Nov. 16, 1926. 1,606,749

A. R. CLARK ET AL

FLUID PURIFIER

Filed Dec. 7, 1925

Fig 1

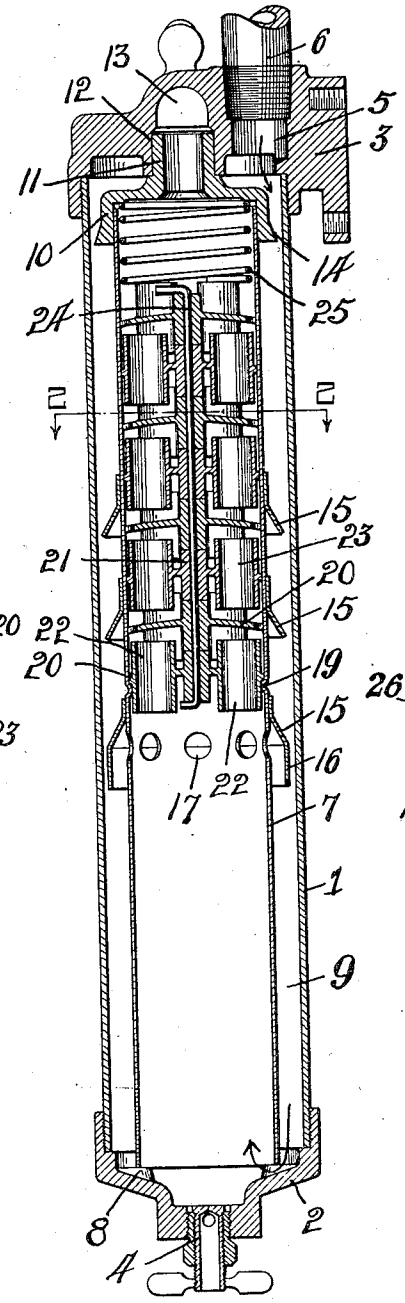


Fig 2

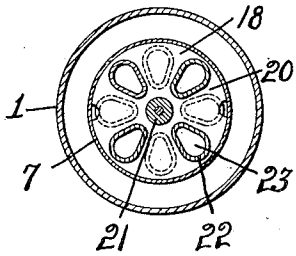
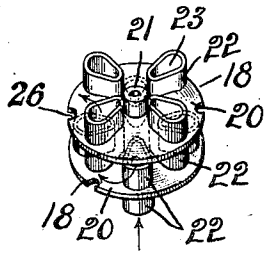


Fig 3



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FLUID PURIFIER.

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This invention relates to fluid condensers and purifiers, and particularly to a device for use in connection with compressed air to remove the impurities therefrom.

All compressed air has more or less oil, moisture and dirt mixed therewith, and the object of the present invention is to provide a simple, compact and inexpensive device for efficiently removing such foreign matters and impurities from the compressed air preparatory to using the purified air.

The invention is fully described in the following specification, and while in its broader aspect it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a central, longitudinal sectional view of a device embodying the invention. Fig. 2 is a section on the line 2—2 in Fig. 1, and Fig. 3 is a perspective view of two of the baffling units of the device in assembled relation.

Referring to the drawings, 1 designates a shell or casing of cylindrical form, 2 a bottom closure member for the casing, and 3 a top closure member therefor, said closure members, in the present instance, being threaded to the respective ends of the casing. The lower member 2 has a drain valve 4 provided therein and the upper member 3 is provided with an opening 5 therethrough into the top of the casing through which compressed air may be introduced into the casing from a supply pipe 6. An inner tube or shell 7 of less diameter than the interior of the shell 1 is disposed axially therein with its wall spaced from the wall of the shell 1 and with its lower end seating on lugs 8 in the bottom member 2, whereby provision is made for the passage of fluid from the space 9 between the two shells around the lower end of the inner shell 7 between the lugs 8 and thence upward in said shell. The upper end of the shell 7 fits into a cap member 10 having a nipple 11 projecting upward centrally therefrom and into a registering socket 12 in the top member 3. Air in passing through the nipple opening of the member 11 from the upper end of the shell 7 enters a passage 13 in the member 3, by which it is directed to a point of discharge from said member not shown. It is understood, however, that the passage 13 is connected to a leading-off pipe through which the purified air is directed to the point of use.

The air to be purified enters the top of the shell 1 above the cap member 10, and in passing downward around said member through the space 9 it is baffled by the projecting edge 14 of the member. Below the member 10 the shell 7 is provided therearound, in the present instance, with three downwardly extending, outwardly tapering baffle flanges 15, which are disposed in longitudinally spaced relation along the shell and the lower one, which is provided a distance above the bottom of the shell, has a cylindrical skirt 16 depending therefrom. The shell 7 is provided within the baffle member 16 with an annular series of openings 17 through which air may enter the interior of the shell 7 after passing around the lower edge of the flange 16. The baffling of the air in its passage downward through the space 9 causes some of the particles of oil, dirt and other impurities to be precipitated into the lower portion of the shell 1. Disposed in superimposed relation within the shell 1 above the openings 17 are a plurality of baffle units 18, the lower of which rests on an internal annularly depressed portion 19 of the shell 7, as hereinafter described, and the remainder being supported by the lowermost unit and disposed in built-up relation one upon another. Each unit 18 includes a disc 20 of slightly dished form with its concave side down, an axially perforated hub sleeve 21 disposed centrally of the disc and projecting above and below the same, and a plurality, in the present instance 4, of equidistantly spaced flanges 22 projecting above and below the disc 20 integrally therewith and forming passages 23. The flanges 22 and the passages formed thereby, in the present instance, are transversely elongated and gradually narrow in cross-sectional size from their outer edges inwardly toward the center of the disc.

In assembling the baffle units 18 within the shell 7 they are successively placed in the shell from its upper end, the diameter of the discs 18 being substantially the same as the internal diameter of the shell, thereby closing the communication through the shell except through the passages in the baffle units and enabling the disc of the lower unit to seat on the shoulder formed by the inwardly

pressed portion 19 of the shell. The subsequent units are placed in the shell 1 over the other with the hub sleeves 21 resting one upon another and forming the spacing means for the discs. The flanges 22 forming the passages 23 are slightly longer at each side of the disc than the end portion of the hub sleeve 21 at the side therewith, and when the units are assembled the adjacent ends of the flanges 22 of two adjoining units alternate with each other, as shown, with the ends of the flanges of one unit passing between and alternating with the ends of the flanges of the next adjoining units. The units 18 are preferably tied together by a wire or rod 24 which is passed through the central openings of the hub sleeves 21 and turned over at the outer ends of the hubs of the outermost units to retain the units in assembled relation and to permit them to be removed from and inserted into the shell as an entirety if desired. A coiled compression spring 25 is disposed within the upper end of the shell 7 and bears at its lower end against the uppermost unit 18 as a seat and at its upper end against the cap member 10 whereby a set of units 18 are held seated on the inturned seat portion 19 of the shell and the shell itself is retained seated on the lugs 18 in the bottom member 2 due to the permissible longitudinal movement of the shell 7 within the cap member 10. It is preferable to provide the discs 20 at the edges thereof with notches, as shown at 26 in Fig. 3, to permit the drainage of any liquid of condensation which may gather on the top of a disc. These notches are not of sufficient size to destroy the baffling action desired by the use of the discs.

It is apparent that in the use of this device the air after coming from the compressor or other source of supply and before purifying is introduced into the upper end of the passage 9 and passes downward around the baffling members 14 and 15 and thence around the skirt flange 16 and into the interior of the shell 7 through the opening 17. A portion of the air may also pass into the interior of the shell 7 around its lower edge. The air after entering the shell 7 passes upward in a circuitous manner through the passages 23 of the successive units 18 and is successively baffled by its contact with the successive discs 20 and by the walls of the adjacent alternating flanges 22 forming the passages 23. In other words, the air first passes up through the passages 23 of the lowermost unit 18, thence strikes against the disc 18 of the next unit and passes downwardly therefrom around the lower edges of the flanges 22 of the next unit and then upward through the passages 23 of such flanges against the disc 20 of the next unit in order, and so on until the air has passed through all of the units. The shell 7 is shown as having eight baffle units 18 disposed therein and this, in ordinary practice, is found sufficient to effectively purify the air by removing the oil, moisture and other impurities therefrom. The lower portion of the device may be cleaned of precipitated and accumulated matter by an opening of the valve 4 or by a removal of the bottom member 2, and when such member is removed the inner shell 7 and its baffling units 18 may also be removed from the outer shell 1 and the units 18 then removed from the shell 7 for the purpose of cleaning.

We wish it understood that our invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of embodiment in numerous forms without departing from the spirit of the claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a device of the class described, an outer and an inner shell spaced apart and having provision for the introduction of air into the upper portion of the space between the two shells and to enter the inner shell from said space at a distance below its upper end and provision for the cutlet of air from the upper end of the inner shell, and a plurality of baffle units disposed in spaced relation one over the other in the inner shell and each comprising a disc-like portion with flanges projecting above and below the same in spaced relation around its center and forming prolonged passages therethrough with the flanges at each side of a disc projecting between and alternating with the flanges at the adjacent side of the next disc in order.

2. In a device of the class described, means forming a passage through which the fluid to be purified passes, and a plurality of baffling units disposed in successive order in said passage and each comprising a disc, a spacing hub and a plurality of flanges projecting in opposite directions from the disc and forming passages therethrough with extensions at each side of the disc, which extensions lap and alternate with the adjacent passage extensions of the adjoining unit.

3. In a device of the class described, means forming a passageway, and a baffle means disposed in the passageway and comprising a plurality of spaced discs substantially fitting the passageway, each disc having wall extensions at each side which provide passages through the disc and which lap and alternate with the adjacent extensions of the next disc in order whereby the fluid in traversing the passageway is caused to take a circuitous route through the several passages of the succeeding discs.

4. In a device of the class described, a shell forming a passageway for the fluid to

be purified and having a baffling means therein including a plurality of discs spaced apart lengthwise of the shell and being of dished form with their concave sides disposed in a direction opposite to the direction of flow of the fluid, and flanges projecting above and below each disc in spaced relation thereabout and forming prolonged passages therethrough with the flanges at each side of a disc projecting between and alternating with the flanges at the adjacent side of the next disc in order.

5. In a device of the class described, inner and outer shells forming a passage therebetween, a lower closure member for the lower ends of the shells providing a communication therebetween, a closure means for the upper ends of the shells providing a fluid inlet passage to the space between the shells and a fluid exit passage from the upper end of the inner shell, said inner shell having provision at a distance above its lower end for the entrance of fluid therein from the passage between the shells, and baffle means within the inner shell above the communication between it and the passage between the shells, said latter means comprising a plurality of successively positioned discs substantially fitting the inner shell, and flanges projecting above and below each disc and forming extended passages through the discs which terminate in slightly spaced relation to the next discs in order and alternate with the extended passage ends of such discs.

6. In a device of the class described, an outer shell, closure members for the upper and lower ends of the shell, the upper member having a fluid inlet opening into the shell, and a fluid exit opening, a cap member disposed within the upper portion of said shell and having a passage in communication with the outlet opening of the top member, an inner shell disposed within the outer shell in spaced relation thereto and resting at its lower end on said lower member to provide communication between its lower end and the space between the shells and having its upper end fitting into said cap member, said inner shell being provided with openings above its lower end for the passage of fluid therein from the space between the shells, a plurality of baffle units disposed within the inner shell above said openings, each unit comprising a disc, a hub member projecting from the disc and cooperating with the hub members of adjoining discs to space the discs, and a plurality of flanges extending above and below each disc to provide prolonged passages through the discs, said flanges extending between and alternating at their ends with the adjacent flanges of adjoining discs, and means within the upper end of the inner shell and acting on the baffle units and against the said cap member to hold the baffle units in position within the inner shell and to hold the inner shell seated in the outer shell.

In testimony whereof we have hereunto signed our names to this specification.

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WILLIAM F. BLESSING.