

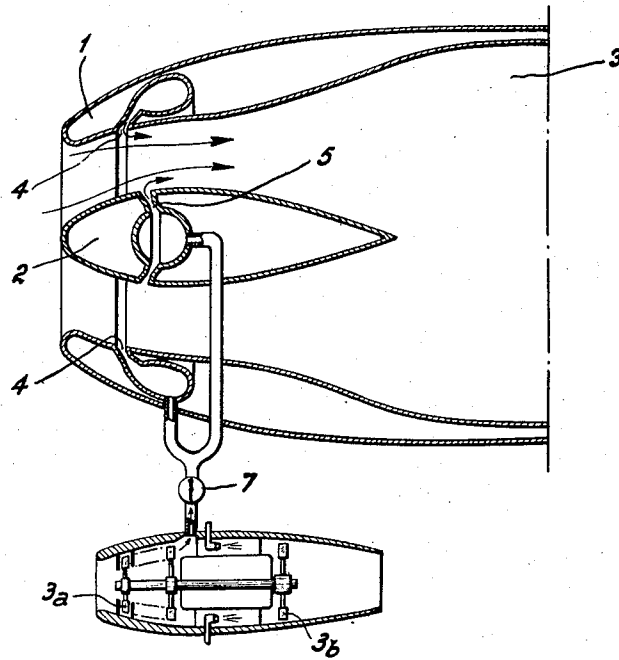
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M. KADOSCH ET AL

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AIR INTAKE CONTROL FOR JET PROPULSION UNITS

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INVENTORS

Marcel Kadosch

Jean H. Bertin

By Watson, Cole, Brindle &

Watson ATTORNEYS

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AIR INTAKE CONTROL FOR JET PROPULSION UNITS

Marcel Kadosch, Paris, and Jean H. Bertin, Neuilly-sur-Seine, France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France, a French company

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1 Claim. (Cl. 60—35.6)

The present invention relates to the control of air intakes of jet propulsion unit.

An object of this invention is to provide aerodynamically operating means for varying the effective area and outline of an air intake casing without requiring displacement of movable members in said air intake.

A further object of this invention is to adapt the air intake to various flight conditions.

According to one of its forms of embodiment, the invention enables the cross-section of the air intake passage and/or its internal shape to be varied according to whether the speed of travel through the air is subsonic or supersonic. When the auxiliary jet is not in operation, the full physical cross-section of the air intake passage is available for the quantity of air passing into the reaction unit, which is satisfactory for flight at low speed. On the other hand, when the auxiliary jet is blown into the air intake opening, this auxiliary jet causes a fluid wall to be substituted for the solid wall of the air intake passage, so that the cross-section available for the air drawn in is reduced. In addition, the fluid wall takes, in its proper flow, the form of a convergent-divergent fluid discharge-nozzle and the passage of the air intake is thus adapted to supersonic flight.

In the accompanying drawing, the single figure is a longitudinal section of an air intake casing arranged in accordance with the invention.

In this figure, the fairing 1 of the air intake of a reaction unit, which is supposed in this example to be a ram-jet unit, surrounds a streamlined body 2 such that the general outline, from the forward end up to the neighborhood of the maximum cross-section of this streamlined body, is slightly convergent, only to become later more strongly divergent up to the combustion chamber 3. Blowing slots extended at 4 on the internal periphery of the fairing, and at 5 on the external periphery of the streamlined body. These slots are so shaped as to expand the fluid which passes through them, thus producing a jet at a high dynamic pressure. The slots may have a convergent-divergent form; they are arranged at the beginning of the divergent portion of the reactor air intake and may be supplied with a suitable auxiliary fluid having a total pressure greater than the static pressure of the air flowing

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through the intake opening of the reaction unit. The slots may be supplied, for example, with compressed air obtained from a small compressor 3a driven by a suitable auxiliary engine, for example by a gas turbine 3b. The supply of air to the slots is controlled by a valve 7.

When the flow of air in front of the ram-jet unit is subsonic, the slots are not supplied with air and the air intake opening is divergent. When the flow is supersonic, the slots are supplied with compressed air and there is thus obtained a convergent-divergent discharge-nozzle by the action of the blowing jet or jets (along the arrows shown at the top) which constitute fluid walls the shape of which may be varied at will and which permit the presence of a subsonic flow at the point at which the main flow becomes divergent.

What we claim is:

In a jet propulsion unit designed to operate both in the subsonic and in the supersonic range and having a forwardly opening air intake bounded by two walls, an outer wall and an inner wall, defining a generally divergent passage whose outline is designed for subsonic flow, an aerodynamically-operating device for adapting said air intake to supersonic flow, comprising a circular slot-like nozzle extending through each of said walls and opening towards the interior of said air intake in a forwardly inclined direction, said slot-like nozzles being substantially opposite each other, and controllable means for supplying pressure fluid to said nozzles to form screen-like jets projecting into said intake from said walls where-by a convergent-divergent duct with fluid walls is substituted for said divergent passage with physical walls.

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