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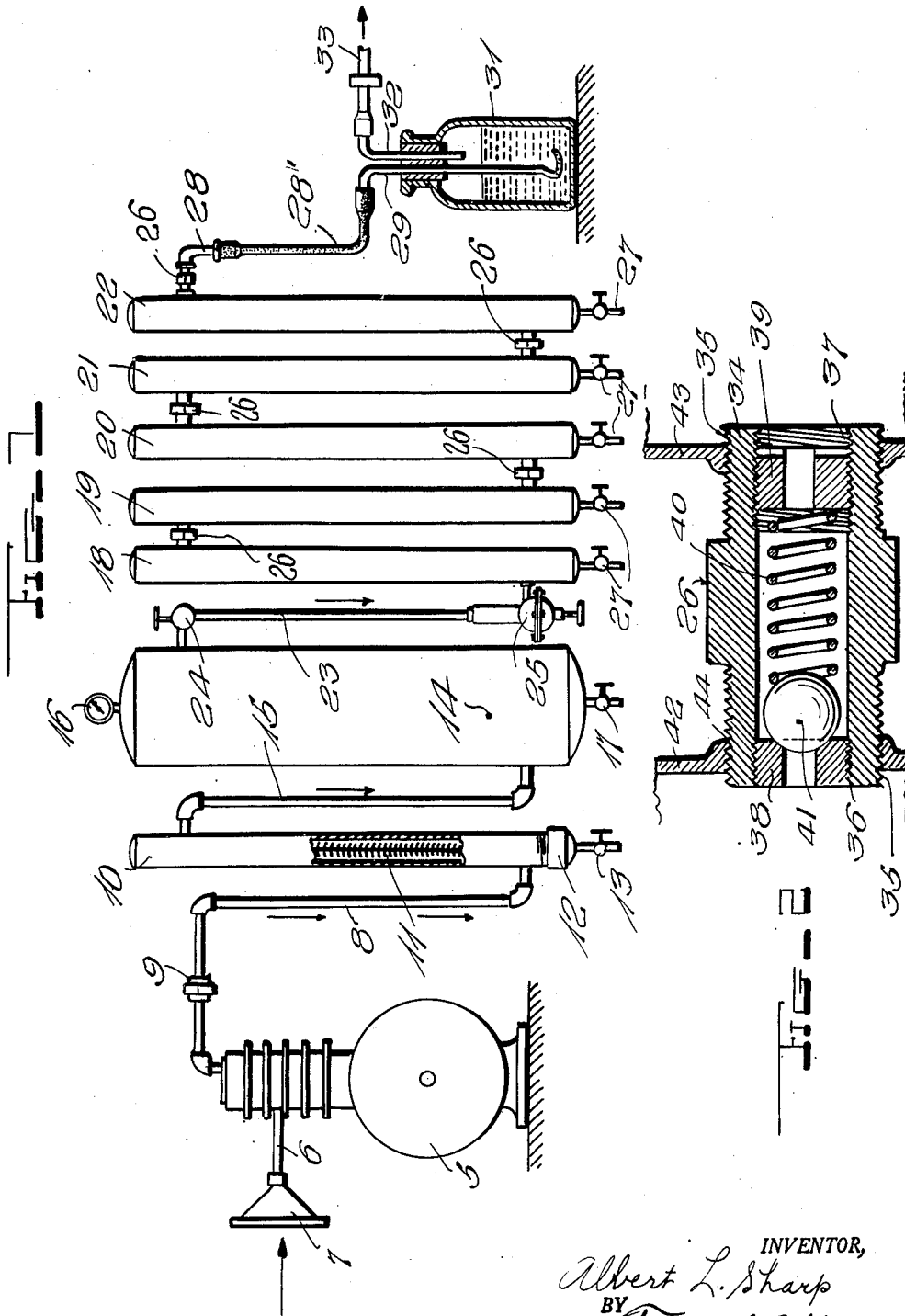
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2,501,541

MEDICATED AIR DISTRIBUTING APPARATUS

Filed March 14, 1947

2 Sheets-Sheet 1



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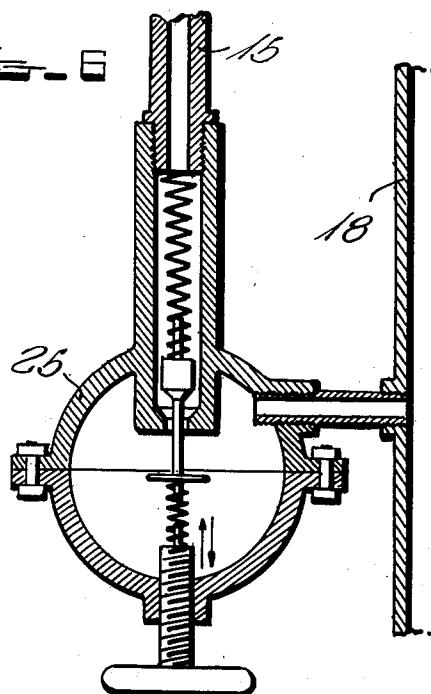
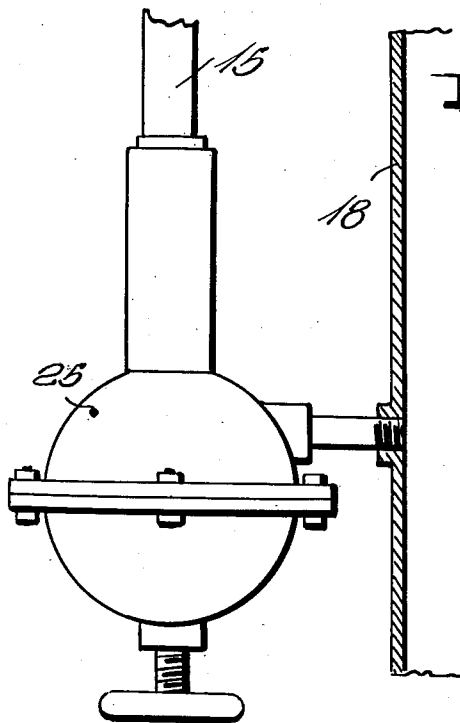
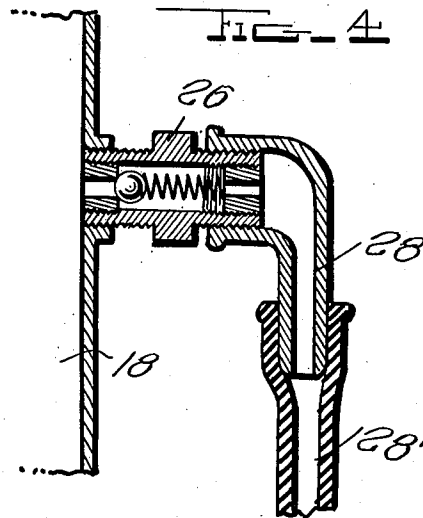
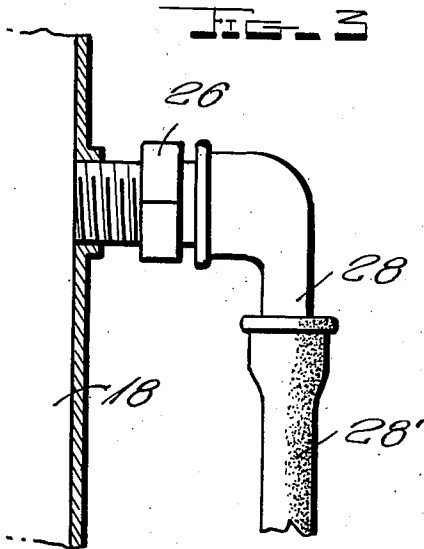
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MEDICATED AIR DISTRIBUTING APPARATUS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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MEDICATED AIR DISTRIBUTING
APPARATUS

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5 Claims. (Cl. 62—140)

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This invention relates to the purification of air and means for supplying it to local wards or operating rooms so that apparatus may be mounted on an appropriate transporting medium, such as a truck, carriage, or the like, and as the transporting means may be selected to suit particular requirements, it is believed unnecessary to show such a transporting medium for an understanding of the invention by one skilled in the art.

An object furthermore of the invention is to provide a compressor which may be associated directly with the other parts of the apparatus, or the compressor may be located at any distant point, such as in a basement or other part of a building having air conducting ducts leading to the apparatus; and furthermore, it is the purpose of the inventor to provide a container for holding fluid to which the previously treated air is delivered so that it passes through the liquid and escapes for distribution and use during surgical operations and the like, so that by this means, sterile air results from its passage through the several elements of the apparatus. It has been found that four units or cylinders are usually effective and efficient, though in the illustration one other cylinder is added as a twenty-five per cent safety factor to insure complete sterility.

A further object of this invention is to provide an apparatus of the character indicated which is simple in construction and comparatively inexpensive to manufacture and maintain, and it has proven efficient and satisfactory in use.

With the foregoing and other objects in view, the invention consists in the details of construction, and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this application, wherein like characters denote corresponding parts in the several views, and in which—

Figure 1 illustrates a view in elevation, partly in section, of the compressor and the several units through which air is conducted and treated for purifying it;

Figure 2 illustrates a sectional view of an expansion valve connecting the cylinders;

Figure 3 illustrates a view in elevation, partly in section of one of the cylinders with an expansion valve and coupling;

Figure 4 illustrates a sectional view thereof;

Figure 5 illustrates a view in elevation of an adjustable automatic expansion valve connected to a cylinder shown in section; and

Figure 6 illustrates a sectional view of said valve.

In these drawings 5 denotes a conventional type of air compressor, the mechanism of which is

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well known and need not, it is thought, be illustrated or described in detail, though it is supplied with an air supply pipe 6, with an enlarged intake mouth or funnel 7, which is constructed as a silencer so that the operation is noiseless, and the air passes through a supply pipe 8 in which a valve 9 is interposed, and the said pipe 8 discharges into a tank or cylindrical member 10 which contains air cleaning material 11 of any well known type. The bottom of the tube 10 has a cap 12 with a valve discharge pipe 13 so that the cylinder 10 may be drained, or if the cap is removed, new filtering material may be substituted.

An air compression and storage tank 14 has a pipe 15 connected to it, which pipe communicates with the cylinder 10 near the upper end thereof, and the pipe is joined to the tank near the bottom thereof so as to leave a space between the pipe and the said bottom for accumulations which may occur so that the circulation of the air will not be affected.

The tank 14 is provided with a pressure gauge 16 of well known utility, and the bottom of the tank has a drain cock or valve 17.

A succession of expansion cylinders 18, 19, 20, 21, and 22 also forms part of the installation, and a pipe 23 communicates with the pressure tank near its top and with the cylinder 18 above its lower end, and the said pipe 23 is supplied with suitable valves 24 and 25 by which the passage of air through the pipe is controlled. The valve 24 is the well known cut-off type, whereas the valve 25 is of the automatic expansion type, as illustrated in Figures 5 and 6 of the drawing, and since the details of such a valve are well known, it is believed unnecessary to describe them for an understanding of the invention by one skilled in the art, but their structural details are obvious from an inspection of Figure 6.

The cylinders 18 and 19 are connected together near their upper ends by an automatic expansion valve 26, and the cylinders 19 and 20 are connected together near their lower ends by a similar expansion valve 26, the cylinders 20 and 21 are connected together near their upper ends by an expansion valve 26, and the cylinders 21 and 22 are connected together near their lower ends by an expansion valve 26 so that the communication between the several cylinders causes the air to travel in a circuitous route from the cylinder 18 to the cylinder 22, and it is seen that the valves near the lower ends of the cylinders are spaced from the ends thereof to a sufficient degree as to produce lodgments for foreign materials below the air entrances of the cylinders, and the cylinders are each provided with a drain cock, such as 27, to permit the removal of accumulations at the lower ends of the said cylinders.

A pipe 28 is connected to the cylinder 22

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through an expansion valve 26, preferably near the upper end thereof, and the pipe has a connection 28' coupled to an injector tube 29 which extends through a stopper 30 in a bottle or reservoir 31, it being intended that the bottle should contain a medicament which will be absorbed, to some extent, by air passing through the liquid or medicament, and there is a discharge pipe 32 extending through the cork or stopper 30 which terminates in a space in the bottle between the cork and the medicament so that the medicated air may be drawn from the bottle and through a suitable pipe 33 delivered to an operating room or supplied to a patient being treated.

All of the expansion valves 26 are preferably of the same construction and they include a tubular member 34 having external threads 35 at their ends, which ends are threaded in adjacent cylinders for affording the circulation of air between them. In the present embodiment of the invention, each tubular member is threaded internally at its ends, as shown at 36 and 37, and apertured bushings 38 and 39 engage the respective threads 36 and 37. A spring 40 is interposed between the bushing 39 and a ball valve 41, which valve is forced against the inner surface of the bushing 38 and it is effective to close the passage so long as the pressure in a cylinder to which the valve is connected does not overcome the tension of the spring holding the valve on its seat.

It is seen from an inspection of Figure 2 that a wall 42 of one of the cylinders and the wall 43 of the adjoining cylinder have threaded apertures, such as 44, with which the external threads of the tubular member engage for anchoring a valve to the respective cylinders.

It is obvious from the foregoing description that the objects of the invention initially introduced in the specification are attained by the assembled instrumentalities whose functions have been described in connection with a description of the elements so that further resumé of the operation is believed unnecessary for an understanding of the invention by one skilled in the art.

I claim:

1. In a purified air distributing apparatus, an air compressor, a filtering member, a connection between the said air compressor and the filtering member, an air pressure tank in communication with the said filtering member, a plurality of expansion cylinders having means of communication in succession, a connection between the air pressure tank and the first of said expansion cylinders, and means to conduct the purified air from the last of said expansion cylinders to a point of use.

2. A purified air distributing apparatus according to claim 5 wherein the means of communication in succession includes an expansion valve between adjacent cylinders, the said ex-

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pansion valve being so located that the air stream cannot flow directly from one cylinder into the next cylinder and in which the lower end of each cylinder is provided with a drain cock for drawing off impure accumulations.

3. In a purified air distributing apparatus, an air compressor, a filtering member, a connection between the said air compressor and the filtering member, an air pressure tank in communication with the filtering member, a plurality of expansion cylinders having means of communication in succession, said means of communication including an expansion valve disposed between each two cylinders, certain of said expansion valves connecting the upper ends of two cylinders and the rest of the expansion valves each connecting two cylinders together at the lower ends of the latter cylinders, a drain cock at the lower end of each cylinder for drawing off impure accumulations and means to conduct the purified air from the last of said expansion cylinders to a point of use.

4. A purified air distributing apparatus based on claim 5 wherein the means of communication in succession includes an expansion valve between adjacent cylinders, said expansion valve comprising a tubular member having external threads engaging threads in the walls of the adjacent cylinders and in which the tubular member has internal threads at its ends with apertured bushings threaded in the said ends, and a spring located between a bushing at one end and a valve seated against the bushing at the other end so that the valve controls the passage of air through the tubular member.

5. In a purified air distributing apparatus, an air compressor, a filtering member, a connection between said air compressor and the filtering member, an air pressure tank in communication with said filtering member, a plurality of expansion cylinders having means of communication in succession, said communication means including an expansion valve between adjacent cylinders, the said expansion valves being so located that the air stream cannot flow directly from one cylinder into the next cylinder, an adjustable automatic expansion valve for controlling the communication between the air pressure tank and the first expansion cylinder, an outlet for the last cylinder, an expansion valve for said outlet and means to conduct the purified air from said outlet to a point of use.

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The following references are of record in the file of this patent:

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