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CLEANER FOR AIR TANKS

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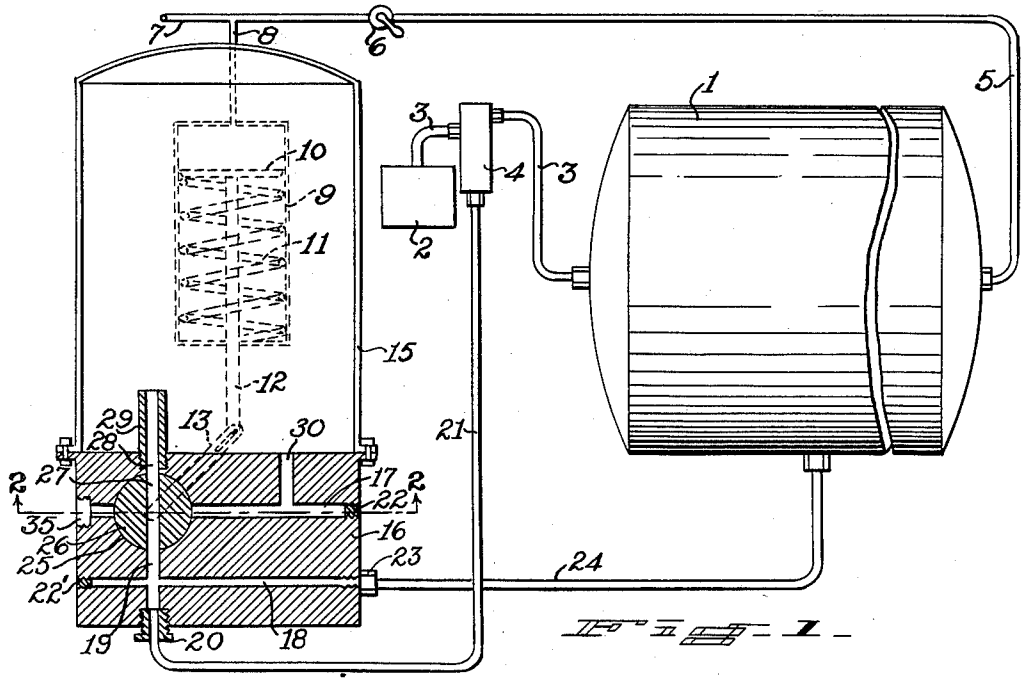


FIG. 1

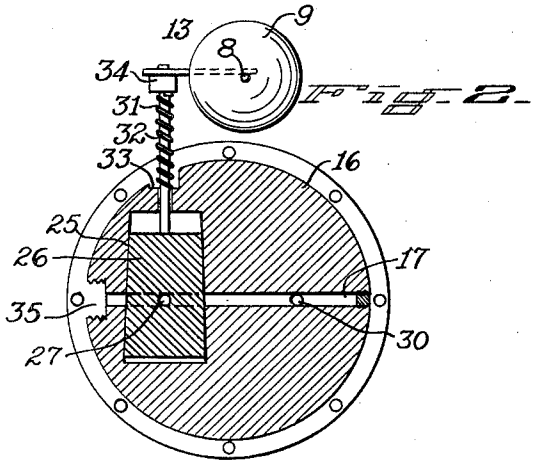


FIG. 2

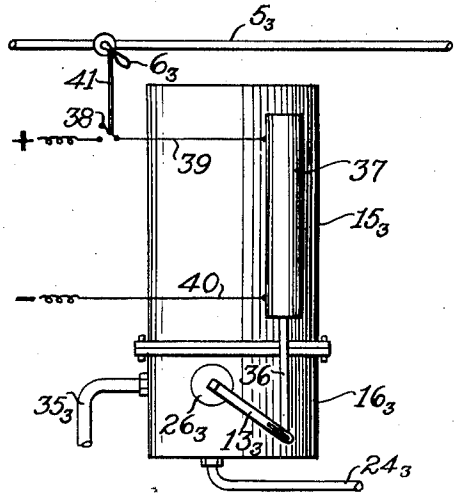


FIG. 3

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CLEANER FOR AIR TANKS

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5 Claims. (Cl. 303—88)

This invention relates to means or an arrangement of apparatus for cleaning compressed air tanks automatically while they are in use without interfering with the use of such tanks.

It is well known that water, oil, dirt, etc., often collect in the bottoms of air tanks and should be removed because of the damage or inconvenience sometimes caused by the same being carried with the air to the devices that are operated by the compressed air. When drain pipes or cleaning pipes for air tanks have valves therein that must be opened manually, the operators often forget to open the valves, and sometimes leave the valves open too long thus losing too much air.

By the present invention, obstructions or objectionable solid or liquid matter are automatically removed periodically from compressed air tanks without an excessive loss of air and without requiring any attention on the part of the operators. The means for removing the objectionable matter from the tanks cannot be inadvertently left in position to cause excessive loss of air from the tanks.

The invention will be understood from the description in connection with the accompanying drawing, in which:

Fig. 1 is a side view partly in section and partly broken away, showing an illustrative embodiment of the invention;

Fig. 2 is a section along the line 2—2 of Fig. 1; and

Fig. 3 is a side view showing a modification of some of the parts.

In the drawing, reference character 1 indicates an air tank that may be mounted on a street car or truck, for example, or on a stationary support. A compressor is indicated at 2, which may be an automatic compressor of the well known sort which starts to pumping air when the pressure becomes below a minimum and stops pumping air when the pressure reaches a maximum for which the compressor is set. Pipe 3 leads through a trap 4 for catching water and the like from the compressor 2 to the tank 1. An outlet or air supply pipe 5 extends from the tank 1, and a 3-way valve 6 is provided therein for admitting air to mechanism (not shown) through the pipe 7 for operating doors or for other purposes for which compressed air is used.

A pipe 8 leads from the pipe 7 to a fixed cylinder 9 the lower end of which is open to atmosphere and the upper end of which is closed. The piston 10 in the cylinder 9 is forced upwardly by a compression spring 11 the lower end of which bears against the bottom of the cylinder. A piston rod 12 connects the piston 10 to the slotted end of a valve arm 13.

A cleaning cylinder tank or reservoir 15 is provided for receiving charges of moisture or dirt laden air, which charges are discharged in succession. A base 16 may be provided for the tank 15, this tank being made air tight. Transverse ports 17 and 18 are provided in the base 16, as well as an intercepting port 19 one end of which is provided with a connection 20 for a pipe 21 leading from the trap 4. Plugs 22 and 22′ are shown closing one end of the pipes 17 and 18, respectively. A connection 23 is provided at the other end of the port 18 from the plug 22 for the cleaning pipe 24 that leads from the bottom of the air tank 1.

A tapered or truncated cone shaped opening or valve seat 25 (Fig. 2) is provided in the base 16, and the ports 17 and 19 enter this opening. A solid valve 26, shaped according to the valve seat 25, is provided in this valve seat with a diametrical port 27 intermediate its ends in a position to register with the ports 17 and 19. A port 28 registering with the port 19 extends from the valve seat 25 into the tank 15. A short standpipe 29 extends into the tank 15, where the port 28 enters. A drain port 30 is provided from the bottom of the tank 15, connecting with the port 17. A stem 31 (Fig. 2) is provided for the valve 26, and the arm 13 is securely attached to the outer end of this valve stem. A compression spring 32 is provided on the valve stem 31 between the seat 33 in the base 16 and a lug 34 on the arm 13 to keep the valve 26 tight in the valve seat 25 so as to prevent leakage of air. An outlet 35 at the end of the port 17 leads to the atmosphere.

The operation of the device shown in Figs. 1 and 2 is as follows:

When the operator turns the valve 6 to admit air into the pipe 7 from the tank 1 to do work, some of the air passes through the pipe 8 and forces the piston 10 downwardly against the resistance of the spring 11, turning the arm 13 of the valve 26 to a position at right angles to that shown in Fig. 1, thus establishing communication from the inside of the tank 15 through the ports 30, 17 and 27 to the atmosphere. This discharges impurities which may have collected in the bottom of the tank 15.

When the valve 6 is returned, communication between the pipes 5 and 7 is cut off, and the pipe 7 is opened to the atmosphere. The release of pressure in the pipes 7 and 8 resulting therefrom enables the spring 11 to return the piston 10 to

the upper part of the cylinder 9, thus returning the valve 26 to the position shown in Fig. 1. This cuts off escape of air through the ports 30 and 17 and opens connection from the tank 1 through the pipe 24 and from the trap 4 through the pipe 21 to the ports 19, 27, 28 and standpipe 29, thus permitting a charge of air carrying impurities to enter the tank 15 and its pressure becomes the same as that in the tank 1. The tank 15 is made very small in comparison with the tank 1, so that a comparatively small amount of air enters the tank 15 each time the valve 6 is opened. Standpipe 29 prevents impurities that collect in the bottom of the tank 15 from escaping through the port 28. The operation of filling the tank 15 with air laden with impurities and subsequently discharging the same occurs each time the valve 6 is manipulated. The valve 26 with its port 27 may be located at right angles to the positions already described so that impure air from the tank 1 would enter the tank 15 and be discharged therefrom when the valve 6 closes and opens, respectively, instead of when it opens and closes.

In the modification shown in Fig. 3 the parts corresponding to the parts already described are designated by the same reference characters but with the subscript 3. In this modification, a rod 36 is attached to a solenoid or an electromagnet 37 for operating the arm 13_3 of the valve 26_3. A switch 38 in the electric circuit 39, 40, that supplies current to the solenoid 37 is connected by a connection 41 so that when the valve 6_3 is opened and closed the switch 38 is opened and closed and the electromagnet 37 is alternately energized and de-energized, thus alternately opening and closing the valve 26_3 for the same purpose as already described.

What is claimed is:

1. A cleaner for cleaning an air tank while the tank is under pressure, comprising a base, an air and dirt reservoir mounted on said base, said base having a port in communication with the bottom of said air tank, a second port providing communication between said reservoir and the atmosphere, and a transverse port having one end in free communication with said reservoir, said transverse port intersecting the first two ports, a rotary valve having a passageway therethrough, said valve being located in said base so as to control the passage of matter through said ports, and means for turning said valve from one of its two positions to the other, said valve when in one position providing communication between said air tank and said reservoir for directing air and dirt from the bottom part of said air tank to said reservoir and when in the other position closing the passageway from said air tank and opening the second passageway for discharging air and dirt from said reservoir.

2. A cleaner for an air tank while the air tank is under pressure, comprising a base, an air and dirt reservoir carried by said base, said base having a port in communication with the bottom of said air tank, a second port providing communication between said reservoir and the atmosphere, and a transverse port having one end in free communication with said reservoir, said transverse port intersecting the first two ports, and a rotary valve having a passageway therethrough, said rotary valve being located at the intersection of the first-mentioned port and the transverse port for controlling the inlet to said reservoir and the outlet therefrom.

3. A cleaner for an air tank, comprising a reservoir, a base for said reservoir having a passageway from the reservoir to the atmosphere, a second passageway communicating with the first-mentioned passageway open at one end to said reservoir and at the other end to the second passageway, and a rotary valve having a single passageway positioned at the junction of the transverse passageway and the first-mentioned passageway to establish connection between the bottom of said air tank and said reservoir and between said reservoir and the atmosphere alternately.

4. A cleaner for cleaning an air tank while the tank is under pressure, comprising a reservoir, a base formed with a port in communication with the bottom of said tank, a second port in communication with said reservoir at one end and with the atmosphere at the other end, and a transverse port extending from the first-mentioned port across the second port to the reservoir, a rotary valve having a passageway therethrough located at the intersection of said transverse port and the second port, and mechanism for rocking said valve to alternately bring the passageway therein into registry with the transverse port and the second port, said mechanism including a rock shaft, a lever rigidly secured to said rock shaft, a spring for moving said lever in one direction, and air actuated means for moving the lever in the opposite direction.

5. A cleaner for cleaning an air tank while the tank is under pressure, comprising a reservoir, a rotary valve for alternately connecting said reservoir with the bottom of said tank and the atmosphere, and means for causing said valve to function, said means including a swinging lever connected with said valve, a spring actuated member for moving said lever in one direction, and means for causing air to move said spring actuated member in the opposite direction.

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