

UNITED STATES PATENT OFFICE.

JOSEPH HIDY JAMES, OF PITTSBURGH, PENNSYLVANIA.

ILLUMINANT AND METHOD OF PRODUCING THE SAME.

1,028,357.

Specification of Letters Patent.

Patented June 4, 1912.

No Drawing.

Application filed March 17, 1911. Serial No. 615,173.

To all whom it may concern:

Be it known that I, JOSEPH HIDY JAMES, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Illuminants and Methods of Producing the Same, of which the following is a specification.

This invention has reference to a new illuminant consisting of a mixture of acetylene gas and the vapor of a highly volatile acetylene solvent, such vapor being luminous when burning and forming an important constituent element of the light producing mixture. Various solvents possess the necessary characteristics, both as to the luminosity of the solvent vapor, and when in liquid form the capacity for absorbing relatively large volumes of acetylene. I have found that all the best solvents for acetylene are those of organic compounds containing the carbonyl group ($=C=O$), and I have further found that the lower the molecular weight of the compound used the higher is its solvent power for acetylene gas. The carbonyl compounds to which I refer include such liquids as aldehydes, ketones, esters and acids of the fatty series. And I have further found that of the above liquid compounds the one possessing the highest solvent power and at the same time capable of being held in liquid form by placing it under pressure in a closed container is acetaldehyde. This substance is a liquid at temperatures below 21° C., and evaporates rapidly at temperatures from 5° C. to its boiling point, the amount of evaporation increasing as the boiling point is approached. Further developing the idea of low molecular weight compounds I have discovered that by saturating acetaldehyde with formaldehyde gas the capacity of the solvent for acetylene gas is greatly increased. A tank containing a mixture of acetaldehyde and formaldehyde saturated with acetylene gas comprises a portable package from which on release of pressure an illuminant issues consisting of acetylene gas, formaldehyde gas, and acetaldehyde vapor, all of which are combustible.

A characteristic of the invention is the employment of a highly volatile solvent, by which I mean a solvent that volatilizes rapidly at ordinary room or laboratory temperatures, and my experience and present knowledge lead me to believe that no solvent boiling above 22° C. will be efficient.

Under the practices prior to my invention it has not been proposed to have the solvent form a constituent part of the illuminant, nor has a solvent been proposed heretofore possessing the necessary dual characteristics, viz., capacity in liquid form for absorbing the requisite quantities of acetylene gas, and sufficiently volatile to emerge as a vapor with the gas. On the contrary, every effort has been directed toward completely separating the acetylene as it emerges from the container, both for producing an unadulterated illuminant and for preserving the solvent so that it may be reused.

I am aware that as incident to the present practice a very small percentage of the solvent escapes with the gas and is burned therewith, but this is not a desired occurrence nor does it to any noticeable or appreciable extent comprise a constituent element of the illuminant. The solvent from which it emanates is not highly volatile, nor volatile in the sense that it may or can constitute a factor in the composition of the illuminant.

With tanks charged as heretofore by the use of non-volatile solvent the delivery pipes leading to the burners are not infrequently flooded, particularly at the beginning of the discharge, extinguishing the light and wasting the solvent. This inconvenience is obviated herein as the solvent vaporizes as soon as it emerges from the container into the line and cannot reach the burner in liquid form.

The advantages of the composition must be apparent. With the entire gaseous and liquid contents of a container available as an illuminant, far greater lighting hours-service is provided for a given charge of acetylene than has heretofore been attained.

I claim:—

1. An illuminant consisting of a mixture

of acetylene gas, acetaldehyde vapor, and formaldehyde gas.

2. The method of producing an illuminant consisting in saturating liquid acetaldehyde
5 with formaldehyde gas, charging acetylene gas into the acetaldehyde thus saturated, and then vaporizing said liquid.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH HIDY JAMES.

Witnesses:

J. M. NESBIT,

F. E. GAITHER.