(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 272 010**
A2

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **87310433.5**

(51) Int. Cl.4: **F04F 5/14**

(22) Date of filing: **26.11.87**

(30) Priority: **11.12.86 GB 8629648**

(43) Date of publication of application:
22.06.88 Bulletin 88/25

(84) Designated Contracting States:
DE FR NL

(71) Applicant: **WESTINGHOUSE BRAKE AND SIGNAL COMPANY LIMITED**
Pew Hill
Chippenham Wiltshire(GB)

(72) Inventor: **Bye, Leonard James**
3 Sadlers Mead
Chippenham Wiltshire(GB)
Inventor: **Small, Steven Alan**
78 Wood Lane
Chippenham Wiltshire(GB)

(74) Representative: **Newstead, Michael John et al**
Page & Co. Temple Gate House Temple Gate
Bristol BS1 6PL(GB)

(54) **A device for ejecting granular or particulate material.**

(57) A device (18) for ejecting granular or particulate material from supply means (20), comprises an elongate body (3/6/7) for through flow of the material, a nozzle (10) defining within the body (3/6/7) an air gap, and means (4/5/6) whereby air can be supplied to the air gap and as a result of the Venturi effect created thereby in the device flow of material through the device is enhanced or enabled. The nozzle (10) is adjustable as regards its position in the device whereby the air gap may be adjustable. By adjusting the air gap it can be set to a value to achieve optimum flow of material through the device.

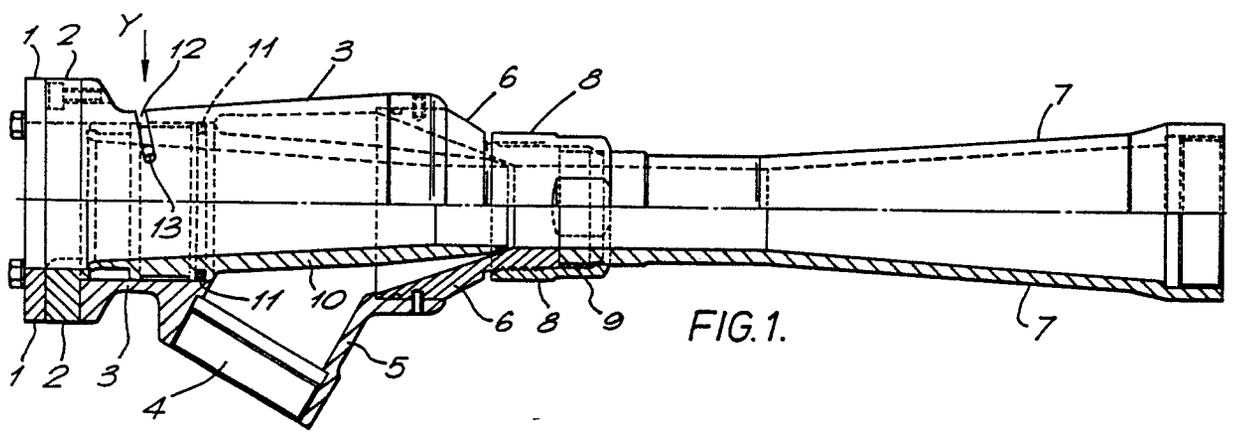

FIG.1.

EP 0 272 010 A2

A DEVICE FOR EJECTING GRANULAR OR PARTICULATE MATERIAL

The present invention relates to a device for ejecting granular or particulate material.

Devices for ejecting granular or particulate material from supply means for such material (such as a hopper) are known in the form of an elongate device through which the material flows, the device including a nozzle for the material, the nozzle defining an air gap in the device, to which gap air is supplied whereby as a result of the Venturi effect created in the device, the flow of material through the device is enhanced or enabled.

According to the present invention, there is provided a device for ejecting granular or particulate material from supply means, the device comprising an elongate body for through flow of the material, a nozzle defining within the body an air gap, and means whereby air can be supplied to the air gap and as a result of the Venturi effect created thereby in the device flow of material through the device is enhanced or enabled, characterised in that the nozzle is adjustable as regards its position in the device whereby the air gap may be adjusted. The provision for adjusting the air gap enables setting the gap to a value to achieve optimum flow of material through the device.

The present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a view, partly in section longitudinally, of a device for ejecting granular or particulate material;

Figure 2 is a view in the direction of arrow Y in Figure 1;

Figure 3 is a part section on Z-Z in Figure 2; and

Figure 4 is a schematic diagram of an air "bleed" arrangement used with the device.

Referring to the drawings, reference numeral 1 designates an annular flange plate at an input end bolted to an annular flange connector 2 which is itself fastened by screws to a hollow body 3 having an air inlet 4 in a portion 5 of body 3 for connection to a source of compressed air. Body 3 is fastened by screws to a throat body 6 which is itself connected to a flared, diffuser body 7 via a locking nut 8 and a compression sleeve 9. Inside the body 3 is an elongate nozzle 10 defining at its innermost end an annular gap between itself and the inside face of body 6. This gap is adjustable in a manner which will be explained below, by adjusting longitudinally the position of the nozzle 10, reference numeral 11 designating an O-ring seal between nozzle 10 and body 3.

In use of the ejecting device, the input end is coupled to the output of a device from which granular or particulate material is fed, for example a hopper supplied with such material. The material flows through the nozzle 10 and then through and out of the diffuser body 7 for subsequent handling of the material. The flow of the material is enabled or enhanced by supplying compressed air into inlet 4, this air emanating into the nozzle 10 through the annular gap between the innermost end of nozzle 10 and the inside face of body 6. As a result of the Venturi effect created where the air emanates from the annular gap, the air laden with the granular or particulate material is sucked through nozzle 10 and into diffuser body 7. To control the degree of suction for a particular application, the nozzle 10 may be adjusted as regards its longitudinal position, to adjust the annular gap between its innermost end and the inner face of body 6 to achieve optimum flow of material. To enable such adjustment of the nozzle 10 the body 3 is formed with a slot 12 through it, extending obliquely across the longitudinal axis of the ejecting device; and the nozzle 10 has two blind holes 13 and 14, these blind holes being spaced 60° apart circumferentially. With the nozzle 10 in the position shown in Figure 1, i.e. in its most inward position and with the narrowest possible annular gap between its innermost end and the inner face of body 6, the blind hole 13 underlies the slot at one end of the latter. To adjust the position of nozzle 10 and hence the annular gap, a bar 15 is inserted into the blind hole 13 (see Figure 3) and rotated in an anti-clockwise direction in Figure 3. The bar 15 slides in slot 12 and, due to the latter being oblique, the nozzle 10 is pulled towards the left in Figure 1. After 60° of rotation, the blind hole 14 appears under the above-mentioned one end of slot 12. To further adjust the position of nozzle 10, the bar 15 may be inserted into the blind hole 14 and rotated again in an anti-clockwise direction in Figure 3, to pull the nozzle 10 further to the left in Figure 1. After 60° of rotation the bar 15 is again at the other end of slot 12, and the nozzle 10 has rotated a total of 120° and has been pulled in total from the position shown in Figure 1 to a position in which its left hand end in Figure 1 (i.e. its outermost end) is at the junction of flange plate 1 and connector 2, as shown by a broken line in Figure 1, and the annular gap is as large as permissible. In use, the annular gap is set to a value which achieves optimum flow of material by adjustment of nozzle 10, the latter then being locked in place by a grub-screw 16 passing through body 3. Reference numeral 17 denotes a scale marked on the outside of body 3, for use in resetting the nozzle to a desired position with reference to its innermost position.

To improve the flow of material through the ejecting device, there is provided a "bleed" of air from the input to inlet 4 to the material before it reaches the air gap of the device. Referring to Figure 4, reference numeral 18 designates the body arrangement 3/6/7 of the ejecting device; reference numeral 19 designates a compressed air line feeding inlet 4; and reference numeral 20 denotes a hopper for feeding material to the body arrangement 3/6/7 of the device 18 via an input chamber 21. To "bleed" air from line 19 to material before it reaches the air gap of the device 18, there is a line 22 connected between line 19 and chamber 21 via an adjustable throttle in the form of a tap 23 for controlling the degree of air "bleed". It has been found that providing such a "bleed" of air to the material can improve the flow of material through the device 18.

Claims

1. A device (18) for ejecting granular or particulate material from supply means (20), the device comprising an elongate body (3/6/7) for through flow of the material, a nozzle (10) defining within the body (3/6/7) an air gap, and means (4/5/6) whereby air can be supplied to the air gap and as a result of the Venturi effect created thereby in the device flow of material through the device is enhanced or enabled, characterised in that the nozzle is adjustable as regards its position in the device (18) whereby the air gap may be adjusted.

2. A device as claimed in Claim 1, wherein the nozzle (10) is adjustable longitudinally in the elongate body (3/6/7) to adjust the air gap.

3. A device as claimed in Claim 2, wherein the body (3/6/7) has therein a slot (12) extending obliquely transversely of the longitudinal direction of the body (3/6/7) and through which an actuating member (15) can be inserted in a blind hole (13) in the nozzle (10), movement of the actuating member (15) along the slot (12) then serving to move the nozzle (10) longitudinally in the elongate body (3/6/7).

4. A device as claimed in Claim 3, wherein there is a plurality of blind holes (13, 14) in the nozzle (10) for co-operation in turn with the slot (12) to receive in turn the actuating member (15).

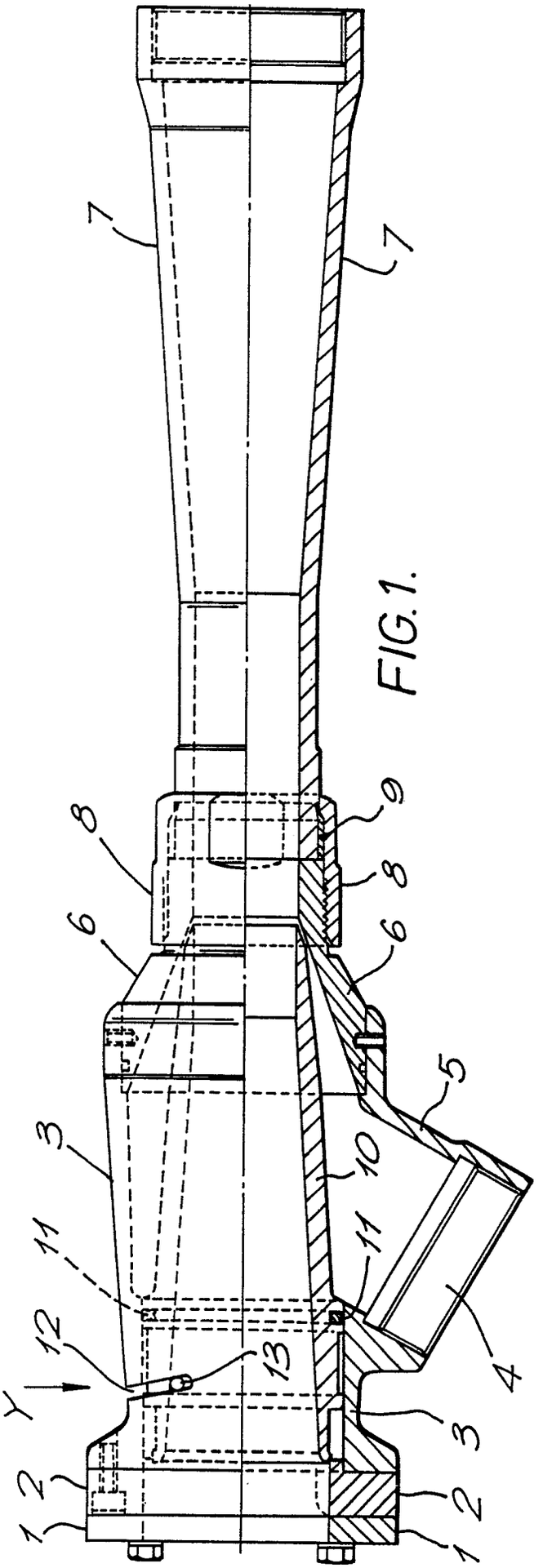

FIG.1.

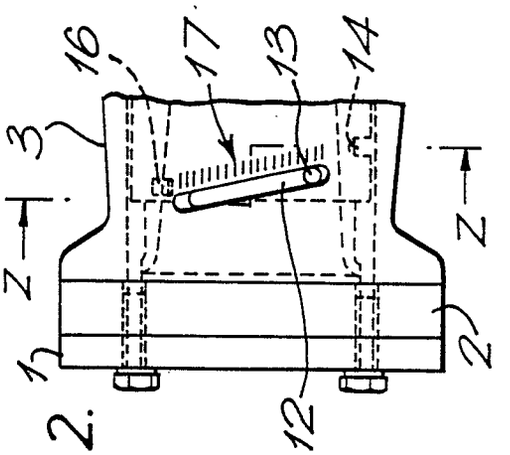

FIG.2.

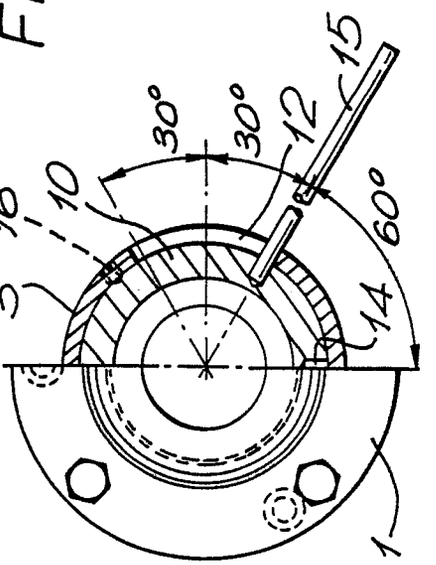

FIG.3.

FIG. 4