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PROCESS FOR COMPRESSING CHLORIN AND OTHER GASES.

APPLICATION FILED SEPT. 12, 1916. RENEWED MAY 17, 1919.

1,313,160. Patented Aug. 12, 1919.

Fig. 1.

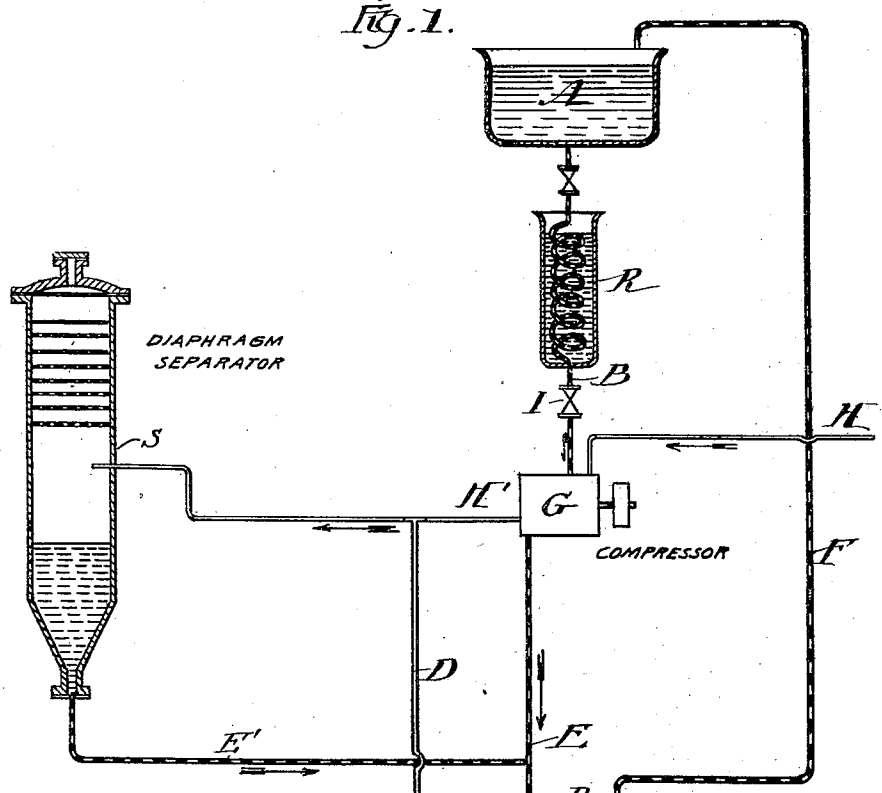
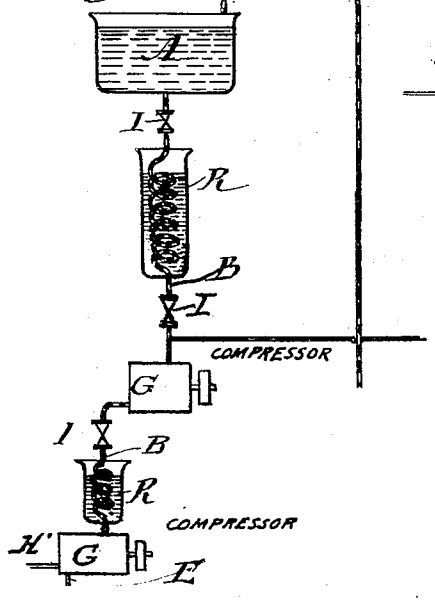


Fig. 2.



Inventor

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By

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PROCESS FOR COMPRESSING CHLORIN AND OTHER GASES.

1,313,160. Specification of Letters Patent. Patented Aug. 12, 1919.

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To all whom it may concern:

Be it known that I, LEONE LEVI BIANCHINI, a subject of the King of Italy, and residing at 66 Via Due Macelli, Rome, Italy, have invented certain new and useful Improvements in Processes for Compressing Chlorin and other Gases, of which the following is a specification.

This invention relates to the compression of chlorin and other gases such as phosgen and the like.

The object of the invention is to provide an improved compressing system wherein the sulfuric acid used in the compressor is conveniently cooled before use and is subsequently collected for use again, and any of the acid carried forward with the chlorin is separated and returned to the system.

It is usual to employ sulfuric acid either as a liquid piston or in some other form for compressing chlorin and like gases, inasmuch as moist chlorin attacks metallic surfaces. Liquid pistons, however, can only be moved slowly so that the work of compression is slow when they are employed. Various particular types of compressors have been suggested for use with sulfuric acid in compressing chlorin.

The present invention relates to an improved system for the compression of chlorin or the like wherein the sulfuric acid fed from a tank is cooled before entering a rotary compressor, and after being discharged from the compressor is conducted into a vessel from which it is raised to the feed tank for re-use. Two vessels are preferably used for receiving the sulfuric acid, so that while one is being filled with acid from the compressor, the other can be discharged into the feed tank. The system also includes a centrifugal diaphragm separator into which any acid carried forward with the chlorin is separated, the separated acid being conducted to one or the other of the vessels receiving the acid from the compressor. In order that these vessels may be put under the same pressure as the compressed chlorin, a branch pipe leads from the delivery end of the compressor to the vessels. Suitable cocks are provided in the system so that the quantity of sulfuric acid supplied from the tank to the compressor may be controlled, and in order that one of the vessels may be connected to receive sulfuric acid from the compressor and separator while the acid in the other vessel is being discharged into the feed tank again.

In the accompanying drawing Figure 1 shows diagrammatically the plant used for compressing chlorin according to the present invention.

Fig. 2 illustrates a modified construction involving a plurality of compressors.

An elevated feed tank A containing sulfuric acid maintained at 94–96% H_2SO_4 communicates with a rotary compressor G by means of a pipe B, the flow through which is controlled by cocks I, while a serpentine cooler R is arranged between the two cocks for the purpose of insuring the cooling of the sulfuric acid before it enters the compressor. The chlorin is supplied to the suction end of the compressor G by a pipe H. A pipe E, having two branches controlled respectively by cocks 3 and 4, conducts the sulfuric acid discharged from the compressor into one or the other of two vessels M, M′. The cocks 5 and 6 on these vessels connect either of them when its cock is opened to a pipe F, which leads back to the feed tank A. On the vessels M, M′ are also provided cocks N, N′ for controlling the supply of compressed air to said vessels for the purpose of forcing out the sulfuric acid contained therein through pipe F, to the feed tank A. The cocks N, N′ are ordinary three-way cocks, to permit compressed air to be admitted to the vessels, the vessels cut off from such supply, or the vessels exhausted to the atmosphere, these operations being obviously necessary to operate the return circulation as described.

The compressed chlorin discharged from the compressor G, passes through a pipe H′ to a centrifugal diaphragm separator S, from which latter it passes out through a delivery pipe H″. Any sulfuric acid carried forward with the chlorin and removed in the separator S is conducted by a pipe E′ to the pipe E, which leads to the vessels M, M′.

For the purpose of maintaining the same pressure in the vessels M, M′ as that of the compressed chlorin while the acid is being delivered into these vessels, a pipe D, fitted with cocks 7 and 8, is provided, leading from the pipe H′ to the vessels M, M′. This pipe D equalizes the pressure in the return

system to the vessels M, M′ to permit a normal flow of the acid to such vessels.

The compressor G may be a gas compressor of any known or appropriate type; for example it may be constructed after the manner of a drum gas-meter or of a Roots compressor, for low pressure, or of a multicellular compressor of the steam turbine type for large quantities and great pressures.

Where high pressures are required, the compression may be carried out in stages by means of several compressors arranged in series, the acid from one compressor being conducted to the suction end of a second compressor, from the second compressor to a third compressor, and so on, and finally back to the vessels M, M′, from which it is raised to the feed tank A again. Serpentine coolers are then interposed between the various compressors for cooling the acid. The chlorin also passes successively from one compressor to another and finally through the diaphragm separator.

The acid is delivered from the feed tank A in such quantities as are necessary to absorb the heat of compression and so that the temperature of the acid does not rise too high above, nor fall too much below 40° C. A higher temperature must be avoided as it would be detrimental to the metallic parts and the packings of the compressor, while a lower temperature would favor the acid being carried along by the gas. The degree of concentration of the acid is maintained approximately constant as the apparatus would otherwise be exposed to corrosion.

The flow of acid through the compressor serves to lubricate the compressor, to protect the same against corrosion due to moisture in the gas, and to maintain a low temperature within the compressor by absorbing the heat produced by the compression, thus conducing to the regular and economical working of the compressor and also rendering possible the subsequent liquefaction of the chlorin, as the intimate contact between the gas and the acid insures the complete desiccation of the gas within the compressor.

The system is operated as follows: Sulfuric acid from the feed tank A passes through the cooler R and pipe B to the suction end of the compressor G, the flow of sulfuric acid being controlled by means of the cocks I. The acid comes into contact with the chlorin in the compressor, serving the purposes already enumerated. The compressed chlorin passes out from the compressor G through the pipe H′ and into the separator S from which it passes out through the delivery pipe H″.

The sulfuric acid from the compressor G passes into one of the vessels M, M′, for example, the vessel M. The cocks 5 and N of this vessel are closed and the cocks 3 and 7 are open, so that the sulfuric acid from the compressor and the separator can flow in, and in order to maintain the pressure of the chlorin in the vessel. On the vessel M′, however, the cocks 4 and 8 are closed and the cocks N′ and 6 are open, so that compressed air can enter the vessel M′ and force the sulfuric acid already collected therein back through the pipe F to the feed tank A. When the vessel M′ has been emptied in this way, its cocks N′ and 6 are closed. When the vessel M is filled with acid, the cocks 4 and 8 are opened so that the acid then flows to vessel M′, and the cocks 3 and 7 are closed so as to stop the flow of acid to vessel M. The cocks N and 5 are then opened so that the acid from vessel M may be forced back into the feed tank A by compressed air, and when this is finished the cocks N and 5 are closed so that the vessel M is ready to receive acid again.

The system above described may be used for producing and maintaining strong partial vacuums in vessels or apparatus wherein chlorin or other corrosive gases are developed, such vessels being connected by the pipe H to the compressor G.

What I claim is:

1. In a compressing system for chlorin and like gases, a supply tank, a rotary compressor, means for introducing sulfuric acid from the supply tank to the rotary compressor, means for supplying chlorin to the rotary compressor, two vessels, means for equalizing the pressure in said system and vessels, means for carrying the acid from the rotary compressor to the vessels selectively, a source of compressed air connected with the vessels for forcing out the acid through a pipe back to the supply tank.

2. In a compressing system for chlorin and like gases, a supply tank, a rotary compressor, a pipe for supplying sulfuric acid from the supply tank to the rotary compressor, a cooler arranged on this pipe for keeping the acid at the required temperature, means for supplying chlorin to the rotary compressor, two vessels which are connected to selectively receive the acid from the compressor, means to direct the pressure of the system to such vessels to equalize such pressure, a source of compressed air connected with the vessels for forcing out the acid through a pipe back to the supply tank, a diaphragm separator wherein the acid carried forward from the compressor with the chlorin is separated therefrom to be brought back to the vessels.

3. In a compressing system for chlorin and like gases, a tank supplying sulfuric acid, rotary compressors, pipes connecting the supply tank with the first compressor and each compressor with the following compressor, a cooler arranged on each of these pipes, means for carrying chlorin through the rotary compressors, two vessels

which selectively receive the acid from the last compressor, pipes having connection in the system beyond the last compressor and having valved connection with said vessels for equalizing the pressure, a source of compressed air connected with the vessels for forcing out the acid through a pipe back to the supply tank, a diaphragm separator wherein the acid carried forward from the compressors with the chlorin is separated therefrom to be brought back to the circulating system.

In testimony whereof I have signed my name in the presence of two subscribing witnesses the 18th day of August, 1916.

LEONE LEVI BIANCHINI.

Witnesses:
O. PZYOCOLO,
TORELLO FONTAIN.