July 6, 1948. F. B. JAVERY 2,444,775

WARP BEAM COMPRESSOR DEVICE

Filed Oct. 4, 1946

2 Sheets-Sheet 1

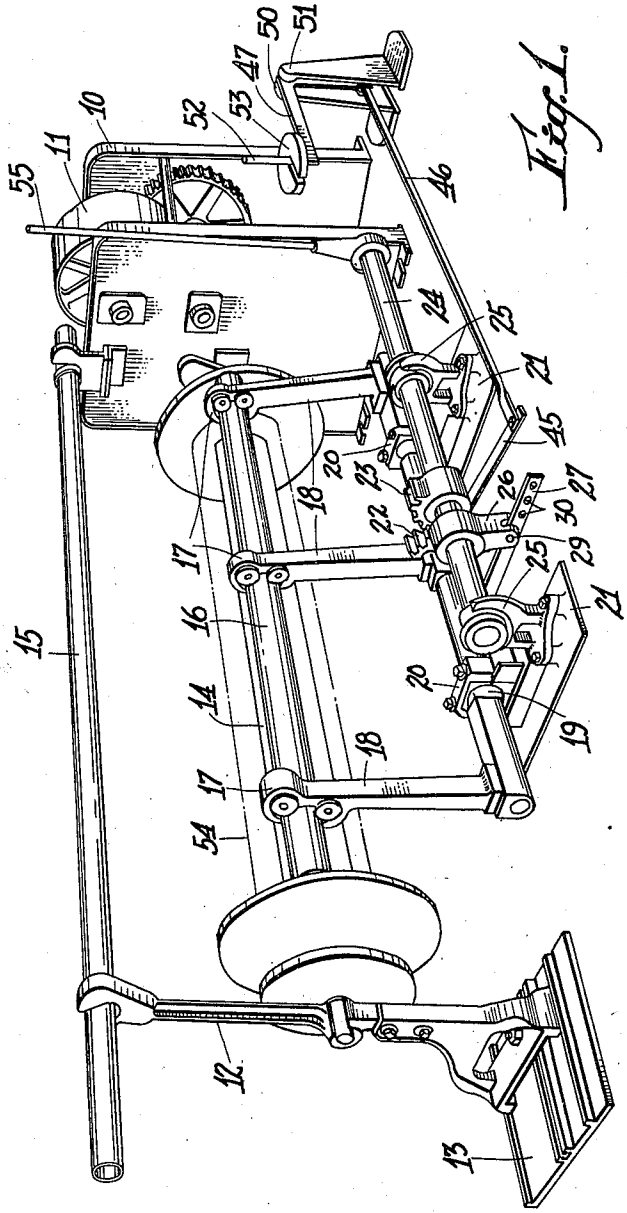

Fig. 1.

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2 Sheets-Sheet 2

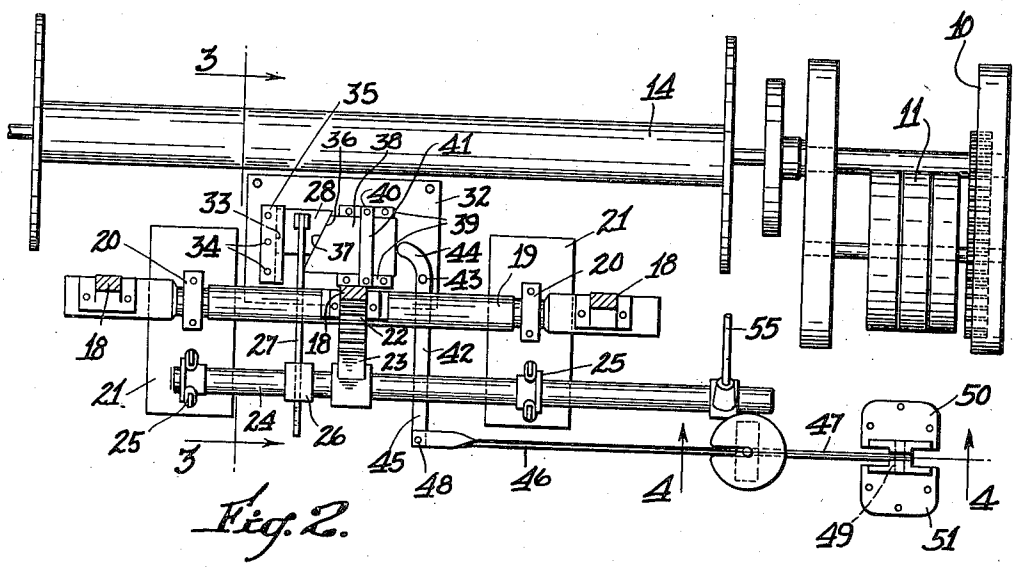

Fig. 2.

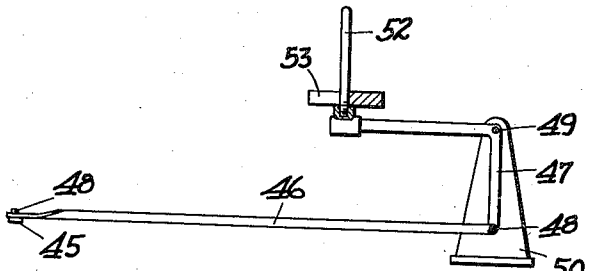

Fig. 4.

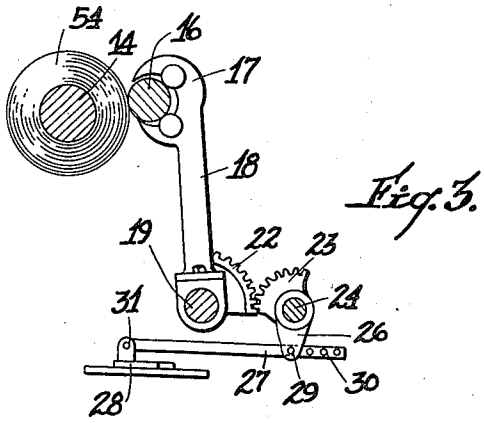

Fig. 3.

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2,444,775

UNITED STATES PATENT OFFICE

2,444,775

WARP BEAM COMPRESSOR DEVICE

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7 Claims. (Cl. 28—38)

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The present invention relates to warp beam winding machines which are utilized in the textile industry for collecting upon a single warp beam the yarn from a plurality of creels or spools. More particularly, the present invention relates to warp beam compressor devices which are adapted to exert a pressure upon the yarn as it is wound about the warp beam so that the yarn will be wound about the warp beam under a proper and uniform tension.

It is not new in the textile art to provide warp beam winding machines with compressors, but such compressing devices which have been heretofore devised have been of such design as to require an undue amount of space for the installation thereof. Furthermore, these prior compressor devices were not designed so that they could be attached to or removed from a winding machine with any degree of facility. In fact most of these prior devices had portions thereof secured to overhead means as well as to the floor upon which the winding machine rested and, therefore, it is clear that such devices might prevent ready access by the operator to certain parts of the winding machine. Therefore, it is the primary object of the present invention to provide a warp beam compressor which is so designed that it will require a minimum of valuable space for the installation thereof.

A further object of the present invention is to provide a warp beam compressor which, although efficient in operation, is rugged in construction and at the same time inexpensive to manufacture.

A still further object of this invention is to provide a warp beam compressor which will exert a substantially constant pressure upon the yarn at all times during the winding operation.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention from which the several features of the invention and the advantages attained thereby will readily be understood by those skilled in the art.

In the accompanying drawings:

Fig. 1 represents a perspective view of a warp beam winding machine with the present invention incorporated therein.

Fig. 2 represents a top plan view of a portion of the machine disclosed in Fig. 1.

Fig. 3 represents a sectional view of the present

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machine taken substantially along line 3—3 of Fig. 2.

Fig. 4 represents a sectional view taken substantially along line 4—4 of Fig. 2.

Referring particularly to Fig. 1, the present warp beam winding machine comprises a power head unit designated generally by the numeral 10, which power head unit has mounted therein the usual driving gears and driving pulleys 11 connected to a source of power by means of belts which are not disclosed herein. Horizontally spaced from the power head unit is an end frame member 12 which is adapted to be secured to a base plate 13 which in turn may be secured to the floor by the usual means. Mounted in appropriate bearing means carried by the spaced members 10 and 11 is the usual warp beam 14 one end of which is designed to be rotated by the pulleys 11 all in the usual manner. The top portions of the members 10 and 12 are adapted rotatably to receive the usual spread bar 15. As is well known in the art, the present type of machine is adapted to have yarn from a plurality of creels directed about the spread bar 15 from which the yarn is carried over to the warp beam 14 upon which the yarn is wound in the usual fashion.

In order that the yarn may be wound with a uniform tension upon the warp beam the present machine is provided with a compressor shaft 16 which is rotatably mounted and disposed against the outside surface of the yarn as the same is being wound about the warp beam 14. By providing sufficient pressure against the compressor shaft 16 it is directed to be forced against the yarn thereby to effect a proper tension in the yarn as the same is wound about the warp beam. Referring particularly to Figs. 1 and 3, the compressor shaft 16 is rotatably mounted within head members 17 of which one is carried upon each of three arms 18 which are in turn suitably secured upon a rock shaft 19 rockably carried within two bearing members 20, 20. These bearing members 20, 20 are in turn suitably secured upon plates 21, 21 which are secured to the floor in a suitable fashion. Thus it may be understood that as the yarn accumulates on the warp beam 14 it will be effective to shift the compressor shaft 16 away from the warp beam about the axis of its rock shaft 19. Both the compressor shaft and its rock shaft 19 are disposed in parallelism with the warp beam 14.

Mounted rigidly upon the rock shaft 19 is a segment gear 22 which meshes with a corresponding segment gear 23 carried upon a second

rock shaft 24 which is rockably mounted within bearing members 25, 25. These bearing members 25, 25 are also secured to the floor plates 21, 21. Thus, by means of the segment gears 22 and 23, the rock shafts 19 and 24 will be made to operate in synchronism with each other.

Rigidly secured to and depending from the shaft 24 is a crank element 26 to the free end portion of which is pivotally secured one end of a link 27 whose other end is pivotally secured to a sliding wedge or friction block 28. Referring particularly to Figs. 1 and 3, it may be seen that the link 27 is secured to the crank 26 by means of a pin 29. By providing the end of the link 27 with a plurality of apertures 30 it is to be understood that the effective length of the link 27 may be altered by inserting the pin 29 into a selected one of these apertures 30. A similar pin 31 functions to secure the link 27 to the wedge member 28. This wedge member 28 is slidably mounted upon a floor plate 32 which has secured thereon an abutment block 33 by means of bolts 34. This abutment block carries on the top portion thereof a guide plate 35 which overlaps one edge portion of the wedge 28 for the purpose of cooperating with the abutment block 33 in the guiding of the element 28 upon the plate 32. Referring particularly to Fig. 2, it is to be understood that the one side of the element 28 is formed so as to be inclined relative to a rectilinear path of movement through which the rocking element 19 will actuate the wedge 28. This inclined surface is designated by the numeral 36 and it is engaged by an inclined surface 37 formed on a second wedge 38 or friction block. This second wedge is adapted to bear against the first wedge 28 and to be guided by oppositely disposed and spaced guide blocks 39, 39 which are secured to the plate 32 by means of bolts 40. Across the top portions of the blocks 39, 39 is carried, by means of the bolts 40, a guide strap 41 which functions to hold the member 38 within the confines of the guides 39, 39. Thus, it is to be understood that the path of movement of the element 38 is disposed at right angles to that of the element 28. Referring particularly to Fig. 2, a pressure lever 42 is pivotally mounted upon the plate 32 by means of a fulcrum bolt 43 which is threaded directly into the plate 32. This pressure lever 42 is disposed in a horizontal plane and the shorter limb thereof, designated by the numeral 44, is curved and adapted to engage the right hand end of the member 38. The longer limb 45 of the lever 42 has pivotally secured thereto one end of a link 46 whose other end is similarly secured to one arm of a bell crank lever 47. Bolts 48, 48 function to secure the link 46 to the members 45 and 47. This bell crank lever 47 is pivotally secured by means of a pin 49 between a pair of spaced bracket members 50 and 51 which are adapted to be secured directly to the floor by any suitable means.

The free arm of the bell crank lever 47 has a pin 52 carried therein for the purpose of receiving one or a plurality of weights 53 for the purpose of biasing this arm of the bell crank lever downwardly. It is to be understood, that the weights 53 will be effective to bias the shorter limb 44 of the pressure lever 42 against the right hand end portion of the wedge 38 thereby to force this wedge into engagement with the wedge 28. Thus, the wedge 38 will oppose the movement of the wedge 28 in the event that this latter element is moved toward the front portion of the machine. Referring particularly to Fig. 3, it is to be understood that as the yarn, designated generally by the numeral 54, accumulates on the warp beam 14 it will be effective to shift the compressor shaft 16 away from the warp beam 14 to the end that the rock shaft 19 will be rotated in a clockwise direction and the rock shaft 24 will be rotated in a counter clockwise direction. This movement of the rock shaft 24 will shift the wedge 28 towards the front portion of the machine thus to force the element 38 to move against the shorter limb 44 of the lever 42 to the end that the weights 53 will be elevated slightly. Due to the fact that the effective length of each of the arms 18 is appreciably greater than that of the crank 26 the amplitude of movement of the bell crank lever 47 will never be very great in spite of the fact that the arms 18 will be shifted through a substantial angle as the yarn accumulates upon the warp beam 14. As the entire mechanism is so adjusted that the free arm portion of the bell crank lever 47 will be in a horizontal position whenever the warp beam 14 is approximately half full, and as the amplitude of movement of the bell crank lever is relatively small, it is to be understood that the bell crank lever with its weights 53 will exert a substantially constant force against the wedge 38 at all times.

Mounted upon an overhanging end portion of the crank shaft 24 is a handle member 55 which is adapted to provide a means whereby an operator may shift the compressor shaft 16 away from the warp beam 14 preparatory to either placing the beam 14 upon or removing the same from the winding unit.

From the above description it is to be understood that the present invention comprises a compressor unit which is most compact as the component elements thereof are small in size and are closely coupled. Furthermore, the present compressor unit is so designed that the greater portion thereof may be placed beneath the winding machine proper and thus it does not prevent access to the machine nor does it require valuable floor space that could be otherwise used.

I claim:

1. The combination in a warp beam winding machine including a rotary warp beam for winding material thereon, and means for rotating said warp beam, of a compressor shaft for engaging the surface of the material which is wound about said warp beam, said compressor shaft being adapted to be shifted away from said warp beam by the material as it accumulates on said warp beam, and means connected with said compressor shaft for opposing the movement of said compressor shaft away from said warp beam, said means comprising a pair of interengaging and relatively slidable friction blocks of which one is connected to said compressor shaft, and means for biasing said friction blocks together thereby to oppose relative sliding movements therebetween in one direction.

2. A compressor device for use with a warp beam winding machine having a rotary warp beam for winding material thereon, and means for rotating said warp beam, said compressor device comprising, a compressor element for engaging the surface of the material which is wound about said warp beam, said compressor element being pivotally mounted adjacent said warp beam so that it may be shifted away therefrom by the material as the material is accumulated on said warp beam, a first friction block connected with said compressor element and adapted for rectilinear

motion, a second member engaging said first friction block, and means including a gravity-biased means for urging said second friction block against said first friction block thereby to oppose the rectilinear movement of said first friction block in one direction.

3. A compressor device for use with a warp beam winding machine having a rotary warp beam for winding material thereon, and means for rotating said warp beam, said compressor device comprising, a compressor element for engaging the surface of the material which is wound about said warp beam, said compressor element being pivotally mounted adjacent said warp beam so that it may be shifted away therefrom by the material as the material is accumulated on said warp beam, a first friction block connected with said compressor element and adapted for rectilinear movement, said first friction block having a surface thereof inclined relative to its direction of motion, a second friction block disposed in engagement with the inclined surface of said first friction block, and means to bias said second member against said first friction block thereby to oppose the movement of said first friction block in one direction.

4. The combination in a warp beam winding machine including a rotary warp beam for winding material thereon, and means for rotating said warp beam, of a compressor element for engaging the surface of the material which is wound about said warp beam, said compressor element being pivotally mounted adjacent said warp beam so as to be shifted away from said warp beam by the material as it accumulates on said warp beam, and means for opposing the movement of said compressor element away from said warp beam, said means comprising, first and second members, each of said members being mounted for rectilinear movement and each having a surface thereof inclined relative to its direction of movement, said first and second members being disposed with their respective inclined surfaces in engagement with each other and each being confined for movement in a path disposed substantially at right angles to that of the other member, means to connect said first member with said compressor element, and means for biasing said second member against said first member thereby to oppose the movement of said first member in one direction.

5. In a compressor device for a warp beam winding machine having a rotary warp beam for winding material thereon, and means for rotating said warp beam, the invention which comprises, a compressor element disposed in parallel relation with and pivotally mounted adjacent to said warp beam so as to be shifted away from said warp beam by the material as it accumulates upon said warp beam, and means for opposing the movement of said compressor element away from said warp beam, said last mentioned means including first and second interengaging and relatively slidable friction blocks of which said first block is connected to said compressor element, and means for urging said second block against said first member so as to oppose the movement of said first block in one direction, said last mentioned means including a fulcrumed lever whose one end carries a gravity-biased mass and whose other end is associated with said second block.

6. A compressor device for use with a warp beam winding machine having a rotary warp beam for winding material thereon, and means for rotating said warp beam, said compressor device comprising, a compressor element for engaging the surface of the material which is wound about said warp beam, said compressor element being pivotally mounted adjacent said warp beam so that it may be shifted away therefrom by the material as the material is accumulated upon said warp beam, a first friction block connected with said compressor element and adapted for rectilinear movement, said first friction block having a surface thereof inclined relative to its direction of motion, a second friction block disposed in engagement with the inclined surface of said first friction block, and means to urge said second block into relative sliding engagement with said first friction block thereby frictionally to oppose the movement of said first block in one direction, said last mentioned means including a fulcrumed lever whose one end carries a gravity-biased mass and whose other end is associated with said second block.

7. A compressor device for use with a warp beam winding machine having a rotary warp beam for winding material thereon, and means for rotating said warp beam, said compressor device comprising, a rock shaft disposed in parallel relation with said warp beam, a compressor element carried by said rock shaft, and means for urging said compressor element toward said warp beam as the material is accumulated on said beam, said last mentioned means including a crank operatively connected with said rock shaft, a wedge-shaped member adapted for rectilinear movement, a link connecting said wedge-shaped member with said crank, a member disposed in engagement with said wedge-shaped member, and means including a gravity biased mass for urging said member against said wedge-shaped member thereby to oppose the rectilinear movement of said latter element in one direction.

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REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Name	Date
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Certificate of Correction

July 6, 1948.

Patent No. 2,444,775.

FRANK B. JAVERY

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows: Column 5, lines 1 and 23, strike out "member" and insert instead *friction block*; column 6, line 5, for "member" read *block*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of September, A. D. 1948.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.