

Nov. 25, 1924.

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C. M. MARDEL

JIB CRANE

Filed Nov. 28, 1921

2 Sheets-Sheet 1

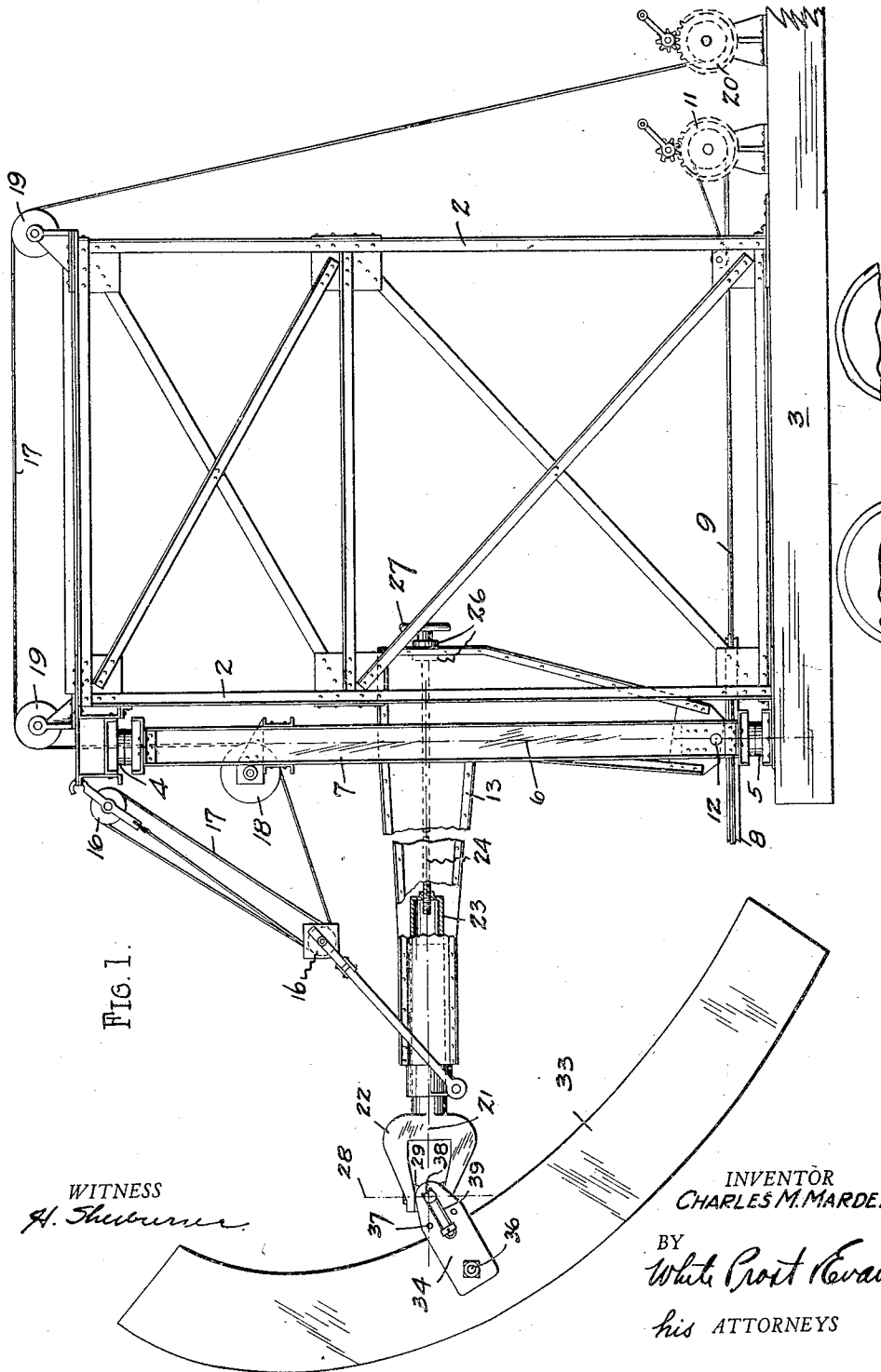


FIG. 1.

WITNESS

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FIG. 2.

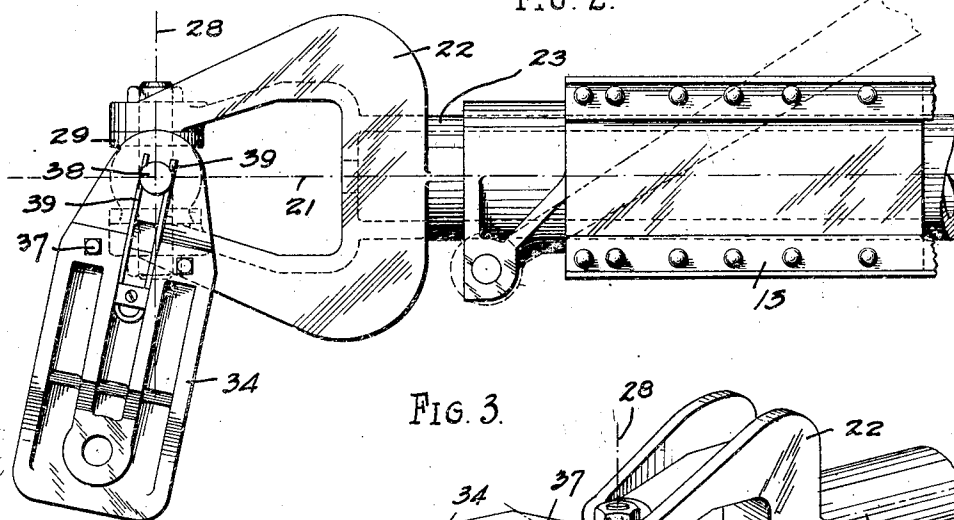


FIG. 3.

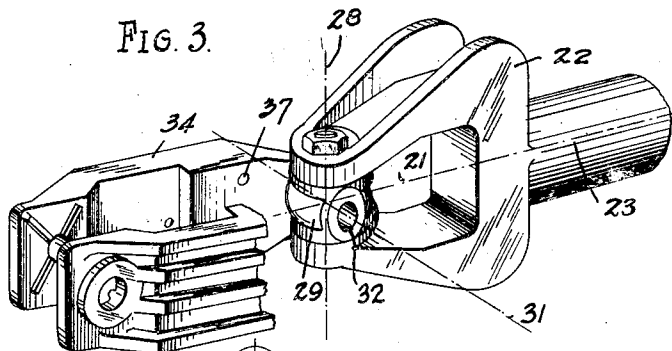
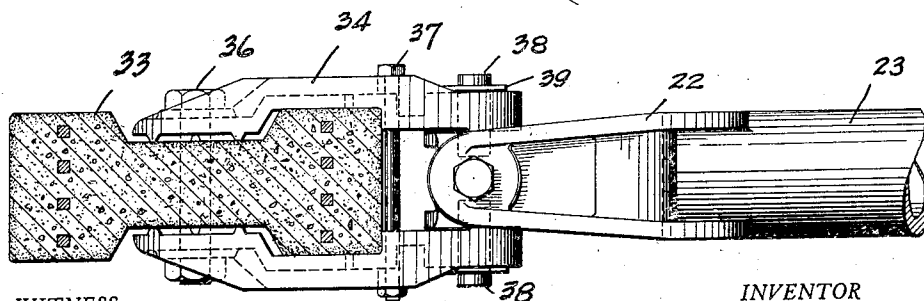
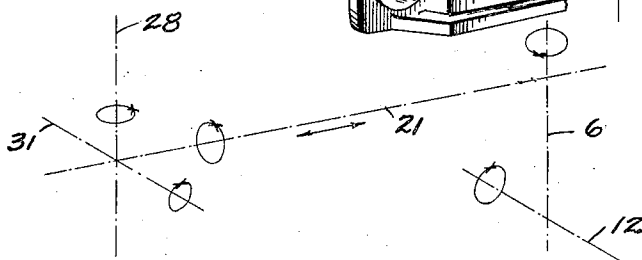


FIG. 4.



WITNESS

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FIG. 5.

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## UNITED STATES PATENT OFFICE.

CHARLES M. MARDEL, OF OAKLAND, CALIFORNIA, ASSIGNOR OF ONE-HALF TO SAN FRANCISCO-SACRAMENTO RAILROAD COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

## JIB CRANE.

Application filed November 28, 1921. Serial No. 518,227.

*To all whom it may concern:*

Be it known that I, CHARLES M. MARDEL, a citizen of the United States of America, and a resident of Oakland, in the county of Alameda and State of California, have invented a new and useful Jib Crane, of which the following is a specification.

My invention relates to jib cranes and an object of the invention is to provide a crane particularly adapted for setting heavy concrete ribs in tunnel construction or analogous work. Another object of the invention is the provision of a jib crane characterized by extreme flexibility, whereby the handling of the suspended body especially in close quarters, is greatly facilitated.

My invention possesses many other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of my invention. It is to be understood that I do not limit myself to the showing made by the said description, as I may adopt variant forms of my invention within the scope of the claims.

Referring to the drawings, Fig. 1 is a side elevation of the crane of my invention showing the same installed on a car. A curved tunnel rib is shown suspended from the jib. Fig. 2 is a detail view of the head of the jib drawn on a larger scale. Fig. 3 is a perspective view of the head of the crane. Fig. 4 is a diagrammatical view in perspective showing the pivotal axes of the various members of the structure and the directions of their respective movements. Fig. 5 is a view of the jib head taken in a horizontal plane, and showing the rib or body supported thereon in section.

In general terms the device of my invention comprises a crane having a jib mounted on a suitable vehicle for pivotal movement about both a horizontal and a vertical axis. On the end of the jib is a head both pivotally and slidably arranged so that it can be rotated or extended or retracted at will. The head includes a member pivotally mounted thereon on an axis which intersects at right angles the axis on which the head as a whole is mounted on the jib. Pivotal-ly mounted on this pivot head member on an axis lying in the same plane with the axis of the head and intersecting the axis of the pivotal member at right angles are means

for attaching to the jib head the body to be handled. These means comprise clamp bars readily connected to and disconnected from the body, and so proportioned that the axis of their pivotal mounting lies in the center of gravity of the body. In the present instance the body to be handled is shown as a concrete rib for tunnel construction. It is necessary when placing these ribs, to work in very close quarters and because of their great weight, much difficulty has been experienced hitherto in handling them and getting them into proper position. With the apparatus of my present invention, these ribs are readily picked up from the loading platform, swung into position and accurately placed. Since the rib is supported substantially at its center of gravity and the head of the jib is arranged for pivotal movement of the rib on three different axes intersecting in the center of gravity and also for extension and retraction, and the jib as a whole is movable about both horizontal and vertical axes upon its mounting vehicle, it is obvious that a quick setting of the rib is readily accomplished.

More particularly my device comprises a supporting frame 2 arranged on the end of a suitable vehicle such as a flat car 3. Suitably mounted in bearings 4 and 5 to turn about a vertical axis 6 is a mast 7 on the base of which is a bull ring 8. Cables 9 on the bull ring pass to a drum 11 operated by power or by hand as desired so that the mast may be turned on its vertical axis. Pivoted on a horizontal axis 12 near the lower end of the mast is an L-form jib 13. Sheaves 16 and a cable 17 are interposed between the end of the jib and the frame in the usual manner to give control of the jib, the cable 17 passing over pulley 18, journaled on the mast, then upwardly thru the bearing 4 on the axis line of the mast and over pulleys 19 on the frame to a windlass or drum 20, to which the power for the movement of the jib is applied by any suitable means.

Pivotal-ly arranged in the end of the jib on the longitudinal axis 21 is a yoke 22. The shaft 23 of the yoke is also longitudinally movable along the axis 21 and movement in this direction is controlled by the shaft 24 threaded into the shaft 23 at one end and at the other provided with collars

26 for preventing longitudinal movement. A hand wheel 27 provides means for turning the shaft 24 to extend or retract the yoke and parts mounted thereon which comprise  
5 the head of the jib.

During pivotal movement of the yoke about the axis 21, some slight extension or retraction of the yoke in respect to the jib may occur owing to the threaded engagement of the shafts 23 and 24, but this movement, if material, may be compensated by  
10 a corresponding rotation of the hand wheel 27 and shaft 24.

Pivotaly mounted between the jaws of the yoke 22 on an axis 28 which intersects the axis 21 at right angles is a pivot block 29. On an axis 31 which intersects the axis 28 at right angles and lies in the same plane as axis 21 the pivot block is provided with  
20 pivot pin seats 32, Fig. 3, one of such seats being on each side of the pivot block.

Means are provided for attaching the body 33 to be handled, in the present instance shown as a tunnel rib, pivotaly to the pivot block on the axis 31, and such attachment means is proportioned so that the center of gravity of the combined body and attachment means will lie substantially at the point of intersection of the pivotal  
25 axes 21, 28 and 31. Such means comprise clamp bars 34, one of which is clamped upon each side of the rib by a bolt 36 passing thru suitable apertures left for that purpose. Smaller tie bolts 37 also connect the two  
30 clamp bars. Connection with the pivot block 29 is made by pins 38 passing thru suitable apertures in the clamp bars and seating in the pin sockets 32 in the pivot block. Accidental disengagement of the  
35 pivot pins is prevented by suitable means such as spring clips 39.

It will be appreciated from the above that since the center of gravity of the jib supported on the jib head lies substantially at the intersection of the three pivotal axes of the head and since the head may be extended or retracted on the jib by the rotation of hand wheel 27, and the jib as a whole is movable about the axes 6 and 12, and the entire apparatus is movable with the vehicle on which it is mounted, the rib may be readily and quickly picked up from a conveniently located storage or loading point, transported to the work and placed in the desired position, the rib responding easily to pressure applied by the hands of the workman assigned to that duty. After placing the rib, the clamp bars 34 are disconnected and the apparatus moved to pick up  
40 another piece.

I claim:

1. A crane comprising a jib, a yoke on said jib, a pivot block pivoted on said yoke, clamp bars adapted for attachment to the  
65 body to be handled pivoted on said pivot

block, and means for extending and retracting said yoke on said jib.

2. A crane comprising a jib, a yoke pivotaly and slidably mounted on said jib, a pivot block pivoted on said yoke, clamp  
70 bars adapted for attachment to the body to be handled pivoted on said pivot block, and means for moving said yoke longitudinally of its axis.

3. A crane comprising a jib, a yoke  
75 pivotaly and slidably mounted on said jib, a pivot block pivoted on said yoke, clamp bars adapted for attachment to the body to be handled pivoted on said pivot block, a threaded rod interposed between said jib  
80 and yoke and a hand wheel for turning said rod to extend and retract said yoke.

4. A crane comprising a jib, a yoke pivoted on said jib, a pivot block pivoted on said yoke, and means adapted for attachment to the body to be handled pivoted  
85 on said pivot block.

5. A crane comprising a jib mounted for pivotal movement about horizontal and vertical axes, a yoke on said jib, a pivot block  
90 pivoted on said yoke, and means adapted for attachment to the body to be handled pivoted on said pivot block, the axes of the pivots of said pivot block and attachment means intersecting at right angles.  
95

6. A crane comprising a jib mounted for pivotal movement about horizontal and vertical axes, a yoke slidably mounted on said jib, means for extending and retracting said  
100 yoke, a pivot block pivoted on said yoke, and means adapted for attachment to the body to be handled pivoted on said pivot block, the axes of the pivots of said pivot block and attachment means intersecting at right angles.  
105

7. A crane comprising a jib mounted for pivotal movement about horizontal and vertical axes, a yoke pivotaly and slidably mounted on said jib, means for extending and retracting said yoke, a pivot block  
110 pivoted on said yoke, and means adapted for attachment to the body to be handled pivoted on said pivot block, the axes of the pivots of said yoke, pivot block and attachment means intersecting at the same point.  
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8. A crane comprising a mast pivoted in a vertical axis, a jib pivoted to the mast in a horizontal axis, means for moving the jib, a yoke on said jib, a pivot block pivoted on said yoke, and means adapted for attachment to the body to be handled pivoted on said pivot block, the axes of the pivots of said pivot block and attachment means intersecting at right angles.  
120

9. A crane comprising a jib, a yoke on said jib, a pivot block pivoted on said yoke, and means adapted for attachment to the body to be handled pivoted on said pivot block, the axes of said pivots intersecting at right angles, and said attachment means  
125 130

being proportioned to position the center of gravity of said body at said intersection.

10. A crane comprising a jib, a yoke pivoted on said jib, a pivot block pivoted on said yoke, and means adapted for attachment to the body to be handled pivoted on said pivot block, the axes of said pivots intersecting at the same point, and said attachment means being proportioned to position the center of gravity of said body at said intersection.

11. A crane comprising a jib, a yoke pivoted on said jib slidable thereon, means for extending and retracting said yoke on said jib, a pivot block pivoted on said yoke and means adapted for attachment to the body to be handled pivoted on said pivot block, the axes of said pivots intersecting at the same point, and said attachment

means being proportioned to position the center of gravity of said body at said intersection.

12. A crane comprising a jib mounted for pivotal movement about horizontal and vertical axes, a yoke pivotally and slidably mounted on said jib, means for extending and retracting said yoke, a pivot block pivoted on said yoke, means adapted for attachment to the body to be handled pivoted on said pivot block, the axes of said pivots intersecting at the same point, and said attachment means being proportioned to position the center of gravity of said body at said intersection, and means for moving said jib.

In testimony whereof, I have hereunto set my hand.

CHARLES M. MARDEL.