Feb. 23, 1932. J. B. SCHAUB 1,846,069

AIR CURRENT CONVEYER

Filed Oct. 17, 1928

FIG. 2.

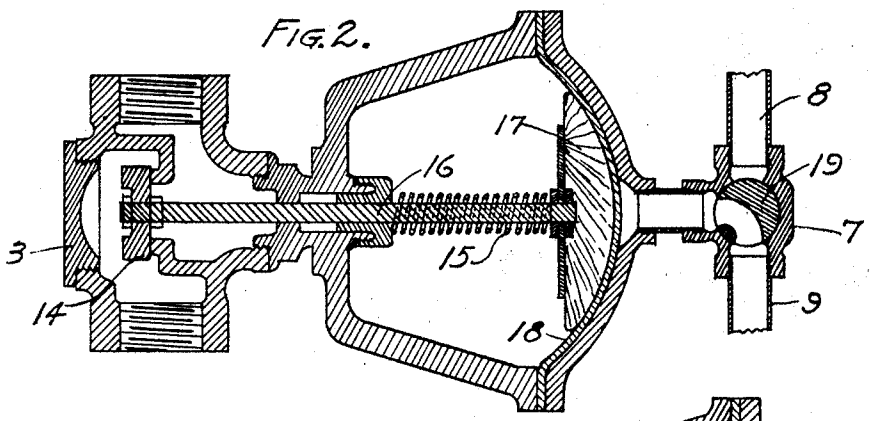


FIG. 3.

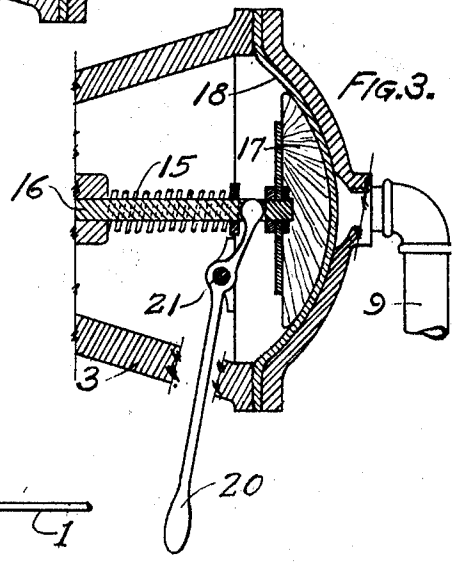
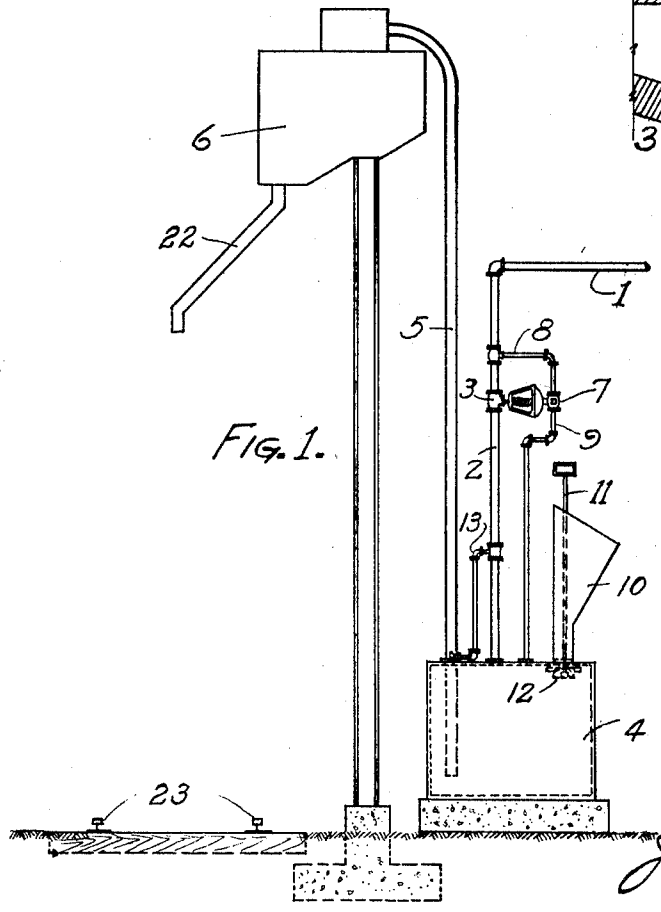


FIG. 1.



INVENTOR

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UNITED STATES PATENT OFFICE

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AIR CURRENT CONVEYER

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My invention relates to an arrangement of apparatus constituting a conveyer system, and used for transporting finely divided solids, granular materials, and comminuted materials as well as fluid or liquid substances, in a lateral direction or a vertical direction or a combination of lateral and vertical directions and uses tubular conduits as conducting members and utilizes air or gas having been compressed greater than the pressure of the atmosphere as a conveying medium.

It more particularly applies to conveyers used for elevating sand from a receptacle at approximately ground level to a receptacle sufficiently elevated to allow the sand to flow by gravity into the sandbox or dome of locomotives.

The object of my invention is to provide a means of automatically cutting off the supply of compressed air as soon as the materials in the conveyer system have been conveyed, thereby saving the expense of constant attention from an attendant and saving the expense of dissipated compressed air due to its continued flow when no materials are being conveyed.

My invention will be fully understood upon reference to the accompanying drawings, in which—

Figure 1 is a non scale and rather schematic view illustrating a conveyer system used for transporting dry sand from an elevation near the level of the track to an elevated storage sufficiently high to permit the sand to flow by gravity from the storage, through a spout into the sand dome on the top of a railway locomotive, in which the several features of my invention are embodied.

Figure 2 is a section view, to a somewhat larger scale, of the control valve which operates to open and close the compressed air supply line and is shown in combination with a three way cock which is used for operation.

Figure 3 is a part section view of a modification of the control valve which operates to open and close the compressed air supply line and is shown in combination with a hand lever which is an alternate means of operation.

Referring to Figure 1, 1 is a tubular conduit or conductor pipe leading from an air compressor or from an air storage reservoir or from any other suitable source of air that is under greater pressure than that of the atmosphere, and which furnishes the means of operation for the conveyer system. 2 is a continuation of the same conductor pipe after passing the pressure control valve 3, and connecting to the forwarding chamber 4. 5 is a tubular conduit or conductor pipe connecting forwarding chamber 4 with delivery chamber 6, and through which the material to be conveyed must pass. 7 is a three way valve or cock so arranged in relationship to the pressure control valve 3 that the pressure control valve 3 can be operated by means of air pressure variations through conductor pipes either 8 or 9. 10 is a funnel shaped spout by means of which the materials to be conveyed may be more readily placed into the forwarding chamber 4. 11 is a handle connecting the valve 12 which is used to close the opening under funnel 10 after the materials to be conveyed have been placed into the forwarding chamber 4. 13 is a small conductor pipe connecting the compressed air supply line and the materials conductor line and is sometimes used to assist the flow of the materials to be conveyed, a feature well understood by those versed in the art. 22 is a spout connecting the chamber 6, and through which the material may flow by gravity into the dome of a locomotive located on railway track 23.

By referring to Figure 2 is seen an enlarged sectional view of the pressure control valve 3 and the three way cock 7. In valve 3 the valve disc 14 is biased to a closed position by means of a suitable coil spring 15 which surrounds the reciprocating stem 16 that connects valve disc 14 and diaphragm block 17. The valve disc 14 is forced into open position by action of reciprocating stem 16 when sufficient air pressure is introduced through either conductor pipe 8 or conductor pipe 9 to exert a pressure on diaphragm 18 to offset the pressure of coil spring 15. The air pressure will operate through either conductor pipe 8 or 9 depending upon the position of the plug 19 in the cock 7.

Figure 3 is an enlarged sectional view of a modification of a portion of the pressure control valve 3. In this figure the conductor pipe 9 is connected to the pressure control valve 3 by a direct connection rather than through a three way cock as in Figures 1 and 2. A hand lever 20 pivoted on a pin 21 is provided as a means of operating the valve disc 14 against the pressure of the coil spring 15.

The method of operation when the three way cock is used in combination is as follows:—

After the material to be conveyed or elevated has been placed into forwarding chamber 4 through funnel spout 10 the valve 12 is closed by means of handle 11. Then cock 7 in the air pressure line 8 is set to permit a pressure of air from the supply line 1 to press on the diaphragm 18 and in turn compress the spring 15 and thereby open valve disc 14 which is normally in a closed position. Following this operation the compressed air passes from supply line 1 into line 2 and into forwarding chamber 4. The air pressure in forwarding chamber 4 causes the material in this chamber to pass through the conductor pipe 5 and be deposited into the receiving tank 6. The three way cock 7 is now set to permit the pressure in chamber 4 to pass through conductor pipe 9 and operate against the diaphragm 18 and hold the valve disc 14 in open position. As soon as the material previously placed in chamber 4 has been conveyed the pressure in chamber 4 will decrease due to the decrease in pressure resistance, this in turn permits a decrease in pressure on the diaphragm 18 and as a result the spring 15 will cause the valve disc 14 to close thereby stopping the flow of compressed air from the main supply through conductor pipe 1.

The method of operation when hand lever is used is as follows:—

After the material to be conveyed or elevated has been placed into the forwarding chamber 4 as previously described, and the valve 12 is closed, the hand lever 20 is operated against the pressure of spring 15 to cause valve disc 14 to open and thereby permit the compressed air to pass through conductor lines 1 and 2 and cause pressure in forwarding chamber 4 and in turn cause the material in forwarding chamber 4 to pass through conductor pipe 5 to the receiving tank 6. The pressure created in forwarding chamber 4 by the compressed air will also operate through conductor pipe 9 and in turn cause a pressure on the diaphragm 18 and thereby hold the valve disc 14 open against the pressure of the spring 15. It is therefore unnecessary for the operator to hold the lever 20 against the pressure of the spring 15. As previously explained, as soon as the material in the forwarding chamber 4 has been conveyed the drop in pressure in the chamber will result in a drop in pressure on the diaphragm 18, by virtue of the connecting conductor pipe 9 and as a result the spring 15 will cause the valve disc 14 to close thereby stopping the flow of compressed air from the main supply through the conductor pipe 1.

Heretofore it has been difficult to determine definitely as to when the materials in the forwarding chamber have been all conveyed and therefore the compressed air was frequently permitted to flow much longer than was necessary. Also it has heretofore been necessary for the operator or attendent to wait beside the conveyer and close off the compressed air supply by hand thus preventing him from performing other duties. Also if for some reason the operator or attendant has had occasion to go away from the conveyer, the air has continued to flow until he returned thereby frequently causing considerable waste in power.

My invention when installed in connection with an air current conveying system as described, causes the compressed air supply to be automatically shut off as soon as the materials to be conveyed have been conveyed, thereby causing a considerable saving in expense in the operation of conveyers of the class described.

It is evident the arrangement of the various parts of my invention may be varied to considerable extent, both in individual detail and in group, as local conditions may require without deviating from the object to be gained. Discharge of the materials may be made to open space direct or direct into some utilizing member. It is also evident that different kinds of valves from those shown and described may be used with the same result, I therefore do not propose to limit my invention to the exact details and arrangements as shown and described.

I am fully aware of the fact that conveying systems operated with compressed air as a conveying medium are neither new nor novel. I am also fully aware of the fact that pressure control valves and three way cocks as shown and described herein are neither new nor novel. Such features I do not claim as my invention.

I claim:

1. A system for conveying granular materials comprising a source of compressed gas, a forwarding chamber having conduits for conducting the compressed gas and for conducting the granular materials connected thereto, means for discharge at delivery end of conduit, and a pressure control valve intercepting the compressed gas conduit, said valve having operating means responsive to pressure variations within a chamber, said chamber of said valve having conduits connecting source of compressed gas and cavity

of forwarding chamber through a common control point.

2. In a conveyer of the class described, a forwarding chamber having a discharge conduit and a compressed air supply conduit connected thereto, a valve in the air supply conduit having auxiliary chamber control, said chamber having conduit connection to forwarding chamber.

3. In a conveyer of the class described, a forwarding chamber having a discharge conduit and a compressed air supply conduit connected thereto, a valve in the air supply conduit having auxiliary chamber control, a three way cock and conduits connected thereto whereby the auxiliary chamber may be placed in communication with either the air supply or the forwarding chamber.

4. In a conveyer of the class described, a forwarding chamber, conduits for compressed gas and for conveying materials connected thereto, a valve in the compressed gas conduit having auxiliary chamber control, and means for placing said auxiliary chamber in communication with gas supply or forwarding chamber.

5. In an air current conveyer, a forwarding chamber having conveyer conduit and compressed gas supply conduit connected thereto, a valve, having a spring and pressure chamber operating means, located in the compressed gas conduit, said valve having provision for operation against force of said spring and having conduit connection between pressure chamber and forwarding chamber.

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