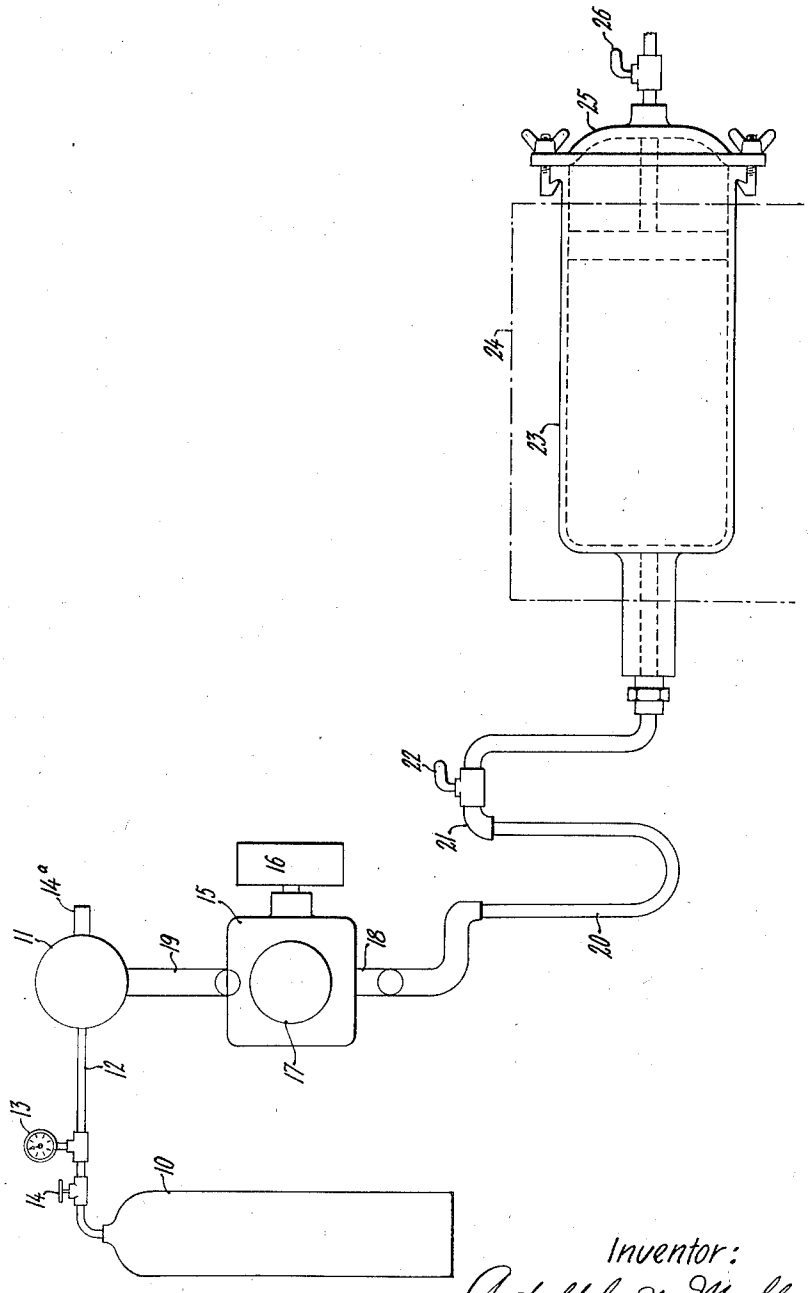
Jan. 28, 1930. A. W. MACHLET 1,745,104

CARBURIZING PROCESS

Filed May 6, 1927



Inventor:
Adolph W Machlet
by B C Strickney
Attorney

Patented Jan. 28, 1930 1,745,104

UNITED STATES PATENT OFFICE

ADOLPH W. MACHLET, OF ELIZABETH, NEW JERSEY

CARBURIZING PROCESS

REISSUED

Application filed May 6, 1927. Serial No. 189,281.

This invention relates to carburizing of iron, steel and other articles.

As set forth in Patent No. 1,337, 244, carburizing gas is caused to flow through a heated retort, whereby articles in the retort become carburized, the gas used being a hydrocarbon, such as ordinary city gas, or producer gas, or the like. In some cases a solid portion of carbon is placed within the retort, to furnish the carburizing material.

When it is attempted to employ for carburizing the gas known as propane, it is found that excessive deposit of lampblack is made upon the heated articles and in the retort. This great deposit involves a great waste and expense, and is otherwise objectionable. Propane is in the nature of a hydrocarbon gas which is compressed or embodied in liquid form for commercial use, and sold in flasks at a pressure of 110 pounds or more per square inch. This liquid, upon being released, expands into the form of gas, which it is desired to use in carburizing.

The object of the present invention is to make it practicable to carburize with such gases which have proven to be prohibitively carbonous or lampblack-depositing.

Other features and advantages will hereinafter appear.

The accompanying drawing or diagram indicates an apparatus or organization involving the present invention.

In carrying out this invention, the preparation of propane is released from a tube 10, and may expand into a bell or gasometer in which it may remain under some pressure. There may also be pumped into the bell a volume of air at a like pressure; there being about three or four times as much volume of air as of propane. This gas is not apt to explode when the volume of the gas is more than one-tenth of the volume of air.

Instead of a bell, there is preferably used a gas-and-air mixer 11, having at 12 a duct or communication for inflow of gas from tube 10 to the mixer, said duct having a pressure gage 13 and a pressure-reducing or controlling valve 14. These mixers are usually provided with adjustable means (not shown) for regulating the proportions of volumes of the gases forming the delivered mixture.

For mixing the air and gas in any desired proportions, there may be used the well-known Schematische Darstellungeines Selas-Apparates. Air is drawn into the mixer through an inlet 14a. A pump 15, driven by a belt pulley 16, draws the mixture from the mixer 11, and may be provided with the automatic by-pass device 17 which is usual in air or gas pumps, to permit the mixture to flow idly back from the delivery end 18 to the intake end 19 of the pump, when the pump is delivering the mixed gas and air faster than is required, or when communication between the pump and carburizer is closed.

From the pump a flexible hose 20 conducts the mixture to a pipe 21 having a valve 22 to control the supply of carburizing gas to the carburizing retort 23, which is heated in a furnace 24. There may be a lifting and falling movement of the retort, in loading and discharging articles from the same, this movement being accommodated by the flexible supply pipe 20. The revolving retort is sealed by a cover 25 hooked onto the delivery end of the retort. The cover is provided with a vent 26 for slow escape of vitiated gas from the retort. The retort and furnace may be constructed in the manner disclosed in said United States Patent No. 1,337,244, granted to me April 20, 1920.

The mixed propane and air, delivered from the bell or gasometer, or from the mixer 11, to the retort 23 of the carburizing apparatus, gives excellent carburizing results upon the iron or steel articles in the retort, with little or no deposit of lampblack upon the carburized articles. This renders propane practicable for use in carburizing, and gives a wide outlet for this class of manufacture, and fills a long-felt want in the art, especially where city gas or other gas is not at hand for carburizing purposes. Moreover, owing to the small proportion or volume of propane in the described carburizing mixture, the expense of using propane is so far reduced that it can be used successfully in competition with

city gas, and with other cheap grades commonly used for carburizing.

If a gasometer is used, it will be understood that air can be forced into the gasometer by a pump having suitable pressure indicators, and that there may also be provided for the pump a relief valve or bypass, so that the pressure of the gas in the gasometer will not become excessive, even though the pump is kept running. When a gasometer is used, any suitable means may be provided for proportioning the mixture of air and propane.

The improvements may also be used with some grades of city gas, natural gas, oil gas, etc.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. The carburizing process consisting in compressing propane gas to liquid form, permitting expansion of the liquid to gas form, reducing the expanded gas by adding thereto about three volumes of atmospheric air to one volume of the expanded gas, and carburizing iron or steel articles by heating them in an atmosphere of the gas so reduced, thereby substantially avoiding the faulty deposit of lampblack upon the articles.

2. The carburizing process consisting in compressing propane gas to liquid form, permitting expansion of the liquid to form gas to a certain pressure above atmospheric, reducing the expanded gas while under pressure by the forcible addition thereto of about three volumes of atmospheric air to one volume of the expanded gas, and carburizing iron or steel articles by heating them in an atmosphere of the reduced gas under pressure above atmospheric.

ADOLPH W. MACHLET.