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PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improved Means for Effecting the Propulsion of Vehicles, Ships, Aeroplanes, and the like.

I, OCTAVE MORIZE, of 44, rue de Varize, Chateaudun (Eure-et-Loir), France, Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improved means for effecting the propulsion of vehicles, ships, aeroplanes and the like. According to this invention an explosive mixture such as is commonly used on said vehicles or crafts is ignited and discharged into an ejector thus causing suction of the surrounding air; the ejector is in the form of a convergent-divergent tube, and the velocity of the mixture of air and combustion gases is progressively reduced in the divergent part of the tube, a difference of pressure being set up between the inlet and outlet of the tube, thus causing the propulsion of the vehicle or craft.

I am aware that it has been proposed to mount ejector-like apparatus on a craft so as to create a reaction by the discharge of a fluid into the atmosphere or the water, but my invention involves the use of a convergent-divergent ejector in the divergent part of which the velocity of the motive fluid is progressively slackened so as to utilize, with a better efficiency, the energy of said fluid.

Referring to the accompanying drawings which illustrate by way of example, means for carrying out the invention, Figure 1 shews diagrammatically the whole of one form of device for propulsion according to this invention, with a single ejector tube which is in longitudinal section; Figure 2 is a sectional elevation of a modification; Figure 3 is a similar part view of a modification with a plurality of injecting nozzles in the ejector; and Figure 4 is a similar part view of a modification with an annular nozzle.

In the apparatus shewn in Figure 1, there is arranged in the rear of an ejector tube *a*, a combustion, or explosion chamber *b*, the walls of which are preferably lined with refractory material. This chamber terminates at its front in a nozzle *i*, which discharges into the inwardly tapering end of the ejector tube *a* and the chamber is supplied, on the one hand, with preferably liquid fuel, under pressure through a pipe *c*, 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 shewn in Figure 1, the fuel is assumed to be liquid delivered from a tank *e*, to the combustion chamber by means of

[*Price* 6*d*.]

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 equalise 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, whilst 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 shewn in Figure 2, the ejector tube is provided with a plurality of intakes arranged in series, each drawing in the surrounding air through its front opening. The mixture of motive fluid and air is thus improved, and the negative pressures set up in the successive intakes are rendered cumulative.

In the example shewn in Figure 3, the combustion chamber *b*, is provided with a plurality of nozzles *i*, discharging, either directly or through small subsidiary ejector nozzles *m*, into the inwardly tapering intake of the apparatus shewn in Figure 1 or Figure 2.

In another modification, Figure 4, the combustion chamber terminates in an annular nozzle *i*, adapted to draw air into and outside the jet simultaneously.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. Means for effecting the propulsion of vehicles, ships, aeroplanes, and the like, comprising an explosion or combustion chamber which discharges the products of combustion through a nozzle at the intake of an ejector so as to cause suction of the surrounding air, said ejector having a convergent-divergent shape whereby the velocity of the mixture of air and combustion products is gradually reduced in the divergent part of the ejector, the energy of said mixture being utilized to a maximum.

2. Means for effecting the propulsion of vehicles, ships, aeroplanes and the like as claimed in Claim 1, wherein the convergent-divergent ejector is provided with a plurality of intakes, arranged in series, substantially as and for the purpose set forth.

3. Means as in Claim 1 wherein the combustion chamber is provided with a plurality of nozzles discharging, either directly or through subsidiary ejector nozzles, into the inwardly tapering intake of the main ejector, substantially as set forth.

Dated this 19th day of March, 1919.

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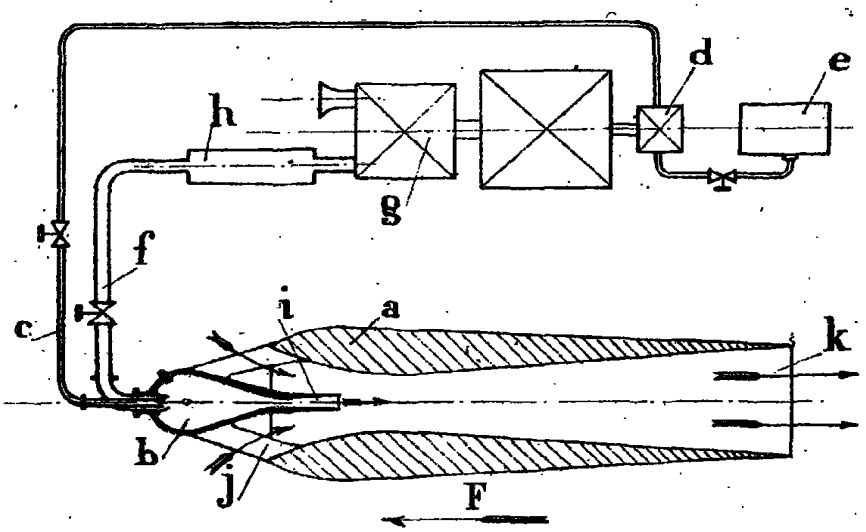

Fig. 1

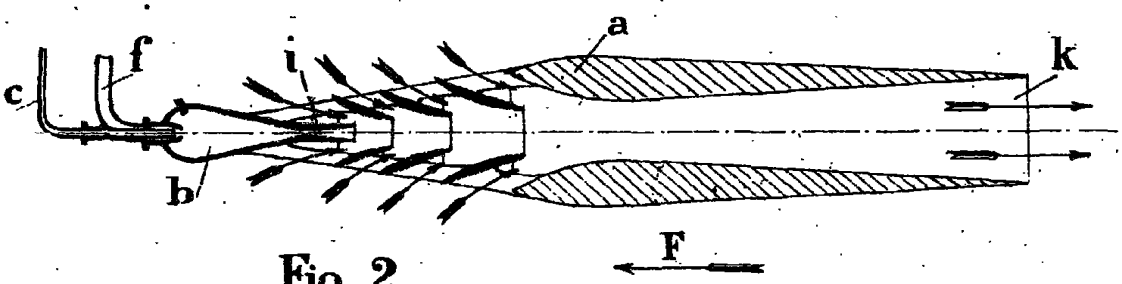

Fig. 2

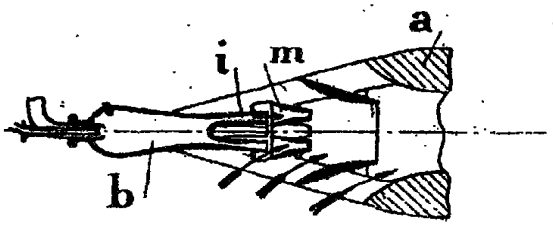

Fig. 3

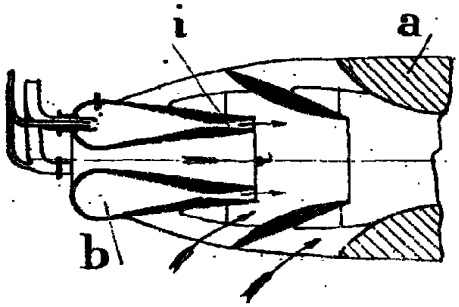

Fig. 4

Malby&Sons, Photo-Litho.