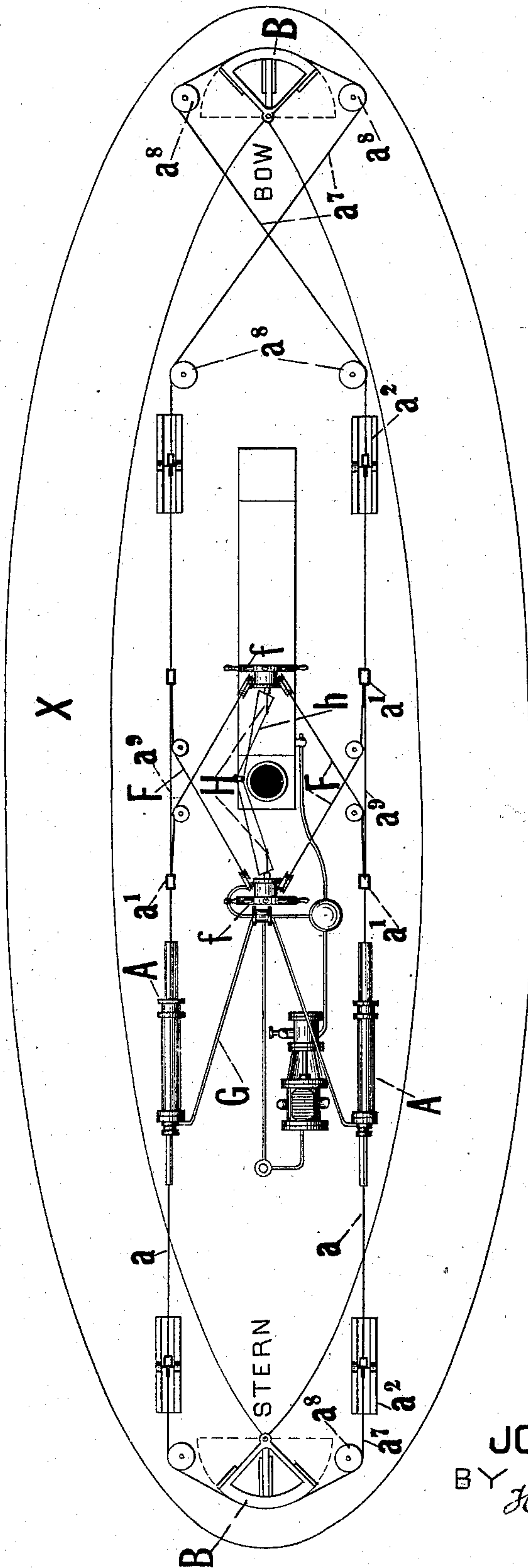


(No Model.)

6 Sheets—Sheet 1.

J. GATES.  
Steering Apparatus for Ferry Boats.  
No. 239,761  
Patented April 5, 1881.

Fig. 1.



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(No Model.)

6 Sheets—Sheet 2.

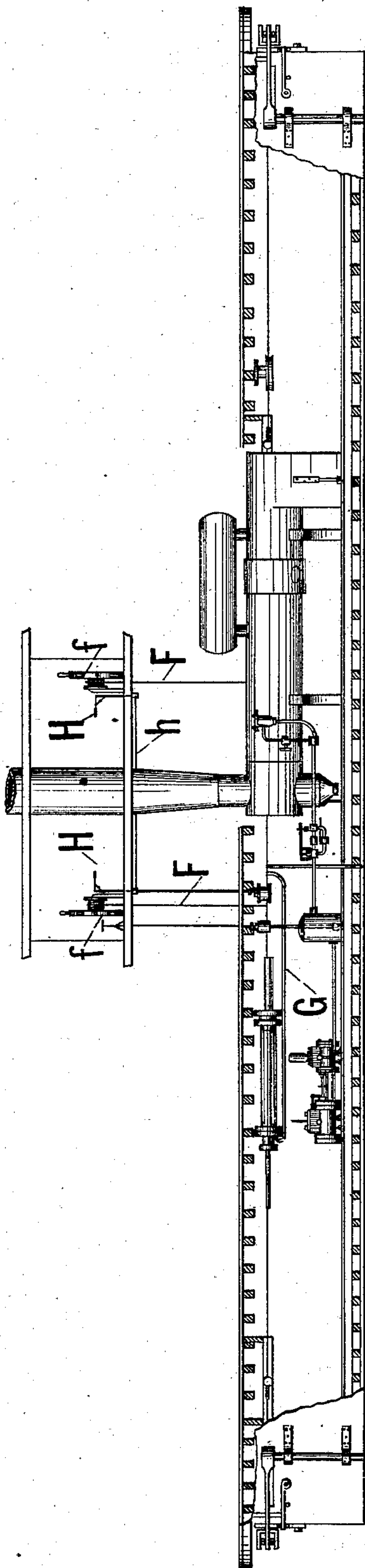
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No. 239,761

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Fig. 2.



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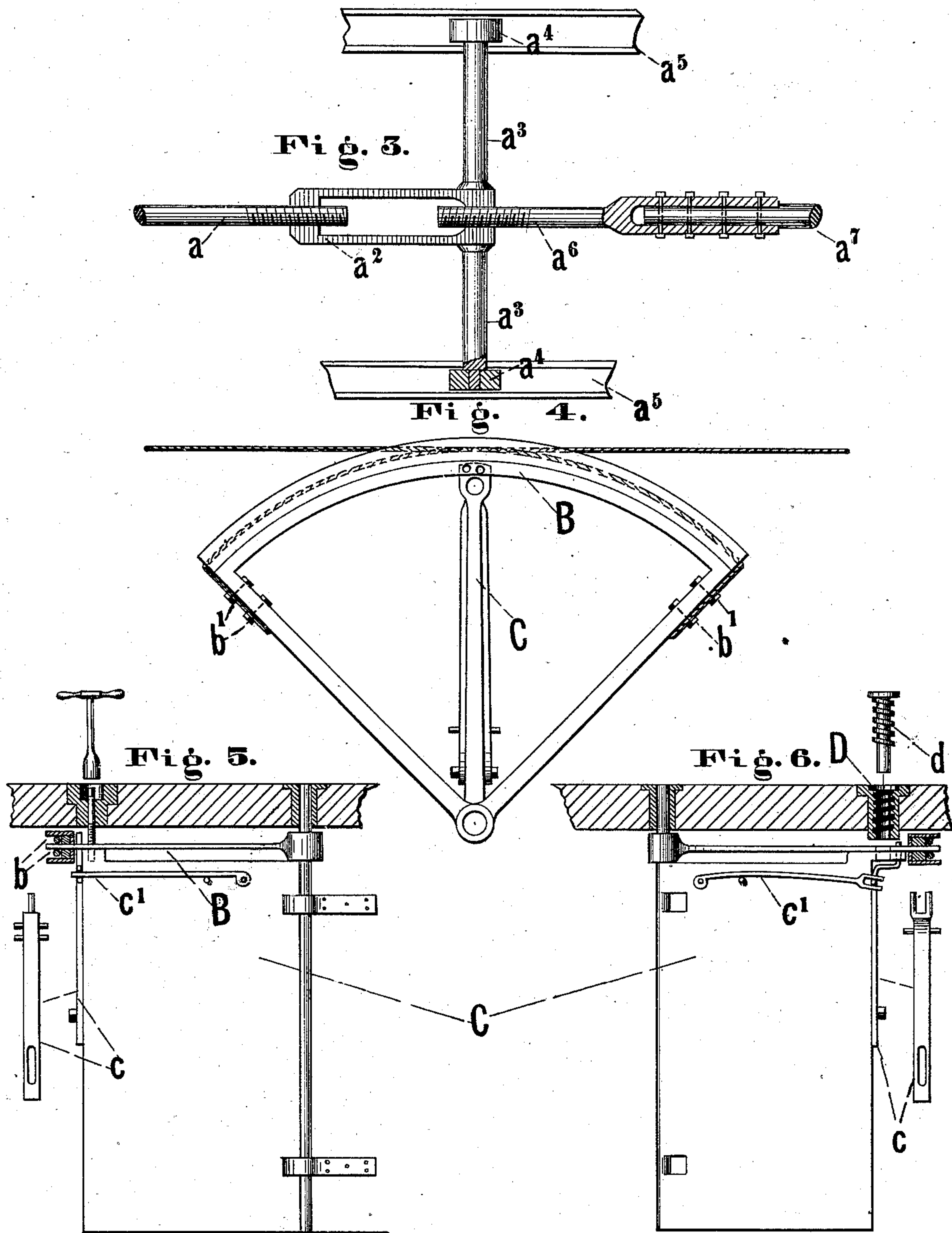
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(No Model.)

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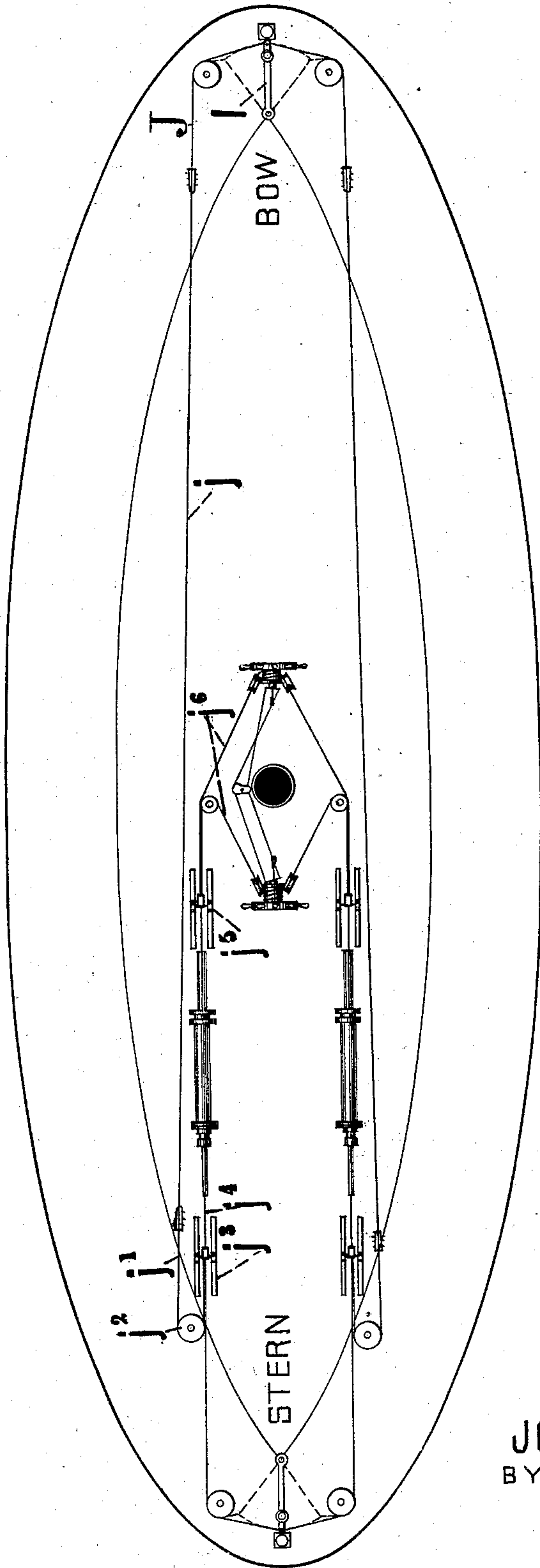
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Fig. 7.



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(No Model.)

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No. 239,761  
Patented April 5, 1881.

Fig. 8.

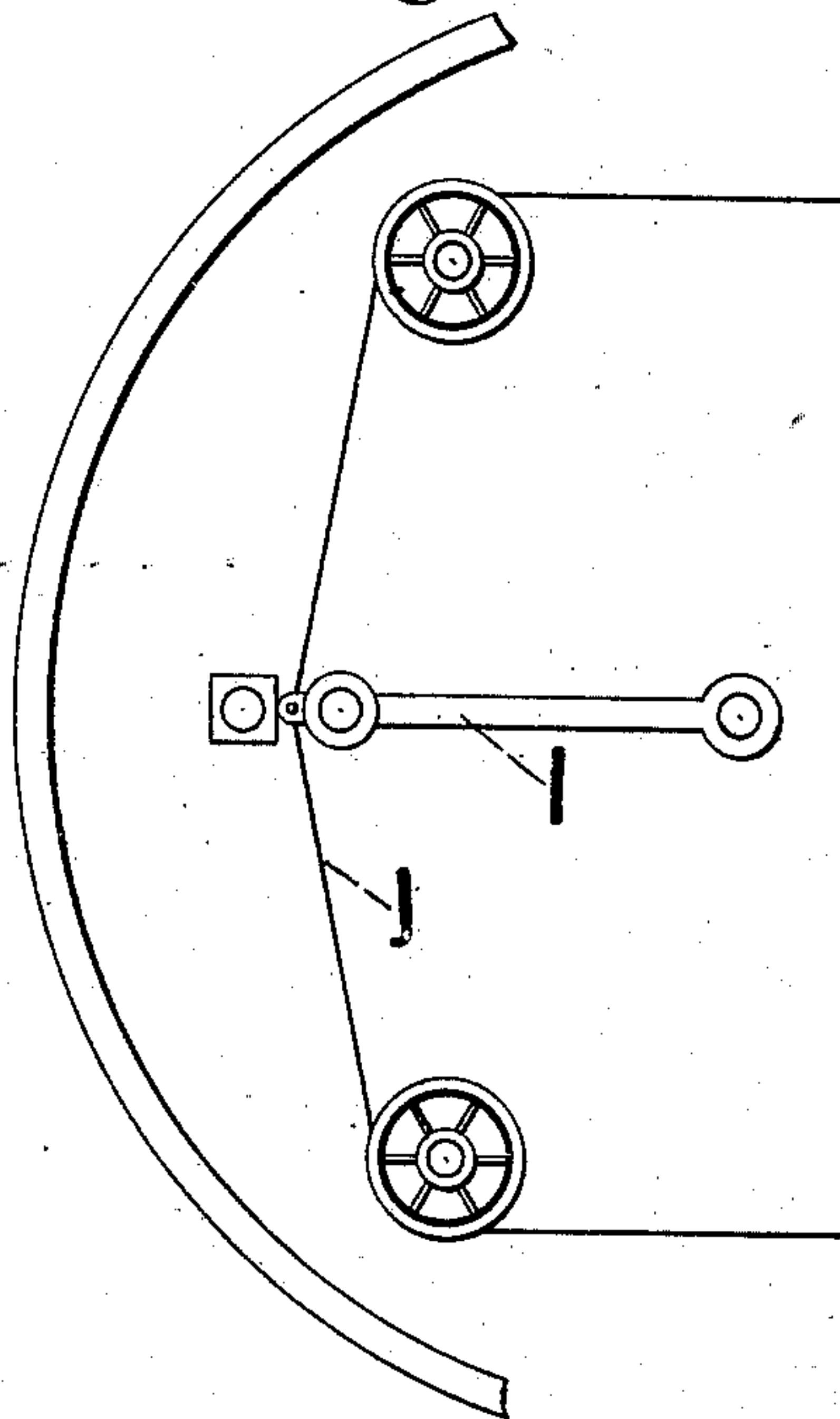


Fig. 9.

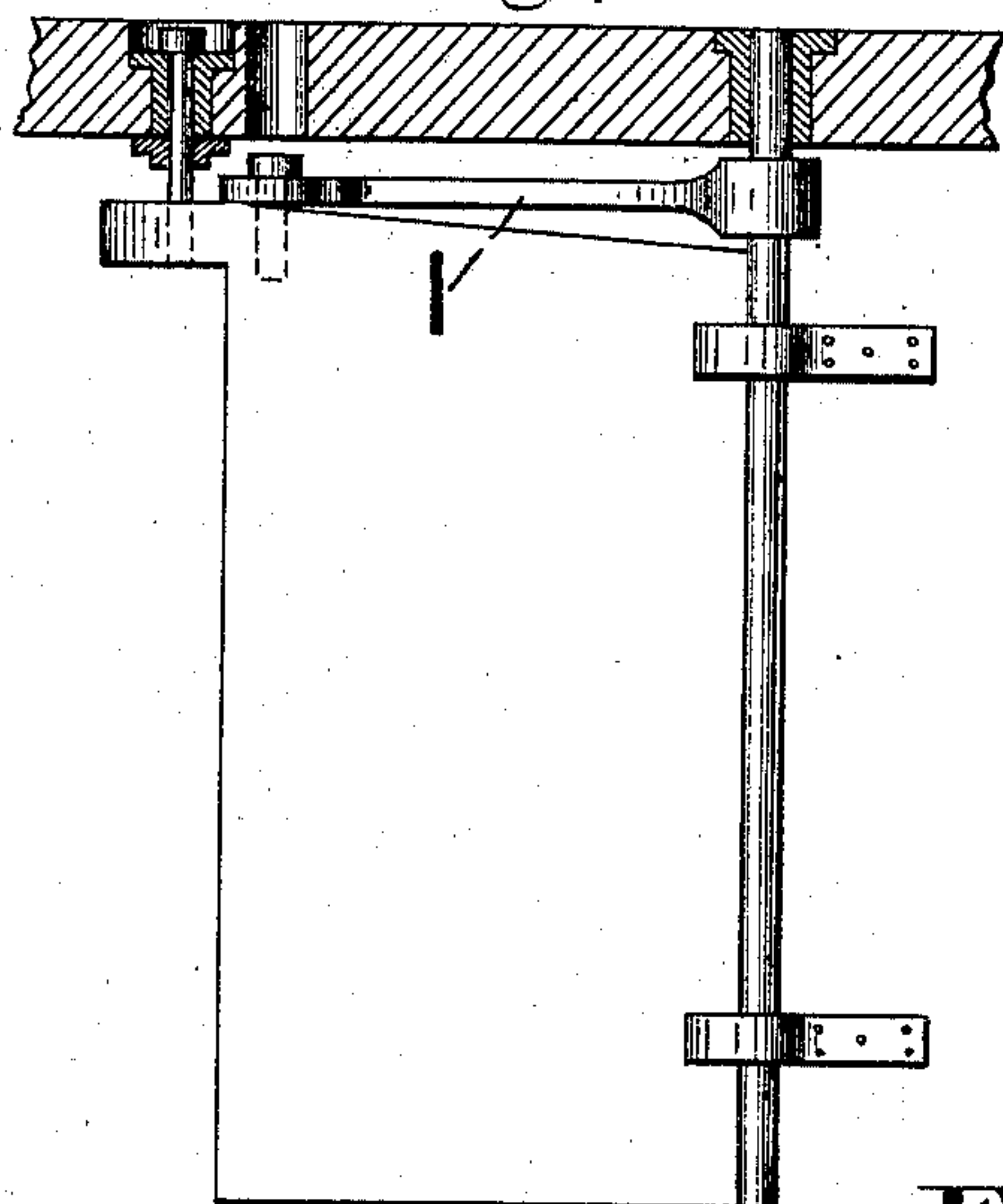


Fig. 10.

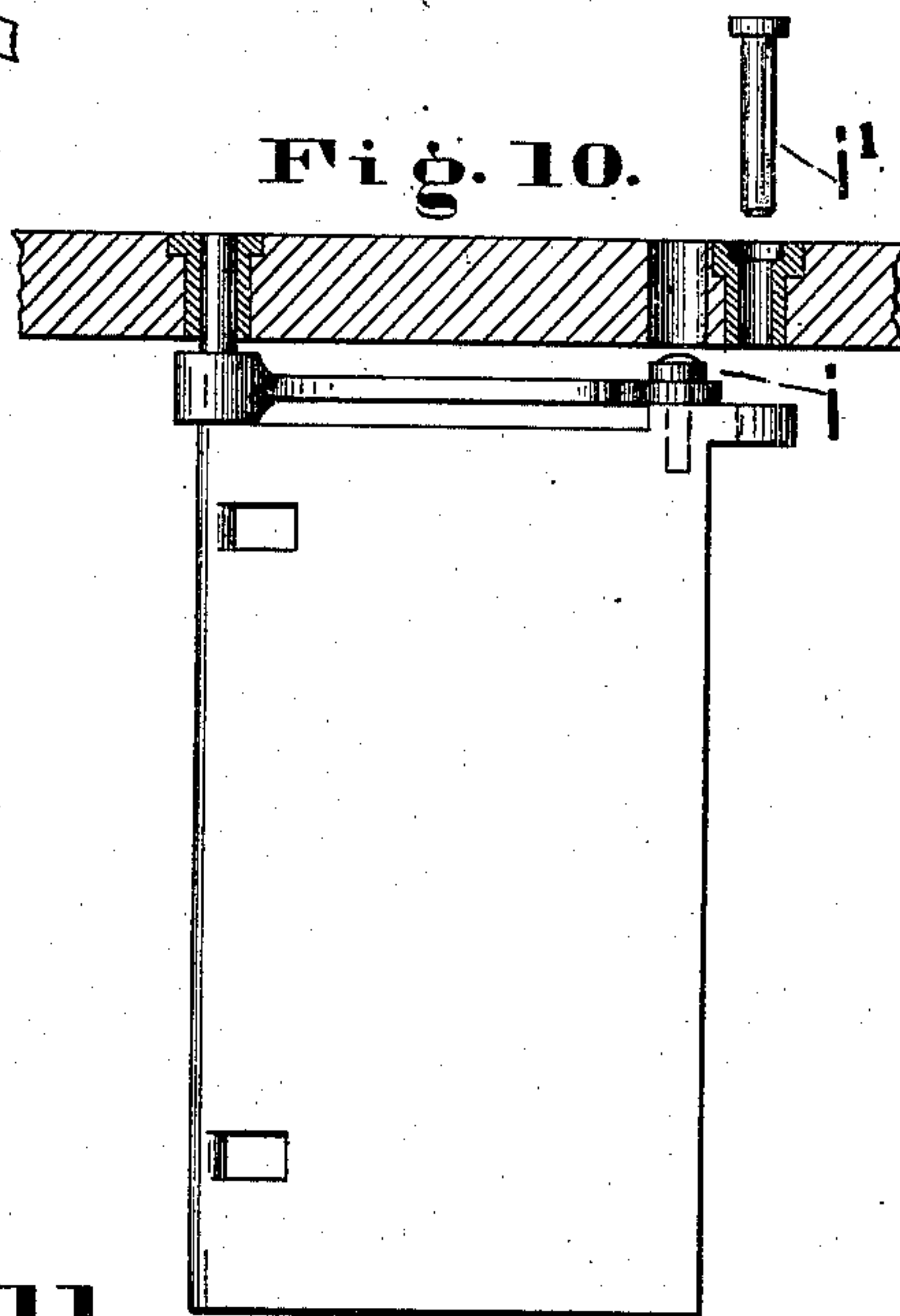
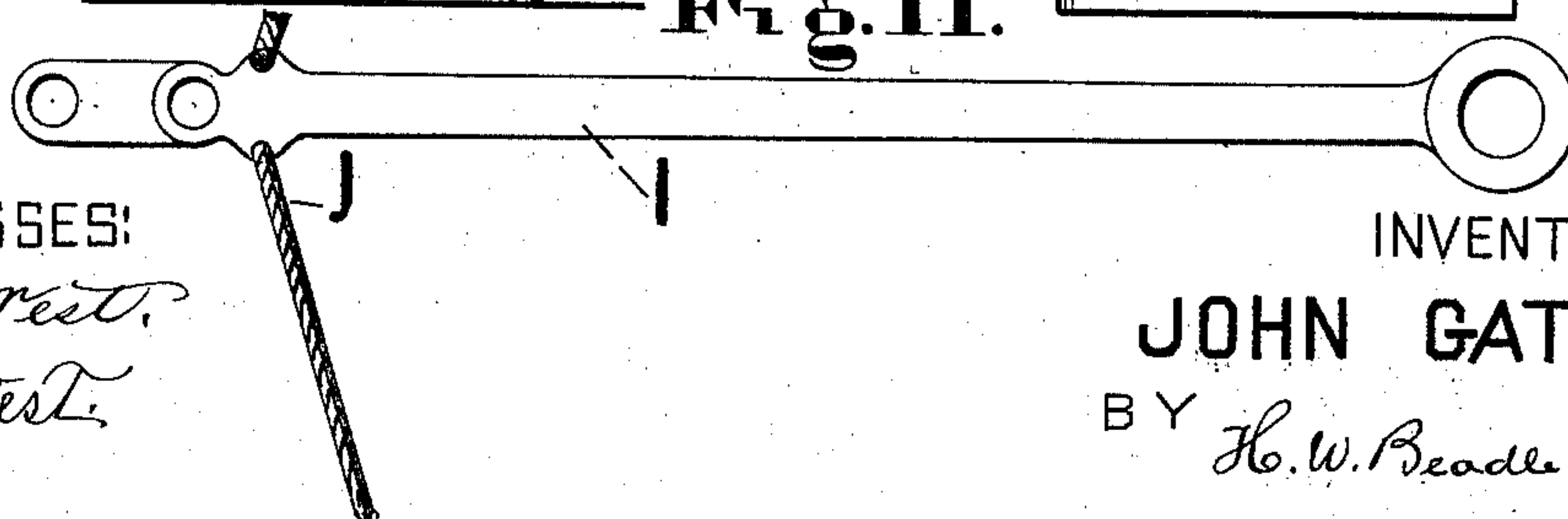


Fig. 11.



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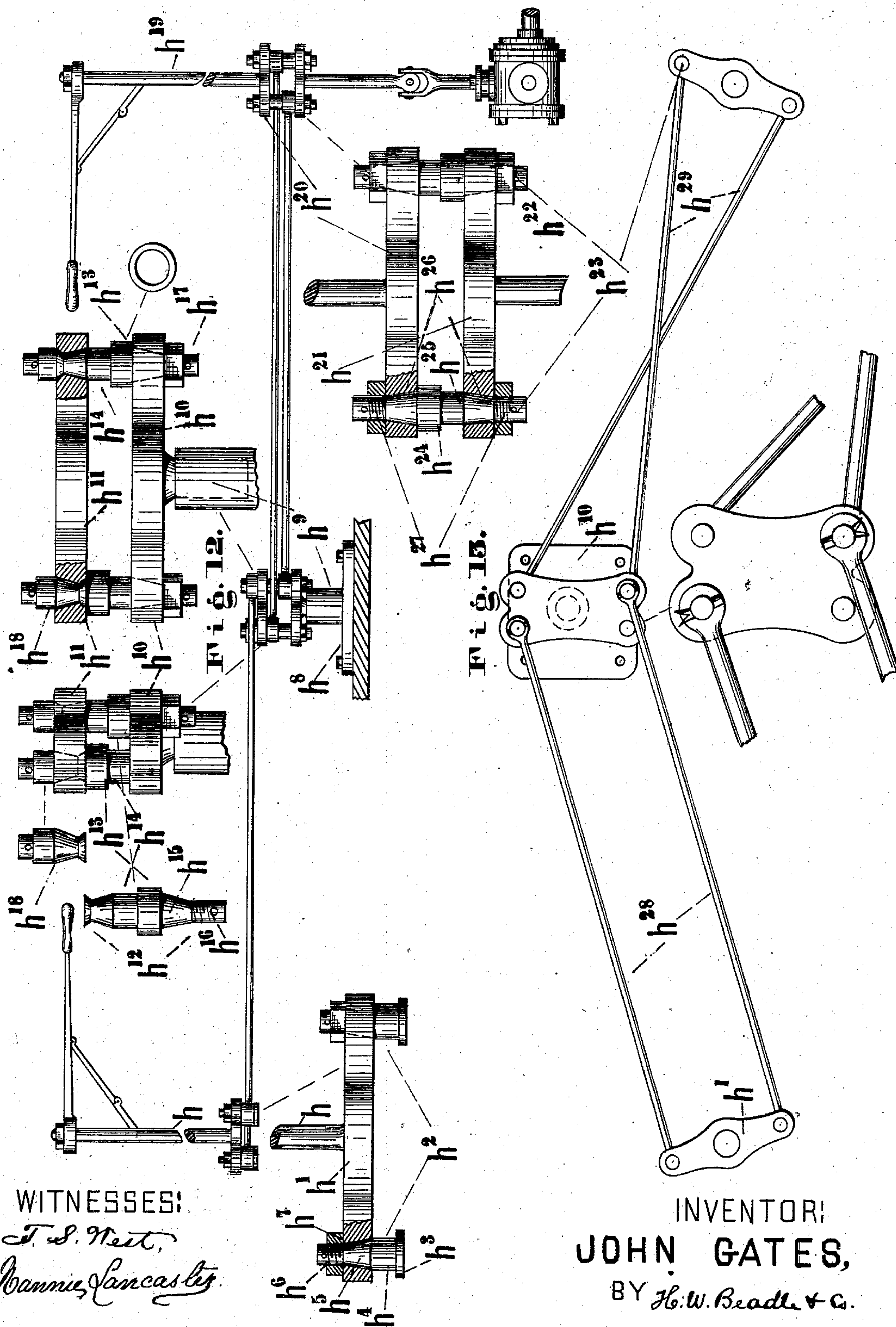
6 Sheets—Sheet 6.

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## Steering Apparatus for Ferry Boats.

**No. 239,761**

**Patented April 5, 1881.**



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# UNITED STATES PATENT OFFICE.

JOHN GATES, OF PORTLAND, OREGON.

## STEERING APPARATUS FOR FERRY-BOATS.

SPECIFICATION forming part of Letters Patent No. 239,761, dated April 5, 1881.

Application filed July 15, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN GATES, of Portland, Multnomah county, and State of Oregon, have invented new and useful Improvements in Steering Apparatus for Ferry-Boats; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention consists, mainly, in the combination, with a rudder at each end of the boat and intermediate connecting devices for uniting the two together, of actuating mechanism for giving them movement, and mechanism for taking up the slack of the connecting devices, the construction being such that the rudders may be moved simultaneously, if desired, for the purpose of joint action in steering the boat in any desired direction.

It consists, further, in certain details of construction, all of which will be fully described hereinafter.

In the drawings, Figure 1 represents a plan view of a ferry-boat having my improved steering apparatus applied thereto; Fig. 2, a side elevation of the same; Fig. 3, an enlarged view of one of the specially-constructed turn-buckles; Figs. 4, 5, and 6, enlarged views of the quadrant and rudder; Fig. 7, a plan view of a ferry-boat provided with tillers in place of quadrants; Figs. 8, 9, 10, and 11, enlarged views of the tillers, and Figs. 12 and 13 views illustrating the mechanism for uniting the steering-levers together for simultaneous action.

To enable others skilled in the art to make and use my improved steering apparatus, I will proceed to describe fully the construction of the same and the manner of its operation.

X, Fig. 1, represents a common double-ended boat, with a rudder hung in the usual way at each end of the boat. For convenience the right end of the boat in the drawings is termed the "bow," and the left-hand end the "stern."

A A represent hydraulic or steam cylinders of any proper construction, located on each side of the boat, at any proper point in the line of connection between the steering-wheel and rudder.

a represents a rod upon each side, extending through the cylinder, upon which is lo-

cated a collar, against which the piston pushes when the power mechanism is employed to steer the boat.

a' represents a common turn-buckle, into which the front end of the rod a is screwed, and a<sup>2</sup>, Figs. 1 and 3, a special turn-buckle or link, near the stern of the boat, into which the rear end of the rod is screwed.

a<sup>3</sup>, Fig. 3, represents an axle or arm having rollers a<sup>4</sup>, adapted to run in guides a<sup>5</sup>, as shown.

a<sup>6</sup> represents a threaded rod held by the link of turn-buckle a<sup>2</sup>, which is provided with a proper socket for receiving and holding the wire rope a<sup>7</sup>, leading around the guide-pulley a<sup>8</sup> to the quadrant.

B, Figs. 1, 4, and 5, represents a quadrant strongly pivoted to any proper point of support in line above the rudder, which is provided at its periphery with the grooves b b, Fig. 5, adapted to receive from each side the wire rope a<sup>7</sup>, which, being carried about the face of the same, as shown in Fig. 4, is secured at its end by staples or bolts b', as shown.

C, Figs. 4 and 5, represents the rudder, and c a bolt united thereto, which is employed to unite the rudder to the quadrant when it is desired to impart the movement of the latter to the former.

C' represents a spring, located upon the rudder, which, when free to act, forces the bolt upward, so that it engages with a proper opening in the quadrant, as shown.

D, Fig. 6, represents a threaded opening in the floor of the boat, above the bend of the bolt when the rudder is in a central position, and d a threaded pin adapted to turn in the socket, as shown. When the threaded pin is turned entirely down in the socket its lower end rests upon the bend of the bolt and holds the latter against the action of spring C', out of contact with the quadrant.

F F, Fig. 1, represent ropes leading from the turn-buckle a' to the front steering-wheel, f.

The parts described constitute a complete apparatus for manipulating the stern rudder by hand, the rod a rendering freely through the cylinder without being acted upon in any way.

G represents a supply-pipe leading from any proper valve to the cylinder.



H, Figs. 1 and 2, represents a lever, which is indirectly connected, as will be hereinafter described, with valve mechanism for controlling the supply of water or other fluid to the cylinder. If the lever is actuated the stern rudder will be manipulated by power instead of by hand, the pressure supplied to the cylinder by the pipe G giving movement to the piston, and the piston communicating movement to the collars upon the rods *a a*. The mechanism for manipulating the bow-rudder is identical in construction. The steering mechanism for the bow and stern may be used independently if desired. The two are united for joint operation by means of the intermediate rods *a'*, Fig. 1, extending below the turn-buckles *a' a'*, as shown. These rods are provided at one end with a right-hand screw-thread, and at the other end with a left-hand screw-thread, and the turn-buckles with which they connect have corresponding threads, so that the line of connection may be tightened or loosened by turning these rods in the proper direction. By means of set-nuts screwed up against the turn-buckles the rods are held in any position in which they may be placed. The steering-lever H, in the end of the pilot-house toward the bow of the boat, is connected to the steering-lever in the end of the pilot-house toward the stern of the boat by a system of rods, which will hereinafter be described.

*h*, Fig. 12, represents the shaft of the steering-lever, and *h'* a right-angled base-piece forming a solid part of the same.

*h<sup>2</sup> h<sup>2</sup>* represent pins or bolts having heads *h<sup>3</sup>*, a bearing portion, *h<sup>4</sup>*, a taper portion, *h<sup>5</sup>*, and a threaded portion, *h<sup>6</sup>*, adapted to receive the nut *h<sup>7</sup>*. The taper portion of these pins is held in a correspondingly-formed opening in the base-plate by means of the nuts, as shown.

*h<sup>8</sup>* represents a base-piece having a hollow column, *h<sup>9</sup>*.

*h<sup>10</sup>* represents a plate having below a central pivot-stud adapted to rest in the socket of the column, and at two points diagonally opposite to each other tapering openings, as indicated in dotted lines.

*h<sup>11</sup>* represents a plate, which is provided at each corner with a tapering opening.

*h<sup>12</sup>* represents a pin with a taper end above, a shoulder portion, *h<sup>13</sup>*, a bearing portion, *h<sup>14</sup>*, a taper portion, *h<sup>15</sup>*, and a threaded portion, *h<sup>16</sup>*, as shown. The upper end of the pin rests in one of the openings in plate *h<sup>11</sup>*, and is strongly riveted to the same. The lower end of the pin extends through the plate *h<sup>10</sup>*, and is properly secured by a nut, as shown.

*h<sup>17</sup>* represents a pin, which is constructed like the pin *h<sup>12</sup>*, with the exception that the bearing portion *h<sup>14</sup>* is above the shoulder portion *h<sup>13</sup>*, and that the latter, instead of being a fixed portion of the pin, is removable, the same consisting of a loose collar, as shown. This pin is secured to the plates *h<sup>11</sup> h<sup>10</sup>* in the same manner as the pin *h<sup>12</sup>*, but in a position diagonally opposite to the latter.

*h<sup>18</sup> h<sup>18</sup>* represent two short pins having taper

ends below, which rest in the remaining openings of the plate *h<sup>11</sup>*, and are strongly riveted thereto.

*h<sup>19</sup>* represents the shaft of the opposite steering-lever, having, also, a base-piece, *h<sup>20</sup>*, with tapering openings.

*h<sup>21</sup>* represents a plate similar to the base-piece *h<sup>20</sup>*, which is provided with a shaft, *h<sup>22</sup>*, extending downward to a universal joint, by means of which it is united to the valve-chest, as shown.

*h<sup>23</sup> h<sup>23</sup>* represent pins, each of which is provided with a shoulder portion, *h<sup>24</sup>*, a bearing portion, *h<sup>25</sup>*, and two taper portions, *h<sup>26</sup>*, and two threaded portions, *h<sup>27</sup>*; but in one pin the shoulder portion is above and the bearing portion below, and in the other the bearing portion is above and the shoulder portion below. By means of these pins the base-piece *h<sup>20</sup>* and plate *h<sup>21</sup>* are strongly united, as shown.

*h<sup>28</sup> h<sup>28</sup>* represent two parallel rods of similar construction, each of which is provided at each end with an eye, as shown. These rods are held at one end by the pins *h<sup>2</sup>* of the base-piece *h'*, and at the other end by the pins *h<sup>18</sup>* of the plate *h<sup>11</sup>*.

*h<sup>29</sup> h<sup>29</sup>* represent two crossed rods of similar construction, the eyes of which are held at one end by the pins *h<sup>12</sup> h<sup>17</sup>*, and at the other end by the pins *h<sup>23</sup> h<sup>23</sup>*.

The operation of the steering apparatus as a whole is substantially as follows:

When steering by power, the steering-lever in either end of the pilot-house being moved to either side, both rudders will be moved simultaneously in that direction. This result is accomplished in the following manner: By the movement of the steering-lever the valve, either directly or by the intermediate mechanism described, is moved to one side to open the supply-port to one of the cylinders and the exhaust-port to the other. In consequence of this action the piston of one of the cylinders is caused to come in contact with the collar of rod *a* and give the same proper movement in a forward direction. By the movement of this rod the entire line of connection which encircles the boat is actuated, and hence the quadrants of both rudders are simultaneously moved both in the same direction, in consequence of the crossing of the ropes at one end. If desired, however, in case of floating ice or drift, the rudder at either end may be disengaged from its quadrant and be pinned to the boat, in which case one rudder only will be actuated. When steering by power the steering-wheels serve as indexes to show the position of the rudders.

When steering by hand, the throttle-valve is first closed to shut off the power supply, and this action, by means of the special construction of the valve, opens a water-way from the cylinders to the exhaust-pipe, so that the cylinders are entirely relieved of pressure. The pistons then move to the rear ends of the cylinders and there remain. By using the steering-wheels then, the rods *a* will render



through the cylinder without being affected thereby in any way. Both rudders hence will be moved simultaneously, as before, if properly attached to their quadrants. The movement of one steering-lever is communicated to the other in the same direction by the system of crossed rods, before described. If no obstacle intervened between the two levers two simple crossed rods would answer; but in the boat shown, which is provided with a central smoke-stack, the crossed rods are carried at an angle from the base-piece of one lever to a central pivoted carrier, from which plate extend parallel rods to the base-pieces of the other lever.

By turning the shaft of one lever the base-piece rigidly attached thereto is moved, and by means of the connecting-rod also the central carrier and the base-piece of the other lever.

By connecting the rudders together in the manner described one is made to balance the other, and also both act together in turning the boat in any desired direction.

By the employment of the quadrant the ropes are kept taut in all positions of the rudder.

In Fig. 7 is shown a modification of my invention, which will now be described.

I, Figs. 7, 8, and 9, represents a tiller, which may be employed, if desired, where there is not sufficient room to use the quadrant.

*i*, Fig. 10, represents a removable pin, by means of which the tiller may be united to the rudder when it is desired to communicate the movements of the former to the latter.

*i'* represents a pin, by means of which a rudder may be secured in a central position when it is disengaged from the tiller.

J, Figs. 8 and 11, represents the tiller-ropes, properly secured to the tiller, as shown in Fig. 11, which extend about proper guide-pulleys on either side of the boat to the turn-buckle, Fig. 7, as shown.

*j*, Fig. 7, represents a rod extending from this turn-buckle to the one at the opposite end of the boat; and *j'* a rope which is carried about a proper pulley, *j*<sup>2</sup>, to the turn-buckle *j*<sup>3</sup>, as shown.

*j*<sup>4</sup> represents a rod extending through the cylinder to the turn-buckle *j*<sup>5</sup>, and *j*<sup>6</sup> *j*<sup>6</sup> ropes leading to the steering-wheels, as shown.

The general operation of the modified form is substantially like that of the main construction, previously described—that is, both rudders are moved simultaneously in the same direction when one steering-lever is moved.

I am aware that it is not new to move simultaneously, by means of crossed ropes, the rudder at each end of the boat to the same side, and therefore I do not claim this feature; but I am not aware that such a system is provided upon each side of the boat with mechanism for taking up the slack in the line of connection, and this feature, being important, I do claim.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with steering mechanism, substantially as described, and the line of connection *a*, uniting the rudders at each end in such manner as to move simultaneously to the same side, mechanism *a*<sup>2</sup>, substantially as described, for taking up the slack located in the line of connection upon each side of the boat, as set forth.

2. In combination with the rudder C, the quadrant B, and the spring-bolt *c c'*, adapted, when free, to act to unite the two together.

This specification signed and witnessed this 16th day of June, 1880.

JOHN GATES.

Witnesses:

E. W. CORNELL,  
T. N. HUGHES.