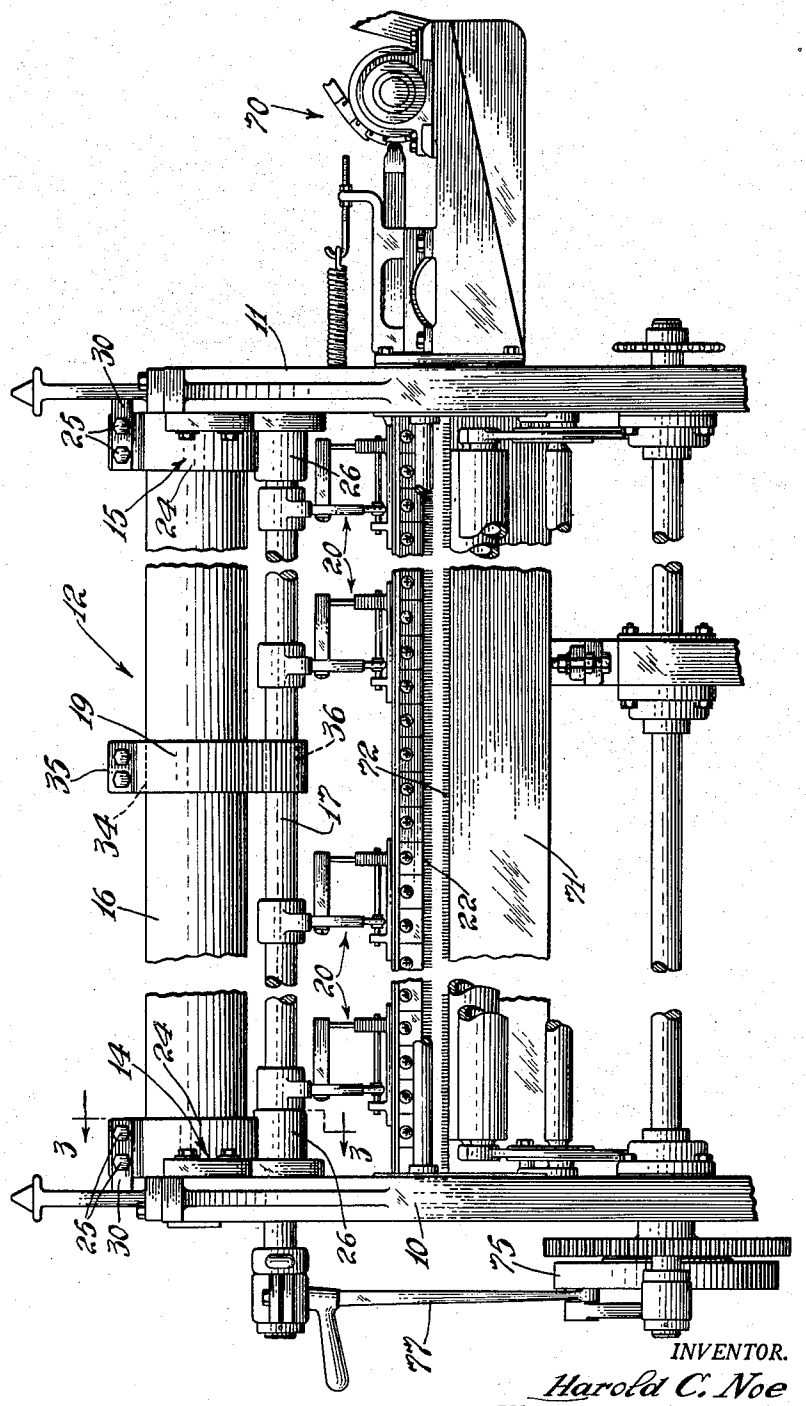
July 18, 1950 H. C. NOE 2,515,253

GUIDE BAR SUPPORTING CONSTRUCTION FOR WARP KNITTING MACHINES

Filed July 21, 1947 4 Sheets-Sheet 1

Fig. 1



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GUIDE BAR SUPPORTING CONSTRUCTION FOR WARP KNITTING MACHINES

Filed July 21, 1947 4 Sheets-Sheet 2

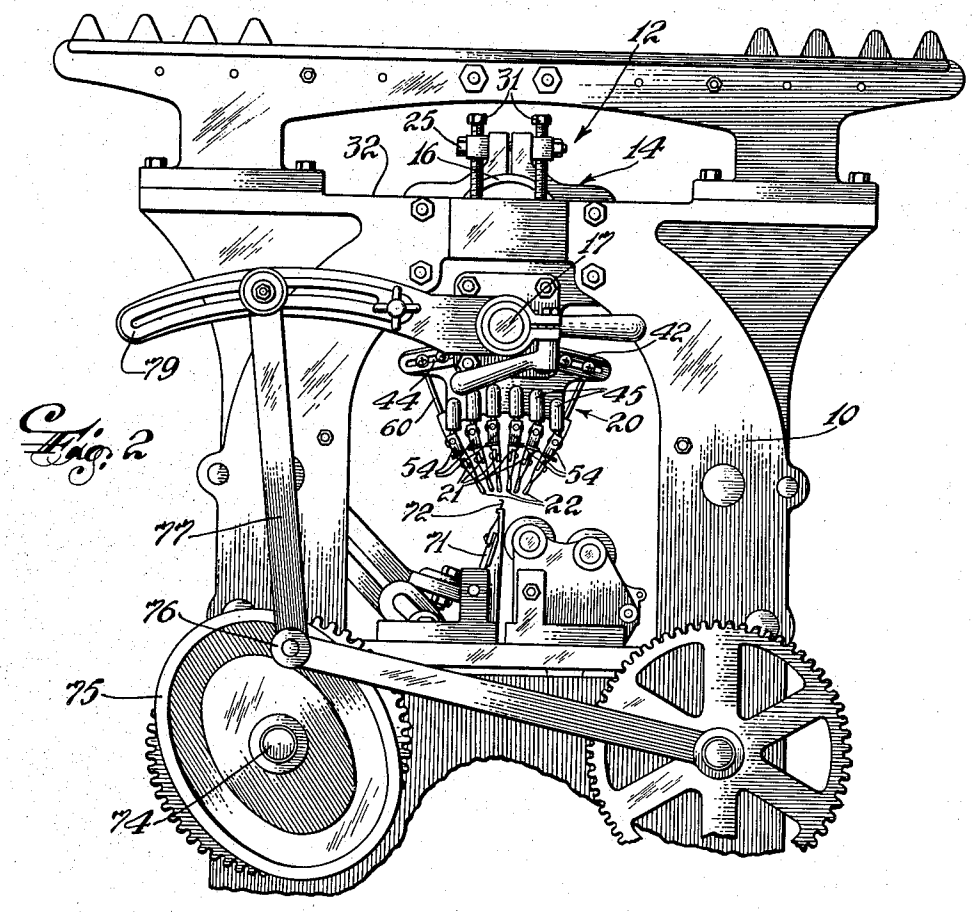


Fig. 2

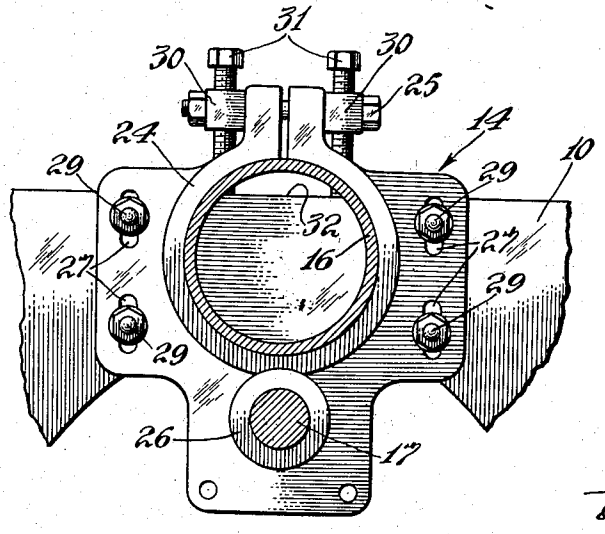


Fig. 3

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GUIDE BAR SUPPORTING CONSTRUCTION FOR WARP KNITTING MACHINES

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Fig. 4

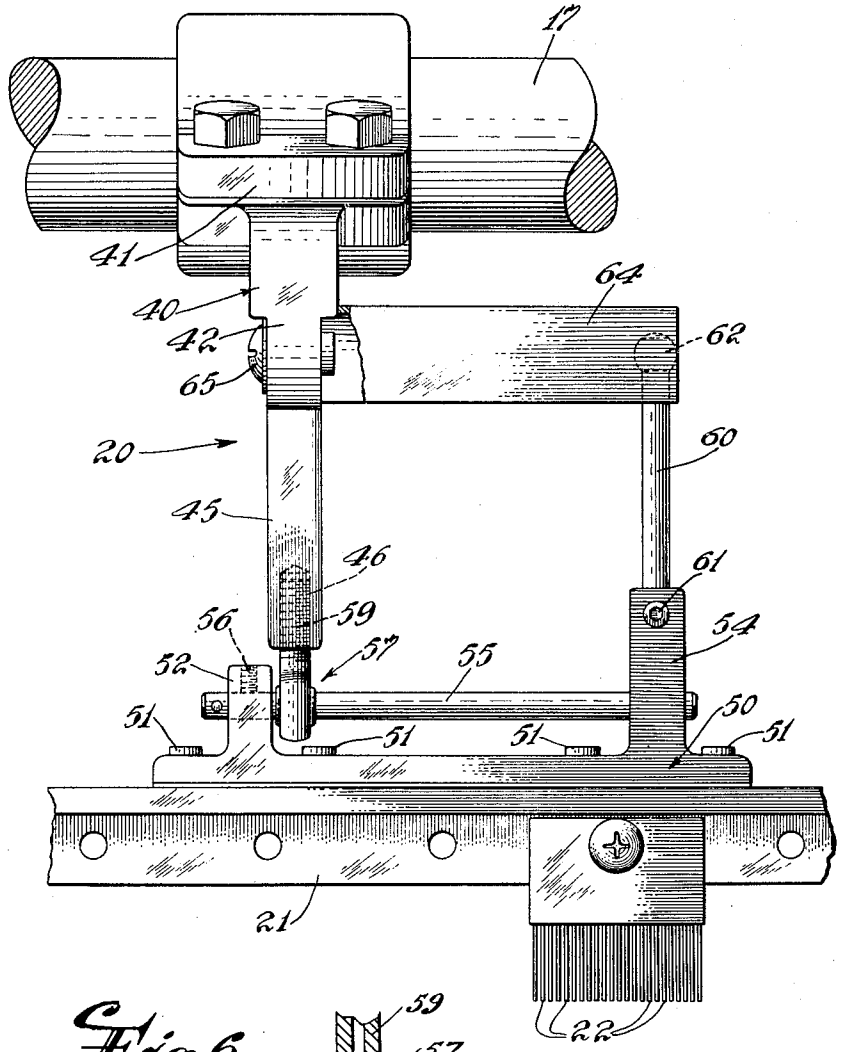
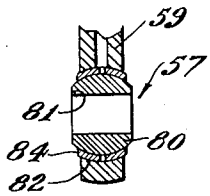


Fig. 6



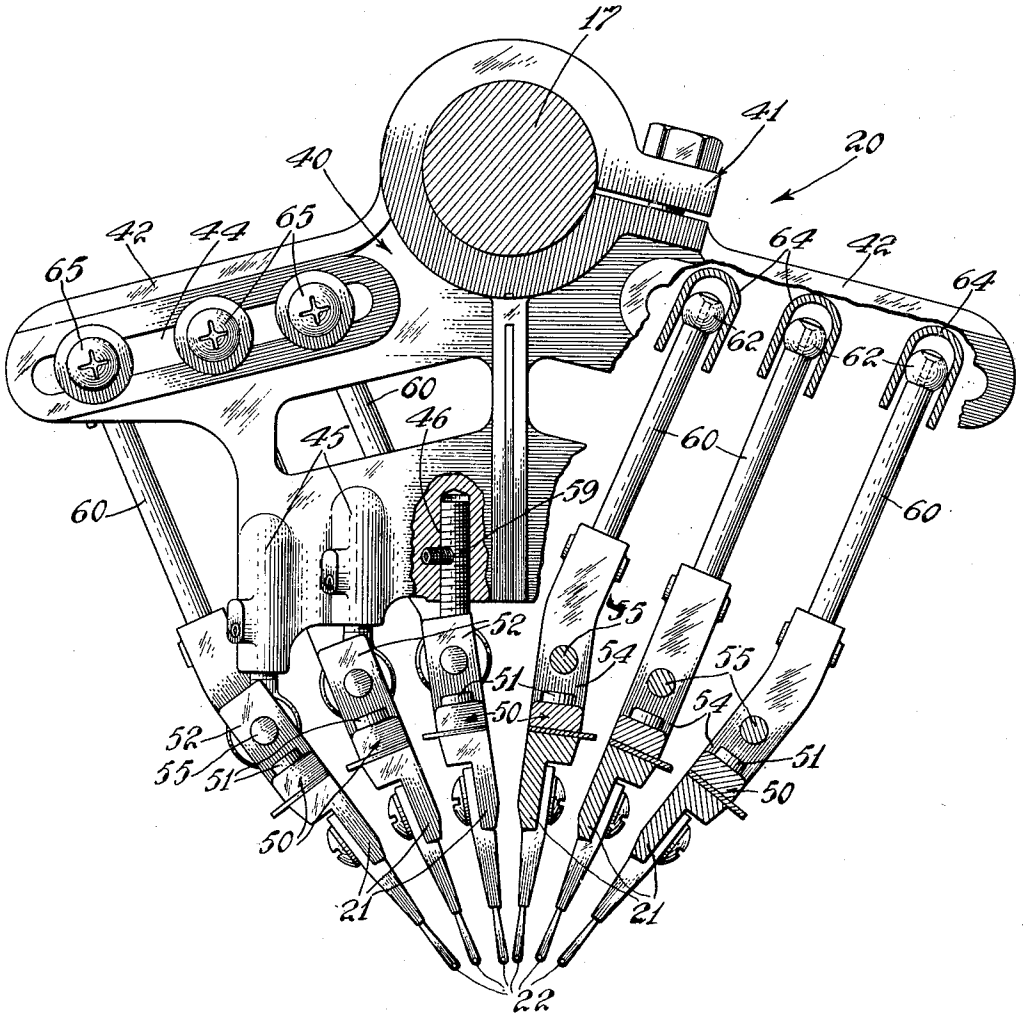
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GUIDE BAR SUPPORTING CONSTRUCTION FOR WARP KNITTING MACHINES

Filed July 21, 1947 4 Sheets-Sheet 4

Fig. 5



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Patented July 18, 1950

2,515,253

UNITED STATES PATENT OFFICE

2,515,253

GUIDE BAR SUPPORTING CONSTRUCTION FOR WARP KNITTING MACHINES

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Application July 21, 1947, Serial No. 762,322

18 Claims. (Cl. 66—86)

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The present invention relates to warp knitting machines, and more particularly to an improved construction for supporting the warp guide bars thereof.

The present invention is concerned with warp knitting machines of the type which generally comprise a pair of end frames supporting one or more horizontal needle bars and one or more horizontal warp guide bars. The needle bars are arranged for upward and downward movement which is effected by suitable cams and linkage. The guide bars are arranged for forward and backward rocking motion whereby the guides are moved to and fro between the needles, this motion being effected by a cam and linkage. The guide bars also are arranged for endwise patterning motion whereby the guides move longitudinally with respect to the needles, the latter motion being effected by a pattern cam or the like. The effect of these guide bar and needle motions is to lap the yarn on the needles and produce fabric such as cloth.

Heretofore considerable difficulty has been experienced with machines of this type when operated at high speeds and/or while knitting goods from a warp comprising tightly stretched elastic yarn. High operating speeds and such yarn loads subjected these machines, particularly the guide bar supporting constructions thereof, to considerable torsion. This resulted in undue vibrations, and severe wear and tear on the parts of the machine, which eventually caused damage requiring shutdowns and repair.

The present invention aims to overcome the foregoing difficulties and disadvantages by providing an improved construction for supporting the guide bars of such machines.

An object of the present invention is to provide a guide bar supporting construction which is rigid under all conditions of load and while the machine is operating at high speed.

Another object is to provide a construction of the foregoing character which resists torsion.

Another object is to provide a guide bar supporting construction which enables the guide bars to be readily raised and lowered as a unit.

Another object is to provide an assembly for suspending the guide bars which resists torsion.

Another object is to provide an assembly of the foregoing character which facilitates adjustment of the guide bars.

Another object is to provide a guide bar suspension assembly which maintains the guides in alignment even when the guides are used in connection with tightly stretched yarn.

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A further object is to provide a guide bar supporting construction and assembly for accomplishing the foregoing objects and advantages which is relatively light in weight and can be manufactured and assembled in an economical manner.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

In accordance with the invention, the foregoing objects and advantages are attained by hanging the guide bar assembly from a supporting tube having a relatively large diameter and thick walls which supports the guide shaft and assures rigidity and resists torsion. Each guide bar is supported from the shaft by a plurality of hangers including self-aligning bearing means and torsion resisting members, thus assuring rigidity under any condition of load and speed. The entire guide bar supporting construction, including the tube, the guide bar shaft, the guide bar hangers and the guide bars themselves, can be adjusted up or down as a unit. In addition, each individual guide bar can be adjusted independently.

A preferred embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawings, forming a part of the specification, wherein:

Figure 1 is a fragmentary front elevational view of a warp knitting machine embodying the present invention.

Figure 2 is an end elevational view of the machine shown in Figure 1.

Figure 3 is a sectional view taken along the line 3—3 on Figure 1, illustrating the means for adjusting the up and down position of the tube supporting the guide bar assembly.

Figure 4 is an enlarged fragmentary elevational view, illustrating a guide bar hanger in accordance with the invention.

Figure 5 is an end view of the guide bar hanger shown in Figure 4, certain parts being broken away for clearness.

Figure 6 is an enlarged sectional view of a bearing utilized in connection with the guide bar hanger.

Referring to the drawings in detail and more particularly to Figures 1 and 2 thereof, there is shown a warp knitting machine comprising a pair of upright spaced apart end frames 10 and 11; shafts, rods and frame structure supported by the frames which are common to such machines, but are not described in detail herein since the present invention is not concerned therewith; and a construction 12 supported by the frames at the upper ends thereof for supporting the guide bars and associated parts.

This supporting construction 12 comprises a pair of brackets 14 and 15 each respectively attached to the frames 10 and 11, a tube 16 having its ends supported by the brackets 14 and 15, a guide bar rock shaft 17, having its ends supported by the brackets 14 and 15 and having its middle portion supported by a bearing member 19 on the tube 16, and a plurality of hangers or bracket members 20 described in detail hereinafter for supporting guide bars 21 having warp yarn guides 22 thereon.

The brackets 14 and 15, as shown in Figure 3, each have a split collar portion or clamp 24 for receiving the ends of the tube 16 provided with bolts 25 threaded therein for securing the tube against movement, and each have a bearing 26 below the collar portion for receiving the ends of the shaft 17. The brackets have vertical slots 27 therein, four being shown by way of example, for receiving bolts 29 threaded into the end frames for securing the brackets in adjusted up or down position as will become apparent hereinafter. The brackets further are provided with lateral extensions 30 having vertically disposed screw members 31, such as bolts, threaded therethrough, the lower ends of which engage a surface 32 at the upper portion of the end frames, whereby the screw members 31 upon rotation thereof are adapted to raise and lower the bracket members with respect to the frames.

The tube 16 is an integral member formed of steel tubing and preferably has a diameter of about six inches and a wall thickness of about one-half inch. This tube, by reason of its construction, is rigid throughout its length and is adapted to resist torsional loads of a high value.

The bearing member 19 has an aperture 34 (Figure 1) for receiving the tube 16, a clamp 35 for securing it to the tube, and a bearing aperture 36 for receiving the shaft 17 and supporting the same for rotation therein. While only one such bearing member has been shown, it will be understood that any desired number may be utilized. These bearing members prevent sagging or bending of the shaft between the ends thereof and thereby render the shaft more rigid.

The hangers 20 are illustrated in detail in Figures 4 and 5, and any number may be utilized for supporting the guide bar at spaced intervals. While four of these hangers are shown in Figure 1 by way of illustration, the knitting machine, in accordance with the invention, utilizes six hangers equidistantly spaced on the shaft 17, two of the hangers not being shown because portions of the machine are broken away for simplicity and clearness.

Generally described, the hangers comprise a bracket member 40 supported by the rock shaft 17, and a connection for suspending the guide bars

21 which is constructed and arranged to permit lateral or endwise movement of the guide bars and includes self-aligning bearing means and torsion resisting means.

The bracket member 40 comprises a clamp 41 for securing it to the rock shaft 17 for movement therewith, a laterally extending portion 42 at each side having a slot 44 therein, and a depending portion 45 having threaded vertical apertures 46 therein. The bracket member illustrated herein is adapted to accommodate six guide bars, and, consequently, is provided with six apertures 46 each adapted to receive a guide bar connecting member. The slots 44 each are of a length to receive three guide bar connecting members about to be described. It will be apparent that the bracket members could be constructed to accommodate a smaller or larger number of guide bars, and that the bracket members permit certain guide bars to be omitted or removed to meet the requirements of the pattern of the fabric to be produced on the machine. Since all the connections between the bracket members 40 and the guide bars 21 are the same, the connection between one of the bracket members and one of the guide bars will be described for the sake of simplicity.

As shown in Figure 4, a lengthwise extending bracket 50 is secured to the guide bar by bolts 51. The bracket has a pair of spaced apart upwardly extending portions 52 and 54 which are perpendicular with respect to the guide bar. Each of the portions 52 and 54 has a horizontally extending aperture for receiving a rod 55 or the like, which is disposed in parallel relation with respect to the guide bar and is secured to the portion 52 by a set screw 56.

The rod 55 is slidably mounted in a self-aligning bearing member 57, preferably of the type known as a "Heim" bearing. This bearing positioned intermediate the portions 52 and 54 and has a shank 59 threaded into an aperture 46 of the bracket member 40, whereby the bracket member 40 slidably supports the bracket through the connection provided by the rod 55 and the bearing member 57.

The bearing member 57 is shown in section in Figure 6 with the rod 55 removed, and a generally spherical element 80 having a bore 81 for receiving the rod 55, a generally spherical seat 82 at the end of the shank 59 for receiving the element 80, and a relatively thin spherical insert or shell 84 formed of bearing metal interposed between the seat 82 and the element 80.

The portion 54 of the bracket 50 has an upwardly extending rod or arm 60 secured therein by a set screw 61, the arm being disposed perpendicular with respect to the guide bar and parallel with respect to the bracket member 40. The upper end of the rod 60 has a ball member 62 mounted thereon for rotation about the vertical axis of rod 60, as shown. The ball member is adapted to roll in a rigid U-shaped channel member 64 having one end thereof attached to the bracket member by a bolt 65 disposed in the slot 44 (Figure 5). The channel member is parallel with respect to rod 55 and the guide bar 21. The slot 44 in which the bolt 65 is mounted permits the channel member to be adjustably positioned whereby the arm 60 is positioned to place the bracket 50 and guide bar 21 in various tilted or angular positions. However, when the bolt 65 is secured, the channel member provides a rigid guide for the arm 60 and prevents any tendency of the guide bar

bracket 50 to rock about the rod 55. In this manner, a self-aligning and torsion resisting connection is provided between the guide bar 21 and its rock shaft 17.

In order to more fully appreciate the present invention and to generally understand the characterizing features of the machine in connection with which it is used, there is shown in Figure 1 the pattern cam 70 for operating the guide bars to effect endwise movement thereof. In Figure 2 the needle bar 71 and the needles 72 thereon are shown below the guides 22. The needle bar 71 and guide bars 21 are operated from the cam shaft 74, the cams and linkage for operating the needle bar not being shown. The needle bar cam 75 on the shaft 74 effects rocking of the shaft 17 by means of the follower 76, link 77 and arm 79 secured to the end of the shaft 17. The cam shaft is rotated by a suitable drive, not shown.

From the foregoing description it will be seen that the present invention provides an improved warp knitting machine.

By loosening the bolts 29 and rotating the screw members 31, the entire supporting structure for the needle bars, including the rock shaft 17, may be raised or lowered into desired up or down positions as a unit to vary the relative positions of the guides and the needles. After this is done, the bolts 29 are fastened again to secure the brackets 14 in their adjusted position.

The bracket members 40 by reason of the slots permit individual adjustment of the guide bars to vary the pattern and facilitate removal of certain guide bars if they are not required for making the chosen pattern. The self-aligning bearing and improved arrangement to permit endwise movement of the guide bars also assist in the setting up and adjustment of the guide bars.

The guide bar hanger construction, including the self-aligning bearings and the torsion resisting channel members, resist the torque set up by the tension of the yarn drawn around the needles by the guides, and enable the machine to be operated at high speed. Any torque translated to the rock shaft 17 is resisted by the improved shaft suspension including the intermediate bearing member 19 and the hollow cylindrical tube 16. The tube is extremely rigid and materially strengthens the machine to permit its use under high loads at high speeds without damage thereto.

The improvements provided by the present invention not only render the machine more rugged in construction, but reduce the weight and the initial cost thereof, simplify its design, and reduce its maintenance cost.

While the present invention has been described in connection with a warp knitting machine, it may be advantageously embodied in other machines of similar construction and operations where similar problems exist.

As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described, and all statements of the scope of the

invention which, as a matter of language, might be said to fall therebetween.

I claim:

1. In a warp knitting machine, the combination of a pair of end frames, a tube horizontally disposed between said frames, a bracket at each end of said tube for connecting said tube to said frames, said bracket having a horizontal bearing therein beneath said tube, a rock shaft having its ends disposed in said bearings respectively, a guide bar, and a plurality of depending members for supporting said guide bar connected to said shaft for movement therewith.

2. In a warp knitting machine, the combination of a pair of end frames, a tube horizontally disposed between said frames, a bracket at each end of said tube for connecting said tube to said frames, said bracket having a horizontal bearing therein beneath said tube, a rock shaft having its ends disposed in said bearings respectively, a guide bar, a plurality of depending members for supporting said guide bar connected to said shaft for movement therewith, and a member supported by said tube between the ends thereof having a bearing therein through which said shaft extends.

3. In a warp knitting machine, the combination of a pair of end frames, a tube horizontally disposed between said frames, a bracket at each end of said tube for connecting said tube to said frames, said bracket having a horizontal bearing therein beneath said tube, a rock shaft having its ends disposed in said bearings respectively, a guide bar, and a plurality of depending members for supporting said guide bar connected to said shaft for movement therewith, said brackets and said frames having cooperating means for adjusting the position of said tube in a vertical plane and the position of said shaft and the guide bar supported thereon.

4. In a warp knitting machine, the combination of a pair of end frames, a tube horizontally disposed between said frames, a bracket at each end of said tube for connecting said tube to said frames, said bracket having a horizontal bearing therein beneath said tube, a rock shaft having its ends disposed in said bearings respectively, a guide bar, a plurality of depending members for supporting said guide bar connected to said shaft for movement therewith, and a member supported by said tube between the ends thereof having a bearing therein through which said shaft extends, said brackets and said frames having cooperating means for adjusting the position of said tube in a vertical plane and the position of said shaft and the guide bar supported thereon.

5. In a warp knitting machine, the combination of a pair of end frames having bolt means thereon adjacent the upper end thereof, a bracket member for each of said frames, said bracket members having vertical slots for receiving said bolt means to adjust the position of said bracket members in a vertical plane and having a clamping collar and a bearing beneath said collar, a hollow cylindrical tube having its ends clamped in said collars, a rock shaft having its ends disposed in said bearings, a guide bar, and means for supporting said guide bar for movement with said shaft.

6. In a warp knitting machine, the combination of a pair of end frames having bolt means thereon adjacent the upper end thereof, a bracket member for each of said frames, said bracket members having vertical slots for re-

ceiving said bolt means to adjust the position of said bracket members in a vertical plane and having a clamping collar and a bearing beneath said collar, a hollow cylindrical tube having its ends clamped in said collars, a rock shaft having its ends disposed in said bearings, a guide bar, means for supporting said guide bar for movement with said shaft, and a member supported by said tube between the ends thereof having a bearing therein through which said shaft extends.

7. In a warp knitting machine, the combination of a guide bar rock shaft, a guide bar, a bracket connected to said guide bar having an arm provided with a roller at the free end thereof, a bracket member connected to said rock shaft for movement therewith having a U-shaped channel parallel to said guide bar for receiving and guiding said roller on said arm, and means for slidably connecting said bracket and said bracket member.

8. In a warp knitting machine, the combination of a guide bar rock shaft, a guide bar, a bracket connected to said guide bar having a rod parallel to said guide bar and having an arm perpendicular to said guide bar, and a bracket member connected to said rock shaft for movement therewith having an arm parallel to said first arm provided with a self-aligning bearing at the free end thereof for slidably supporting said rod and having a member parallel to said rod formed with a channel for receiving and guiding said bracket arm to serve as a torsion resisting connection between said bracket and said bracket member.

9. In a warp knitting machine, the combination of a guide bar rock shaft, a guide bar, a bracket connected to said guide bar having a rod parallel to said guide bar and having an arm provided with a roller at the free end thereof, and a bracket member connected to said rock shaft for movement therewith having a U-shaped channel parallel to said guide bar for guiding said roller and having an arm provided with a self-aligning bearing at the free end thereof for slidably supporting said rod, whereby said bracket member slidably supports said guide bar.

10. In a warp knitting machine, the combination of a pair of end frames, a tube horizontally disposed between said frames, a bracket at each end of said tube having a horizontal bearing therein beneath said tube, a rock shaft having its ends disposed in said bearings respectively, a guide bar, bracket means connected to said guide bar, bracket members connected to said rock shaft for movement thereof, and means for slidably connecting said bracket means and said bracket members including torsion resisting means.

11. In a warp knitting machine, the combination of a pair of end frames, a tube horizontally disposed between said frames, a bracket at each end of said tube having a horizontal bearing therein beneath said tube, means for adjustably connecting said brackets to said end frames, a rock shaft having its ends disposed in said bearings respectively, a guide bar, bracket means connected to said guide bar, bracket members connected to said rock shaft for movement thereof, and means for slidably connecting said bracket means and said bracket members including torsion resisting means.

12. In a warp knitting machine, the combination of a pair of end frames, a tube horizontally

disposed between said frames, a bracket at each end of said tube having a horizontal bearing therein beneath said tube, means for adjustably connecting said brackets to said end frames, a rock shaft having its ends disposed in said bearings respectively, a guide bar, bracket means connected to said guide bar, bracket members connected to said rock shaft for movement thereof, means for slidably connecting said bracket means and said bracket members including torsion resisting means, and a member supported by said tube between the ends thereof having a bearing therein through which said rock shaft extends.

13. In a warp knitting machine, the combination of a pair of end frames, a horizontally extending tubular member between said end frames at the upper ends thereof, a guide bar, a rock shaft having means for supporting said guide bar, a bracket on each of said end frames for supporting said tubular member and said rock shaft, said brackets having vertical slots therein, bolt members extending through said slots and secured to said end frames for attaching said brackets thereto for up and down movement, and screw means carried by said brackets for engaging said end frames to effect up and down movement of said brackets and said tubular member and said rock shaft carried by said brackets.

14. In a warp knitting machine, the combination of a pair of end frames, a bracket connected for up and down movement on each of said end frames, a rock shaft having its ends rotatably supported by said brackets, a member extending lengthwise above said rock shaft having its ends secured to said brackets, means between the ends of said member for supporting said rock shaft, and a guide bar supported by said rock shaft.

15. In a warp knitting machine, the combination of a pair of end frames, a bracket connected for up and down movement on each of said end frames, a rock shaft having its ends rotatably supported by said brackets, a member extending lengthwise above said rock shaft having its ends secured to said brackets, means between the ends of said member for supporting said rock shaft, a guide bar supported by said rock shaft, and jack means associated with each of said brackets and said end frames for effecting up and down movement of said brackets.

16. In a warp knitting machine, the combination of a guide bar rock shaft, a guide bar parallel to said shaft, a bracket connected to said guide bar having an arm perpendicular to said guide bar, a bracket member connected to said rock shaft for movement therewith having a member parallel to said guide bar formed with a lengthwise extending channel for receiving and guiding the free end of said arm, and means for slidably connecting said bracket and said bracket member.

17. In a warp knitting machine, the combination of a guide bar rock shaft, a guide bar, a bracket connected to said guide bar having a rod parallel to said guide bar and having an arm provided with a roller at the free end thereof, and a bracket member connected to said rock shaft for movement therewith having a channel parallel to said guide bar for guiding said roller and having an arm provided with a bearing at the free end thereof for slidably supporting said rod, whereby said bracket member slidably supports said guide bar.

18. In a warp knitting machine, the combination of a guide bar rock shaft, a guide bar parallel to said shaft, a bracket connected to said guide bar having a rod parallel to said guide bar and having an arm perpendicular to said guide bar, and a bracket member connected to said rock shaft for movement therewith having a member parallel to said guide bar formed with a lengthwise extending channel for receiving and guiding the free end of said arm and having an arm perpendicular to said guide bar provided with a bearing adjacent the free end thereof for slidably supporting said rod.

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