

A DIVERTER DEVICE

The invention relates to a diverter device for a pipe for the pneumatic conveyance of loose material.

5 Such a device may comprise a housing with first and second generally coaxial, generally mutually aligned connections; a third connection, the axis of which forms an acute angle with the axis of the second connection; a switching valve journaled in side members of the housing; and having two flow channels, the first of which interconnects
10 the first and second connections when the switching valve is in a first position, and the second of which interconnects the first and third connections when the switching valve is in a second position; a double-acting actuator arranged outside the housing and having an actuator rod pivotally connected to one end of an arm, the other end of
15 which is non-rotatably connected to a rotatable member which extends through one of the side members of the housing, has a bore for receiving a journal of the switching valve and is integrally formed with an entrainment plate disposed between a side face of the switching valve and said side member, the entrainment plate being form-lockingly
20 connected (ie retained captive by virtue of the shapes of the components) to the switching valve.

A diverter device for a pipe of this kind has been disclosed by the applicants through previous public use. The two side members, sometimes referred to as cover plates, have strips of equal congruence
25 which project over the housing and which form a fork-like support for the actuator, which may be a working cylinder, the piston rod of which engages on the bevelled end of the freely disposed drive lever. Mounted on the cover plate of the housing are end position switches which are actuated by a cam formed on the arm. The freely disposed
30 arrangement of the afore-mentioned parts is unfavourable both from the point of view of preventing accidents and from the point of view of operational safety. The parts which are built onto the corresponding cover plate also complicate dismantling thereof which is frequently necessary in order to clean the diverter device. One advantage of the
35 known diverter device is the fact that the region of compressed air and the drive are distinctly separate from the inside of the diverter device and thus from the product and conveyance medium.

According to the invention, there is provided a diverter device for a pipe for the pneumatic conveyance of loose material, the device comprising a housing with first and second generally coaxial, generally mutually aligned connections; a third connection, the axis of which
5 forms an acute angle with the axis of the second connection; a switching valve journaled in side members of the housing and having two flow channels, the first of which interconnects the first and second connections when the switching valve is in a first position, and the second of which interconnects the first and third connections when
10 the switching valve is in a second position; a double-acting actuator arranged outside the housing and having an actuator rod pivotally connected to one end of an arm, the other end which is non-rotatably connected to a rotatable member which extends through one of the side members of the housing, has a bore receiving a journal of the switching
15 valve and is integrally formed with an entrainment plate disposed between a side face of the switching valve and said side member, the entrainment plate being form-lockingly connected to the switching valve, the actuator being connected to said side member through which the rotatable member extends; and the side member, the rotatable
20 member, the arm and the end of the rod being enclosed in a chamber a peripheral wall of which is an integral part of said side member and which is closed by a cover.

Thus, there is provided a diverter device which need have no freely disposed moving parts and wherein the side member can be removed
25 quickly and easily for fast cleaning.

Since the entire drive can be arranged on said side member, the other oppositely disposed, side member simply needs to be unscrewed from the housing for the purpose of cleaning. Moreover, that other side member can be releasably connected to the housing without the use
30 of tools. Also, all driven parts are protected both from contact and from dirt.

Preferably, both sides of the switching valve are designed in the same way in order to produce a form-locking connection with the entrainment plate, and provided between the lateral face of the
35 switching valve which is remote from the entrainment plate and the other side member is a spacer disc equal in thickness to the entrainment plate.

This preferred embodiment is advantageous in that the actuator side of the diverter device can be changed at any time simply by altering the side members concerned. Therein, the switching valve remains in its preselected fitted position on the operating side. If
5 the entrainment connection between the entrainment plate and the switching valve is designed appropriately, the position of the actuator relative to the connections can also be altered for the two possible drive sides, to be more precise by displacing the side member which carries the working cylinder, relative to the housing through a desired
10 angle by using screws.

Conveniently, abutments and also corresponding end position switches are arranged in the chamber to define two end positions of the arm.

It is preferable that the working cylinder is secured to the wall
15 of the chamber.

The invention is diagrammatically illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a longitudinal section through a diverter device according to the invention;

20 Figure 2 is a view corresponding to Figure 1 of a drive side with a partly broken away side cover plate with a switching valve in a first position; and

Figure 3 shows the same view as Figure 2 but with the switching valve in a second position.

25 Referring to the drawings, a diverter device for a pipe comprises a basically circular housing 1 with three connections 1a, 1b and 1c provided at its periphery in a generally Y-shaped array, the first connection 1a of which and the second connection 1b of which have a joint central axis which extends in displacement relationship relative
30 to the geometrical centre of the housing 1.

The housing 1 contains a switching valve 4, which is preferably in the form of an aluminium cast piece. The switching valve 4 has a first flow channel 4.1 for communicating the first connection 1a with the second connection 1b (see Figure 2) and a second flow channel 4.2
35 for communicating the first connection 1a with the third connection 1c. In addition, the switching valve 4 has two journals 4.3 and 4.4. The journal 4.3 rotatably mounts the switching valve 4 in a rear cover

plate 6 of the housing 1 by way of a sleeve 5. The other journal 4.4 is not mounted directly in a front cover plate 7 of the housing 1, but is received in a bore 8.1 of a pivot pin 8 which is in one piece with an entrainment plate 8.2 which is arranged between the front cover plate 7 and the adjacent side face of the switching valve 4. The entrainment plate 8.2 is form-lockingly connected to the switching valve 4 by two entrainment pins 9a and 9b which engage in corresponding bores 4.5 of the switching valve 4.

The pivot pin 8 is rotatably mounted in the front cover plate 7 by way of a sleeve 10, and is guided therethrough. The projecting part of the pivot pin 8 forms an actuation pin of the switching valve 4. The actuation pin is embraced by a collet 11a at one end of an arm 11, on the other end of which arm a piston rod 12a of a double-acting working cylinder 12 is engaged by way of a pivot member 13.

The working cylinder 12 pivots the switching valve 4 backwards and forwards between the positions shown in Figures 2 and 3. In each of the end positions, the arm activates an appropriate end position switch 14a or 14b.

All moving parts of the drive and also the end position switches 14a and 14b are disposed in a chamber which is defined by the outer face of the front cover plate 7, a peripheral chamber wall 7a and a cover 15. Since the front cover plate 7 of the housing is usually a cast member, it is simplest if the chamber wall 7a is manufactured in one piece with the front cover plate 7. The working cylinder 12 is secured to the chamber wall 7a by means of a tubular adaptor piece 12b. The working cylinder 12 can be secured directly or indirectly to the front cover plate 7. If the front cover plate 7 can be rotated appropriately, by the use of screws, through angles relative to the housing 1, it is then possible to bring the working cylinder 12 into different positions than that shown relative to the connections 1a and 1b. Above all, the actuation side of the switching valve 4 can be changed, to be more precise by simply exchanging the cover plates 6 and 7 including the associated parts. Associated therewith is a spacer disc 16 which is arranged between the rear cover plate 6 and the adjacent surface of the switching valve 4 and which embraces the journal 4.3, the spacer disc 16 being equal in thickness to the entrainment plate 8.2, so that the alignment of the flow channels 4.1

and 4.2 of the switching valve 4 with the connections 1a and 1c of the housing 1 does not change if the actuation side is changed. Another prerequisite is that the two side faces of the switching valve 4 are designed in the same way to produce a form-locking connection with the entrainment plate 8.2. In the embodiment, this is by way of the bores 4.5 which receive the respective entrainment pins 9a.



CLAIMS

1. A diverter device for a pipe for the pneumatic conveyance of loose material, the device comprising a housing with first and second
5 generally coaxial, generally mutually aligned connections; a third connection, the axis of which forms an acute angle with the axis of the second connection; a switching valve journaled in side members of the housing and having two flow channels, the first of which interconnects the first and second connections when the switching valve is in a first
10 position, and the second of which interconnects the first and third connections when the switching valve is in a second position; a double-acting actuator arranged outside the housing and having an actuator rod pivotally connected to one end of an arm, the other end which is non-rotatably connected to a rotatable member which extends
15 through one of the side members of the housing, has a bore receiving a journal of the switching valve and is integrally formed with an entrainment plate disposed between a side face of the switching valve and said side member, the entrainment plate being form-lockingly connected to the switching valve, the actuator being connected to said
20 side member through which the rotatable member extends; and the side member, the rotatable member, the arm and the end of the rod being enclosed in a chamber a peripheral wall of which is an integral part of said side member and which is closed by a cover.
- 25 2. A diverter device according to claim 1, wherein both sides of the switching valve are designed in the same way in order to produce a form-locking connection with the entrainment plate, and provided between the lateral face of the switching valve which is remote from the entrainment plate and the other side member is a spacer disc equal
30 in thickness to the entrainment plate.
3. A diverter device according to claim 1 or claim 2, wherein abutments and also corresponding end position switches are arranged in the chamber for two end positions of the arm.
- 35 4. A diverter device according to any one of claims 1 to 3, wherein the actuator is secured to the peripheral wall of the chamber.



5. A diverter device according to any one of claims 1 to 4, wherein the switching valve is secured to the entrainment plate by means of entrainment pins.

5 6. A diverter device for a pipe for the pneumatic conveyance of loose material substantially as hereinbefore described and illustrated with reference to the accompanying drawings.