May 28, 1929. C. A. NEVINS 1,714,690

VALVE

Filed July 1, 1926

Fig. 1.

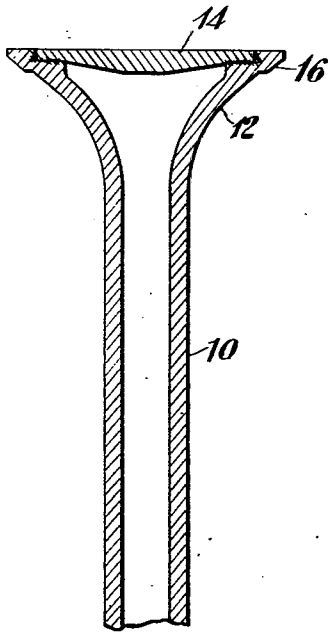
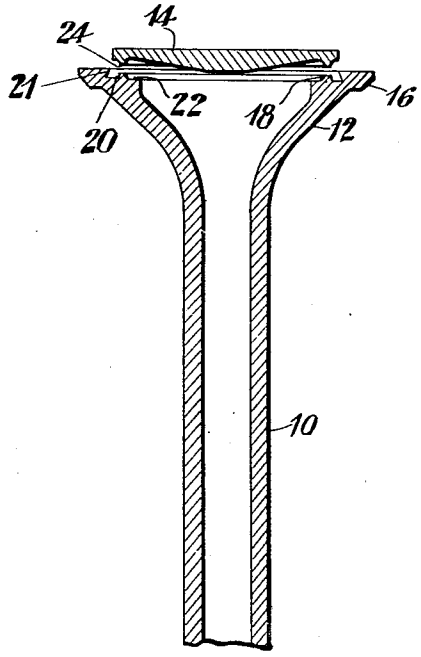


Fig. 2.



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UNITED STATES PATENT OFFICE.

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VALVE.

Application filed July 1, 1926. Serial No. 119,871.

This invention relates to an improved method of manufacturing valves by electric welding and it is an object of the invention to devise an improved and economical method for manufacturing strong, light, durable valves suitable for use in internal combustion engines and capable of withstanding high temperatures and high pressures without failure due to warping, cracking, breaking or other causes.

The invention will be best understood by reference to the accompanying drawing forming part of this specification and wherein

Fig. 1 is a cross-section of a completed valve made in accordance with the present invention and

Fig. 2 is a cross-sectional view of the two parts of which the valve is composed and showing the preferred manner in which the parts are prepared for welding.

In the drawings, 10 indicates the valve stem, 12 the valve head, 14 the closure or cap of the head and 16 the bevel valve-seat. Preferably, as is shown in the drawings, the valve-stem 10, the head 12 and the seat 16 are formed integral as one piece, and may be generally designated as the body of the valve. The body of the valve may be made from any suitable material, such as steel, nichrome, or other material capable of withstanding the particular requirements of temperature, resistance to corrosion, resistance to erosion and resistance to mechanical stress, to which the valve will be subjected in actual service.

The interior of the head of the valve body is provided with an upstanding ridge 18 which can conveniently be considered as having been formed by providing an annular groove 20 in the head. This groove serves to separate the ridge proper from the main body of the metal on the outside of which the bevel valve-seat is formed and consequently when the ridge is fused with the cap 14 the heat is largely localized in the ridge and undesirable heating of the metal on which the valve seat is formed is reduced to a minimum, thus avoiding warping of and temperature stresses in the metal. Preferably, though not necessarily, the interior of the head 12 will be provided with a ledge 22 against which the cap 14 will abut after the welding operation is complete, the face of the ledge preferably lying in the same plane as the bottom of the groove 20. Welding is effected by bringing the cap 14 into contact with the ridge 18, passing an electric current through the contacting surfaces and pressing the cap toward the bottom of the groove 20 and the face of the ledge 22 as the contacting surfaces fuse.

It is preferred that the top of the ridge 18 be somewhat below the top of the head inasmuch as this allows the cap to be more readily positioned on the ridge. It is also preferred that the outer wall formed by the groove 20 be undercut or bevelled inwardly as indicated at 21 in order to form a space into which some of the fused metal may flow between the rim of the cap and said wall to effect a tight joint between the rim and wall. In order to effect a more ready fusion between the cap and ridge 18 it is preferred to provide an annular ridge 24 on the cap 14, this ridge preferably being substantially of the form and size as the ridge 18.

It is contemplated that the valve-stem and the head on which the valve-seat 16 is formed shall be of special metal adapted to withstand high temperatures in operation without deterioration. The cap 14, however, may be of a different kind of metal since its primary purpose is merely to serve as a closure. When a different material is used for the cap 14, care must be exercised in selecting a material whose coefficient of expansion is substantially the same as that of the material used for the valve-body; otherwise there will be a tendency of the completed valve to crack or warp when subjected to high, fluctuating temperatures.

The preparation of the parts for welding is easily and cheaply effected and enables a strong, durable, hollow valve to be manufactured at a low cost.

What I claim is:

1. A method of closing the head of a hollow valve body with a closure plate comprising providing a fusible seat within the head, bounding the outer rim of the seat by an annular groove whereby the outer side of the seat is spaced from the metal on the outer side of which the valve seat is formed, beveling inwardly the side wall opposite the outer side wall of the fusible seat to provide a space into which fused metal may flow during the welding operation, bringing the

closure plate into contact with the fusible seat, passing electric current through the contacting surfaces, and forcing the plate toward the bottom of the groove as the contacting surfaces fuse.

2. A method of closing the head of a hollow valve body with a closure plate comprising forming a ledge within the valve head, forming an annular rib on the ledge, forming a rib on the closure plate, said plate having a thickness equal to the distance between the plane of said ledge and the plane of the end of the valve head, and having a surface equal to that of said ledge, both ribs being of equal diameter and the rib on the ledge being below the end surface of the head, bringing the ribs into contact, passing electric current through the ribs to effect welding, and forcing the closure plate toward the ledge as the ribs fuse until the closure plate is flush with the head of the valve.

3. A method of closing the head of a hollow valve with a closure plate comprising providing within the head a ledge against which the plate will rest after the welding operation is completed, the head having a wall surrounding said ledge, providing a plate adapted to substantially cover said ledge, providing an annular fusible rib on one of said members, undercutting the wall surrounding said ledge to provide space into which fused metal may flow during the welding operation, forcing the plate member toward the ledge, and passing electric current through said rib to fuse it and to weld the plate member to the valve member.

In testimony whereof I affix my signature.

CHAS. A. NEVINS.