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JET DEFLECTING DEVICE

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Fig. 3

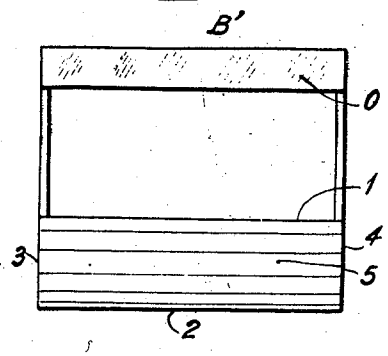


Fig. 1

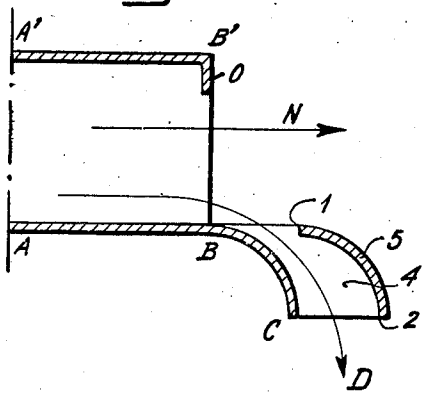
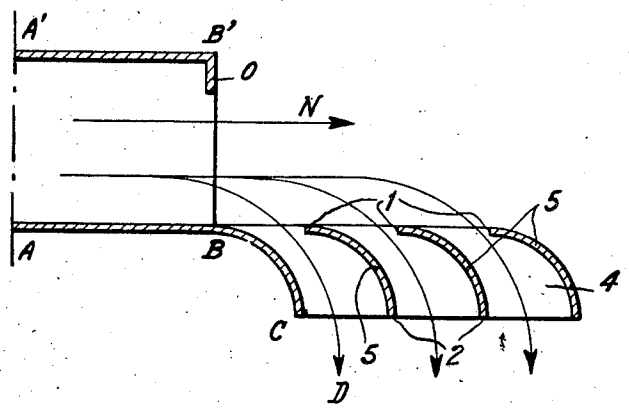


Fig. 2



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JET DEFLECTING DEVICE

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3 Claims. (Cl. 299—122)

This invention relates to means for deflecting a jet issuing from a nozzle.

An object of this invention is to stabilize and further the deflection of a jet which has been initiated in any manner, by means of a solid or fluid obstacle asymmetrically disposed with respect to the flow, or by the natural tendency of the fluid to adhere to a convex wall. A further object of this invention is to provide means acting on the boundary layer or more generally on the marginal layer of the deflected jet by guiding it by means of suitable surfaces, it being possible for this action to be extended to successive layers of fluid in the deflected jet.

These and other objects will become apparent in the following description illustrated by the accompanying drawings in which:

Figure 1 is a diagrammatic longitudinal section of a nozzle provided with jet deflecting means;

Figure 2 is a similar view of a preferred modification;

Figure 3 is an end view of either of said forms.

In Figure 1, ABA'B' is the longitudinal section of a nozzle through which a fluid flows in the direction AB, the fluid leaving the nozzle through the orifice contained in the plane BB' perpendicular to the drawing.

Any device having the effect of producing asymmetry in the distribution of the pressures in the neighborhood of the section BB' of the outlet orifice subjects the jet to a combination of forces tending to deflect it from the normal direction of flow N. If it is desired to deflect the jet in the direction of D, for example, this device may be an obstacle O disposed close to B', the wall AB being extended beyond B by a curved wall BC convex on the side of the flow, against which wall the deflected stream bears. The device initiating the deflection may also comprise only the convex wall BC without an obstacle O at B'.

In the latter case, use is made of the natural tendency of the fluids "to adhere" to the walls which are convex on the side of the flow.

The wall BC may be rounded or polyhedral and rough or polished.

When the deflection in the direction D has been produced by any means, the flow adheres to BC on one of its faces under the effect of the forces of viscosity and assumes a curvature which generates a depression tending to force the flow against the wall BC, thus extending beyond the plane BB' the effect of depression from B' to B. On the other hand, the streams which adhere to the wall

BC are slowed down and the static pressure increases thereon on the path from B to C to the point where the dynamic pressure of this stream is cancelled out.

The equilibrium of these two opposite effects determines the limit of the deflection obtained.

Regardless of the means by which the deflection has been initiated, special means is provided, in accordance with the invention, in order to obtain a considerable angle of deflection.

According to the invention, deflecting means is provided at the outlet of the nozzle for furthering the deflection initiated by the above-described means. This increase in deflection is obtained by guiding the deflected jet by means of a vane 5 (Figure 1) or a number of such vanes (Figure 2) located outside the zone which would be occupied by the jet if it flowed axially without deflection of the nozzle ABA'B'.

The vanes 5 have leading edges 1 adjacent, exposed to and staged along the path of the axially-flowing jet and trailing edges 2 exposed to the atmosphere. In other words, the leading edges 1 lie on an imaginary surface extending in prolongation of the wall AB of the nozzle and these vanes extend laterally from said surface, so that an axial jet formed by the nozzle would flow substantially unaffected past the exposed leading edges of the vanes.

These vanes 5 which are formed of segments of generally cylindrical surfaces extending parallel to each other, are supported beyond the outlet orifice of the nozzle by means of side flanges 3 and 4 secured to the wall of the nozzle.

What we claim is:

1. The combination with a nozzle designed for forming an axially-issuing jet, of a jet deflecting device comprising a set of laterally extending guide vanes positioned downstream of said nozzle, outside the normal flow path of said axially-issuing jet, said vanes being adapted to define successive passages having inlet ends spaced along said flow path and facing generally towards the axis of the nozzle and outlet ends opening into the atmosphere at a substantial angle with said axis, and means acting on said jet for urging the same towards said vanes and into said passages.

2. The combination of claim 1 wherein the means for urging the jet towards the vanes comprises an obstacle projecting into the jet.

3. The combination of claim 1 wherein the set of vanes is located on one side of the flow path of the axially-issuing jet.

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