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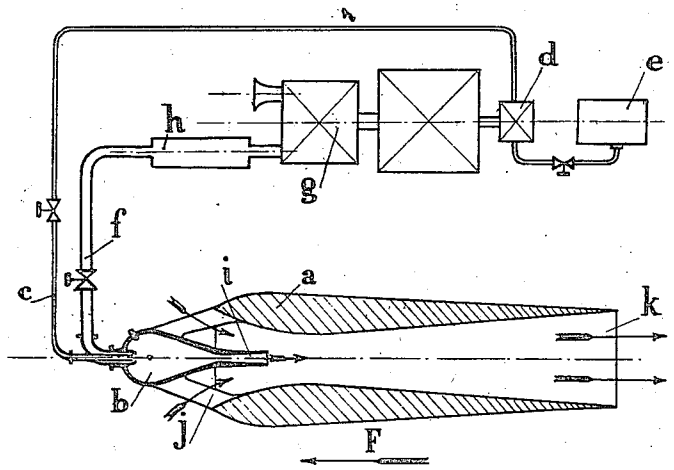
PROPELLING DEVICE FOR USE ON VEHICLES, MARINE VESSELS, OR AIRCRAFT.

APPLICATION FILED MAR. 27, 1919.

1,375,601. Patented Apr. 19, 1921.

Fig. 1



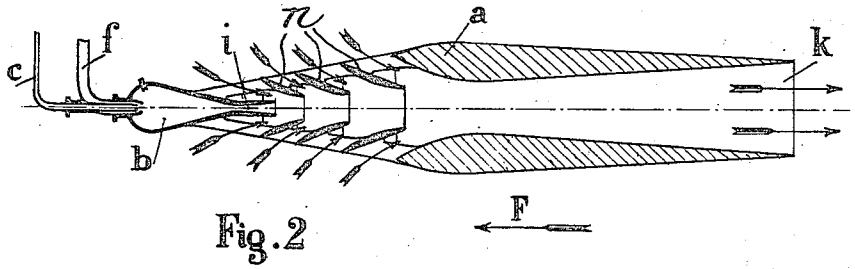


Fig. 2

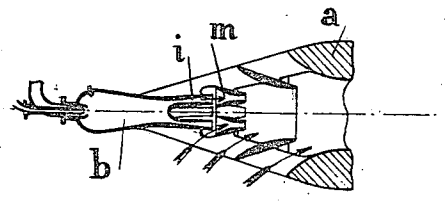


Fig. 3

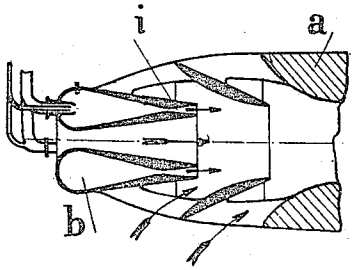


Fig. 4

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UNITED STATES PATENT OFFICE.

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PROPELLING DEVICE FOR USE ON VEHICLES, MARINE VESSELS, OR AIRCRAFT.

1,375,601. Specification of Letters Patent. Patented Apr. 19, 1921.

Application filed March 27, 1919. Serial No. 285,629.

To all whom it may concern:

Be it known that I, ERNEST MORIZE, a citizen of the French Republic, residing at Boulogne-sur-Seine, France, have invented certain new and useful Improvements in Propelling Devices for Use on Vehicles, Marine Vessels, or Aircraft; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improved means for effecting the propulsion of vehicles of any kind, terrestrial, aquatic or aerial. Said means comprise an ejector mounted on the vehicle, a difference of pressure being created in the ejector between its front and rear ends which exerts a forward thrust on the vehicle itself.

Referring to the accompanying drawings which illustrate, by way of example, different embodiments of my invention:

Figure 1 shows diagrammatically a complete apparatus for propulsion according to this invention, with a simple ejector tube which is shown in longitudinal section; Fig. 2 shows a longitudinal section of a modification of the ejector, Fig. 3 is a similar part view of a modification with a plurality of injecting nozzles in the ejector tube; and Fig. 4 is a similar part view of a modification with an annular nozzle.

In the apparatus shown in Fig. 1, there is arranged in the rear of an ejector *a*, a combustion, or explosion chamber *b*, the walls of which are preferably lined with refractory material. This chamber terminates at its front end in a nozzle *i*, which discharges into the inwardly tapering end of the ejector; and the chamber is supplied, on the one hand, with fuel, under pressure, through a pipe *c* (said fuel being either liquid or simply a gas), and on the other hand with the medium which supports combustion (which medium may be of any kind whatsoever) through a pipe *f*, under a higher pressure than that prevailing in the combustion chamber. In the example shown in Fig. 1, the fuel is assumed to be liquid delivered from a tank *e*, to the combustion chamber by means of a pump *d*, and the medium is assumed to be air delivered by a compressor *g*, to the combustion chamber, through a chamber *h*, which is interposed in the pipe *f*, and serves to equalize the flow of air.

The apparatus works in the following manner: The fuel, ignited by any device whatsoever—electric or incandescent for example—burns inside the combustion chamber *b*, and the resulting gases are discharged through the nozzle *i*, at a velocity corresponding to their inherent energy. The gaseous jet sucks in the surrounding air through the front opening *j*, of the ejector, and transmits progressively a portion of its kinetic energy to that air in the inwardly tapering portion of said tube. Subsequently, the velocity diminishes in the flared rearward portion of the ejector, thus imparting increased pressure to the moving fluid at the rear opening *k*, of the ejector, while a negative pressure is set up at the front opening *j*.

The difference in pressure produced by this means exerts a thrust on the vehicle in the direction of the arrow F and in the opposite direction to that in which the fluid is discharged.

The intensity of the thrust can be controlled by varying the supply and pressure of the fuel and of the medium supporting the combustion.

In the modification shown in Fig. 2 the ejector tube *a* is preceded with several injector tubes *n* in series therewith. Air is drawn in through the inlets provided between the successive tubes, as shown by the arrows. The jet of compressed gases issuing from the nozzle *i* loses a portion of its velocity as it mixes with the air drawn into the first injector tube *n;* it loses still more of its velocity when it further mixes with the air entering the second injector tube *n*, and so forth. Finally the mixture on entering the divergent portion of ejector *a* is reduced in velocity and pressure is thereby generated. The pressure differences generated between the inlets and outlets of the successive injectors *n* and ejector tube *a* are added together to cause the propulsion of the vehicle.

In the example shown in Fig. 3, the combustion chamber *b* is provided with two nozzles *i* instead of one, as in the previous example, a larger number of nozzles may also be used. Said nozzles may discharge direct into the injector tubes *n* and ejector tube *a* as before, or small injectors *m*, as shown in Fig. 3, may be interposed between the nozzles *i* and the first injector tube *n*.

In another modification, Fig. 4, the combustion chamber terminates in an annular nozzle *i*. The annular jet of gases issuing from said nozzle draws air both through the

interior surface and the exterior surface of said jet, as shown by the arrows in Fig. 4; the mixture of air and gases then passes through the injector tubes *n* and ejector tube *a* as in the former cases. Moreover, the aspiration into the ejector may be effected, not only by products of combustion, but also by any other fluid to which kinetic energy has been transmitted by any known means.

What I claim is:

A propelling device of the character described comprising a comparatively large ejector tube traversed by a Venturi bore adapted to have its front and rear ends directly placed in communication with the exterior medium in which the tube is placed, said medium having free passage therethrough, the restricted portion of the Venturi bore being situated in the forward part of the bore of the tube, such tube being slotted near the forward restricted portion thereof, a series of progressively larger injector tubes situated within the slotted end of said ejector tube, said injector tubes having their wider ends disposed forwardly and their restricted ends rearwardly and situated within the wider forward ends of adjacent injector tubes, the openings between adjacent injector tubes being in free communication with the exterior medium, a combustion chamber located forwardly of the first injector tube and having a nozzle projecting into the larger forward end of such first tube, means to supply a fuel to said combustion chamber, and means to also supply a supporting fluid thereto, substantially as described.

In testimony whereof I affix my signature.

ERNEST MORIZE.