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M. CLAUDE

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BLOWPIPE FOR CUTTING APPARATUS

Filed March 8, 1928

Fig. 1.

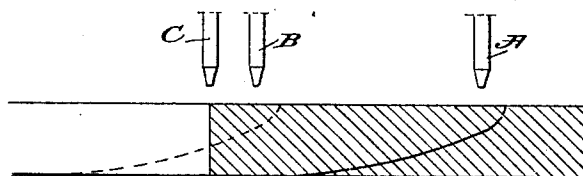


Fig. 2.

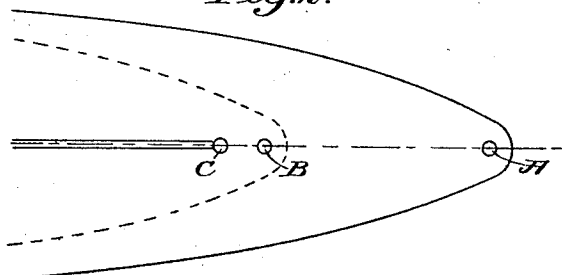
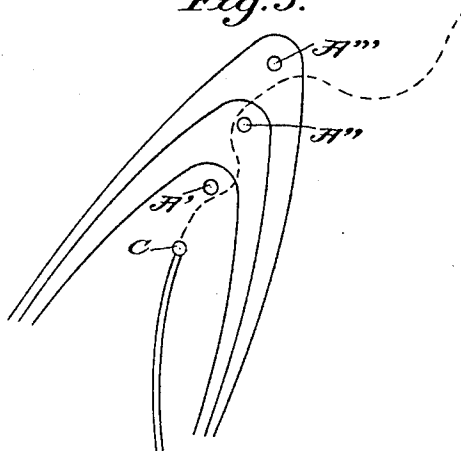


Fig. 3.



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BLOWPIPE FOR CUTTING APPARATUS.

Application filed March 8, 1928, Serial No. 260,093, and in France March 19, 1927.

This application is a substitution in part of my application No. 180,976 filed April 4, 1927, in which it is stated that apparatus is known and used in metal cutting comprising a heating jet and a cutting jet, but that the heating jet is so close in advance to the cutting jet that the heating is localized in a very small part of the work piece, and it has not the time to penetrate the thickness of the work piece so that the proper oxidizing reaction is produced only at the surface with regard to the depth-heating of the work piece, and the heat is concentrated near the cutting jet, referred to the surface of the work piece.

The concentration of heat at the cutting path sets up strains in the adjacent metal to which the molecular arrangement of the adjacent metal cannot readjust itself. Consequently a region of weakness is engendered in the metal between the relatively narrow path of heating which precedes the cutting jet and forms the border portion of the cut work piece and the more remote unheated portions of the metal.

The present invention has for its object the arrangement of a heating jet or jets ahead of the cutting jet at a sufficient distance which is chosen according to the thickness of the piece to be cut: then at the speed of cutting, the heat has the time to spread into the metal progressively, and in the whole thickness: further, the molecular state of the metal affected by the oxidizing jet is not altered abruptly from that of the deeply underlying portions of the metal.

In this way can be obtained a very good regularity in the cutting, even with very thick plates. Further, heating the plate on a relatively great surface prevents the metal hardening near the line of cutting. By way of example, the invention is illustrated in the annexed drawings wherein:

Fig. 1 is a sectional view showing diagrammatically the distribution of heat in the case of an additional preheating jet.

Fig. 2 is the same view in plan.

Fig. 3 is a diagram showing the distribution of heat in the case of curve cutting with

three preheating jets preceding the cutting jet.

It has been verified that to avoid the objectionable features attendant upon the use of ordinary known cutting torches and chiefly for very thick work pieces it was necessary to place the preheating jets at a distance of several centimeters ahead of the usual heating jet. Good results were obtained for plates 10 millimeters thick with a preheating jet placed at 5 centimeters ahead of the usual heating jet.

In this way it is possible to have a progressive heating of the plate, and further, much to decrease the molecular strain of the metal at the time of cutting. The distribution of heat produced by the additional heating jet designated at A in the drawings is shown by an approximate parabolic curve on the surface and through the section of the work piece. A similar curve is shown to denote the distribution of heat with regard to the ordinary heating jet B which is nearest the cutting jet C. It is shown that the heating jet B affects only the superficial layers of the metal prior to the cutting jet reaching the point of heating, so that the reaction for cutting is absent or imperfect in the deepest part of the plate. A relatively narrow surface zone is also heated prior to the passage past a given point, of the cutting jet.

If an additional heating jet A is added, a sufficient distance in advance, for instance 5 centimeters, the heat produced by this jet would have the time to penetrate even to the innermost layers of the work piece before the passage of the cutting jet as is clearly shown by the heavy curve in Fig. 2, so that the cutting jet will work efficiently for the whole thickness of the work piece. It is also observed from Fig. 2 that the curve representing the heat from the additional heating nozzle A has spread into a much wider zone at the point of passage of the cutting jet.

Preferably the apparatus comprises ahead of the cutting jet, a set of heating jets arranged in line, with respect to the cutting jet, each being separated from the other by

several centimeters, the jets being placed in such a manner that the heating of the cutting line begins at several centimeters at least ahead of the cutting jet, and that the temperature of the work piece is progressively increased as the device proceeds. Such an arrangement is shown in Fig. 3, A', A'', and A''' in advance of the cutting jet C.

Such an arrangement permits further a satisfactory heating of the plate even in the case where the line of cutting is a curve, a little hard to follow. In prior torches, the heating has been strictly localized on the line of cutting and at a very small distance from the cutting jet, even if several jets were used for the heating; here, on the contrary, heating at some distance ahead permits the temperature to increase throughout a wide zone following the curved lines associated with the respective jets A', A'' and A''', the cutting line being within this zone; further, this preheating permits the operator with the greatest facility, to cut lines of complicated curves without venturing into an unheated portion of the metal.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

In a blow pipe of the type having a cutting nozzle for applying a cutting jet to a work piece, an additional nozzle mounted to travel with said cutting nozzle, for progressively preheating the work piece in advance of the cutting nozzle, said additional nozzle being positioned to apply the preheating jet to the same surface of the work piece as that against which the cutting jet impinges, and arranged at such a distance from the cutting nozzle as to permit the conductivity of the work piece to have distributed the heat from said additional nozzle through a mass of the work piece much greater in area and thickness than the extent of the mass heated by said cutting nozzle, by the time the latter has traversed said mass, said distance being such as substantially to exclude said additional nozzle from functioning as an essential concomitant of the cutting nozzle in the performance of the cutting operation.

In testimony whereof I have signed my name to this specification.

MAURICE CLAUDE.