

UNITED STATES PATENT OFFICE.

JOSEPH HIDY JAMES AND HERBERT WATSON, OF PITTSBURG, PENNSYLVANIA, ASSIGNORS
TO THE SEARCHLIGHT GAS COMPANY, OF WARREN, OHIO, A CORPORATION OF OHIO.

TREATMENT OF ACETYLENE GAS.

No. 928,867.

Specification of Letters Patent.

Patented July 20, 1909.

Application filed March 29, 1909. Serial No. 486,580.

To all whom it may concern:

Be it known that we, JOSEPH HIDY JAMES and HERBERT WATSON, both of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in the Treatment of Acetylene Gas, of which the following is a full, clear, and exact description.

Our invention has relation to the treatment of acetylene gas, and it is designed to provide a method for overcoming the difficulties which have heretofore been associated with the compression, transportation and storage of this gas, which, under the high pressure necessary to commercial use, is of dangerous character. It is well known in the art that the usual method of handling this gas, which consists in compressing it and dissolving it in acetone, has failed to eliminate the danger of explosion, both during the time occupied in the mechanical act of compression into containers and in the containers themselves, where the gas is kept under pressure. In fact, frequent explosions have resulted from this method of treatment which have sometimes been attended by the loss of life and great danger to property. We have discovered that these difficulties may be overcome and the danger of explosion reduced to a minimum by mixing the gas with the vapor of acetaldehyde in or about equal volumes and compressing the mixed gas and vapor into a suitable container in which they can be safely stored, and transported. While this method of treatment very slightly diminishes the luminosity of the gas, it does not do so to an objectionable extent for ordinary purposes.

Acetaldehyde boils at 21 degrees centigrade, and is therefore very volatile, and when acetylene gas is diluted or mixed with the vapor of acetaldehyde, it is not as susceptible to spontaneous decomposition under compression. In fact, our experiments and observation tend to show that an actual chemical reaction takes place between the acetaldehyde and the acetylene, whereas pure acetylene is an endothermic compound, and is consequently unstable and undergoes spontaneous decomposition into its elements as certain critical points of pressure or temperature are reached. We have also discovered that if the acetaldehyde vapor is condensed into a liquid, it has a far greater

dissolving power on acetylene than any other heretofore known solvent, acetone, which has hitherto been considered as having the maximum of efficiency in this respect, only having about three-quarters the efficiency of acetaldehyde under the same conditions of temperature and pressure. The liquid acetaldehyde may therefore also be employed for the storage of acetylene. When used in this manner, we prefer to mix it with an organic compound of higher molecular weight and boiling point which compound contains the carbonyl group ($-C=O$), such as ethyl or methyl acetate. In this way, the boiling point can be greatly raised, and the solubility of the mixture has been proved to have a higher dissolving power than the mean of the two substances when used separately. For the storage of acetylene in cold climates, the percentage of acetaldehyde would be increased relatively to the percentage of the other organic compound, whereas in warmer climates, the percentage of this other organic compound of higher molecular weight would be increased sufficiently to raise the boiling point of the mixture above the temperature to which the container would be subjected in use. In all practical cases, however, the percentage of the acetaldehyde will be sufficient to keep the solvent power to a point greatly above that of the heavier organic compound.

While, as above stated, we prefer to use ethyl or methyl acetate as the organic compound of higher weight, we may use other organic compounds containing the carbonyl group and of a higher molecular weight than the acetaldehyde.

We claim:

1. The method of treating acetylene gas for storage, which consists in mixing together and compressing acetylene gas with the vapor of acetaldehyde, substantially as described.

2. The method of treating acetylene gas for storage, which consists in mixing together substantially equal volumes of the gas and of the vapor of acetaldehyde and compressing the same into a suitable container, substantially as described.

3. The process of treating acetylene gas for storage which consists in dissolving the gas in a mixture of acetaldehyde and an organic compound of higher molecular weight

and boiling point, than acetaldehyde, and
varying the percentage of the two substances
in the mixture to vary the boiling point
thereof according to the conditions of tem-
5 perature to which the mixture contained in
the gas is to be subjected, substantially as
described.

In testimony whereof, we have hereunto
set our hands.

JOSEPH HIDY JAMES.
HERBERT WATSON.

Witnesses:

H. M. CORWIN,
GEO. H. PARMELEE.