

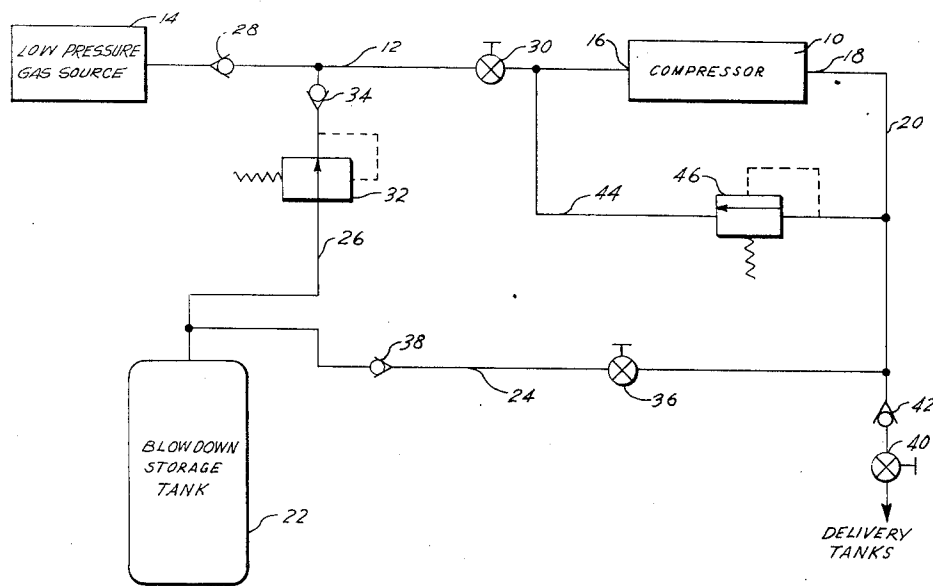
[54] **BLOWDOWN STORAGE FOR COMPRESSORS**
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[58] Field of Search 417/280, 503, 26, 279, 302-323, 417/901, 303, 304; 60/36

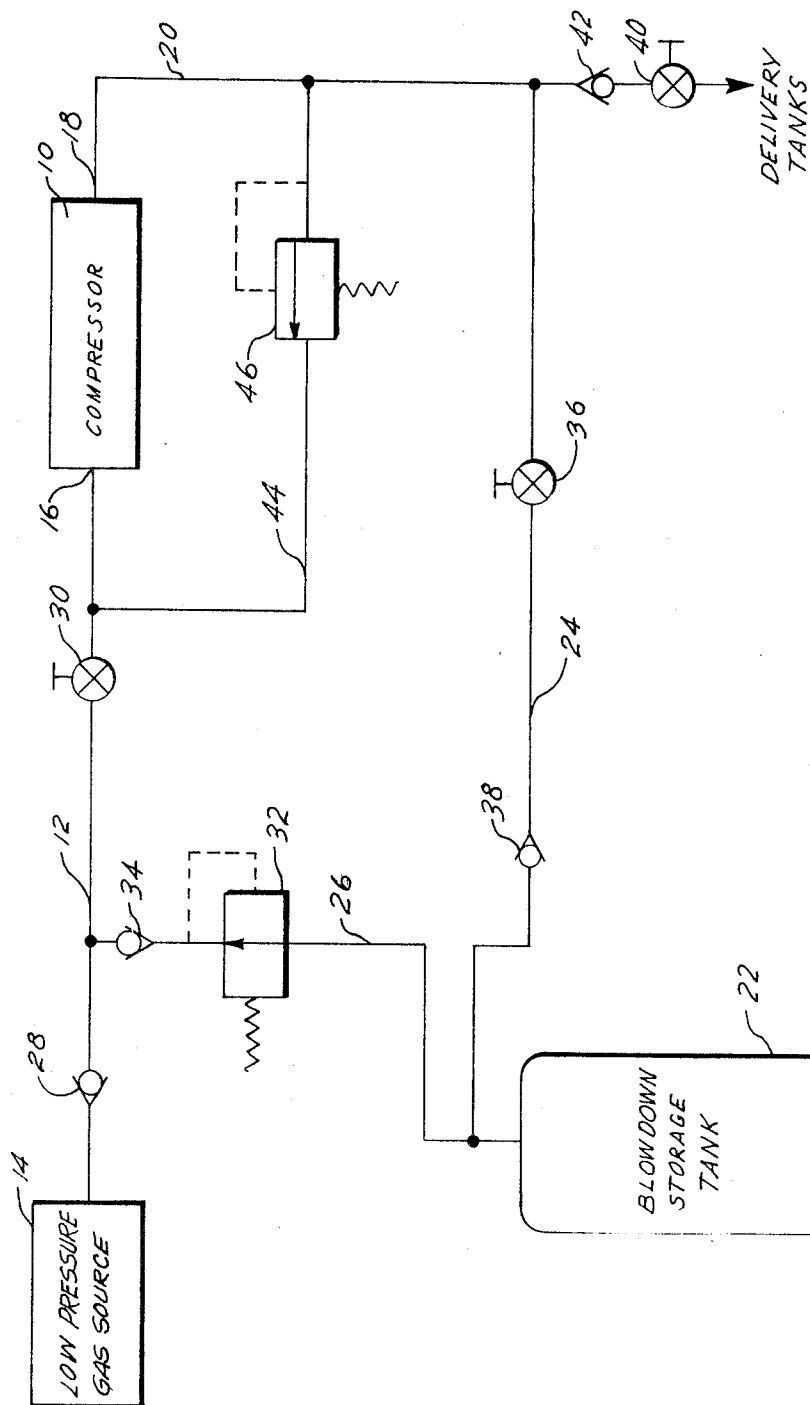
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[57] **ABSTRACT**
When a compressor is shut down, the gas in its pumping cylinders is discharged into a blowdown storage tank. When the compressor is started again, gas from the blowdown storage tank is used as a gas source for the compressor until pressure in the storage tank approaches normal supply pressure.

4 Claims, 1 Drawing Figure





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BLOWDOWN STORAGE FOR COMPRESSORS.**BACKGROUND OF THE INVENTION**

The present invention relates to compressor systems in general and, more in particular, to a compressor system employing a blowdown storage tank to store blowdown gas from the compressor which is subsequently used when the compressor is started again.

In normal practice, after a compressor is shut down, relatively high pressure gas within the compressor is discharged to atmosphere. Thus this gas is lost.

SUMMARY OF THE INVENTION

The present invention provides a compressor system wherein the relatively high pressure gas remaining on the discharge or outlet side of a compressor, typically in its pumping cylinders, after compressor shutdown is stored in the blowdown storage tank or vessel for subsequent introduction into the compressor's inlet when the compressor is started again.

In more specific form, the present invention contemplates a compressor system having a compressor of one or more stages, an inlet to the compressor and an outlet from the compressor. A blowdown storage tank is selectively coupled, as through a valve, to the outlet side of the compressor to receive gas from the outlet side when the valve is opened. The blowdown tank is also coupled, as through a regulator, to the inlet side of the compressor for the discharge of blowdown storage tank gas into the inlet of the compressor when it is started. Means, such as a check valve, between the blowdown storage tank and the outlet side of the compressor is provided to prevent gas from flowing from the blowdown storage tank to the outlet side of the compressor when the pressure there is lower than in the tank. On the inlet side of the compressor, means such as a check valve, is disposed between the connection of the blowdown storage tank to the inlet side and a source of low pressure gas to prevent blowdown storage tank gas from passing by the check valve. Another check valve may be provided between the compressor inlet and the storage tank to prevent gas flow from the inlet side into the tank.

These and other features, aspects and advantages of the present invention will become more apparent from the following description, appended claims and drawing.

BRIEF DESCRIPTION OF THE DRAWING

The single FIGURE is a flow diagram of the compressor system of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the FIGURE, a compressor 10 is shown. This compressor is typically a multistage reciprocating type compressor. A line 12 leads from a source of low pressure gas 14 to an inlet 16 of compressor 10. An outlet 18 of compressor 10 leads to a delivery line 20.

A blowdown storage vessel or tank 22 is coupled to delivery line 20 through a line 24. The blowdown storage tank is also coupled to inlet line 12 through a line 26.

A check valve 28 between the junction of line 26 with line 12 and a low pressure gas source 14 prevents gas flow from the blowdown storage tank to the low pressure gas source. An inlet shutoff valve 30 in line 12 is disposed downstream of the junction of line 26 with line 12 for the selective communication of the blowdown storage tank with inlet 16 of the compressor.

A regulator 32 in line 26 regulates the pressure of gas from the blowdown storage tank from blowdown storage tank pressure to a predetermined value of, say, 3 p.s.i. A check valve 34 in line 26 between the junction of line 26 and line 12 and regulator 32 prevents gas flow from line 12 into line 26.

A selectively actuatable blowdown valve 36 in line 24 provides for the selective communication of blowdown storage tank 22 with delivery line 20. A check valve 38 in line 24 prevents gas flow from the blowdown storage tank to the delivery line.

Line 20 leads to the consumption point of the gas being compressed by compressor 10, for example, delivery tanks. A selectively actuatable delivery valve 40 is disposed in line 20 for selective communication of outlet 18 of compressor 10 with the delivery tanks. A check valve 42 is in line 20 to prevent gas flow from the delivery tanks to the outlet of the compressor or into the blowdown storage tank.

A relief line 44 communicates the outlet of compressor 10 with its inlet through a relief valve 46 which is set at, say, 2,700 p.s.i. and functions to circulate gas from the outlet side of the compressor to its inlet in the event that the delivery line pressure reaches the setting of relief valve 46.

Assuming that the blowdown storage tank 22 is exhausted and it is desired to start compressor 10, valve 30 is opened to admit gas from low pressure gas source 14, which may deliver gas at, say, 2 p.s.i. and the compressor is started. Delivery valve 40 will be opened, while blowdown valve 36 is closed. The compressor is run until the delivery tanks are up to pressure. The compressor is then shut down, delivery valve 40 closed, and blowdown valve 36 opened. The high pressure gas remaining in the pumping cylinders of the compressor will then pass through delivery line 20, line 24 and into blowdown storage tank 22, where it will remain until the compressor is started again.

When the compressor is started again, gas will pass from the blowdown storage tank 22 through line 26, regulator 32 and into line 12 until the pressure within the blowdown storage tank is reduced to a point approaching the pressure of the low pressure gas source whereupon the low pressure gas source provides gas to compressor inlet 16.

In the event that during the charging of the delivery tanks the pressure in the delivery tanks reaches the pressure setting of relief valve 46, the relief valve will open to circulate gas from the compressor outlet to the inlet. When this occurs, check valves 28 and 34 prevent gas from flowing into the low pressure gas source or the blowdown storage tank.

The present invention provides a compressor blowdown system which conserves the gas remaining in the compressor after it is shut down for subsequent compression when the compressor is started again. This system conserves on gas which would otherwise be exhausted to atmosphere.

The present invention has been described with reference to a certain preferred embodiment. The spirit and scope of the appended claims should not, however, necessarily be limited to the foregoing detailed description.

What is claimed is:

1. A blowdown storage compressor system comprising:
 - a. a compressor having an inlet for receiving a low pressure gas from a source thereof and an outlet for discharging high pressure gas to a delivery point;
 - b. a blowdown storage vessel;
 - c. means for selectively communicating the compressor inlet with the storage vessel when the pressure in the storage vessel exceeds the pressure from the source of low pressure gas by a predetermined amount;
 - d. means for preventing gas flow from the low pressure source to the storage vessel;
 - e. means for selectively communicating the compressor outlet with the storage vessel;
 - f. means for preventing gas flow from the storage vessel to the compressor outlet; and
 - g. means for preventing gas flow from the delivery point to the storage vessel.
2. The blowdown storage compressor system claimed in claim 1 including:
 - a. means for preventing gas flow from the storage vessel to the low pressure source; and
 - b. means for communicating the compressor inlet with the compressor outlet at a predetermined re-

lief pressure.

3. The blowdown storage compressor system claimed in claim 2 wherein:

- a. the selective communication means between the compressor inlet and the storage vessel comprises a regulator valve between the storage vessel and the inlet of the compressor which is sensitive to both the storage vessel pressure and the pressure of the low pressure gas source to communicate the storage vessel with the inlet of the compressor only when the pressure in the storage vessel exceeds the pressure from the source of low pressure gas source by a predetermined amount;
- b. the means for preventing gas flow from the low pressure source to the storage vessel includes a one-way check valve disposed in series between the compressor inlet and the storage vessel; and
- c. the means for preventing gas flow from the storage vessel to the compressor outlet includes a one-way check valve disposed in series between the compressor outlet and the storage vessel.

4. The blowdown storage compressor system claimed in claim 3 wherein:

- a. the means for preventing gas flow from the delivery point to the storage vessel includes a one-way check valve disposed in series between the delivery point and the storage vessel; and
- b. the means for preventing gas flow from the storage vessel to the low pressure source includes a one-way check valve disposed in series between the storage vessel and the low pressure source.

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