P. H. CAZIER AND W. H. HECKER.

COMPRESSED AIR FILTERING APPARATUS.

APPLICATION FILED SEPT. 17, 1921.

1,429,713. Patented Sept. 19, 1922.

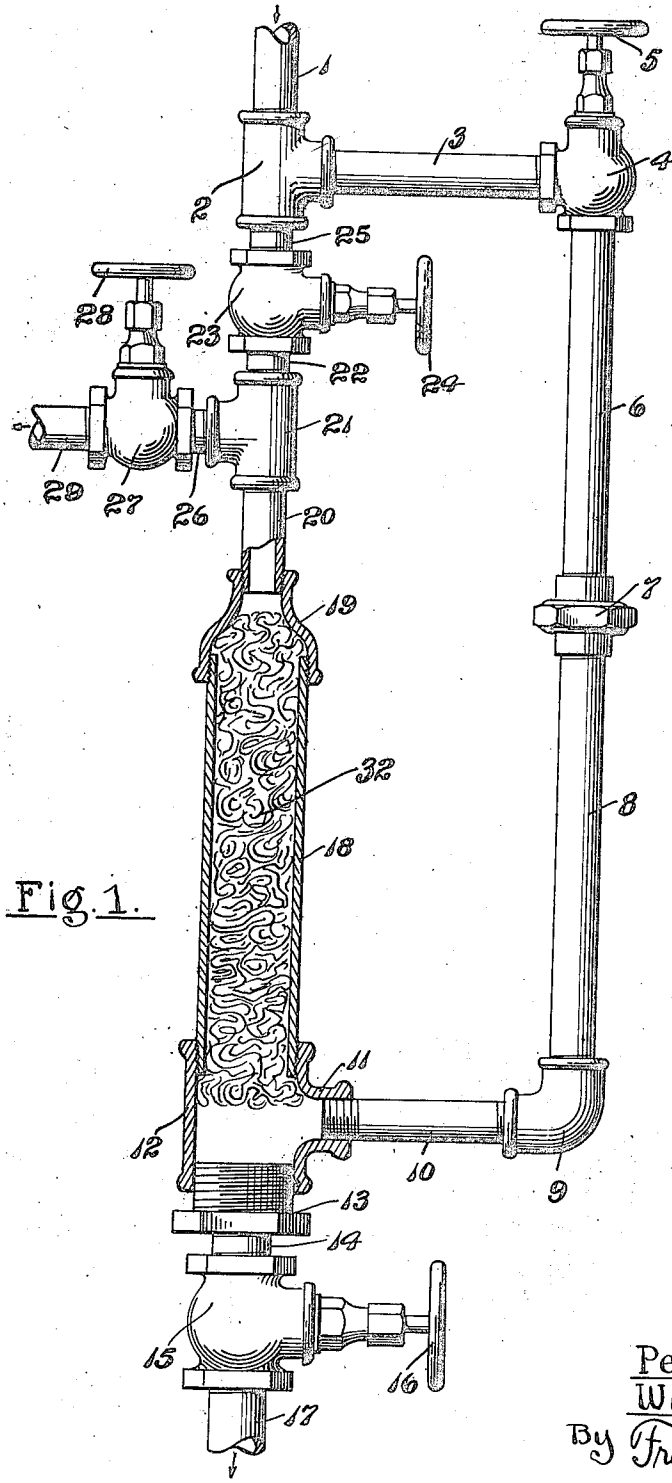

Fig. 1.

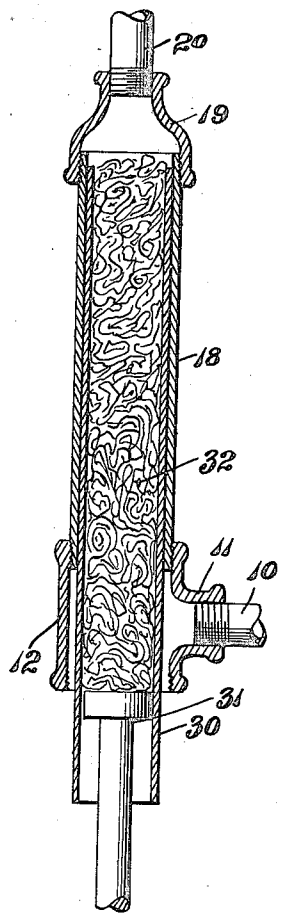

Fig. 2.

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COMPRESSED-AIR-FILTERING APPARATUS.

Application filed September 17, 1921. Serial No. 501,333.

To all whom it may concern:

Be it known that we, PERRY H. CAZIER and WILLIAM H. HECKER, citizens of the United States of America, residing at Nashville, in the county of Barry and State of Michigan, have invented certain new and useful Improvements in Compressed-Air-Filtering Apparatus; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an apparatus for use in removing moisture, oil and the like from compressed air. In compressing air, the moisture which is carried as water vapor in the air is condensed, and the lubricant from the compressor used is more or less carried into the compressed air. Under compression the moisture condenses to water and goes from the tank or other container of compressed air when the same is taken for use. In the use of the air for operating air sprayers or brushes for the application of varnish, shellac or other like coatings to articles of furniture, the water coming from the sprayer nozzle with the varnish or the like causes a roughening of the grain of the wood and is otherwise detrimental for the proper finish and application of the coating. In fact on days when the humidity of the atmosphere is high, it is almost if not quite impossible to operate the spraying apparatus by means of compressed air due to the high percentage of water therein. The lubricating oil is also a source of trouble to a lesser degree. In many other ways where compressed air is used, the water therein is a source of trouble and annoyance.

Our invention is directed to a very simple yet effective construction whereby the water is wholly removed from the air, or at least to a degree where it is not of consequence, and at the same time other undesirable ingredients are likewise removed, such as lubricating oil from the compressing machine. And it is a primary object and purpose of the invention to make an apparatus which is practical and efficient, durable and economical in manufacture and maintenance for the attainment of the end set forth, and as will appear as understanding of the invention is had from the following description, taken in connection with the accompanying drawing, in which,

Fig. 1 is a side elevation, with parts broken away and in section, of the apparatus, and

Fig. 2 is a fragmentary vertical section through the filter holding portion of the apparatus, showing the method of introducing the filtering material therein.

Like reference characters refer to like parts in the different figures of the drawing.

In the construction, the pipe 1 leads from any tank or other reservoir of compressed air and connects into the upper end of a T-coupling. A horizontal pipe 3 connects with the T 2 in one side thereof and at its opposite end leads into a valve casing 4, the valve in which may be opened or closed by operation of the hand wheel 5. A vertical pipe 6 leads downwardly from the valve casing 4, being connected by a union 7 with a second vertical pipe 8 in direct alinement with the pipe 6, an elbow 9 being secured at the lower end of pipe 8 for connection thereof to a second horizontal pipe 10 which leads into a lateral neck 11 in the side of a second T-coupling 12. A reducer bushing 13 threads into the lower end of the T 12 and a short nipple 14 connects therewith, at its lower end leading into a valve casing 15, the valve in which is operated to open or closed position by hand wheel 16. An outlet pipe 17 leads downwardly from the valve casing 15.

A tube 18 has threaded connection into the upper end of T 12, at its upper end being equipped with a reducer 19 for connection of a nipple 20 therewith, to the upper end of which a third T-couplig 21 is attached. A short connecting nipple 22 connects the upper end of T 22 with a valve casing 23, the valve in which is operated to open or closed position by hand wheel 24. The upper end of the valve casing 23 is connected with the lower end of T 2 by a nipple 25, as shown.

From the T 21, a short nipple 26 projects laterally and connects with a valve casing 27, the valve position in which is controlled by hand wheel 28. A pipe 29 leads away from the casing 27 to the nozzle or sprayer which is to be actuated by compressed air, not being shown in the drawing as it forms no part of the present invention. The tube 18 is of relatively large diameter compared with the diameters of the other pipes in the construction and is adapted to be filled with any suitable absorbing and filtering material. We have used absorbent cotton and the same has proved particularly satis-

factory. In filling said tube 18, the bushing 13 with attached parts is removed from the lower end of T 12, and a tube 30 of thin sheet metal is first filled with the absorbent cotton, indicated at 32, and then inserted upwardly through the T 12 and the tube 18. The tube 30 is long enough that it projects a distance below the T 12. A plunger 31 is placed in the lower end of the tube 30 and the tube then drawn downwardy over the plunger, thereby leaving the cotton in the tube 18, as is evident.

In operation, the valves in casings 23 and 15 are closed and those in casings 4 and 27 are opened. The compressed air coming through pipe 1 passes through pipes 3, 6, 7 and 10, and upwardly through the cotton 18, passing outwardly through pipe 29 for use. In passing through the absorbent cotton, the water and any lubricating oil in the air is retained and absorbed, so that the air passing outwardly through pipe 29 is dry. In the course of time, the cotton becomes saturated, whereupon valves in casings 4 and 27 are closed and those in casings 15 and 23 are opened, thereby making a direct downward passage for the air through the cotton 32 and outwardly through the outlet pipe 17, the water carried by the cotton being blown outwardly through the outlet pipe 17 as is evident. In this way it is possible to alternately saturate the cotton and then blow and dry it out, replacing the cotton at intervals when it has more or less lost its absorbent qualities.

This construction has been in practical use and has proved an effective bar against the passage of water in the compressed air out at the outlet pipe 29, whereby the air actuating the spraying of varnish, shellac or other finishing and coating materials is dry and has no damaging effect on the wood coated or the material used in coating. The construction is simple in construction, very valuable in operation, making the working possible irrespective of how much water vapor there may be in the atmosphere, durable in service, and economical in use. It may be used in practically any and all places where compressed air is used for spraying or other like operations, such as operating a sand blast or the like. The appended claims define the invention and we consider ourselves as entitled to all forms of structure coming within the scope thereof.

We claim:

1. An apparatus of the class described, comprising a vertically positioned container, absorbent material for collecting moisture and lubricant from compressed air passed therethrough, means for carrying compressed air to the lower end of the container, means to close said air carrying means against the passage of air, said last named means being normally open, a normally open outlet to the container at its upper end, means to close said outlet, a normally closed outlet to the lower end of the container, means for opening said outlet, and a normally closed conduit for carrying compressed air into the upper end of the container combined with means for opening said conduit, substantially as and for the purposes described.

2. An apparatus of the class described, comprising a relatively large vertically positioned tubular container, absorbent material therein, an inlet to the upper end of the container, a normally open branch pipe leading to one side from said inlet, a manually operable valve in said branch pipe, a second manually operable valve at the upper end and connected with said inlet and directly connected to a compressed air carrying pipe, a laterally extending conduit for compressed air leading from the pipe to the lower end of the container, said conduit having a manually operable valve therein, and a normally closed outlet to the lower end of the container having a manually operable valve therein, substantially as described.

3. An apparatus of the class described, comprising a vertically positioned container, absorbent material for collecting moisture and lubricant from compressed air passed therethrough, an outlet to the lower end of the container, an outlet to the upper end of the container, manually operable means for independently closing or opening said outlets, a conduit for carrying compressed air to the lower end of the container between the absorbent material and the lower outlet, means for opening or closing said conduit, a second conduit for carrying compressed air into the upper end of the container, and means for opening or closing said conduit, substantially as and for the purposes described.

4. An apparatus of the class described, comprising a vertically positioned tubular container, a T-coupling attached to the lower end thereof, a reducer bushing in the lower end of the coupling, a conduit having a manually operable valve therein connected with the bushing and leading to the outside, a conduit for compressed air leading to the T-coupling, said last named conduit having a manually operable valve therein, a third conduit connecting the second conduit with the upper end of the container and having a manually operable valve therein between the container and the second conduit, a branch conduit leading from the third conduit between the container and the valve in the third conduit and likewise having a manually operable valve therein, and absorbent material filling the container.

5. An apparatus of the class described, comprising a vertically positioned container, absorbent material therein permitting the

passage of compressed air therethrough and absorbing moisture and lubricant from the air on passage, means for carrying compressed air to the lower end of the container, means for carrying compressed air to the upper end of the container, an outlet to each end of the container, means for independently opening or closing either outlet, and means in each of said air carrying means for independently opening or closing the same, substantially as described.

In testimony whereof we affix our signatures.

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