

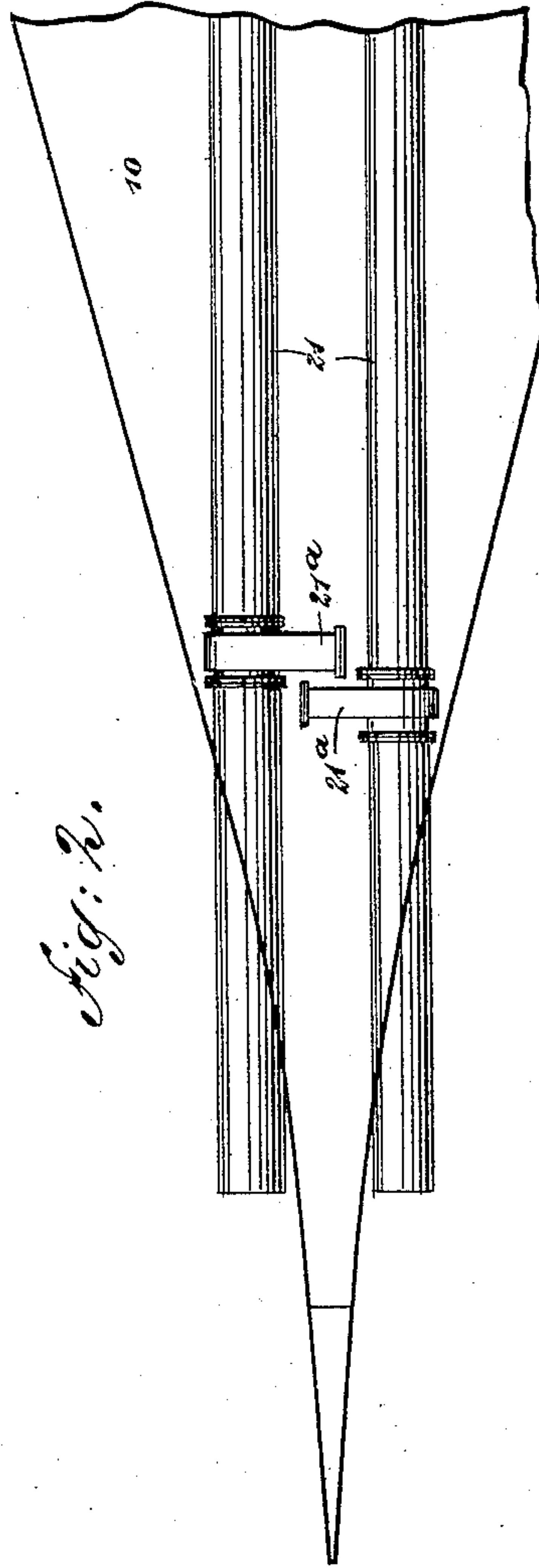
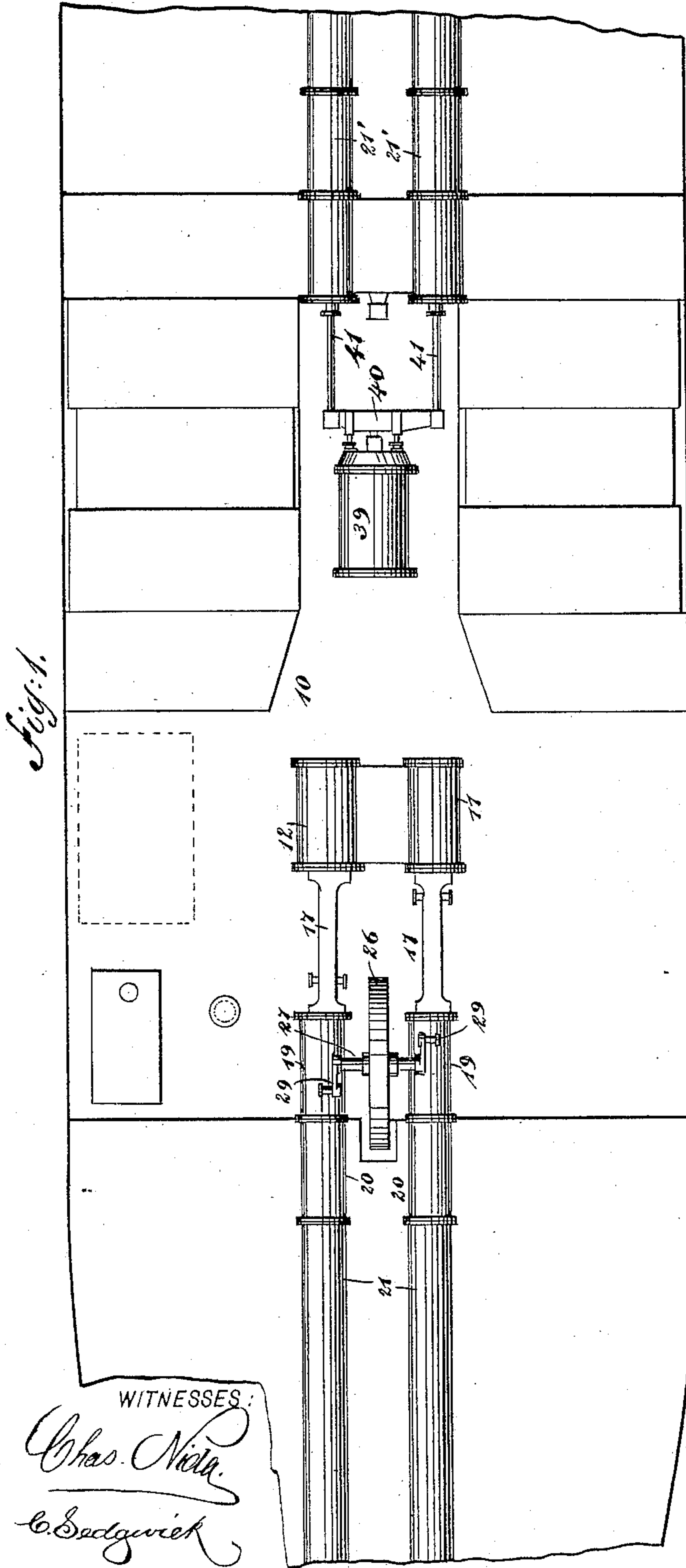
(No Model.)

2 Sheets—Sheet 1.

E. J. MEISTER.
APPARATUS FOR PISTON PROPULSION.

No. 472,380.

Patented Apr. 5, 1892.



WITNESSES:

Chas. Vida.
C. Sedgwick

INVENTOR:

E. J. Meister
BY *Munn & Co.*

ATTORNEYS

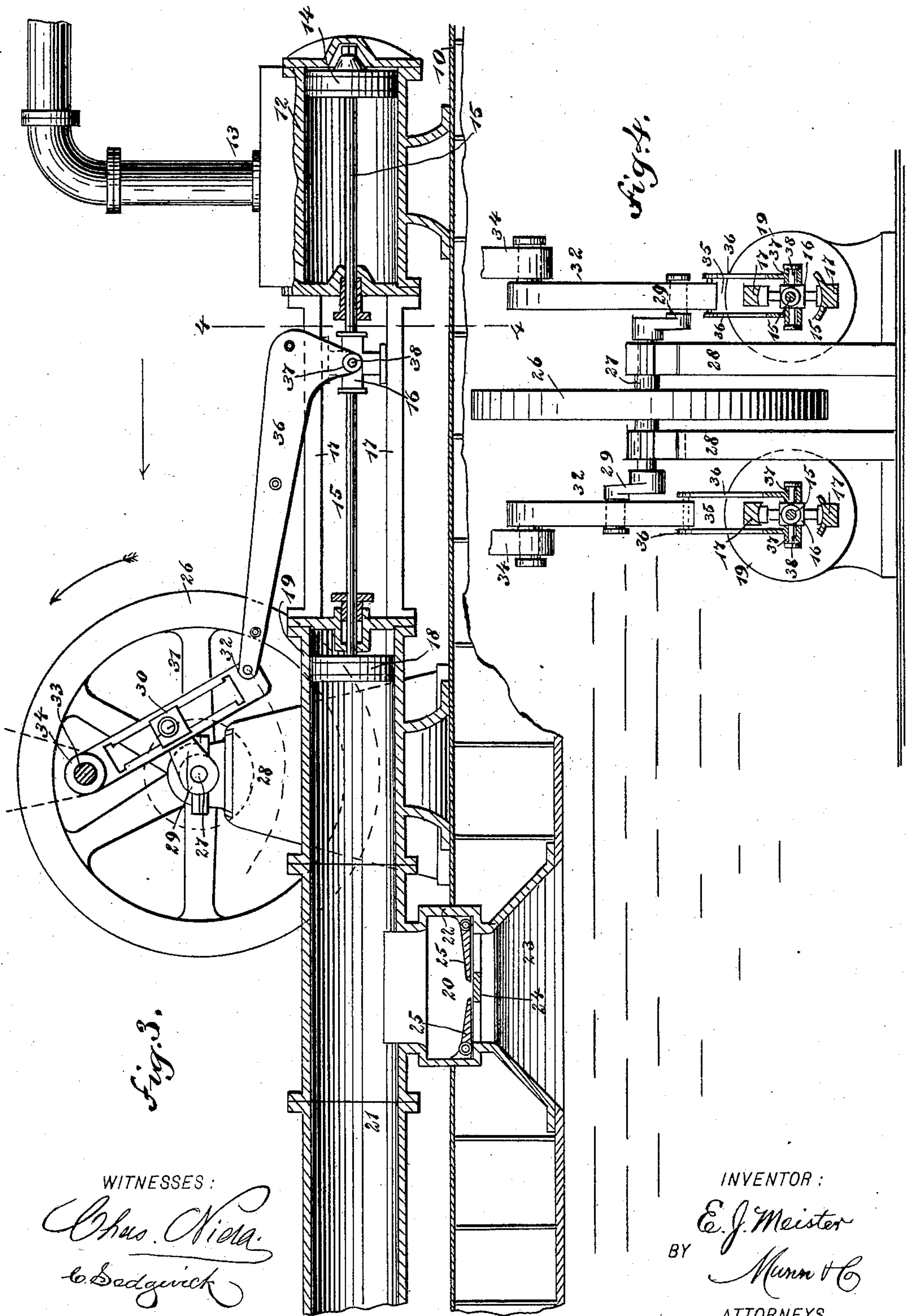
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UNITED STATES PATENT OFFICE.

ERWIN J. MEISTER, OF NEW YORK, N. Y.

APPARATUS FOR PISTON PROPULSION.

SPECIFICATION forming part of Letters Patent No. 472,380, dated April 5, 1892.

Application filed November 19, 1891. Serial No. 412,408. (No model.)

To all whom it may concern:

Be it known that I, ERWIN J. MEISTER, of the city, county, and State of New York, have invented a new and Improved Apparatus for
5 Piston Propulsion, of which the following is a full, clear, and exact description.

My invention relates to improvements in that class of machinery which is used for propelling vessels by forcing a current of water
10 through the hull of the vessel and ejecting it at the ends; and the object of my invention is to provide a simple apparatus by means of which the water may be easily drawn into the water-pipes, and also to provide means for giving
15 to the water-pistons an irregular stroke, so that they will have a quick outstroke, thus enabling the water to be ejected with great force and comparatively slow recovery, thus preventing excessive suction.

20 To this end my invention consists in an apparatus the construction of which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification,
25 in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a broken plan view of the apparatus as applied to a vessel with the stroke-controlling mechanism removed. Fig. 2 is a
30 broken plan view showing the manner in which the pipes project from the vessel, and more especially the side valves, which provide for lateral movement or steering. Fig. 3 is an enlarged longitudinal section of the apparatus
35 embodying my invention, and Fig. 4 is a vertical cross-section of the same on the line 4 4 in Fig. 3.

The vessel 10 is of the usual construction and may be of any approved type, and it is provided with engines or steam-cylinders 11 and
40 12, (which are supplied with steam by pipes 13,) which also may be of any usual kind, but which are preferably high and low pressure cylinders. Each cylinder is provided with
45 the usual reciprocating piston 14, the piston-rod 15 of which extends outward through one end of the cylinder in the usual way and through a cross-head 16, to which it is secured. The cross-head is of the common
50 kind and slides in the usual manner between the slide-bars 17. The piston-rod 15 of each

the cross-head, which moves in the slideway formed by the slide-bars 17, and connects with
a water-piston 18, which moves in the water- 55 cylinder 19, the latter connecting with the outlet-pipe 21, and it will be observed that there are two of these pipes, which are arranged parallel with each other and which align longitudinally with the cylinders 11 60 and 12. These pipes 21 extend rearwardly through the stern of the vessel and are provided with laterally-extending valves 21^a, of a common kind, which may be manipulated so that water may be forced out laterally 65 from either pipe, so as to effect the steering of the vessel. Each pipe 21 is provided with a valve 20, which is located on the under side of the pipe and adjacent to the water-cylinder 19. The valve 20 comprises a casing 22, a funnel- 70 shaped opening 23, leading from the casing through the bottom of the vessel's hull, a cross-plate 24, arranged transversely in the bottom of the casing 22, and the usual form of flap- 75 valves 25, which are pivoted in opposite ends of the casing and which rest, when closed, on the cross-strip 24.

While I have shown a particular form of valve, as described above, I do not claim the valve as my invention, as any valve may be 80 used which will permit a free inlet of water.

The hull of the vessel will sink into the water in the usual way, and as a consequence the upward pressure of the water will open the valves 25, so that the water will flow freely 85 and with considerable force into the pipes 21. The engines are provided with a common fly-wheel 26, which is mounted between the water-cylinders 19 and is secured to a crank-shaft 27, which is mounted on suitable sup- 90 ports 28 and the end cranks 29 of which are oppositely arranged and are journaled in sliding boxes 30, which move in slots 31, produced longitudinally in levers 32, which levers are pivoted at their upper ends, as shown at 33, 95 to supports 34, and the levers 32 align with the piston-rods 15. Each lever 32 is pivoted at its lower end to a link 35, which is shaped, preferably, somewhat like an elbow-lever in order to facilitate its connection with the cross- 100 head 16, to which the front end of the link is pivoted. The link 35 consists, essentially, of two parallel side bars 36, which embrace the upper slide-bar 17 and which terminate at

their front and lower ends in boxes 37, which are mounted on a transverse shaft 38, secured to the cross-head 16. The pistons 14 of the steam-cylinders are adapted to work alternately—that is to say, they will move in different directions—and it is essential that two cylinders and pistons be used together in order that my invention may be successfully carried out.

10 The operation of the apparatus is as follows: We will suppose that one of the pistons 14 is at the extreme front end of its cylinder, as shown in Fig. 3, and in this case the piston of the opposing cylinder will be at the rear end of the same. In this case the slide-box 30 of one crank 29 will be comparatively near to the pivoted end of a lever 32 and the slide-box of the opposite crank will be near the free end of its lever. When the slide-box is well up toward the upper end of the lever, as in Fig. 3, and the piston 14 advances, it will be seen that the piston will reach the limit of its stroke while the crank 29 is making about one-third of a revolution, and consequently the water-piston 18 will be moved very quickly in the water-cylinder 19 and the water in the pipe 21 will be ejected with great force; but the return stroke of the piston will be comparatively slow, as it will have to be made while the crank 29 is making the other two-thirds of its revolution. It is obvious that a single piston connected up in this way could not work successfully; but by using two engines one serves to balance the other and the dead point or center is successfully passed.

35 In Fig. 1 I have shown a single cylinder 39, having double pistons and piston-rods, which connect with a cross-head 40, having piston-rods 41, which are adapted to operate water-pistons like those already described and force water through the pipes 21', which pipes are

exactly similar to the pipes 21 and extend to the bow of the vessel instead of to the stern. These pipes may be, however, provided with the driving and regulating mechanism described above, and in practice this mechanism is preferably employed.

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

1. In an apparatus of the character described, the stroke-regulating mechanism comprising a double crank-shaft, slotted levers pivoted above the cranks, sliding boxes pivoted to the cranks and adapted to slide in the levers, and operative connections between the free ends of the levers and the piston-rods of the engines, substantially as described.

2. The combination, with the pair of engines having alternating pistons, of a common crank-shaft for the engines, the shaft having oppositely-arranged cranks thereon, slotted levers pivoted above the cranks and having sliding boxes therein, which form the crank-bearings, and link connections between the levers and the engine piston-rods, substantially as described.

3. The combination, with the engines having alternating pistons and having sliding cross-heads connected with the piston-rods, of a common crank-shaft for the engines, levers pivoted above the cranks of the shafts and provided with longitudinal slots, bearing-boxes for the cranks, said boxes being held to slide in the levers, and links pivoted to the levers and to the cross-heads, substantially as described.

ERWIN J. MEISTER.

Witnesses:

WARREN B. HUTCHINSON,
EDGAR TATE.