Sept. 22, 1942. G. O. GRIDLEY 2,296,612

FLAME HARDENING HEAD

Filed Jan. 10, 1940

Fig. 1.

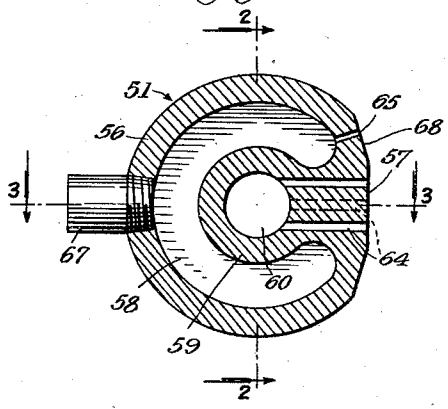


Fig. 2.

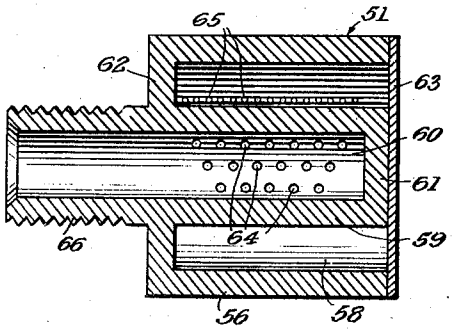


Fig. 4.

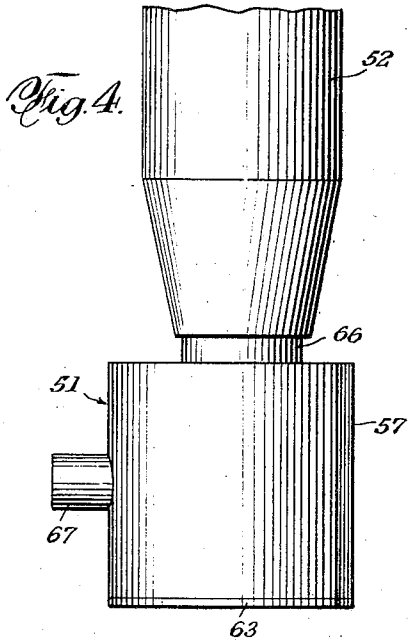
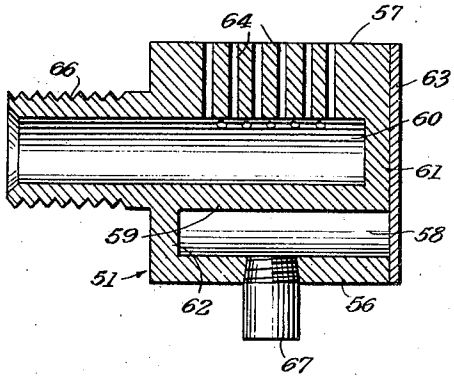


Fig. 3.



INVENTOR
GEORGE O. GRIDLEY

BY Mitchell & Herbert

ATTORNEYS.

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FLAME HARDENING HEAD

George O. Gridley, Berlin, Conn., assignor to The New Britain Machine Company, New Britain, Conn., a corporation of Connecticut

Application January 10, 1940, Serial No. 313,226

1 Claim. (Cl. 266—4)

My invention relates to a flame hardening head.

It is an object to provide an improved form of flame hardening head, particularly, though not exclusively, for use in flame hardening cam surfaces.

Other objects and various features of novelty and invention will be hereinafter pointed out or will become apparent to those skilled in the art.

In the drawing which shows, for illustrative purposes only, a preferred form of flame hardening head embodying my invention—

Fig. 1 is a transverse sectional view through an improved flame hardening head;

Fig. 2 is a sectional view taken substantially in the plane of the line 2—2 of Fig. 1; and

Fig. 3 is a sectional view taken substantially in the plane of the line 3—3 of Fig. 1.

Fig. 4 is an elevation of the flame hardening head of Figures 1–3.

As shown in the drawing, the flame hardening head 51 is of novel form and is so arranged as to maintain the head in a cool and workable condition and so as to prevent flash backs into a mixing tube 52, wherein there is usually a combustible mixture of gas and oxygen. One of the advantageous features of my improved flame hardening head is the provision of a water chamber almost completely surrounding the gas chamber in the head. The wall of the gas chamber is preferably relatively thin and the gas chamber is thus at all times maintained in a relatively cool condition when the head is in operation.

In the particular form illustrated the flame hardening head consists of a block of metal 56, such as brass or other suitable material. The head may be of generally cylindrical form and preferably has a relatively flat face 57, constituting a part of the generally cylindrical form of head and slightly angularly arranged faces 58 at one or both sides of the flat face 57. The block 56 is cored out or otherwise formed, so as to provide an annular water chamber 58, which almost completely surrounds the wall 59 of a cylindrical gas duct or chamber 60. The gas chamber 60 preferably extends almost to the right hand end of the burner head, as viewed in Figs. 10 and 11, and may have an integral end wall 61, so that the chamber 60 may be described as a well extending into the block and, as shown, substantially centrally thereof. The annular water chamber 58 may have an integral wall 62 constituting one end of the burner head and be closed at its right hand end, as by means of a metal plate 63, which may be brazed or otherwise secured to the block 56, so as to form a closure for the annular water chamber and, if desired, the bottom wall 61 of the gas chamber 60 may abut or be secured to the plate 63. However, it is also contemplated that a part at least of the bottom wall 61 may be separated from the closure plate 63, so as to provide additional water space about the gas chamber 60. A plurality of small burner openings 64 extends from the gas chamber 60 to and through the flat face 57, preferably perpendicular to such face, and in the form illustrated I employ three rows of such burner openings of which the openings of the middle row are substantially perpendicular to face 57 and substantially radial with reference to the gas chamber 60, so that there will be an intense heat area provided for quickly heating the adjacent surface of the cam 50 when the head is in operation.

To one side of the burner openings 64 I provide one or more rows of quenching water outlet openings 65 preferably perpendicular to one surface 68. The flame hardening head may have a screw connection 66 for attachment to the mixing tube 52, and is provided with a water connection 67 for connection to a source of water supply, as will be understood.

When the flame hardening head 51 and a cam surface to be hardened are moved relatively to each other, they are kept in close proximity and as soon as a part of the cam surface is heated to the desired temperature, the heating action is applied to another part of the surface and the part already heated is immediately quenched by the water jets through the jet opening 65. When necessary the position of the head, relative to the surface to be heated, may be varied to avoid overheating of the surface of the article subjected to surface hardening.

It will be seen that I have provided an exceedingly simple means of hardening cams and other parts. The hardening head is of such form as to be simple and relatively cheap to manufacture and yet is constantly maintained in a cool and workable condition so as to reduce the danger of flash backs in the mixing tube to a minimum.

While the invention has been described in considerable detail and a preferred form of flame hardening head illustrated it is to be understood that various changes may be made within the scope of the invention as described in the appended claim.

I claim:

A flame hardening head including a block of

metal having a substantially C-shaped chamber extending into said block from one end and defining an upstanding boss, said boss having a bore therein extending in from the opposite end of said block, whereby the bottom of said chamber and the bottom of said bore are integral parts of said block, closure means for the open end of said substantially C-shaped chamber, water inlet connection means to said chamber, gas inlet connection means to said bore, said block having a row of flame openings extending transversely of and from said bore to the outside of said block and located between the adjacent ends of said substantially C-shaped chamber, said block having a row of quenching water openings substantially parallel to said row of flame openings and extending from said chamber to the outside of said block.

GEORGE O. GRIDLEY.