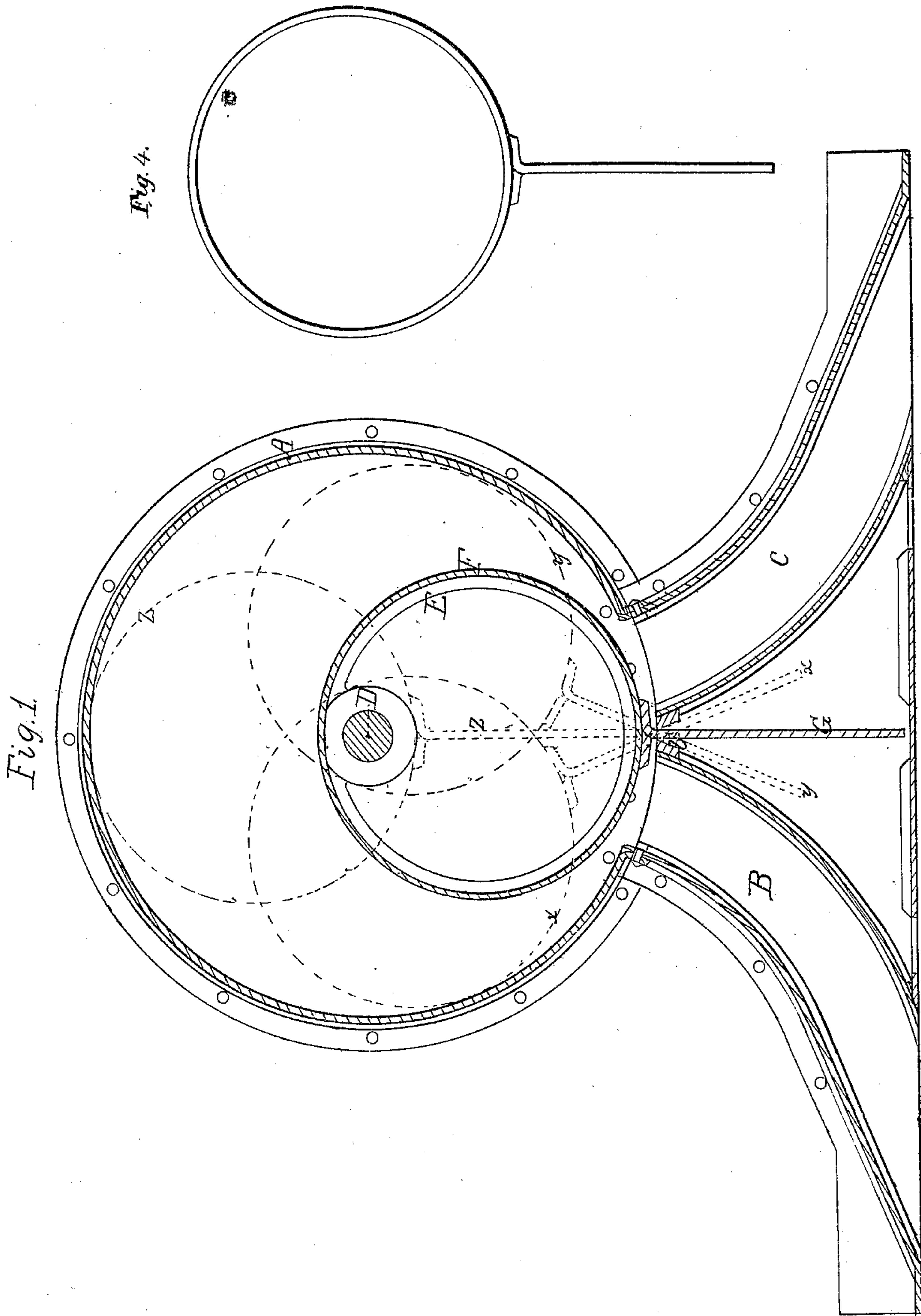


E. Campbell.
Paddle Wheel.

Sheet 1, 4 Sheets.

No 18,314.

Patented Sept. 29, 1857.

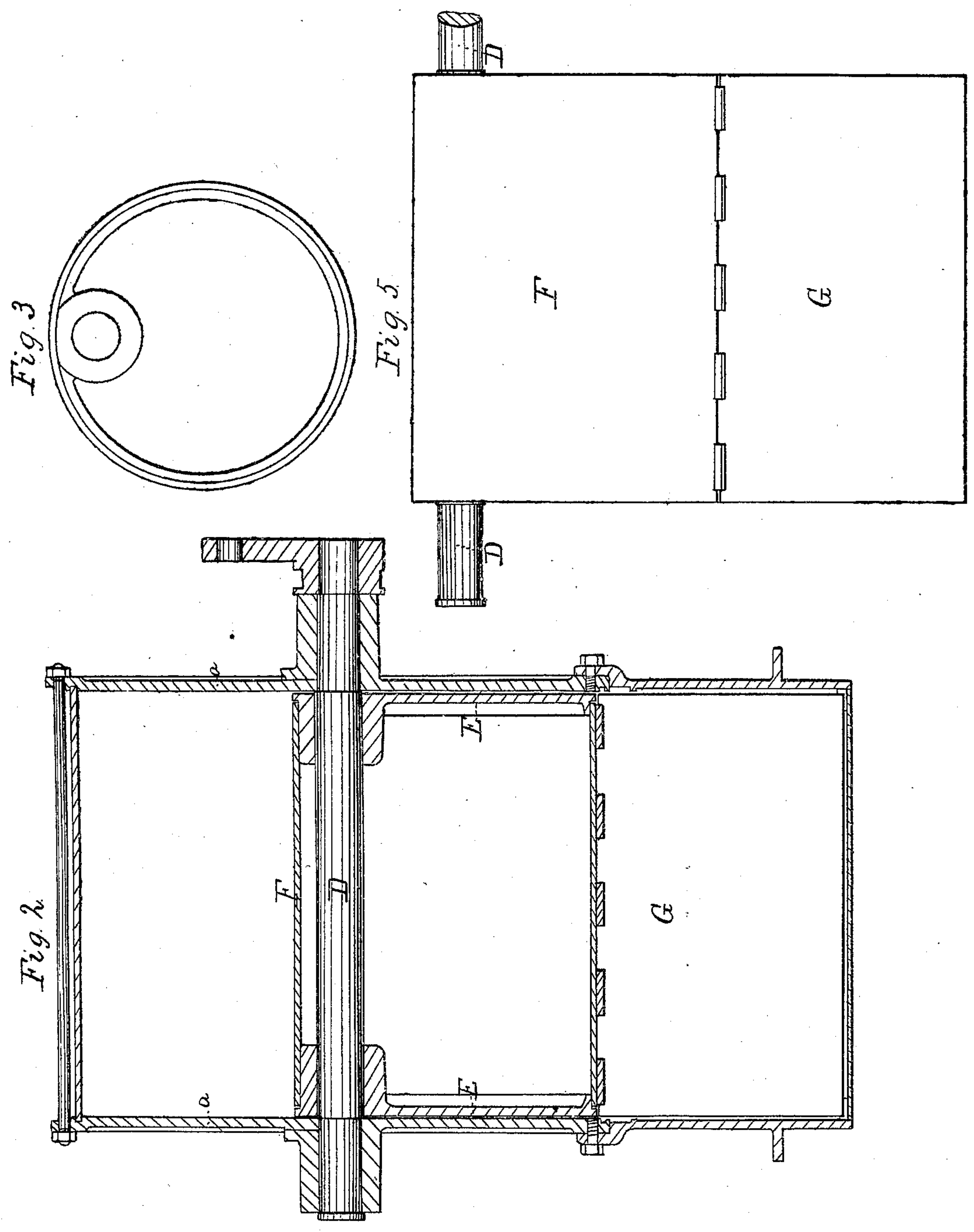


Sheet 4 of 5

E. Campbell.
Paddle Wheel.

No. 18,314.

Patented Sept. 29, 1857.

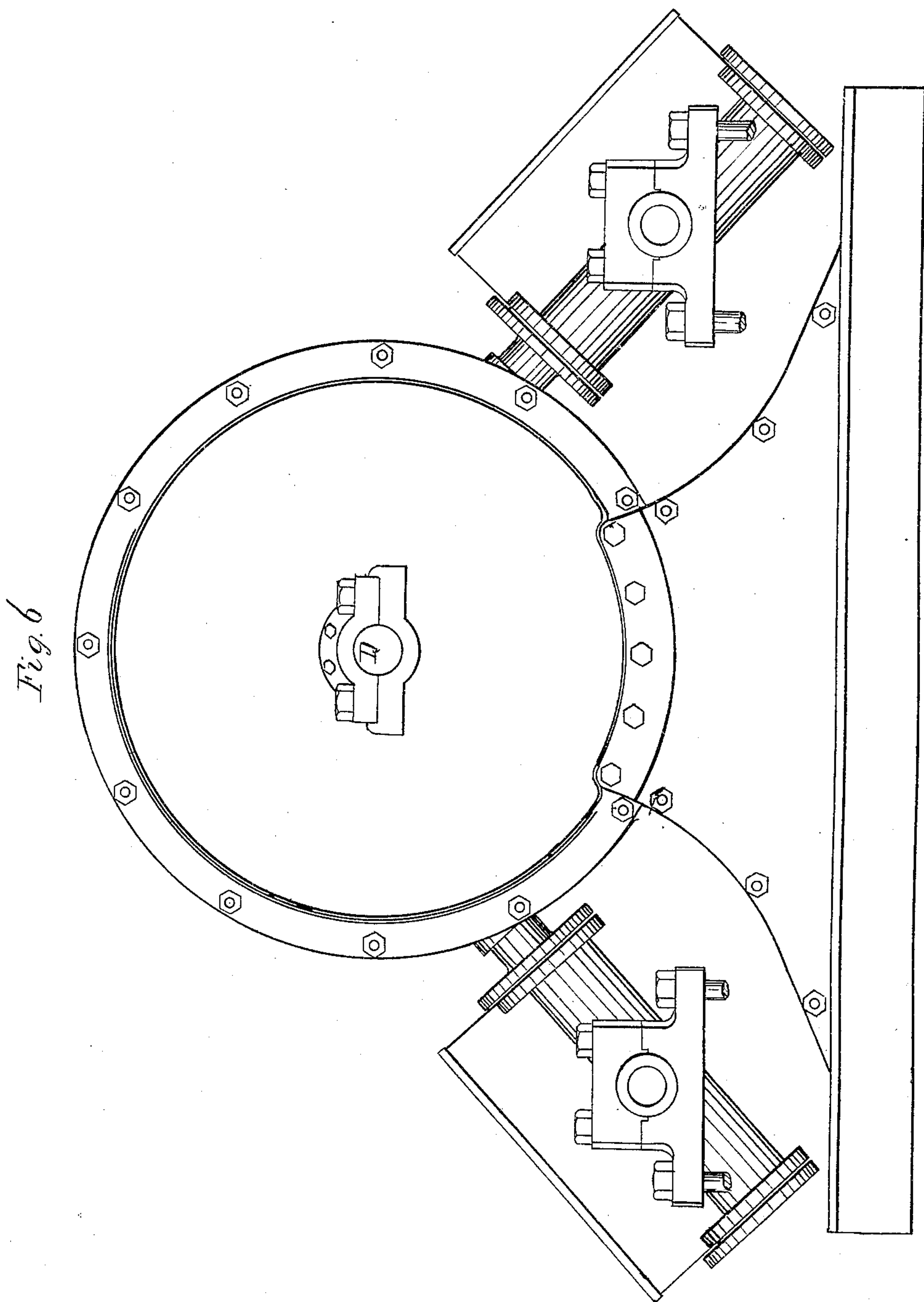


Sheet 3, 4 Sheets.

E. Campbell.
Paddle Wheel.

No 18,314.

Patented Sept. 29, 1857.

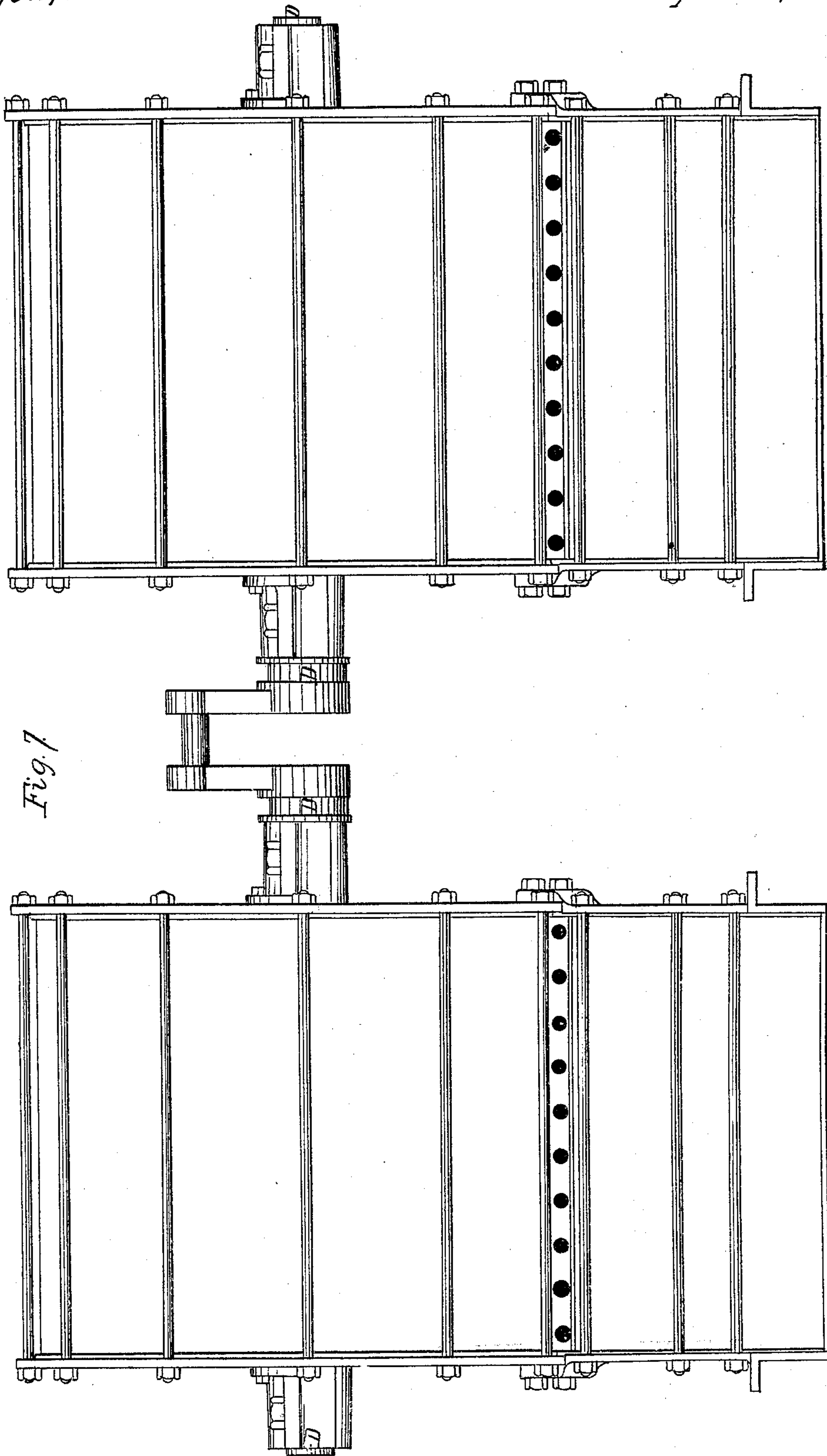


Sheet 4, 4 Sheets.

E. Campbell.
Paddle Wheel.

No 18,314.

Patented Sept. 29, 1857.



UNITED STATES PATENT OFFICE.

ETHAN CAMPBELL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO WM. P. PAGE
AND EDWARD F. HODGES.

IMPROVED MARINE PROPELLING APPARATUS.

Specification forming part of Letters Patent No. 18,314, dated September 29, 1857.

To all whom it may concern:

Be it known that I, ETHAN CAMPBELL, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Apparatus for Propelling Navigable Vessels; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, of which—

Figure 1 denotes a vertical and transverse section of the said apparatus; Fig. 2, a vertical and longitudinal section of it; Fig. 3, an inner elevation of one of the eccentric heads, which are affixed to the shaft, to be hereinafter described. Fig. 4 is an end view of the tubular wing-cylinder and its wing. Fig. 5 is a side elevation of the wing-cylinder and its wing as they appear when applied to the shaft and its eccentric heads. Fig. 6 is an end view of the propeller-case, and shows the positions of inclined steam-engines when applied for the purpose of operating the shaft. Fig. 7 denotes an elevation of two propeller-cases, their shafts, and connecting bell-crank, they when in use being arranged athwartships of a vessel and so as to open out of her hold and on opposite sides of the keelson thereof.

In such drawings, A represents a cylindrical case or vessel provided with two curved induction pipes or passages B and C, leading out of its lower part and arranged with respect to one another and the case, as shown in Fig. 1. Through the axis of the said cylindrical case a shaft D extends and turns freely in the ends of the case. The said shaft has two circular heads E E affixed upon it eccentrically, as shown in Figs. 1 and 2, each of said heads being placed, as shown in Fig. 2, in contact, or nearly so, with the adjacent head *a* of the case A. A tubular winged cylinder F turns freely on the two heads E E, it being arranged thereon as exhibited in Figs. 1 and 2. This cylinder has a wing or rectangular division-plate G extended downward from it and directly between the two passages B and C, such wing being constructed in its length to correspond to the distance between the heads *a a* of the case A. This wing G is firmly attached to the cylinder F, and when the apparatus is in operation plays freely through a space *b*, arranged between the con-

ducting passages B and C, as shown in Fig. 1, the sides of such space *b* being so formed as to be in contact with those of the wing G in whatever position such wing may be. When the shaft D is put in revolution, it will cause the two eccentric heads E E to revolve with it around and within the case A, such a movement of the heads operating in connection with the space *b*, and the wing G serving to create in the tubular cylinder F a peculiar movement within the said case, by which such cylinder F will be carried around against the entire inner surface of the case.

In constructing the apparatus the cylinder F should have such a diameter as will cause its outer surface while being moved with and by the eccentric heads to always touch or nearly touch the inner surface of the case in a line parallel to the axis of the latter. This is an important matter of construction, as on it the correct operation of the apparatus depends.

If we suppose the mechanism above described to be arranged in the hold of a ship or vessel, and so that the two passages B and C shall open through the bottom thereof in such manner that the water in which such vessel may float may enter the lower ends of them while they are arranged longitudinally in the vessel, and we put the shaft D in revolution by a steam-engine or other proper means, the action of the apparatus will be such as to cause water to be drawn through one of the passages B C and into the case A, and finally expelled therefrom through the other of said passages. The propulsion of the ejected fluid against the water surrounding the vessel will cause said vessel to be moved or propelled along through the said water.

In Fig. 1, *x y z* show three positions of the tubular wing-cylinder F and its wing G during one entire revolution of the shaft D, the said positions being indicated by dotted lines.

From the above it will be seen that by permanently attaching the wing G to its cylinder F, so that one shall be immovable relatively to the other, the said wing has vibratory as well as up-and-down movements imparted to it while the cylinder F is moved within its case. This arrangement or application of the parts, in connection with the peculiar man-

ner of working the case—viz., with an orifice *b*, formed so as not only to admit of the said vibratory movements of the wing, but so as to be in contact with its opposite sides—dispenses with the necessity of jointing or hinging the wing to its cylinder *F*, and thus avoids the danger of leakage at and breakage of such joint. In several other respects advantages come from the above application of the parts.

Now I do not claim an eccentric cylinder and a wing or valve arranged so as to rotate together in a cylindrical case, the wing during such rotation being made to slide in a recess formed in the eccentric cylinder, nor do I claim the principle of propelling a vessel by an apparatus for forcing jets of water against the water in which the vessel may be floating.

What I claim is—

My improved propelling apparatus, constructed and operating so that its wing-cylinder *F* and wing-plate *G* may not only simultaneously rise and fall in their case *A*, but at the same time have lateral motions in contrary directions, and the wing operate against a space *b*, so formed in and applied to the case as not only to be in contact, or nearly so, with the opposite sides of the wing, but allow the vibratory as well as the up-and-down movements of the wing, as specified.

In testimony whereof I have hereunto set my signature this 11th day of October, A. D. 1856.

ETHAN CAMPBELL.

Witnesses:

R. H. EDDY,

WM. P. PAGE.