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SHEAVE ASSEMBLY

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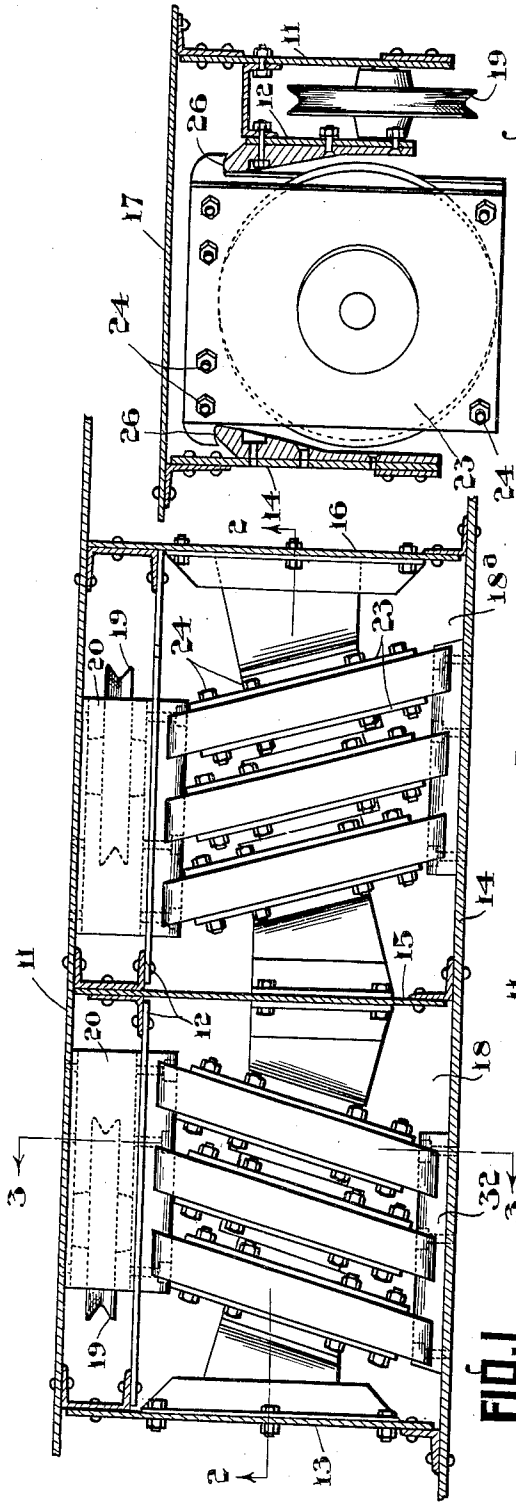


FIG. 1

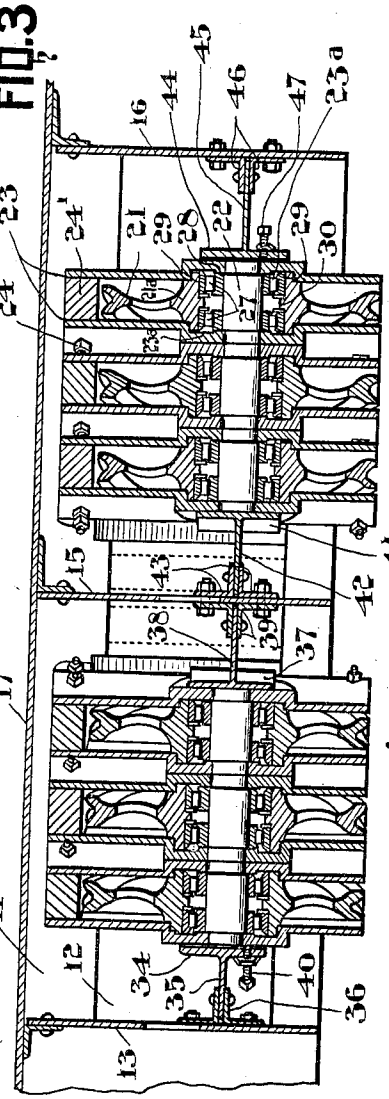


FIG. 2

FIG. 3

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SHEAVE ASSEMBLY

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This invention relates to an improved sheave assembly for cranes and similar structures, wherein the mounting and dismounting of the sheave assembly is often complicated by the lack of adequate working space, due to the frequent necessity of locating the sheaves in comparatively inaccessible portions of the frame structure. This difficulty is further increased when the sheaves are mounted on anti-friction bearings as the removal of such bearings is a task that cannot be conveniently performed in the absence of considerable working space.

The present invention has for its object to eliminate the existing difficulty referred to and it consists in providing an improved assembly which permits each sheave to be mounted in place or removed as a separate unit and is, therefore, especially adapted for use in the top girt of cranes and in all structures wherein the working space available for sheave mounting and dismounting operations is necessarily very limited.

According to this invention, each unit of the sheave assembly comprises a sheave mounted on a shaft having its ends supported by a shaft hanger consisting of a pair of plates located at opposite sides of the sheave. Rollers or other anti-friction bearings are preferably interposed between the sheave and its supporting shaft. The shaft hanger of each unit is provided with means for engaging suitable supporting members attached to portions of the crane or other structure in which the sheaves are to be mounted. The shaft hangers of each assembly are arranged in parallel relation and maintained in abutting engagement by suitable retaining members interposed between the end hangers of each assembly and opposing portions of the frame structure within which the assembly is mounted.

Proceeding now to a more detailed discussion of the invention, reference will be had to the accompanying drawing, wherein

Figure 1 is a fragmentary, sectional plan view of a portion of a crane structure having my improved sheave assembly mounted therein.

Figure 2 is a vertical sectional view taken along the line 2—2 of Fig. 1.

Figure 3 is a transverse sectional view taken along the line 3—3 of Fig. 1.

In the present instance, our improved sheave assembly is illustrated as applied to the top girt framing of a crane structure, but it will be understood that this assembly is adapted for application to any other type of structure in which it may be found useful to facilitate sheave mounting and dismounting operations.

As herein illustrated, the crane structure comprises frame members 11, 12, 13, 14, 15, 16 and 17. The areas 18 and 18*a* bounded by the framing members 12, 13, 14, 15 and 16 represent the spaces in which the sheave assemblies are mounted. The customary guide pulleys indicated at 19 are mounted beneath channel members 20 bridging portions of the spaces reserved between the frame members 11 and 12.

The sheave assembly provided, in accordance with the present invention, for location in each of the spaces 18 and 18*a* comprises a plurality of separate units. Each unit includes a sheave 21 mounted on a supporting shaft 22. The ends of the shaft are keyed in suitable openings formed in a pair of side plates 23 located at opposite sides of the sheave 21. These plates 23 are secured together by a plurality of bolts 24 or similar fastening devices. A horizontally extending bar 24′ is secured between the upper edges of the plates 23 by certain of the bolts 24. The ends of this bar project laterally beyond the opposite vertical edges of the plates 23 and have their lower edges notched as indicated at 26. The plates 23 and the bar 24′ conjointly provide a hanger for the shaft 22, by means of which the sheave 21 is supported in position, as hereinafter explained.

Anti-friction bearings are preferably interposed between the sheave 21 and the shaft 22 of each unit. These bearings may be of any suitable type, but we prefer to employ the roller bearing construction shown to advantage in Figure 2. On referring to this figure, it will be noted that two series of rollers 27 are interposed between each shaft

22 and the hub of the associated sheave 21. The rollers of each series are mounted between an inner race ring 28 encircling the shaft 22 and an outer race ring 29 extending around the hub 21*a* of the sheave 21. The two roller races thus provided are separated from one another by means of an inwardly projecting annular rib 30 formed integral with the hub 21*a*. It will also be noted that the ends of this hub 21*a* are reduced to extend into suitable recesses 23*a* formed by offsetting the central portions of the plates 23.

A suitable number of sheave units, constructed as described, are assembled in abutting relation within each of the spaces 18 and 18*a*. As shown to advantage in the several figures of the drawing, the units of each assembly are supported in place by means of supporting plates 32 attached to the frame members 12 and 14 to serve as rests for the notched ends 26 of the bars 24'. It will be noted that sufficient clearance is provided in each of the spaces 18 and 18*a* to permit each unit of the assembly to be slid into and out of supporting engagement with the plates 32 when said units are free to be so moved. Ordinarily, the units of each assembly are held in abutting engagement with one another by means of suitable retaining members interposed between the end units of said assembly and the opposing frame members at the ends of the spaces 18 and 18*a*. As shown to advantage in Figs. 1 and 2, the unit at the left of the assembly located in the space 18 is engaged by the head 34 of a T-shaped retaining member having its shank 35 secured to the frame member 13 by suitable angle strips 36. The unit located at the right of said assembly is held in abutting engagement with the head 37 of a second retaining member having its shank 38 fastened by angles 39 to one side of the frame member 15. The head 34 of the first mentioned retaining member is preferably equipped with a pressure screw 40 by means of which the several units of the assembly may be firmly pressed together. The unit at the left of the assembly located in the space 18*a* is likewise engaged by the head 41 of a T-shaped retaining member having its shank 42 fastened by angles 43 to the frame member 15. The unit at the right of the last mentioned assembly is engaged by the head 44 of a T-shaped retaining member having its shank 45 fastened by angles 46 to the frame member 16. The head 44 of this member carries a pressure applying screw 47 corresponding to the screw 40 previously described.

When it is desired to remove the sheaves from the spaces 18 and 18*a* this is accomplished by removing the T-shaped retaining members secured to the frame members 13 and 16 and then sliding the units of each assembly in the direction of said frame members and out of engagement with the supporting plates 32. After being thus removed the component parts of each unit may be conveniently taken part for replacement or repair by removal of the bolts 24.

The units of each assembly are preferably mounted so that each sheave is contained in a plane inclined with respect to the longitudinal axis of the girt. This obviates the necessity of swivelling the co-operating sheaves carried by the load supporting block (not shown) and also minimizes the wear on the cables as it provides for a substantially straight-line lead of the cables from the girt sheaves to the load supporting sheaves. In connection with this feature it will also be understood that the girt sheaves may be arranged at any angle, less than a right angle, with reference to the longitudinal axis of the girt.

Having thus described our invention, what we claim is:—

1. A sheave assembly capable of being conveniently mounted in a confined space or removed therefrom, said assembly comprising supporting means, a plurality of independent hangers slidably suspended in side by side relation from said supporting means and a sheave mounted in each hanger, each of said hangers being independently slidable into and out of engagement with said supporting means.

2. The combination with a structure comprising framing members defining a restricted sheave receiving space of a sheave assembly adapted to be conveniently mounted in said space or removed therefrom, said assembly comprising a series of independent hangers each having a sheave mounted therein and supporting means for the hangers arranged in said space to leave clearance permitting the hangers to be slid into and out of engagement therewith.

3. A sheave assembly comprising hanger supporting means, a series of hangers slidably engaged with said supporting means and arranged in side by side relation, a sheave mounted in each hanger and means removably engageable with the end hangers of the series to prevent sliding movement of the hangers relative to said supporting means.

4. A sheave assembly comprising a series of hangers, a sheave carried by each hanger, supporting means in slidable engagement with all of said hangers, said hangers being suspended in side by side relation from said supporting means and means engageable with the end hangers of the series to hold said hangers in abutting engagement with one another and to prevent sliding movement of the hangers relative to said supporting means.

5. A sheave assembly comprising a pair of spaced supports, a plurality of sheave units adapted to be suspended therefrom, each unit consisting of a hanger including a pair of side plates, a sheave rotatably mounted between said plates and a supporting bar se-

cured to the upper edges of said plates and having its ends projecting therebeyond and disposed in sliding engagement with said supports.

6. A sheave assembly comprising a pair of spaced parallel supports, a series of sheave units adapted to be suspended therefrom, each unit comprising a hanger having a sheave rotatably mounted therein and a cross bar at the upper end of the hanger having its ends projecting into sliding engagement with said supports and means engageable with the end hangers of the series to prevent sliding movement of the hangers relative to said supports.

7. A sheave assembly comprising a series of independent units, each unit consisting of a pair of side plates secured together, a sheave rotatably mounted between said plates and a supporting bar secured between the upper portions of said plates with the ends of the bar projecting outwardly beyond adjacent edges of the plates, a frame structure, a pair of spaced parallel supports secured to the frame structure and adapted to slidably support the projecting ends of said bar and retaining members interposed between the end units of the series and portions of the frame structure to prevent sliding movement of the units relative to said supports, the arrangement being such as to permit said units to be freely slid into or out of engagement with said supports upon removal of the retaining members.

8. A sheave assembly comprising a series of independent units, each unit consisting of a shaft hanger, a cross bar carried by the upper portion of the hanger with the ends of the bar projecting outwardly therefrom, a shaft carried by said hanger, a sheave mounted on said shaft and an anti-friction bearing interposed between the shaft and the sheave, a pair of parallel supports between which the units are adapted to be arranged in side by side relation with the projecting ends of the cross bar slidably arranged on said supports and means for temporarily preventing sliding movement of the cross bar relative to said supports.

In witness whereof, we have hereunto set our hands.

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