Nov. 2, 1926. 1,605,490

E. A. WATSON

RELIEF DEVICE FOR PNEUMATIC EXHAUST SYSTEMS

Filed April 27, 1925

Fig. 2.

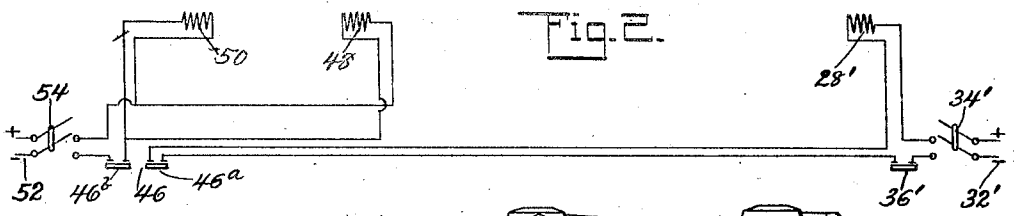


Fig. 3.

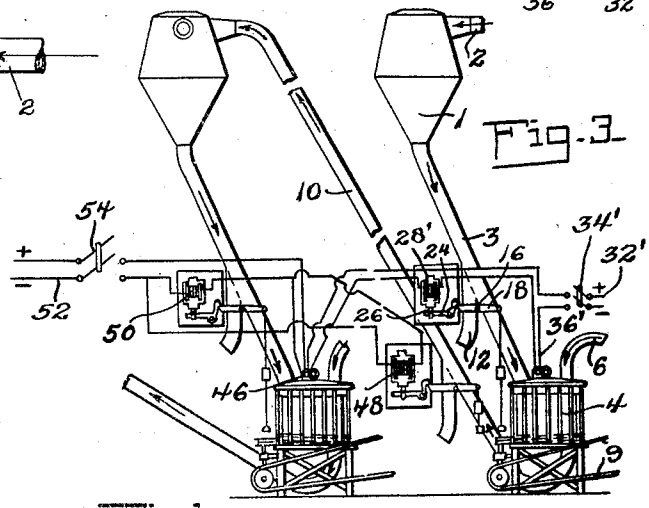
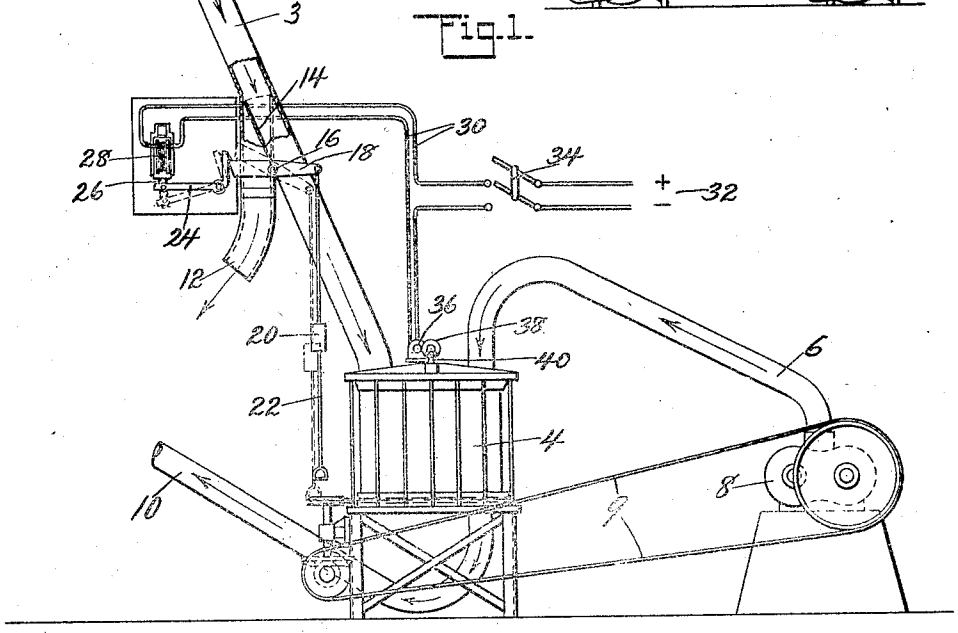


Fig. 1.



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RELIEF DEVICE FOR PNEUMATIC EXHAUST SYSTEMS.

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The following is a full, clear and exact description, such as will enable others skilled in the art to which it appertains to make and to use the same, reference being had to the accompanying drawings which illustrate the preferred form of the invention; though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof within the scope of the claims will occur to persons skilled in the art.

In said drawings:

Fig. 1 is a view in elevation, partly broken away, of a pneumatic collecting system equipped with a relief device constructed in accordance with this invention;

Fig. 2 is a wiring diagram showing the manner of controlling a plurality of relief devices in a pneumatic collecting system; and

Fig. 3 is a view on a reduced scale of a main charger and an auxiliary charger arranged to feed thereinto.

This invention relates to pneumatic collecting systems and more particularly to automatically operating relief devices to prevent the choking of the pipe lines leading to the chargers of such a system upon the failure of the chargers, and it is an object of this invention to provide by-pass valves in the pipe lines leading to the chargers of such a system which will be operated automatically on the failure of the chargers to divert from the chargers the material passing through the pipe lines to the chargers.

In the drawing, the invention is shown applied to a pneumatic collecting system of the type shown in the patent to Woodley #1,184,403, May 23, 1916, and comprising a centrifugal collector 1 receiving the discharge from a low pressure line 2 and discharging by gravity through pipe line 3 to a charger 4 of the type shown in the Woodley patent. The character 4 is supplied pressure through pipe line 6 from a high pressure blower 8 operated by any suitable means (not shown), and is operated from the blower 8 as by a belt 9 so that any failure of the means operating the blower 9 will also shut down the charger 4. The charger 4 discharges through the line 10 to another charger if the charger 4 is an auxiliary charger or to the furnace or storage bin if the charger 4 is the main or sole charger in the system.

The pipe line 3 between the collector 1 and charger 4 is provided with a discharge outlet 12 controlled by a by-pass or diverting valve 14 mounted upon a shaft 16 having an operating lever 18 fixed thereon. The valve 14 is biased to a position in which the material passing through the pipe line 3 will be diverted to the discharge outlet 12 by means of a weight 20 fixed on an operating rod 22 connected to one end of the operating lever 18. The valve 14 is held in position to direct the material passing through the pipe line 3 to the charger 4 by means of a pivotally mounted latch 24 which engages the other end of the operating lever 18 and is held in engagement therewith by the armature 26 of the solenoid 28 which is pivotally connected to an end of the latch 24.

The solenoid 28 is controlled by a circuit 30 connected to a source of power 32 and having therein a manually operated switch 34 and a centrifugally operated switch 36 which is driven by the gear train 38 from the shaft 40 of the charger 4. The centrifugally operated switch 36 is so designed that while the charger 4 is in operation the switch 36 will be closed completing the circuit from the source of power 32 through the switch 34 and solenoid 28, energizing the solenoid 28 and operating the armature 26 to retain the latch 24 in engagement with the lever 18 and maintain the valve 14 in the position shown in full lines in Fig. 1. Upon any failure of the driving mechanism which permits the charger 4 to stop, the switch 36 will open the circuit of the solenoid 28 permitting the armature 26 to drop and release the latch 24 from the lever 18. The weight 20 will then operate the lever 18 and the valve 14 to the position in which the valve 14 diverts the material passing through the pipe line 3 to the discharge outlet 12.

In starting the operation of the system the charger is first started and then switch 34 closed, closing the circuit to the solenoid 28. The valve 14 is then moved to the position closing the discharge outlet 12 by means of the operating rod 22 whereupon the latch 24 will be held in engagement with the lever 18 by means of the armature 26 which is attracted by the solenoid 28. While the solenoid 28 is shown as one which is ener-

gized when the valve 14 is to be held in the position to close the discharge outlet 12, it will be understood that the solenoid 28 and the switch 36 may be arranged so that the solenoid 28 will be deenergized when the valve is held in that position and the valve operated to divert the material to the discharge outlet 12 upon the closing of the circuit and the energizing of the solenoid 28.

In the wiring diagram shown in Fig. 2, the solenoid 28′ controls a by-pass valve as in Fig. 1 located in a pipe line leading to an auxiliary charger and the circuit of the solenoid is controlled by a centrifugally operated switch 36′ and manually operated switch 34′ controlling the power from the source of power 32′. The circuit of the solenoid 28′ is in this construction extended from the auxiliary charger to the centrifugal switch 46 of the main charger and is controlled by a contact 46^a of the centrifugal switch 46. The centrifugal switch 46 also includes a contact 46^b which controls the circuits of solenoids 48 and 50 controlling the by-pass valves in the pipe lines leading to the main charger, one of which may be in the pipe line between the main and auxiliary chargers. The circuits of the solenoids 48 and 50 receive power from a source of power 52 through a manually operated switch 54.

It will be noted that the circuit of the solenoid 28′ is controlled not only from the auxiliary charger but from the main charger so that the auxiliary charger will be protected as well as the main charger in case the main charger is shut down and the switch 46 operated. Further, the circuits shown will permit of the auxiliary charger being shut down by the operation of the switch 36′ or 34′ without in any way interfering with the operation of the main charger as the by-pass valves in the pipe lines leading to the main charger are controlled by solenoids in circuits receiving their power from the source of power independently of the control circuit for the auxiliary charger and controlled by a switch independent of the switch controlling the control circuit for the auxiliary charger.

What is claimed is:

1. In a pneumatic collecting system, a charger, a supply line discharging into said charger, an auxiliary discharge outlet in said supply line and a valve in said supply line controlled by said charger for opening said discharge outlet and closing the supply line to the charger.

2. In a pneumatic collecting system, a charger, a collector discharging into said charger, an auxiliary discharge outlet in the line between the collector and the charger, a valve controlling the discharge from said collector into said charger and into said auxiliary discharge outlet and means controlled by the operation of said charger for controlling said valve.

3. In a pneumatic collecting system, a charger, a collector discharging into said charger, a three-way valve controlling the discharge from said collector into said charger, and means for automatically controlling the operation of said three-way valve according to the operation of said charger.

4. In a pneumatic collecting system, a charger, a collector discharging into said charger, a three-way valve controlling the discharge from said collector into said charger, electrically operated means controlling said three-way valve and means operated by said charger for controlling said electrically operated means.

5. In a pneumatic collecting system, a charger, a collector discharging into said charger, an auxiliary discharge outlet in the line between the collector and the charger, a valve controlling the discharge from said collector into said charger and into said auxiliary discharge opening, a magnet for controlling said valve, an electrical circuit for said magnet and a switch automatically controlled in accordance with the operation of said charger for controlling said circuit.

6. In a pneumatic collecting system, a charger, a supply line discharging into said charger, and means automatically controlled in accordance with the operation of said charger to divert the supply from said line away from the charger when said charger stops.

7. In a pneumatic collecting system, a main charger, an auxiliary charger feeding into said main charger, a feed for said auxiliary charger and means controlled by said main charger for diverting the supply from said auxiliary charger.

8. In a pneumatic collecting system, a main charger, an auxiliary charger feeding into said main charger, a feed for said auxiliary charger, means controlled by said main charger for diverting the supply from said auxiliary charger and means controlled by said auxiliary charger for diverting the supply from said auxiliary charger independently of said main charger.

9. In a pneumatic collecting system, a main charger, an auxiliary charger feeding into said main charger, a feed for said auxiliary charger and means controlled by said main charger for diverting the supply from said main and auxiliary chargers.

10. In a pneumatic collecting system, a main charger, an auxiliary charger feeding into said main charger, a feed for said auxiliary charger, means controlled by said main charger for diverting the supply from said main and auxiliary chargers and means controlled by said auxiliary charger for divert-

ing the supply from said auxiliary charger independently of said main charger.

11. In a pneumatic collecting system, a main charger, an auxiliary charger feeding into said main charger, a feed for said auxiliary charger, and a valve controlled by said main and auxiliary chargers for diverting the supply from said auxiliary charger.

12. In a pneumatic collecting system, a main charger, an auxiliary charger feeding into said main charger, a feed for said auxiliary charger, diverting valves controlling the feeds to said main and auxiliary chargers and means controlled by said main charger for controlling said by-pass valves.

13. In a pneumatic collecting system, a main charger, an auxiliary charger feeding into said main charger, a feed for said auxiliary charger, a diverting valve controlling the feed to said auxiliary charger, electrically operated means controlling said valve and switches operated by said main and auxiliary chargers for controlling said electrically operated means.

14. In a pneumatic collecting system, a main charger, an auxiliary charger feeding into said main charger, feeds for said main and auxiliary chargers, diverting valves controlling the feeds to said main and auxiliary chargers, electrically operated means controlling said valves, switches operated by said main charger for controlling said electrically operated means and a switch operated by said auxiliary charger for controlling the electrically operated means and diverting valve in the feed to said auxiliary charger.

In witness whereof I have hereunto set my hand.

EDMUND A. WATSON.