June 30, 1936. G. R. RICH 2,045,799

FORM FOR USE IN FABRICATING MOTOR VALVES

Filed Oct. 8, 1935

Fig. 1.

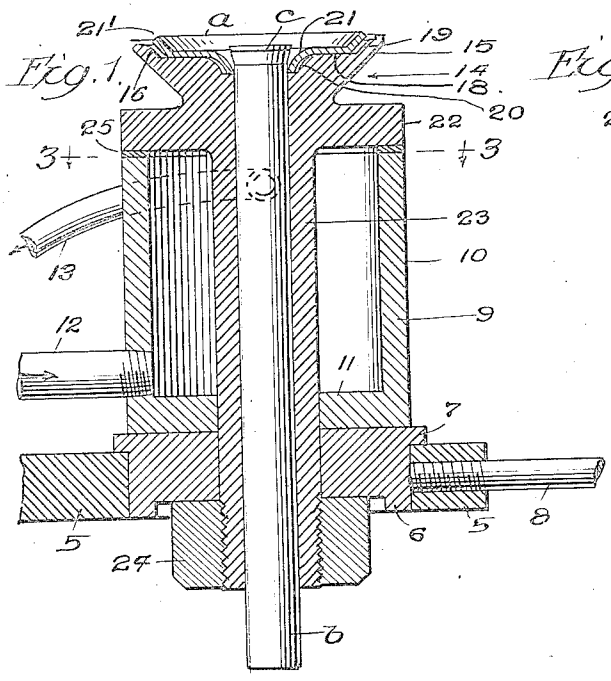


Fig. 2.

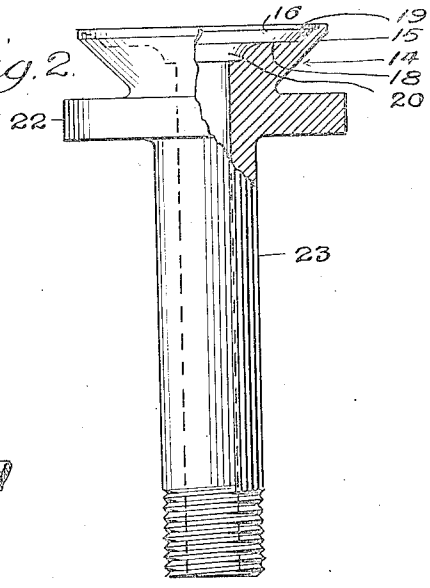


Fig. 3.

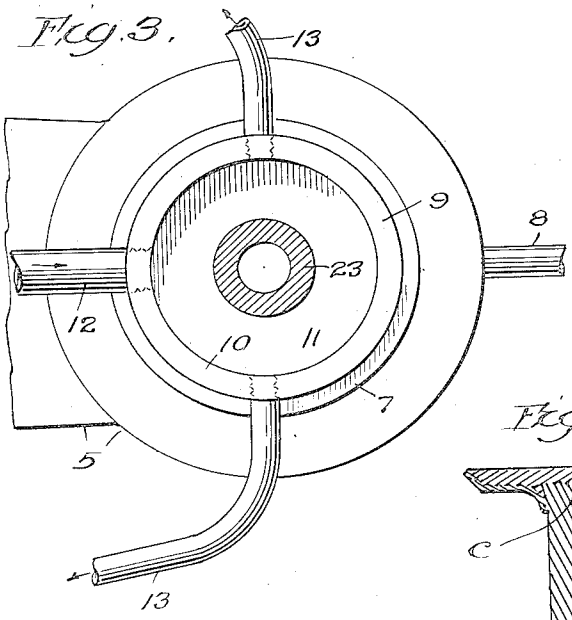


Fig. 4.

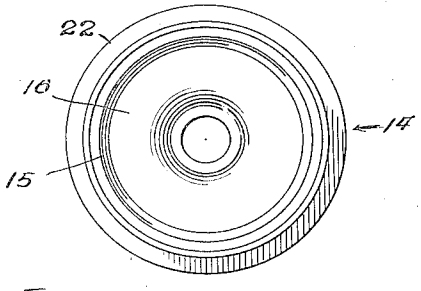
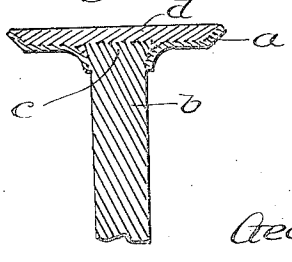


Fig. 5.



Inventor:
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FORM FOR USE IN FABRICATING MOTOR VALVES

George R. Rich, Battle Creek, Mich.

Application October 8, 1935, Serial No. 44,131

7 Claims. (Cl. 113—59)

This invention relates to forms for use in fabricating motor valves.

One of the objects of this invention is to provide a form in which may be fabricated composite metal motor valves, formed with cast metal inserts in their heads. In accordance with this invention, the cast metal insert is melted from a stick of metal with the use of an arc welding apparatus, and inasmuch as the temperature developed in the fusing process runs as high as six thousand degrees, it has been found that means must be provided to conduct this excessive heat rapidly away from the valve structure and from the form itself to prevent overheating of certain parts of the valve.

Another object is to provide cooling means for the form, whereby the conduction of the heat from the valve structure may be controlled.

The present invention consists in the several novel features of construction, arrangement and combination of parts, hereinafter fully set forth and claimed.

The invention is clearly illustrated in the drawing accompanying this specification, in which:

Fig. 1 is a central, vertical section through a water jacketed form, containing a simple embodiment of the present invention, and illustrating parts of a motor valve held therein preparatory to being fabricated.

Fig. 2 is a side elevation, partly broken out of the form alone;

Fig. 3 is a view, partly in plan and partly in horizontal section, taken on the line 3—3 of Fig. 1,

Fig. 4 is a plan of the form seen in Fig. 2; and

Fig. 5 is a fragmental, central section through a motor valve fabricated in the device.

Referring to said drawing, which is merely illustrative of one exemplification of the invention, the reference character 5 designates a fragment of an arm of a turntable of a valve fabricating machine, such as is disclosed in my co-pending application, Serial No. 44,132, filed October 8, 1935. In said arm is a hole in which is received a centrally apertured, circular block 6, which is formed with an annular flange 7, that rests on the arm. The block is held in place on the arm by any suitable means, here shown as a handle 8 in the form of a rod, threadedly mounted in the arm 6, and impinging on the side of the block 6. As many forms may be mounted on the turntable as is desired, and one of the operations required in fabricating a valve may be performed at one station around the turntable and another at a different station and the handles therefor provide convenient means for rotating the turntable.

Resting upon the block 6, is a water jacket 9, having an annular side wall 10, and a centrally apertured bottom wall 11. A cold water inlet pipe 12 is threaded in the annular jacket wall 10 adjacent its bottom and furnishes cooling water to the jacket and hot water discharge pipes 13 are threaded in the wall adjacent its top and conduct the hot water away from the device. The co-pending application shows and describes water circulating means for the water jacket.

The form is seen at 14. Desirably the form comprises a body, in the form of a cup holder 15, which has a countersink 16, formed in its upper face to receive the cup portion, *a*, of a composite metal valve which is to be fabricated. The bottom face of the countersink is flat, as seen at 18, and its side face is flared as at 19. From the bottom face a centrally disposed flaring or bell-shaped depression 20 extends downward to receive the neck 21 of the cup. The diameters of the flaring end faces of the countersink and depression are greater than those of the rim 21' and neck 21 of the cup so as to leave some clearance between the adjacent side faces of these parts. To prevent the form from conducting the heat away too rapidly from the marginal portions of the cup, the external face of the top portion of the form is flared upwardly so as to leave a relatively thin wall around the side of the countersink. Below the flaring top portion of the form is an annular flange 22, which forms the head or top of the water jacket 9, and from said flange projects a downwardly extending sleeve 23, which passes down through the apertures in the bottom wall of the water jacket 10 and block 6, and is threaded therebelow to receive a nut 24, which fastens the form and water jacket together and fastens them upon the block. A gasket 25 is desirably interposed between the flange 22 and annular wall 10 of the water jacket to make a tight joint.

The form is preferably composed of copper, owing to the high efficiency of copper for absorbing and conducting away heat. The cooling water being in contact with the form, and since cool water is continuously replacing the heated water, the form is kept in a relatively cool condition.

The composite valve which is fabricated on this device, comprises the cup, *a*, heretofore described, a steel rod or stem, *b*, which extends through the neck of the cap and has a head or enlargement, *c*, at its upper end that rests on the neck and suspends the rod in the bore in the sleeve. In addition to the cup and rod, the com-

pleted valve has a cast metal insert, *d*, that is received in the cup and fused thereto and to the head of the rod. The insert is formed by melting from a metal stick by an arc welding apparatus, a sufficient portion of metal to completely fill the cavity in the cup. In carrying on the fusing process, borax is first packed into the clearance space between the rim of the cup and side wall of the countersink, and also spread upon the bottom of the cup and upon and around the head of the rod. One end of a metal stick is then placed on the top of the head of the rod and the point of an arc welding tool is placed on the end portion of the stick, and when the current is turned on, an arc is created which develops ample heat to melt a portion from the metal stick and flow it into the cavity in the cup and into the groove between the head of the rod and the neck.

The rod being in contact with the form, and the web or bottom of the cup being the only part thereof which contacts with the form, the arc is confined above the head of the rod and above the bottom or web of the cup. Consequently there is no danger of melting away any portion of the rim of the cup or its neck, although by flowing the molten metal around in the cup at a fusing temperature, a complete fusion or blending together of the metals of the cup and head with the cast metal is effected.

Valves are made of different sizes. By making the form removable from the jacket, it may be readily replaced by a different one. All that is necessary to make the substitution is to unscrew the nut **24**, remove the form, replace it with another one and replace the nut.

More or less variation of the exact details of construction is possible without departing from the spirit of this invention. I desire, therefore, not to limit myself to the exact form of the construction shown and described, but intend, in the following claims, to point out all of the invention disclosed herein.

I claim as new and desire to secure by Letters Patent:

1. A water cooled form for use in fabricating composite metal articles of manufacture composed of a cup, a rod, and a cast metal insert, comprising a copper body portion having a countersink in its upper face for holding the cup portion of the article, while the insert is being cast upon the cup and fused thereto, said body portion having a sleeve co-axially aligned with the countersink and extending down from the body portion to receive the rod portion of the article, a water jacket for the body portion and its sleeve, and water inlet and outlet pipes for the water jacket.

2. A water cooled form for use in fabricating motor valves composed of a cup, a rod and a cast metal insert, comprising a flaring body portion having a countersink in its upper face for receiving the cup portion of the valve, said countersink being substantially the same contour as the cup but of greater diameter than that of the cup, whereby only the bottom of the cup makes contact with the form, a sleeve co-axially aligned with the countersink and projecting down from the body portion of the form and adapted to receive the rod portion of the valve, a water jacket for said body portion and sleeve, and water inlet and outlet pipes for the water jacket.

3. A water cooled form for use in fabricating motor valves composed of a cup, a rod and a cast metal insert, comprising a flaring body portion having a countersink in its upper face of approximately of the same contour as that of the cup but of greater diameter, whereby the bottom only of the cup makes contact with the form, said body portion being formed with a sleeve co-axially aligned with the countersink and projecting down therefrom to receive the rod portion of the valve, a water jacket for the body portion and surrounding the sleeve, and water inlet and outlet pipes for the water jacket.

4. A water cooled form for use in fabricating motor valves composed of a cup having a flat bottom portion, a rod and a cast metal insert, comprising a copper body portion having a countersink in its upper face conforming substantially to the contour of the cup but of greater diameter than that of the cup, whereby the flat bottom only of the cup may make contact with the flat bottom of the form, there being a flange below the body portion and a sleeve projecting down therefrom adapted to receive the rod portion of the valve, a water jacket for said body portion projecting down from said flange and surrounding the sleeve, and water inlet and outlet pipes for the water jacket.

5. A water cooled form for use in fabricating motor valves composed of a cup, a rod and a cast metal insert, comprising a cup holding body portion, having a rod receiving threaded sleeve projecting down therefrom, and a flange between the body portion and sleeve, a cylindrical hollow body open at the top and co-operating with the flange to form a water jacket for the body portion, and a nut on said sleeve for securing together the body portion and cylindrical hollow body.

6. A form for use in fabricating motor valves composed of a cup, a rod and a cast metal insert, comprising a flaring body portion having a countersink in its upper face formed with a flaring side face, a sleeve projecting down from the body portion and a flange between the flaring body portion and sleeve, a water jacket extending down from said flange, and water inlet and outlet pipes for the water jacket.

7. A form for use in fabricating motor valves composed of a cup, a rod and a cast metal insert, comprising a body portion on which the cup is supported with the rod suspended from the cup, a sleeve projecting down from the body portion and adapted to receive the rod, and a water jacket for the body portion and sleeve, and water inlet and outlet pipes for the water jacket.

GEORGE R. RICH.