UNITED STATES PATENT OFFICE.

JAMES R. ROSE, OF EDGEWORTH, PENNSYLVANIA, AND JOHN HARRIS, OF LAKEWOOD, OHIO, ASSIGNORS TO CARBO-OXYGEN COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF DELAWARE.

GASEOUS FUEL.

1,404,235. Specification of Letters Patent. **Patented Jan. 24, 1922.**

No Drawing. Application filed December 26, 1919. Serial No. 347,462.

To all whom it may concern:

Be it known that we, (1) JAMES R. ROSE, (2) JOHN HARRIS, citizens of the United States, residing at (1) Edgeworth, (2) Lakewood, in the county of (1) Allegheny, (2) Cuyahoga, and State of (1) Pennsylvania, (2) Ohio, have invented a certain new and useful Improvement in Gaseous Fuel, of which the following is a full, clear, and exact description.

This invention relates to gaseous fuel, and more particularly to a fuel which is particularly useful for the purpose of cutting metals with great rapidity, where extreme cleanness of cutting is not essential. A use for which our gas is particularly well suited is for cutting scrap iron.

It has been proposed heretofore to mix with hydrogen, gases such as illuminating gas and carbon monoxide, for the purpose of imparting visibility to the cone within the flame produced by the burning of the hydrogen and for certain kinds of cutting and welding. As pointed out hereinbefore, it is the purpose of this invention to produce a gas which will enable the cutting operation to be performed with greater rapidity than can be realized by the aforesaid mixtures. For this purpose we form a mixture of methane and butane with hydrogen in the proportions of from 2½% to 12½% by volume each of such methane and butane to the hydrogen constituents. This gas has a relatively high carbon content, which materially increases the flame volume and heat units over those obtainable by the combustion in a blow-pipe of hydrogen alone with oxygen, and also produces in the flame a visible or luminous cone which enables the proportions of the gases to be conveniently adjusted and the flame to be applied efficiently to the work.

The carbon content of our gaseous mixture is lower than that required for operating on heavy masses of metal and for cutting cast iron and steel, and corroded, dirty and slaggy iron and steel—in which operations a large flame volume and high units are essential. However, our gaseous mixture is capable of cutting with much greater rapidity than can gases having a higher carbon content.

According to Richards on Metallurgical Calculations published in 1908, the flame temperature produced by the combustion of the aforesaid gases will be above 3200° C., and the variations in the percentages of the said gases will cause the following variations in the net B. T. U. per cubic foot of mixture and in the cubic feet of oxygen required for the combustion of a cubic foot of such mixture:

No. 1 mixture, 95% H. with 2½% each of butane and methane; net B. T. U.'s 383; cu. ft. of oxygen .687.

No. 2 mixture, 75% H. with 12½% each of butane and methane; net B. T. U.'s 743; cu. ft. of oxygen 1.437.

Having thus described our invention, what we claim is:—

1. A gas for cutting, welding and heating purposes consisting of a mixture of methane and butane with hydrogen in the proportions of from 2½% to 12½% by volume each of methane and butane to hydrogen.

2. A gas for cutting, welding and heating purposes consisting of a mixture of methane and butane with hydrogen in proportions not substantially less than 5% by volume of such combined gases to the hydrogen and not materially more than 25% of such combined gases to the hydrogen, the methane and butane being present in the proportions of at least 2½% each in such mixture.

In testimony whereof, we hereunto affix our signatures.

JAMES R. ROSE.
JOHN HARRIS.