

(No Model.)

A. CIURCU.

APPARATUS AND MEANS FOR PROPELLING BY REACTION.

No. 407,394.

Patented July 23, 1889.

Fig. 2.

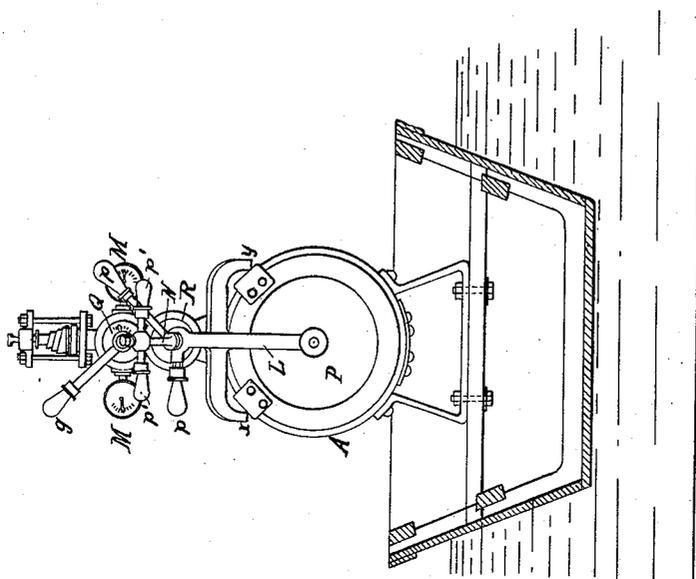
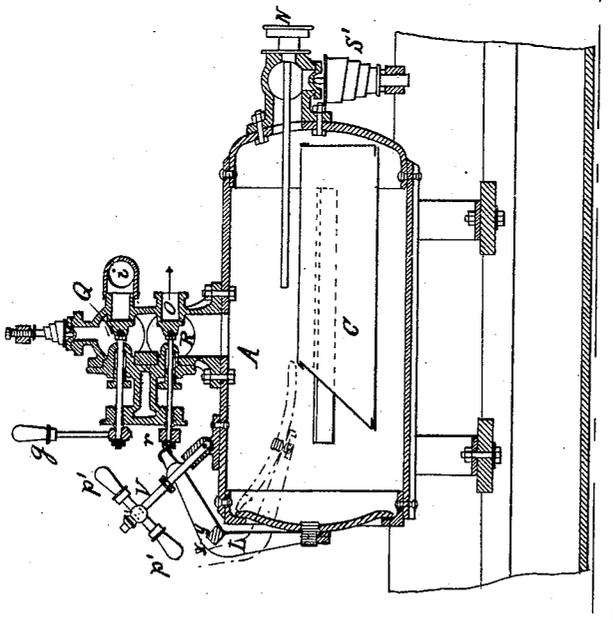


Fig. 1.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ALEXANDRE CIURCU, OF PARIS, FRANCE.

APPARATUS AND MEANS FOR PROPELLING BY REACTION.

SPECIFICATION forming part of Letters Patent No. 407,394, dated July 23, 1889.

Application filed October 29, 1888. Serial No. 289,468. (No model.) Patented in France October 12, 1888, No. 179,001; in Germany October 19, 1886, No. 39,964; in England June 7, 1887, No. 8,182; in Belgium June 8, 1887, No. 77,754; in Italy June 17, 1887, No. 21,863, and in Austria-Hungary August 21, 1887, No. 41,129.

To all whom it may concern:

Be it known that I, ALEXANDRE CIURCU, publicist, of Paris, (Seine,) in the Republic of France, have invented an Improvement in
5 Apparatus and Means for Propelling by Reaction, (for which I have obtained Letters Patent in France, dated October 12, 1886, No. 179,001; British patent, No. 8,182, June 7, 1887; Belgium, No. 77,754, June 8, 1887; Italy, No.
10 21,863, June 17, 1887; Germany, No. 39,964, October 19, 1886; Austria, No. 41,129, August 21, 1887,) of which the following is a specification.

This invention relates to an improved apparatus for propelling vehicles, boats, balloons, aerial machines, and like purposes by the reaction of gas under pressure escaping from a contracted orifice. The gas may be advantageously generated by the combustion
20 of a compound consisting of, say, about seventy-eight per cent. of nitrate of ammonia intimately mixed with about twenty-two per cent. of petroleum. To this mixture is added about seven per cent. of wood-charcoal previously broken into small fragments and soaked in a concentrated solution of nitrate of ammonia. A compound of this description
25 contains within itself all the elements necessary for its combustion, and can consequently be burned in a closed air-tight vessel in order to generate the required volume of gas. This compound is burned in a closed vessel, and when the combustion of the compound has generated enough gas to produce
30 the required pressure the gas is allowed to escape through suitable valves operated by hand or otherwise. The nozzles or outlet-orifices may be so arranged as to enable the boat or the like to be propelled in any desired
40 direction by opening and closing different valves, and the closed vessel or generator is provided with suitable safety-valves, manometers, pyrometers, and other requisites. When one charge of the compound is consumed, a fresh supply is introduced and two
45 or more vessels may be employed in order to obtain a continuous or interrupted supply of gas.

A method of realizing this invention is
50 hereinafter described in detail with reference

to the drawings; but this apparatus can of course be varied in form, proportions, and respective positions of the parts according to circumstances; and in order that my said invention may be fully understood I shall now
55 proceed more particularly to describe the same, and for that purpose shall refer to the several figures on the annexed sheet of drawings, the same letters of reference indicating corresponding parts in both the figures.

Figures 1 and 2 of the accompanying drawings represent, respectively, a longitudinal section and an end elevation of a propeller apparatus constructed according to this invention and applied to a boat.

This apparatus consists of a horizontal steel cylinder A, forming a closed vessel or generator in which the combustion of the compound and its conversion into gas takes place. This cylinder is fastened to the boat
70 or other vehicle in any convenient manner. At one end of the cylinder is a door P, opening inward, so that the pressure from within will tend to press it against its seat, and thus prevent any escape of gas. A lever L
75 fixed to the door oscillates on pivots *x* and *y*, Fig. 2, and is provided with a handle *p*. The other end of the cylinder or generator is closed, and is provided with a pyrometer N and a safety-valve S. At the top of
80 the generator is an outlet-passage provided with two valves R and Q, operated by handles *r* and *q*, and a safety-valve S'. Attached to the inside of the generator are guides *c*,
85 on which slides a receptacle C, of thin sheet-iron, in the form of a large spoon or shovel about half the length of the cylinder. The door P is opened, as shown in dotted lines in Fig. 1, and closed air-tight by the lever L. This lever L is tightened by means of a screw
90 V, connected to the side of the generator and provided with handles. The spoon or shovel C is filled with gas-producing materials—such as those hereinabove described—and introduced into the generator A on guides *c*, and
95 is drawn out again to be refilled after the complete combustion of the charge.

Several spoons or shovels are prepared beforehand to prevent interruption of supply of gas. The lighting of the charge can be ef- 100

fected in different ways; but a simple method
 consists in throwing some pieces of red-hot
 charcoal-carbon on the compound just before
 closing the door P. As this combustible is a
 5 compound of substances containing in them-
 selves all the necessary elements for combus-
 tion in an air-tight vessel, the charge, when
 once alight, is entirely converted into gas, al-
 though all communication with the air out-
 10 side is prevented. The gas, which is formed
 in large amount, accumulates in the vacant
 space in the generator, and if only a rela-
 tively small exit be made for the gas the
 pressure immediately becomes considerable.
 15 When the pressure has reached the point at
 which the apparatus is to be worked, the sec-
 tional area of the outlet-passage is enlarged
 by opening the valve R by means of the han-
 dle *r*, thus enabling the gas to escape with
 20 force through an orifice O and producing a
 reaction tending to impart movement to the
 apparatus in the opposite direction. Suppos-
 ing the apparatus be fixed to a vehicle or to
 a boat, as shown in the drawings, or to the
 25 car of a balloon, this thrust will be trans-
 mitted to the system on which the apparatus is
 fixed; consequently the vehicle, boat, or bal-
 loon will be propelled in the direction oppo-
 site that in which the gas is escaping.
 30 According as the internal pressure indi-
 cated by a manometer M increases or dimin-
 ishes the opening of the valve R is increased
 or diminished, so as to maintain as constant
 a pressure as possible. The valve Q, placed
 35 above the valve R and operated by the han-
 dle *q*, allows the gas to escape through an or-
 ifice *i* independently of its exit by the orifice
 O. This valve Q discharges the gas through
 40 two lateral tubes fitted in the orifice *i* in such
 a way that the escaping jets or streams mate-
 rially counteract one another; but each of the
 lateral tubes being provided with an inde-
 pendent valve lateral thrusts or impulses to
 45 the right or left are obtained, as desired, by al-
 lowing the gas to escape separately through
 the right tube or through the left, and in this
 way it is possible to direct or steer the whole
 system in any desired direction. It is needless
 50 to say that the number of the tubes and valves
 is not limited to that shown in the drawings,
 and can be varied according to requirement.
 The regulating-valve R can also be replaced
 by valves fixed on the orifice O, regulated be-
 55 forehand for the pressures necessary to pro-
 duce the desired speed and being opened au-
 tomatically by the pressure of the gas. These
 valves, when employed, are placed in a line
 with the horizontal axis of the generator, in
 60 order that the projection of the gas may act
 in the same direction and produce a horizon-
 tal reaction. Automatic valves can be fitted

on in cases where it is necessary to dispense
 with constant attention on the part of the op-
 erator.

When it is desired to obtain a perfectly con- 65
 tinuous action, two or more generators are
 provided, which are alternately charged with
 the combustible compound and which are con-
 nected by means of tubes to a small gas-res-
 70 ervoir carrying the valves and tubes for the
 propelling and guiding jets.

The communicating tubes between the burn-
 ers and the reservoir are provided with valves
 which open or close, according as the respect-
 ive generator is in work or not—that is to say, 75
 according as a charge of the combustible com-
 pound is being consumed therein or prepara-
 tion is being made for burning a charge while
 the other or next generator is in action.

I claim as my invention—

1. A propelling apparatus consisting of the 80
 combination of a boat, a balloon-car, or other
 device to be propelled, with a gas-generating
 chamber provided with outlets for the direct
 escape of the gases from the generating-cham- 85
 ber, controlling-valves for the outlets, and an
 opening closed by a door through which the
 explosive materials are passed into the gen-
 erator, substantially as described.

2. A propelling apparatus consisting of a 90
 boat, balloon-car, or similar device, in combi-
 nation with a gas-generator having outlets and
 controlling-valves and an opening closed by
 a door, a removable receptacle for holding the 95
 combustible material, and guides within the
 generator for the removable receptacle, as and
 for the purpose set forth.

3. A propelling apparatus consisting of the 100
 combination of a boat, balloon-car, or other
 device to be propelled, with a gas-generator
 consisting of a closed vessel with discharge-
 outlets and controlling-valves therefor, and a
 door in the vessel opening inward and closing
 against a seat under the gas-pressure, all sub- 105
 stantially as described.

4. A gas-generator consisting of a closed 110
 vessel provided with suitable outlets and safe-
 ty-valves, a door opening inward and closing
 against a seat under the gas-pressure, a piv-
 oted lever, one end of which is fixed to the
 door, and a screw attached to the outside of
 the generator to fasten the other end of the
 lever when the door is closed, substantially as
 described.

In testimony whereof I have signed my name 115
 to this specification in the presence of two sub-
 scribing witnesses.

ALEXANDRE CIURCU.

Witnesses:

LEON FRANEKEN,
 R. J. PRESTON.