

No. 694,911.

Patented Mar. 4, 1902.

J. L. CRANDALL.  
MARINE RAILWAY.

(Application filed Aug. 31, 1901.)

(No Model.)

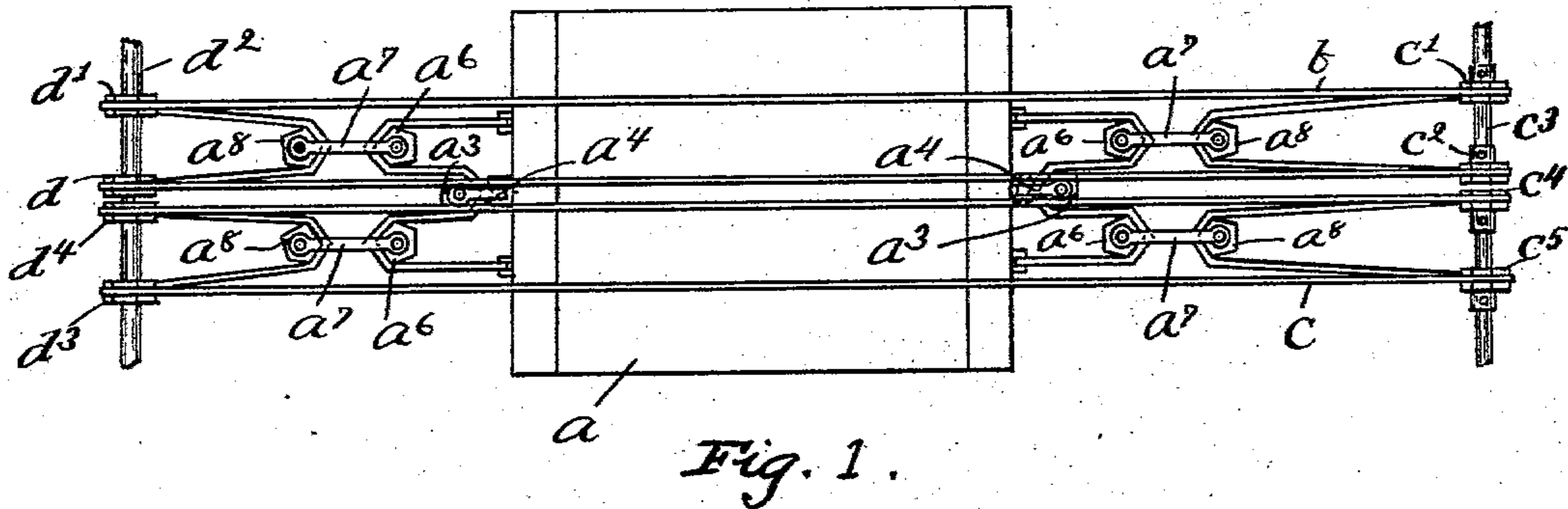


Fig. 1.

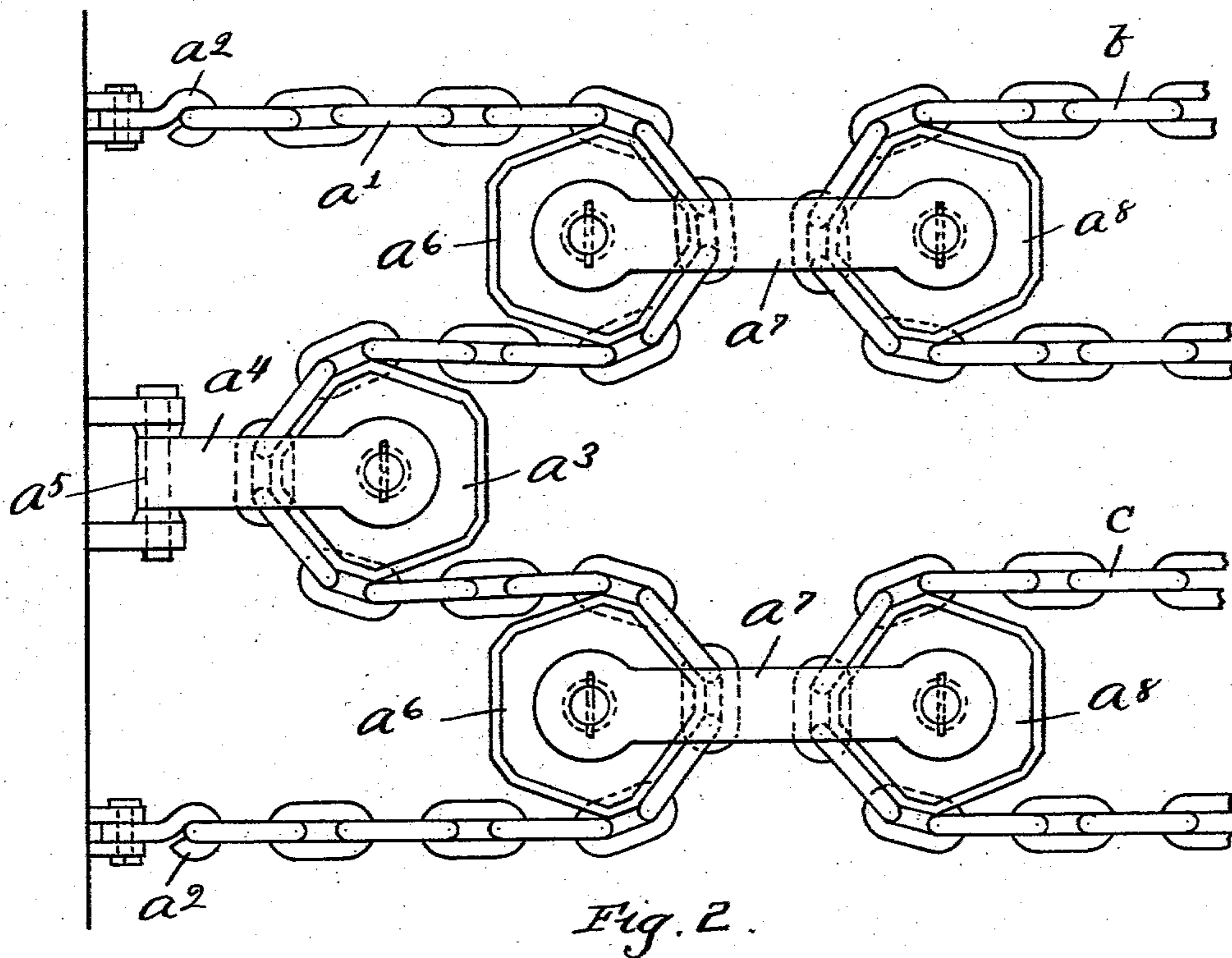


Fig. 2.

Witnesses:

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att'y

# UNITED STATES PATENT OFFICE.

JAMES L. CRANDALL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO H. I. CRANDALL & SON COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

## MARINE RAILWAY.

SPECIFICATION forming part of Letters Patent No. 694,911, dated March 4, 1902.

Application filed August 31, 1901. Serial No. 73,899. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES L. CRANDALL, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Marine Railways, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to marine railways, sometimes called "slipways" or "patent slips," and has for its object to improve and simplify the construction of the means employed for hauling in or along the cradle, to the end that the strain upon each chain of number of chains employed may be equalized, even though the chains or the links thereof vary slightly in length.

The invention is particularly applicable in cases where a number of chains are employed as the means of hauling in or along the cradle.

Figure 1 shows in diagram a cradle and means embodying this invention for hauling it along, comprising bridle-chains connected to the cradle in opposite ways and two actuating-chains each connected with both bridle-chains and means for equalizing the strain or pull of said actuating-chains. Fig. 2 is an enlarged view showing one of the bridle-chains and a portion of the two actuating-chains.

*a* represents in diagram a cradle which may be of any usual or suitable construction. To the cradle *a* two bridle-chains are attached in opposite ways, said chains being herein shown as made alike and each comprising a chain *a'*, attached at its end to the cradle *a*, as at *a<sup>2</sup> a<sup>2</sup>*, and at a point intermediate its length passing around a chain-wheel *a<sup>3</sup>*, which is supported by a bar *a<sup>4</sup>* or other suitable support connected with the cradle, as at *a<sup>5</sup>*. Each bridle-chain *a'* at a point between each end and the chain-wheel *a<sup>3</sup>* passes around a chain-wheel *a<sup>6</sup>*, connected to a bar or other support *a<sup>7</sup>*, bearing another chain-wheel *a<sup>8</sup>*. It will be seen that for each end of the cradle or each direction it is moved there will be two chain-wheels *a<sup>8</sup>*, the supports of which are connected with the chain-wheels *a<sup>6</sup>*, around which the bridle-chain passes.

Two actuating-chains *b* and *c* are provided, which

are made alike, or substantially so. The actuating-chain *b* is herein shown as made as an endless chain and passes around one of the chain-wheels *a<sup>8</sup>* at or near one end of the cradle and over two chain-wheels *c' c<sup>2</sup>*, which are rigidly secured to a driving-shaft *c<sup>3</sup>*, and along the under side of the cradle to a point at or near the opposite end thereof, and then around two idle chain-wheels *d' d'*, loosely mounted on a shaft *d<sup>2</sup>* or otherwise supported, and around one of the chain-wheels *a<sup>8</sup>* at said opposite end of the cradle. The other actuating-chain *c* is likewise herein shown as made as an endless chain and passes around the other chain-wheel *a<sup>8</sup>* at or near one end of the cradle and over two chain-wheels *c<sup>4</sup> c<sup>5</sup>*, rigidly secured to the driving-shaft *c<sup>3</sup>*, and along the under side of the cradle to a point at or near the opposite end thereof, and then around two idle chain-wheels *d<sup>3</sup> d<sup>4</sup>*, loosely mounted on the shaft *d<sup>2</sup>*, and around the other chain-wheel *a<sup>8</sup>* at said opposite end of the cradle. As the driving-shaft *c<sup>3</sup>* is turned the actuating-chains *b* and *c* will be simultaneously operated and the cradle moved along in one or the other direction, and the strain or pull upon the bridle-chains which are connected with the cradle will be equalized. It will be understood that the chains employed for this purpose are large, and while they may comprise the same number of links, yet in practice they will vary in length; but by the means herein provided this difference will be readily compensated for.

I claim—

1. In an apparatus of the kind described, a bridle-chain connected to the cradle, passing around a chain-wheel also connected with the cradle, and also passing around two chain-wheels, as *a<sup>6</sup>*, disposed between said chain-wheel and the points of attachment of the chain to the cradle, and two actuating-chains passing around other chain-wheels, the supports of which are connected to said chain-wheels *a<sup>6</sup>*, and also passing around chain-wheels rigidly secured to a driving-shaft, substantially as described.

2. In an apparatus of the kind described, two bridle-chains connected respectively to

the cradle in opposite ways, each passing  
around a chain-wheel also connected with the  
cradle, and also around two chain-wheels, as  
a<sup>6</sup>, disposed between the aforesaid chain-wheel  
5 and the points of attachment of the chain to  
the cradle, and two actuating-chains passing  
around other chain-wheels, the supports of  
which are connected to said chain-wheels a<sup>6</sup>,  
and around chain-wheels rigidly secured to

a driving-shaft, and also around idle chain- 10  
wheels, substantially as described.

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.