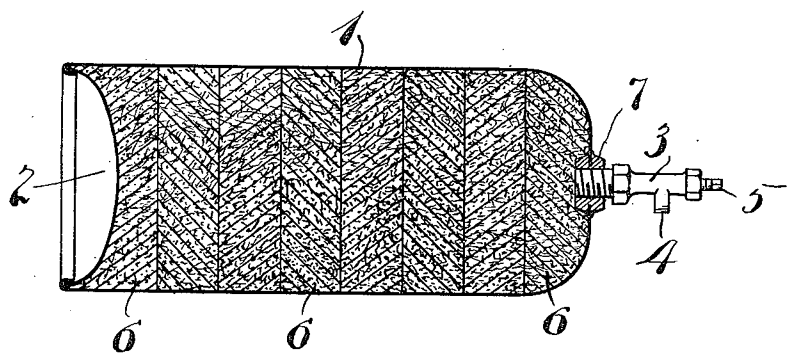
M. C. WHITAKER & F. J. METZGER.

STORAGE OF ACETYLENE.

APPLICATION FILED MAY 2, 1911.

1,003,559. Patented Sept. 19, 1911.



Witnesses:
Chas. A. Peard
Ida M. Hunziker

M. C. Whitaker
F. J. Metzger
Inventors
By their Attorneys
[illegible]

UNITED STATES PATENT OFFICE.

MILTON C. WHITAKER AND FLOYD J. METZGER, OF YONKERS, NEW YORK, ASSIGNORS TO HARRY E. ROBINSON, OF BROOKLYN, NEW YORK.

STORAGE OF ACETYLENE.

1,003,559. Specification of Letters Patent. Patented Sept. 19, 1911.

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To all whom it may concern:

Be it known that we, MILTON C. WHITAKER and FLOYD J. METZGER, citizens of the United States, residing at Yonkers, county of Westchester, State of New York, have invented certain new and useful Improvements in Storage of Acetylene, of which the following is a full, clear, and exact description.

Our invention relates to improvements in the storage of acetylene.

The object of the invention is to provide an improved method for treating the contents of an acetylene reservoir to prevent the formation therein of explosive metallic acetylids, the introduction of the chemical used in said method serving to dissolve or decompose any already formed metallic acetylids such as may exist therein prior to said introduction. Further, the treatment is such as to prevent the combination of any of the stored acetylene in such a form as to render it unserviceable or unavailable, since to the extent that the acetylene might be rendered unserviceable or unavailable would the yield or output of a tank be reduced.

In the present storage of acetylene, many tanks are constructed of steel, with the seams and heads brazed in with a brass brazing material containing a large percentage of copper, which under certain conditions may combine with the acetylene to form the well known explosive copper acetylid. Many such tanks are filled with asbestos disks made of fiberized asbestos cemented together with silicate of soda. In the preferred method of storing acetylene, these disks are saturated with a solvent for the acetylene gas, commercial acetone being one well known solvent therefor.

The conditions to be met with to realize the improvement herein set forth is to select a chemical and introduce it into the storage reservoir which will not only decompose any formed acetylids but will also prevent the formation thereof after introduction, which chemical will be soluble in acetone; one that will not be decomposed or changed by the condition of the interior of the tank as caused by the presence of silicate of soda; one which contains substantially no water, either in the form of water of crystallization or moisture, because if water is present it will tend to soften the silicate cement therein; one which will not attack the asbestos to destroy or alter its fibrous and porous structure; one which will not decompose or react with the silicate in such a way as to destroy or impair its cementing power; one which will not attack the brazing materials to weaken the seams; one which will not attack the material of the shell or the fittings thereof; one which will not decompose or combine with acetylene; one which will dissolve or decompose the acetylids when in a solution of commercial acetone without the addition of water; one which will not affect the power or capacity of the acetone to absorb or to give up acetylene gas; one which will not be volatile or decomposed into volatile products and which would thereby be introduced into the acetylene gas and be discharged therewith; one which will not, when used for the purposes described and supersaturated with acetylene gas under pressure, form an explosive or unstable compound.

We have found that such soluble thiocyanates (sulfo-cyanates) as ammonium-thiocyanate, sodium thio-cyanate or potassium thiocyanate fulfil the conditions referred to.

We have selected and prefer to use ammonium thiocyanate, which is a well known white crystalline chemical compound containing no water in the form of moisture or water of crystallization, is readily soluble in acetone, is not decomposed by such conditions as may exist within the tank above described, does not attack the metal, and in no way interferes with the proper functioning of the tanks, freely dissolves formed acetylids of copper or other explosive acetylids, and its presence effectually prevents the formation of these acetylids. Furthermore, this solution or decomposition is complete even in the presence of an excess of actylene gas at all points from atmospheric pressure up to maximum pressure of the tanks, from which we are able to conclude that it works under all of the normal operating conditions of the tanks.

To illustrate a conventional form of tank or gas receptacle, such as we have referred to above, we have, in the accompanying drawing, shown, by a single view, mainly in central longitudinal section and on a reduced scale, a tank or gas receptacle appropriate for the storage of acetylene gas, and in connection with which our invention may be successfully employed.

In the drawing, 1 represents a cylindrical shell constituting the outer side wall of the tank.

2 represents one end wall. This end wall is ordinarily formed separately from the shell 1 and is rigidly secured therein in any well-known manner. Ordinarily a suitable brazing material is employed to perfect the joint between the end wall 2 and the shell 1.

3 represents a valve casing having an outlet 4. The valve casing 3 has the usual passage therein which is controlled by a suitable valve, the stem of which is shown at 5.

7 represents a spud, so-called, having an annular groove therein into which the upper edge of the shell 1 is forced to form a gas-tight joint. At this joint, it is also customary to provide a brazing material. The valve casing 3 takes into the spud 7. The shell 1 is filled with a suitable porous material, ordinarily asbestos. Such filler is usually inserted in the form of a series of superposed disks 6—6. In preparing said disks, it is customary to use a suitable binder or sizing, such as silicate of soda, which operates to give stability to the material of the disks to prevent said disks from becoming deformed when moistened or saturated with acetone, which is customarily employed as above stated.

Since such receptacles as we have described frequently contain copper (or a metal of the copper group), which is one of the metals which will cause the formation of acetylid unless prevented, it is obvious that our invention is of utility even though the main walls of the tank are not formed of such metal, so long as there is any metal exposed to the action of the gas within the tank which will permit the formation of acetylid. Such a metal can be found in the brazing material referred to, or in any brass or copper fittings in communication with the interior of the tank, for example, the valve or the valve casing. To that end, it should be understood that in a broad sense our invention should not necessarily be limited to use in a tank in which the gas retaining walls are formed entirely of a metal which will permit the formation of acetylid.

What we claim is:

1. An improvement in the storage of acetylene comprising a container constituted in whole or in part of a metal of the copper group, a porous filler contained therein, acetone therein, and a substance soluble in acetone which will decompose acetylids and which will prevent the formation of acetylids.

2. An improvement in the storage of acetylene comprising a container constituted in whole or in part of a metal of the copper group, a porous filler therein, a solvent for acetylene therein, and a substance therein soluble in said acetylene solvent which will prevent any reaction between acetylene and any part of said container, and which will not injuriously affect the contents of said container.

3. An improvement in the storage of acetylene comprising a container constituted in whole or in part of a metal of the copper group, a solvent for acetylene therein, and a substance therein which has the property of rendering impossible of formation metallic acetylids.

4. An improvement in the storage of acetylene comprising a container constituted in whole or in part of a metal of the copper group, a solvent for acetylene therein, and ammonium thiocyanate therein.

5. An improvement in the storage of acetylene comprising a container, a solvent for acetylene therein, said container being formed in whole or in part of a metal upon which acetylene will react, and a substance therein which will prevent reaction between acetylene and said metal.

MILTON C. WHITAKER.
FLOYD J. METZGER.

Witnesses:
J. A. TILDEN,
FRANK C. ERB.