J. L. CRANDALL.

RAILWAY DRY DOCK.

APPLICATION FILED JUNE 30, 1916.

1,210,425.

Patented Jan. 2, 1917.

2 SHEETS—SHEET 1.

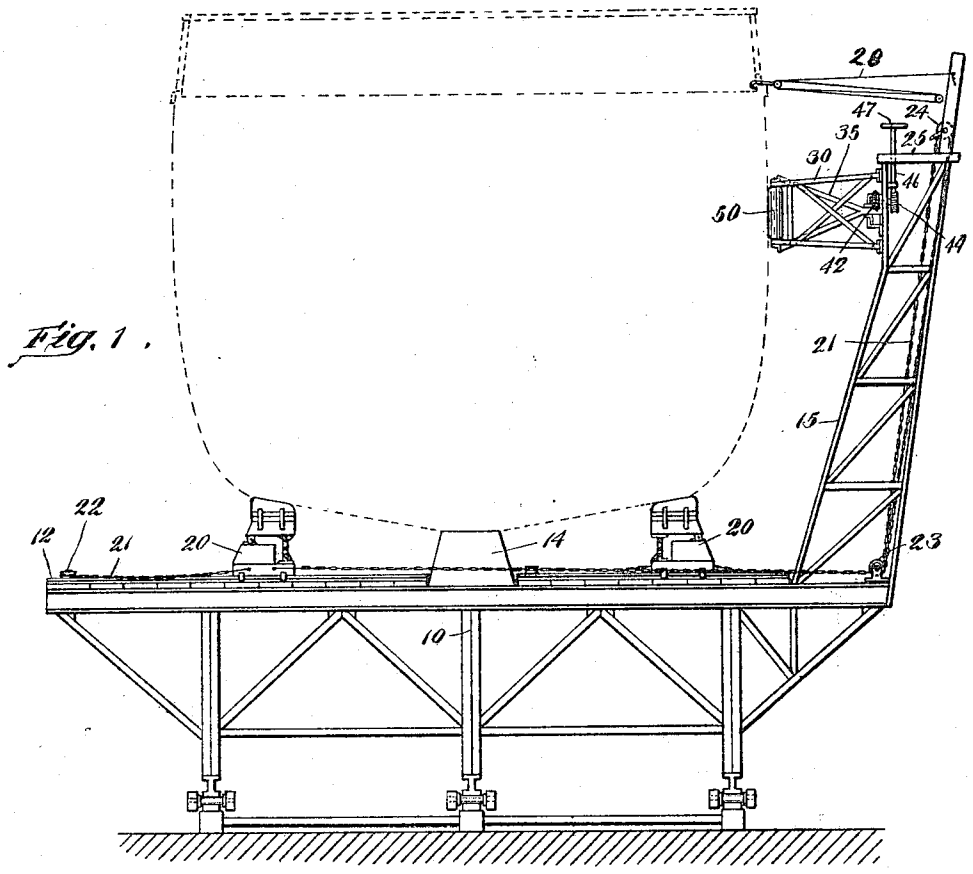



Fig. 1.

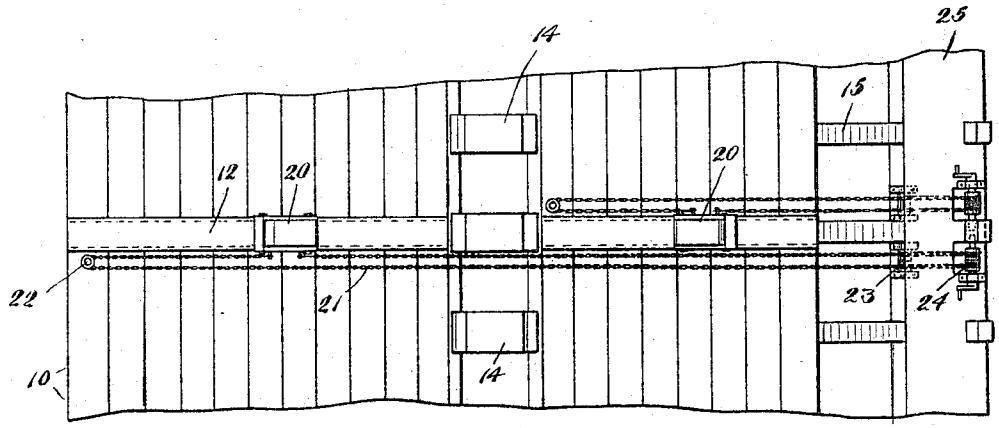



Fig. 2.

Witness.
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James L. Crandall.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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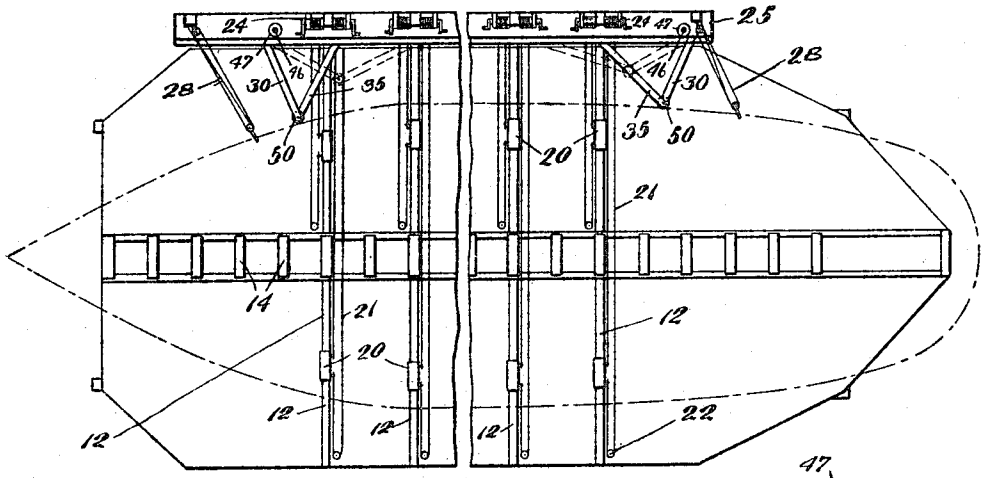



Fig. 3.

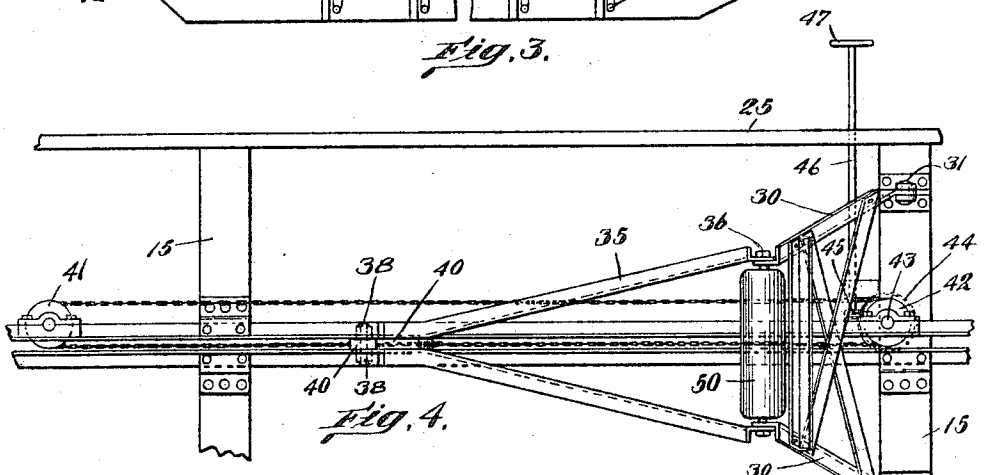



Fig. 4.

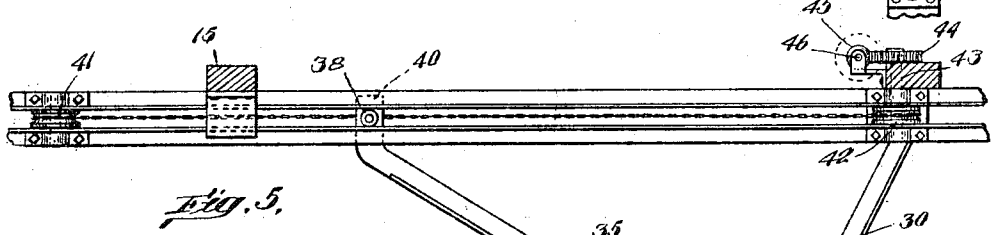
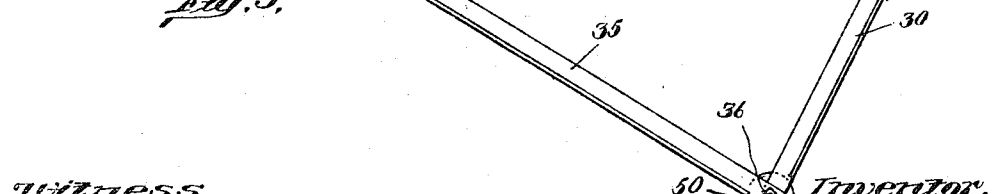



Fig. 5.




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THE ROGERS PETERS CO. PHOTO-LITHO. WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

JAMES L. CRANDALL, OF MALDEN, MASSACHUSETTS, ASSIGNOR TO CRANDALL ENGINEERING COMPANY, OF EAST BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

## RAILWAY DRY-DOCK.

1,210,425. Specification of Letters Patent. Patented Jan. 2, 1917.

Application filed June 30, 1916. Serial No. 106,933.

*To all whom it may concern:*

Be it known that I, JAMES L. CRANDALL, a citizen of the United States, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Railway Dry-Docks, of which the following is a specification.

Marine railways, or railway dry docks, as ordinarily constructed, have a cradle which receives and supports the vessel, which cradle comprises a bed, and two upright wings arranged one at each side of the bed. Means are connected to the wings adapted for connection with the opposite sides of the vessel, for exerting a pulling force thereon, to center the vessel in the cradle, and an essential function of the wings is to furnish supports for the centering-means at the sides of the vessel. Such a cradle is necessarily very costly.

This invention has for one of its objects the construction of a cradle having but a single upright wing which is arranged at one side of the bed and having associated therewith improved centering-means involving two essential separate elements, one adapted for connection with the side of the vessel to exert a pulling force thereon, and the other adapted for exerting a thrust or pushing force upon or against the same side of the vessel. By such form of centering-means, the vessel may be centered on the bed, and but one wing employed, yet the efficiency of the cradle will not be substantially reduced.

The movable bilge-blocks are or may be constructed as usual and are adapted to be arranged on the bed beneath the vessel, at opposite sides of its keel, and another object of the invention is the provision of operating-means for the bilge-blocks which are arranged at both sides of the keel, which operating-means are arranged upon the single upright wing, so that from said wing all of the bilge-blocks may be moved in both directions.

Figure 1 is an end elevation of a portion of a railway dry dock, illustrating particularly the cradle. Fig. 2 is a plan view of the bilge-blocks and operating-means therefor. Fig. 3 is a plan view of the cradle illustrated in Fig. 1. Fig. 4 is an enlarged front elevation of the thrust element adapted for exerting a pushing force upon or against the side of the vessel. Fig. 5 is a plan view of the thrust element of Fig. 4.

The bed of the cradle is or may be constructed as usual, comprising a structural frame-work 10, having transversely disposed bilge-block slide-ways 12, and keel-blocks 14. The upright wing 15 of the cradle, which is arranged at one side only of the bed, is constructed essentially as usual, although it is here shown as adapted to support additional elements on account of one wing only being employed.

20 represents the bilge-blocks, several being provided at each side of the keel-blocks, which are adapted to slide upon the transversely disposed slide-ways 12. These blocks are separately movable in opposite directions, and to move them, a separate operating-means is provided for each block, here shown as comprising an endless chain 21, fastened at its ends to the block, and extended over rolls or pulleys 22 and 23, and around a winch 24. Usually the bilge-blocks are arranged in pairs, the blocks of each pair being arranged at opposite sides of the keel-block, and the moving chains 21 for the blocks of a pair and extended over the cylindrical members of a pair of winches 24, supported by a frame and arranged at a convenient place on the upright wing 15, preferably near the top, where a platform 25 is erected. A workman standing on this platform may operate the operating-means for both bilge-blocks of the pair, to move them in either direction desired.

Tackles 28 are provided at or near the top of the upright wing, which tackles may be of any usual or suitable construction and adapted to be connected with the side of the vessel and arranged to exert a pulling force thereon for the purpose of assisting in centering it in the cradle on the keel-blocks. Said tackles form one element of the centering-means. As many of these tackles will be provided as necessary.

The thrust elements are arranged on the same upright wing, and there may be two or more of such elements provided as may be deemed necessary. These thrust elements are made alike so one only will now be described.

30 represents a toggle member pivoted at

one end at 31 to a support or supports on the upright wing, said member comprising a pair of side-bars and numerous connecting bars adapted to form a rigid structure.

35 represents another toggle member pivoted at 36, and comprising a pair of side bars which are pivotally connected at their outer extremities with the outer extremities of the side bars of the toggle member 30, and mounted at their other ends on a pivot-pin. Said pivot-pin has rolls 38 arranged upon it adapting it to freely slide along in guiding-supports provided for them on the upright wing. A block or bar 40 is arranged on said pivot-pin to which the ends of an endless chain are connected, and said chain passes over rolls or pulleys 41 and 42. The pulley or chain-wheel 42 is secured to a short shaft 43, to which a worm-wheel 44 is secured, which is engaged by a worm 45 on a shaft 46, having a hand-wheel 47 for turning it. By turning said shaft in one or the other direction, the pulley 42 is rotated correspondingly, and the block or bar 40 is moved in one or the other direction to move the toggle-member 35 in and out, and correspondingly move the toggle-member 30 on its pivot, resulting in moving the pivotal connection between the two toggle members in and out.

An elongated roll 50 is arranged on the pivot-pin which connects the two toggle-members, and said roll is adapted for engagement with the side of the vessel to exert a pushing force thereon, it being vertically disposed, see Fig. 1.

I have here shown this structure as illustrating one embodiment of my invention, but it is obvious that other structures may be employed, and adapted to serve as thrust elements, which come within the spirit and scope of my invention. This thrust element is adapted to exert a powerful thrust or pushing force against the side of the vessel, tending to move it in a direction opposite to that moved by the tackle, and hence forms another element of the centering-means for the vessel.

I claim:—

1. In a railway dry dock, a cradle having an upright wing, and a thrust element arranged on said wing adapted for engagement with the side of the vessel, comprising two toggle-members, and a thrust-roll and operating-means for said members.

2. In a railway dry dock, a cradle having an upright wing, and a thrust element arranged on said wing adapted for engagement with the side of a vessel, comprising two toggle-members, and a thrust-roll, and a sliding-block, to which one of said members is pivotally connected, and means for sliding said block to operate the toggle-members.

3. In a railway dry dock, a cradle having an upright wing, and a thrust element arranged on said wing adapted for engagement with the side of a vessel, comprising two toggle-members, a thrust-roll and a sliding-block to which one of said members is pivotally connected, an endless chain connected with said block, and means to move said chain in opposite directions.

4. In a railway dry dock, a cradle having an upright wing, and a thrust element arranged on said wing adapted for engagement with the side of a vessel, comprising two toggle-members, a thrust-roll and operating-means including a worm-wheel and worm for moving said toggle-members in and out.

5. In a railway dry dock, a cradle having a single upright wing, and means arranged thereon adapted for connection with a vessel to exert a pulling force thereon, and means also arranged on said wing adapted for engagement with a vessel for exerting a pushing force thereon.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES L. CRANDALL.

Witnesses:
B. J. NOYES,
H. B. DAVIS.

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