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NOZZLE FOR A HEATING OR VENTILATING SYSTEM

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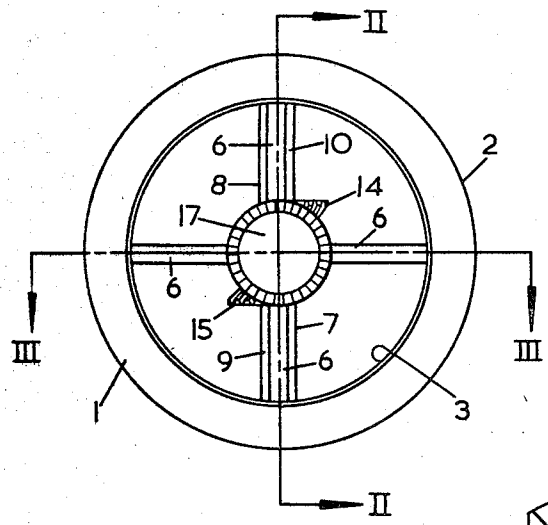


FIG. 1.

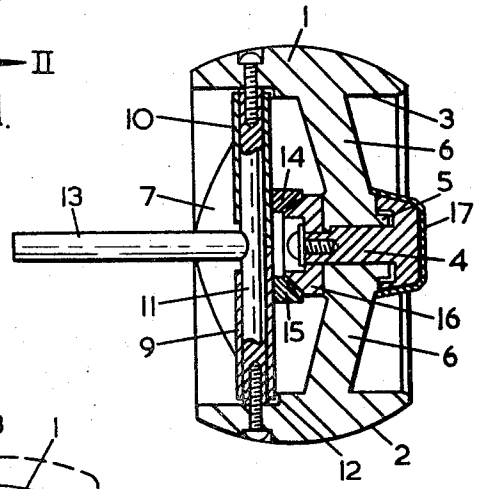


FIG. 2.

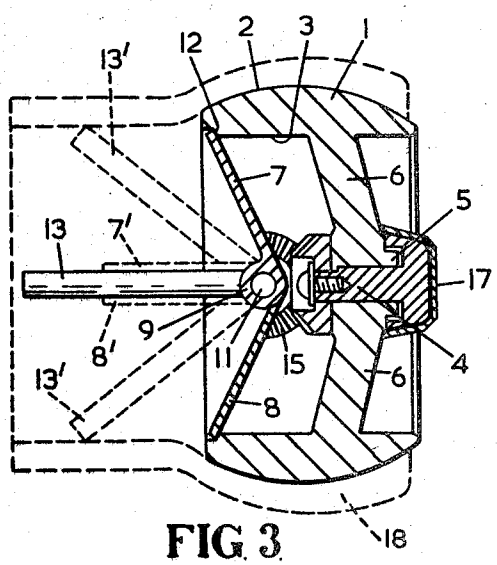


FIG. 3.

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NOZZLE FOR A HEATING OR VENTILATING SYSTEM

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Int. Cl. B05b 1/34

ABSTRACT OF THE DISCLOSURE

A directional nozzle for a heating or ventilating system. The nozzle is defined by a tubular deflector member having a part-spherical outer surface universally movable in a seating. The deflector member contains a pair of semi-circular flaps hinged together along their diametral edges about a common axis extending perpendicularly to the axis of a spindle extending axially of the deflector member and movable laterally of its axis to effect directional adjustment of the deflector member by universal movement of the latter in its seating. The spindle is connected by bevel gears to the flaps whereby on turning the spindle about its axis the flaps can be swung between open and closed positions to vary the area of flow through the tubular member.

The invention relates to a directional nozzle, for a heating or ventilating system, of the kind comprising a tubular housing having a part-spherical seating at its outlet and a tubular deflector member having a part-spherical outer surface co-operating with the seating. By moving the deflector member in its seating in a universal manner, the direction of an air stream issuing therefrom can be altered.

In a known nozzle of the aforegoing kind of the tubular deflector member has a central knob supported therein by substantially radially-extending arms. The tubular member can be moved in its seating to alter the direction of the issuing air stream by an operator gripping the knob and moving it laterally in the desired direction.

With such a nozzle, the flow of air cannot be interrupted by adjustment of the deflector member. If it is desired to interrupt the flow of air, an additional valve, e.g., a butterfly valve, has to be provided upstream of the nozzle. An object of the invention is to provide a nozzle having a combined obturating and deflecting member.

According to the invention, a directional nozzle of the foregoing kind also includes an obturating member, the latter being movable within said tubular deflector member between a fully-open position in which the obturating member causes minimum interference in the air flow through the deflector member and a closed position in which the obturating member closes the flow path through the deflector member, and a spindle extending axially of the deflector member and rotatable to effect said movement of the obturating member, the spindle also being movable laterally of its axis to effect directional adjustment of the deflector member by universal movement of the latter in its seating.

Conveniently, the obturating member comprises a pair of semi-circular flaps which are hinged together along their diametral edges about a common axis extending diametrically across the tubular member and perpendicular to the axis of the spindle, the flaps being operatively connected to the spindle by a differential gear drive, whereby the flaps can be swung in opposite directions between positions in which they each extend across the flow path through the deflector member to close the latter and the fully-open position in which the two flaps are parallel with each other and with a plane extending diametrically

of the deflector member and containing the axes of the hinge and the spindle.

The invention also includes a tubular deflector member for a directional nozzle as set out in the immediately preceding two paragraphs.

By way of example, one form of tubular deflector member for a directional nozzle in accordance with the invention will now be described, with reference to the accompanying drawings, in which:

FIGURE 1 is a front view of the tubular deflector member;

FIGURE 2 is an axial section on the line II—II in FIGURE 1 and showing the obturating members closed, and

FIGURE 3 is an axial section on the line III—III in FIGURE 1 and showing the obturating members closed.

The tubular deflector member **1** has an outer surface **2** in the shape of the central zone of a sphere and is co-operable with a part-spherical seating surface in the mouth of a tubular housing therefor to which a stream of air is to be supplied. The inner surface **3** of the deflector member is cylindrical and contains an axially-extending spindle **4** which is rotatable in a tubular bearing **5** supported by four radially-extending spider arms **6** extending from the inner surface **3** of the deflector member **1**. The arms are of thin cross-section and have curved leading and trailing edges, thereby causing minimum interference to the flow of air through the deflector member. The latter also contains a pair of semi-circular flat, thin flaps **7**, **8**, each integral with a respective sleeve **9**, **10**, mounted for turning around a common coaxial pin **11**, extending diametrically across the deflector member in a direction perpendicular to the axis of the spindle **4**. The flaps **7**, **8** can be swung on the pin **11** between positions as shown in full lines in FIGURE 3 in which their semi-circular edges seat against a shoulder **12** formed in the inner surface **3** and thereby close the flow-path through the tubular member and fully-open position, as shown by broken lines at **7'** and **8'** in FIGURE 3, in which they extend reawardly of the deflector member and parallel with each other one on each side of a rod **13** coaxial with the spindle **4** and supported by the spindle **11**, with which it is integral. The purpose of the rod **13** is to limit the extent of universal movement of the tubular member **1** by the free end of the rod **13** bearing against the inside of the tubular housing in which the tubular member is fitted, thereby to prevent the semi-circular edges of the flaps from jamming against the housing wall when they are in their fully-open positions. The tubular housing **18** has been indicated by broken lines in FIGURE 3. Two limiting positions **13'** of the rod **13** have also been indicated in broken lines in FIGURE. 3. As the flaps are thin, there will be minimum interference with the air flow through the nozzle, when the flaps are in their fully-open positions. The spindle **4** is connected to the flaps **7**, **8** by a differential gear drive comprising a pair of portions **14**, **15** of a co-axial bevelled pinion each integral with the respective flap **7** or **8**, and a crown wheel **16** carried on the inner end of the spindle **4** and engaging both pinion portions **14**, **15**. Rotation of the spindle **4** in its bearing **5** will therefore cause simultaneous and opposite pivoting of the flaps **7**, **8**. Movement of the spindle **4** laterally of the housing will effect directional, universal adjustment of the deflector member **1**. The flaps **7**, **8** may be set in any desired intermediate positions to effect partial obturation of the nozzle by an appropriate turning movement of the spindle **4**. Adjustment of the spindle **4** is effected by the user holding a knurled or milled end cap **17** fitted on the outer end of the spindle **4**.

Conveniently the ratio of the differential gear is unity. The crown wheel is preferably made of a synethic plastics material, e.g., nylon, and in that case it may have, for the

purpose of avoiding back-lash, say, one tooth less than the pinions would have if they were complete.

Although in the foregoing example, the spindle is used to operate the hinged flaps **7, 8**, it could be used to operate another type of obturating member, e.g., an iris.

What I claim as my invention and desire to secure by Letters Patent of the United States is:

1. A directional nozzle comprising a tubular housing having a part-spherical seating at its outlet and a tubular deflector member having a part-spherical outer surface co-operating with the seating, and a spindle extending axially of the deflector member and rotatable about its axis and also movable laterally of its axis to effect directional adjustment of the deflector member by universal movement of the latter in its seating, wherein the improvement comprises a pair of semi-circular flaps, hinged together along their diametral edges about a common axis extending diametrically across the tubular member and perpendicular to the axis of the spindle, a bevel gear drive connected between said spindle and said flaps, whereby the flaps can be swung in opposite directions between positions in which they each extend across the flow path through the deflector member to close the latter and a fully-open position in which the two flaps are parallel with each other and with a plane extending diametrically of the deflector member and containing said common axis and the axis of the spindle, and a stop member co-axial with the spindle and extending from the the tubular member into the tubular housing and arranged to bear at its inner end against the internal surface of the tubular housing, when the deflector member has been inclined to the axis of the latter by a limiting angle.

References Cited

UNITED STATES PATENTS

595,014	12/1897	Doolittle	239—537 X
2,513,463	7/1950	Eklund et al.	98—40
2,735,353	2/1956	Griner	98—41 X
2,974,580	3/1961	Zimmerman et al.	239—579 X
3,010,381	11/1961	Glass	98—41
3,138,085	6/1964	Mitchell	98—40 X
3,319.560	5/1967	Schaaf	98—40

FOREIGN PATENTS

533,791	2/1941	Great Britain.

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U.S. Cl. X.R.

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