

F. P. Dimmelfel. Hydraulic Propeller.

N^o 10,149.

Patented Oct. 25, 1853.

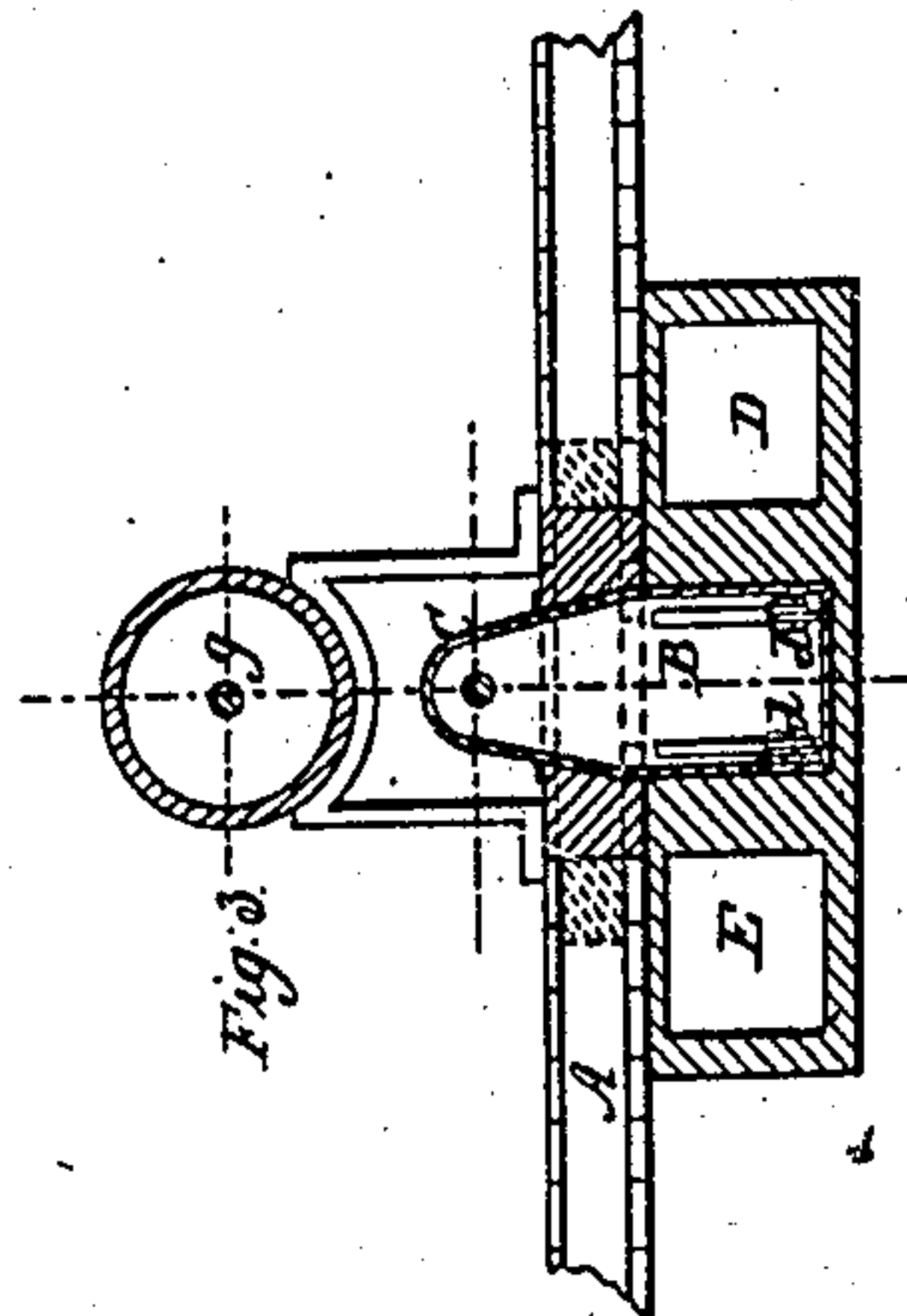


Fig. 3.

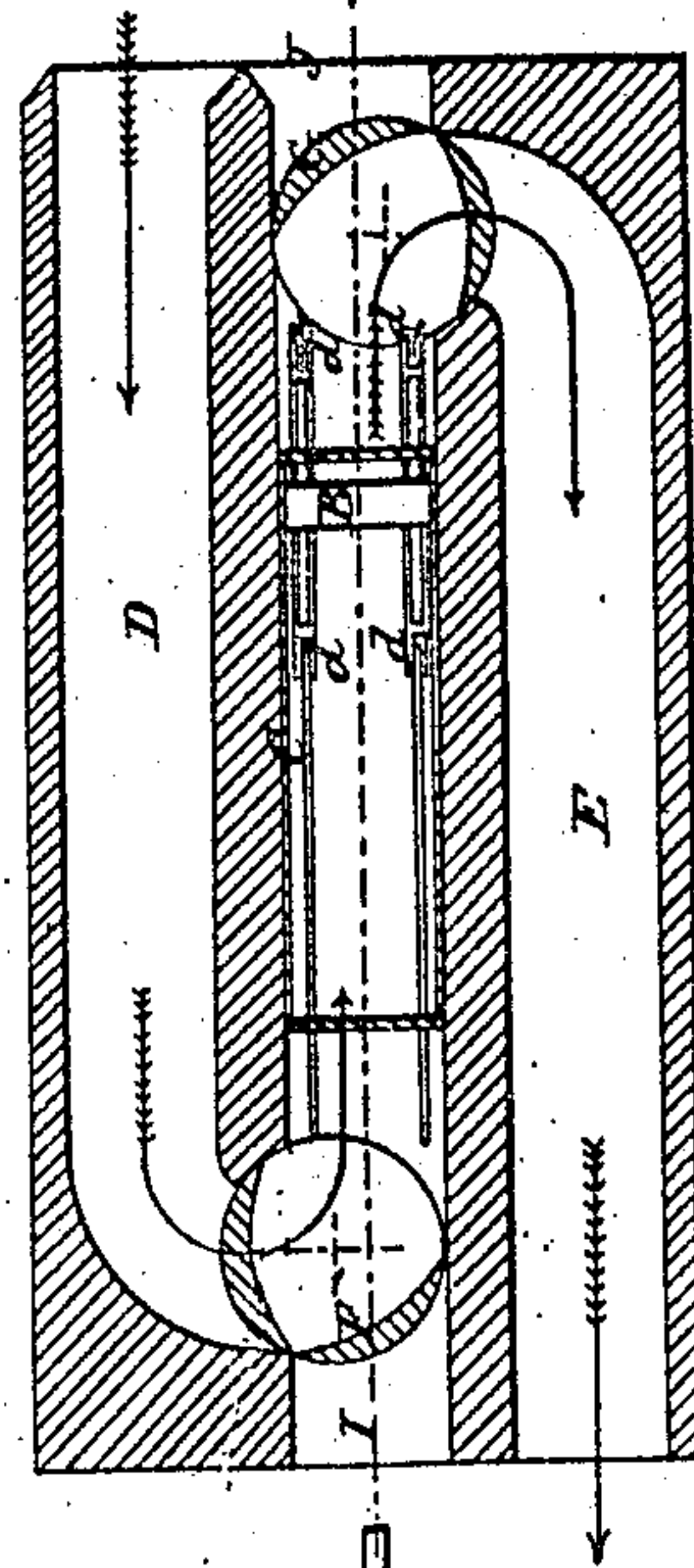


Fig. 4.

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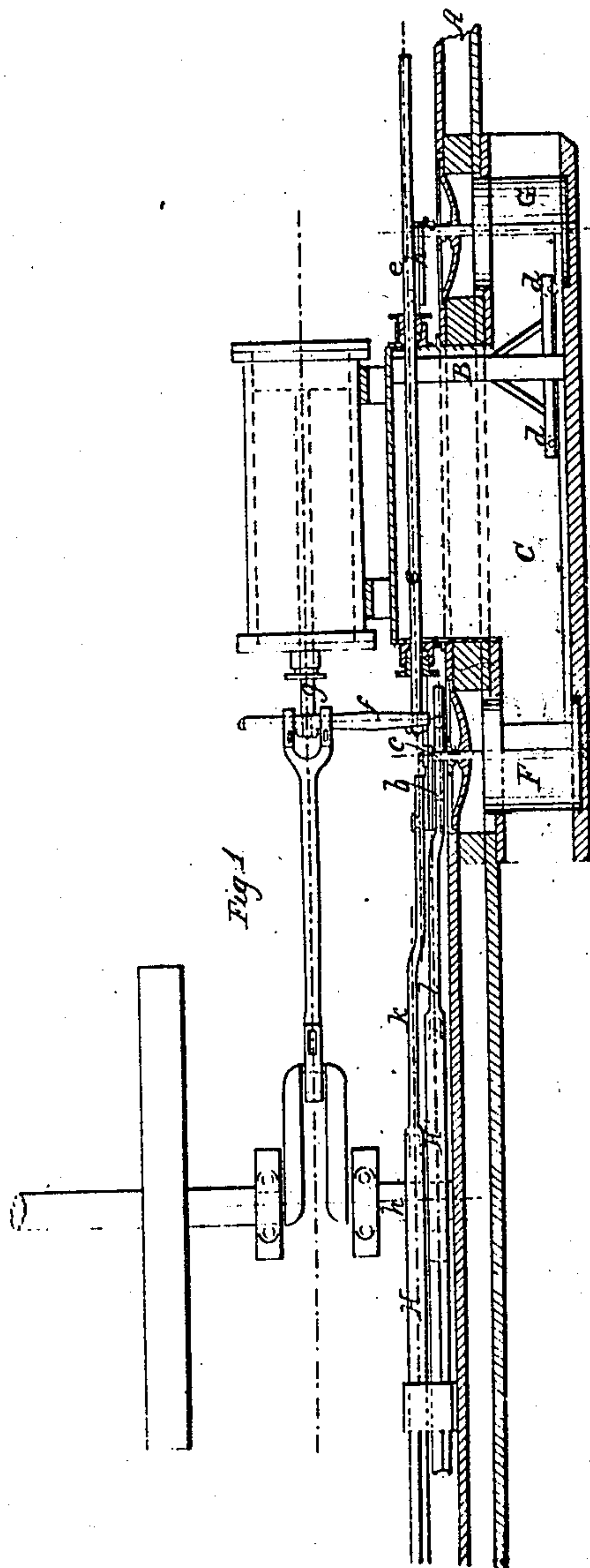


Fig. 1.

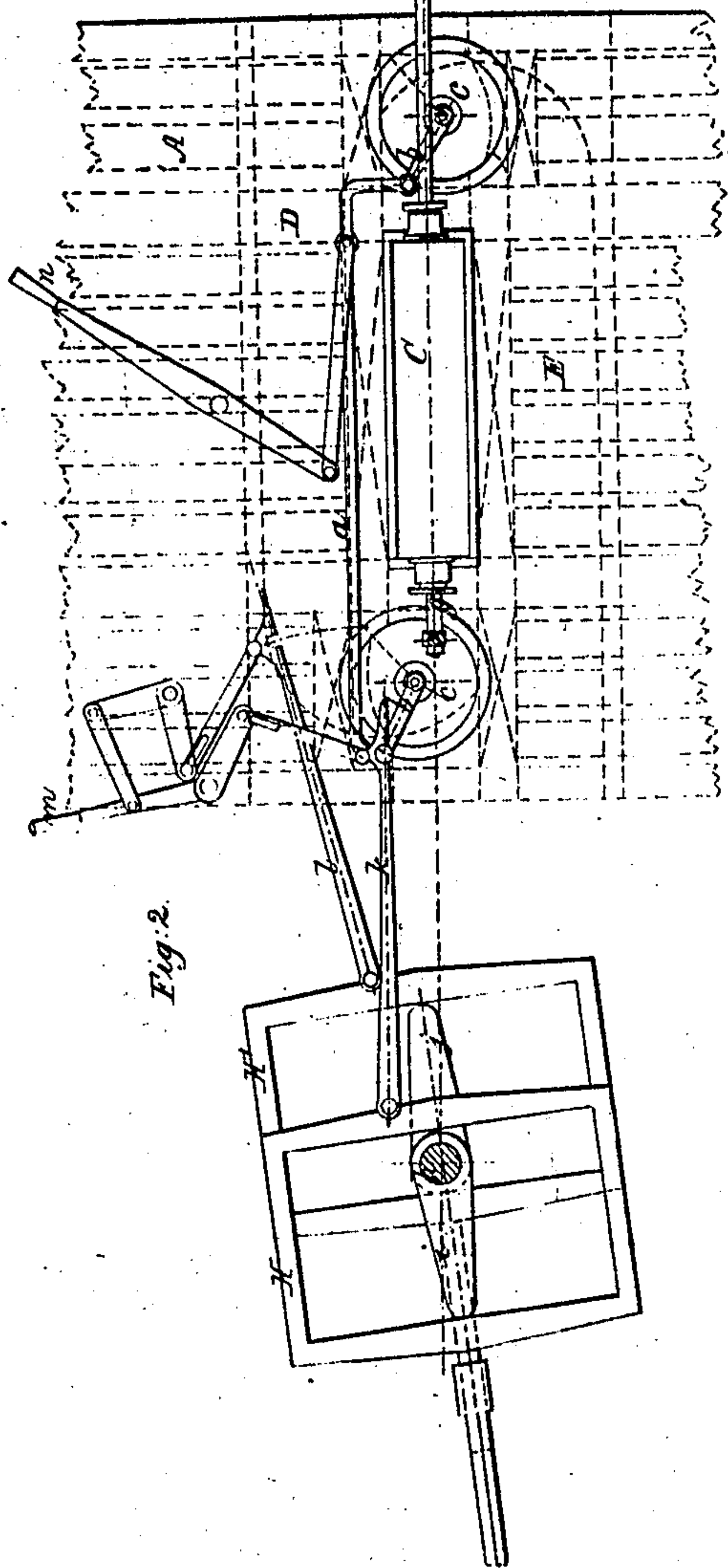


Fig. 2.

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UNITED STATES PATENT OFFICE.

FREDERIC P. DIMPFEL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN PROPELLING VESSELS.

Specification forming part of Letters Patent No. 10,149, dated October 25, 1853.

To all whom it may concern:

Be it known that I, FREDERIC P. DIMPFEL, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Submarine Propellers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figure 1 represents a longitudinal section of my improved propeller with the engine-driving mechanism attached and showing its position in relation to the keel of the vessel; Fig. 2, a plan taken above the keel and illustrating the valve-gear connected with the propeller; Fig. 3, a vertical transverse section, and Fig. 4 a horizontal section or plan taken below the keel.

Among the various forms of submerged propellers those consisting of pumps that alternately draw in and eject the water to produce a propelling effect upon the vessel have been variously arranged and operated, but have all been more or less defective and unsuccessful in practice. To improve this class of propellers is the object of my invention.

The propeller represented in the accompanying drawings is arranged to work below the keel or bottom of the ship; but it may be arranged to operate at the sides or other portions of the vessel below the surface of the water. In this propeller a reciprocating piston B works parallel to the keel, and during both its forward and backward stroke acts upon the water outside the vessel in the same direction. This propelling-piston B is placed within an oblong chamber C, that communicates on its opposite sides and at or near its opposite ends with water-passages D and E, which also run parallel to the keel, and one pipe or passage D is open at its end next to the bow of the ship, while the open end of the other pipe E faces the stern of the vessel. These water-passages connect with the chamber C beyond or outside of the range of motion of the piston, and the ends I and J of the chamber C, which extend beyond the connection of the water-passages, are open at either end to the outside water. Valves F and G are situated near either end of the reciprocating-piston chamber at the points of connection of the water-passages D and E with the said chamber. These valves are so con-

structed and arranged as to close or open, as may be required, the open ends of the piston-chamber C or the communications of the said chamber with the side water-passages D and E. The two valves thus arranged are connected by a coupling-rod *a* and arms *b*, attached to the valve-stems *c* for the purpose of producing a simultaneous action of the valves.

The reciprocating piston B is supported on running-wheels *d*, pivoted to a braced frame connected with the piston. These wheels run on rails projecting along and above the bottom of the piston-chamber C, whereby the piston is relieved from friction.

The chamber C extends up through the vessel's bottom above the keel, and the propelling-piston B is of corresponding form to the transverse section of the chamber. A rod *e* is attached to the propelling-piston at or near its top. This rod projects through either end of the piston-chamber above the keel inside the vessel, and is connected by an arm *f* with the piston-rod *g* of a steam-engine, which serves to give to the propelling-piston B the requisite reciprocating motion within the chamber C. The piston-rod *g* of the steam-engine is likewise made to communicate rotary motion to a vertical shaft *h* by means of a connecting-rod and crank in the ordinary manner. This revolving vertical shaft has toes *i* and *j* attached to it. These toes give an intermittent and opposite reciprocating motion to yokes H and H', which are connected by either one of two valve-rods *k* and *l* with the rod *a*, that connects and actuates the valves for the purpose of giving the proper action to the valves in relation to the propelling-piston to cause the piston as it moves in either direction to exert a propelling action or effect in the same direction, which action is as follows: When the propelling-piston B is traveling toward the vessel's bow, the valves F and G are turned or set so as to close the ends of the piston-chamber and to open the communications between it and the two side water-passages, whereby the water will be drawn from the forward end of the vessel through the passage D into the piston-chamber behind the piston, while the water in the chamber on the opposite side of the piston will be forcibly ejected through the other passage E out toward the stern of the ship, and thereby produce the requisite propelling

action or effect on the travel of the piston B in the opposite direction or during its back stroke by the changed position of the valves that are then made to close the lateral openings communicating with the water-passages and to open the ends of the piston-chamber, so that water will be drawn into the chamber in front of the piston at the same time that the water behind the piston is expelled directly out of the chamber toward the vessel's stern.

To reverse the vessel's motion, the valves F and G are turned partly round, so as to reverse the order in which they close the orifices in relation to the course or travel of the piston, so that during its forward stroke it will expel the water through the open end of the chamber toward the bow and through the water-passage D in the same direction during its back-stroke. In order thus to reverse the action of the propeller, the valve-rod *k* is lifted out of gear with the valve-lever by means of a handle *m* and the jointed links and levers connected therewith, while the other valve-rod *l* is at the same time forced inward, so that upon shifting the valves by means of a handle *n*, connected with the coupling-rod, so as to put the reversing valve-rod *l* into gear with the connecting-rod *a* of the valve-arms, the action of the propeller will be reversed, although the engine will continue to run in the same direction. The cross-frames which operate the respective valve-rods *k* and *l* travel in opposite directions to one another. Thus the action of the propeller can be reversed by connecting the valve to the one or the other without the usual delay of stopping the engine, which will have the effect to prevent numerous accidents in cases of emergency, besides facilitating generally the management of the vessel.

The toes which cause the valves to open and close the several inlets and outlets as described are made to act suddenly upon the valves at the proper intervals for this purpose, so that when the propelling-piston is arriving at the end of either of its strokes or is being reversed the proper channels for the ingress and egress of the water will be

promptly opened, and thus a steady continuous propelling effect by one piston be obtained and the power employed economically, as the piston throughout its double stroke continues to exert the same full and direct propelling effect. In addition to the advantage which is obtained by reversing the action of the propeller without changing or stopping the motion of the engine, the propelling effect may be increased or diminished at pleasure without altering the velocity of the piston by partially opening or closing to any desired extent the water-valves of the propeller.

The apparatus I have described may be modified in its construction and in the arrangement of its parts without overstepping the limits of my invention. Thus, for example, two or more of such propellers may be arranged at opposite sides of the vessel, or valves of different construction may be employed in place of the turning-valves I have described. The piston and its chamber may also be constructed in any approved manner and the guiding-wheels may be arranged to move in deep longitudinal grooves formed in the opposite sides of the piston-chamber, as shown in section at Fig. 4.

If needful, a flat hinged valve or other equivalent device may be placed at an angle of about thirty degrees in front of the openings D and E to deflect a portion of the water that would otherwise strike direct against the ends of the chambers. This valve may be operated by a rod or shaft passing into the vessel and receiving motion from the engine.

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

The arrangement of the water-passages, apertures, and valves, in combination with a reciprocating piston and its chamber, substantially in the manner and for the purposes herein set forth.

FR. P. DIMPFEL.

In presence of—

WILLIAM WHELAN,
WM. SERRELL.