No. 647,127.

Patented Apr. 10, 1900.

J. G. AIKIN.

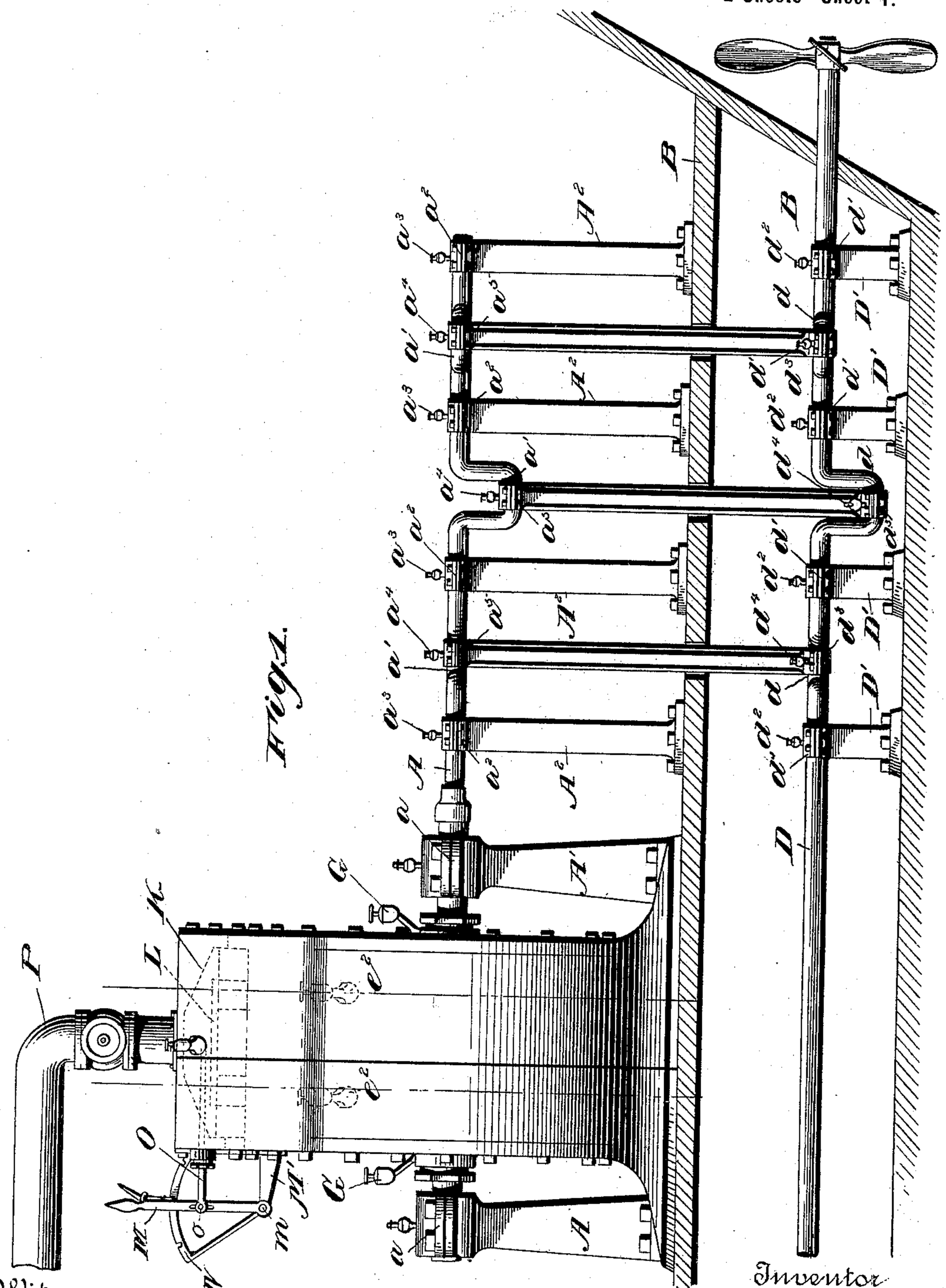
ROTARY TURBINE ENGINE.

(Application filed July 28, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses
L. C. Hills
G. W. Casey

Inventor
John G. Aikin,
By E. A. Bond
Attorney

No. 647,127.

Patented Apr. 10, 1900.

J. G. AIKIN.

ROTARY TURBINE ENGINE.

(Application filed July 28, 1899.)

(No Model.)

2 Sheets—Sheet 2.

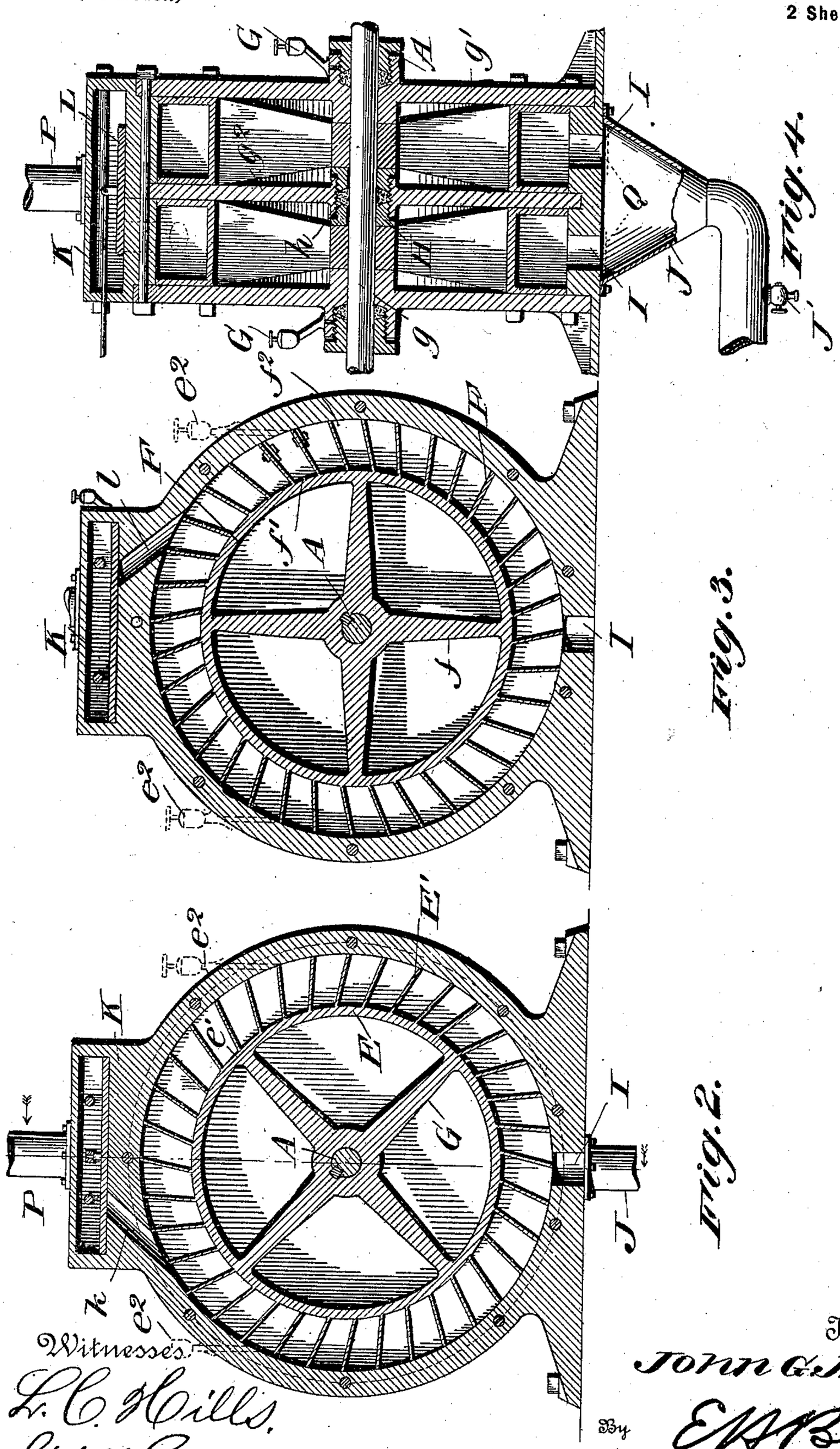


Fig. 4.

Fig. 3.

Fig. 2.

Witnesses:
L. C. Hills.
G. W. Cowl.

Inventor
John G. Aikin,
By E. H. Bond
Attorney

UNITED STATES PATENT OFFICE.

JOHN GASTON AIKIN, OF STOCKTON, ALABAMA.

ROTARY TURBINE ENGINE.

SPECIFICATION forming part of Letters Patent No. 647,127, dated April 10, 1900.

Application filed July 28, 1899. Serial No. 725,414. (No model.)

To all whom it may concern:

Be it known that I, JOHN GASTON AIKIN, a citizen of the United States, residing at Stockton, in the county of Baldwin and State of Alabama, have invented certain new and useful Improvements in Rotary Turbine Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain new and useful improvements in rotary engines; and it has for its object primarily to provide a simple and cheap yet durable, reliable, and efficient reversible double rotary turbine engine for all the uses to which such a device may be put; but the form herein shown is designed more especially for use upon ocean-steamers and is so constructed that the vessel can be quickly reversed and propelled in the opposite direction to which it was going without the necessity of turning around, which, as is well known, consumes considerable time. I provide upon the one shaft two turbines, the one constructed for imparting forward movement to the vessel and the other for giving movement in the opposite direction. They are so arranged that when the one is in operation the other is inactive and runs in a vacuum, so as to offer the least possible resistance. Suitable means are provided for the admission and control of the steam to the turbines. Means are provided for lubricating the wings or blades of the turbines and for oiling the various parts when required. The valves that control the admission of the steam to the cylinders can be controlled in any suitable manner by one lever or two separate levers, one for each valve, as may be found most expedient. The engineer or the pilot may readily and quickly reverse the motion of the vessel or stop her, so that when there is danger of a collision or for any other reason it is desirable to stop or go backward upon short notice it can be done without the necessity of ringing the bell, as is now done, and the speed generated astern will stop the headway faster and prevent disaster.

The invention, although herein shown as applied to a vessel, may be employed in sawmills and other places where a back-and-forward motion is required.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be specifically defined by the appended claims.

The invention in one of its applications is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a vertical longitudinal section through a portion of a vessel with my improvements applied, the latter being shown in elevation. Fig. 2 is a vertical cross-section on the line 2 2 of Fig. 1. Fig. 3 is a vertical cross-section on the line 3 3 of Fig. 1. Fig. 4 is a vertical section taken at right angles to Figs. 2 and 3.

Like letters of reference indicate like parts throughout the several views.

Referring now to the details of the drawings by letter, A designates the main shaft, in this instance shown as mounted in suitable bearings a at the upper ends of the standards A′, suitably secured in position, as upon a support or platform B within the hull B′ of a vessel. The bearings should be provided with suitable means for lubrication, as the oil-cups seen in Fig. 1. This shaft is extended, as indicated in Fig. 1, and is shown as provided with a plurality of cranks a' and as supported on the posts A^2, having at their upper ends suitable boxes or bearings a^2 for the said shaft, and these bearings are provided with oil-cups a^3, so that they may be well lubricated.

C are pitmen connected to the cranks a' of the shaft A by any suitable means and provided with oil-cups a^4 for the boxes or bearings a^5 thereof, as shown clearly in Fig. 1. The other ends of these pitmen are connected to the cranks d of a propeller-shaft D, which is mounted in suitable bearings d' on the posts or standards D′, secured in any suitable manner within the hull of the vessel, the bearings d' being provided with oil-cups d^2, and the bearings d^3 at the points of connection of the pitmen with the cranks d are also furnished with oil-cups, as seen at d^4, all as

clearly shown in Fig. 1, the pitmen working through suitable openings in the support B, as shown.

Fast upon the shaft A are the two turbine wheels E and F, the former designed for imparting a forward motion to the vessel and the other is what I term the "backing turbine." Each turbine consists of a spider *e* or *f*, keyed to the shaft, as seen in Figs. 2 and 3, and the annular rim *e'* or *f'*, from which project the flanges, blades, or wings E' or F', which extend therefrom at substantially the angle shown, and each blade or wing may or may not be provided with an adjustable wear-plate, as seen at f^2 in Fig. 3, which may be adjusted outward to compensate for wear; but this may not be necessary. The blades or wings are of such length as to move in contact with the inner wall of the inclosing chamber, as seen in Figs. 2 and 3, and the blades or wings are oppositely disposed on the two turbines, as will be clearly understood from Figs. 2 and 3, so that the one will revolve the shaft in one direction and the other in the opposite direction.

In Figs. 1, 2, and 3 I have shown oil-cups e^2, whereby the edges of the blades or wings may be readily lubricated as occasion may require.

The turbines are mounted to revolve within separate chambers or compartments of the cylinder, which comprises the heads *g g'* and the central head or partition g^2. This latter is suitably held within the cylinder, and the heads are secured together in the usual manner by bolts, as seen in Figs. 1, 2, 3, and 4. Each compartment is distinct and independent of the other, so that when the one turbine is in operation the other will revolve in a vacuum. The partition or central head of the cylinder is provided with a central opening, which is interiorly threaded, as seen in Fig. 4, to receive the opposite parts of a stuffing-box H, which parts are screw-threaded therein and receive between them a suitable packing, as seen at *h* in Fig. 4.

Suitable means, as the oil-cups shown at G, are provided for oiling the bearings, as seen in Fig. 4.

Each of the chambers of the cylinder is provided at the lower end with an exhaust-passage I, communicating with the exhaust-pipe J, adapted to be connected with a condenser and back to the boiler through an injector and provided with a valve or cock J', as shown in Fig. 4.

K is the steam-chest, mounted upon the top of the cylinder, as shown, and *k* is a steam-passage from the said steam-chest into the compartment or chamber in which the turbine E works to direct steam against the blades or wings thereof, and *l* is another steam-passage leading from the steam-chest into the other compartment, inclining in the opposite direction to the passage *k* and arranged to conduct the steam against the blades of the other turbine when it is desired to rotate the shaft in the opposite direction. The admission of steam to the different chambers is controlled by a slide-valve L within the steam-chest, as seen best in Fig. 4, the said valve being controlled by a hand-lever M, pivotally mounted, as at *m*, on a lateral support M' and provided with a spring-pawl designed to engage in the notches of the segment N, suitably supported from the outer wall of the cylinder, as shown in Fig. 1, and to this lever is pivotally and adjustably connected, as at *o*, the rod O, which is attached to the slide-valve, the valve being so disposed with relation to the ports or steam-passages that when the one is opened the other is closed, and vice versa.

P is the steam-pipe from the boiler.

The boiler and its connections, injector, blow-off, and other accessories may be of the usual and well-known construction; but as they form no part of the present invention the same have not been illustrated.

In some cases it may be found expedient to employ two valves and two levers, one for each valve; but the operation and function will be substantially the same as that herein illustrated.

Suitable means may be provided for regulating the speed, and in some instances I may employ a flap-valve at the exhaust-opening of each of the chambers of the cylinder, as indicated by dotted lines at Q in Fig. 4, so that the exhaust from the one chamber will serve to close the valve of the exhaust of the other chamber, and thus aid in maintaining a vacuum in the chamber containing the non-active turbine.

The capacity of the pockets or chambers of the turbines may be varied according to the conditions under which the engine is to be used.

The operation will be apparent. When it is desired to go ahead, steam is admitted into the chamber of the proper turbine, so that it will act upon the walls of the pockets thereof, the steam at the same time being shut off from the chamber of the other turbine, so that the latter will revolve *in vacuo*, and thus offer practically no resistance to the revolution of the shaft by the active turbine. The exhaust takes place through the exhaust-port at the bottom of the chamber, and the flap-valve at the bottom of the exhaust of the inactive turbine-chamber is closed when such valve is employed; but it is preferable not to provide such valve, so that the exhaust from the active chamber will serve to exhaust the air from the inactive chamber, and thus insure the least possible amount of resistance therein. When it is desired to reverse the motion of the vessel, the lever M is manipulated, so as to shut off the steam from the chamber of the go-ahead turbine and admit it into the other chamber, where it immediately acts upon the walls of the pockets of the hitherto-inactive turbine and sets the same in operation, so that the shaft is re-

volved in the opposite direction and the vessel sent sternward, and the reverse motion will aid in the checking of the forward movement of the vessel, as will be readily understood.

Modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as new is—

1. The combination with the cylinder having integral steam-chest and two independent chambers with oppositely-inclined passages from the steam-chest to said chambers, of a slide-valve in the steam-chest with means for actuating the same to admit steam to one chamber and shut it off from the other, through said inclined passages, a shaft, a turbine thereon in each chamber constructed to impart motion to the shaft in reverse directions, an independent exhaust from each chamber and a flap-valve for each exhaust, and an exhaust-pipe common to both exhausts and provided with a cock, substantially as and for the purpose specified.

2. In a rotary engine of the character described, a cylinder composed of the heads, the central partition, the cylindrical casing, with integral steam-chest, securing-bolts, the said partition being provided with central screw-threaded opening, stuffing-boxes adjustably threaded into said opening from opposite sides, and packing in said opening between the adjacent ends of the stuffing-boxes, all substantially as shown and described.

3. In a rotary engine of the character described, the combination with a cylindrical casing, with central partition, and integral steam-chest, of heads with inwardly-extending bosses, the said partition being formed with central screw-threaded opening, of stuffing-boxes adjustably seated in said opening and extending in opposite directions beyond the partition, a shaft mounted in said bosses and passed through the stuffing-boxes, a packing between the stuffing-boxes, and turbines mounted on said shaft and having hubs disposed between said bosses and stuffing-boxes, all substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN GASTON AIKIN.

Witnesses:
ALMA AIKIN,
LULA AIKIN.