

C. M. TESSIÉ du MOTAY & L. F. BECKWITH.
Reaction and Direct Action Engine.
No. 225,245. Patented Mar. 9, 1880.

Fig. 1.

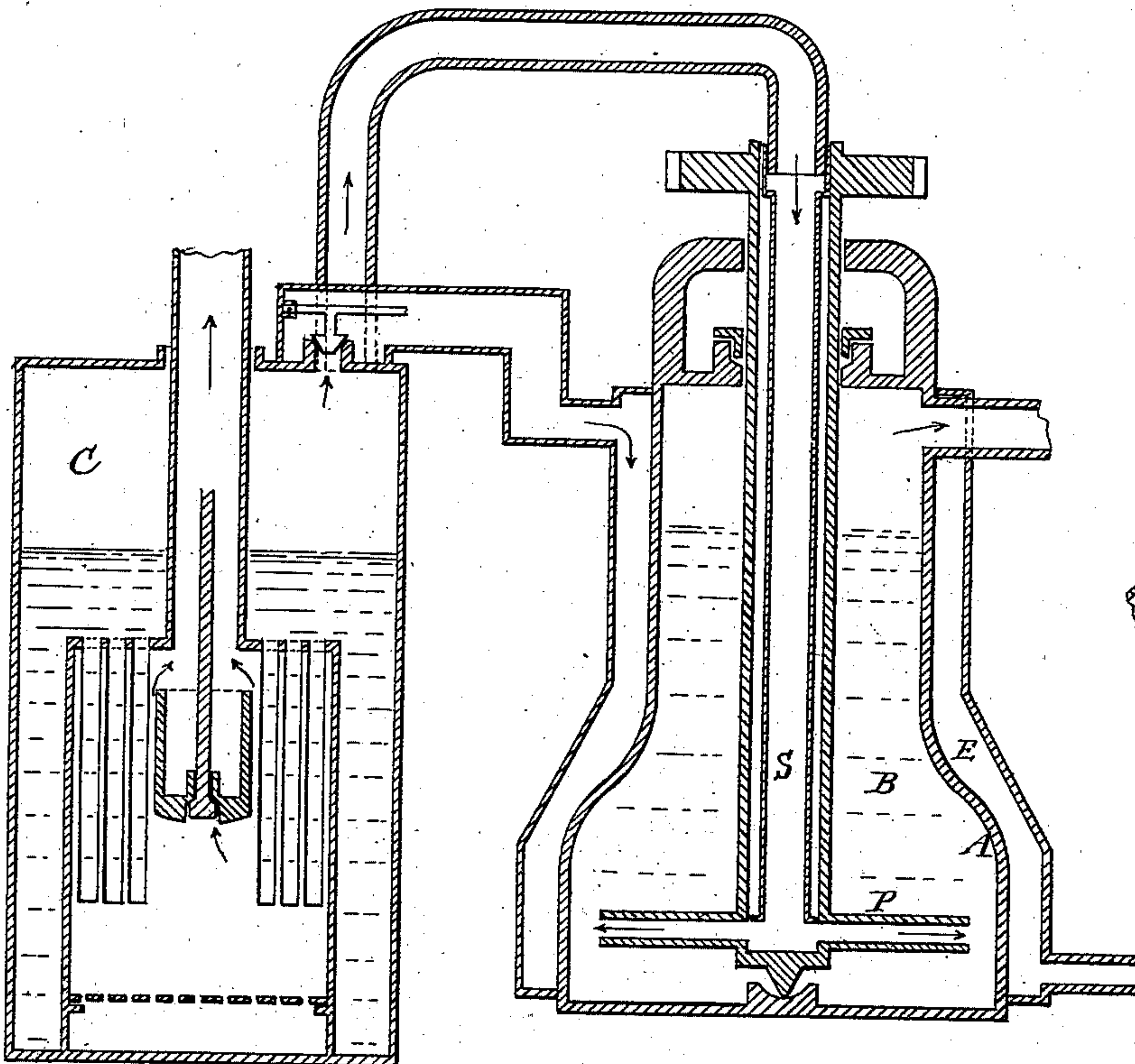


Fig. 2.

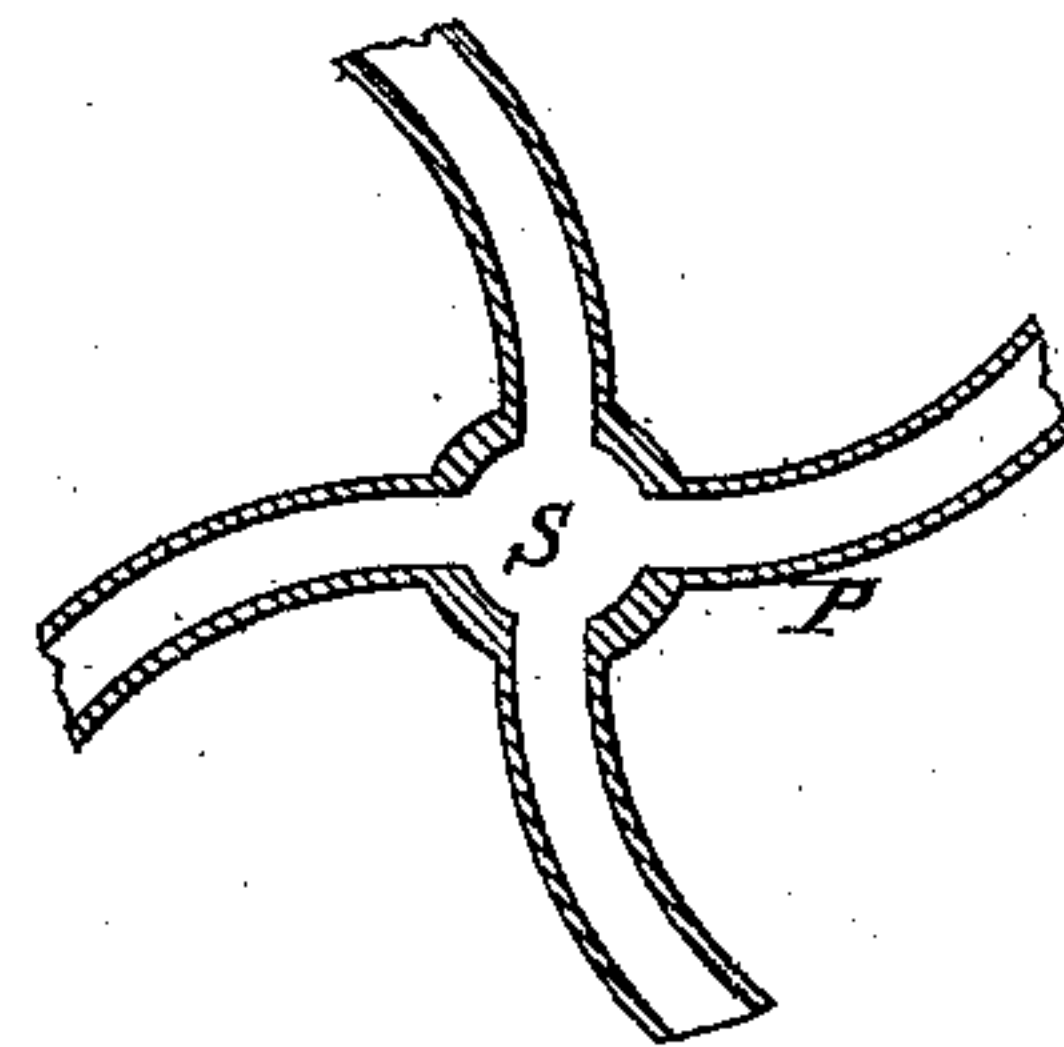


Fig. 3.

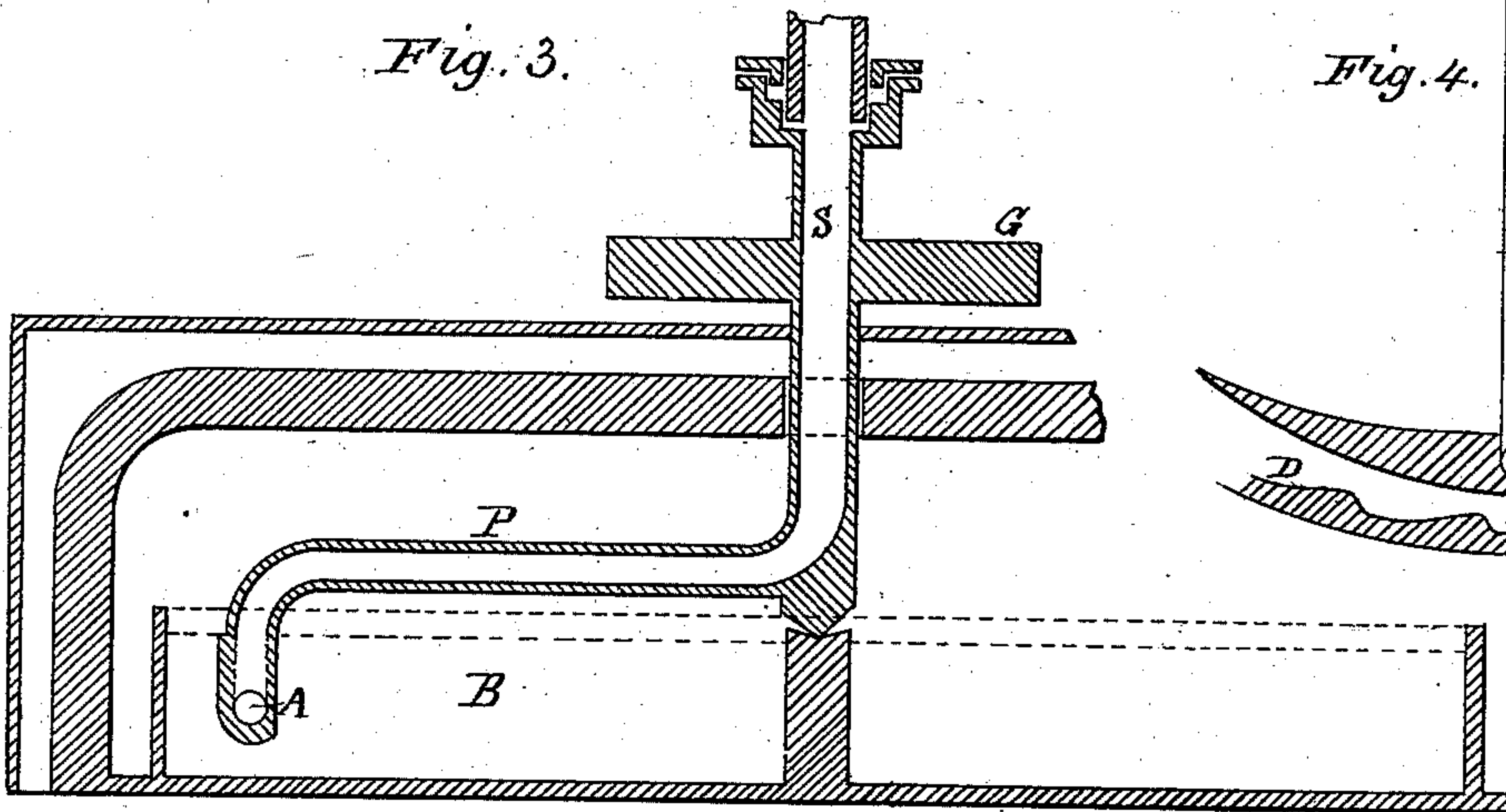
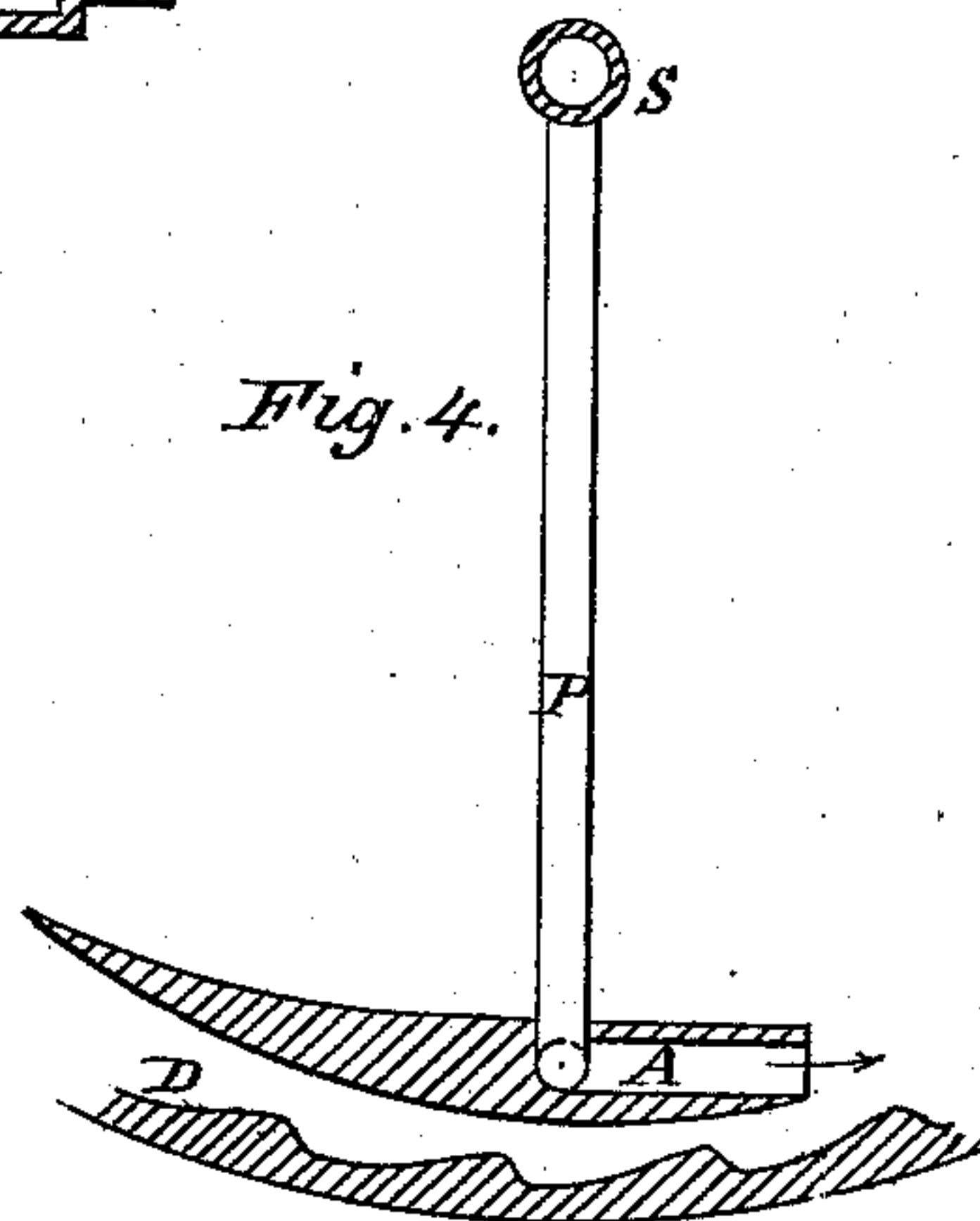


Fig. 4.



Witnesses:

E. E. Masson

E. J. Dick

Inventors.

Cyprien M. Tessié du Motay
& Leonard F. Beckwith by

A. Pollok
Attorney.

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Fig. 5.

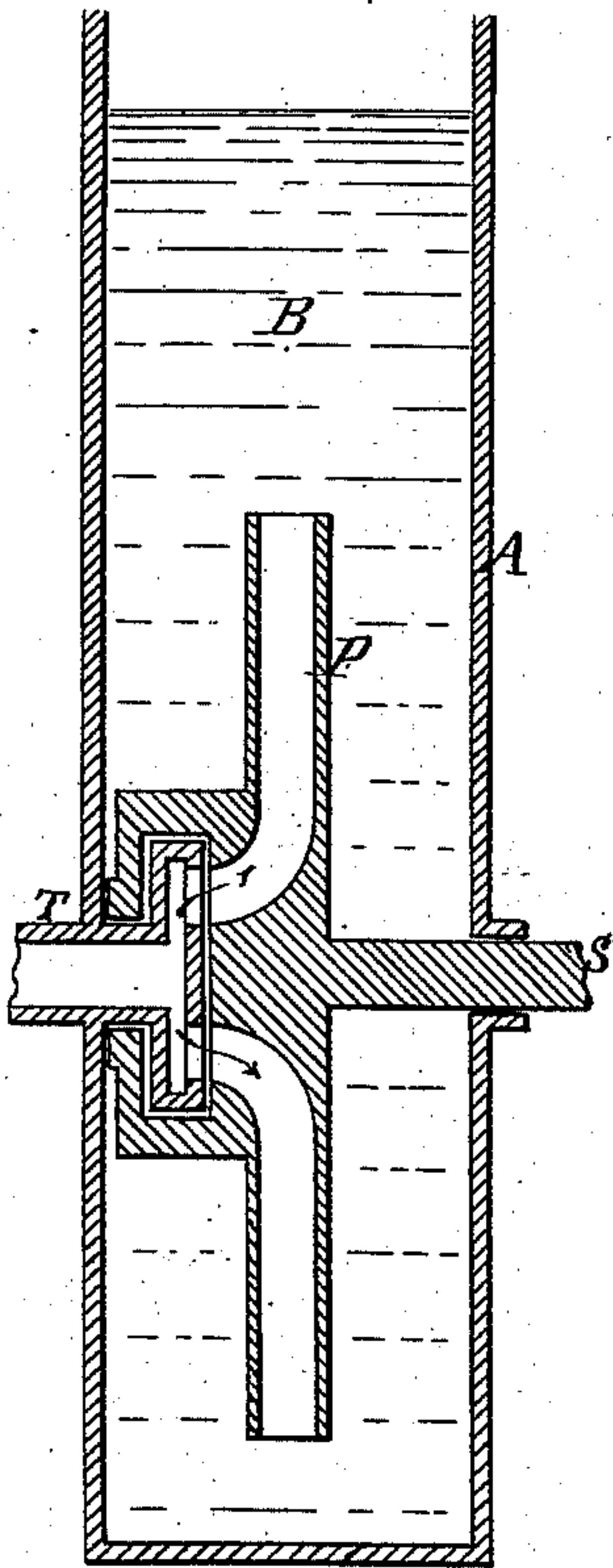


Fig. 6.

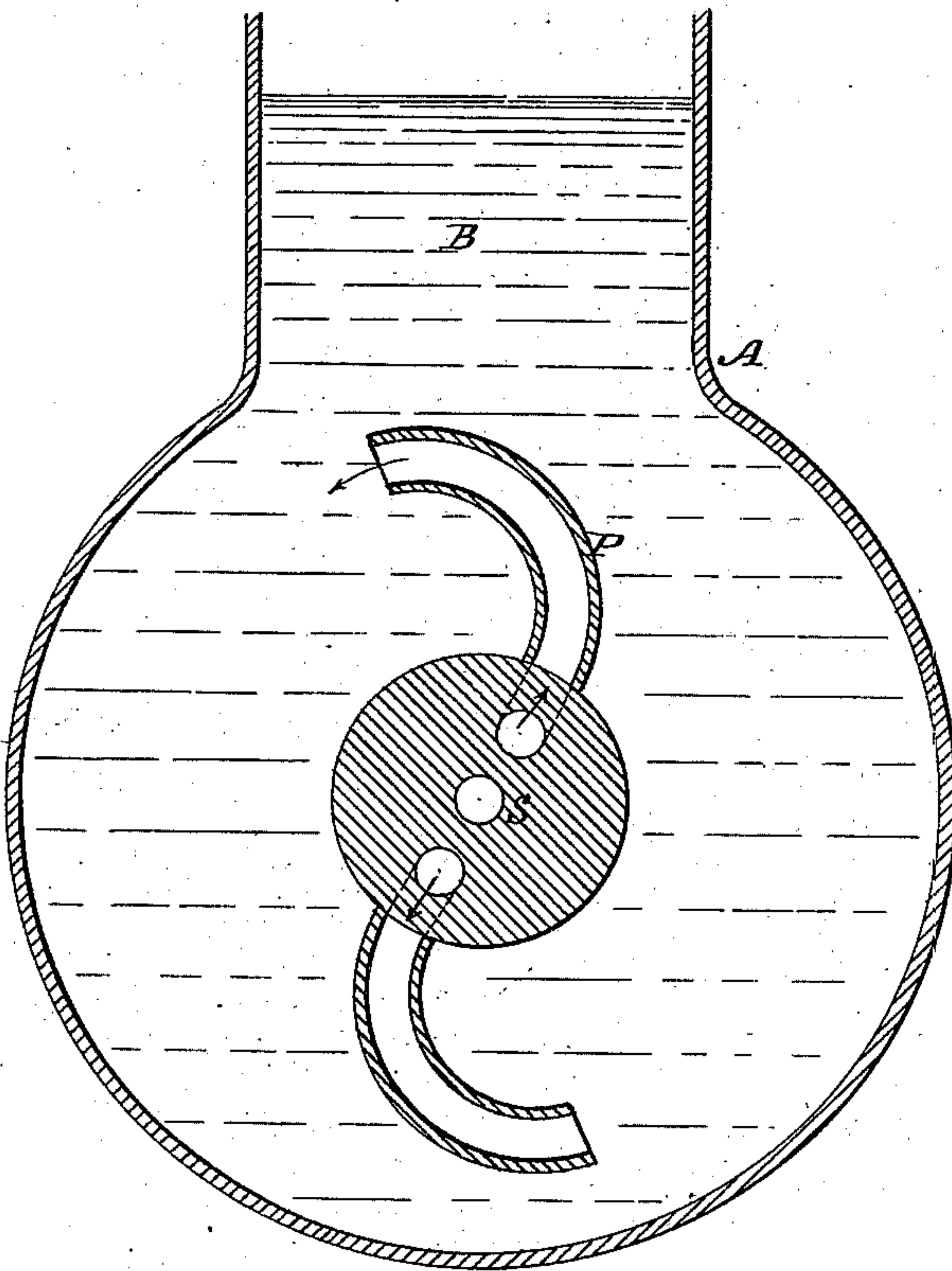


Fig. 7.

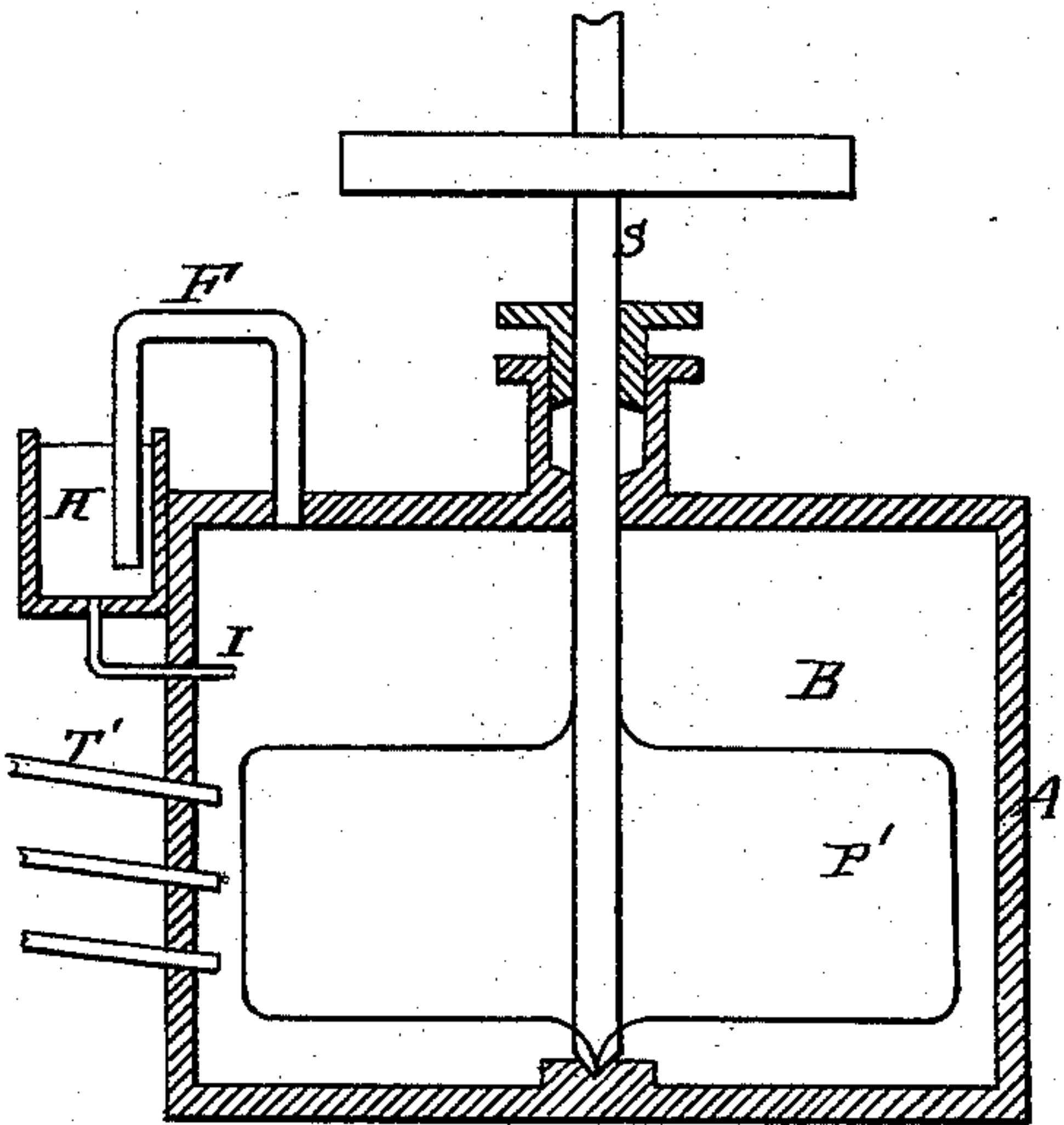
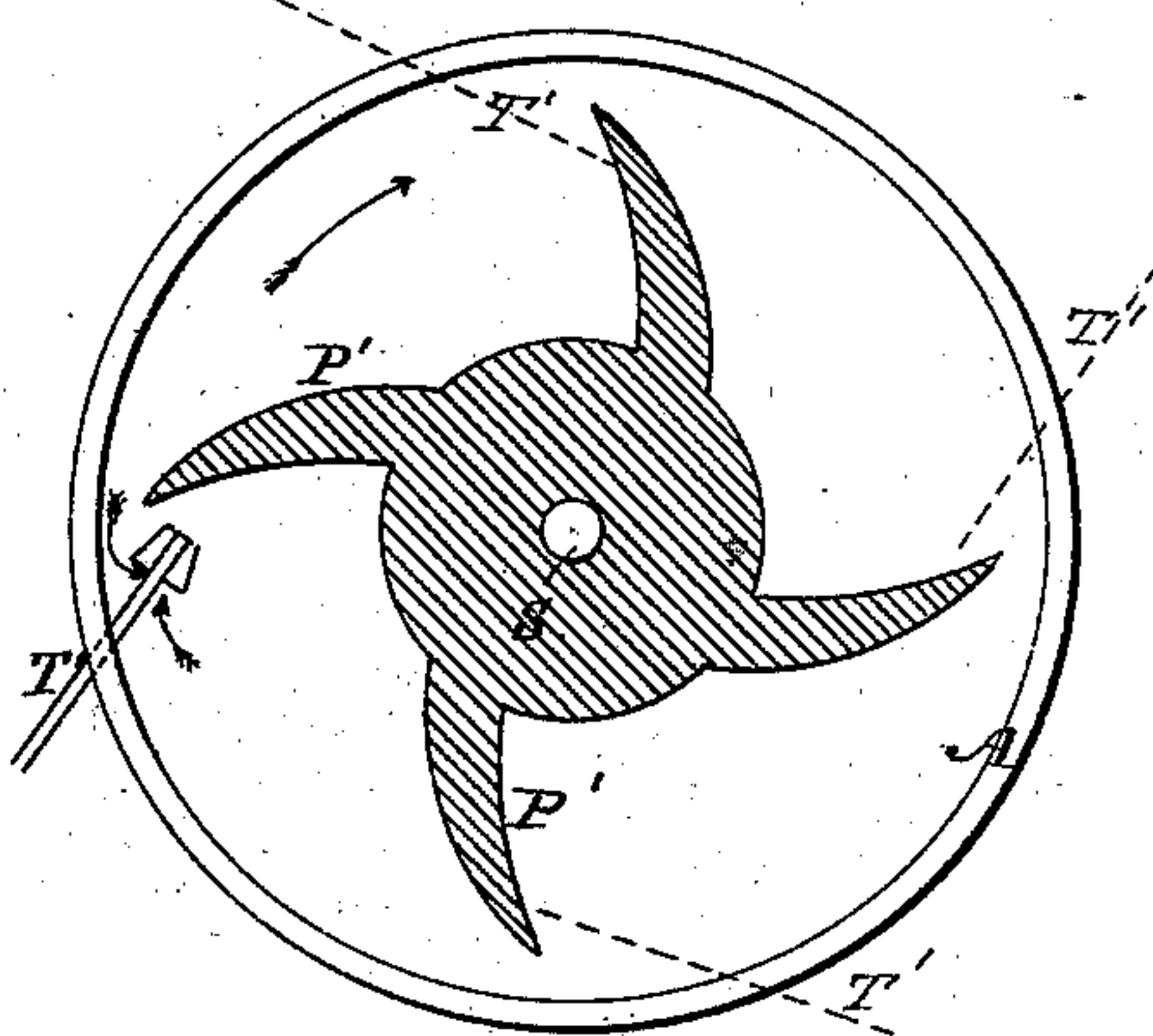


Fig. 8.



Witnesses:
E. E. Masson.

E. A. Dick

Inventors
Cyprien M. Tessié du Motay
& Leonard F. Beckwith
by A. Pollok
attorney

UNITED STATES PATENT OFFICE.

CYPRIEN M. TESSIÉ DU MOTAY, OF PARIS, FRANCE, AND LEONARD F. BECKWITH, OF NEW YORK, N. Y.

REACTION AND DIRECT-ACTION ENGINE.

SPECIFICATION forming part of Letters Patent No. 225,245, dated March 9, 1880.

Application filed May 14, 1879.

To all whom it may concern:

Be it known that we, CYPRIEN M. TESSIÉ DU MOTAY, of Paris, France, temporarily residing in New York city, and LEONARD FORBES BECKWITH, of New York city, have invented a new and useful Double-Medium Reaction and Direct-Action Engine or Motor, which invention is fully set forth in the following specification.

10 This invention relates to that class of machines or engines in which steam, compressed air, or other expansive gas under pressure is used as the agent for producing the motive power without the aid of a piston and cylinder, being made to operate by the reaction or
15 direct impulsion of the steam or other gas.

If the steam or gas is allowed to act or react in the free air or on a gaseous medium, great speed must be obtained, and large quantities
20 of the agent consumed to generate a motive power relatively feeble.

In this invention the mechanical work is increased by the application of the principle of a double medium, the one being gaseous and
25 the other liquid, the latter serving as a point of resistance to or receiving the direct impact of the motive gaseous medium, and being effective in proportion as it is dense and less fluid. This principle is specially applicable to
30 reaction motors.

Heretofore screw-propellers have been devised to operate by reaction of steam and the immersion of the wheel or a part thereof in a receptacle containing a liquid medium.

35 This invention consists, first, in the immersion of a reaction-wheel in a bath contained in a closed vessel, having at the bottom an enlarged space or chamber in which the wheel revolves, and contracted above, so that the
40 bath may be maintained at the proper temperature, and by increasing the height of the bath above the wheel the pressure and resistance to the impact of the steam can be readily increased.

45 The invention consists, secondly, in providing the sides of the vessel containing the bath and reaction-wheel with directing attachments, so as to prevent the liquid from being kept away from the orifices by the pressure of the
50 steam or gaseous medium.

The invention also consists in certain improvements and combination of parts applicable as well to direct-acting as to reaction motors—to wit, in providing the receptacle containing the liquid bath with a steam-jacket, 55 whereby the required temperature of the bath is maintained; or, if a medium solid at ordinary temperatures is employed, it may be liquefied and kept in a liquid condition; and also in making the nozzles which discharge the gaseous medium below the surface of the liquid medium in the form of ejectors, with a short conical tube, open at both ends, and surrounding the tube for delivering the gaseous medium. 60

In a direct-acting motor the steam escapes 65 from a nozzle and forces the liquid against the blades or paddles of the submerged wheel. This is not, however, broadly new, as such motors have been heretofore devised.

The liquid medium employed in this invention is or may be oil, water, fatty or resinous matters in a liquid or melted state, or mercury, or a metallic alloy fusible at a low temperature. 70

The following description will enable those skilled in the art to which it appertains to make and use our said invention, reference being had to the accompanying drawings, in which— 75

Figures 1, 2, 3, 4, 5, 6 represent views, in section, of different varieties of reaction rotary 80 engines; and Figs. 7 and 8 views, in vertical and horizontal section, of a direct-acting engine.

The same letters refer to like parts on all the figures where they occur. 85

A is the receptacle for containing the liquid bath B, in which the motor-wheel, supported by a shaft, S, is wholly or partly immersed. Power is transmitted from the shaft S by a gear-wheel, G. Referring to Figs. 1 to 4, the shaft S is hollow, and conducts steam from a boiler, C, Fig. 1, to hollow radial arms P, with an aperture in each at the end, through which the steam is projected against the liquid, and the resistance produces a reaction, which drives 95 the arms in a direction opposite to that in which the steam escapes and causes the shaft to revolve.

The tendency of the liquid to be kept away from the orifices by the pressure of the steam 100

is or may be corrected by placing directing attachments around the rotating arms or upon the sides of the receptacle, as at Fig. 4; so that when the liquid of which the bath is composed impinges against the sides it is then directed back again into the path of the arms to receive the full force of the jet. The steam rises through the bath and escapes by a suitable opening or pipe.

10 If the bath used is a fusible alloy, a double envelope or jacket, E, Figs. 1 and 3, is employed. It is shown in Fig. 1 in communication with the boiler C through a loaded valve.

In Fig. 1 the shaft S is arranged vertically, 15 and the reaction-wheel with the arms P is submerged in the bath. The form of these arms is shown in horizontal section in Fig. 2.

In Fig. 3 the shaft is also vertical; but the outer ends only of the horizontal arms, of 20 which one only is shown, are submerged, the shape of this submerged portion, and also of the directing attachments D at the sides of the receptacle, being shown by Fig. 4, which is a sectional view.

25 In Figs. 5 and 6, which represent views in vertical section in planes at right angles to each other, the shaft is horizontal and the submerged reaction-wheel turns in a vertical plane. In the apparatus shown in these figures the 30 steam, instead of being admitted through the hollow shaft, is introduced by a stationary pipe, T, Fig. 5. Fig. 6 is a view in sectional elevation in a plane at right angles to that of Fig. 5.

35 Referring to Figs. 7 and 8, the steam is introduced through stationary nozzles or ejectors T', and the arms or paddles P' of the motor-wheel are or may be solid. The arrangement of the ejectors with relation to the paddles is shown in Fig. 8, which is a horizontal 40 section, Fig. 7 being a vertical section. The steam, as it passes through the inner tube, draws in the liquid through the concentric tube, as in a Giffard ejector, and the jet is 45 forced strongly against the paddles P'. As the steam escapes from the bath it is carried off by the pipe F, which dips into the trough or box H, so that any of the liquid in the receptacle A which may be carried off by the 50 steam will be condensed and returned through the pipe I. This trough and pipe might also be used in connection with the apparatus shown in Figs. 1 to 6, and the jacket E might be employed in all the varieties of apparatus 55 shown.

It is obvious that the ejectors or nozzles T', and also the trap or apparatus F H I, for condensing and returning the liquid medium to its receptacle, (shown in Figs. 7 and 8,) could 60 be employed in connection with the engines or motors shown in the other figures. The

ejectors would then be applied to the end of the arms of the reaction-wheels represented in those figures.

Instead of deriving the motive gas or vapor 65 from a steam-boiler, it may be taken from any convenient source, as from a reservoir of compressed air or heated gas under pressure.

It is evident that many modifications other than those we have already indicated might be 70 made in the form of the wheels, so as to diminish the resistance to their revolution—as, for example, by an approximation to the form of a turbine-wheel.

It is evident, also, that many changes might 75 be made in the details and arrangements of parts.

Having thus fully described our said invention and the manner in which the same is or may be carried into effect, what we claim, and 80 desire to secure by Letters Patent, is—

1. The combination, with a submerged reaction-wheel, of the receptacle containing the liquid bath, having at the bottom an enlarged space or chamber, in which the said reaction- 85 wheel is placed and contracted above, the bath filling the enlarged space and extending to a suitable height in the contracted portion above, substantially as described.

2. The combination of a receptacle contain- 90 ing a liquid and having directing attachments on the sides thereof with a reaction-wheel and means for supplying steam or other gaseous medium thereto, the said wheel being immersed in the aforesaid bath at those points 95 from which the steam or gaseous medium escapes, substantially as set forth.

3. The combination, with a suitable receptacle, provided with a steam-jacket, and a liquid bath contained in said receptacle, of a 100 motor-wheel wholly or partly immersed in said bath, and means for applying steam or other gaseous medium beneath the surface of the bath to operate said wheel, substantially 105 as described.

4. In a double-medium engine, the combination of a motor-wheel wholly or partly submerged in a liquid bath, with a nozzle for discharging the gaseous medium below the surface of said bath in the form of an ejector, 110 with a short conical tube, open at both ends, surrounding the tube for delivering the gaseous medium, substantially as described.

In testimony whereof we have signed this specification in the presence of two subscrib- 115 ing witnesses.

C. M. TESSIÉ DU MOTAY.
LEONARD F. BECKWITH.

Witnesses:

E. GILLET,
W. H. BENTON.