

Sept. 26, 1933.

B. F. FITCH

1,927,933

CRANE

Filed Nov. 13, 1931

2 Sheets-Sheet 1

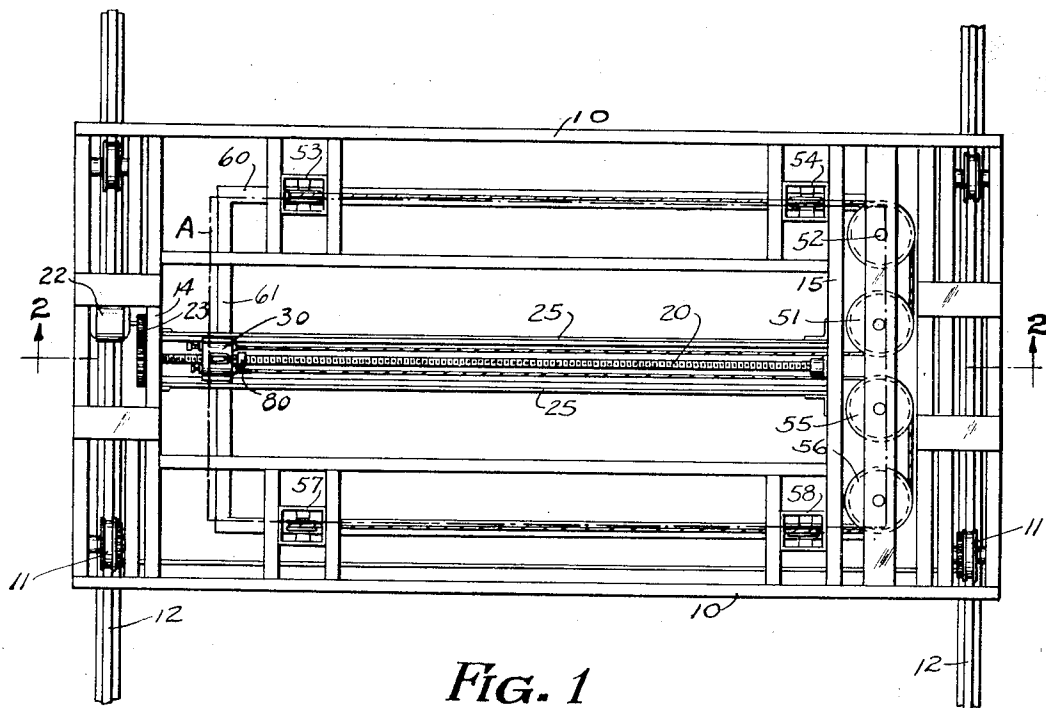


FIG. 1

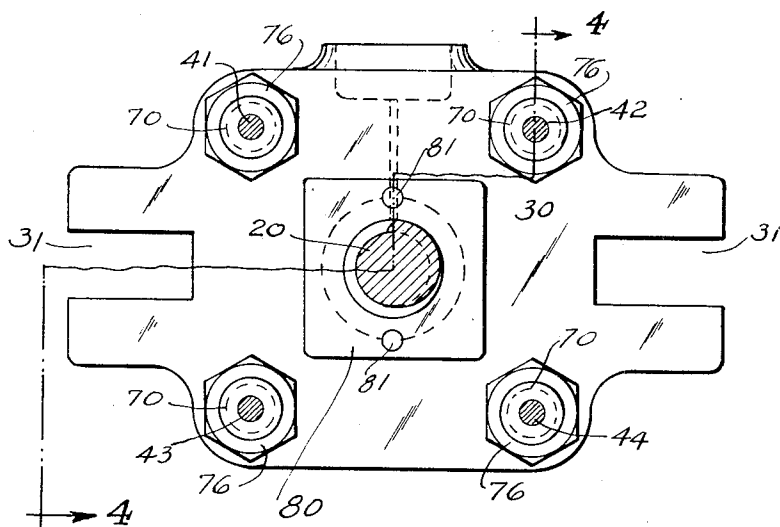


FIG. 3

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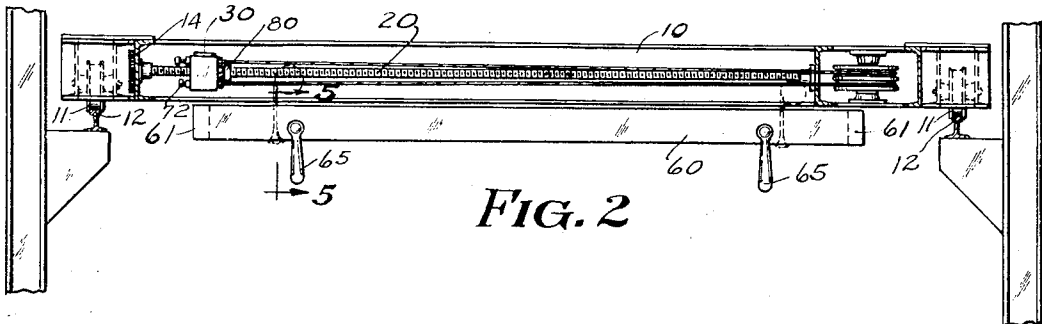


FIG. 2

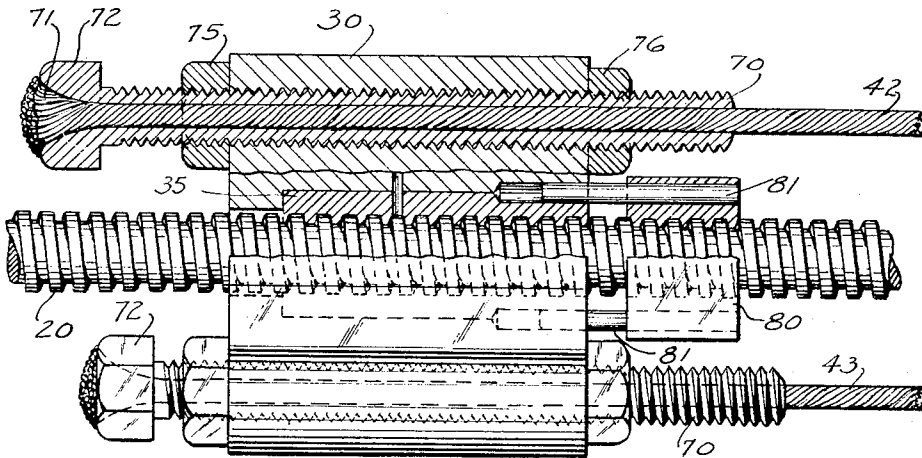


FIG. 4

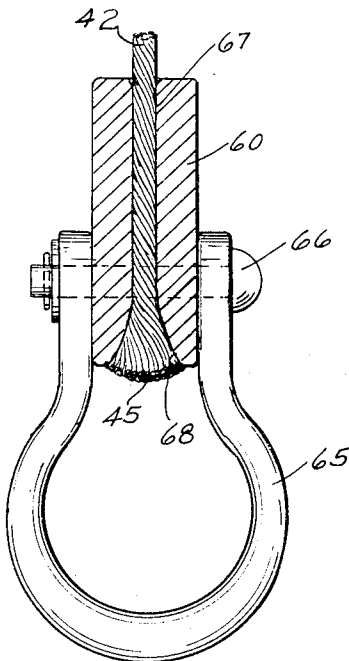


FIG. 5

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UNITED STATES PATENT OFFICE

1,927,933

CRANE

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Application November 13, 1931

Serial No. 574,744

8 Claims. (Cl. 254—144)

This invention relates to a crane for lifting demountable automobile bodies with their loads by means of several cables drawn up as a unit; and more particularly, it is concerned with the screw crane as illustrated in my prior Patent, No. 1,747,765, wherein there is a horizontal rotatable screw on which is mounted a traveling nut and four cables lead from the nut around sheaves to four points of load engagement at the four corners of a rectangle.

One object of the invention is to so connect the cable with the load-engaging members that a minimum of head room is required. Another object is to enable a ready adjustment of any cable to equalize the stress thereon.

My patent referred to shows the four cables terminating at their lower ends in eyes to engage hooks on a demountable automobile body. My Patent No. 1,838,139, issued December 29, 1931, shows a cradle comprising an open rectangular frame having four depending pivoted shackles adapted to engage the hooks on an automobile body adjacent the eaves thereof. In my present invention, I may avail myself of such a cradle, but I connect the cables directly thereto by passing them into openings in the cradle bars and spreading the lower ends of the cables,—this connection being permanent, and the adjustment being made where the cable is connected to the traveling nut. This materially reduces the head room as it allows the cradle to be pulled up substantially against the bottom of the crane itself.

To enable the adjustment at the upper ends of the cables, I extend each of them into a tubular member to which it is anchored, and I mount these tubular members adjustably in the nut so that any cable may be effectively shortened as the equalization of stresses may require. This is also a feature of the present invention.

My invention is illustrated in the drawings hereof and is hereinafter more fully explained and the novel features are summarized in the claims.

In the drawings, Fig. 1 is a plan of a screw crane embodying this invention; Fig. 2 is a vertical central section thereof, as indicated by the line 2—2 on Fig. 1; Fig. 3 is an enlarged end view of the traveling nut; Fig. 4 is a sectional elevation of the traveling nut, the plane of the section being indicated by the line 4—4 in Fig. 3; Fig. 5 is a vertical section through one of the cradle bars in the region of attachment of the cable as indicated by the line 5—5 on Fig. 2.

Referring first to the crane in Figs. 1 and 2,

10 indicates a frame which may have supporting wheels 11 engaging track rails 12 when the crane is to be of the traveling type. The crane frame is shown as provided with intermediate cross beams 14 and 15 in which is journaled a horizontal screw 20 driven by suitable means, as, for instance, the motor 22 connected with the screw by reduction gearing 23. On the screw is a traveling nut 30 which has opposite bifurcated wings 31 slidably engaging guide bars 25 carried by the frame members 14 and 15. These bars prevent the nut rotating, but allow it to travel longitudinally as the screw is rotated by the motor.

Four cables designated 41, 42, 43 and 44 are attached to the nut 30 and lead lengthwise of the crane frame, all in the same direction; and then two of the cables, as 41 and 43, pass around sheaves 51 and 52, and thence forwardly and depend individually over sheaves 53 and 54. On the other side, the two cables 42 and 44 pass around sheaves 55 and 56, and thence depend individually over the sheaves 57 and 58. Thus, the four cables depend at the four corners of a rectangle, corresponding in position to the four sheaves 53, 54, 57 and 58.

The load engaging cradle comprises an open rectangular frame having a pair of spaced side bars 60 and connecting end bars 61. Secured to each side bar are pivoted loops or shackles which are adapted to be swung beneath the hooks formed at the eaves of a demountable body indicated at A in Fig. 1. As illustrated in Fig. 5, the shackles may be mounted on transverse bolts 66 passing through the side bars 60 of the cradle.

To attach the four depending cables to the side bars of the cradle without reducing the head room, I form vertical openings 67 (Fig. 5) in each side bar, these openings flaring at the lower ends to be conical as shown in the figure at 68. The cable is passed downwardly through the opening and its end flared, as indicated at 45, is leaded or welded tightly to the cradle bar. This makes an effective permanent attachment of the cable to the cradle bar without, in any manner, obstructing the space above the bar, so that the cradle may be pulled up tight against the crane frame as illustrated in Fig. 2.

As the cables are anchored tightly and permanently to the cradle bars, I provide the adjustment heretofore mentioned at the other end of the cables where they connect with the nut 30, this adjustment taking care of inaccurate cutting of the original cable lengths or different

stretch on them in use. This adjustment will now be described with reference particularly to Figs. 3 and 4.

Threaded in the nut 30 are four tubular rods 70, each having a bore to receive the cable and having a conical enlargement 71 in its head 72 to receive the spread end of the cable, which is leaded or welded in the rod head. When the cable is originally installed, the head 72 is quite near the nut, as indicated, for instance, in the lower portion of Fig. 4, and then, after installation, or as the cable subsequently stretches, the cable is drawn taut by the rotation of the tubular rod 70, which may thus come into such position as illustrated in the upper portion of Fig. 4. In any case, after the tubular rod has been positioned, it may be tightly locked in place by the jamb nuts 75 and 76.

As illustrated in Fig. 4, the thread of the nut 30, which meshes with the screw 20, is preferably in a separate block 35 set into a cavity in the nut against a shoulder therein. This enables the block to be of bronze or other material best adapted to coast with the screw with comparatively light friction and enables the replacement of this threaded portion, as desired.

To prevent damage in case of breakage of the thread of the bronze sleeve 35, I may avail myself of the safety nut illustrated in my Patent No. 1,657,670. This device comprises a steel nut 80 threaded on the screw and carrying pins 81 loosely slidable in longitudinal cavities in the main nut. The pins prevent the rotation of the safety nut and allow it to travel longitudinally with the main nut; but as there is normally no load on the safety nut, there is little friction between it and the screw. In case, however, of breakage of the bronze nut, the main nut 30 would simply slip lengthwise into engagement with the steel safety nut, which has sufficient strength to hold the load, and may then be used as the operating nut until the bronze nut is replaced.

It will be seen from the drawings and the description given, that my adjustment of the cable lengths at the nut does not require any change in the construction of the crane or in the course of the cables, and little, if any, enlargement of the nut. Adjustment is easily made from time to time as may be required without disturbing any of the rest of the equipment. The cables in this embodiment have such length that the twist given them in making adjustment is considered immaterial. If, however, this twist should in some embodiment become material, it may be avoided by mounting the tubular screws 70 in rotatable bushings in the nut instead of in the nut itself, or such bushings might be used in the cradle bars to receive the lower ends of the cables.

I claim:

1. A lifting device comprising a rotatable screw, a traveling nut therefor, a cable, a tubular member into which the cable extends and to which it is anchored, and means for adjustably mounting the tubular member in the nut.

2. In a crane, the combination of a frame, a

screw rotatably mounted therein, a traveling nut thereon, a lifting cable, a tubular member into which the cable extends and to which it is anchored, said tubular member extending through the nut and being provided with a thread to enable its longitudinal adjustment with reference to the nut.

3. In a crane, the combination of a horizontal overhead frame, a horizontal screw mounted in the frame, means for rotating the screw, a nut mounted on the screw, means on the frame for guiding the nut to allow it to travel but preventing its rotation, a cable adapted to lead from the nut lengthwise of the screw and thence over a sheave and depending to the load, and a tubular threaded rod into which the cable extends and to which it is anchored, said threaded rod having a screw engagement with the nut.

4. The combination with a crane having four depending cables and means adjustably connected to the upper ends of the cables for pulling up on the cables, the cradle having spaced side bars and end bars, the side bars being equipped with shackles to engage a load, said cables extending at their lower ends downwardly through openings in the side bars of the cradle, the lower ends of the cables being spread to anchor them to the cradle bars.

5. In a crane, the combination of a screw, a traveling nut thereof, a tubular rod threaded in the nut and a cable passing through the rod and attached to the distant end thereof.

6. The combination of a crane having a rotatable screw, a traveling nut thereon, a floating cradle provided with means for engaging a demountable body, cables attached to the cradle in a manner to allow it to lift substantially against the crane frame, rods adjustably mounted in the nut and means for attaching the cable to the rods within the lateral confines of the rod.

7. In a crane, the combination with a frame, a rotatable screw mounted therein, a nut mounted on the screw, a pair of frame guide bars parallel with the screw on opposite sides thereof, there being shoulders on the nut engaging said bars, tubular rods which are externally threaded and have an adjustable engagement with the nut, cables leading lengthwise of the screw and about sheaves and eventually depending, each cable occupying one of such rods and being anchored thereto, and a cradle having side bars equipped with load engaging means, the cables extending downwardly through openings in the side bars and secured thereto at their lower ends.

8. In a crane the combination of a frame, a screw rotatably mounted therein, a traveling nut on the screw, tubular rods mounted in the nut on opposite sides of the screw, means for adjusting the rods longitudinally in the nut, cables passing into the rods and attached thereto beyond the free end of the rod, whereby the rod with the cable may be drawn into the nut.

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