(No Model.) 2 Sheets—Sheet 1.

E. KAYE.

MARINE RAILWAY.

No. 494,066. Patented Mar. 21, 1893.

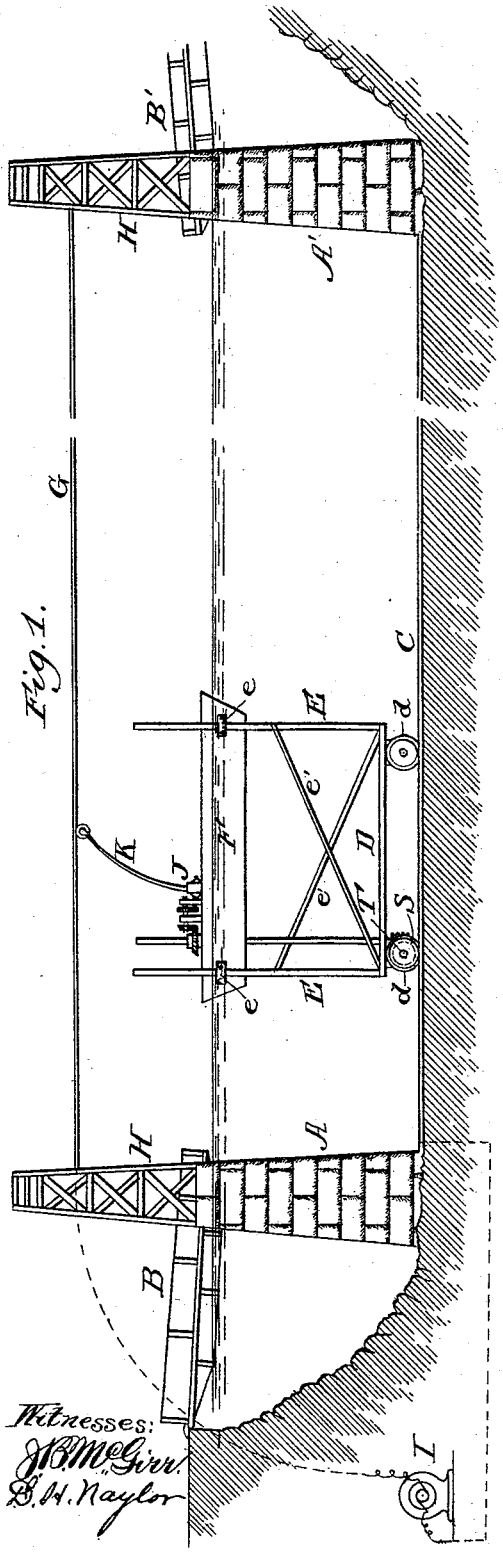

Fig. 1.

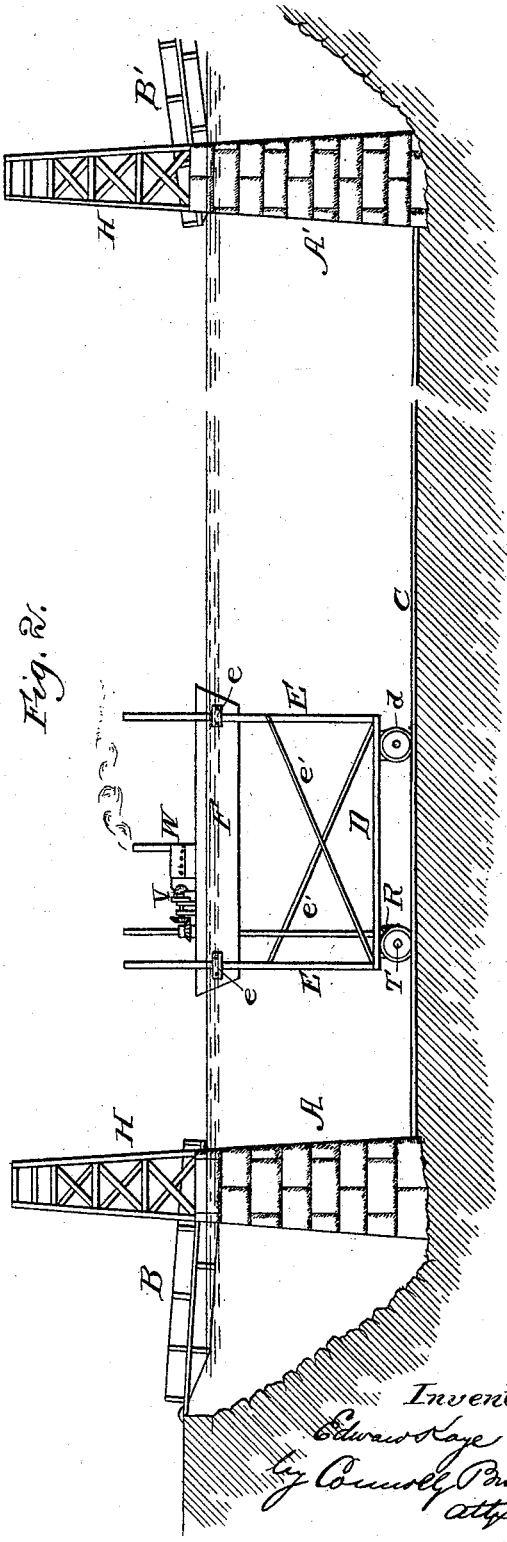

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 5.

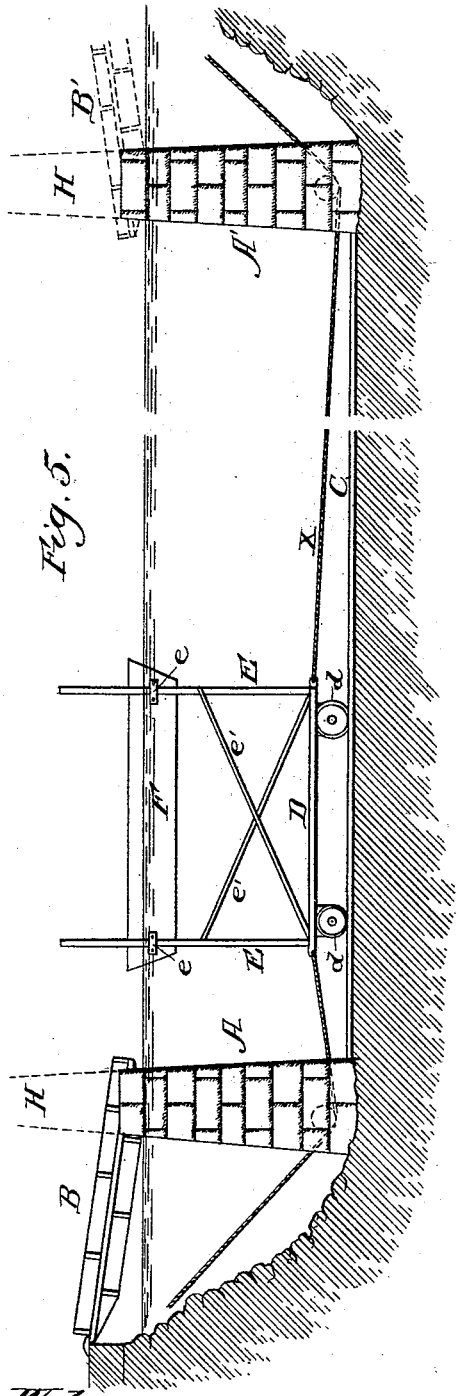


Fig. 4.

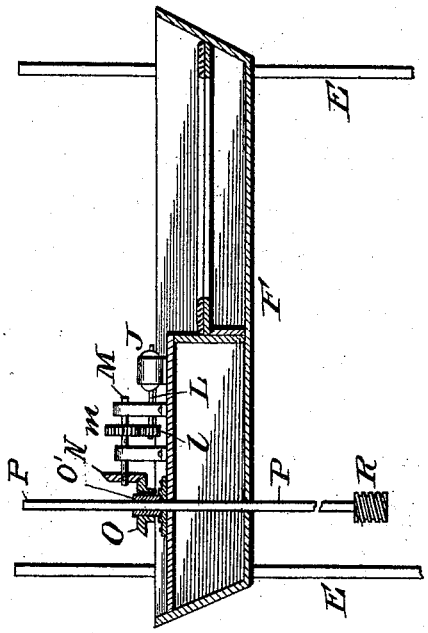
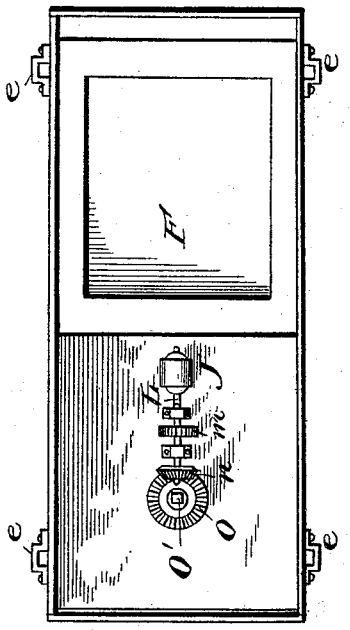


Fig. 3



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UNITED STATES PATENT OFFICE.

EDWARD KAYE, OF PHILLIPSBURG, PENNSYLVANIA.

MARINE RAILWAY.

SPECIFICATION forming part of Letters Patent No. 494,066, dated March 21, 1893.

Application filed December 9, 1892. Serial No. 454,656. (No model.)

To all whom it may concern:

Be it known that I, EDWARD KAYE, a citizen of the United States, residing at Phillipsburg, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Marine Railways; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to marine railways, and has relation in particular to that class of apparatus wherein a boat or vessel is propelled by power applied to a submarine car or carriage connected to the vessel and running on tracks arranged on the bottom of the stream.

My invention has for its object the provision of novel means for propelling a boat, raft, vessel or other conveyance adapted for the transportation of freight or passengers, upon the water in definite lines or directions, and consists in the novel construction, combinations and arrangements of parts hereinafter described.

It is the primary purpose of my invention to provide a comparatively economical plant and system for conveying freight and passengers across bodies of water where the traffic is insufficient to justify the erection of a bridge, and in carrying my invention into effect I propose to lay tracks upon the bottom of the stream between the definite points of transportation and propel cars or carriages along such tracks by power applied from an external source, the conveyances for the reception of the freight or passengers being attached to the cars or carriages and towed thereby.

In one form of my invention, power is communicated to the submarine cars or carriages from a generator of electricity located on the shore by an overhead conductor, a trolley and electric motors carried on the boats and mechanical connections between the motors and the driving axles of the cars or carriages.

In another form of my invention, power is communicated from a source of energy, as a steam engine, carried on the boats by mechanical connections directly to the driving axles of the cars or carriages.

In a still further modification of my invention, the submarine car or carriage is propelled by means of a moving cable operated by a stationary engine on shore.

In the accompanying drawings,—Figure 1 is a side elevation of my improved apparatus; Fig. 2, a side elevation of a modified form of the same; Fig. 3, a plan view of the apparatus shown in Fig. 1; Fig. 4, an enlarged vertical sectional view of the same; Fig. 5, a side elevation of another modification.

A, A′ designate piers or wharves built out from the shores of the body of water which it is desired to cross and B, B′ designate floating platforms hinged to the piers.

C designates a railway built upon the bottom of the stream and extending from wharf to wharf, and D, the body of a car or carriage mounted on wheels *d*, *d*, which run on the railway C.

The car-body D carries strong masts or standards E, E, which pass through guides *e*, *e*, on a boat or vessel F, and are securely braced by cross-pieces *e′*, *e′*. These masts or standards serve to attach together the vessel and the car, so that they will move together and the masts pass through the guides *e*, *e*, loosely enough to permit the vessel to rise and fall with the waves or with the changes of depth of the water, without affecting the position of the car.

A conductor of electricity, G, is suspended over the stream, being stretched from poles H, H′ on the floating platforms B, B′, and is electrically connected with a stationary generator of electricity I, on shore. An electric motor J on the vessel F is electrically connected to the conductor G by a trolley structure K, similar to the trolley apparatus used on electrically propelled street cars. The return circuit from the motor to the generator may be made through the water or through the car track on the bottom of the stream.

L designates the shaft of the electric motor carrying a pinion *l* that meshes with a gear wheel *m* on a shaft M, and N designates a beveled gear wheel carried by the shaft M, and meshing with a beveled wheel O that is keyed on a vertical shaft O′, which is journaled in suitable bearings on the vessel and has an angular hole through its center through which passes a vertical angular shaft P, which

is of a size to fit the hole in the shaft O′ loosely enough to permit the latter to move up and down on the shaft P, as the vessel rises and falls.

The shaft P is suitably journaled at its lower end in journals attached to the car-body D, and carries a worm R, that meshes with a worm-wheel S, set fast on the driving axle T, of the car.

By means of the above described mechanism, motion is imparted to the driving axle of the car, from the motor on the vessel and the angular driving shaft P passing through the hollow vertical shaft O′ allows the vessel to rise and fall with the changes of depth of the water without interference with the operation of the mechanism by which the car is propelled.

In the modified form of apparatus shown in Fig. 2, I have substituted a steam engine V, for the electric motor J, the engine receiving steam from a boiler W and the mechanism employed for imparting motion to the driving axle of the car being the same as that shown in Fig. 1.

In the apparatus shown in Fig. 5, the motive power is not communicated from the vessel to the car, but the latter is drawn back and forth by means of a cable X.

Having described my invention, I claim—

1. In a marine railway, the combination of a submarine car, a floating vessel connected to said car, a motor carried on the vessel, and means for communicating motion from the motor to the driving axle of the car, substantially as described.

2. In a marine railway, the combination of a submarine car, a floating vessel connected to said car, an electric motor on the vessel, and means for communicating motion from the motor to the driving axle of the car, with a stationary electric generator and electric connections between said generator and said motor, substantially as described.

3. In a marine railway, the combination of a submarine car, tracks for the support of the car, vertical masts or standards attached to the car, a floating vessel having guides or ways for the reception of said masts, and means for propelling said car, substantially as described.

4. In a marine railway, the combination of a submarine car D, vertical masts E, E, carried thereby, a floating vessel F, having guides *e*, *e*, for the reception of said masts, and a motor carried on the vessel; with organized mechanism for imparting motion from the said motor to the driving axle of the car, such mechanism including the hollow shaft O′ and the shaft P, sliding in said hollow shaft, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD KAYE.

Witnesses:
A. W. WHISLER,
CHAS. W. HURST.