

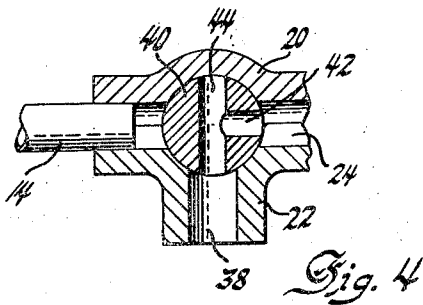
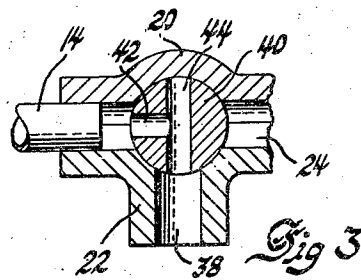
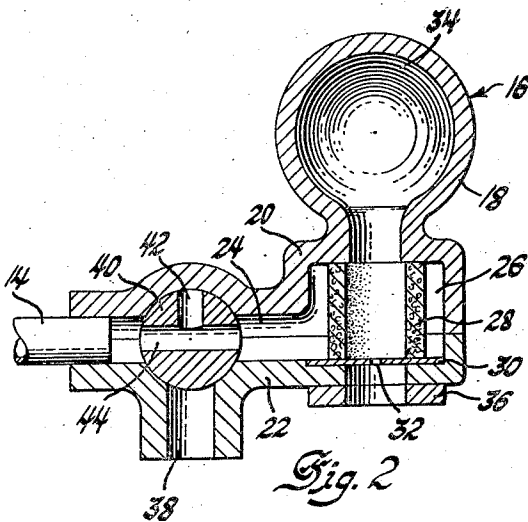
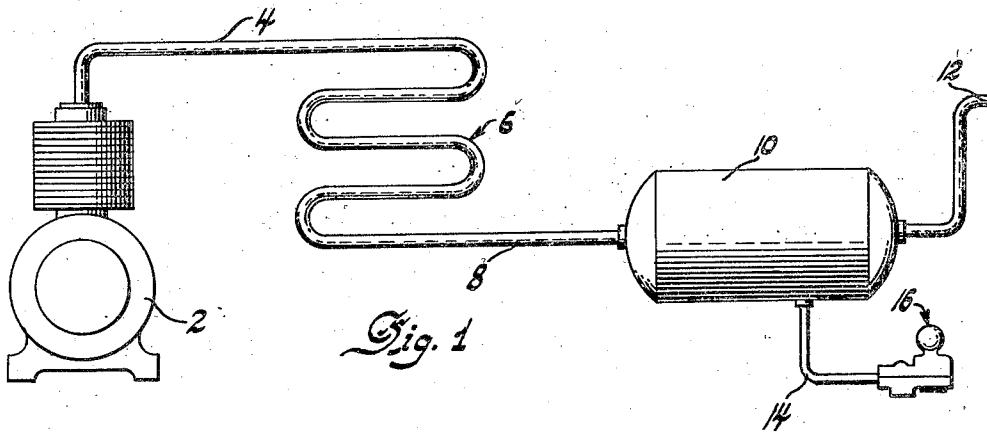
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CONDENSATE DRAIN

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CONDENSATE DRAIN

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3 Claims. (Cl. 210—92)

This invention relates generally to compressed gas systems and more particularly to means for removing moisture; such as, condensate, and other liquids from such systems.

In most compressed gas systems in which the compressed gas is used to operate various pressure devices it is usually impractical to remove all of the moisture from the gas before it is introduced into the pressure system. As the gas moves through the system it is quite often subjected to temperature and pressure changes which cause portions of the moisture suspended therein to condense. It will be readily appreciated that unless some means is provided to remove this condensate it will accumulate in the system and affect the operation thereof.

The usual method for removing this condensate is to provide drain cocks on the bottom or gravity side of the pressure system which may be periodically opened. There are, however, numerous objections to such a method, the most obvious being that someone is constantly forgetting to periodically open the drain cocks resulting in large accumulations of condensate. Another objection to this method is that the condensate cannot be discharged during operation of the system without excessively bleeding off the pressure of the system and perhaps impairing its operation.

The purpose of the present invention is to provide improved means which can be attached to a compressed gas system to automatically discharge any condensate which tends to accumulate in the system without affecting the pressure of the system.

It is a further purpose of this invention to provide means in the automatic condensate discharge means which may be periodically operated to check the automatic operation thereof and which will quickly clean a filter used in combination therewith without prior removal of the filter.

For a further understanding of this invention reference may be had to the accompanying detailed description and drawing, in which:

Fig. 1 is a schematic diagram of a compressed gas system with the new automatic condensate drain attached thereto.

Fig. 2 is an enlarged section in elevation of the condensate drain shown in Fig. 1 and includes a disclosure of the valve means therefor in the normal condensate discharge position.

Fig. 3 shows the valve means of the condensate drain in a position which tests whether the drain is properly discharging the condensate.

Fig. 4 shows the valve means in a position to discharge the small volume reservoir of the condensate drain so as to clean a filter therein which protects a small orifice in the condensate drain from becoming clogged.

Referring now to the accompanying figures, a compressor indicated generally by the numeral 2 is shown connected by means of piping 4 to an after cooler 6 which, in turn, by means of piping 8 charges a reservoir tank 10. The reservoir tank 10 is connected by means

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of a pipe 12 to other operating components of the system. Attached to the bottom or gravity side of the tank 10 by means of a conduit or pipe 14 is the new automatic condensate drain 16 to now be described in detail.

The condensate drain 16 comprises a housing or casing 18 including an upper casing half 20 and a lower casing half 22. The casing halves 20 and 22 together form a passage 24 and a filter chamber 26. The filter chamber 26 is provided with a cylindrical filter 28 which is seated on a small plate 30 supported by the lower casing half 22. The plate 30 has an orifice 32 in the center thereof which connects that portion of chamber 26 located inside the filter 28 with the atmosphere. To shield the orifice 32 from dirt, etc., which might otherwise find its way therein from the atmosphere, a depending washer 36 is attached to the lower casing half 22. The upper casing half 20 has a small volume reservoir 34 therein which is in communication with the filter chamber 26 in such a way that any compressed gas from the passage 24 into the reservoir 34 must first pass through the filter chamber 26 and the filter 28.

The aforementioned piping 14 extends into passage 24 and communicates therewith. Located in the lower casing half 22 is a second passage 38 which is adapted to connect passage 24 with the atmosphere intermediate the lower end of piping 14 and filter chamber 26. Located in passage 24 between passages 24 and 38 and also intermediate the filter chamber 26 and the lower end of piping 14 is a valve 40 having passages 42 and 44 therein. The valve 40 has a plurality of operating positions to which it may be turned by suitable means (not shown).

The operation of this new condensate drain is as follows: When the valve 40 is in the position shown in Fig. 2 it closes off passage 38 and by means of passage 44 connects passage 24 to reservoir 10. Any condensate in reservoir 10 will flow downwardly through pipe 14, through passage 44 and passage 24 into the filter chamber 26. The condensate will then pass through the filter and be discharged to the atmosphere through the orifice 32 which, in practice, is made small enough to prevent excessive bleeding off of the pressure of the system yet of sufficient size to discharge the condensate at a rate to prevent accumulation in the main tank 10. In addition to allowing condensate to be discharged through orifice 32, the position of valve 40 in Fig. 2 also enables the small reservoir 34 to be charged to a pressure substantially the same as that in the main tank 10.

It will be noted that this condensate drain is completely automatic and when in its normal operating position will continuously discharge condensate from the system. If, however, the compressed gas used in the system contains substantial amounts of foreign matter, this matter will tend to collect on the filter 28 thereby rendering it less effective to discharge the condensate. To determine whether such conditions exist, it is merely necessary to turn the valve 40 to the position shown in Fig. 3 which will connect the pipe 14 by means of passages 42 and 44 to the passage 38 leading to the atmosphere. If a substantial amount of condensate is discharged when the valve is in the position shown in Fig. 3, it is probably due to the fact that filter 28 needs to be cleaned. To clean the filter element 28 it is only necessary to turn the valve 40 to the position shown in Fig. 4. When the valve is in this position the gas in the small volume reservoir 34 will discharge through the filter 28, the passages 24, 42, 44, and 38, carrying with it any dirt or sediment which has collected on filter 28. While it has been suggested that valve 40 is manually operated, it should be appreciated that valve 40 could also be automatically controlled to periodically discharge the reservoir 34 and clean the filter 28.

It will now be appreciated that this automatic con-

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condensate drain for compressed gas systems is a simple but unique, easily attached, unitary device having at least three important features. First, it may automatically and continuously discharge condensate which tends to accumulate in a compressed gas system without impairing the pressure of the system; second, it is provided with means for testing whether there is an over-accumulation of condensate in the system; and third, it provides simple but very effective means for immediately cleaning a filter which forms an important part of the automatic discharge portion of the drain without prior removal thereof.

I claim:

1. In combination with a pressure system, means for discharging condensate tending to accumulate in said system beginning at the bottom side thereof comprising a housing communicating with the bottom side of said system and having an opening and orifice therein in constant communication with the atmosphere for the continuous discharge of condensate from said system during operation of said system, a filter in said housing located between said system and said orifice to prevent clogging of said orifice, a volume reservoir in said housing chargeable by the pressure of said pressure system, said volume reservoir being located so as to discharge through said filter and said opening in opposition to the passage of condensate through said filter, and valve means operable to close said opening and connect said orifice and said volume reservoir to said pressure system whereby condensate in said system is filtered before being discharged through said orifice and said volume reservoir is charged by the pressure of said system, said valve means being operable to shut off the pressure of said system from said reservoir and said orifice and connect said opening to said volume reservoir whereby said volume reservoir discharges through said filter and said opening to remove the accumulation of sediment from said filter and clean said filter.

2. Means for preventing the accumulation of condensate in a pressure system comprising a casing connected to said system so that condensate therein will tend to flow into said casing, said casing having a small orifice therein through which said condensate may be discharged without appreciably decreasing the pressure of said system, a filter in said casing located between said system and said orifice to prevent clogging of said orifice, said casing having an opening therein and a small volume reservoir discharge-

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able through said filter and said opening in opposition to the flow of condensate through said filter, and valve means in said casing operable to close said opening and connect said orifice and said volume reservoir to said pressure system whereby condensate in said system is filtered before being discharged through said orifice and said volume reservoir is charged by the pressure of said system, said valve means being operable to disconnect said system from said reservoir and said orifice and connect said opening to said volume reservoir whereby said volume reservoir discharges through said filter and said opening to clean said filter, said valve means further being operable to disconnect said filter, orifice, and volume reservoir from said system and to directly connect said system with said opening whereby the condensate of said system will be discharged directly through said opening and the effectiveness of said orifice in discharging condensate from said system may be tested.

3. Means for preventing the accumulation of condensate in a pressure system comprising a casing having therein a first passage, a filter chamber, a small volume reservoir, and an orifice in communication with the atmosphere; said orifice, passage and reservoir communicating directly with each other through said filter chamber, a filter in said chamber, means connecting said passage to said pressure system, said casing having a second passage therein connected to said first passage between said filter chamber and said means and communicating with the atmosphere, and valve means in said first passage operable to connect said pressure system to said filter chamber whereby the condensate in said system is discharged through said filter and said orifice and said reservoir is charged through said filter, said valve means being operable to disconnect said system from said first passage and connect said passages together whereby said volume reservoir discharges to atmosphere through said passages and filter opposite to the direction of discharge of condensate through said filter.

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