E. Y. MOORE.

JIB CRANE.

APPLICATION FILED APR. 9, 1917.

1,284,745.

Patented Nov. 12, 1918.

3 SHEETS—SHEET 1.

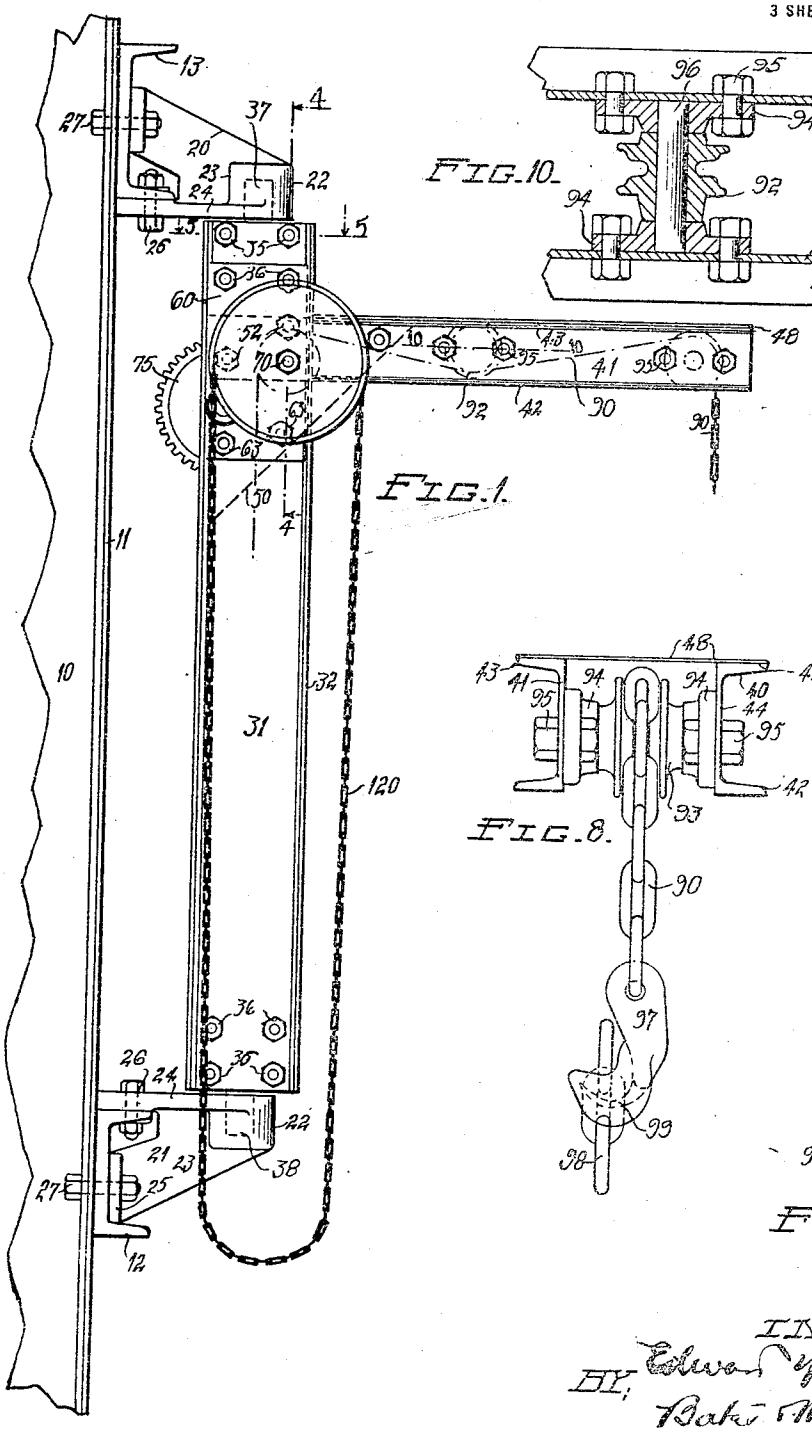


FIG. 1.

FIG. 10.

FIG. 8.

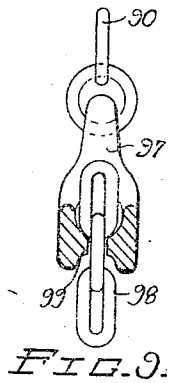


FIG. 9.

INVENTOR,
Edwin Y. Moore
BY Baker Mucklin,
ATTYS

E. Y. MOORE.

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3 SHEETS—SHEET 2.

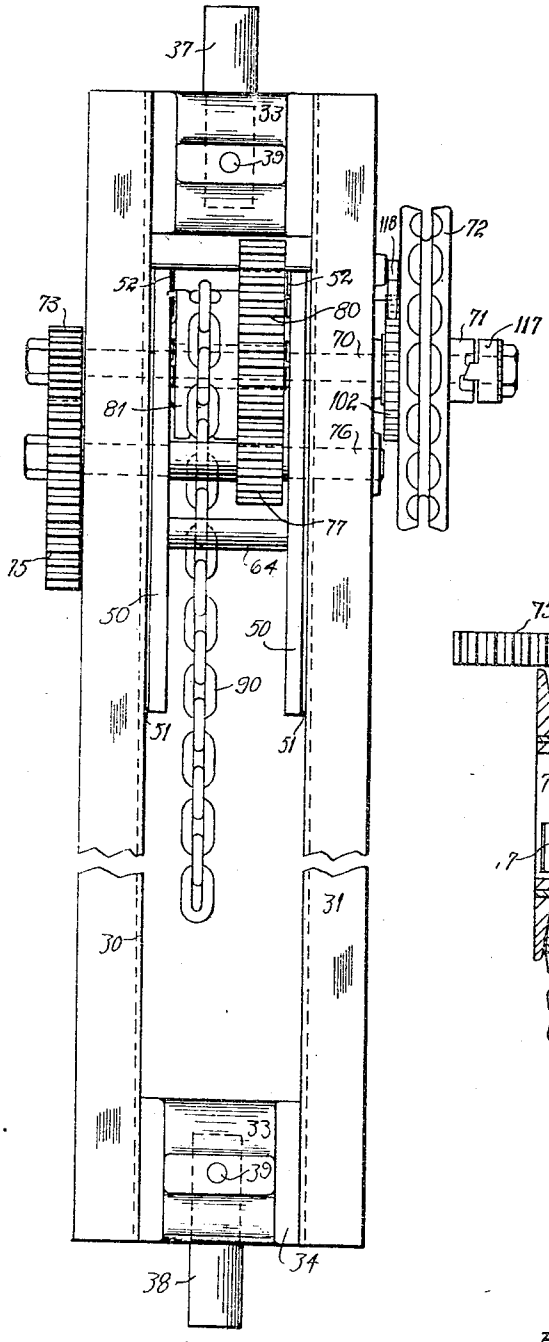


FIG. 2.

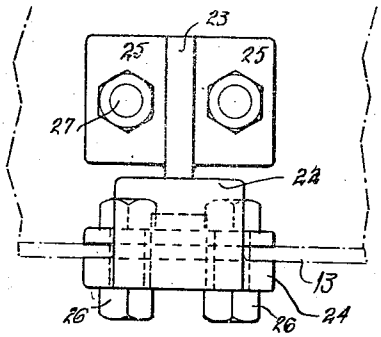


FIG. 11.

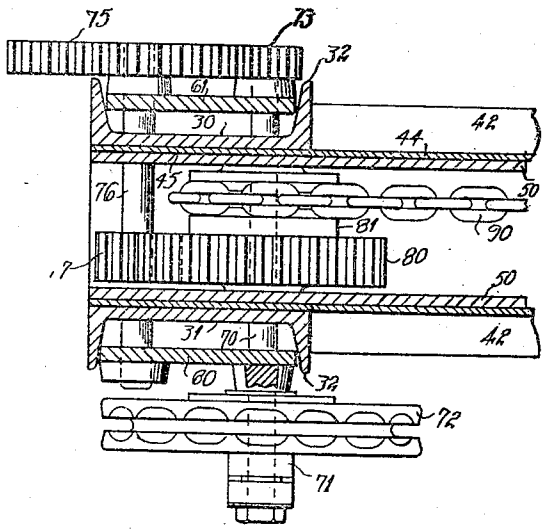


FIG. 3.

INVENTOR,

BY Edward Y. Moore,

Parker Macklin,

ATTYS.

E. Y. MOORE.

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3 SHEETS—SHEET 3.

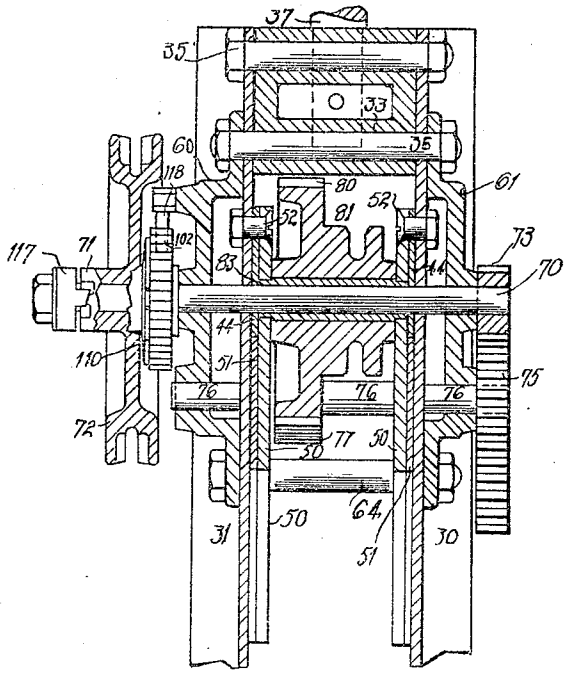


FIG. 4.

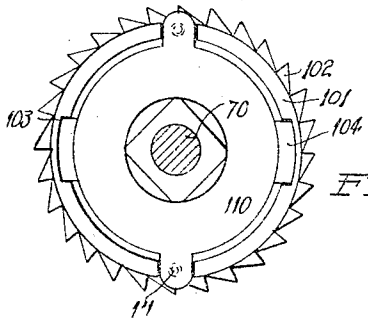


FIG. 7.

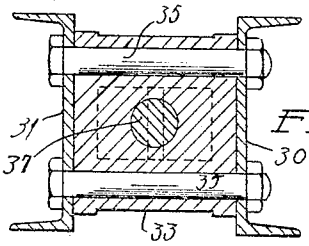


FIG. 5.

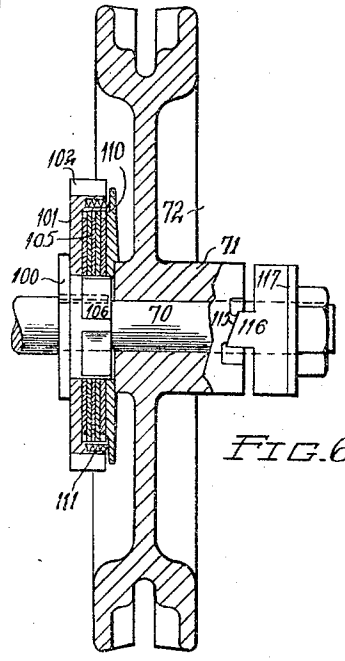


FIG. 6.

INVENTOR,
Edward Y. Moore,
BY,
Bates Macklin,
ATTYS.

UNITED STATES PATENT OFFICE.

EDWARD Y. MOORE, OF CLEVELAND, OHIO.

JIB-CRANE.

1,284,745. Specification of Letters Patent. Patented Nov. 12, 1918.

Application filed April 9, 1917. Serial No. 160,602.

To all whom it may concern:

Be it known that I, EDWARD Y. MOORE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Jib-Cranes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to jib cranes having an outstanding arm arranged to swing about a vertical axis and provided with suitable hoisting mechanism having a flexible raising member depending from the outer portion of the arm. The invention is more particularly concerned with such a jib crane which is arranged to be supported above and below on a vertical post or wall and has an upright frame member which supports the outstanding arm and carries the hoisting mechanism proper, the flexible left member thereof being guided outwardly on the arm and then depending. The object of the invention is to simplify and cheapen the construction of a jib crane of the type mentioned, producing a crane which is effective and strong, and at the same time is comparatively light and compact. The invention is hereinafter more fully described and its essential characteristics are summarized in the claims.

In the drawings, Figure 1 is a side elevation of my jib crane complete; Fig. 2 is an edge elevation on an enlarged scale of the upright frame and the hoisting mechanism it carries, this view being at right angles to Fig. 1; Fig. 3 is a horizontal section through the crane just above the hoisting mechanism; Fig. 4 is a vertical section through the upright and the hoisting mechanism, as indicated by the line 4—4 on Fig. 1; Fig. 5 is a horizontal section through the upper portion of the upright, as indicated by the line 5—5 on Fig. 1; Fig. 6 is an enlarged vertical section of the hand wheel and braking clutch controlled thereby; Fig. 7 is a face view of the clutch, being a section through the main shaft of the hoisting mechanism on the inner side of the hand wheel; Fig. 8 is an end view of the horizontal arm of the frame, showing also the lift hook on the flexible raising member; Fig. 9 is a detail of the lift hook, being a vertical section through it in a plane at right angles to Fig. 8; Fig. 10 is a detail of a portion of the jib arm, being a section on the line 10—10 of Fig. 1; Fig. 11 is an elevation of one of the brackets in which the vertical arm is supported.

As shown in Fig. 1, 10 designates any suitable vertical support for the frame. The support shown may be considered an upright I-beam having flanges 11. 12 and 13 indicate two horizontal channel members which are shown as secured to the I-beam. The crane proper is carried by brackets secured, in the embodiment shown, to the I-beam and to the horizontal channel members.

The brackets mentioned are designated respectively 20 and 21; they may be identical, one facing downwardly and the other upwardly. Each bracket has a cylindrical boss 22 with a vertical recess in it, a vertical web 23 extending from the boss, a horizontal flange 24 extending each side of the web, and vertical flanges 25 extending from the web. As shown, flanges 24 extend across the corresponding channel beam and are bolted thereto by bolts 26. The flanges 25 lie against the web of the channels and are secured by bolts 27 which pass through such web and through the flange 11 of the supporting beam 10.

It is to be understood that the form of the brackets 20 and 21 will vary according to the members to which they are to be secured. The recesses in the bosses of these two brackets, facing downwardly and upwardly respectively, provide means for swiveling the crane frame, which will now be described.

The upright frame of the crane is shown as consisting of two vertical channel beams 30, 31, placed with their backs toward each other and spaced by blocks 33 and 34 between the channel beam at their upper and lower ends. The beams are secured to these blocks by bolts 35 and 36, which pass through the webs of the channels and through the blocks. The blocks 33 and 34 may readily be flanged malleable castings. They have vertical recesses in which are set pins 37 and 38 which enter the recesses of the brackets 20 and 21 and swivel the upright frame thereto. The pins 37 and 38 preferably fit tightly in their cavities in the blocks and are further locked thereto by transverse pins 39 projecting into openings in the blocks.

The horizontal arm of the frame consists essentially of a pair of horizontal channel beams 40 and 41 secured to the upright chan-

nels. As shown these horizontal channels have their flanges 42 and 43 cut away so that their ends abut the face of one of the flanges 32 of the upright channels, while the web portion 44 of the horizontal channel is continued between the webs of the vertical channels, as shown at 45 in Fig. 3, and secured thereto. I also provide triangular gusset plates 50, which are secured to the upright channels and horizontal channels and help support the horizontal channels. These gusset plates extend alongside of the inwardly projecting portion 45 of the channel webs and filler plates 51 below such webs, and suitable bolts pass through the gusset plates, the channel webs, the filler plates and the upright channels. Such bolts are shown at 52 in dotted lines in Fig. 1, and one pair of them appears in full lines in Fig. 4. The horizontal channels are further braced by a top plate 48, secured to the upper flanges 43.

To form effective bearings for the shafts of the hoisting mechanism and to carry the hand wheel and gearing beyond the flanges of the upright channels, I secure a pair of brackets 60 and 61 to the outer sides of these upright channels between their flanges. These brackets have end portions which bear against the outer faces of the channel webs and are bolted to them. Their intermediate portions stand a suitable distance away from those webs so as to properly support the hand wheel and gearing without being unduly bulky. As shown, the two brackets 60 and 61 are secured at their upper ends by the pair of bolts 36 which pass through the block 33. Near their lower ends the brackets 60, 61 are secured by the through bolts 63, which between the channels occupy distance sleeves 64.

70 indicates the main shaft of the hoisting mechanism. This shaft extends through the two upright channel beams and has bearings in the two brackets 60 and 61. On one end it carries the hand wheel 72 which may rotate it, as hereinafter explained, and on the other end it carries a spur gear 73, which meshes with a gear 75 on a shaft 76 also journaled in the brackets 60 and 61. This shaft 76 carries a spur pinion 77 meshing with spur gear teeth 80 formed on the pocket wheel 81. This pocket wheel or lift wheel is journaled on a stationary sleeve 83 surrounding the shaft 70 and having its ends mounted in the gusset plates 50.

It results from the above construction that if the shaft 70 be rotated, the pocket wheel 81 will be rotated, at a correspondingly reduced speed. Extending over this pocket wheel is the lift chain 90. This chain depends idly on the side of the pocket wheel toward the support, passes over the upper side of the pocket wheel and extends approximately horizontally, but somewhat downwardly, between the horizontal channels and beneath a guide pulley 92, carried thereby, and then upwardly over another pulley 93. These pulleys are journaled on axles 96 carried by brackets 94 secured to the inner face of the channels by bolts 95, as shown in Fig. 10. The construction is the same at the pulley 93, except that that pulley is located centrally, as shown in Fig. 8, whereas the intermediate pulley 92 is preferably in a line between the end pulley and the lift wheel 81.

By providing the guide pulley 92, which bends the lift chain downwardly between the pulley 93 and the lift wheel 81, I prevent the chain vibrating up and down in the horizontal arm, and I insure it being wrapped a sufficient distance about the lift wheel 81 so that it will be effectively pulled when the lift wheel is rotated.

The end of the lift chain 90 carries a suitable hook for supporting the load. I have shown for this purpose a bifurcated hook 97 which may engage a chain 98 secured to the load. The bifurcated portion of the hook 98 has inwardly projecting ribs 99 which are adapted to embrace a link standing edgewise and extend between links standing crosswise of the chain 98 and thus support it.

To provide a suitable brake or clutch to hold the load in any desired suspended position, I provide mechanism similar to that shown in my prior patent No. 794,997, and there claimed. This mechanism is here shown in Figs. 4, 6 and 7, and will now be described.

Rigidly keyed on the main shaft 70 is a collar 100 which has both a round and a square portion. Bearing on the round portion is a cup 101 having ratchet teeth 102 on its periphery. In the wall of this cup are a pair of diametrically opposite notches 103. In the cup are a series of disks 105 alternately connected to the collar 100 and to the cup wall. To effect this I make one disk with a round opening at its center and lugs 104 at its periphery which seat in the notches 103, wherefore such disk is rotatable with the cup. The next disk has a round periphery and a square hole in its center engaging the square portion 106 of the collar so that this disk is rigid with the collar. 110 indicates a suitable pressure plate bearing against the adjacent disk and giving a tendency to move away from the cup by suitable springs 111. The hand wheel 72 is journaled loosely on the shaft 70, bearing at its inner edge against the pressure plate 110 and at its outer end having an inclined surface 115, bearing against an incline 116 on a collar 117, rigidly secured to the shaft. The lug 116 extends into a notch in the hub of the hand wheel, but the hand wheel, it will be seen, has some movement independently of the shaft and collar 117.

To raise the load the hand wheel is turned

by the hand chain 120 in the direction to shove its hub toward the upright beam. This forces the pressure plate 110 against the disks, and clamps the movable clutch disks tightly against the ratchet cup 101, so that this cup rotates with the hand wheel. A suitable pawl 118 carried by the bracket 60 lies against the ratchet and clicks idly under it in this raising movement. Whenever the raising rotation of the hand wheel stops, the pawl holds the load in such position.

To lower the load the hand wheel is turned by its chain 120 in the opposite direction, which causes it to travel back on the incline 116, releasing the clutch. This frees the ratchet from the shaft. Accordingly, if the hand wheel be rotated in advance of the rotation of the shaft 70, given by the gravity of the load, the clutch will be maintained out of engagement, and the load will run down, as desired. At any time, the descent of the load may be stopped by simply stopping this backward rotation of the hand wheel.

Having thus described my invention, what I claim is:

1. In a jib crane, the combination of a frame comprising two upright channels with their flanges facing outwardly and distance pieces between the channels near their upper and lower ends secured to them, a horizontal arm comprising two channels with their flanges facing outwardly and their webs continued between the upright channels, a pair of vertical gusset plates, said gusset plates and the vertical and horizontal webs lying side by side, a shaft extending through the gusset plates and the overlapped webs, a lift wheel on said shaft, and a flexible raising member extending therefrom outwardly between the channels of the horizontal arm.

2. In a jib crane, the combination with a suitable support, of a swiveled upright comprising two outwardly facing channel beams with distance blocks between them adjacent to their upper and lower ends, horizontal arms comprising two structural shapes having webs extending onto the inner faces of the upright channel webs, brackets on the outer side of the upright channels between their flanges and secured to the channels, opposite the overlapping webs mentioned, a lift wheel between the channels, a transverse shaft mounted in said brackets, suitable gearing between said shaft and said lift wheel, and a flexible member lying over the lift wheel and extending outwardly along the horizontal arm.

In testimony whereof I hereunto affix my signature.

EDWARD Y. MOORE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."