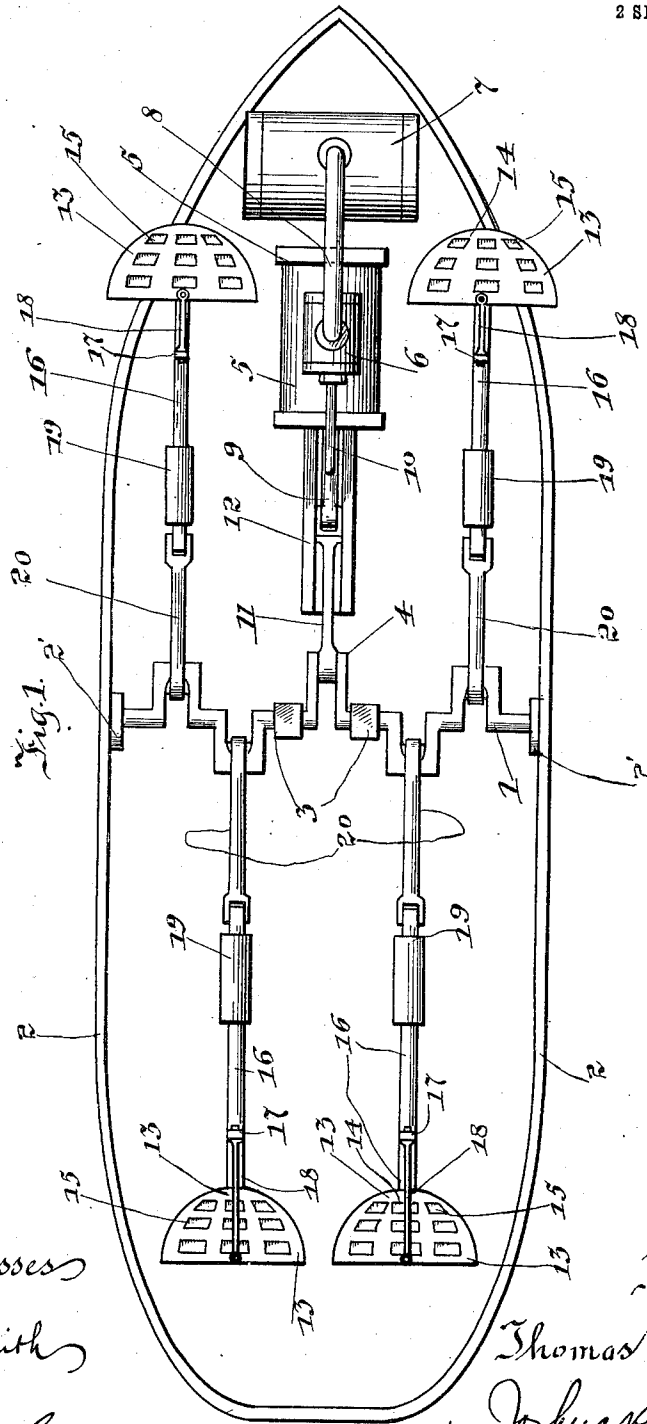


T. W. BLACK.
PNEUMATIC PROPELLING MECHANISM.
APPLICATION FILED SEPT. 27, 1911.

1,030,966.

Patented July 2, 1912.

2 SHEETS—SHEET 1.



Witnesses
W. Smith
B. G. Richards

Inventors
Thomas W. Black,
by *John R. H. Lott*
his Attorney

T. W. BLACK.
PNEUMATIC PROPELLING MECHANISM.
APPLICATION FILED SEPT. 27, 1911.

1,030,966.

Patented July 2, 1912.

2 SHEETS-SHEET 2.

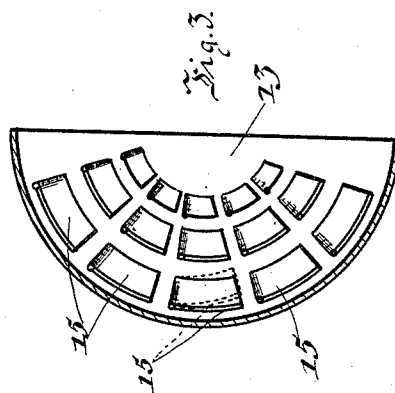
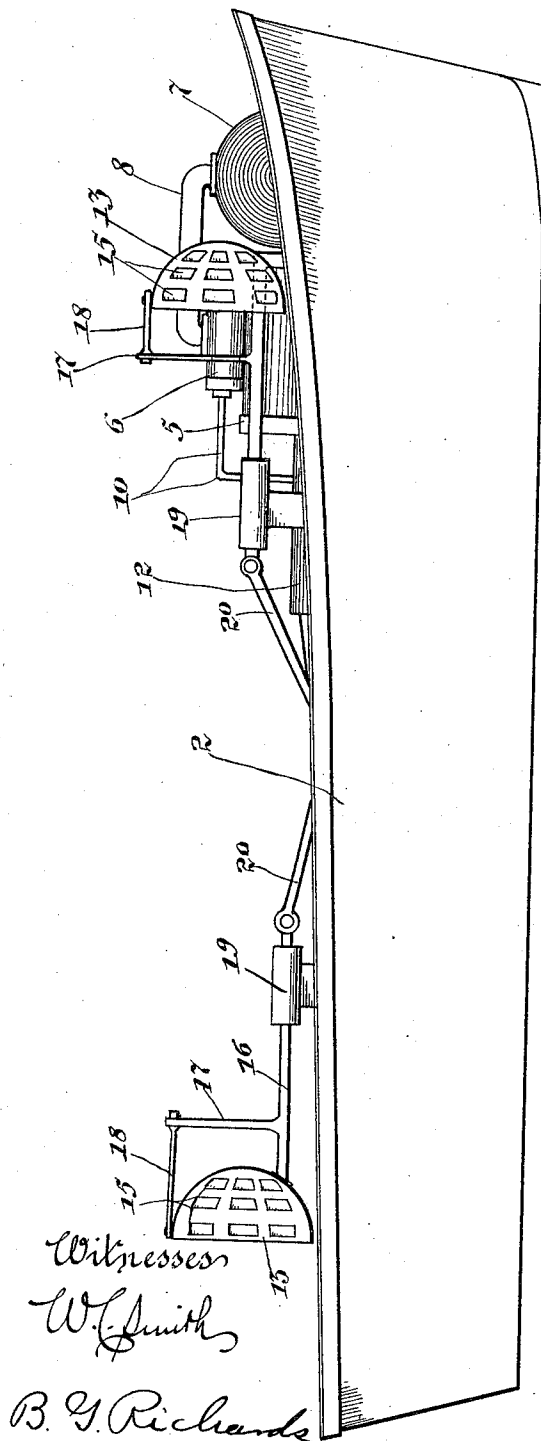


Fig. 2.

Witnesses
W. Smith
B. G. Richards

Inventor
Thomas W. Black
by *John H. Potts*
his Attorney.

UNITED STATES PATENT OFFICE.

THOMAS W. BLACK, OF CHICAGO, ILLINOIS.

PNEUMATIC PROPELLING MECHANISM.

1,030,966.

Specification of Letters Patent.

Patented July 2, 1912.

Application filed September 27, 1911. Serial No. 651,511.

To all whom it may concern:

Be it known that I, THOMAS W. BLACK, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Pneumatic Propelling Mechanism, of which the following is a specification.

My invention relates to improvements in propelling mechanisms for boats or airships, the object being to provide such mechanism which shall be operated pneumatically from a source of air supply.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which,

Figure 1 is a top plan view of a power propelled boat embodying my invention, Fig. 2 is a side elevation of the boat and the mechanism installed therein, and Fig. 3 is a detail section showing a thrust propeller employed in the mechanism.

The preferred form of construction as illustrated in the accompanying drawings comprises a multi-throw crank shaft 1 which is arranged transversely of the boat 2 approximately at the center thereof. Bearings 2' are provided at the ends of the crank shaft 1, also bearings 3 intermediate the bearings 2' and arranged adjacent the middle of the crank shaft 1. A crank 4 provided at the middle of the crank shaft 1 is rotated when the mechanism is in operation by means of a compressed air motor having a cylinder 5 and valve chest 6. Air is supplied to the motor from a suitable storage of air which in this case may be contained in a tank 7 arranged adjacent the motor and connected to the valve chest 6 thereof by means of a pipe 8. The piston rod 9 of the motor is connected to the valve rod 10 thereof in the usual manner, the cross-head of the connecting rod 11 traveling in the usual guides 12. The connecting rod 11 is coupled to the crank 4 and adapted to drive the same as will be apparent by reference to Fig. 1. The valves controlling the compressed air motors are omitted in the drawings, but it is understood that the usual valves may be employed. Arranged adjacent the forward and rearward ends of the boat 2 is a plurality of thrust propellers 13

which are designed to reciprocate longitudinally. Each propeller 13 is preferably hemispherical in form and provided with a plurality of openings 14 in the walls thereof which are intermittently opened and closed by means of suitable flap valves 15, the latter being illustrated in detail in Fig. 3. These valves are hinged to the interior surface of the propellers and adapted to move from the full to the dotted line positions as clearly illustrated. The propellers are all disposed so that their convex surfaces are presented to the atmospheric air against which the boat is driven, the construction being such that when the propellers are thrust forwardly that the valves 15 thereof will be opened in unison, thereby permitting air to flow through the propellers. At the moment that the propellers begin to move rearwardly the valves 15 are closed, thus imprisoning the air therein and forcing air in the rear of the propellers rearwardly, the resulting action being that the boat 2 is driven forwardly. The propellers 13 are mounted at the extremities of connecting rods 16, there being a reinforcing arm 17 and connecting rod 18 for each propeller as clearly illustrated in Fig. 2. The rods 16 are adapted to reciprocate longitudinally in suitable bearings 19 which project upwardly from the bottom of the boat 2. The ends of the rods 16 opposite the propellers 13 are connected by means of connecting rods 20 to the crank shaft 1, it being seen that the forward propellers are connected to cranks which are opposed to the cranks to which the rearward propellers are connected, this construction serving to produce a uniform forward propulsion of the boat 2. In the operation of the mechanism, the reciprocations of the forward propellers 13 are such that when its valves are open that the valves of the rearward propellers are closed and vice versa, the absence of vibration being the result.

By disposing the rods 16 vertically and connecting the same with the crank shaft 1 in a manner similar to that described, the mechanism may be used to advantage for the propulsion of airships, the further modifications required being obvious to those skilled in the art.

A propelling mechanism as set forth is simple of construction and highly efficient in operation.

While I have illustrated and described

the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention.

5 I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claim.

10 Having described my invention what I claim as new and desire to secure by Letters Patent is:

15 A combination with a boat, of a transversely extending crank shaft mounted amid-ship, said crank shaft being provided with five cranks one of which is arranged centrally of said shaft and the other four di-

vided into pairs, the members of which are symmetrically arranged on opposite sides of said central crank and said pairs being 20 oppositely disposed with respect to each other; a pair of reciprocatory air propellers arranged at each end of said boat; operative connections between each of said pairs of cranks and one of said pairs of propellers; 25 and an engine operatively connected with said central crank, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS W. BLACK.

Witnesses:

HELEN F. LILLIS,
JOSHUA R. H. POTTS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."