander.

In the doubletwist strander, present practice requires that when the wire spools are exhausted, the machine must be shut down, all of the spools must be removed from the creel, new spools are then mounted and the individual wires threaded one at a time over their respective pulleys. If the creel contains eight spools, for example, the mounting and threading of these eight spools will take a substantial time, often in the vicinity of 20 minutes or more. This downtime causes a substantial loss in production.

SUMMARY OF THE PRESENT INVENTION

The present invention is directed specifically to improvements in the construction of a doubletwist strander in which the creel support is carried on two cantilevered, spaced, aligned shafts by two spaced aligned bearings. The creel with the wire spools and wire guiding pulleys mounted thereon is removably mounted on the creel support. While the doubletwist strander is in operation, a second creel with full wire spools is made ready at an adjacent position with all of the wires threaded and bunched together ready for insertion at the first twisting position. When the spools of wire then in the operating strander are substantially exhausted, the machine is shut down, the wires are severed from the previously formed rope and the creel is removed from the creel support by a suitable lifting mechanism and deposited at an adjacent position. The second fully loaded and threaded creel is then picked up and lowered into position in the creel support, secured to the support by suitable attaching means and then the bunched ends are quickly threaded through the first twisting position and led over the pulleys on the two synchronized flyers, thence through the second twisting position and on to the take-up drum. In an alternate procedure, the bunched ends from the new full spools are tied or clipped to the severed bunched wires from the prior spools. The machine may then be put back in operation. Since the downtime required by this improved construction is not more than a few minutes,

the production of the machine may be increased over current practice by a very substantial percentage.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a vertical section of the principal elements of a doubletwist stranding machine.

FIG. 2 is a vertical elevation showing the removable creel, the view being taken on the line 2—2 of FIG. 1.

FIG. 3 is a schematic showing of the pulley arrangement.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring first to FIG. 1, there are two main spaced frame members 2 and 4. The frame 2 supports bearings 6 within which is rotatably mounted a shaft 8. This shaft broken away as at 9 has a short cantilevered overhang at the right, terminating at the end 10.

The frame 4 likewise carries bearings 12 within which is rotatably mounted a shaft 14 broken away at 15 which likewise has a short cantilevered overhang terminating at 16. A flyer 18 having on one end a pulley 20 is attached to shaft 8 by screws 21 and 22.

Shaft 14 likewise has a flyer 24 mounted thereon with a pulley 26 at one end. Flyers 18 and 24 are dynamically balanced. Flyer 24 is secured to shaft 14 by screws one of which is shown at 28.

Mounted within shaft 8 is a pulley 30 having its periphery aligned with a radial passage 32 to receive rope coming from pulley 20 and also aligned with an axial passage 34 in shaft 8 through which rope may be delivered to the take-up mechanism.

Similarly, shaft 14 has a pulley 36 mounted therein with an axial passage 38 to receive wires from the spools and a radial side delivery passage 40 through which the initially twisted rope may pass on to pulley 26.

It will be understood that mechanism, not shown, is provided for rotating shafts 8 and 14 and their associated flyers 18 and 24 at identical speeds with the pulleys 20 and 26 being maintained in aligned angular position.

A creel support generally referred to at 42 consists of a depending U-shaped frame having end members 44 and 46 and a connecting bottom platform 48. The depending end members 44 and 46 are carried by bearings 50 and 52 which are mounted on the outboard cantilevered ends of shafts 8 and 14 respectively. The creel support includes a pair of transversely extending supports 54 and 56 spaced to receive the lower end of a creel plate 58. The supports 54 and 56 are rigidly attached to bottom platform 48 preferably by welding as at 60 and 62, and additionally by longitudinal webs 64 and 66 which webs are integral with upstanding webs 68 and 70 which in turn are integral with the end supports 44 and 46. It will be appreciated that the creel support structure just recited constitutes an extremely strong arrangement fully able to carry any loads to which it will be subjected.

The creel plate is preferably in the form of rigid metal generally disc-shaped plate. The shape, however, could be varied and might even be in the nature of a frame work. It must, however, be able to support the spools and be removably secured to the creel support.

In order to accurately locate the removable creel plate 58 on the bottom platform 48, there is provided an upstanding tongue 72 integral with bottom platform 48 and centrally located between supports 54 and 56.

Tongue 72 is adapted to receive a vertical notch 74 in the bottom of creel plate 58. The creel plate 58, when in position between supports 54 and 56, is permanently secured by two bolts 76 and 78 which are screwed upwardly through appropriate holes in bottom platform 48 into corresponding threaded holes 80 and 82 in the bottom edge of creel plate 58. Thus the creel plate, although readily detachable from the bottom platform 48 by the removal of bolts 76 and 78 is nevertheless when in operating position rigidly connected to the strong creel support 42.

If deemed desirable, the upper end of the creel plate may be additionally supported against any possible lateral deflection by a brace 84 in the form of a bar preferably having its right end rigidly secured in any convenient manner as at 86 to creel plate 58 and its left end removably secured to an upward extension 88, which extension is an integral part of the left and member 44 of the creel support. As shown in FIG. 2, the extension 88 may be vertically notched as at 90 to receive the flanged end of brace 84 which when in position may be secured through the use of a removable pin 92.

In a conventional arrangement, the creel plate 58 will have mounted thereon eight spools of wire, four on one side and four on the other. Four spools are shown in FIG. 1 at 94, 96, 98 and 100. Preferably, pairs of spools on opposite sides of the plate will be axially aligned and may be carried by common shafts, two of which are indicated in FIG. 1 at 102 and 104.

The mounting of the wire spools on the creel plate is conventional and need not be explained in more detail herein as this aspect of the construction is well understood in the art. It is, of course, appreciated that the spools are readily replaceable.

In FIG. 2, which is a view looking from the right and taken on the line 2—2 of FIG. 1, the spools 94 and 96 are shown to the right of the vertical center line of creel plate 58, while two additional spools (which of course do not appear in FIG. 1) are shown at 106 and 108. The remaining two spools 110 and 112 suggested in FIG. 3 will be on the left side of plate 58 as viewed in FIG. 1 and behind plate 58 and aligned with spools 106 and 108 as viewed in FIG. 2.

The arrangement is such that the center of gravity of the combined creel support and removable creel is below the aligned axes of shafts 8 and 14. Thus, the complete creel unit hangs in stationary position from the cantilevered shaft ends 10 and 16 even though shafts 8 and 14 are rotating.

The wires from the eight spools carried by creel plate 58 are led over appropriately located pulleys mounted on creel plate 58 with their ends collected together ready to be drawn through a central opening 114 in twisting plate 116 which is affixed in the left end of shaft 14 and in series with passage 38.

The arrangement of the several spools and their related pulleys is schematically shown in FIG. 3. In this view, the wires numbered A, B, C and D are being delivered from the spools 94, 96, 106 and 108, which are the spools on the right side of the creel plate 58, as viewed in FIG. 1. The wires E, F, G and H are being delivered from the other four spools 98, 100, 110 and 112 mounted on the left side of creel plate 58. The creel plate has a center opening 118 through which the wires E, F, G and H pass enroute to opening 114. All of the collected wires, A, B, C, D, E, F, G and H pass through opening 114, through passage 38, around pulley 36, ra-

dially through passage 40, around flyer pulley 26 to flyer pulley 20, thence into radial passage 32, around pulley 30, and then axially through passage 34 to other conventional mechanisms (not shown).

As will be noted by the schematic showing in FIG. 3, the wires A, B, C and D from the spools on the right side of creel plate 58 are guided by pairs of pulleys A'A'', B'B'', C'C'' and D'D'', respectively. Inner pulleys A'', B'', C'' and D'' are spaced 90° apart. Wires E, F, G and H from the four spools on the left side of creel plate 58 are guided by pairs of pulleys E'E'', F'F'', G'G'' and H'H'', respectively. Inner pulleys E'', F'', G'' and H'' are also 90° apart, but 45° away from pulleys A'', B'', C'' and D''. As a result, the eight wires are delivered to the opening 114 in a uniformly spaced pattern which results in an acceptable twisted rope or cord. In practice, when five or more wires are being twisted, one of the wires will automatically assume a core position in a manner known to those familiar with this field.

With the machine in operation, the aligned flyers 18 and 24, because of their connection with shafts 8 and 14 which rotate at equal RPM, likewise rotate together causing the wires to be first twisted at position T1. The partially twisted wires move on over pulleys 36, 26, 20 and 30 to be twisted an equal additional amount at position T2, carrying out the normal function of a double twist stranding machine.

When the wires on the eight spools have about reached exhaustion, the machine is stopped, the wires are cut, bolts 76 and 78 are removed, the brace 84 is disconnected from extension 88 by removal of pin 92, lifting hooks are placed in the openings 120 and 122, and the whole creel plate with the empty wire spools is hoisted free of the creel support 42. Another creel plate already prepared at an adjacent loading station with full spools of wire and with the wires threaded about their related guide pulleys is then lifted by the hoist and lowered into position on the creel support 42. The new creel plate 58 is bolted in place and the ends of the eight collected wires are drawn through opening 114, pulled around pulleys 36, 26, 20 and 30 on through passage 34 and thence to the take-up drum in the conventional arrangement. The machine is then put back in operation and the production of wire rope or cord is resumed. The change-over time required for removal of the first creel plate with the empty wire spools and the installation of the new creel plate with the full wire spools followed by the necessary threading takes but a few minutes as compared with the relatively long downtime required according to the prior practice in which each empty spool has to be removed individually from the permanent creel plate and replaced by a full wire spool.

While the newly inserted creel plate and the full spools are in operation in the twisting machine, the first creel plate can be reloaded and made ready for insertion in the machine when the second set of spools have become exhausted.

In accord with customary practice, each spool's unwinding rotation is controlled by an individual adjustable brake. The brakes for spools 94, 96, 108 and 106 are shown in FIG. 2. Each brake consists of a strap 124 fixed at one end 126 and passing around a portion of a circular grooved part 128 of the spool. The strap can be adjustably tensioned against the groove by means of a nut 130 threaded on stem 132 and acting against a

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fixed support 134. The brakes are readily adjusted so that the wires of the spool are under substantially equal tension enroute to the first twisting position T1.

While the invention has been described in connection with the formation of wire rope or cord, it will be understood that the invention will perform equally well when filaments of other material are used. In the claims, when the term wire is used as the material on the spool, it will be understood that it encompasses all types of single or multiple filaments capable of being twisted into rope.

Modifications and further applications of the invention will now be apparent to those skilled in the art without departing from the spirit and scope of the invention.

I claim:

1. In a double twist stranding machine, a pair of spaced aligned shafts having opposed cantilevered ends, a U-shaped creel support hanging from said ends, a creel plate extending transversely of the axes of said shafts and removably mounted on said creel support, said creel plate having means mounted thereon for carrying a plurality of spools of wire.

2. The construction set forth in claim 1, said creel plate carrying at least one pulley for each spool for guiding the wire from the spool toward the first twisting position, said pulleys being circumferentially spaced from each other.

3. The construction set forth in claim 1, said creel plate being generally in the form of a disc and having a center opening through which wires from spools on the side of said plate remote from the first twisting position may pass enroute to the said first twisting position.

4. The construction set forth in claim 1, said creel support including a bottom platform of substantial transverse width, cooperating means on said platform and the creel plate for locating said creel plate trans-

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versely of said shafts, and means for maintaining said creel plate vertically with respect to said platform.

5. The construction set forth in claim 1, one end member of said creel support having an upward extension and a brace detachably connecting the upper part of said creel plate with said extension.

6. The construction set forth in claim 1, the center of gravity of said creel support, creel plate and spools and wire carried thereby being below the axis of said aligned shafts whereby said creel support and said creel plate will hang in stationary condition from said shaft ends.

7. The construction set forth in claim 1, said creel plate having a center opening, said creel plate carrying inner and outer pulleys for each spool carrying means, the inner of said two pulleys for each spool being mounted close to the axis of said aligned shafts, all of said inner pulleys being uniformly circumferentially spaced about the said axis, whereby wires travelling from said inner pulleys to the first twisting position will be uniformly spaced in conical formation.

8. In a double twist stranding machine, a pair of spaced axially aligned rotatable shafts having opposed cantilevered ends with passageways extending there-through; flyer means carried on said shafts for rotation therewith, said flyer means having pulley means associated therewith; a U-shaped creel support hanging from said ends; a creel plate removably mounted on said creel support, said creel plate having means mounted thereon for carrying a plurality of spools of wire, the arrangement of the aforesaid components being such that the wire from said spools may be threaded through the passageway in one of said ends, thence over said pulley means, and thence through the passageway in the other of said ends.

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