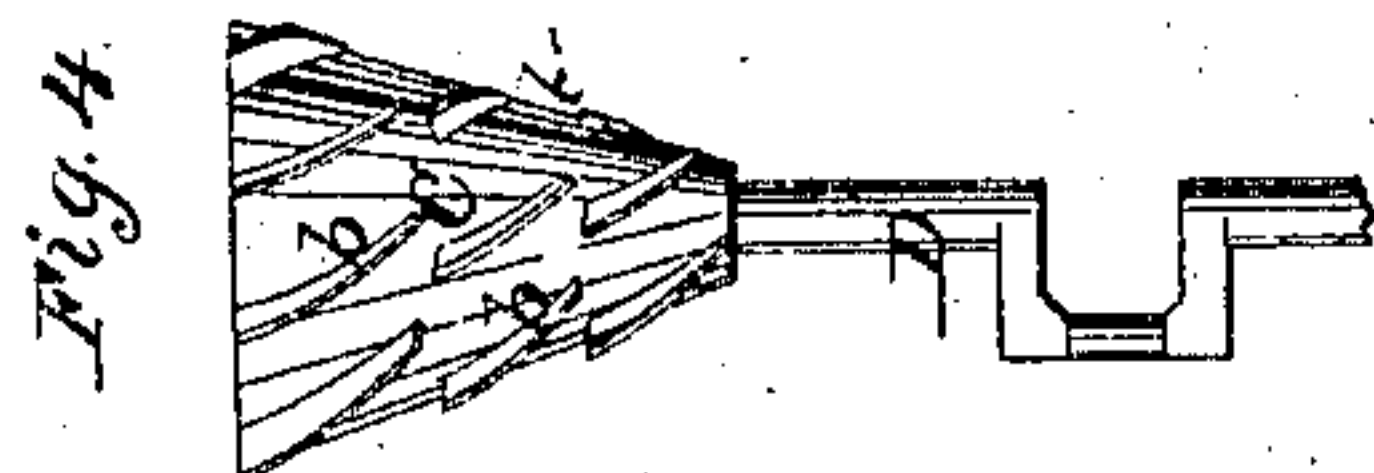


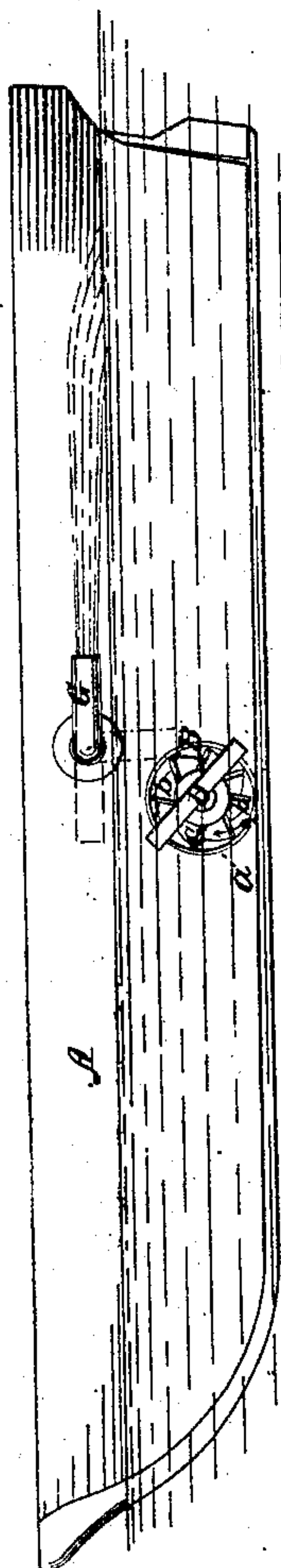
*A. Pagenstecher.*  
*Pneumatic Propeller.*

*N<sup>o</sup> 44,584.*

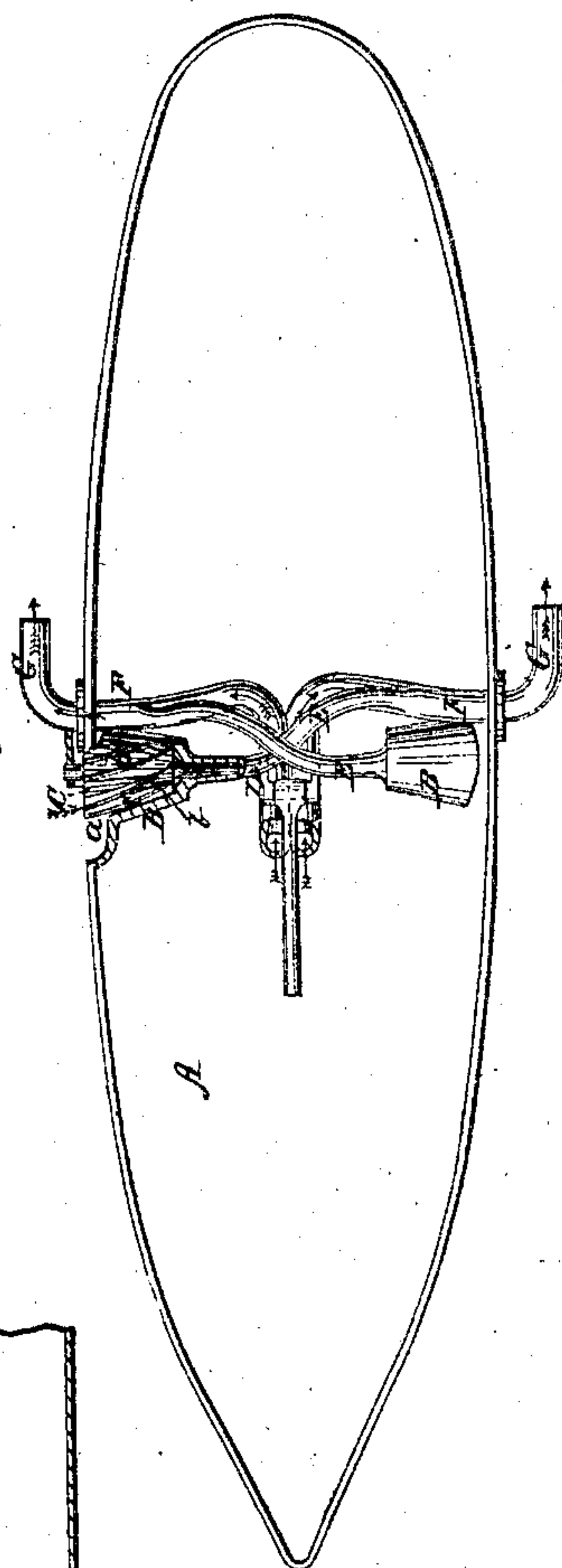
*Patented Oct. 4, 1864.*



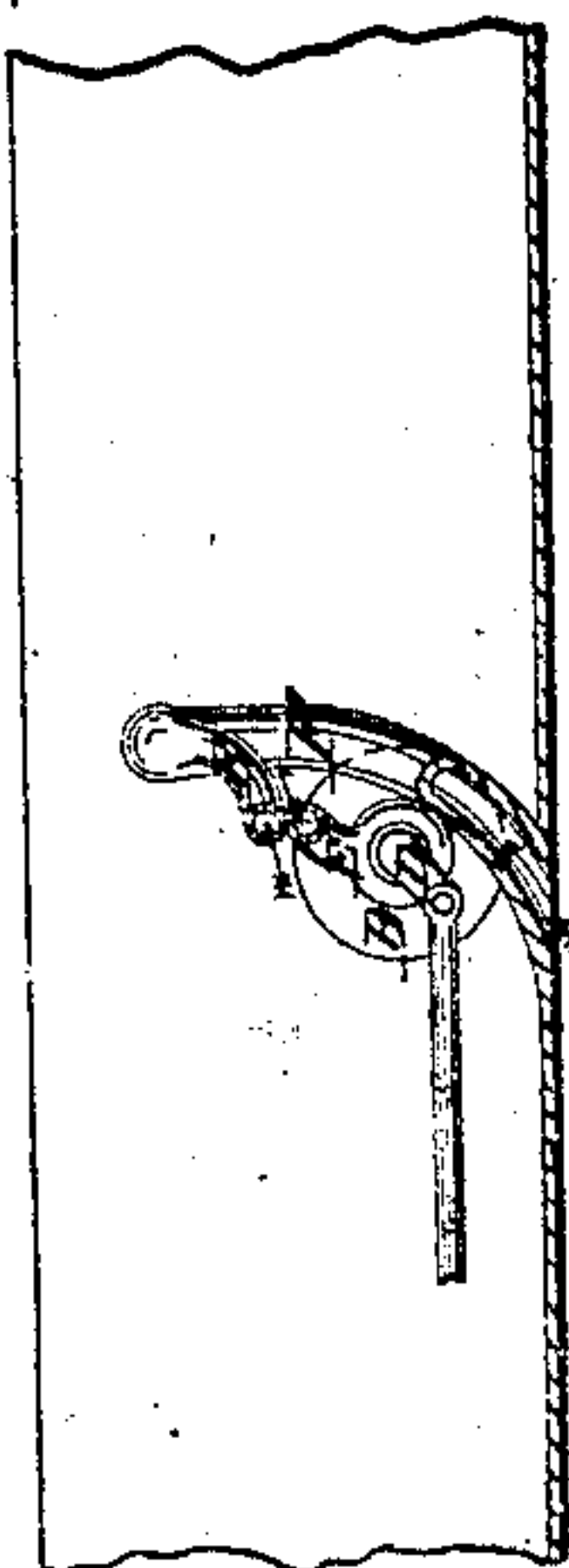
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



*Witnesses,*

*Thos. B. Douglas*  
*Geo. H. Reed*

*Inventor*

*Albert Pagenstecher*

# UNITED STATES PATENT OFFICE.

ALBERT PAGENSTECHER, OF VALPARAISO, CHILI.

## IMPROVED HYDRAULIC PROPELLER.

Specification forming part of Letters Patent No. 44,584, dated October 4, 1864.

*To all whom it may concern:*

Be it known that I, ALBERT PAGENSTECHER, of Valparaiso, in the Republic of Chili, have invented a new and Improved Propeller; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a side elevation of my invention. Fig. 2 is a sectional plan or top view of the same. Fig. 3 is a longitudinal section of the same. Fig. 4 is a detached plan of one of the rotary pumping-cones.

Similar letters of reference in the three views indicate corresponding parts.

The object of this invention is to propel a vessel by the reaction of a stream of water issuing from an orifice or orifices above the water-line.

The invention consists in the employment or use of rotary pumps applied on the sides of the vessel to be propelled in combination with discharge-pipes passing into pipes of a much larger diameter, which take water at the bottom of the vessel and discharge at its sides above the water-line in such a manner that the stream of water issuing from the discharge-pipes acts on the principle of an injector, and a volume of water is expelled from the large pipes much exceeding the volume which the pumps alone, unaided by the injectors, would be capable of expelling, and by the reaction of the water thus driven out of said pipes with great velocity a power is obtained which will propel a vessel or aid in propelling it with a force which is entirely independent of the velocity with which said vessel moves through the water.

The invention further consists in combining with the aforesaid arrangement of pipes revolving nozzles through which the water is expelled in such a manner that by turning said nozzles the motion of the vessel can be reversed or stopped altogether, without reversing or stopping the engine or motive power.

To enable those skilled in the art to make and use this invention, I will proceed to describe it.

A represents the hull of a vessel, constructed of iron or wood, in the usual manner. This hull is pierced on the opposite sides, about

amidships, with two holes, *a*, to receive the conical barrels *B*, which contain the rotary pumps *C*. These pumps consist of cones provided on their peripheries with a series of spiral flanges, *b*, which fit nicely in the conical barrels, and by imparting to these pumps a rotary motion the water is drawn in through the outer or large ends of the conical barrels and expelled through their small ends. The cones *c* are secured to the ends of a conical shaft, *D*, to which a rapid rotary motion is imparted by means of a steam-engine or other suitable source of power.

*E* are the discharge-pipes which emanate from the small or inner ends of the drum *B*, and terminate in pipes *F*, of a much larger diameter. These pipes extend down through the bottom of the vessel *A*, and out at its sides above the water-line, and they are provided with elbow-nozzles *G*, connected to them in such a manner that they can be easily revolved and turned down or backward or forward by suitable mechanism from the deck of the vessel.

The large pipes *F*, being open at both ends, will freely admit the water, which naturally will rise in them to a level with the water-line, and the discharge-pipes *E* pass into them at points from one and a half to four feet above the level of the water. If the pumps begin to operate, and the water rushes out of the discharge-pipes *E* into the large pipes *F*, an action takes place similar to that of the injector. The air in the large pipes is rarefied, and the water impelled by the atmospheric pressure rises in said pipes and joins the current emanating from the discharge-pipes, and a volume of water is driven out through the nozzles of the large pipes much larger than that which would be due to the unaided action of the pumps.

The reaction of the water issuing from the nozzles *G* propels the vessel in the direction opposite to that in which the water runs from said nozzles. If the nozzles point in the direction of the stern the vessel goes forward, and if the nozzles point toward the bow the vessel goes backward, and by turning the nozzles down in a vertical position, as shown in red outlines in Fig. 1, the propelling power ceases to act and the vessel stops. By means of the revolving nozzles the vessel can be turned on its center or pivot, which is accom-



plished by turning one of the nozzles toward the stern and the other toward the bow.

The propelling power due to the reaction of the water issuing from the pipes F is measured by a column of water, the area of the transverse section of which is equal to the area of the nozzles G, and its height is equal to the double height due to the velocity of the discharging water, and found by the formula

$$h = \frac{v^2}{g}.$$

From this observation it is obvious that the propelling power increases with the velocity of the discharging water, and with the areas of the nozzles, and by increasing the number of pumps and nozzles on each side of the vessel the propelling power can be further increased to any desired extent.

This propeller is applicable to vessels of any description. It can be used in conjunction with or independent of sails, and it acts with the same force, whatever the velocity of the vessel may

be. It is of particular advantage for vessels of war, because all its vital parts are below the water-line, and it allows of maneuvering the vessel with the greatest ease and facility.

What I claim as new, and desire to secure by Letters Patent, is—

1. The employment or use of rotary pumps C, applied to a vessel, A, in combination with pipes E' issuing into large pipes F, and producing an action similar to an injection, in the manner and for the purposes herein described.

2. The combination of the horizontal pumping-cones, C b b, conical barrels B, pipes E F, and revolving nozzles G, all constructed, arranged, and operating substantially as specified.

ALBERT PAGENSTECHER.

Witnesses:

J. W. COOMBS,

GEO. W. REED.