

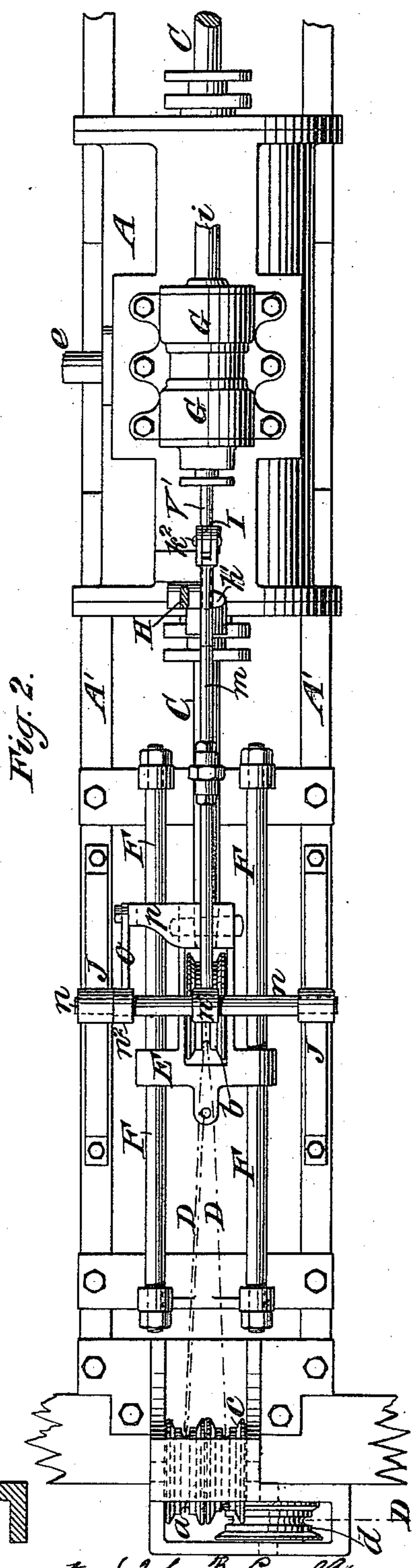
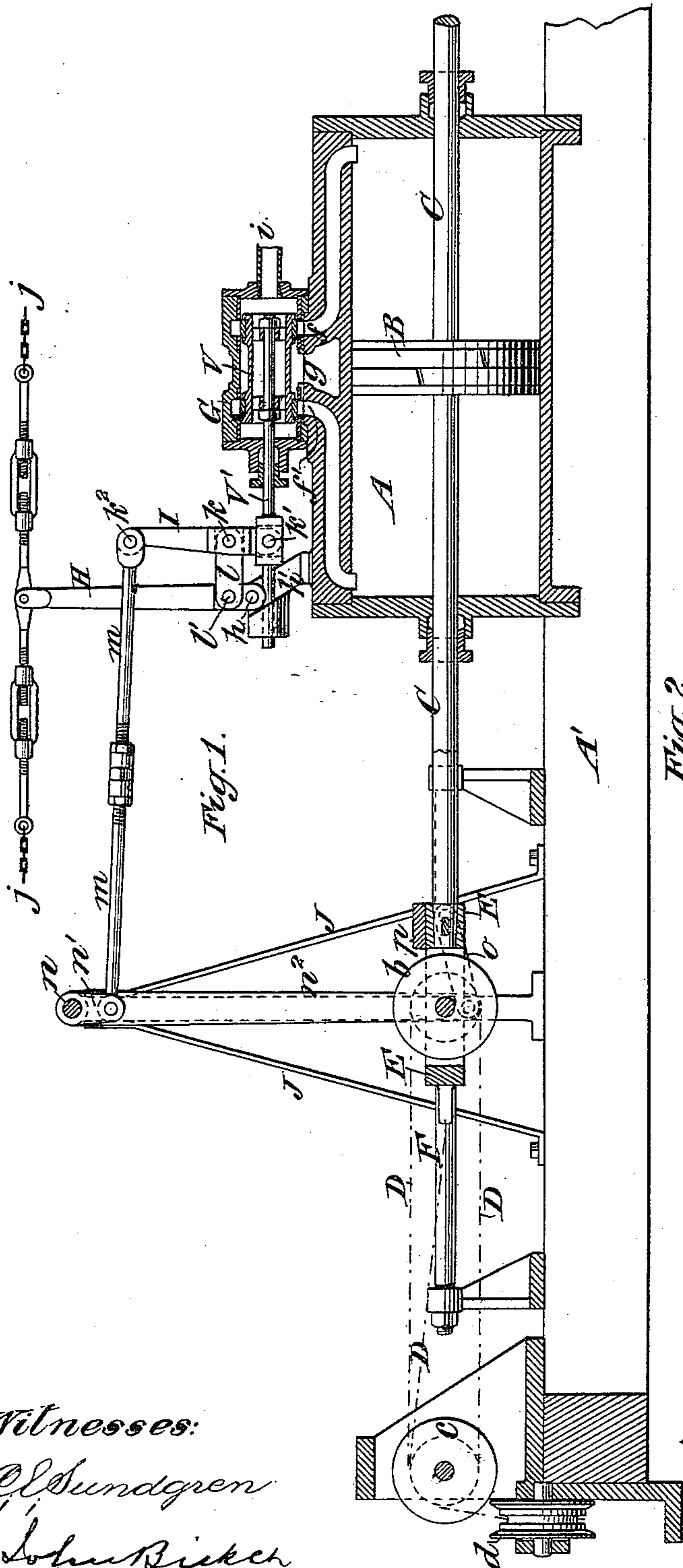
(No Model.)

2 Sheets—Sheet 1.

J. B. LOWELL.
STEERING ENGINE.

No. 420,162.

Patented Jan. 28, 1890.



Witnesses:

Olundgren

John Bickel

Inventor { John B. Lowell
by attorneys { Brown & Hinckley

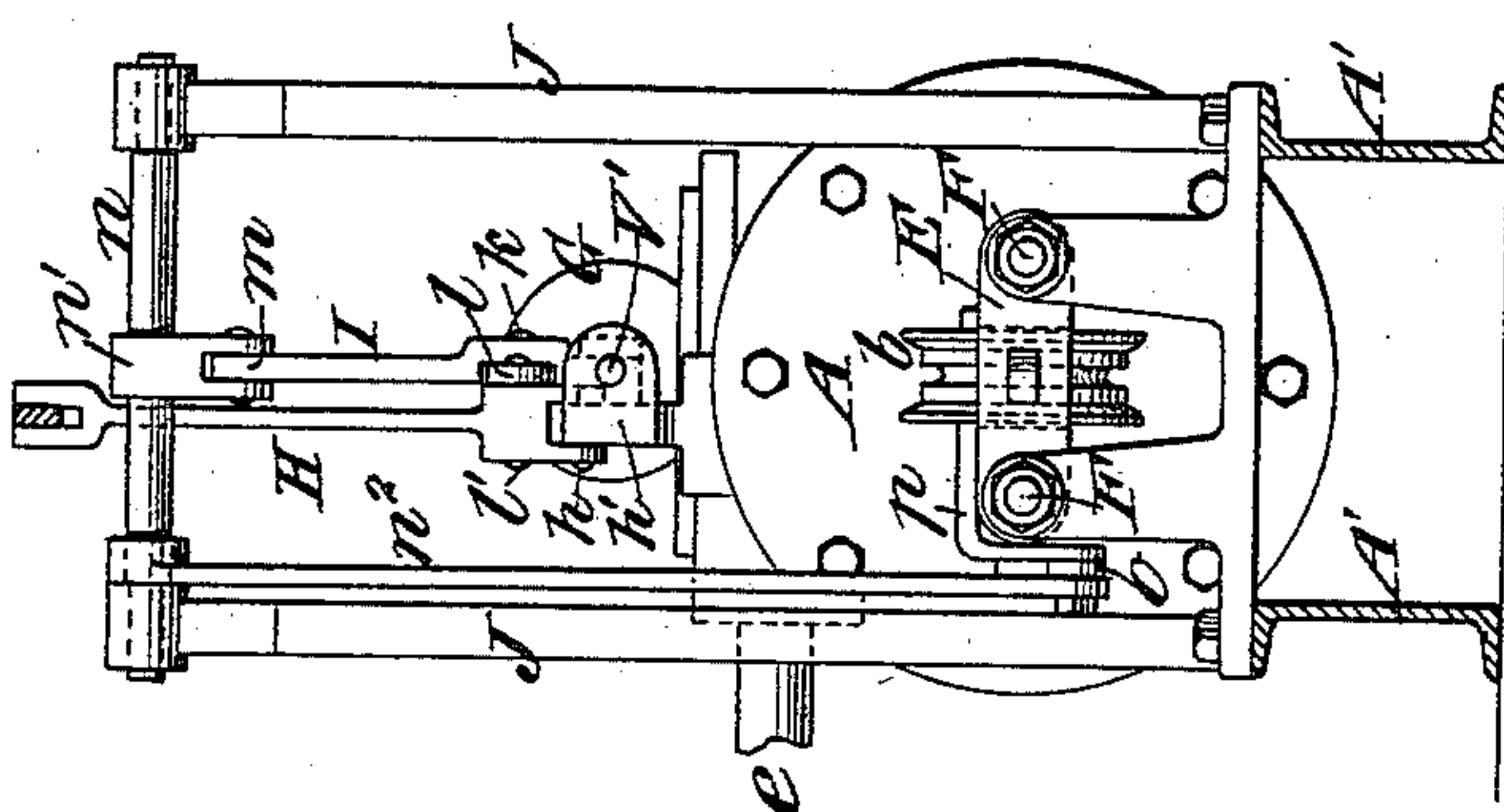
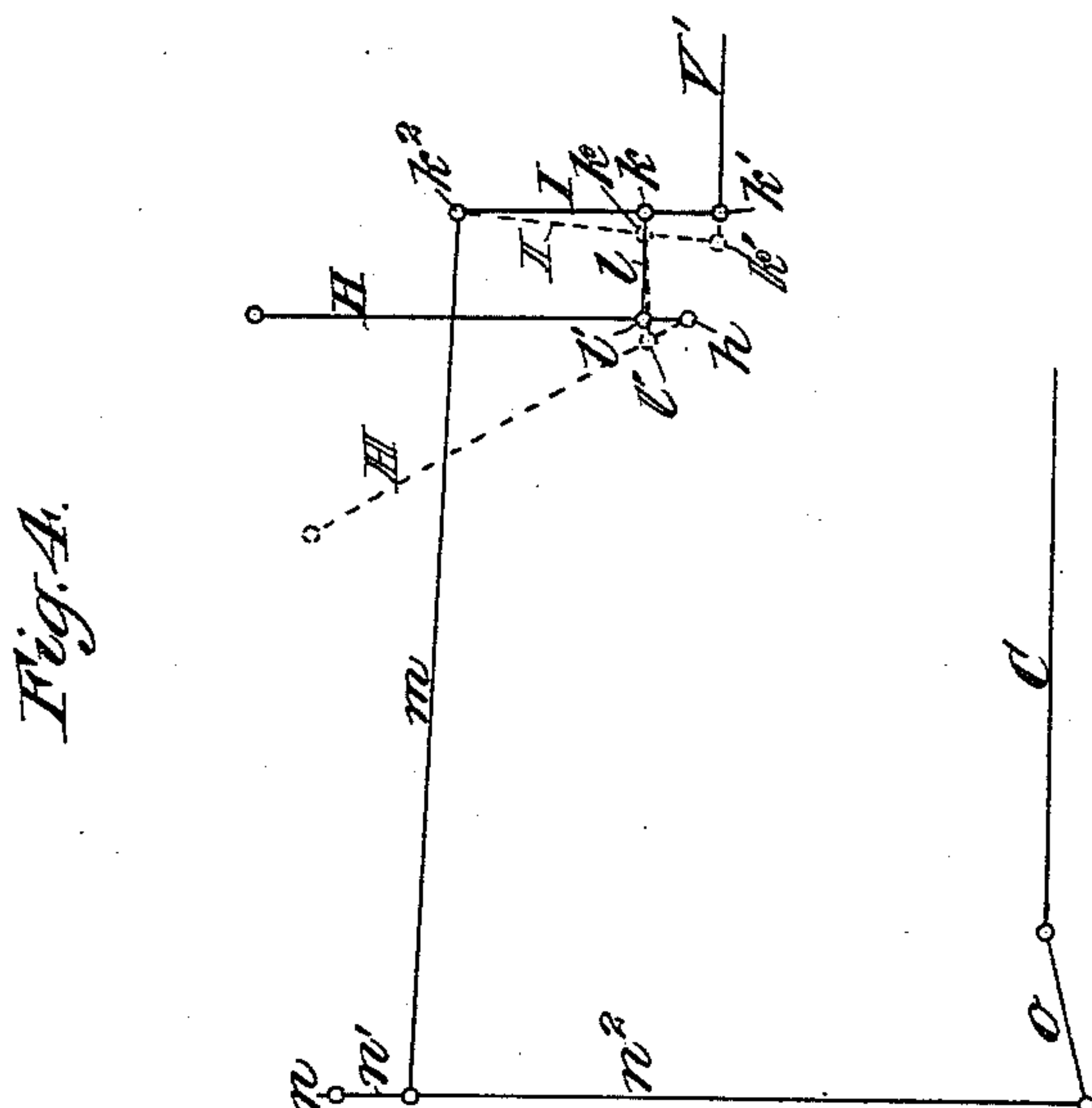
(No Model.)

2 Sheets—Sheet 2.

J. B. LOWELL.
STEERING ENGINE.

No. 420,162.

Patented Jan. 28, 1890.



Witnesses:

Ed Sundgren
John Bicken

Inventor:

Inventor:
John P. Lowell
by attorney
Brown & Griswold

UNITED STATES PATENT OFFICE.

JOHN BURNETT LOWELL, OF BALTIMORE, MARYLAND.

STEERING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 420,162, dated January 28, 1890.

Application filed February 14, 1889. Serial No. 299,879. (No model.)

To all whom it may concern:

Be it known that I, JOHN BURNETT LOWELL, of the city of Baltimore, in the State of Maryland, have invented a new and useful Improvement in Steering-Engines, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to steering-engines to be operated by steam or other fluid under pressure.

It consists in a novel valve-gear, hereinafter described and claimed, operated in part by the steersman through a hand-wheel or equivalent device and in part by the engine itself, but controlled by the steersman, whereby, on bringing the said wheel or device to a certain position, the engine will be caused to move the rudder to an exactly corresponding position.

Figure 1 in the drawings is a longitudinal vertical sectional view of a steering-engine embodying my invention. Fig. 2 is a plan of the same. Fig. 3 is an end view of the same. Fig. 4 is a diagram illustrating the movement of the valve-gear.

Similar letters of reference designate corresponding parts in the several figures.

A is the engine-cylinder, arranged horizontally on a bed-frame A' and intended to be placed athwart the vessel. B is the piston working in said cylinder, and having a rod C, which projects through both ends of the cylinder, and has its ends connected with the rudder by chains or other suitable connections, which may be such as are commonly employed for the purpose.

I have represented at the left-hand end of the rod a part of a system of chains which I propose to employ.

The chain D, which is shown in dotted outline, is connected with a cross-head E on the rod, and thence passes over a sheave *a*, occupying a fixed position near the side of the vessel, thence returns under the said sheave to and under a sheave *b*, carried by the cross-head E, thence returns over the latter sheave to and over a sheave *c* in front of *a*, and thence downward and under a sheave *d*, whence it passes along the vessel to the tiller. The cross-head E runs on fixed horizontal guides F F'. The other end of the piston-rod is of

course connected with the tiller on the opposite side by a similar chain; but this I have not thought it necessary to show. This system of chains multiplies the movement produced by the piston, so that a tiller of considerable length may have the requisite movement given to it by an engine of short stroke.

G is the valve-chest. V is the valve; *f f'*, the induction-ports of the cylinder, and *g* the eduction-port. *i* is the induction-pipe, and *e* the eduction-pipe. These valve, valve-chest, and ports may be such as are common to reciprocating steam-engines; but the valve represented, and which I propose to employ, is the well-known hollow balanced piston-slide valve, and needs no particular description.

I will now describe the valve-gear, which constitutes the most essential part of my invention.

H is a hand-controlled lever for operating the valve *v* by hand. This lever has a fixed fulcrum *h*, (represented as supported in a stand *h'* erected on the cylinder.) This lever is to be connected with the hand-gear of the steering apparatus, which may be of any suitable kind; but I propose generally to use as such hand-gear a wheel like an ordinary steering-wheel, though it may be much smaller, and to connect the said lever H with said wheel by ropes or chains such as are commonly used for steering, and I have represented parts of such chains at *j j* in Fig. 1, connected with said lever. I is a second lever, pivoted at *k* to a short link *l*, which is pivoted at *l'* to the hand-controlled lever H. The lower end of this lever I is also pivoted at *k'* to the stem V' of the valve V and its upper end is connected by a pivot *k²* and a rod *m* with the short arm *n'* of the rock-shaft *n*, which is supported in bearings in two fixed standards J on the bed-frame A'. The said rock-shaft has a longer arm *n²*, which is connected by a short rod or link *o* with an arm *p*, rigidly attached to the cross-head E. When the rudder is in its central position, the piston B of the steering-engine is at the middle of its stroke, and the valve V is in its central position, closing both the ports *f f'* of the cylinder, as shown in Fig. 1. When the rudder is to be turned in either direction, the hand-controlled lever H is moved by hand in the corresponding di-

rection to a certain position and there stopped,
 and the said lever in said movement, operat-
 ing through the link l on the valve-lever I,
 moves the said lever upon the pivot k^2 as a
 5 fulcrum, as illustrated by the diagram, Fig.
 4, in which the unbroken lines represent the
 position of the parts corresponding with Fig.
 1, and the dotted outlines represent them in
 the position last described. This movement
 10 gives the valve a certain movement and a cer-
 tain amount of opening, and thereby admits
 steam to the cylinder through the port f or f' ,
 according to the direction of the movement—
 the port f according to the diagram. The
 15 piston now commences to move and to move
 the rudder, and at the same time operates
 through the cross-head E the arm p , rod o ,
 arm n^2 , rock-shaft n , arm n' , and rod m , and
 causes the valve-lever I to move on the pivot
 20 k as a fulcrum, and thus to move the valve
 in the opposite direction to that in which it
 had previously been moved by the hand-
 controlled lever, and so to close it and shut
 the steam within the cylinder at both ends.
 25 The steam thus inclosed holds the piston in
 the cylinder against movement in either di-
 rection, and so holds the rudder firmly, yet by
 reason of its natural elasticity so holds it that
 it may yield sufficiently to prevent it or the
 30 steering-gear being carried away or broken
 by a sea striking it. The piston and the rud-
 der are thus held until the hand-controlled
 lever H is moved by the steersman. To bring
 the rudder back to its central position, it is
 35 only necessary to bring the hand-controlled
 lever H to its central position to open the
 valve to admit steam to the opposite side of
 the piston to which it had previously been ad-
 mitted. The piston will then return and will
 40 produce the closing of the valve when it ar-
 rives at its central position.

In the above operation the piston is always
 moved a definite distance, according to the
 movement of the hand-controlled lever H by

the steersman, as the farther the said lever 45
 is moved and the more opening given by it to
 the valve the farther the piston moves before
 closing it; hence the steersman can always
 move the valve exactly the distance to bring
 the rudder to a certain position. By a proper 50
 proportion of the lever H the tiller, the steer-
 ing-wheel, and their connections the move-
 ments of the steering-wheel and of the tiller
 may always be the same number of degrees
 of a circle, and in such case the position of 55
 the steering-wheel will indicate exactly the
 position of the rudder. The movement of the
 valve which the steersman has to make can
 be made almost instantaneously, and the
 steam thus admitted very promptly gives the 60
 piston the whole movement necessary for the
 movement of the rudder.

What I claim as my invention, and desire to
 secure by Letters Patent, is—

1. The combination, in a steering-engine, 65
 with a cylinder, a piston working therein, and
 a valve for controlling the admission of steam
 to said cylinder, of a hand-controlled lever
 for opening said valve, a valve-lever, a link-
 connection between said valve-lever and 70
 hand-controlled lever, and a connection be-
 tween said valve-lever and the piston, wholly
 independent of the hand-controlled lever, for
 the purpose of closing the said valve by the
 movement of the piston, substantially as and 75
 for the purpose herein set forth.

2. The combination, with the cylinder A, pis-
 ton B, piston-rod C, and valve V, of the hand-
 controlled lever H, the lever I, connected with
 the valve, the link-connection l between the 80
 two levers, and the rock-shaft n , having arms
 n' n^2 , one connected with the piston-rod and
 the other with the lever I, all substantially as
 and for the purpose herein set forth.

JOHN BURNETT LOWELL.

Witnesses:

E. F. FLAHEY,
 JOHN HUBERT.