

H. C. HARRISON.
 BLOWPIPE AND METHOD OF OPERATING THE SAME.
 APPLICATION FILED DEC. 11, 1909.

968,350.

Patented Aug. 23, 1910.

Fig. 1.

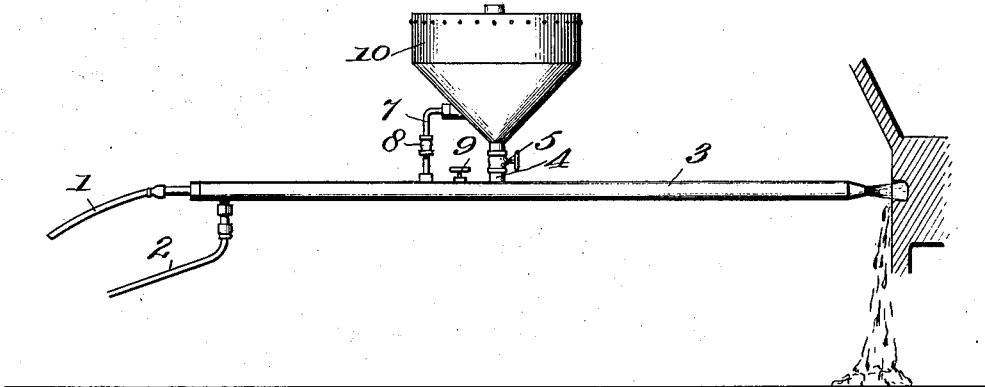


Fig. 2.

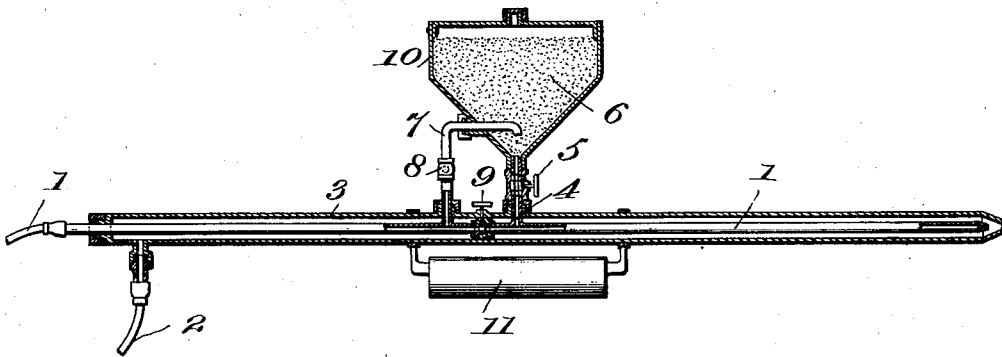
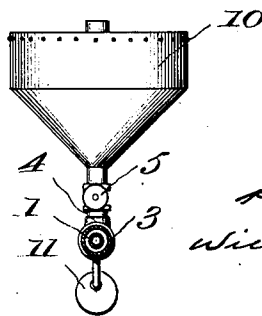


Fig. 3.



Witnesses
Geo. A. Payne.
James C. Dodge.

Inventor
H. C. Harrison
William Fisher
Wicherson
 Attorney

UNITED STATES PATENT OFFICE.

HERBERT C. HARRISON, OF LOCKPORT, NEW YORK, ASSIGNOR TO ELECTRO METALLURGICAL COMPANY, A CORPORATION OF WEST VIRGINIA.

BLOWPIPE AND METHOD OF OPERATING THE SAME.

968,350.

Specification of Letters Patent.

Patented Aug. 23, 1910.

Application filed December 11, 1909. Serial No. 532,691.

To all whom it may concern:

Be it known that I, HERBERT C. HARRISON, a subject of His Majesty the King of Great Britain, residing at Lockport, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Blowpipes and Methods of Operating the Same; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to high temperature blow pipes and to methods of operating the same, and has for its object to produce an instrument of this nature which will create a higher temperature than those now in use.

To these ends the invention consists in the novel combinations of steps and details of construction more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals refer to like parts in all the views:—Figure 1 is a diagrammatic elevational view of a blow pipe illustrating the principles of my invention; Fig. 2, is an elevational sectional view of a slightly modified form of blow pipe; and, Fig. 3, is an elevational sectional view of the form shown in Fig. 2.

It is well known that masses of iron may be easily perforated by the use of an oxyhydrogen blow pipe. These blow pipes are first used to raise to an intense temperature a portion of the surface of the metal, after which the hydrogen, hydrocarbon or coal gas, as the case may be, is almost completely shut off, while the pressure of the oxygen is raised to such an extent that the heated iron burns freely and at the same time is mechanically forced aside by the pressure of the jet impinging upon it. This process, of course, depends for its success upon the presence of iron at a high temperature in an atmosphere of oxygen and upon a blast of sufficient pressure to remove the molten oxidized iron. If the process, however, is tried on a silicious slag or on other material which itself is not readily oxidizable at the temperature of the blast, the process is

changed into that of an ordinary blow pipe or into a mere melting or softening action, and increasing the pressure of the oxygen in such cases merely chills the heated spot. By the present invention, however, I supply finely divided iron, or other metal in a finely divided state, to the blow pipe in such a way that it will burn in a stream of oxygen and in close proximity to or in contact with the body to be perforated, and, thereby, produce an intense temperature on the surface of the body, whether it be of an oxidizable nature or not. This process also produces an exceedingly concentrated heat at the point of impact of the jet, which heat, of course, is intensified if the material is capable of being oxidized at all.

Another result of using finely divided iron or other metal in the blast and thereby obtaining a considerably higher temperature than it would be possible to attain without the addition of such material is the possibility of using a greater pressure in forcing away the soft material. That is to say, I am enabled to increase the pressure of the gases in the blow pipe to a degree much higher than would otherwise be possible without chilling the heated spot.

In some cases it is found that the iron is liable to become spontaneously combustible in the stream of oxygen and especially if it is in too fine a state of subdivision. In such cases I have found that a stream of highly compressed air may be used in place of the oxygen, for that the nitrogen somewhat retards the combustion of the iron, but will allow the same to freely burn at the high temperature existing at the nozzle of the blow pipe.

Instead of iron, for some purposes, a finely divided graphite may be substituted, and in still other cases, finely divided aluminum may be employed. In the case of aluminum, as is well known, the heat of combustion with oxygen is very high indeed, and, therefore, a most intense heat may be produced on the surface of the mass to be perforated. In fact a mixture of finely divided thermit, or finely divided aluminum and iron oxid may be used with excellent results. Also good results may be obtained by blowing a stream of finely divided combustible material from one apparatus onto

the mass to be perforated, and simultaneously blowing thereon a stream of oxygen in the usual way.

In the drawings which are merely diagrammatic, I have illustrated a pipe 1 for supplying oxygen, a pipe 2 for supplying hydrogen or hydrocarbon gas, which are connected to the nozzle 3, all as is well known. At any suitable point in the pipe 1 I introduce a pipe 4 for conveying the finely divided metal or oxid of metal, as best illustrated in Fig. 2. This pipe 4, may be suitably controlled by a valve 5, and may be led to a supply 6 of the finely divided material. The pipe 1 may also be connected, as by the pipe 7 controlled by the valve 8 to the supply 6 of finely divided material, so that there may be produced in said supply 6 a pressure for forcing the material into the pipe 1. That is to say, a certain amount of suction will take place at the base of the pipe 4, gravity will assist in carrying the finely divided material down through the pipe 4, and if the valves 5 and 8 are properly adjusted, this action by gravity will be supplemented by the forcing action of the gas through the pipe 7. It is evident that as the supply of gas in the pipe 1 increases, the supply of finely divided material will likewise increase, and by providing the pipe 7 an automatic action will result which will feed the finely divided material to the pipe 1 in proportion to the pressure therein, and therefore, in proportion to the quantity of material that may be needed to burn. This action may be nicely controlled by suitably manipulating a valve 9 located between the pipes 4 and 7, as best illustrated in Fig. 2.

In some cases it will be found desirable to regulate the supply of finely divided material to a greater nicety, and to this end the nozzle 3 may be rotated on its axis so as to bring the vessel 10 holding the finely divided material at any desired angle to the horizontal, and thereby, to increase or decrease the effect of gravity through the pipe 4. In order to facilitate this action a counterweight 11 may be provided, as shown.

When finely divided aluminum is used, against silicious slag, the heat is so intense that the aluminum immediately unites with the slag to form an aluminum silicate and the pressure of the blast mechanically displaces the same as fast as it is formed. In this way masses of slag may be bored through with the same facility that masses of iron are perforated with the oxyhydrogen blow pipe.

The above drawings, it will be understood, are merely illustrative and show only one means of carrying out my invention; but it will be obvious that those skilled in the art may vary the details of construction and the arrangement of parts without departing from the spirit thereof. Therefore,

I do not wish to be limited to the special features herein disclosed except as may be required by the claims.

What I claim is:—

1. The process of perforating masses of material which consists in heating to a high temperature a portion of said material; in causing a stream of gas under pressure to impinge upon said heated portion; in causing finely divided material which is combustible at high temperatures in said gas to impinge simultaneously upon said heated portion thereby melting the same; and in utilizing the pressure of the impinging gases to remove the molten portions of the mass, substantially as described.

2. The process of perforating masses of material which consists in heating to a high temperature a portion of said material; in causing a stream of gas under pressure containing oxygen and conveying finely divided oxidizable material to impinge upon said heated portion and to melt the same; and in utilizing the pressure of the impinging gases to remove the molten portions of said mass, substantially as described.

3. The process of perforating masses of material, which consists in heating to a high temperature a portion of said material; in causing a stream of gas under pressure containing oxygen and conveying finely divided metal to impinge upon said heated portion and to melt the same; and in utilizing the pressure of the impinging gas to remove the molten portions of said mass, substantially as described.

4. The process of perforating masses of material which consists in heating to a high temperature a portion of said material; in causing a stream of air under pressure and charged with finely divided iron to impinge on said heated portion and to melt the same; and in utilizing the pressure of said air to remove the molten portions of said mass, substantially as described.

5. A blow pipe provided with a plurality of gas pipes, the combination of means for feeding finely divided material into one of said pipes and means for creating a blast of sufficient pressure to remove the material being melted; substantially as described.

6. A blow pipe provided with a plurality of gas pipes, the combination of means for feeding finely divided material into one of said pipes; and means for regulating said feeding means and means for creating a blast of sufficient pressure to remove the material being melted; substantially as described.

7. In a blow pipe the combination of supplies for a plurality of gases under pressure; means for feeding a finely divided metal into one of said supplies; means for regulating said feeding means; means for utilizing the pressure of one of said gases for faci-

tating the feeding of said finely divided material and also for removing the material being melted; substantially as described.

8. In a blow pipe, the combination of supply pipes for a plurality of gases under pressure; means for feeding finely divided metal into one of said supplies; a reservoir to hold said metal; means comprising valves for regulating said feeding means; means for
10 controlling said feeding means according to

the pressure in the supply to which the metal is fed means for creating a blast of a pressure sufficient to remove the material being melted; substantially as described.

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

HERBERT C. HARRISON.

Witnesses:

T. A. WITHERSPOON,

J. FRED HELLEY.