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APPARATUS FOR DEHYDRATING NATURAL GAS

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1. Claim. (Cl. 62—175.5)

Natural gas which is commercially supplied to users or local distributors has to be conducted in many cases over long distance pipe lines from the source to the points of distribution or consumption and, while such a pipe line may have a general downward slope, it is unavoidable that the configuration of the land over which the pipe lines have to run causes local depressions or stretches in which upwardly inclined and downwardly inclined sections meet at the lowest point of said sections. These depressions collect the condensed moisture and have, therefore, to be provided with separators or draining or drip means. Usually these separators and drip cocks or valves are operated by hand by the supervising personnel.

However, while this method may be adequate in warm climates it leads to great difficulties during the cold season in less favored zones. The cooling of the gas in the pipe leads to the condensation of large quantities of water which may freeze and in other ways may do damage to the pipe line; it also causes a back pressure on the compressors and other pumps in the lines, and may cause sudden bursts.

Moreover, sometimes the natural gas contains traces of sulphur dioxide, which, with water, forms a diluted acid causing corrosion of the metal objects with which it comes into contact.

To eliminate the difficulties caused by the presence of water, the invention provides a means for eliminating the moisture at the source of supply itself. This consists in providing at the source of supply a compressor which compresses the natural gas to a high pressure, and then delivers the compressed gas into a receiving tank or reservoir. This tank is preferably encircled by a cooled cooling pipe through which a cooling medium circulates. The low temperature maintained in the tank by means of the cooling coil will condense the water contained in the natural gas, which may be drained and removed by means of a so-called bleeding line connecting with the lowermost portion of the tank.

In this way the moisture is completely removed at the source so that the pipe lines remain moisture free.

The invention is illustrated in the accompanying drawings showing one embodiment thereof. This embodiment is to be regarded as an example illustrating the method and the principle used, and suggesting further embodiments of the invention to the expert skilled in this art. Such other embodiments are, therefore, part of the invention and are not departures therefrom.

The single figure of the drawings is a diagrammatic illustration of the dehydration system. It is partly provided with legends and is self-explanatory.

The natural gas from the source of supply which is supposed to be in immediate vicinity is led to the compressor 1 by means of the pipe line 1, and is compressed to a relatively high pressure. The compressed gas is conveyed to the receiver tank 2 by means of pipe line 4 which contains the check valve 5.

This receiver tank is surrounded at its outside by a cooling coil 6 which is connected with the cooling or refrigerating apparatus 7 providing the cooling medium circulating in said coil. The temperature of the refrigerant is as a rule kept constant by suitable valve means within the refrigerator 7.

A pipe 8 leads from the receiver vessel to the release line 9 which is connected with the main or long distance line. A pressure valve 10 is inserted into this line in order to be able to control the line pressure.

The lower part of the receiver tank is provided with a pipe line 12, into which a valve 11 may be inserted. The line 12 is connected with the drainage or bleeding pipe 13.

The operation of the apparatus has already been explained when describing the method used.

The natural gas passes from its source directly to the compressor 2, where it is compressed and, while under high pressure, is conveyed to the receiver tank 3 through pipe 4.

While under pressure in the tank 3, it is cooled by means of the cooling coil 6 connected with the refrigerator 7. The water vapor content of the compressed natural gas thereby undergoes condensation and the condensate is collected at the lowest point of tank from whence it is drained by means of pipes 12 and 13.

The dry gas then is delivered from the receiver tank through pipe 8 and pressure regulating valve 10 to the release pipe 9 which carries it to the main line. The regulating valve is adjusted in accordance with the pressure desired in the release line 9.

It will be clear that by means of this method the water content of the gas will be completely removed so that the aforementioned disadvantages due to the water contents are completely eliminated.

I claim:

In an arrangement for the dehydration of natural gas before its admission into distributing pipes, a compressor for producing a high press-
sure, a receiving tank, a pipe leading from the said compressor through this tank to a portion near the bottom of the same, a cooling apparatus maintaining a circulating refrigerating fluid at a temperature lower than the temperature of condensation of the water at the pressure prevailing within the tank, a coiled circulation pipe around said tank filled with the refrigerating fluid and connected with said cooling apparatus, so as to produce a permanent circulation of said fluid, a valve controlled discharge pipe connecting the tank with the distributing pipes and a valve controlled water discharge pipe at the bottom of the receiving tank.

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<table>
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