United States Patent

[11] 3,589,380

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[21] Appl. No. **790,412**
[22] Filed **Jan. 10, 1969**
[45] Patented **June 29, 1971**

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[32] Priority **Jan. 29, 1968**
[33] **France**
[31] **137,750**

[54] **ADJUSTABLE JET**
6 Claims, 2 Drawing Figs.

[52] **U.S. Cl.** **137/81,** 137/242, 251/176, 251/326, 251/368
[51] **Int. Cl.** **F16k 3/16**
[50] **Field of Search** 251/176, 205, 326, 328, 177, 179; 137/242, 81

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ABSTRACT: Adjustable jet having a variable section jet passage defined by a fixed wall of sheet material substantially 0.1—0.2 mm. thick and a movable wall. The fixed wall has an orifice which is masked to a varying extent by the movable wall which is integral with a movable shoe. Magnitude-measuring means are provided for controlling the movement of the shoe and elastically yieldable means guide the shoe and maintain the shoe against the fixed wall and against the magnitude-measuring means.

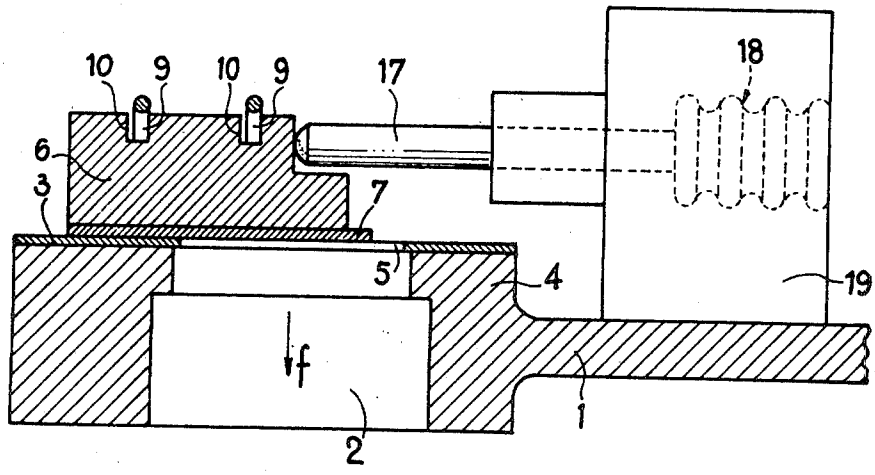
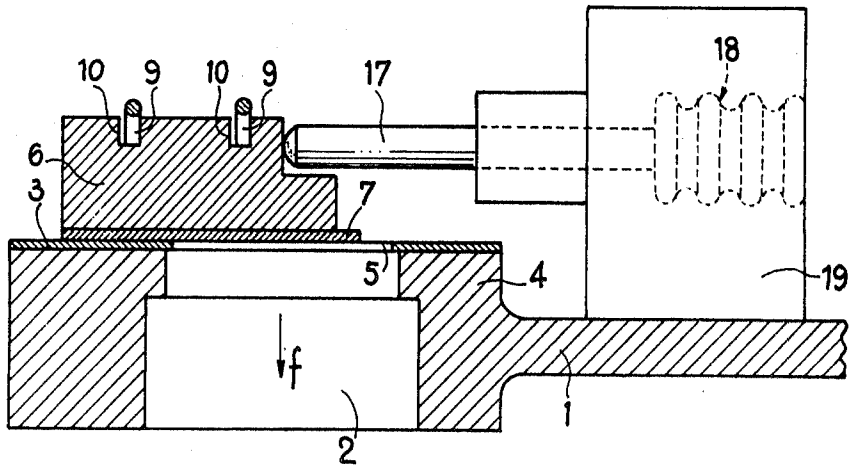


Fig.1



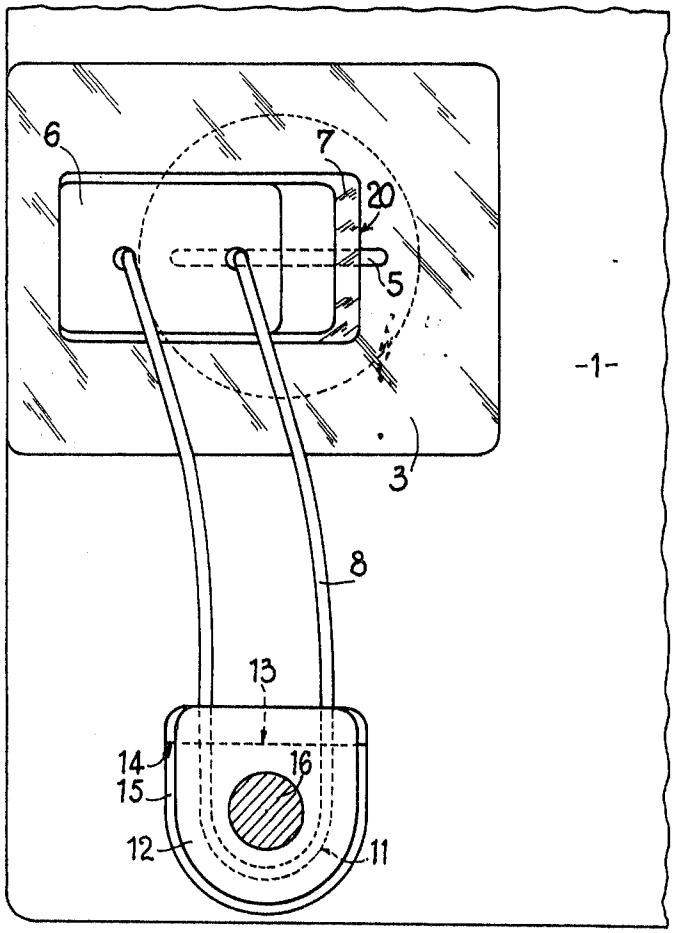


Fig.2

ADJUSTABLE JET

The present invention relates to adjustable jets having a variable-section passage and adapted to regulate gas flows by variation of this section.

In currently used adjustable jets, the section of the passage for the gas is varied by a slide whose movement in a bore uncovers this passage section to a varying extent, or by a needle whose movement in an aperture of appropriate shape defines a variable annular passage section.

Unfortunately, these known devices do not retain their characteristics over a period of time since they are liable to become dirty and this results in a progressive reduction in the passage section.

The object of the invention is to provide an adjustable jet which is improved so as to avoid this drawback.

The invention provides a jet wherein the variable section passage is defined by two thin walls, the first wall being fixed and having an orifice which is masked to a varying extent by the second wall which is integral with a movable shoe guided by elastically yieldable means which maintain said shoe against said fixed wall and against magnitude-measuring means which control the variation in the section of the jet.

The invention is shown to be applied to the case of an air-introducing device provided with a jet whose passage section is controlled by an aneroid capsule as a function of atmospheric pressure.

Further features and advantages of the invention will be apparent from the ensuing description with reference to the accompanying drawing.

In the drawing:

FIG. 1 shows, to a large scale, a longitudinal section of an orifice device provided with a jet adjustable in accordance with the invention, and

FIG. 2 is a plan view thereof.

In the illustrated embodiment, there is formed in a support plate 1 an air-intake pipe 2, this air flowing in the direction indicated by arrow *f*. This pipe is closed in its upper part by a metal foil or sheet 3 having a thickness of 0.1—0.2 mm. and adhered to the upper face of the boss 4. This sheet comprises an orifice 5 of suitable shape, as that of a narrow slot whose width may be constant so as to afford the desired law of variation of the passage section as a function of the variation in the measured magnitude.

Movable above the fixed sheet 3 is a shoe 6 having a lower face to which is adhered a second metal foil or sheet 7 which has a thickness of 0.1—0.2 mm., slightly extends beyond the shoe and slides on the fixed sheet. The sheet 7 uncovers the orifice 5 to a varying extent.

The shoe is maintained in position by a spring 8 having a hairpin or U-shape whose parallel branches have bent ends 9 engaged in two blind apertures 10 in the upper face of the shoe.

The loop portion 11 of the spring is embedded in a member 12 of plastics material having a shoulder 13 placed in front of a shoulder 14 of a boss 15 on the plate 1, so as to position the spring. The loop portion is fixed by a clamping screw 16.

The spring 8 has two functions. Firstly, it biases the shoe 6 downwardly so that the movable sheet 7 is maintained in as perfect a contact as possible with the fixed sheet 3. Secondly, it maintains the shoe against the rod 17 connected to the magnitude-measuring apparatus 18 which controls the variations in the section of the jet. If, for example, the magnitude to be measured is atmospheric pressure, the apparatus is an aneroid capsule maintained in a housing 19 integral with the plate 1.

It can be seen that the section of the air passage is defined by the periphery of the part of the orifice 5 which is uncovered and by the edge 20 of the moving sheet 7 integral with the shoe 6. This periphery is therefore solely formed by the edge of thin walls on which dirt does not accumulate.

Further, as the movable sheet 7 extends beyond the shoe 6, it acts as a scraper when the shoe moves in the direction for closing the orifice 5 and consequently eliminates the impurities which might be deposited on the fixed sheet 3 so that a good contact between the two sheets is maintained.

This contact is also improved by the pressure differential due to the pressure drop across the jet, the part of the orifice which is not uncovered producing a suction effect which tends to apply the sheets against each other.

Another characteristic results from the very shape of the hairpin spring 8 which represents a parallelogram having curvilinear sides which ensures that the shoe 6 moves in a direction parallel to itself with no need for guiding.

Although a specific embodiment of the invention has been described, many modifications and changes may be made therein without departing from the scope of the invention as defined in the appended claims.

In particular, according to another embodiment, the shoe and its associated sheet can be formed by a single member of plastics material having a thin lower lip constituting a scraper and performing the same function as the sheet.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. Adjustable jet comprising means defining a first wall, said first wall being fixed and having a smooth face, an inner thin portion, an outer annular thick portion defining a cavity on a side of said first wall opposed to said smooth face, an orifice which extends axially through said thin portion and has a given minimum transverse extent, said cavity being larger than said orifice so as to be transversely set back from said orifice throughout the periphery of said orifice, said thin portion having a thickness which is a minor fraction of said transverse extent of said orifice whereby said orifice is defined by an edge affording only a small surface for deposit of dust and dirt thereon, means defining a second wall adapted to slide along said smooth face and mask to a varying extent said orifice so as to define a passage of variable section through said first wall, a movable shoe integral with said second wall, magnitude measuring means, elastically yieldable means guiding said shoe and maintaining said second wall in sliding contact with said smooth face and said shoe against said magnitude-measuring means.

2. Adjustable jet comprising means defining a first wall, said first wall being fixed and having a smooth face, an inner thin portion, an outer annular thick portion defining a cavity on a side of said first wall opposed to said smooth face, an orifice which extends axially through said thin portion and has a given minimum transverse extent, said cavity being larger than said orifice so as to be transversely set back from said orifice throughout the periphery of said orifice, said thin portion having a thickness which is a minor fraction of said transverse extent of said orifice whereby said orifice is defined by an edge affording only a small surface for deposit of dust and dirt thereon, means defining a second wall adapted to slide along said smooth face and mask to a varying extent said orifice so as to define a passage of variable section through said first wall, a movable shoe integral with said second wall, magnitude measuring means, elastically yieldable means guiding said shoe and maintaining said second wall in sliding contact with said smooth face and said shoe against said magnitude-measuring means, said first wall comprising a sheet having a thickness of substantially 0.1—0.2 mm. mounted on a support plate defining said cavity.

3. A jet as claimed in claim 2, wherein the movable wall consists of a second sheet attached to a bottom face of said shoe, said second sheet having a thickness of substantially 0.1—0.2 mm. and extending beyond said shoe and constituting a lip portion having a thin leading edge for effecting said masking of said orifice.

4. A jet as claimed in claim 1, wherein said movable wall is in one piece with said shoe and defines a thin lip which has a thickness of substantially 0.1—0.2 mm. and extends laterally beyond said shoe, said lip and said shoe having lower faces in a common plane.

5. Adjustable jet comprising a first wall and a second wall defining a variable section passage, said first wall being fixed and having an orifice which is masked to a varying extent by said second wall, a movable shoe integral with said second wall, magnitude-measuring means, elastically yieldable means guiding said shoe and maintaining said shoe against said fixed wall and against said magnitude-measuring means, said elastically yieldable means comprising two parallel elastically yieldable branches having first end portions held stationary and second end portions connected to said shoe, said branches constituting with said shoe a deformable parallelogram.

6. A jet as claimed in claim 5, wherein said two branches are those of a U-section spring having a loop portion fixed to a fixed support, said second end portions of said parallel branches being bent and engaged in blind apertures in said shoe so as to apply the latter against said fixed wall and bias it in a direction perpendicular to said branches and parallel to said fixed wall.