(No Model.)

S. N. STEWART.

FLOATING DRAW FOR BRIDGES.

No. 407,700. Patented July 23, 1889.

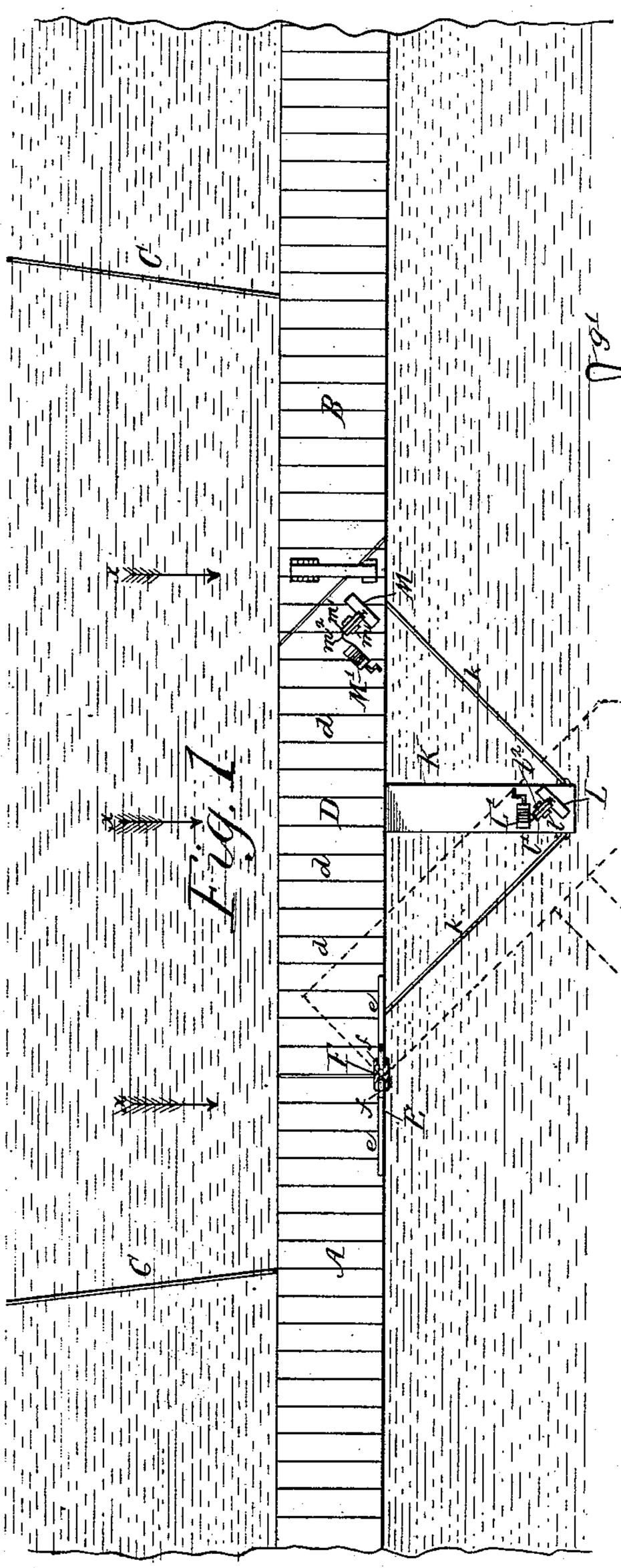

Fig. 1.

Fig. 3

Fig. 4

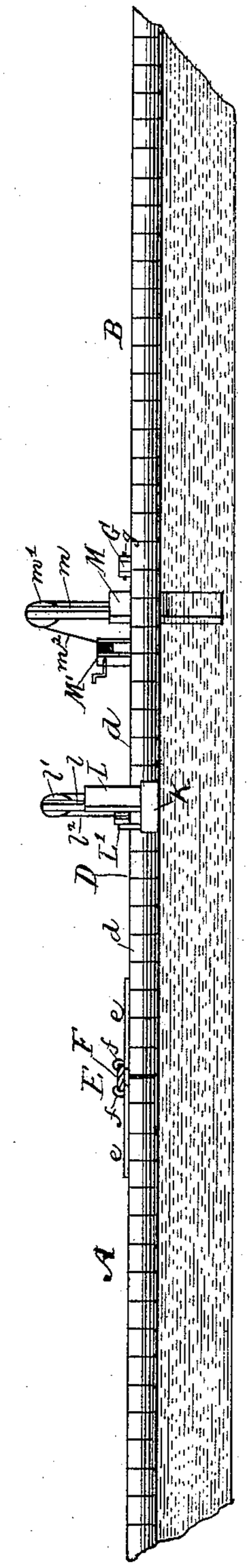

Fig. 2.

WITNESSES.

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UNITED STATES PATENT OFFICE.

SYLVESTER N. STEWART, OF PHILADELPHIA, PENNSYLVANIA.

FLOATING DRAW FOR BRIDGES.

SPECIFICATION forming part of Letters Patent No. 407,700, dated July 23, 1889.

Application filed March 26, 1889. Serial No. 304,825. (No model.)

To all whom it may concern:

Be it known that I, SYLVESTER N. STEWART, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Floating Draws for Bridges; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification.

My invention has relation to floating draws for bridges, and has for its object the provision of a draw of novel form and construction which is adapted to be opened and closed by the direct action of the current of the stream spanned by the bridge of which such draw forms a portion.

My invention has for its further object the provision of a novel form of floating draw for bridges which shall be less expensive and more easily constructed than the draws or similar floating structures hitherto known and used.

My invention has for its still further object the provision of novel means for hinging a floating draw to the causeway at one end and for locking it to the causeway at the other.

My invention is particularly adapted and designed for application to ponton-bridges or bridges in which the causeway is supported upon floating structures, as boats or scows; but it may be applied to bridges of any known or desired form.

In carrying my invention into effect I provide a floating structure—such as a scow or boat, or a number of such secured together—and pivot or hinge such structure at one end to the causeway of the bridge in such manner that the draw in opening will be swung around by the current, and at one side of said structure, at or about the center and at right angles to the same, I throw out a raft, which is suitably and strongly secured at its inner end to the draw structure and at its outer end by guy ropes or rods. Near the outer end of the raft, and at the free or swinging end of the draw structure, I arrange vertically-movable boards that, when lowered, extend a considerable distance below the bottoms of the raft and draw, and which, receiving the pressure of the current, serve as motors to open and close the draw, accordingly as one or the other is lowered into the water.

My invention consists in the novel construction of the draw structure and appurtenant parts, including novel devices for hinging the same at one end and locking it at the other; in the combination, with a pivoted floating draw, of a laterally-extending raft secured to the draw, and motor devices consisting of vertically-movable boards arranged near the outer ends of the raft and draw and adapted to be alternately lowered into the water to open and close the draw, and in the novel construction, combinations, and arrangements of parts hereinafter described and specifically claimed.

Referring to the accompanying drawings, Figure 1 is a plan view of a bridge constructed according to my improvements; Fig. 2, a side elevation of the same; Fig. 3, a detail view showing the devices for locking the draw, and Fig. 4 a detail view showing the device for hinging the draw structure to the causeway.

A and B designate the causeways and extend to the shore. These causeways may be composed of earth, piling, boats, or constructed in any suitable or desired manner. The outer end of causeway A is made rectangular, as shown, while the outer end of causeway B is triangular, the adjacent ends of the draw being shaped to correspond, so that when the draw is closed the continuity of the bridge is maintained in a practically straight line from shore to shore. Where the causeways A B are composed of floating structures the shore ends are firmly anchored or otherwise secured, while the outer ends are kept in position by guy-ropes C C, leading upstream and shoreward.

D designates the draw, which is square at the end adjacent to the causeway A, and at the other end is finished off at an angle coinciding to the angle of the end of causeway B. The draw D is composed of a number of decked scows or flat-boats *d d d*, arranged side by side and firmly secured together, the scow next adjoining the causeway B being formed with one of its sides at an angle corresponding with the angle of the causeway. The decks of the scows *d d d* form the road-bed of the draw, and no superstructure

is employed or necessary. A hand-rail or fence may be added if desired. It is to be noted that the sides of the scows *d d d* are vertical and parallel and come into close contact, and I have found that this construction is preferable to that which has heretofore been employed in ponton-bridges of the ordinary form, and in which the scows, floats, boats, or other floating portions of the bridge have been set at a distance apart and united by an expensive and weighty superstructure.

It might be supposed that a bridge or draw constructed as above described would present a considerable area of resistance to the flowing water; but I have found and have practically demonstrated that, owing to the absence of any superstructure and to the light weight and draft of the scows which may consequently be employed, the bridge or draw is submitted to no more (if as much) strain and the cost is less than when the ordinary form of separated pontons, the intervals between them being bridged over by a superstructure, is employed.

The draw D is attached at one end and side to the causeway A by a hinge E. (Shown in detail in Fig. 4.) Said hinge consists of two similar metallic straps *e e*, having hooks or eyes *f f* at one end. The straps *e e* are bolted one on the causeway A and the other on the draw D, and a strong rope or cord F is wound a number of times and tied around the hooks or eyes *f f*, whereby a hinged connection of great strength is secured, which will permit of both vertical and lateral oscillation of the draw to sufficient extent, while permitting of the instant detachment of the draw and causeway by the severance of the rope-connections—a feature of considerable consequence in case of emergency, as when masses of ice or timber are suddenly swept against the draw by the current, in which case the rope-connection can be instantly cut or untied and the draw dropped into harbor or allowed to float with the stream.

The device for locking the swinging end of the draw to the causeway B is shown in Fig. 3, and comprises a hook G, which is pivoted at *g* on the draw D, and is provided with a handle *g'*, by means of which it may be raised, and a toothed bar or rack H, which is secured upon the top of the causeway B. As the draw is closing, the hook G takes into the teeth of the rack H until the draw is completely closed and holds it in such position. When the draw is to be opened, the hook and rack are disengaged by means of the handle *g'* or a crow-bar.

Upon the side of the draw which is downstream, at about the middle of the same, I throw out a raft K, which is firmly secured to the draw, and at its outer end is braced and held by guy ropes or rods *k k*, extending to near each end of the draw.

The raft K is of somewhat less height and depth than the draw, but is of sufficient depth to float in the water, and is composed of timbers well bolted or otherwise secured together.

Near the lower end of the raft K is placed a board or timber L, which slides vertically in a slot in the raft, and which, when lowered, projects a considerable distance down into the water below the bottom of the raft. An upright post *l* carries a pulley *l'*, over which is passed a rope l^2, which is attached at one end to the upper end of the board L and at the other to a windlass L', and by means of said rope and windlass the board is raised and lowered when required. Near the swinging end of the draw D is arranged a board M, that passes down into the water through a well in one of the scows, and is raised and lowered by a rope m^2, passing over a pulley *m'* upon a post *m* and attached to a windlass M'.

The boards L M are preferably set at an acute angle to the right of a line drawn in the direction of the current and indicated by the arrows *x x*, but may be at any angle.

Operation: The parts, being constructed and arranged as above described, are operated in the following manner: If the draw be closed and it is desired to open the same, the hook G is unlatched from the rack H, and the draw will then be swung partly open by the force of the current or into the position shown by the dotted lines in Fig. 1. The board M is now lowered into the water, and constitutes a motor to force the draw open to its full extent, the water exerting a greater pressure upon the motor-board than upon the side of the raft because of its depth of immersion. To close the draw the motor-board M is raised out of the water, and the current will swing the draw back into the position shown in the dotted lines of Fig. 1. The motor-board L is then lowered into the water, which, pressing against the side of the board, swings the draw around to its fully-closed position, where it is automatically locked by the engagement of hooks G with rack H.

Having described my invention, I claim—

1. A floating draw for bridges, consisting of a series of decked scows having parallel and vertical sides, said scows being attached together with their sides in close contact, instead of being placed at intervals, as usual, and the decks of the same forming the roadbed of the draw, substantially as described.

2. In a floating draw for bridges, movable motor-boards M and L, adapted to be projected into the water, substantially as and for the purpose described.

3. In a floating draw for bridges, the combination, with the draw structure and a movable motor-board M, adapted to be held in the water at an angle to the direction of the current, of the raft K and the movable motor-board L, adapted to be projected into the water below the level of the bottom of the raft and at an angle to the direction of the current, substantially as described.

4. In a floating draw for bridges, the combination, with the causeway A, having a rectangular end, and the causeway B, having a triangular end, of the draw D, having one end corresponding in shape to the causeway A, where it is hinged, and its opposite end corresponding in shape to the end of causeway B, substantially as described.

5. In a floating draw for bridges, the combination, with causeway A and metallic strap *e* secured thereon and formed with an eye *f*, of the draw D, having a similar strap and eye, and the rope or other flexible and separable connection F, all constructed and arranged substantially as described.

6. In a floating draw for bridges, the combination, with the swinging draw D, having the pivoted hook G, of the causeway B, having the rack H, with which said hook is adapted to engage and lock the draw, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 16th day of March, 1889.

SYLVESTER N. STEWART.

Witnesses:
N. W. STEWART,
W. LYOEFUAR.