

"DEVICE AT SUCTION CONVEYORS FOR CONTINUOUS
TRANSPORT OF DEBRIS"

The present invention relates to conveyor arrangements for the continuous transport of debris, in which a suction pump is provided to generate a partial vacuum in a filter container in order to
5 transport debris thereto on a current of air and in which the filter container contains a filter through which the air is passed to the pump from a zone in which the debris is deposited by the air current and from which the debris is discharged.

10 According to the present invention there is provided a conveyor arrangement for the continuous transport of debris, comprising a filter container containing a filter device, a suction pump arranged to create an air current into the container through a
15 conveyor tube, thence through the filter device to the pump, the debris being carried into the filter container along the conveyor tube by the air current and fed from the outlet of the conveyor tube into a discharge zone of the container said discharge zone having an outlet, and a discharge device having an
20 inlet connected to receive debris from said outlet, said discharge device comprising a screw conveyor having at its outlet end a closure which is biased into engagement with the outlet opening to seal the opening
25 in an air-tight manner, and said screw conveyor including a feed screw for feeding debris from the filter container to the outlet of the screw conveyor with sufficient force to move the closure away from the outlet opening against the biasing force and to dis-
30 charge the debris through said outlet, said conveyor arrangement further comprising a float switch device responsive to the level of the debris in the container.

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and a valve operable by the float switch device to relieve the partial vacuum in the filter container when said level is above a predetermined level, and a time relay operating to initiate closing of the valve again after a predetermined interval so as to re-establish the transport of debris to the filter container.

The invention will now be described in more detail with reference by way of example to the accompanying drawings, which illustrates diagrammatically a conveyor arrangement according to the invention.

The plant shown in the drawing comprises a filter container 1 (a so-called low-pressure vessel) with a replaceable filter device 2 of conventional type. At its upper end the filter container 1 is connected to a pump 4 via a conduit 3 and adjacent the lower end of the container is a conveyor tube 5 for debris, preferably in the form of powder or granules, e.g. cement material. The pump 4 is of a size to generate such a vacuum in the filter container 1 that a powerful air current is obtained along the conveyor tube 5 and the debris is transported along said tube by the air current to a debris zone 6 down below in the filter container 1 (arrow R) while the air (arrow L) is passed through the filter device 2, which prevents the debris from flowing into the pump 4. The debris zone 6 beneath the filter device 2 has a decreasing cross-section in a downward direction and towards an outlet 17 which communicates with a discharging device 7 below. This device is designed as a screw

conveyor comprising a cylindrical tube 8 with a feed screw 9 driven by a motor 10. Outlet 17 opens to tube 8. The outer diameter of the feed screw 9 is preferably only a few millimetres less than the inner diameter of the tube 8 and the motor operates the feed screw 9 such that it rotates with a speed of rotation substantially more than 100 rpm, preferably 800-1200 rpm, whereby the feed screw 9 attains a compressor effect.

10 The outlet 11 of the tube 8 is sealed in an air-tight manner by means of a sealing device 12. This device preferably comprises a cap 13, which is pivotally suspended about an axis 14 above the tube 8 in a support structure 15. The cap 13 is preferably suspended with its centre of gravity so positioned that the cap automatically returns to the position closing the tube 8. The cap 13 and/or the tube 8 may be provided with sealing rings (not shown) if this is necessary for obtaining sufficient sealing.

20 Since the feed screw 9 has a slightly smaller outer diameter than the inner diameter of the tube 8 and is driven to rotate at high speed, the screw may discharge the debris from the zone 6 with such a force that the debris pushes the cap 13 out of its sealing position. Furthermore, the feed screw feeds such large amounts of debris that the tube 8 is sealed beyond the cap 13, i.e. the discharging device 7 is sealed by means of the debris even if the cap 13 is open, which means that the discharging device forms a valve device permitting discharge of debris from the filter container 1 without affecting the vacuum therein.

In order to assist the passage of the debris through the zone 6 the conveyor tube may have a downwardly directed end portion 18 of the conveyor tube 5, the outlet of the tube facing towards the outlet 17.

5 The size of the discharging device in combination with the rotary speed is so selected that despite the compressor effect, the screw has such a capacity that the filter container 1 does not become filled with debris, which instead is discharged at the same rate
10 as the debris is fed to the container 1. In this way it is ensured that the plant reaches a very high feeding capacity without the risk of damaging the filter device 2. The filter container 1 also has a float switch 19 for controlling a valve 20 such that
15 the valve opens if the debris in the filter container 1 rises because of shutdowns or for other reasons, above a predetermined level. By opening the valve 20, the vacuum in the filter container is relieved and the transport of debris thereto ceases. The float switch
20 19 and valve 20 co-operate with a time relay 21 regulating the valve 20 to close again after a predetermined time interval so that the vacuum in the filter container 1 is regenerated and the transport of debris to the filter container 1 re-established.

25 The plant described and illustrated in the drawing may of course vary with regard to the number of components and their design and position. Thus, the plant may comprise more than one pump device, filter device, feeding device and discharging device. This
30 may comprise more than one screw and sealing device of another type than a cap. The form of the apparatus is, in other words, not limited to the embodiment shown but may vary within the scope of the claims.

CLAIMS

1. A conveyor arrangement for the continuous transport of debris, comprising a filter container containing a filter device, a suction pump arranged to create an air current into the container through a conveyor tube, thence through the filter device to the pump, the debris being carried into the filter container along the conveyor tube by the air current and fed from the outlet of the conveyor tube into a discharge zone of the container said discharge zone having an outlet, and a discharge device having an inlet connected to receive debris from said outlet, said discharge device comprising a screw conveyor having at its outlet end a closure which is biased into engagement with the outlet opening to seal the opening in an air-tight manner, and said screw conveyor including a feed screw for feeding debris from the filter container to the outlet of the screw conveyor with sufficient force to move the closure away from the outlet opening against the biasing force and to discharge the debris through said outlet, said conveyor arrangement further comprising a float switch device responsive to the level of the debris in the container, and a valve operable by the float switch device to relieve the partial vacuum in the filter container when said level is above a predetermined level, and a time relay operating to initiate closing of the valve again after a predetermined time interval so as to re-establish the transport of debris to the filter container.



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2. A conveyor arrangement according to claim 1, wherein the outlet end of the conveyor tube faces towards the outlet of the discharge zone.

5 3. A conveyor arrangement as claimed in claim 1 or claim 2 wherein the feed screw rotates at a speed in the range 800 to 1200 rpm.

