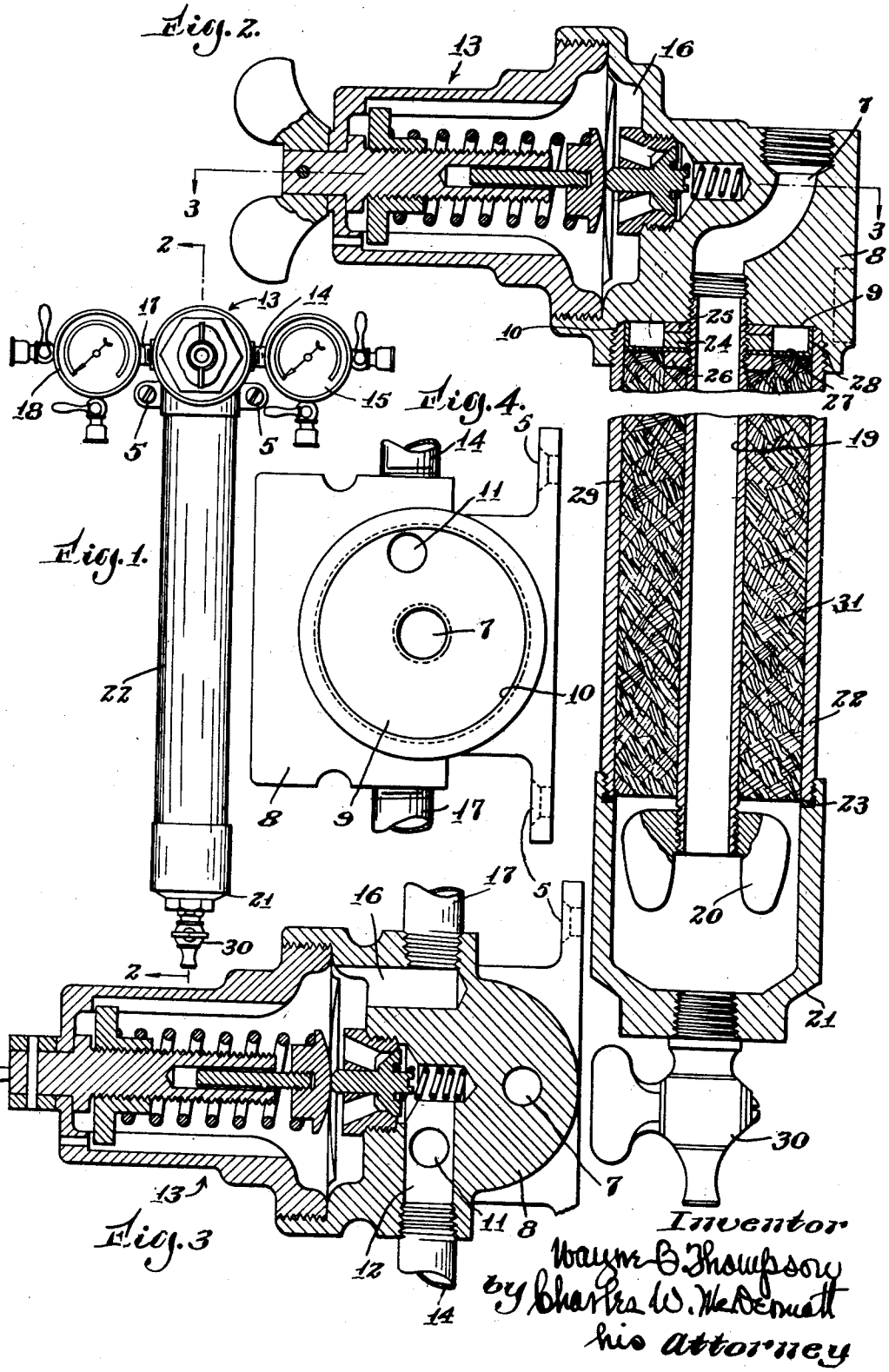
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SEPARATOR

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SEPARATOR

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The present invention relates to separators, and more particularly to air regulating set assemblies which are used in pneumatic apparatus, such as spray painting equipment, to regulate the main air line pressure and to clean the air by removing oil, water and dirt therefrom.

The air delivered from an air compressor into a main air line carries free liquid in the form of water of condensation, oil from the internal working parts of the compressor, vapors thereof and some atmospheric dust. Heretofore it has been proposed to remove this dirt, oil and water from the air by providing the pressure regulating valve body with two air passages which terminate out of communication with each other on one face of the body, and to connect these passages by a depending tube which drops, under the influence of gravity, free dirt, water and oil into a sump formed by the bottom of a casing enclosing the tube and connected to the peripheral edge of the face of the body provided with two air passages. From the bottom of the tube the air passes upwardly through filter packing, such as cotton waste, which substantially fills the space surrounding the tube between it and the casing. This packing removes the oily and watery vapor and the dirt therein. The air thus cleaned passes out of the packing into the other passage in the body which is in communication with the pressure regulating valve. The free dirt, oil and water collects in the sump from which it may be blown from time to time through a pet-cock. But the packing becomes saturated with the oil, water and dirt removed by it from the air and therefore the dirty packing must be removed and replaced with fresh waste to prevent the oil, water and dirt from being carried into the pressure reducing valve passage when the packing has outlived its usefulness. Owing to the velocity with which the air passes through the packing the air tends to drive the packing along with it with the result that the packing becomes compacted in a small, hard compass in the space between the tube and casing. To remove the small, compressed packing saturated with oil, water and dirt from the casing is a hard, tedious job. A hook of some kind is used. The operative must insert the hook blindly into the casing and pull out the packing piecemeal. So hard and tedious is the job of removing the worn-out packing from the casing that it is often neglected, the packing ceases to function, and oil, water and dirt are carried over into the equipment supplied with compressed air.

The principal object of the present invention is to provide novel and improved means for mounting the filter packing in a separator such, for instance, as in an air regulating set assembly.

To the accomplishment of this object a feature of the present invention contemplates the provision in a separator having a motive agent passage, stuffed loosely with filter packing, and having at least a portion of its wall engaged directly by the packing, of means for removing the packing as a unit from the passage. It is preferred, to construct the means for removing the packing as a unit so that it constitutes parts of the passages through which the motive agent flows.

Accordingly another feature of the present invention contemplates the provision in a separator having a motive agent passage, stuffed loosely with filter packing, and having at least a portion of its wall engaged directly by the packing, of means through which the motive agent flows for removing the packing as a unit from the passage.

Other features of the invention relate to certain devices, combinations and arrangements of parts, hereinafter described and then set forth in detail in the appended claims which possess advantages which will be apparent to those skilled in the art.

The various features of the present invention will be readily understood from an inspection of the accompanying drawing illustrating the best form of the invention at present known to the inventor, in which,

Figure 1 is a view in elevation of an air regulating set assembly;

Fig. 2 is an enlarged view in sectional elevation on the line 2—2, Fig. 1;

Fig. 3 is a view in sectional plan on the line 3—3, Fig. 2; and

Fig. 4 is a detail view in bottom plan of the recessed face of the pressure reducing valve body, the parts connected thereto being removed for convenience.

In the illustrated embodiment of the invention the air regulating set assembly is secured by screws 5 (Fig. 1) to a vertical support. The compressed air from the compressor or storage tank connected therewith is conducted by a horizontal main motive agent or air line (not shown) to a tortuous passage 7 (Figs. 2, 3 and 4) formed in the main body portion 8 of the air regulating set assembly. The passage 7 terminates on a flat face 9 (Figs. 2 and 4) constituting the face of a cylindrical recess 10 formed on the bottom of the body 8. Terminating upon the flat face 9 is a

second passage 11 (Figs. 3 and 4) which communicates with a chamber 12 formed in the body 8. The chamber 12 communicates with a pressure reducing valve 13 the construction of which forms no part of the present invention. The chamber 12 is also connected to a pipe 14 (Fig. 33) which conducts the air to a gage 15 (Fig. 1) for indicating the main line air pressure. After the air passes through the pressure reducing valve 13 it enters a chamber 16 (Figs. 2 and 3) in the body 8 into which a pipe 17 is threaded which conducts the air under reduced pressure to the point of use. The amount of reduced air pressure in the pipe 17 is indicated by a gage 18 (Fig. 1) in communication with the air in the pipe 17.

With this construction the main motive agent passages 7 and 11 both terminate on the face 9 and are therefor out of communication with each other within the body 8. In order to connect the passages 7 and 11 a depending tube 19 (Fig. 2) provided with external threads at one end, is threaded into internal threads formed in the passage 7 adjacent the face 9. At its lower end the tube 9 is provided with a wing-nut 20 to facilitate the connection of the tube 19 with the passage 7 and also its disconnection therefrom. The tube 19 discharges the air from the main line into a cap 21 which is threaded upon the lower end of a casing 22. Interposed between the top edge of the cap 21 and the lower edge of the casing 22 is a gasket 23. The casing 22 is threaded at its upper end into the recess 10 in the body 8 and consequently surrounds the passages 7 and 11 in the face 9 of the body 8 (Fig. 4).

Interposed between the face 9 and a locknut 24 threaded on the upper portion of the tube 19 is a disk washer 25. Interposed between the locknut 24 and a second locknut 26 on the tube 19 is a circular strainer or screen 27. The margin of the screen is bent as shown in Fig. 2 to form a skirt 28 loosely engaged with the internal wall of the casing 22. The peripheral edge of the screen 27 normally engages the face 9 of the body 8 on a circle surrounding the passages 7 and 11.

With this construction the main line air from the passage 7 enters the tube 19, passes into the cap 21 and then flows upwardly in the auxilliary motive agent passage 29 formed by the space between the tube 19 and casing 22. After passing through the screen 27 the air enters the passage 11. When the air enters the cap 21 from the tube 19 and then reverses its flow, free dirt, oil and water in the main line air is left behind in the sump in the cap 21 from which the collected impurities may be blown through the pet-cock 30.

In order to remove from the air oily and watery vapors and dirt therein, which pass into the passage 29 with the upwardly flowing air, the passage 29 is stuffed loosely with about 60 grams of white waste 31. This waste rids the air of the remaining oil, water and dirt.

When the waste 31 has been in use for some time it is liable to become saturated with the impurities withdrawn from the air to such an extent that the packing is no longer effective to catch the oil, water and dirt. In order to replace the worn-out packing with clean waste a valve on the main air line is closed, the pet-cock 30 is opened to relieve the pressure, the cap 21 is removed from the casing 22, the wing-nut 20 is manipulated to unscrew the tube 19 from the passage 7, and the tube 19 is withdrawn from the casing 22. As the screen 27 is rigidly secured to the tube 19 by the locknuts 24 and 26 the screen 27 acts to push the dirty waste 31 as a unit from the casing 22 when the tube 19 is withdrawn from the casing 22.

The tube 19 is then replaced in the casing by threading it into the passage 7. Clean waste is then inserted into the passages 29 by stuffing it loosely into the space bounded by the tube 19, the casing 22 and the screen 27. Finally the cap 21 is screwed into position on the casing 22 and the valve on the main air line is opened to readmit main line air to the air regulating set assembly.

With the construction described the duty of maintaining the clean packing in the passage 29 is very light.

It will be apparent from the foregoing description that the screen 27 performs three functions. It stops impurities which may work through the packing 31, it prevents the compressed air from blowing strands from the waste 31 into the pressure reducing valve, and it pushes the packing as a unit out of the casing 22. While the filter packing is cotton waste, preferably, because of its cheapness and universal availability, it must be understood that any filter medium may be employed which is capable of being stuffed loosely into the passage 29 and then compacted by the compressed air to fill the passage.

It will be clear also to those skilled in this art, with the general objects of the present invention in view, that changes may be made in the details of structure, the described and illustrated embodiment thereof being intended as an exploitation of its underlying essentials, the features whereof are definitely stated in their true scope in the claims herewith.

What is claimed as new, is:—

1. In an air regulating set assembly the combination with a valve and communicating main and auxiliary motive agent passages leading thereto, said auxiliary motive agent passage having a depending tube connected to the main motive agent passage, a casing therefor, and filter packing stuffed loosely into the space between the tube and the casing the entire lower face of said packing being unsupported, of means connected to the tube and located adjacent the upper end of the casing above the filter packing for removing all the packing from the casing as a unit upon the disconnection of the tube from the main motive agent passage and its withdrawal from the casing.

2. In a separator, the combination with a body having a face, motive agent passages terminating at said face out of communication with each other within the body, of means for connecting the motive agent passages comprising a tube detachably connected to one of said passages, a cylindrical casing enclosing the tube connected to the body in communication with the other one of said passages, a screen connected to the tube and arranged to engage the internal wall of the casing adjacent the face of the body, and filter packing substantially filling the space bounded by the tube, screen and casing unfixed therein, the entire lower face of said packing being unsupported whereby when the tube is detached from the passage to which it is normally connected and removed from the casing the screen pushes the packing out of the casing.

3. In a separator, the combination with a body having a face, motive agent passages terminat-

ing at said face out of communication with each other, of means for connecting the motive agent passages comprising a tube threaded into one of said passages, a cylindrical casing enclosing the tube connected to the body in communication with the other one of said passages, a screen, connected to the tube, having its peripheral edge engaged with the face of the body and provided with a marginal skirt engaged with the internal wall of the casing, and filter packing substantially filling the space bounded by the tube, screen and casing whereby when the tube is threaded out of the passage to which it is normally connected and removed from the casing the screen pushes the packing out of the casing.

4. In an air regulating set assembly the combination with a valve and communicating main and auxiliary motive agent passages leading thereto, said auxiliary motive agent passage having a depending tube connected to the main motive agent passage, a casing therefor provided with a cap into which free dirt, oil and water is delivered by the tube, cotton waste stuffed loosely into the space between the tube and the casing, the entire lower face of said waste being unsupported and a screen interposed between the waste and the valve to stop impurities which work through the packing and to prevent strands of the waste from reaching the valve, of means connecting the tube and the screen for causing the screen to push the waste out of the casing as a unit when the tube is disconnected from the main motive agent passage and withdrawn from the casing.

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