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STRINGING BLOCK APPARATUS

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This invention relates to stringing block apparatus for use in stringing cables and more particularly to multiple-pulley stringing block apparatus for use in simultaneously stringing a plurality of cables in side-by-side relation.

It has become a common practice in the stringing operation to pull or string a plurality of conductor cables simultaneously in side-by-side relation. It is, of course, desirable to string or pull a plurality of cables simultaneously in side-by-side relation and certain stringing block devices have been developed to permit this type of stringing operation. Most of the prior art devices currently now being used to permit simultaneous stringing of a plurality of cables in side-by-side relation have been found unsatisfactory in several respects.

During the stringing operation wherein a plurality of cables are simultaneously pulled or strung for subsequent connection to an insulator support, a stringing block is usually suspended from an insulator and the cables are thereafter threaded through the block by the lead line. In the multiple stringing operation, the lead line is connected to a running board, the latter having the conductor cables secured thereto so that when the running board is pulled through the stringing block, the cables presumably will be seated on their respective sheaves or pulleys. Most of the prior art devices currently being used for this type of work are exceedingly large and heavy and are comprised of a pair of pulleys or sheaves mounted in spaced apart relation with a central roller-like construction interposed between these pulleys. The central sheave or roller is intended to accommodate the pulling line and when the running board is pulled through the block the conductor cables are intended to be seated upon the outboard pulleys or sheaves. However, in the prior art devices, the central pulley has no groove, as such, but is of hourglass configuration thus permitting a great deal of lateral play thereupon by the pulling line. With this arrangement, the running board will not be properly aligned with the stringing block apparatus so that the passing of the latter through the stringing block is impaired.

Another disadvantage experienced through use of the prior art devices is that these devices will become angularly displaced with respect to the vertical prior to the passing of the running board through the stringing block. This angular displacement of the prior art stringing block is caused by the weight differential in the conductors being pulled and the pulling line and it has been found that the pulling line will sometimes be outweighed as much as six to one with respect to the conductors. It has, therefore, been necessary to stabilize these prior art devices by means of tag lines and the like.

It is, therefore, a general object of this invention to provide a novel multiple, tandem-pulley, stringing block, of highly efficient and compact construction for use in simultaneously and effectively stringing a plurality of cables in side-by-side relation.

Another object of this invention is the provision of a novel and improved multiple, tandem-pulley, stringing block of the class described which is arranged and constructed to automatically adjust to the weight imbalance, attributable to the weight differential of the pulling line and conductors being strung so that there is no noticeable increase in the pulling tension when the running board passes over the pulleys.

Another object of this invention is the provision of a novel and improved multiple, tandem-pulley stringing

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block apparatus for use in simultaneously stringing a plurality of cables in side-by-side relation and which includes a plurality of pulleys arranged in tandem pairs, the latter serving to maintain a pulling line, conductors and passing board in properly aligned relation throughout the stringing operation.

A still further object of this invention is the provision of a novel and improved multiple, tandem-pulley stringing block apparatus for use in simultaneously and effectively stringing a plurality of conductor cables in side-by-side relation which includes a plurality of pulleys arranged in tandem pairs and guide means cooperating with the pulleys for maintaining a pulling line and conductors being pulled in seated relation on their associated supporting pulleys during the stringing operation.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawing wherein like character references refer to the same or similar parts throughout the several views and in which:

FIG. 1 is a side elevational view of my invention shown suspended from a conventional insulator string and in supporting relation with a plurality of conducting cables during a stringing operation;

FIG. 2 is a side elevational view on an enlarged scale of my invention with certain parts thereof indicated in adjusted position by dotted line configuration;

FIG. 3 is a front elevational view of the invention; and

FIG. 4 is a vertical cross sectional view taken approximately along line 4—4 of FIG. 3 and looking in the direction of the arrows, certain parts thereof being illustrated in an adjusted position by dotted line configuration.

Referring now to the drawing, it will be seen that my novel multiple, tandem-pulley stringing block apparatus, designated in its entirety by the reference numeral 10, includes a support structure 11 comprised of a pair of upstanding frame elements 12 each being of substantially channel-shaped cross sectional configuration and being rigidly interconnected at their respective lower ends by means of a transverse frame element 13. Referring to FIGS. 3 and 4, it will be seen that the transverse element 13 is provided with a centrally located upstanding flange 14. A pair of spaced apart upstanding post elements 15 are rigidly interconnected to the transverse frame element 13 and each has an arcuate upper end 15a as best seen in FIG. 4. The function of the upstanding post elements 15 will be described hereinbelow.

Referring now to FIG. 2 it will be seen that the upper terminal portions of the upstanding frame elements 12 each have a block 16 welded thereto. It will be noted that the blocks 16 have a centrally and downwardly extending recess 17 formed therein and the upper end of each block has a pair of axially spaced apart cylindrical retainer elements 18 fixedly secured thereto. It should also be pointed out that although not shown on the drawing the web portion of each of the upstanding frame elements 12 is also suitably recessed and this recess will be disposed in registering relation with the recess 17 formed in the block 16. A triangular shaped bracket or yoke structure 19 having its respective ends suitably apertured is positioned so that the apertured ends, thereof, are disposed between the respective cylindrical retainers 18 and a pin 20 extends through the cylindrical retainers and mounting bracket 19 and is locked in place by a cotter pin 21. The apex of the triangular shaped mounting bracket 19 is provided with a plurality of apertures 22 to facilitate coupling or connections thereof to conventional insulator support S as shown in FIG. 1. It will therefore be seen that the mounting bracket permits the block to be readily removed from suspended relation with an insulator string after the conductors have

been pulled to the desired tension. The conductors will be attached to the insulator string by the permanent clamps and fittings.

A mounting frame structure designated generally by the reference numeral 23 is pivotally mounted on the support structure 11 and this mounting frame structure includes a plurality of spaced apart, substantially parallel triangular mounting plates 24. It will be noted that adjacent mounting plates 24 rotatably support a pulley structure therebetween. In this connection, the outermost pairs of triangular mounting plates 24 rotatably support a pair of outboard pulley structures 25 therebetween while the innermost pair of triangular mounting plates 24 suitably mount a central pulley structure 26 therebetween. It will also be noted that the innermost of the triangular mounting plates associated with the respective outboard pulley structures 25 are rigidly interconnected with the triangular mounting plates 24 associated with the central pulley structure 26 by means of U-shaped channel members 27. Each of these U-shaped channel members 27 includes a web 28 and depending flanges 29 as best seen in FIG. 4. The apex of the respective mounting plates are all suitably apertured for the reception of a pivot axle or pin 30 which passes therethrough. The pivot axle or pin 30 is of tubular construction and has its opposite end rigidly secured to the upstanding frame elements 12 by means of lock screws 31. It will also be noted that spacer elements 32 are interposed between the outermost of the triangular mounting plates 24 and their associated upstanding frame elements 12 as best seen in FIG. 3.

Referring again to FIG. 3 it will be seen that the triangular mounting plates associated with each of the pulley structures are rigidly interconnected by means of a bolt 33 and nut 34, the former having a suitable cylindrical spacer positioned there around for spacing these plates in proper arrangement. Referring again to FIG. 3 and FIG. 4 it will be seen that the outboard pulley structures 25 are each comprised of a pair of similar pulleys 25a, the pulleys of each pair being disposed in tandem relation while the central pulley structure 26 is comprised of a pair of pulleys 26a also arranged in tandem relation. It will be seen that the pulleys 25a of the outboard pulley structures are each provided with the conventional pulley grooves 25b while the pulleys 26a comprising the central pulley unit are also provided with the conventional pulley grooves 26b and the pulleys of all of the pulley structures are of similar construction. Referring to FIGS. 2 and 4 it will be seen that the pulleys of each pulley structure are rotatably mounted adjacent the forward and rearward terminal portions of their respective associated pair of triangular mounting plates 24, the pulleys comprising the outboard pulley structures being mounted for rotation about axle structures 35 while the pulleys comprising the central pulley unit are mounted for rotation about axle structures 36. It will be seen that the axes of rotation of the pulleys comprising each of the pulley structures is disposed on opposite sides of and slightly below the pivot pin 30. Actually, the rotational axes of the pulleys of each pulley structure are disposed equidistant from the pin 30 and are also disposed in parallel relation with respect to the pivot pin 30.

Referring again to FIG. 3, it will be seen that the post elements 15 each have a pair of hooks 37 affixed to opposite surfaces thereof. It will also be noted that the triangular mounting plates 24 disposed on opposite sides of and adjacent each post 15 are also provided with hooks 38 and coil springs 39 interconnect the side plates with their associated posts. The coil springs 39 are tension springs and serve to bias the mounting frame structure 23 towards its centrally located position about its pivot pin when the mounting frame has been pivoted about its axis of pivot. It will, therefore, be seen that the tension

springs 39 actually constitute centering springs for centering the mounting frame on the support structure during the stringing operation.

In most of the prior art devices currently being used for the multiple cable stringing operation, there is no provision for preventing the cables seated upon the respective pulleys from being laterally displaced. To this end, however, I have provided means for preventing lateral displacement of the respective cables and pulling lines from being laterally displaced from their seated relation upon the associated pulleys.

Referring now to FIG. 3, it will be seen that a pair of guide members or gates 40 are pivotally secured to the bracket 19 and depend therefrom. These guide members 40 are of substantially channel shaped configuration and each has a pair of out-turned flanges 41. The uppermost portion of the gate 40 is recessed as at 42 to thereby define a pair of ears 40a. The bracket 19 is provided with a pair of depending bearings or bosses 43 each supporting a pivot pin 44, the latter being secured in its associated bearing by means of a set screw 45. The pin 44 extends through apertures formed in the flanges 41 of its associated guide member to thereby permit pivoting movement of the guide member as best seen in FIG. 4.

Each of the guide members 40 is urged to a central depending position with respect to the pulley structures by means of a pair of torsion springs 46, the latter being positioned around the pivot pin 44 of each guide member and on opposite sides of the latter. Thus, it will be seen that the guide members are each secured to a bracket 19 for swinging movement about a substantially horizontal transverse axis. Referring again to FIG. 3 it will be seen that the guide members 40 are positioned on opposite sides of the central pulley structure 26 and also substantially traverse the space between the outboard pulleys and the central pulley structures. It will further be noted that the guide members 40 also have their lower terminal edges positioned below the upper circumferential edges of each of the pulleys so that there is no danger of the pulling rope or conductor cables being displaced laterally from their associated pulley structures.

During the stringing operation involving the stringing of a plurality of cables simultaneously in side-by-side relation, my novel multiple, tandem-pulley stringing block apparatus 10 will be suspended from a conventional insulator string S as shown in FIG. 1. The bracket 19 provides means for ready connection of the stringing block 10 to the insulator. The particular embodiment of my novel stringing block illustrated in the drawings will accommodate either two or three conductors simultaneously although it will be seen that any desired number of conductors may be accommodated by increasing the size and number of pulley structures of the particular stringing block. A pulling rope P will be secured to a triangular shaped running board R in the conventional manner and the latter will have the conductor cables secured thereto. Again, referring to FIG. 1 it will be seen that the running board R has a pair of conductor cables C secured thereto for simultaneous stringing. The pulling rope P will be threaded through the stringing block and will be seated upon the pulleys 26a of the central pulley structure 26 and the pulling rope will thereafter be pulled through the stringing block. The pulling rope will be pulled until the running board R has passed through the support structure 11 and the conductor cables are seated upon their respective outboard pulley structure 25.

It has been found that when several conductors are simultaneously pulled through a stringing block, the conductors will greatly outweigh the pulling rope so that there is a great weight differential on opposite sides of the pulley. This type of an operation causes conventional stringing block devices to be moved from the vertical at a high displacement angle before the running board passes over the stringing block and it has been found necessary in most cases to put a rope tag line on the

bottom of the stringing block so that this tendency towards this high displacement angle will be resisted. It has been found, however, as pointed out above that through the use of my device there is still a slight angular displacement but there is no increase in the pulling tension because of the tandem arrangement of the pulleys of each pulley structure. There is also a tendency of the insulator string to become slightly displaced from the vertical but the weight of the block itself tends to overcome this tendency and the pivotal action between the support structure and the mounting support frame allow the pulley structures themselves to oscillate in a direction to offset the angular displacement. It will, therefore, be seen that the disadvantage of the necessity of tag lines associated with the prior art devices plus the increase in pulling tension are completely obviated by my novel stringing block apparatus.

It will also be seen that the tandem arrangement of the pulleys of the central pulley structure cooperates with the pulling cable to hold the entire stringing block apparatus square or in alignment with respect to the running board and therefore prevents hang-up of the board against the support structure 11. The tandem arrangement of the cables of the outboard pulley structures, of course, substantially reduce the bending moment of the cables as the conductor cables pass over these pulley structures and also facilitates even support and passage of the running board over the stringing block apparatus.

The guide members 40 cooperate with the support structure 11 and the respective pulleys of each of the pulley structures to prevent accidental lateral displacement of the cables from one pulley structure to another. Since these gates or guide members 40 are readily pivotal at their respective axis of pivot, the gates will readily pivot when encountered by the running board when the latter is pulled over the stringing block apparatus and will thereafter be urged to their depending centered relation. When the mounting frame structure 23 pivots relative to the support structure 11, this pivoting action takes place against the bias of the tension springs 39 which tend to center the mounting frame structure on the support structure. The depending flanges 29 of the U-shaped channel member 27 engage the edges of the upstanding posts 15 to limit pivoting movement of the mounting frame structure 23 so that movement of the pulley structure beyond a predetermined point is prevented.

It will, therefore, be seen from the foregoing description that I have provided a novel multiple tandem-pulley stringing apparatus which is readily adaptable for use in efficiently stringing a plurality of conductor cables simultaneously in side-by-side relation. It will also be noted from the foregoing description that my novel multiple, tandem-pulley stringing apparatus obviates the necessity of the use of tag lines thus rendering the stringing operation through the use of my device more economical than was heretofore possible with conventional stringing devices.

It will also be noted that my novel stringing block apparatus is arranged and constructed to assure positive alignment of the running board when the latter passes over the stringing block thus preventing any tendency of the latter to bind with regard to the stringing block apparatus and also prevents any tendency of the cables from becoming laterally displaced from their seated relation upon their associated pulleys.

Thus, it will be seen that I have provided a novel and improved multiple, tandem-pulley stringing apparatus which is not only of highly efficient and inexpensive construction but functions in a more efficient manner than any heretofore known comparable devices.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the general scope of my invention.

What is claimed is:

1. Multiple-pulley stringing block apparatus for use in

simultaneously stringing a plurality of cables in side-by-side relation, said apparatus comprising a support structure including a pair of upstanding, spaced-apart frame elements, a bracket member having opposite sides thereof connected to said frame elements and being readily connectible to a support such as an insulator, a mounting frame structure pivotally mounted on said support structure for pivotal movement relative thereto, a central pulley structure rotatably mounted on said mounting frame structure centrally thereof, a pair of outboard pulley structures rotatably mounted on said mounting frame structure on opposite sides of and in substantially parallel relation and with said central pulley structure, each of said pulley structures being comprised of a pair of similar pulleys disposed in tandem relation, and the rotational axis of the respective pulleys comprising each pulley structure each being disposed on opposite sides of and substantially equidistant from the axis of pivot of said mounting frame structure.

2. The multiple-pulley, stringing block apparatus as defined in claim 1 and cooperating stop means on said support structure and mounting frame structure respectively for limiting pivotal movement of the latter about its axis of pivot.

3. The multiple-pulley, stringing block apparatus as defined in claim 1 wherein the pulleys of said pulley structures which are disposed on the same side of the axis of pivot of said mounting frame structure have their rotational axes disposed in substantial coaxial relation.

4. The multiple-pulley, stringing block apparatus as defined in claim 1 and a pair of spaced apart-guide members pivotally connected with said bracket member and depending therefrom and being disposed in substantially upstanding relation on opposite sides of said central pulley structure and serving to prevent accidental displacement of cables from one pulley structure to another.

5. The multiple-pulley, stringing block apparatus as defined in claim 1 and resilient means interposed between said mounting frame structure and said support structure and yieldably resisting relative pivotal movement therebetween.

6. Multiple-pulley, stringing block apparatus for use in simultaneously stringing a plurality of cables in side-by-side relation, said apparatus comprising a support structure having coupling means for ready connection thereof to a support such as an insulator, a mounting frame structure pivotally mounted on said support structure for pivotal movement relative thereto, a central pulley structure mounted on said mounting frame structure centrally thereof, a pair of outboard pulley structures rotatably mounted on said mounting frame structure on opposite sides of and in substantial parallel relation with said central pulley structure, each of said pulley structures being comprised of a pair of similar pulleys disposed in tandem relation and being mounted for rotation about axis disposed substantially parallel to the axis of pivot of said mounting frame structure, and a pair of spaced-apart guide members pivotally connected with said support structure for pivotal movement relative thereto and being disposed in upstanding relation on opposite sides of said central pulley structure and serving to prevent accidental lateral displacement of a cable from one pulley structure to another.

7. Multiple-pulley, stringing block apparatus for use in simultaneously stringing a plurality of cables in side-by-side relation, said apparatus comprising a support structure having coupling means for ready connection thereof to a support such as an insulator, a mounting frame structure pivotally mounted on said support structure for pivotal movement relative thereto, a central pulley structure mounted on said mounting frame structure centrally thereof, a pair of outboard pulley structures rotatably mounted on said mounting frame structure on opposite sides of and in substantially parallel relation with said central pulley structure, each of said pulley

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structures being comprised of a pair of similar pulleys disposed in tandem relation and being mounted for rotation about an axis disposed substantially parallel to the axis of pivot of said mounting frame structure, and cooperating stop means on said support structure and mounting frame structure respectively for limiting pivoting movement of the latter about its axis of pivot. 5

8. Multiple-pulley, stringing block apparatus for use in simultaneously stringing a plurality of cables in side-by-side relation, said apparatus comprising, a support structure having coupling means for ready connection thereof to a support such as an insulator, a mounting frame structure pivotally mounted on said support structure for pivotal movement relative thereto, a central pulley structure mounted on said mounting frame structure centrally thereof, a pair of outboard pulley structures rotatably mounted on said mounting frame structure on opposite sides of and in substantially parallel relation with said central pulley structure, each of said pulley structures being comprised of a pair of similar pulleys disposed in tandem relation, and the rotational 10 15 20

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axes of the respective pulleys comprising each pulley structure being disposed on opposite sides of and substantially equidistant from the axis of the pivot of said mounting frame.

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