Oct. 10, 1950 B. G. WARD, JR 2,525,055

HEATING AND HARDENING BURNER

Filed April 27, 1945

FIG. 1.

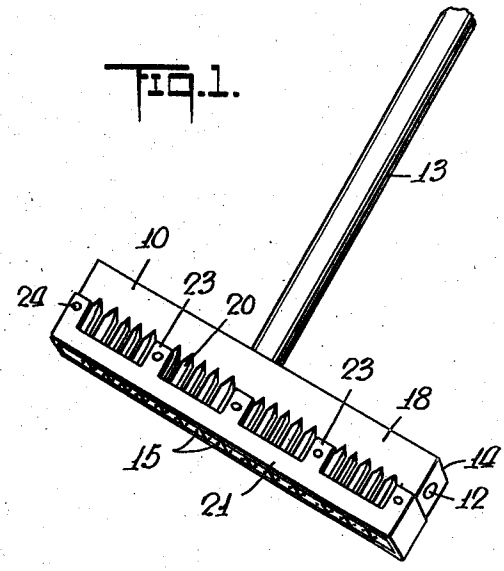


FIG. 2.

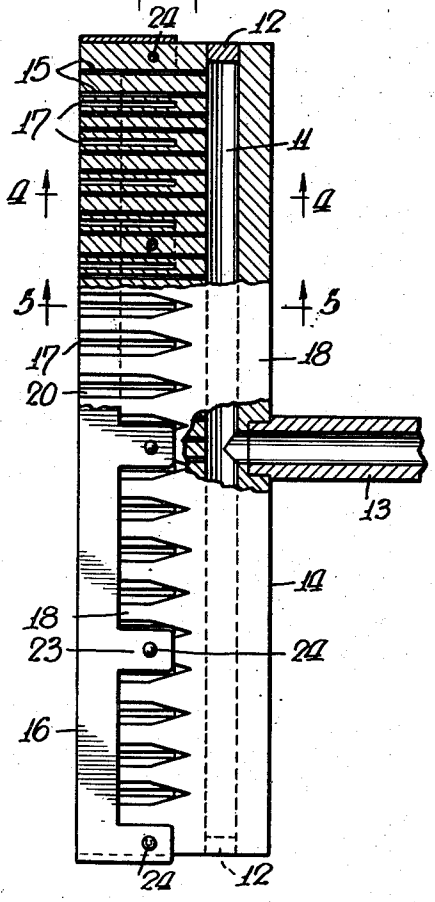


FIG. 3.

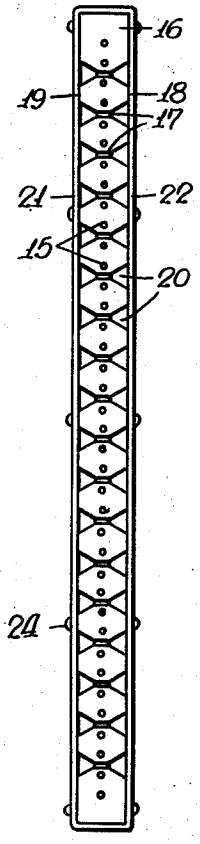


FIG. 4.

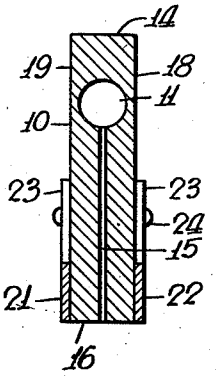
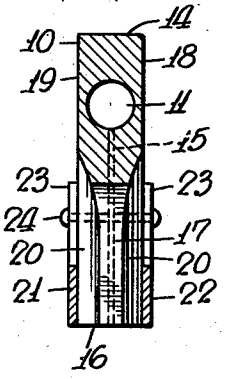


FIG. 5.



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HEATING AND HARDENING BURNER

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2 Claims. (Cl. 158—27.4)

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This invention relates to blowpipes or burner apparatus of the type designed and adapted for producing a row of closely spaced high temperature flames for the heat treatment of the surface of an article, as for instance in flame blasting and descaling operations to remove scale, rust, or other adhering material therefrom, or to so alter said material that it may be easily removed mechanically.

In apparatus of this general type it is common practice to secure the burner head intermediate of its ends to a handle extending at right angles thereto, and through which handle the mixture of combustible and combustion supporting gases is delivered to a passage disposed in and extending lengthwise of the burner head, and from which passage there leads a row of branch passages to the row of gas outlets at which the flames are formed.

As the flames are small, the burner head when in use, is disposed quite close to the surface to be heated, and therefore when used continuously for a long period, the head is liable to become heated to such an extent that there is liability of injury to the head, or preignition of the gas mixture within the torch head. As one feature of my invention there is provided a new and improved construction which facilitates the cooling of the head during the use thereof.

In order to obtain uniform results on the surface being treated, it is desirable that the burner outlets be kept at a substantially constant distance from said surface as the burner moves over it. This is commonly accomplished by resting the side or edge of the burner on said surface, and with the flames projected from an adjacent side and at an angle to said surface. As the burner body is commonly formed of copper or other metal or alloy which is much softer than a steel or iron plate presenting the surface to be treated, and as said surface is often quite rough, the sliding movement of the burner head over the rough hard surface causes wear which materially shortens the life of the burner.

In order to reduce such wear, it has been proposed to provide the burner head with hard inserts along opposite sides thereof, but these materially increase the cost and often give trouble due to the fact that they have a different coefficient of expansion from the body of the burner.

As a further feature of my invention there is provided a simple, inexpensive guard member which may be readily removed and replaced if necessary, and which prevents direct contact of the burner body with the surface being treated.

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As a further important feature the burner body is provided with grooves or channels disposed between adjacent gas outlet passages and substantially parallel thereto, and the guard member coacts with the burner body to close the outer sides of these channels while leaving both ends open. Thus currents of cooling air are induced through said passages and act to prevent the burner body from becoming heated to an objectionably high temperature. By forming the cooling passages as channels in the surface of the burner body, they may be readily and easily cut with a milling tool, and without the necessity for drilling the burner body or providing special piping for a cooling fluid.

Various other objects and advantages will be apparent from a consideration of the specific embodiment shown in the drawing, or will be hereinafter pointed out. Except to the extent defined in the claims, the details may be modified in various ways and to various degrees without departing from the scope of the invention and without sacrificing the main advantages obtained thereby.

In the accompanying drawing:

Fig. 1 is a perspective view of the burner with a portion only of the handle thereof.

Fig. 2 is a side elevation of the burner body and guard, portions thereof being shown in section.

Fig. 3 is a face view of the burner, and

Figs. 4 and 5 are sections on the lines 4—4 and 5—5 respectively of Fig. 2.

In the construction illustrated there is provided a burner body 10 which is in general of rectangular form as to its longitudinal and transverse sections. This may be formed of copper or other suitable material, and has a longitudinal passage 11 which may be formed by drilling a hole therethrough and then closing the opposite ends of the hole with plugs 12. The handle 13 is welded or otherwise secured to the rear face 14 of the burner body and communicates with the passage 11 intermediate of the ends of the latter.

The combustible and combustion supporting gases which are ordinarily acetylene and oxygen, may be delivered from suitable valve controlled pipes to a mixer at the outer end of the handle. As these features constitute no part of the present invention they have not been illustrated. The burner body is provided with a row of small discharge passages 15 leading from the manifold passage 11 to the front face 16 which is opposite to the rear face 14. Thus the mixture of gases

delivered through the handle 13 and the manifold passage 11, flows through all of the passages 15 and forms a row of small high temperature flames at the outlets of the passages 15.

In order to facilitate cooling of the burner, the burner body is provided with a series of transverse slots 17 extending in from the front face 16 for a considerable distance. These slots may, if desired, be arranged alternately with the discharge passages 15, but preferably they are arranged between each alternate pair of passages, so that there will be two passages 15 between each two of the slots 17. The side faces 18 and 19 of the burner body are provided with channels or grooves 20 opposite to each of the slots 17, and the channels are preferably substantially V-shaped, and may be tapered so that at their upper ends they merge into the side faces of the burner, and with the smaller or pointed upper ends of the grooves slightly above the inner ends of the slots 17. As is shown, these grooves extend rearwardly from the burner face for a substantial distance.

Secured to the burner body are a pair of plates 21 and 22, each of which may have one edge substantially in the plane of the face 16 of the burner body, or may extend slightly therebeyond. The opposite edge of each of the plates 21 and 22 is spaced at some distance below the upper ends of the channels 20 and the slots 17. In other words, the width of each plate is somewhat less than the length of the channels. The plates may have lugs or extensions 23 at the ends thereof, and if desired, at a few intermediate points, and by means of which the plates may be secured to the burner body by screws, rivets or pins 24. Preferably the two plates 21 and 22 are made from a single piece of metal which may extend all the way around the burner body and across the ends of it as well as across the sides. These plates are of very much harder material than the burner body, so that when the burner is held in an inclined position in respect to a hard rough surface to be treated, for instance as shown in Fig. 1, the edge of one plate will bear on said surface and will prevent the burner body from being worn away by repeated movement over said surface. These plates, if they become worn or warped, may be readily removed and replaced by new ones by merely removing the screws, rivets or pins 24.

The plates in my improved construction serve a double function, in that they not only protect the burner body from wear, but they also engage the faces 18 and 19 between adjacent channels so as to form the outer wall of passages which are open at their upper and lower ends. In the use of the burner, the flames projected from the outlet ends of the discharge passages 15 will induce air currents through the channels 20 from the upper ends of the latter to the lower ends, and this automatically induced air circulation through the channels will keep the burner body reasonably cool and prevent such overheating as might injure the burner or cause preignition in the passages thereof.

The channels and the slots coact to subdivide the lower portion of the burner body into a series of relatively small nozzles between which air may circulate to insure proper cooling. By forming the slots and the channels by simple machining operation, it is not necessary to do any drilling of the burner body other than to provide the manifold passage 11, the discharge passages 15, and the openings for the plate attaching elements 24.

I have referred to the forming of the nozzle by the cutting of the slots and the milling of the channels. It will of course be obvious that it is is not essential that there be two such separate cutting operations, as the channels may be cut sufficiently deep so that they intersect, and therefore the separate forming of the slots 17 is not necessary.

As previously indicated, the channels or air passages are so spaced that there are two gas outlet passages between successive channels. Obviously there might be a lesser number of such channels, or there might be a separate channel between each two gas passages.

The lugs may be omitted from the plates if desired, and the plates be held in place only by attaching members at the ends of the burner body. The plates with their connecting end portions may be considered as a sleeve telescoped onto the burner body. The side plates serve to protect the air channels of the burner body from becoming clogged or filled with material detached from and thrown up from the surfaces being treated. In case any clogging or filling of the channels occurs, it will be obvious that they may be readily cleaned out by brushes applied to the channels and thin blades projected through the slots.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A flame blasting or descaling burner for producing a plurality of high temperature heating flames, including an elongated metal body having a single manifold passage extending lengthwise thereof, a supply passage leading into said manifold passage for delivering a combustible gas mixture thereto, a row of branch passages leading from said manifold passage to outlets in the face of the burner body to discharge a plurality of spaced streams of said combustible gas mixture to form a plurality of high temperature heating flames, said body having also a plurality of grooves formed in opposite sides thereof, located between pairs of said branch passages, substantially parallel thereto and extending rearwardly for a substantial distance from said face of the burner, and plates extending lengthwise of said burner secured thereto on opposite sides thereof and covering only a portion of the length of said grooves adjacent to the said face of the burner and defining with said grooves open-ended passages terminating at said face adjacent to and between pairs of said outlets for said combustible gas mixture.

2. A flame blasting or descaling burner for producing a plurality of high temperature heating flames, including an elongated metal body having a single manifold passage extending lengthwise thereof, a supply passage leading into said manifold passage for delivering a combustible gas mixture thereto, a row of branch passages leading from said manifold passage to outlets in the face of the burner body to discharge a plurality of spaced streams of said combustible gas mixture to form a plurality of high temperature heating flames, said body having also a plurality of grooves formed in opposite sides thereof, located between pairs of said branch passages, substantially parallel thereto and extending rearwardly for a substantial distance from said face of the burner, said grooves in opposite sides of said burner being connected in pairs by slots extending for a substantial distance from said face of the burner, and plates extending length-

wise of said burner secured thereto on opposite sides thereof and covering only a portion of the length of said grooves and slots adjacent to the said face of the burner and defining with said grooves and slots open-ended passages terminating at said face adjacent to and between pairs of said outlets for said combustible gas mixture.

BERT G. WARD, JR.

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