July 7, 1953 T. C. NORTH 2,644,545

ELEVATOR TOWER ASSEMBLED FROM PREFABRICATED PANELS

Filed Nov. 9, 1950 3 Sheets-Sheet 1

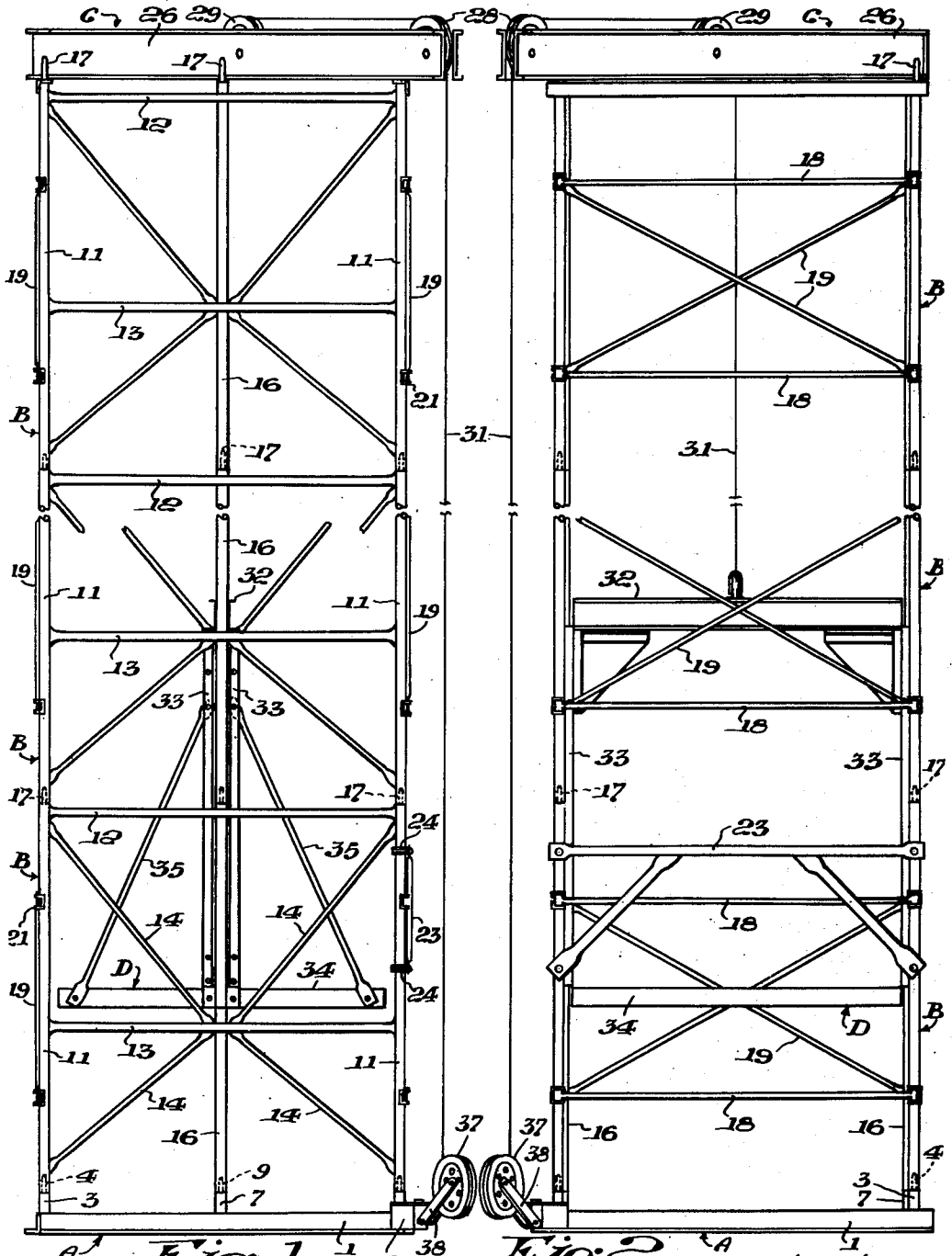


Fig. 1.

Fig. 2.

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ELEVATOR TOWER ASSEMBLED FROM PREFABRICATED PANELS

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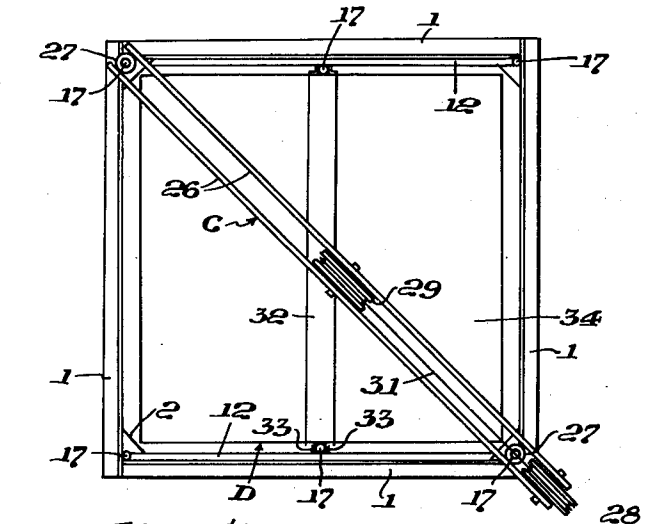


Fig. 3.

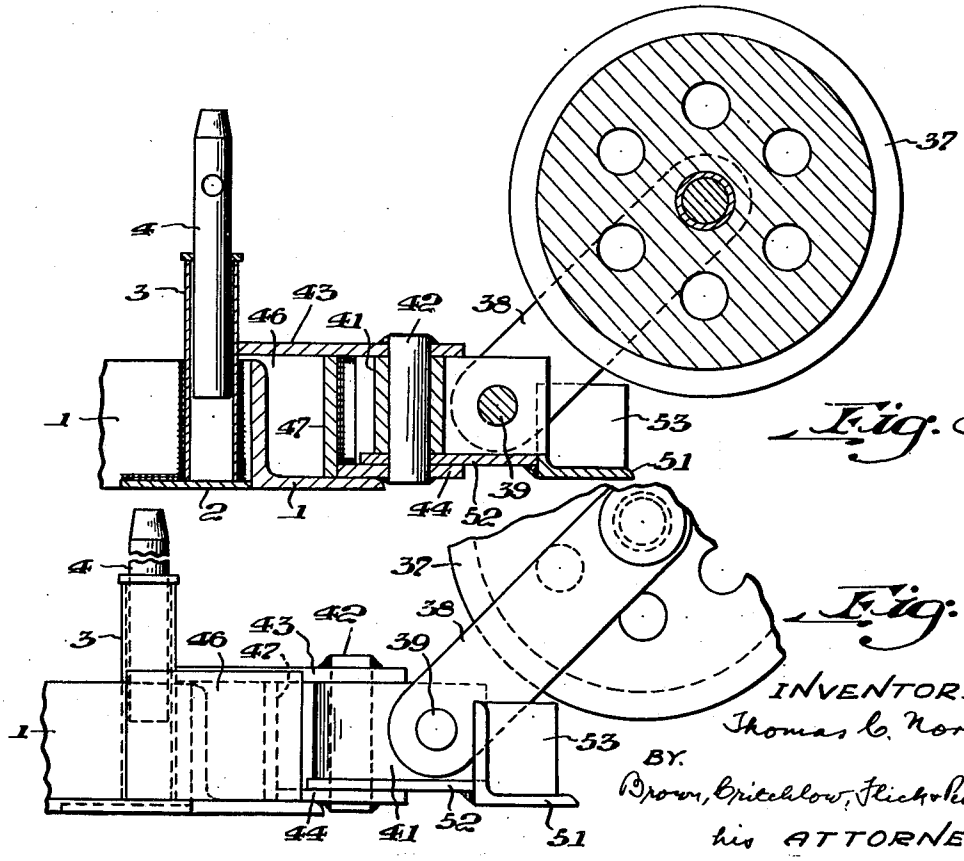


Fig. 8.

Fig. 7.

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Filed Nov. 9, 1950 3 Sheets-Sheet 3

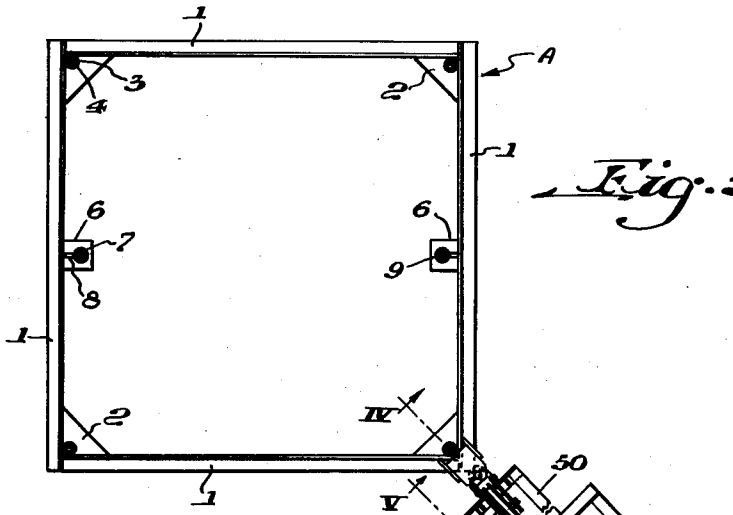


Fig. 5.

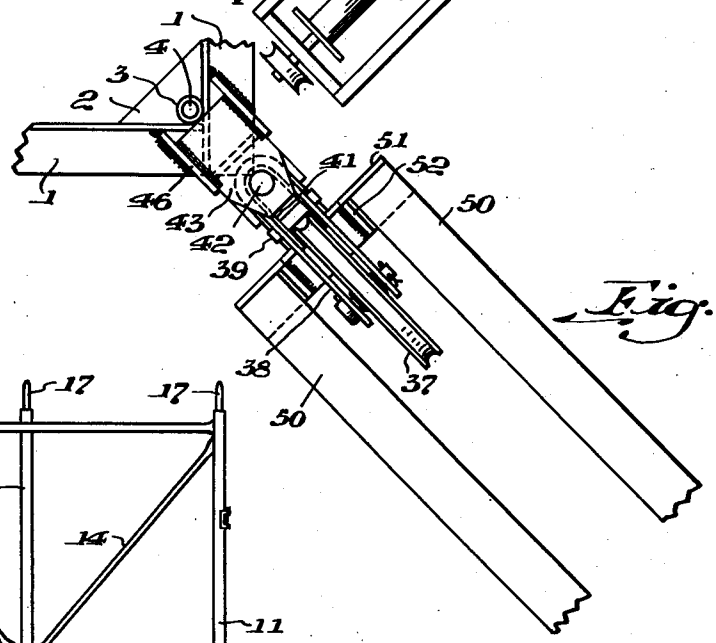


Fig. 6.

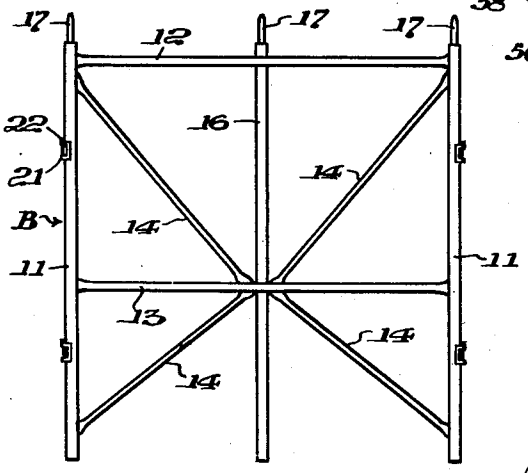


Fig. 4

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2,644,545

UNITED STATES PATENT OFFICE

2,644,545

ELEVATOR TOWER ASSEMBLED FROM PREFABRICATED PANELS

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Application November 9, 1950, Serial No. 194,792

5 Claims. (Cl. 187—2)

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This invention relates to elevator towers for handling building material, and more particularly to those constructed in sections from metal members.

The usual elevator tower of this type is assembled at the building site from a large number of separate metal members which are bolted together to form legs and braces and vertical guides for the elevator or lift. It requires a great deal of time and labor to build such a tower piece-by-piece, and it necessarily involves a considerable amount of bolting. Also, the hoist that operates the elevator and the base of the tower have to be bolted down to prevent them from moving toward each other, or else the hoist is spaced the desired distance from one side of the tower by intervening blocking elements engaging the side of the base. Neither system of holding the hoist is very satisfactory.

It is among the objects of this invention to provide an elevator tower which is formed from prefabricated panels that can be quickly mounted on top of one another in two parallel stands without the use of bolts, which utilizes braces without bolts for quickly fastening the two stands of panels together, which has elevator guides permanently connected to the panels, which has a cathead that does not have to be bolted in place, and which has a specially arranged seat at the base of the tower for receiving the ends of blocking elements for spacing the hoist from the seat.

In accordance with this invention, the tower has a rectangular base frame, two opposite sides of which support a pair of parallel stands of superimposed, prefabricated, vertical panels. Each of the panels has a pair of tubular legs permanently connected by cross braces which permanently support a vertical tubular elevator guide between the legs. The lower ends of the legs of the lowest pair of panels are telescoped over vertical pins secured to the corners of the base frame. Preferably the lower ends of the elevator guides also may be telescoped over pins with which opposite sides of the base frame may be provided. The upper ends of the panel legs have pins projecting from them up into the lower ends of the panel legs above them. The same thing may be true of the elevator guides. The two stands of panels are connected by removable braces, preferably of the boltless type, whereby a rectangular tower is formed. A cathead is seated on top of a pair of diagonally opposite corners of the tower and projects outward from one of them. The cathead is provided with vertical openings that receive the top panel pins at

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those two corners of the tower, and it includes a sheave near its center and a sheave supported by its projecting end. A lift is disposed inside the tower, where it is guided in its vertical travel by the tubular guides on the panels. The lift is raised by a cable connected to it and extending up over the center sheave of the cathead and then out and down around the outer sheave. The cable then extends down to the bottom of the tower and under a sheave attached to the underlying corner of the base frame. From there the cable extends out to the usual hoist. To block the hoist away from the tower, a horizontal member is disposed outside of the base frame and is provided with a seat for hoist-blocking elements, such as timbers. This member is connected to the same corner of the frame as the base sheave and can be swung laterally on a vertical axis. Above the seat member the base sheave is journaled in a support that is pivotally connected with the corner of the frame in such a way that the sheave can be swung both vertically and horizontally.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which Fig. 1 is a view of a panel side of the tower; Fig. 2 is a view of a brace side of the tower; Fig. 3 is a plan view; Fig. 4 is a side view of one of the tower panels; Fig. 5 is a plan view of the base frame; Fig. 6 is an enlarged plan view of the lower sheave and blocking seat member; Fig. 7 is an enlarged elevation taken on the line VII—VII of Fig. 5; and Fig. 8 is an enlarged vertical section taken on the line VIII—VIII of Fig. 5.

Referring to Fig. 5 of the drawings, the base A of the tower is a rigid rectangular frame formed from four angle bars 1 welded together at their ends and reinforced by triangular corner plates 2. Disposed in each corner of the frame is a vertical sleeve 3 that is welded to the adjoining sides of the frame and to the corner plate on which it rests. A pin 4 is welded in each of these sleeves and projects above it. Midway between the two corner pins at two opposite sides of the frame, a small base plate 6 is welded to the inside of the frame. A vertical sleeve 7 rests on each of these base plates a short distance from the adjacent side of the frame. The sleeves are welded to the plates and to narrow vertical plates 8 that are welded to the sides of the frame. Pins 9 are welded in these sleeves and project from their upper ends.

Two opposite sides of the tower are formed from parallel stands of superimposed, vertical panels B. Each panel is prefabricated, preferably by

welding all of its constituent members together. As shown in Fig. 4, each panel is formed from a pair of tubular legs 11 that are rigidly connected at their upper ends and near their central portions by horizontal braces 12 and 13, respectively, which also may be tubular. Inclined braces 14 connect the opposite ends of the legs to the central portion of the lower horizontal brace 13. Welded to one side of the horizontal braces midway between the panel legs is a vertical tubular member 16 that serves as an elevator guide. This member is the same length as the legs of the panel. Welded in the upper ends of the legs and the elevator guide are pins 17 which project above them and which are adapted to telescope into the lower ends of the legs and guide of a like panel mounted on the one just described. In this way, any number of panels can be set on top of one another with their legs and elevator guides in alignment. It is desirable to connect the adjoining ends of the elevator guides together by pins in this manner, because a considerable length of each guide below the center brace 13 is not supported by anything.

For holding the two stands of panels B upright and parallel to each other, they are connected by removable horizontal braces 18 and inclined braces 19, as shown in Fig. 2. Although any suitable brace may be used for this purpose, it is preferred to use braces that do not require bolts to hold them in place. One type of such a brace is shown in the copending patent application of John A. Kirkpatrick, Serial Number 76,828, filed February 16, 1949. As there shown, the ends of the braces are notched to permit them to be slid sideways into notched brackets 21 attached to the sides of the panel legs. The braces may be held in the brackets by vertical pins 22 that can be raised to release the braces. The brace side of the tower where the loading and unloading is done may omit braces 18 and 19 at the different landing levels to provide access openings. In place of the omitted braces, trussed braces 23 may be substituted at the top of the access openings by attaching them to the panel legs by clamps 24.

Resting on top of the tower is a cathead C formed from a pair of spaced parallel channels 26 that extend diagonally across the tower. As shown in Fig. 3, the channels are spaced apart by a pair of vertical sleeves 27 that receive the pins 17 at two diagonally opposite corners of the tower to hold the channels upright and in place. The cathead helps to hold the tower square. The cathead projects outward from one corner of the tower and has a sheave 28 journaled in the projecting ends of the channels. Another sheave 29 is journaled in the channels near the center of the tower. These sheaves support a cable 31 which extends down into the tower to support an elevator or a lift D. The lift has a central top beam 32, the ends of which support the upper ends of two pairs of laterally spaced, vertical angle bars 33. Each pair of these bars has parallel flanges that straddle the adjacent elevator guide 16 and slide up and down on the guide when the cable is raised or lowered. The lower ends of the two pairs of bars 33 support the floor 34 of the lift, which also is connected to the upper part of the bars by inclined braces 35.

The part of the lift-actuating cable 31 that extends down over the outer sheave 28 of the cathead passes under a sheave 37, connected to the underlying corner of the base frame of the tower, and then out to a hoist E, shown in Fig. 5. As best shown in Figs. 6, 7 and 8, this base sheave is journaled in the outer ends of a pair of supporting links 38, the inner ends of which are pivotally mounted on a horizontal pin 39 located between the sheave and the adjacent corner of the base frame A. The pin is supported by the outer end of a U-shape bracket 41 that extends around a vertical pivot pin 42 mounted in parallel upper and lower plates 43 and 44 which are welded to angle bars 1 at the corner of the base frame. These plates are connected by vertical side plates 46, which in turn are connected by a vertical cross plate 47 between the horizontal plates. This mounting of the base sheave 37 forms a swivel connection that permits the sheave to swing up and down and sideways.

To avoid having to bolt down the tower and the hoist, and to provide a definite and adjustable seat for blocking timbers 50 between the tower and the hoist, a short horizontal angle bar 51 is connected to the same outer corner of base frame A as sheave 37. This bar is located directly in front of the pivot pins 39 and 42. Welded to the central part of the frame side of the bar is a short plate 52 that is pivotally mounted on the vertical pin 42 beneath the U-shape bracket 41. The vertical flange of the bar 51, which may have its central portion cut away to permit links 38 to swing down across the bar, forms an abutment for the ends of the blocking timbers 50 that rest on the lower flange of the bar. Thus, the bar forms a seat for the timbers, the other ends of which are braced against the hoist. The vertical flanges of the seat bar may be reinforced by parallel vertical plates 53 welded to both flanges of the bar. With this arrangement, the hoist is blocked against seat bar 51 and does not exert any pressure against the tower base. Due to the pivotal connection of the seat bar to the base, the hoist can be located in different positions around the adjacent corner of the tower and yet always be squared up with the bar. Because both the bar and the base sheave support are pivotally mounted on the same vertical pin, the sheave can always be swung sideways with the bar to keep it in line with the hoist.

An elevator tower constructed in accordance with this invention can be put up in a very small fraction of the time that is required for erecting conventional towers. All that has to be done is to set the side panels B on top of one another on base 8, connect the two panel sides of the tower by the quickly installed cross braces, and set the cathead C on top of the panels. The elevator guides being permanent parts of the side panels, they are installed with the panels. The hoist can be quickly blocked against the tower in several different positions by utilizing adjustable angle bar 51 which forms seats for the blocking timbers.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. An elevator tower comprising a rectangular base frame, pins projecting upward from the corners of the frame, a pair of parallel stands of superimposed prefabricated vertical panels supported by two opposite sides of the base frame,

each of the panels having a pair of tubular legs permanently connected by cross braces permanently supporting a vertical tubular elevator guide between the legs, the lower ends of the legs of the lowest pair of panels being telescoped over the base frame pins, pins projecting from the upper ends of said legs and telescoped into the lower ends of the panel legs above them, removable braces connecting the two stands of panels, a cathead seated on top of a pair of diagonally opposite corners of the tower and projecting outward from one of them, the cathead being provided with vertical openings receiving the top panel pins at said corners and including a sheave near its center and a sheave supported by its projecting end, a sheave attached to the corner of the base frame beneath said projecting cathead sheave, a lift-actuating cable extending under the base sheave and up and over the cathead sheaves and down into the tower, and a lift suspended in the tower by the cable and slidable vertically on said guides.

2. In an elevator tower, a base comprising a rigid rectangular frame, a horizontal member outside of the frame forming a seat for hoist-blocking elements, means pivotally connecting said member to the frame on a vertical axis to permit said member to be swung sideways, a vertical sheave above said member, a support for the sheave, and means pivotally connecting said support to the frame on said vertical axis to permit the sheave to be swung sideways relative to the frame and said seat member.

3. In an elevator tower, a base comprising a rigid rectangular frame, a horizontal member outside of the frame forming a seat for hoist-blocking elements, a vertical pivot pin outside of the frame and connected thereto, said seat member being pivotally mounted on the pin, a vertical sheave above said member, a support for the sheave, and means pivotally mounted on said pin and connected to said sheave support to permit that support to be swung sideways relative to the frame and said seat member.

4. In an elevator tower, a base comprising a rigid rectangular frame, a horizontal member outside of the frame forming a seat for hoist-blocking elements, a vertical pivot pin outside of the frame and connected thereto, said seat member being pivotally mounted on the pin, a vertical sheave above said member, a support for the sheave, a bracket pivotally mounted on said pin, and means pivotally connecting said sheave support to the bracket on a horizontal axis, whereby the sheave can be swung vertically and horizontally.

5. In an elevator tower, a base comprising a rigid rectangular frame, a horizontal angle bar outside of the frame and normally disposed diagonally of one frame corner, one flange of the angle bar projecting upward from the other flange along the side nearest the frame, a connecting member fastened to the central part of the bar and extending toward said frame corner, a vertical pivot pin extending through said member, means secured to said frame corner for supporting the pin, a bracket pivotally mounted on the pin above said connecting member, a vertical sheave above said bar, a support for the sheave, and a horizontal pivot pin connecting said sheave support to the bracket between the vertical pin and the bar.

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