Sept. 19, 1933. R. D. McINTOSH 1,927,465

AIR CONDITIONING APPARATUS

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Fig. 1.

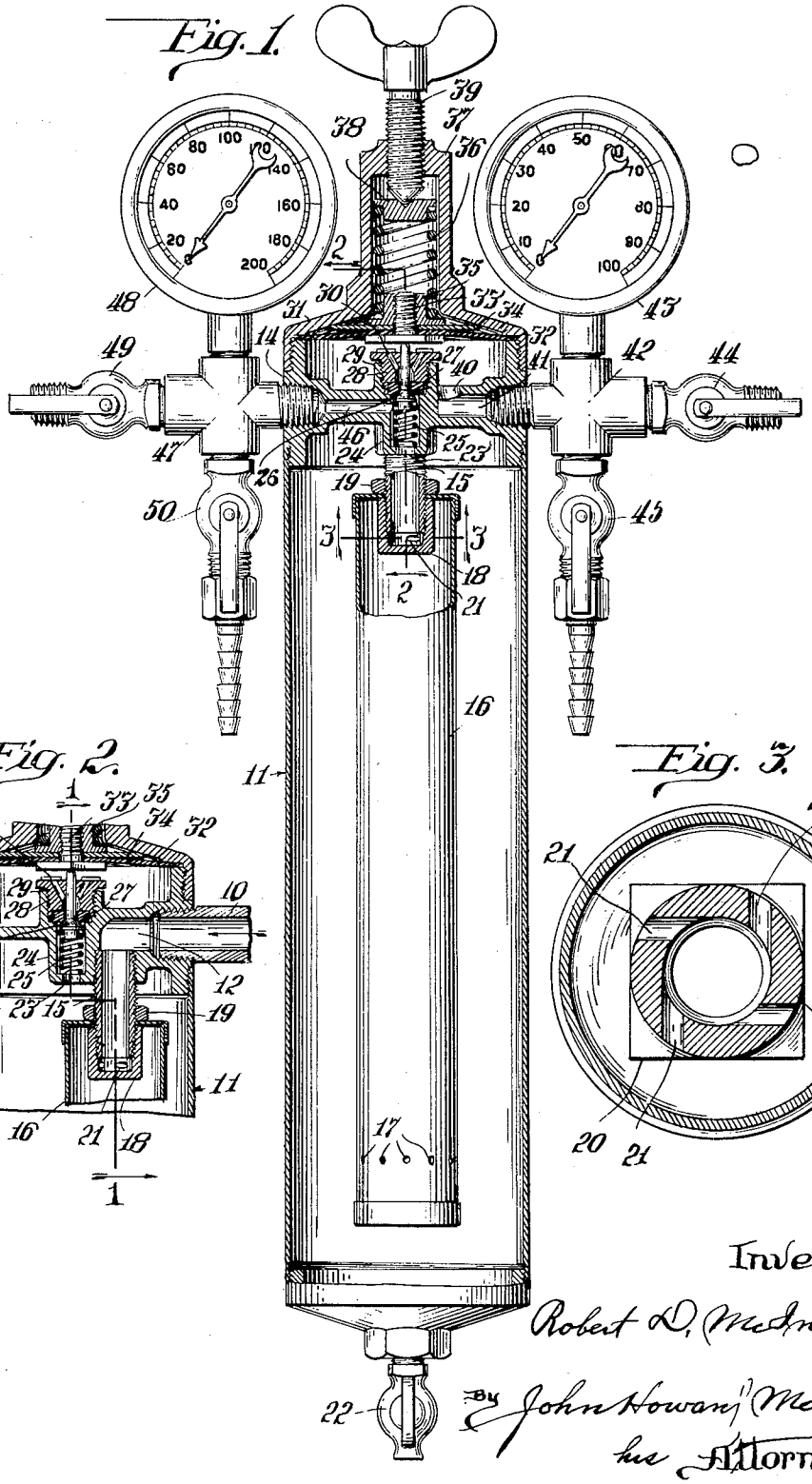


Fig. 2.

Fig. 3.

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AIR CONDITIONING APPARATUS

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6 Claims. (Cl. 183—92)

My invention is concerned with air conditioning apparatus, and is designed to take air from a compressor, and deliver it, free from the moisture and oil it may have picked up in passing through it, at two different pressures, one of which may be regulated to any desired degree, for any useful purpose, such as to a spray gun, and to a pressure paint container, from which the spray gun is supplied.

To this end, it consists of certain novel combinations of elements, all as will be hereinafter fully described and particularly pointed out in the claims.

To illustrate my invention, I have annexed hereto a sheet of drawing, in which the same reference characters are used to designate identical parts in all the figures, of which,—

Fig. 1 is a vertical sectional view, through my improved apparatus, on the line 1—1 of Fig. 2;

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

Fig. 3 is a detail in section, on a much enlarged scale, on the line 3—3 of Fig. 1.

The air to be filtered is led from a compressor by any suitable connections to the pipe 10, which is screwed through an opening in the main cylinder 11 into an inlet 12 formed in the web portion 13 of the generally cylindrical casting 14 constituting the body of the pressure-regulating valve. Screwed into the under side of the web 13, in an enlargement provided therefor, is a short pipe 15 constituting an outlet from the casting and an inlet for the filter proper, the main portion of which is the smaller cylindrical chamber or tube 16, which is closed at the top, except for the inlet, and which has the outlet apertures 17 near the lower end thereof. The inlet pipe 15 has screwed on its lower end the nipple 18, and that and the nut 19 threaded on the pipe 15 serve to secure and hold the cylinder 16 suspended from the regulating valve casting. The nipple 18 is provided with the external squared portion 20, to which a wrench may be applied, and near its lower end it is provided with one or more, preferably four, apertures 21, tangential to its internal periphery, through which the compressed air escapes and strikes the adjacent wall of the cylinder 16 at an acute angle thereto, preferably more acute than that indicated in the drawings, so that the air is given a whirling motion by contact with said wall, and flows in substantially a helical path on the inner face of the same until it reaches the outlet ports 17, from which it escapes, freed from any oil or water which it may have carried, the oil or water adhering to the inner wall of the cylinder 16, and eventually reaching the bottom thereof. When the cylinder fills up to the height of the ports 17, the condensed water and oil will flow out into the bottom of the cylinder 11, from which it may be drawn at necessary intervals by the drain cock 22 placed in the bottom of the cylinder for that purpose.

The now filtered air, unreduced in pressure, rises and enters the opening 23 formed in the bottom of the part 24 projecting downward from the center of the web, and having the seat adjacent the opening for the lower end of the helically-coiled expanding spring 25 housed therein, the upper end of which co-operates with the head of the valve 26 which co-operates with the valve seat formed in the disk 27 seated on the upper end of the passage through the part 24, and held in place by the plug 28 screwed into the projection 29 on the upper side of the web 13 and opposite the part 24. The plug 28 has the outlets 30 therefrom, and the diameter of the stem of the valve 26 is somewhat smaller than the diameter of the opening in the disk 27 through which it passes, so that when the valve 26 is unseated, compressed air can pass through the opening and to the upper side of the web 13. The top of the cylinder 11 is closed by the cap 31, which clamps between it and the top of the casting 14 the diaphragm 32, through which passes the screw 33, which passes also through the disk 34, and has the nut 35 screwed thereon. A strong helically-coiled expanding spring 36 has its lower end seated on the nut 35 and is housed in the cylindrical extension 37 of the cap 31, and has its upper end co-operating with the disk 38, which is held in any desired position by the thumb screw 39 threaded through the top of the extension 37.

The operation of the pressure-reducing valve is as follows: The filtered compressed air passes upward through the port 23, and when the apparatus is not in operation holds the valve 26 seated. When it is to be used, the screw 39 is turned down to a position in which the head of the screw 33 contacts with the upper end of the stem of the valve 26 and moves the same down far enough to unseat the valve an amount that will vary with the pressure to be secured by the regulating apparatus. The compressed air is now free to pass the valve and fill the chamber above the web 13, and as its pressure increases, in opposition to the spring 36, the diaphragm 32 is raised until the valve is re-seated. The air at reduced pressure being drawn off reduces the pressure against the diaphragm 32, and the spring 36 opens the valve

26 again and permits a fresh supply of the higher-pressure air to enter the portion of the chamber above the web 13, and this operation is repeated, so as to supply the air at the reduced pressure.

In the particular embodiment of my invention illustrated, the air at the reduced pressure enters the port 40 formed in the top of the web 13 and communicating with the outlet passage 41 formed therein and extending to the exterior of the casting, in which the preferably four-way connection 42 is screwed. On this connection will preferably be provided the gauge 43 to show the reduced air pressure, while it also has the pair of cocks 44 and 45 for connections to carry the air at reduced pressure wherever it is to be used. The casting 14 also has its web 13 provided with the outlet passage 46 therein, which communicates directly with the passage in the part 24 below the valve 26, so that air at the full pressure may pass to the connection 47, screwed into the casting and having the gauge 48 to show the unreduced pressure, and the cocks 49 and 50 to provide for the passage of the air at unreduced pressure as needed.

The operation of the completed apparatus will be readily understood, and it will be seen that by its use, I furnish a supply of filtered air delivered at substantially unreduced pressure from the compressor to any desired point, and at the same time a supply of filtered air reduced to any desired pressure by the action of the reducing valve at any desired point.

While I have shown and described my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

1. In an apparatus of the class described, the combination with a filter for removing oil and water from air, having an inlet thereto and a preferably cylindrical casing to which the air is delivered after the oil and water have been removed, of a pressure regulator located on said casing having a branched inlet passage, one branch leading directly from said casing and the other through the regulating valve, so that filtered air under two pressures is delivered therefrom.

2. In an apparatus of the class described, the combination with an air filter cylinder, of a casing containing the air filter cylinder, a pressure regulator forming the top of the casing, said pressure regulator including a body casting having an inlet for the unfiltered compressed air and an exit therefrom to the air filter cylinder suspended therefrom, an inlet for the filtered air with one outlet for unregulated air and another outlet through the regulator, and an inlet and outlet therein for the regulated air.

3. In an apparatus of the class described, the combination with a cylinder having air outlets toward the discharge end thereof, and a compressed-air inlet member at the other end having a plurality of inlet ports substantially tangential to its inner periphery that cause the entering air to move to said outlets through a circuitous path on the inner surface of the cylinder, of a casing enclosing the cylinder, and a drain cock in its lower end.

4. In an apparatus of the class described, the combination with a main cylinder having a drain cock in its lower end and an outlet for filtered air controlled by another cock, of a filter cylinder suspended therein having an air and water outlet toward its lower end and an inlet at its upper end through the main cylinder, and a nipple closing said inlet and having openings therein substantially tangential to its inner periphery to cause the compressed air to travel down the inner walls of the filter cylinder in a circuitous path.

5. In an apparatus of the class described, the combination with a cylinder having a drain cock in its lower end and its upper end formed by a pressure regulator, of a filter cylinder therein below the pressure regulator having an air outlet toward its lower end and having means at its upper end for introducing compressed air therein and compelling it to travel in a circuitous path down to the outlet, said pressure regulator having two outlets therefrom, one for compressed air at the pressure it is received from the filter cylinder and the other for the air after it has been passed through the regulator.

6. In an apparatus of the class described, the combination with an air filter cylinder, of a casing containing the air filter cylinder, a pressure regulator forming the top of the casing, said pressure regulator including a body casting in the form of a short cylinder and having a central web separating it into two parts, said web having an inlet for unfiltered compressed-air through the cylindrical portion and an outlet from its web proper to the air filter-cylinder suspended therefrom, and an inlet from the filter side of the web with a direct outlet therefrom through the cylindrical portion and an outlet through the regulator communicating with a reducing valve in the web, and said web having an inlet from the other side of the web and an outlet therefrom through the cylindrical portion.

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