APPARATUS FOR CONDITIONING OR DESURFACING METAL

Original Filed May 9, 1936 3 Sheets-Sheet 1

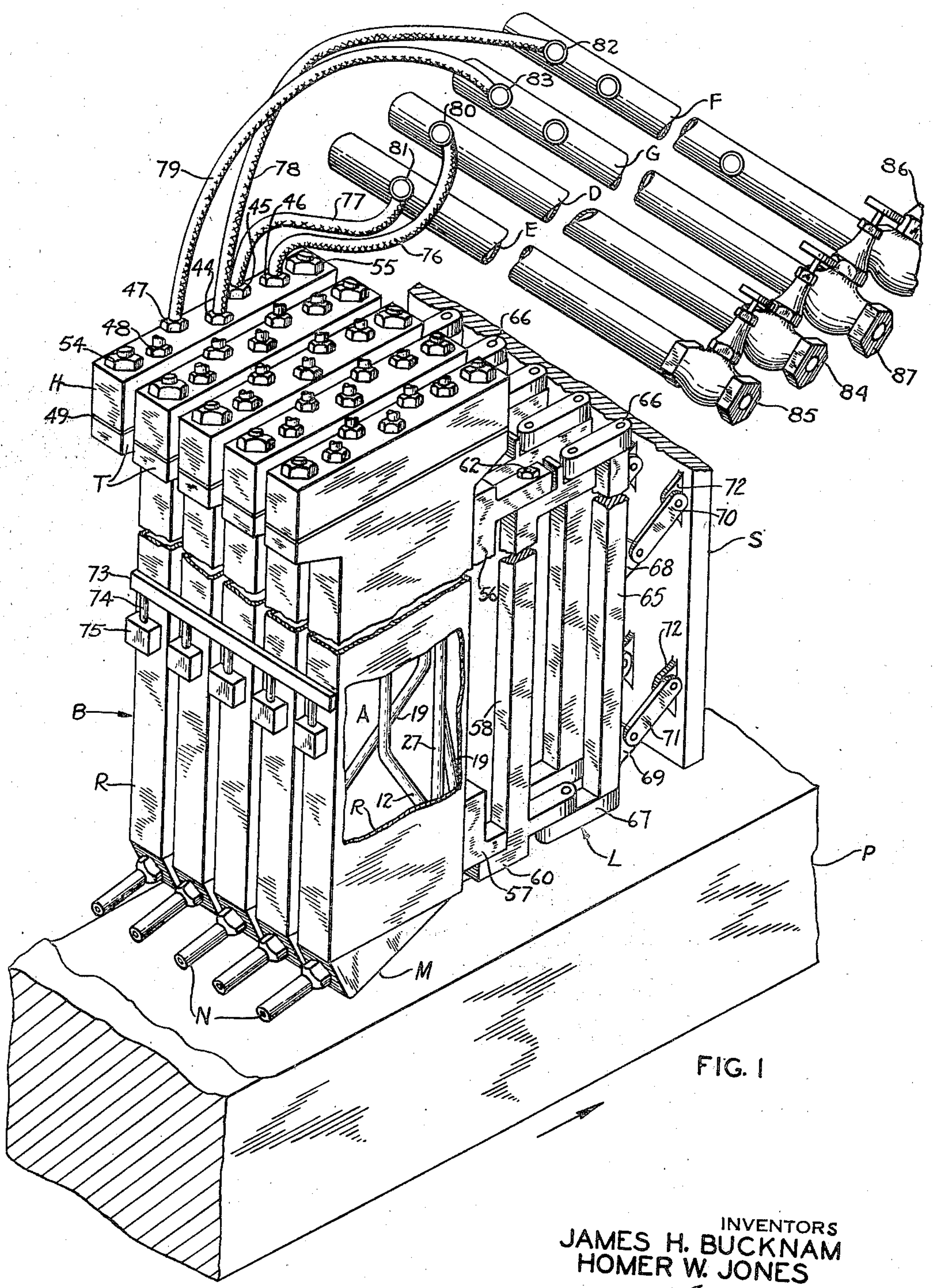

FIG. I

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Dec. 3, 1940. J. H. BUCKNAM ET AL 2,223,402
APPARATUS FOR CONDITIONING OR DESURFACING METAL
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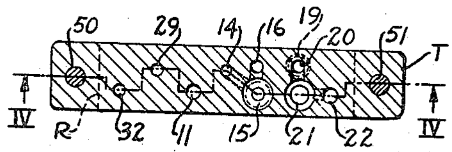

FIG. 5

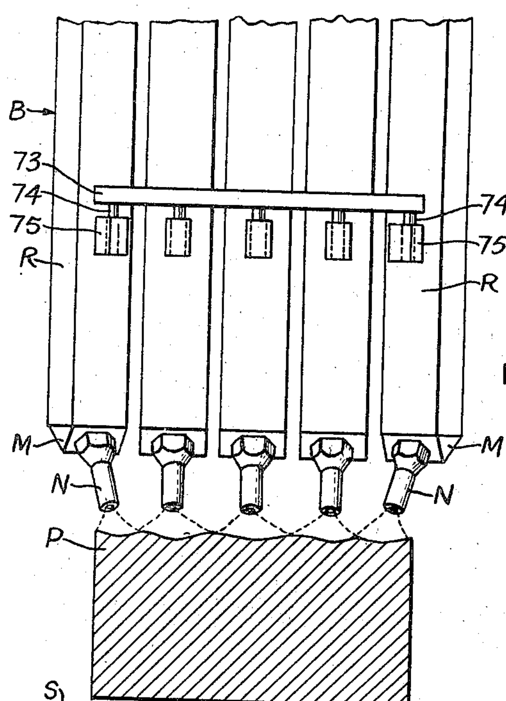

FIG. 2

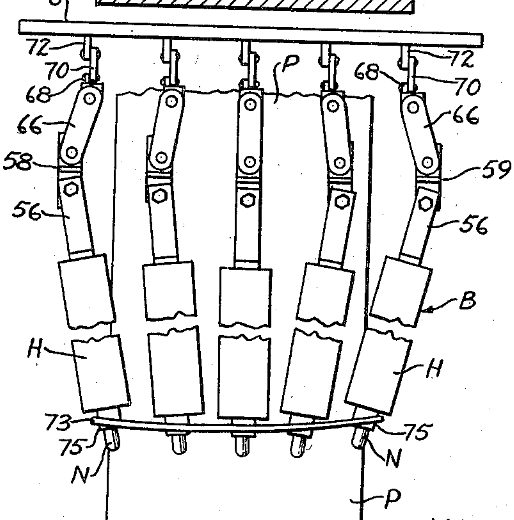

FIG. 3

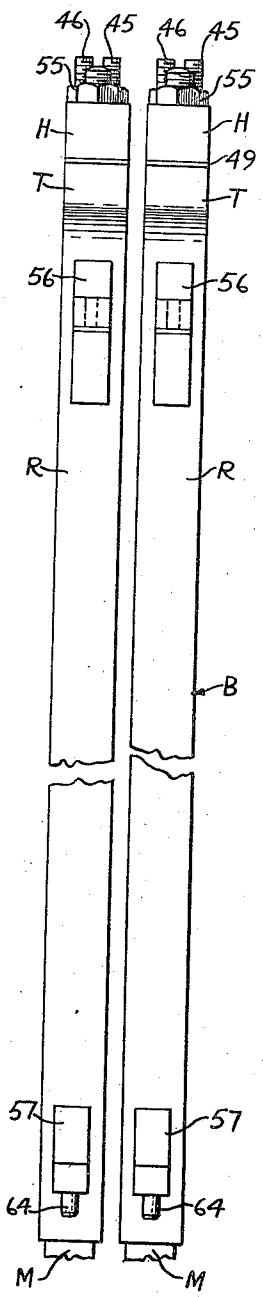

FIG. 6

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APPARATUS FOR CONDITIONING OR DESURFACING METAL

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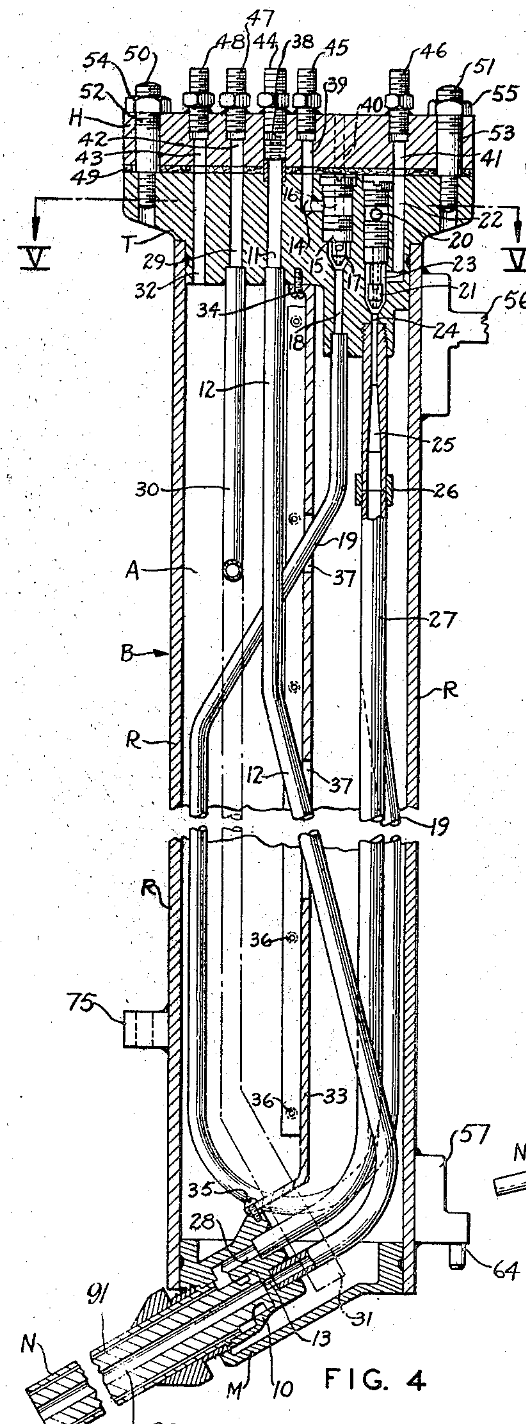

FIG. 4

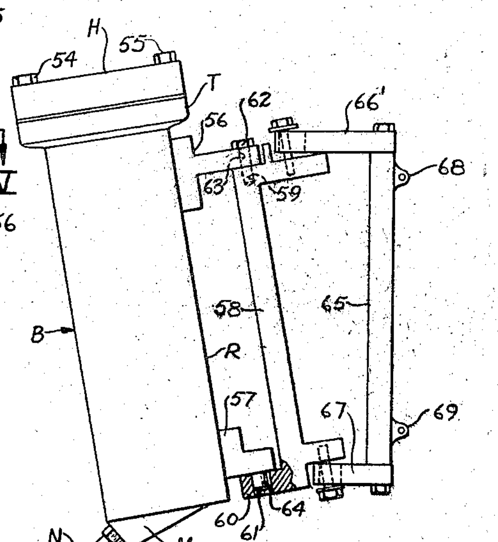

FIG. 7

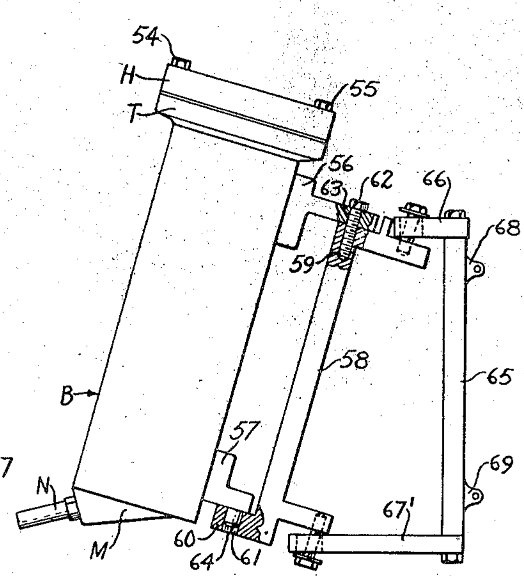

FIG. 8

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UNITED STATES PATENT OFFICE

2,223,402

APPARATUS FOR CONDITIONING OR DESURFACING METAL

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Continuation of application Serial No. 78,832 May 9, 1936. This application December 7, 1939, Serial No. 308,006

11 Claims. (Cl. 266—23)

This invention relates to the art of conditioning or desurfacing ferrous metal bodies by means of an oxidizing gas stream, and more particularly to an improved blowpipe unit and an assembly of such units for projecting gaseous heating and oxidizing jets against the surface of a metal body to remove a surface layer of metal therefrom.

The present invention is a continuation of our application Serial No. 78,832, filed May 9, 1936, and is more or less closely related to an application for Blowpipe apparatus for surfacing metals, filed by the present applicants September 16, 1936, and serially numbered 101,038, two patents issued to the applicant Jones herein numbered 2,125,174 and 2,125,176, an application filed by the applicant Jones herein jointly with Edmund A. Doyle on June 27, 1934, for Apparatus for removing surface metal from metallic bodies, serially numbered 732,668, and a patent numbered 2,157,095 issued to the applicant Bucknam.

Billets, blooms, slabs and similar semi-finished steel shapes are desurfaced to eliminate defects in the surfaces of such shapes and to improve such surfaces for subsequent rolling. Such desurfacing is accomplished by applying a suitable wide oxidizing gas stream obliquely to the heated surface during relative movement of the steel shape and suitable apparatus for applying thereto oxidizing and high temperature heating jets. Heretofore, such apparatus has included a row of blowpipes individually somewhat similar to the oxyacetylene blowpipe used for cutting metals.

For satisfactory desurfacing, it is important that each blowpipe shall continuously deliver the proper jets so that the entire group will always present a uniform substantially unbroken desurfacing stream across the entire width of the shape. However, the intense heat developed by the desurfacing operation, especially when the entire billet or other shape is hot, may overheat one or more blowpipes of the group and render the same ineffective or inoperative; and other difficulties, such as obstructions on the billet, may disable one or more of the blowpipes.

The principal object of this invention is to provide a desurfacing apparatus comprising a row of blowpipe units so constructed that they will be less liable to become inoperative during desurfacing and so associated that they will together present a wide, continuous and more uniform desurfacing stream. Other objects are to provide a multiple blowpipe assembly in which the blowpipe units may be very closely spaced in a row; in which any inoperative blowpipe unit may be quickly and accurately replaced by an operative unit without disturbing the connections and adjustments of the other units of the assembly, and in which each blowpipe unit is constructed to provide an oxidizing gas stream of relatively high metal removing efficiency. A further object is to provide a desurfacing apparatus of this type in which the angular positions of the blowpipes relatively to the work and relatively to one another may be varied through a substantial range of adjustment more conveniently.

The above and other objects and the novel features of this invention will become apparent from the following description taken with the accompanying drawings, in which:

Fig. 1 is a perspective view, partly broken away, illustrating a multiple unit blowpipe assembly embodying this invention;

Fig. 2 is a fragmental front view of the assembly illustrated in Fig. 1, showing the lower portions of the blowpipes;

Fig. 3 is a broken plan view of the blowpipe assembly and its supporting connections;

Fig. 4 is a longitudinal section on the line IV—IV of Fig. 5, showing the construction of one of the blowpipe units of the assembly;

Fig. 5 is a cross section of a blowpipe unit taken on the line V—V of Fig. 4;

Fig. 6 is a broken rear elevation of two blowpipes in position for concerted action; and

Figs. 7 and 8 are side elevations of blowpipe units of the assembly, showing two forms of support therefor.

Generally speaking, the invention comprises a blowpipe unit and an assembly of such units consisting of a sufficient number of units to deliver a continuous desurfacing stream of approximately the same width as the billet or other shape to be desurfaced. Each blowpipe unit includes a housing so constructed that it completely encloses the several gas conduits for conveying oxygen and acetylene or other suitable gases to the nozzles which deliver the preheating and oxidizing jets cooperating to form the desurfacing stream. The housing also provides a chamber to permit the circulation of an adequate quantity of cooling fluid into heat exchange relation with the conduits and the various parts which are subjected to the intense heat. Each unit including its housing is desirably substantially rectangular in transverse cross-section the dimensions of the section being narrow enough to permit the several units to be compactly assembled close together side by side, and deep enough to provide the space required to enclose the gas conduits of each unit, and to accommodate the required volume of cooling medium. Each unit also comprises a detachable hose block for readily connecting gas supply manifolds and a source of cooling fluid to the unit. The several units are independently and adjustably mounted on a single plate or other support, so that any unit may be removed and replaced independently of the others and so that the position of the entire assembly may be varied relatively to the work.

The improved blowpipe assembly of the metal conditioning apparatus, as shown in Fig. 1 of the drawings, comprises a row of blowpipe units B individually mounted on a suitable support, such as the vertical plate S, and individually connected to several manifolds D, E, F, and G for supplying acetylene, preheating oxygen, desurfacing oxygen, and cooling water, respectively, to each unit. Each unit is desirably secured to the support S by an articulated connection or linkage system collectively indicated at L, whereby the unit is so suspended that it may be adjusted both vertically and laterally. Suitable mechanism (not shown) may be provided to raise or lower the supporting plate S, or to move it laterally, relatively to a surface of the work such as the steel billet P, to locate the group of blowpipe nozzles in the proper position for desurfacing. Obviously, the number of blowpipes used will depend upon the width of the surface layer to be removed. Suitable mechanism (not shown) may be provided to propel the billets in succession past the stationary blowpipe assembly; or conversely, the plate S carrying the blowpipe units, the manifolds, and associated parts may be propelled lengthwise of the billet.

Since the several blowpipe units and the means for mounting each on the plate S are identical in construction, only one unit and its mounting will be described here in detail.

Each blowpipe unit B comprises a rear block or base T, a nozzle block M in which a nozzle N is operatively disposed, and an elongated shell or housing forming the body R of the blowpipe unit. The blocks T and M have rectangular portions fitting into and sealingly secured to the opposite ends of the shell to provide an enclosed chamber A for the several gas conduits or tubes and for the cooling medium and its supply tube. To accommodate all of these tubes and provide an ample volume of cooling medium, and at the same time adapt the several units for close spacing so their nozzles will jointly deliver a substantially uniform and continuous desurfacing stream, each unit and the body thereof are rectangular in cross section, the width dimension of the cross section being considerably smaller than the other. Such narrow units may therefore be assembled side by side, with their wider sides close together, so the nozzles will not be too far apart to provide the desired unitary stream across the width of the billet.

The nozzle block M has a nozzle socket or head 10 formed integrally therein, and the nozzle N is fastened in this nozzle head. The construction of the nozzle head is made as light as is consistent with proper strength in order to bring cooling fluid with which it is in contact into close association with the nozzle N to abstract heat quickly therefrom. When the blowpipe unit B is disposed with its longitudinal axis standing vertically above the horizontal top face of the billet P which is to be desurfaced, the nozzle N is located between the planes of the wider sides of the unit and projects at an abrupt angle obliquely forwardly and downwardly of the unit and at an acute angle to the billet surface, in proper position to deliver obliquely against such surface a central cutting or desurfacing jet of oxygen and a surrounding row of preheating jets of a combustible gas mixture, such as a mixture of actylene and oxygen.

The cutting or desurfacing oxygen conduit 12 is connected into a cutting oxygen receiving duct 11 in the base T and extends therefrom through the chamber A to the nozzle head 10, where a cutting oxygen duct 13 extends smoothly in continuation thereof to the inlet end of the axial cutting oxygen passage 90 in the nozzle N. The conduit 12 makes smooth curves in the chamber A adjacent the inlet end of the nozzle and ends in alignment with the oxidizing gas passage 90, thereby providing a minimum interference with the flow of cutting oxygen into and through the passage 90.

The base T also has a combustion supporting or preheating oxygen duct 14 extending from its rear face to the rear end of an injector 15 in the base T, and an air passage 16 extends from the rear face of the base to the suction chamber 17 of the injector 15. A mixing throat 18 extends from the discharge end of the injector 15 forwardly of the base T; and it will be evident that when oxygen passes through the injector 15 it will carry air from the suction chamber 17 with it to the mixing throat 18. The receiving end of a combustion supporting or preheating mixture conduit 19 is fitted into the base T at the end of the mixing throat 18, and extends through the chamber A around smooth curves to the front of the blowpipe unit and back again to the base T. The discharge end of the mixture conduit 19 enters a passage 20 in the base, which passage extends to the rear end of an injector and mixer 21 in the base T. The length of the mixture conduit 19 provides resistance against flashbacks.

An acetylene or fuel gas passage 22 extends from the rear face of the base T to the suction chamber 23 of the injector and mixer 21. The injector and mixer 21 discharges into a throat 24 which terminates in a mixing and expansion tube 25. This tube is connected by a coupling 26 with a heating mixture conduit 27, the forward end of which is connected to the nozzle head 10. A duct 28 extends through the nozzle head 10 from the discharge end of the conduit 27 to the rear end of the usual preheating gas passages 91 in the nozzle N. Thus the combustion supporting mixture draws acetylene from the suction chamber 23 into the throat 24, mixes therewith in the mixing and expansion tube 25 and passes through the heating mixture conduit 27 and the duct 28 into the preheating passages of the nozzle N.

A cooling water conduit 30 extends through the chamber A from a cooling water receiving duct 29 in the base T to an outlet adjacent the nozzle head 10 where the greatest heat reaches the blowpipe. Thus cooling fluid may be supplied independently and substantially directly against the block M to indirectly cool the nozzle N. The number of gas tubes which are necessarily positioned adjacent the nozzle head 10 may make it desirable to deform the cross section of the discharge end 31 of the conduit 30, and such deformation is illustrated in Fig. 4 of the drawings. The cooling fluid which is discharged adjacent the nozzle head is free to flow back generally through the chamber A, and a discharge duct 32 extends from the chamber A through the base to its rear face.

It is preferred to provide a stiffener 33 extending longitudinally within the blowpipe and substantially centrally thereof. This stiffener may be attached at one end to the base T as at 34 and at the other end to the nozzle block M as at 35. Furthermore, the stiffener preferably extends across the smaller dimension of the blowpipe and may be connected at points 36, as by spot welding or rivets, to the wider sides of the shell R. The stiffener thus prevents bulging of these sides, particularly under pressure of the cooling fluid, and thereby provides a more rugged and durable blowpipe unit. Openings 37, 37 are formed in the stiffener 33 to permit certain of the gas tubes to extend therethrough and the openings are desirably made of sufficient size for free passage of the cooling fluid past the stiffener.

In order that the blowpipe unit may be quickly disconnected and replaced by a similar unit, all of the fluid connections are made through a hose block H having ducts 38, 39, 40, 41, 42, and 43 extending therethrough and positioned to register respectively with the cutting oxygen receiving duct 11, the combustion supporting oxygen duct 14, the air passage 16, the acetylene passage 22, the cooling water receiving duct 29, and the discharge duct 32. Nipples 44, 45, 46, 47, and 48 are disposed in the outer ends of the ducts 38, 39, 41, 42 and 43 respectively in order that hose connections (later to be described) may be coupled to the hose block H. It will be noted that no nipple is required at the outer end of the air intake duct 40. A gasket 49 having appropriate holes therethrough is disposed between the base T and the hose block H in order to prevent leakage. Bolts 50 and 51 fastened in the base T project rearwardly thereof and are adapted to extend through holes 52 and 53 in the hose block H with their threaded ends extending beyond its rear face. Accordingly, when nuts 54 and 55 are screwed upon the respective threaded ends, the hose block H may be drawn forcibly toward the base T, thereby compressing the gasket 49 and making leak-tight connection through the respective ducts with the blowpipe passages.

The articulated connection or linkage system L which supports each blowpipe unit B comprises a vertically disposed bar 58 having a vertical threaded hole 59 in its top (Figs. 7 and 8), and a forwardly extending foot 60 with a vertical hole 61 therein at its bottom. Brackets 56 and 57, respectively, secured to the rear wall of the shell R adjacent its upper and lower ends, are provided with means coacting with the bar 58 to permit the unit B to be quickly removed and replaced. A bolt 62 passed through a hole 63 in the bracket 56 and screwed into the threaded hole 59 in the bar 58 connects the top of the unit B with the bar 58; and a depending pin 64 on the bracket 57 fits into the hole 61 in the foot 60, thereby connecting the bottom of the unit B to the bar 58. The bolt 62 and the pin 64 are not coaxial and therefore the blowpipe unit is rigidly fixed to the bar 58 when the bolt and pin are in place. The blowpipe unit may be quickly disconnected from the bar 58 (and therefore from the link system L) merely by unscrewing the bolt 62 and raising the unit until the pin 64 leaves the hole 61. A substitute blowpipe unit may be as quickly added to the assembly by properly positioning the brackets 56 and 57 and screwing the bolt 62 into place.

The bar 58 is connected near its top and bottom to a second vertically disposed bar 65 by means of horizontally movable spaced links 66 and 67 which may swing about vertically aligned pivots adjacent the opposite ends thereof. The bar 65 has a pair of lugs 68 and 69 secured to its rear face near the upper and lower ends thereof, respectively; and a pair of vertically swingable links 70 and 71 are connected by horizontal pivots to the lugs 68 and 69, respectively, and to a corresponding pair of lugs 72, on the forward face of the plate or support S.

Since the horizontally movable links 66 and 67 are of equal length and have their front ends coaxially pivoted and their rear ends coaxially pivoted, the unit B may be swung horizontally into any desired position either parallel to its original position or at an angle thereto. Furthermore, the links 70 and 71 being parallel and of equal length, the blowpipe unit may be swung upwardly or downwardly with respect to the plate S into successive parallel positions.

Since each unit B of the group is similarly mounted, it will be apparent that one or more units of the assembly may be moved upwardly out of operating position to decrease the width of the desurfacing stream when a narrow billet is to be desurfaced. Furthermore, the horizontally movable links 66 and 67 which support each unit permit the units to be spaced apart as desired either parallel to each other or angularly related as shown in Fig. 3.

In desurfacing a billet or similar body, best results usually are obtained when the molten oxide and metal remains on, and is advanced along, the surface which is being desurfaced ahead of the nozzles N. Accordingly, the outside blowpipe units of the assembly preferably are set in inwardly directed positions as illustrated in Figs. 2 and 3. The inner jets then propel the molten oxide and metal along the surface, and the jets issuing from the end blowpipes impel the molten metal and oxide not only forwardly but away from the edges of the billet.

Suitable means may be provided to hold the forward edges of the several blowpipes in fixed spaced relation relatively to one another while permitting the rearward edges of the units to be set different distances apart and also permitting any unit to be replaced without disturbing the setting of the other units. As shown, a lug 75 having a vertical hole is secured to the front wall of the shell R of each blowpipe unit, and a comb member 73 is provided with a row of round teeth 74 which severally, removably but tightly, fit the holes in the lugs 75. By lifting the comb, the teeth may be removed from their sockets to release the front ends of the units, but during the desurfacing operation the several units are held in fixed adjusted relation to one another in the row.

Means may be provided for changing the vertical angle of each blowpipe nozzle relatively to the work when conditions, such as different compositions of metal, require such change. Accordingly the upper horizontal movable link or the lower horizontal movable link may be lengthened as illustrated at 66′ and 67′ in Figs. 7 and 8. In such constructions the bar 58 is not altered in any way but larger holes must be provided in the horizontal links to accommodate the bolts or pins by which they are connected to the bar 58.

The manifolds D, E, F, and G which supply acetylene, preheating oxygen, desurfacing, and cooling water may be supported upon the same structure that supports the plate S. Hose connections carry the four named fluids from each manifold to each blowpipe unit B. As the hose connections are the same for each unit, only those connecting the manifolds with the farthest blowpipe unit shown in Fig. 1 will be described. Thus hoses 76, 77, 78, and 79 carry acetylene, preheating oxygen, desurfacing oxygen, and cooling water from the respective manifolds to nipples 46, 45, 44, and 47 respectively in the hose block H. Flow of the respective fluids through the hoses may be controlled by valves 80, 81, 82, and 83 which are schematically shown on the respective manifolds. A hose, not shown, may be connected to each nipple 48 in the hose block H for discharging cooling water to any convenient point.

Master valves 84, 85, 86, and 87 are provided on the manifolds D, E, F, and G, respectively, for controlling the supply of the fluids to the manifolds. Thus, if the master valve 84 is closed, the acetylene supply to all of the blowpipe units B is shut off, whereas the acetylene supply to the individual blowpipe units is controlled by the control valves on the manifold D, as the valve 80. The other fluids are similarly controlled by master valves and individual control valves. All of the valves are located for convenient manipulation by the operator of the assembly.

In operation, the apparatus is set up with the blowpipe nozzles at the proper distance above the top surface of the billet P, a sufficient number of units being connected in the assembly to provide, when spaced closely enough, a substantially continuous metal-removing stream across the entire face of the billet which is to be desurfaced. Blowpipe units of the assembly which are not required to form a metal removing stream of the necessary width may be elevated vertically by moving the vertically swingable links 70 and 71 and the gas supply to such units may be shut off by the individual control valves on the several manifolds. If variation from the usual jet angle with the surface is required, the necessary lengths of horizontally movable links 66′ or 67′ may be substituted for the usual lengths 66 and 67. The units are next disposed at the proper distance, one from the other, and at the proper angles relatively to one another by turning about the pivots of the horizontally movable links, and the master valves are opened. The control valves are then adjusted to give the desired supply of fluids to each unit and the gases issuing from the nozzles are ignited. Relative movement is then given the billet P and the blowpipe assembly so that the former moves with respect to the latter in the direction of the arrow in Fig. 1 and the jet is passed completely over the metal body. Following this each of the other faces are in turn brought adjacent the blowpipe nozzles until the entire body has been desurfaced.

From the foregoing, it will be obvious that the present invention provides a simple, rugged, easily maintained desurfacing apparatus which is readily adaptable for use with different sizes and compositions of metal. It will also be seen that the apparatus provides for accurate adjustment of the angular relation between each blowpipe nozzle N and the support S both vertically and horizontally and thereby permits the nozzles to be arranged in the row at the optimum relation with respect to the work surface according to the composition of the metal, the depth of the layer of surface metal to be removed, the temperature of the work and the speed of movement. It has been found that the provision of the smooth curve in the supply conduit 12 adjacent the inlet end of the nozzle so that the conduit ends in alignment with the oxygen passage 90 of the nozzle imparts characteristics to the oxygen stream that effect relatively high metal removing efficiencies.

It will be understood, of course, that fuel gas, other than acetylene, may be employed and where the word "acetylene" is used in this specification, it is intended to include any appropriate fuel gas. Similarly, it will be understood that the expressions "preheating oxygen" and "desurfacing oxygen" are employed for convenience and because oxygen is ordinarily used for preheating and desurfacing. However, it is not intended to exclude other fluids which might be similarly employed. Finally, the expression "cooling water" is employed herein because this is the cooling fluid now contemplated as applicable to the apparatus. However, it is not intended to exclude other cooling fluids by the use of this expression.

The particular embodiment, here described and illustrated in the accompanying drawings, is presented to indicate how the invention may be applied. Other forms, differing in detail but not in principle, from that here disclosed will, of course, suggest themselves to those skilled in the art.

We claim:

1. In a multiple unit blowpipe assembly for conditioning metal bodies, the combination of a plurality of separate blowpipe units having nozzles arranged in a row, said blowpipes each having a body which in right section has a relatively narrow width to permit close spacing of said nozzles in the row, said nozzles extending obliquely downwardly and forwardly from the lower portions of said bodies; means for supplying gas to the upper portions of said blowpipe bodies, passages extending through said bodies for conveying gas from the upper portions of said blowpipes to the inlet ends of said nozzles, said passages having smooth curves immediately adjacent the inlet ends of said nozzles; a common support for said nozzles; articulated means including pivoted parallel links connected between the rear portions of each of said blow pipe bodies and said common support for mounting said blowpipes on said support and providing independent adjustment of each of said nozzles into close side by side relation to produce a substantially continuous highly efficient wide surface metal removing stream; and means cooperating with the forward portion of each blowpipe body to hold said blowpipe nozzles in the desired side by side spacing relatively to each other.

2. In a multiple unit blowpipe assembly, the combination of a plurality of separate blowpipes, said blowpipes each having a narrow width to permit close spacing of said blowpipes adjacent each other and each blowpipe also having comparatively great depth to accommodate gas conduits therein; a common supporting means for said blowpipes; articulated means for independently mounting said blowpipes on said supporting means in side by side relation and sufficiently close together to produce a substantially continuous wide metal-removing stream said articulated means comprising parallel swingable links pivoted on said support and connected to said blowpipes for adjusting said blowpipes independently in

successively parallel positions along said support; and means for supplying gas to said blowpipes.

3. In a multiple unit blowpipe assembly, the combination of a plurality of separate blowpipes, said blowpipes each having a shell which in right section has one dimension considerably greater than the other; nozzles secured to the lower ends of said shells; passages through said shells for conducting blowpipe gases to said nozzles; means for circulating a cooling fluid through said shells and around said passages; means for independently mounting said blowpipes side by side and sufficiently close together to produce a substantially continuous wide metal-removing stream, said mounting means comprising a single support common to the several blowpipes of said assembly, blowpipe securing means on said support, means on the rearward portion of each blowpipe for securing such blowpipe removably to said blowpipe securing means on said support; means cooperating with the forward portion of each blowpipe to hold said blowpipes fixedly in a desired side by side spacing relatively to each other; and means for supplying blowpipe gases and cooling fluid independently to each blowpipe.

4. In a multiple blowpipe assembly, the combination of a plurality of separate blowpipe units arranged side by side in a row; a common support for said units; means for independently mounting each blowpipe unit individually on said common support including a pair of pivoted substantially parallel, horizontally adjustable links for each unit said links being each pivotally secured to said support and connected to a respective one of said units and arranged to provide transverse adjustment of said units relatively to each other; and a member cooperating with each of said blowpipe units to hold all of said units fixedly in spaced relation to each other in the row.

5. In a multiple unit blowpipe assembly, the combination of a plurality of separate blowpipe units; means for independently mounting said units side by side and sufficiently close together to produce a substantially continuous wide metal-removing stream, said mounting means comprising a single support common to the several units of said assembly, a pair of pivoted substantially parallel movable links for each blowpipe pivotally connected to said support, a vertically disposed member pivoted to each pair of said links, means on each blowpipe unit adapted to secure such unit removably to a respective one of said vertically disposed members, and means for supplying acetylene, preheating oxygen, desurfacing oxygen and cooling water independently to each blowpipe unit.

6. The combination of a blowpipe; a support therefor; and means for connecting said blowpipe to said support; said connecting means comprising pivoted substantially parallel horizontally movable links constructed and arranged to carry said blowpipe in transversely displaced parallel positions and to permit its angular displacement, and parallel vertically swingable links pivoted on said support and connected to said blowpipe constructed and arranged to carry said blowpipe in displaced successively parallel vertical positions.

7. The combination of a blowpipe; a support therefore; and means for connecting said blowpipe to said support; said means comprising pivoted substantially parallel horizontally movable links disposed one above the other constructed and arranged to carry said blowpipe in transversely displaced parallel positions and to permit horizontal angular displacement thereof, one of said links being longer than the other in order to incline said blowpipe at a desired angle with respect to a horizontal plane.

8. The combination of a blowpipe having a forwardly disposed gas orifice; a vertically disposed support; and means for connecting said blowpipe to said support to permit vertical movement and horizontal adjustment of said blowpipe relatively to a work surface; said connecting means comprising two groups of substantially parallel spaced adjustable links pivotally connected between said support and said blowpipe, one of said groups being constructed and arranged to carry said blowpipe in vertically displaced parallel positions, and the other group of said links being constructed and arranged for horizontally adjusting said blowpipe and also for adjusting said blowpipe gas orifice at a desired transverse angular relation to said support.

9. An elongated blowpipe adapted for use with one or more similar blowpipes closely spaced in a row; said blowpipe having a shell of substantially rectangular transverse cross section, the width dimension of the cross section being considerably smaller than the dimensions perpendicular thereto; a nozzle secured to one end of said shell and extending obliquely therefrom; a hose block secured to the other end of said shell and having fluid passages extending therethrough; tubes within said shell for conveying fluids from said passages to said nozzle; and means for circulating a cooling fluid through said shell.

10. A blowpipe comprising a rear block; a nozzle block having a nozzle head formed integrally therewith; a shell connecting said rear block and said nozzle block, said shell being of substantially rectangular transverse cross section, the width dimension of the cross section being substantially smaller than the dimensions perpendicular thereto; tubes for acetylene, preheating oxygen and desurfacing oxygen in said shell and connecting said rear block and said nozzle head; and means for circulating a cooling fluid through said shell and for discharging cooling fluid against said nozzle block and said nozzle head.

11. A blowpipe adapted for use in conjunction with one or more similar blowpipes, said blowpipe comprising a shell of substantially rectangular transversely narrow cross section, the dimension of the cross section perpendicular to the width being considerably greater than the width; a stiffener partition extending longitudinally of the shell and across the small dimension of said shell, said stiffener being connected to the sides of said shell having the larger dimension of the cross section to prevent bulging thereof; and means for circulating a cooling fluid within said shell and on both sides of said stiffener partition.

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