

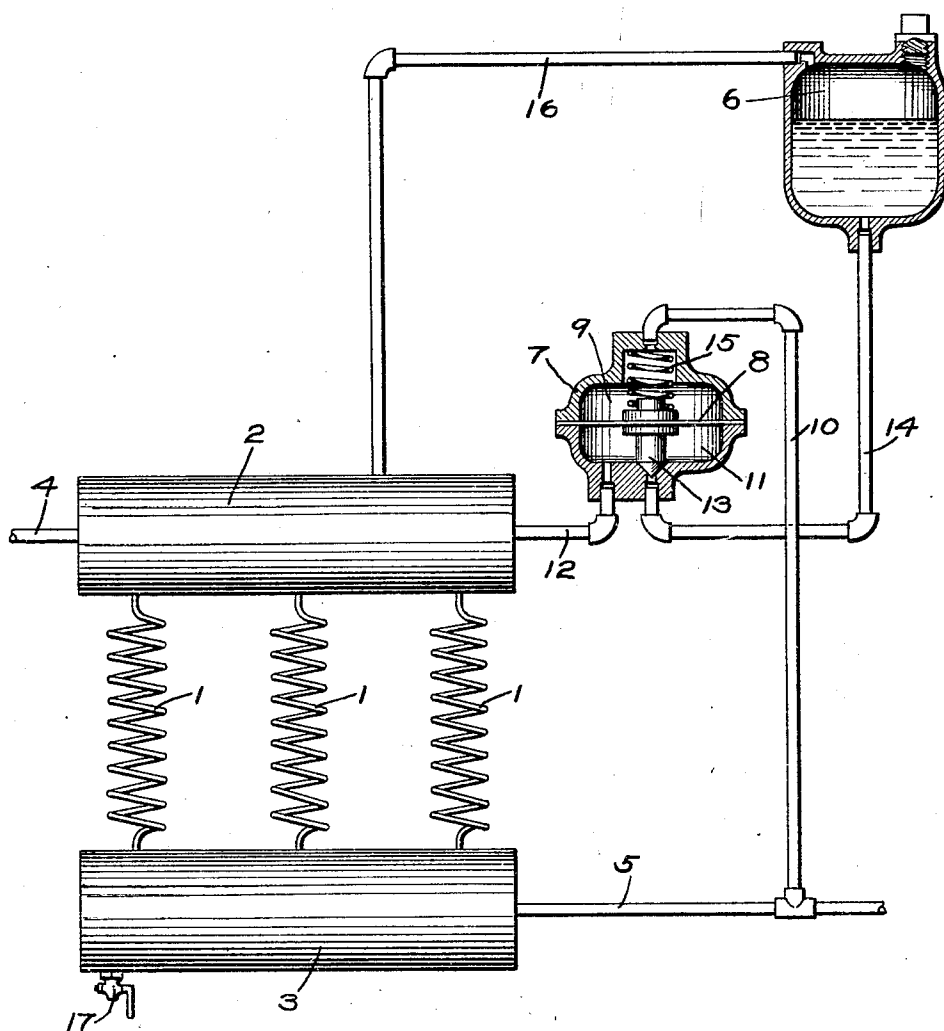
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C. C. FARMER

AIR PURIFIER

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INVENTOR

CLYDE C. FARMER

BY *Wm. M. Eady*
ATTORNEY

UNITED STATES PATENT OFFICE.

CLYDE C. FARMER, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF WILMERDING, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

AIR PURIFIER.

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This invention relates to air purifiers, and more particularly to a device for purifying air employed in a fluid pressure brake system.

5 With the usual fluid pressure brake system employed on railway trains, the locomotive is equipped with an air compressor and one or more main reservoirs into which the compressor compresses air.

10 The air compressed by the compressor carries in suspension more or less oil, which comes from the compressor and water vapor, which is present in air taken from the atmosphere by the compressor. It has been
15 found that the oil and water carried by the air tends to collect on valves employed in the brake equipment and in some cases, the deposits so formed, interfere with the desired operation of certain valves, so that it
20 is very desirable to remove oil and water from the compressed air before it is supplied to the brake apparatus.

The principal object of my invention is to provide means for purifying compressed
25 air before it is supplied to a fluid pressure system, such as a fluid pressure brake system.

In the accompanying drawing, the single figure is a diagrammatic view of an apparatus embodying my invention.

30 According to my invention, one or more sections 1 of coiled pipe are provided, the pipe being preferably of relatively small diameter, each section having an inlet end connected into a header 2 and an outlet end
35 connected into a drain reservoir 3.

The compressed air of the system is supplied through pipe 4 to the header 2 and passes from the drain reservoir 3 to a pipe 5,
40 which is connected to a fluid pressure system, such as a fluid pressure brake system.

As the compressed air flows through the section 1 of coiled pipe, the air is cooled, so that water vapor in the air condenses on the inner walls of the pipe and at the same time,
45 the swirling of the air through the coils, causes oil as well as water to collect on the inner walls of the pipe.

It has been determined by actual test that the above arrangement of coiled pipe will
50 effectively remove substantially all of the oil and water held in suspension in the compressed air, but the coils of pipe tend to become clogged with oil and water collecting on the inner walls of the pipe, so as to prevent
55 the flow of compressed air through the

apparatus to the fluid pressure system. Furthermore, water collecting in the coils will tend to freeze, when the coils are exposed to the atmosphere in the winter time, and thus cause clogging of the coils.

60 In order to prevent clogging of the air purifying coils, as above referred to, I provide means operated automatically, as the coils tend to clog, for supplying a liquid to the coils which will liquefy the oil so that
65 it will run out of the coils and also prevent the water from freezing, or if frost has formed to liquefy same.

For this purpose, a receptacle 6 is provided, which contains a liquefying agent,
70 such as alcohol for preventing freezing, and a light oil, such as benzine, for rendering the oil liquid, so that it will drain out.

The supply of liquid in the receptacle 6 is controlled by a valve device which may
75 comprise a casing 7 containing a flexible diaphragm 8, having the chamber 9 at one side connected by a pipe 10 to the outlet air pipe 5, and having chamber 11 at the opposite side connected by pipe 12 to the header
80 2 and thereby being subjected to the pressure of air supplied to the header.

The diaphragm 8 operates a valve 13, which controls communication from a pipe
85 14, leading to the receptacle 6 to chamber 11. The diaphragm 8 is subject to the pressure of a coil spring 15, acting in a direction tending to seat the valve 13. The liquid in the receptacle 6 is subject to the pressure of
90 air supplied to the header 2, fluid being supplied from the header through pipe 16 to said receptacle.

In operation, air under pressure flows through pipe 4 to the header 2 and thence through the coils 1 to the drain reservoir 3,
95 the oil and water in the air collecting on the inner walls of the coils 1. From the reservoir 3, the purified air passes through pipe 5 to the fluid pressure system.

So long as the flow through the coils 1
100 is free and unimpeded, the pressure of fluid in the reservoir 3 and consequently the pressure of fluid acting in chamber 9 on the diaphragm 8 will be substantially equal to the pressure of fluid supplied from header 2,
105 through pipe 12 to chamber 11, and consequently the diaphragm 8, with the assistance of spring 15 will hold the valve 13 closed.

If the coils 1 should become clogged, however, then it will be evident that the pressure
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of air in the header 2 will be greater than the pressure of air in the reservoir 3 and as a consequence, the pressure of air in chamber 11 will exceed that in chamber 9, so that the diaphragm 8 will be actuated to effect the opening of the valve 13. Liquid from the receptacle 6 will then be supplied through pipe 14 to chamber 11 and thence will flow into the header 2. The liquid supplied to the header enters the several coils 1 and acts to liquefy the oil collected therein and also to liquefy frost, if any has collected.

The oil and water in the coils then drains out of the coils and into the drain reservoir 3, so that the coils are cleared of matter tending to obstruct the flow of air, and the compressed air is again permitted to flow freely.

It will be evident that the above described action will automatically occur, whenever the coils become sufficiently clogged so as to result in the creation of a differential of air pressures on the diaphragm 8.

A drain cock 17 may be provided at the lower portion of the reservoir 3, so that when desired, accumulated liquid may be drained out.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The combination with a pipe coil interposed in a flow of fluid for separating oil and water from the flowing fluid, of means operated upon the clogging of said coil with oil

and water for supplying a liquid to said separating means which acts by gravitational flow through said coil to clear same of the collected oil and water.

2. The combination with a coil of pipe through which a stream of fluid flows and in which oil in the air stream collects, of means operated by the differential of fluid pressures between the inlet and the outlet of the air stream for supplying a liquid to said coil for clearing same of the collected oil.

3. The combination with one or more sections of coiled pipe interposed between the inlet and outlet of a current of air and adapted to collect oil contained in said air current, of a device operated by the differential of air pressures between the inlet and outlet, created by the clogging of the coils with oil, for supplying a liquid to said coils adapted to clear the coils of oil.

4. The combination with a plurality of vertically disposed sections of coiled pipe through which a current of air flows, said coils being adapted to collect oil and water contained in said air current, of a device operated upon a decrease in fluid pressure at the air outlet side of said coils, due to clogging of the coils with oil and water, for supplying a liquid to said coils for the purpose of clearing the coils of oil and water.

In testimony whereof I have heretunto set my hand.

CLYDE C. FARMER.