Jan. 12, 1926. 1,569,497

J. A. JOHNSON

MARINE PROPULSION

Filed May 27, 1925 2 Sheets-Sheet 1

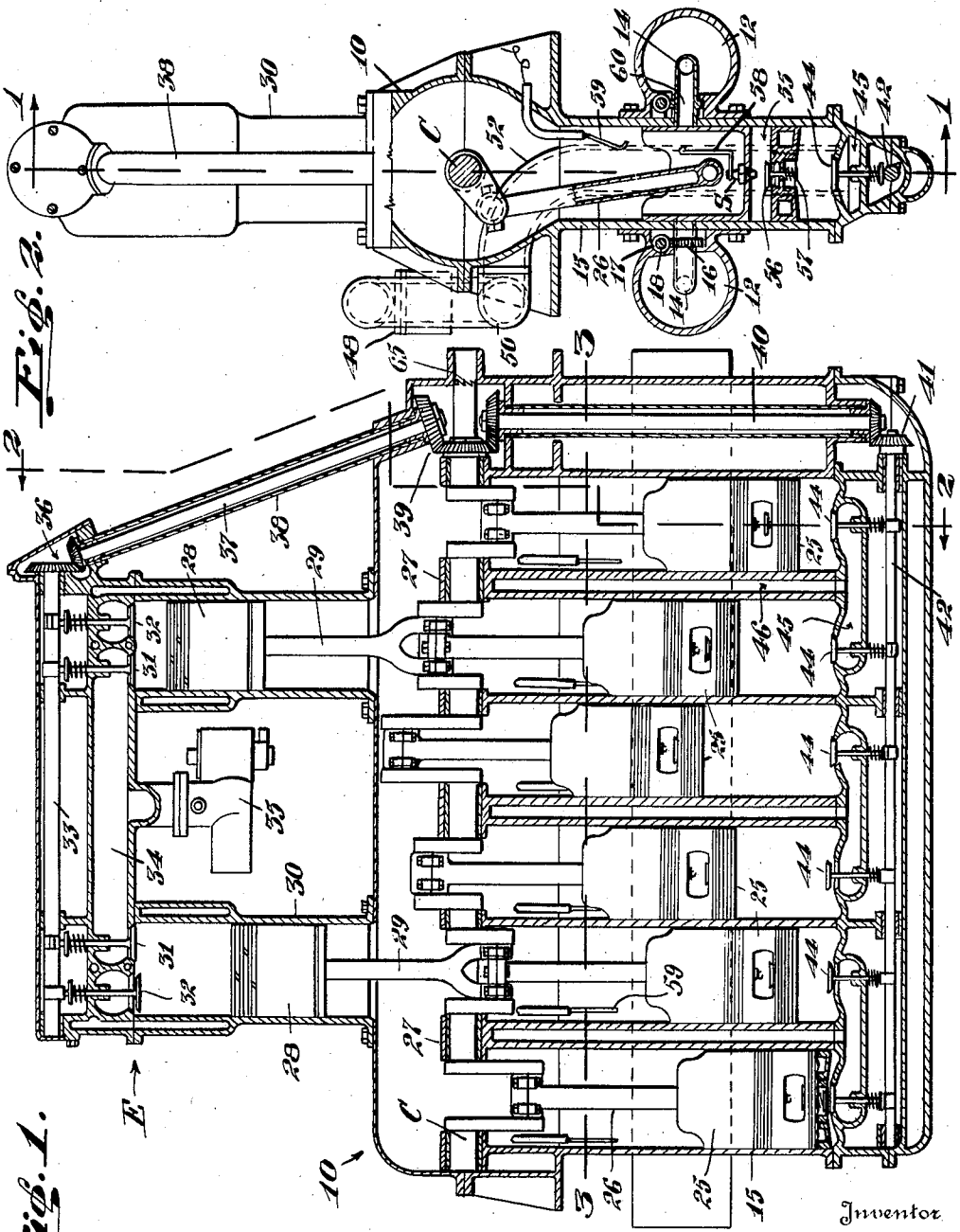


Fig. 2.

Fig. 1.

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Fig. 3.

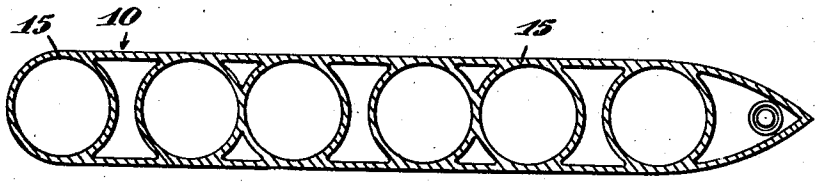


Fig. 4.

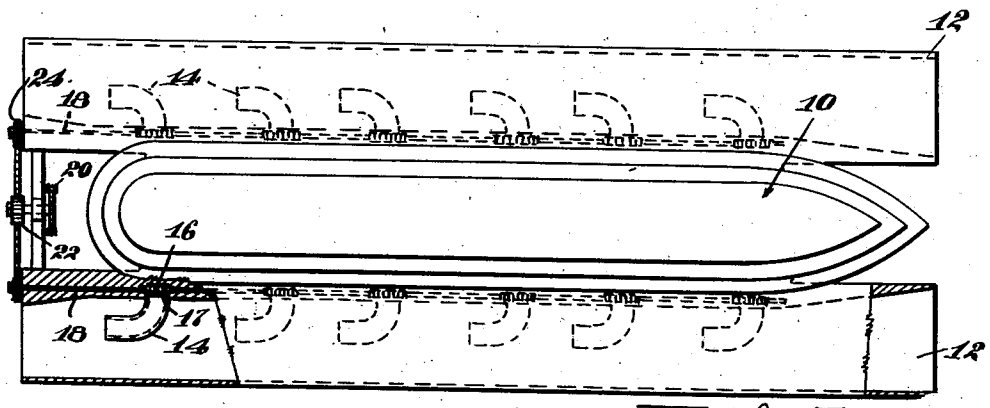


Fig. 5.

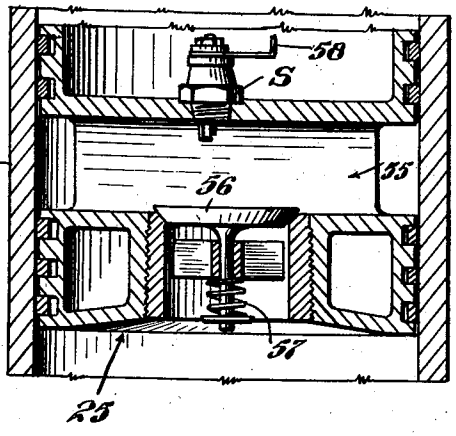
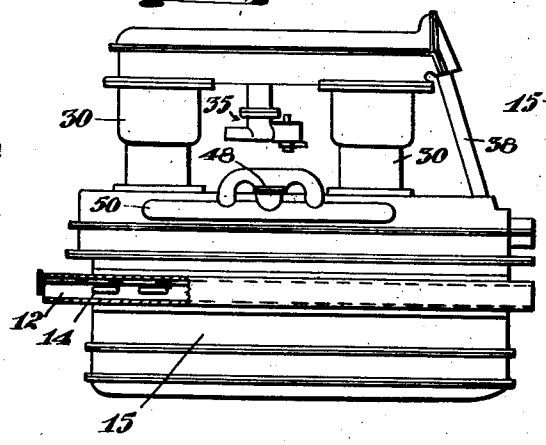


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN A. JOHNSON, OF LOS ANGELES, CALIFORNIA.

MARINE PROPULSION.

Application filed May 27, 1925. Serial No. 33,258.

To all whom it may concern:

Be it known that I, JOHN A. JOHNSON, a citizen of the United States, residing at Los Angeles, Calif., in the county of Los Angeles and State of California, have invented new and useful Improvements in Marine Propulsions, of which the following is a specification.

This invention relates to means for propelling marine craft and more particularly to a form wherein gases of combustion are used as a means of energy.

An object of the invention is to employ the explosive energies of explosive gases for propelling marine craft, a further object being to discharge exploded gases into the water through which the craft passes whereby displacement of the water under the explosive forces of the gases will propel the craft either backward or forward.

A further object is to provide relatively simple, efficient and serviceable means for the purpose stated.

Briefly, the invention comprises a plurality of pistons working in cylinders from which gases resulting from explosion of combustible mixtures are projected into the water in a direction to propel the craft by displacement of the water. In the preferred form the pistons themselves contain explosive chambers wherein a compressed combustible mixture is exploded and from which the exploded gases are discharged. An internal combustion engine of ordinary type or other prime mover may be employed for actuation of the pistons. The exploded gases are discharged into propulsion tubes which are adjustable to change the direction of the discharging ends thereof in order to change the direction of travel of the craft upon which the device is used. The invention resides also in other combinations and arrangement of parts and features of construction illustrated in the drawings in certain forms, described herein and pointed out in the claims. In the drawings:

Fig. 1 is a vertical longitudinal section taken on the line 1—1 of Fig. 2;

Fig. 2 is partially an end elevation and partially a transverse section taken on the line 2—2 of Fig. 1;

Fig. 3 is a horizontal section through the cylinder head as taken on the line 3—3 of Fig. 1;

Fig. 4 is chiefly a plan view representing in more or less diagrammatic fashion the power plant of the present invention;

Fig. 5 is a vertical sectional detail through one of the pistons and its cylinder; and

Fig. 6 is a side elevation of the power plant complete, a portion of one of the water conducting tubes being broken away.

An engine casing 10 is shown provided with laterally disposed water conducting tubes 12 which extend longitudinally of the craft into which there projects a plurality of adjustable propulsion tubes 14 which have communication with a plurality of cylinders 15 carried in the casing 10. The means for adjusting the tubes 14 comprises a gear 16 carried by each tube engageable by a worm 17 on a longitudinally extending shaft 18. A shaft 18 is disposed on each side of the engine for the operation of the two sets of tubes 14 into which gases are discharged from the opposite sides of the cylinders, said shafts 18 being operated through the medium of a wheel 20 which actuates a sprocket 22 for driving a chain 24 connected with the shafts 18. By rotating the tubes 14 by this means the direction of the craft may be readily changed.

In each of the cylinders 15 a piston 25 is reciprocably mounted, these pistons being operable through the medium of connecting rods 26 from a crank shaft C suitably journalled in bearings 27. Said crank shaft C is adapted to be actuated by any common type of internal combustion engine E such as that indicated wherein pistons 28 are employed to drive said shaft C through the medium of connecting rods 29. The pistons 28 are reciprocable in cylinders 30 which are charged and exhausted by way of valves 31 and 32 actuated by means of a cam shaft 33. The explosive charges are drawn into the cylinders 30 past intake valves 31 from a manifold 34 supplied by a carburetor 35. The actuation of the cam shaft 33 is properly timed with relation to the cam shaft C through the medium of a gear connection 36 with a shaft 37 housed at 38 and connected by gears 39 with said shaft C.

The admission of explosive gases to the cylinders 15 and the pistons 25 is controlled through the medium of a shaft 40 which is geared to the crank shaft C and extends downwardly through the casing 10, the low-

er end of the shaft 40 being geared at 41 to a cam shaft 42 which operates a plurality of spring returned poppet valves 44. The explosive mixture is drawn past the valves 44 into the cylinders 15 from a plurality of manifolds 45 fed by passages 46 which are supplied by a carburetor 48 by way of a manifold 50 disposed at the side of the engine and connected with the passages 46. As the pistons 25 are moved upwardly on their intake strokes through the medium of the pistons 28 and crank shaft C, the poppet valves 44 are opened by the cam shaft 42 for intake of combustible mixture from the manifolds 45. Upon the down-stroke of said pistons 25 the valves 44 are closed and the gases are compressed between the lower walls of the pistons and the lower walls of the cylinders 15, the compressed gases being then forced upwardly into a transversely disposed combustion chamber 55 carried in each of the pistons 25, said gases being forced past a spring returned poppet valve 56 carried in the lower end of each piston. When the next up-stroke commences each valve 56 is closed by its spring 57, thus trapping the compressed gases in the explosion chamber 55. As the upward movement continues the compressed explosive mixture in each chamber 55 is ignited by means of a spark plug S through contact of a finger 58 carried by the spark plug with a finger 59. Immediately following ignition of the explosive gases, the ends of each chamber 55 are brought into registry with ports 60 in the side walls of the cylinders 15 which ports lead to the propulsion tubes 14. In this manner full explosive force of the ignited mixture is transmitted directly to the tubes 14 and thereby projected longitudinally of the water conducting tubes 12 for propulsion of the craft in the desired direction. For the purpose of starting, one end of the crank shaft C is provided with a ratchet 65 for engagement by a crank whereby the explosive engine E which actuates the pistons 28 will be started and in this manner start operation of the pistons 25. It will be clear from the foregoing that intake of explosive mixture by way of the poppet valves 44 will take place upon each upstroke of the pistons 25 and that said mixture will be compressed upon each down-stroke thereof and be forced into the explosion chambers 55, wherein said mixture will be trapped and the full force of the exploded gases will be retained until the ends of each chamber 55 are brought into registry with the ports 60 leading to the propulsion tubes 14. It will also be clear that the discharge of the exploded gases through the tubes 14 will propel the craft and that reversal of the position of said tubes 14 will reverse the direction of the craft.

I claim:—

1. In a device of the character disclosed, pistons, each having a combustion chamber therewithin, means for actuating the pistons, and propulsion tubes for receiving exploded gases from the combustion chambers.

2. In a device of the character disclosed, pistons, each having a combustion chamber therewithin, means for actuating the piston, and propulsion tubes for receiving exploded gases from the combustion chambers, said tubes being adjustable to change the direction of travel of the vessel upon which the device is used.

3. In a device of the character disclosed, a piston having a combustion chamber therewithin, means for actuating the piston, and means for receiving an exploded charge from said chamber for operation of the device.

4. In a device of the character disclosed, a piston having combustion chambers therewithin, an engine for actuating said pistons, means for supplying an explosive mixture to said chambers, means for igniting the same, and propulsion means for receiving exploded gases from the chamber after ignition.

5. In a device of the character disclosed, an internal combustion engine including a cylinder, a reciprocable piston in the cylinder having a combustion chamber therewithin, means to supply an explosive gas to the cylinder, said piston being adapted to compress the gas in the cylinder at one end of a stroke, a valve in the end of the piston to permit the compressed gas to enter the combustion chamber, means to ignite the compressed gas as the piston approaches the opposite end of a stroke, said cylinder having a support for escape of exploded gas after ignition, and means to receive the exploded gas for actuation of the device.

6. In marine craft, an internal combustion engine including pistons each having a combustion chamber therewithin, water receiving conduits, and propulsion tubes extending into the said conduits to receive exploded gases from the combustion chambers.

7. In marine craft, an internal combustion engine including pistons each having a combustion chamber therewithin, water receiving conduits and propulsion tubes extending into the said conduits to receive exploded gases from the combustion chambers, said propulsion tubes being rotatable to change the direction of movement of the craft.

JOHN A. JOHNSON.