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DISCHARGE NOZZLE FOR JET SILENCING

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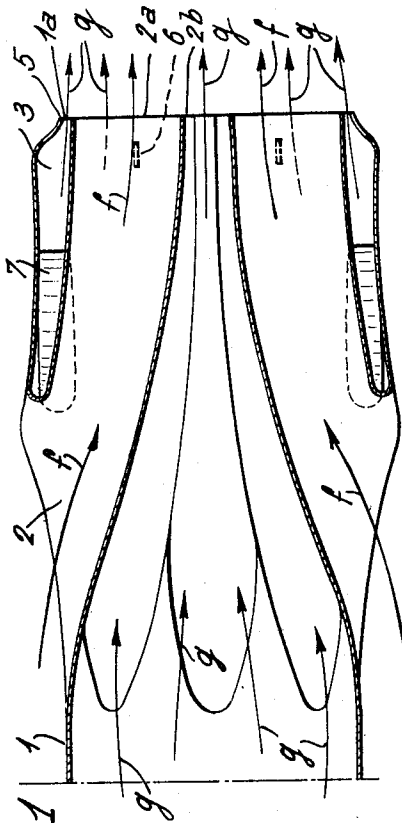


Fig: 1

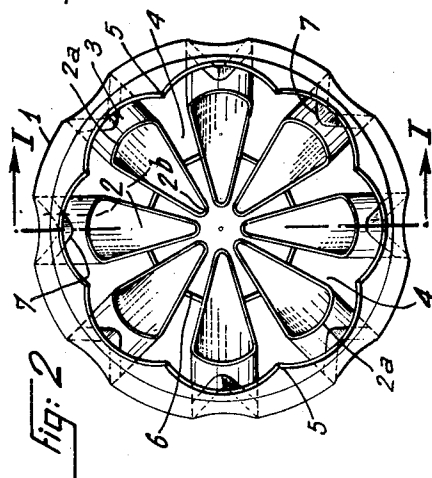


Fig: 2

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DISCHARGE NOZZLE FOR JET SILENCING

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5 Claims. (Cl. 181—33)

This invention is concerned with improvements in or relating to silencers.

Silencers for jet engines are known, characterised in that the outlet cross-section of the jet is shaped so as to have the form of a slot with a relatively large linear development which surrounds, on at least two opposite sides, the outlet orifice of a conduit for the passage of atmospheric air.

In one embodiment of that invention the outlet section of the jet has the form of an annular slot, the inner edge of which surrounds the outlet orifice of the air which is carried along by the said jet.

The present invention is an improvement or modification of that invention and seeks to improve the mixture and acceleration of the jet with the atmosphere. According to the present invention there is provided a silencer comprising a plurality of air ducts each of which is encompassed over the major part of its periphery by ducting defining a path for exhaust gas.

According to one embodiment of the present invention the ducts are so arranged as to firstly define a plurality of radial passages for the exhaust gas and secondly with the ducting an annular exhaust gas passage, the passages substantially encompassing outlet orifices of the ducts.

This disposition assures an excellent carrying along of the air, each exit orifice corresponding to an injector wherein the induced air passes in the centre and the induced gas on the periphery.

The channels of the induced air may have a constant profile, preferably slightly convergent in the upstream-downstream sense in order to obviate detachment of the induced air current. Summing up, the various portions of the aspirated air are separated by a sort of radial and circumferential profile, the trailing edges of which are blown upon by the exhaust gases.

The jet pipe may be circular, elliptic or of any other appropriate shape.

According to another embodiment of the present invention the silencer comprises at least two tubular air ducts each encompassed by a generally tubular member, the annulus defined by each duct and its associated tubular member forming the exhaust gas passage.

Each of the tubular members is preferably supported on a conical body of the silencer, the portions in common with this body being abolished in order to create a passage for the exhaust gases. The outer conduits may be distinct from or partly merged with one another over part of their length.

The present invention also concerns the application of silencers of the kind described to a reaction propulsion engine ground installation.

In order that the present invention may be well understood there will now be described an embodiment thereof, given by way of example, reference being had to the accompanying drawing in which,

FIGURE 1 is a view in longitudinal section of a downstream portion of a jet pipe on the line I—I of FIGURE 2; and

FIGURE 2 is an end view of the device of FIGURE 1. In FIGURES 1 and 2 the jet pipe offers radial and oblique conduits 2 regularly distributed over the circumference of the said jet pipe and so arranged as to form,

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on the one hand, a peripheral gap 3 and, on the other hand, radial passages 4 for the exit of the exhaust gases.

The outlet orifices 2a of the conduits 2 are in the present embodiment situated in the same plane as the outlet 1a of the jet pipe.

The section of the conduits 2 is substantially constant or preferably slightly convergent in the sense in which the air is carried along as indicated by the arrows f.

The outlet orifices 2a have the shape of almost juxtaposed sectors in such a manner that the radial passages 4 are narrow and of an approximately uniform width, the corners 2b of these orifices being nevertheless rather near one another so as to obviate the formation of too large a central jet which would be a cause of noise.

It is advantageous to provide inward indentations 5 in the outer wall of the jet pipe in line with the passages 4 in order that the cross-section area offered to the passage of the gases may everywhere have practically the same width. The exhaust gases flow along the arrows g.

A reinforcement of the comparatively plane surfaces of the conduits 2 near the exit may be attained by means of ties or gussets connecting two walls of one and the same conduit or the opposite walls of two adjacent conduits as shown at 6 in FIGURE 2. These ties or gussets may even be combined so as to form reinforcement rings (not shown) co-axial with the jet pipe.

At the origin of the conduits 2 the dihedral angles between the pipe 1 and the outer walls of conduits 2, which offer themselves to the lateral flow of the gases, may be closed off for example by means of small deflector sheets 7 (FIGURES 1 and 2) which likewise contribute to the rigidity of the assembly.

What we claim is:

1. A silencer for a gas discharging device comprising a jet pipe of generally circular cross section having an inlet end and an outlet end, said pipe being provided, intermediate its ends, with a plurality of air intake orifices regularly distributed over the circumference of said pipe, said orifices having an elongated shape in the direction of the longitudinal axis of said pipe; a plurality of air conduits, regularly distributed about said longitudinal axis, having respectively one end portion connected to the portions of said pipe defining said orifices and the other end portion terminating flush with the edge of said outlet end of said pipe; said other end portions of said conduits having in cross section the shape of circular sectors, the straight walls of said end portions being located in planes substantially radial with respect to said pipe whereas the curved walls of said end portions are located at a distance of the outlet portion of said pipe, the average distance between two adjacent straight walls of two adjacent conduits being substantially equal to the distance between said outlet portion and said curved walls.

2. A silencer as claimed in claim 1 wherein the diameter of the inlet portion of said pipe is smaller than the diameter of the outlet portion, said orifices being provided in an intermediate portion of said pipe the diameter of which increases from said inlet portion towards said outlet portion.

3. A silencer as claimed in claim 2 wherein said outlet portion of said pipe has a convergent shape in the direction of flow of the gases.

4. A silencer as claimed in claim 1 wherein deflecting sheets are provided between said conduits and said pipe and extend from both sides of the inlet portion of said conduits towards the outlet end of said pipe.

5. A silencer as claimed in claim 1 wherein said distances are a minor fraction of the diameter of said outlet end.

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