Jan. 19, 1932. A. V. RIGBY 1,841,453

METHOD OF FORMING VALVE PORTS

Filed April 11, 1930

Fig. 1

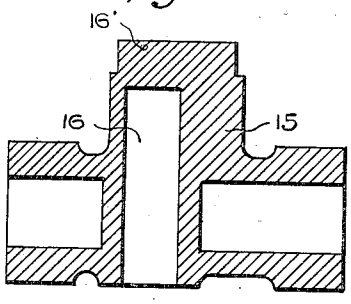


Fig. 2

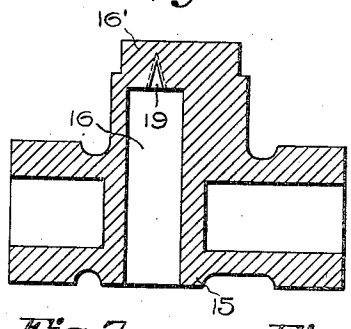


Fig. 3

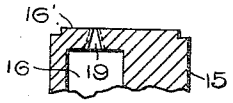


Fig. 4

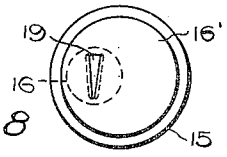


Fig. 6

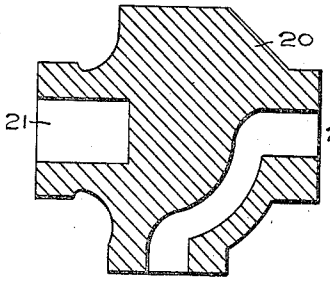


Fig. 7

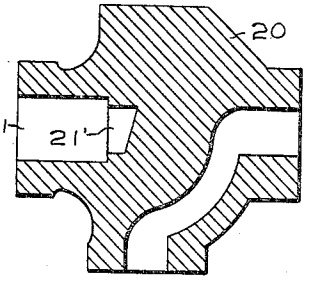


Fig. 8

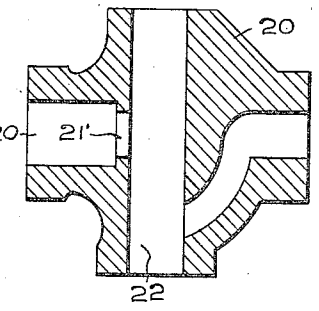


Fig. 9

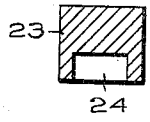


Fig. 10

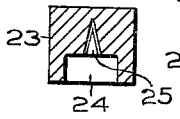


Fig. 11

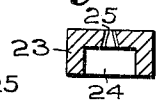


Fig. 12

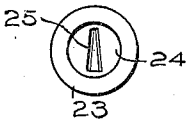


Fig. 13

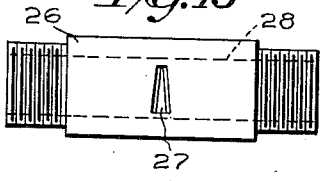


Fig. 14

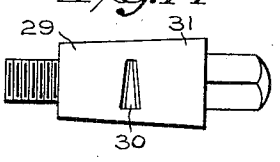
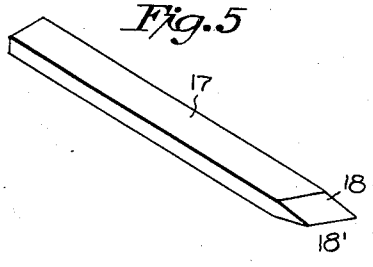


Fig. 5



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1,841,453

UNITED STATES PATENT OFFICE

ALBERT V. RIGBY, OF SHARON, PENNSYLVANIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE RIGBY MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO

METHOD OF FORMING VALVE PORTS

Application filed April 11, 1930. Serial No. 443,350.

My invention relates to valves, relating in particular to the porting of regulating valves, having either integral or insert seats.

In the manufacture of small valves, usually cast of brass, having the body or shell provided with either an integral or insert ported seat, wherein the seat port is relatively narrow, it is well known as being impractical, and impossible in some instances, to form the port, either by core or green sand, without being rough and more or less defective in contour, or of uncertain area. Where the opening is rough, excessive friction results, and where the contour and area are irregular, regulation of the liquid or fluid passing therethrough will not be alike in any two valves so made.

My invention has for its objects, to provide a punch cut and surfacing method wherein positive results in the port formation in each and every instance is assured; to provide a port having smooth walls; be perfect in contour; sharp in outline; and all of the same area, and, when required, the port may be a mere slit of minute width, or of other minute forms.

In describing my invention reference is to be had to the accompanying drawings, forming a part of this specification, wherein like portions in the several views of each form shown, are indicated by like numerals of reference.

In said drawings:

Figure 1 is a sectional side elevation of a blank valve body of flat seat formation.

Fig. 2 is a like view thereof after having received the initial step in my improved method.

Fig. 3 is also a like view of the valve seat portion thereof, after having received the second, or final step.

Fig. 4 is a plan view of the finished valve seat and its port.

Fig. 5 is a perspective of the cutting tool employed in performing the initial step.

Fig. 6 is a sectional side elevation of a blank valve body of annular seat formation.

Fig. 7 is a like view thereof, after having received the initial step in my improved method.

Fig. 8 is also a like view thereof, after having received the second or final step.

Fig. 9 is a sectional side elevation of an insertible flat seat member, in its blank formation.

Fig. 10 is a like view of the same, after receiving the initial step of our method.

Fig. 11 is a like view of the same, after having received the final step.

Fig. 12 is a plan view of the same, after receiving the final step.

Fig. 13 is a side elevation of a sleeve, as ported by my method, and

Fig. 14 is a side elevation of a tapered plug valve, as ported by my method.

Referring to the flat seated valve casing, as shown in Figs. 1 to 4 inclusive, the blank casting 15 is provided with either a cored or bored chamber 16 and, having the seat portion 16′ at the end thereof, of increased thickness upon its face.

In performing the initial step or operation, a punch cutting tool 17, provided with a tapered point 18, terminating in an angularly disposed sharp cutting edge 18′ or of a shape corresponding to that of the port, is forcibly caused to enter the under side of the seat 16′ transversely, as by a blow from a hammer, or by other impacting means, to form a port indent or cut 19, of corresponding form and depth, preferably without piercing the opposite seat side, as shown in Fig. 2, after which the tool is withdrawn.

The next, or final step in the operation is, to remove the surplus material from the face of the valve seat, to finish same by suitable means, to such depth as will expose the point of the indent, thus providing a port of the desired area, as in Fig. 3, which in this instance presents in outline the form of an acute triangle.

Referring to Figs. 6, 7 and 8, the blank 20 is provided with the chamber 21. In this instance, the tool is employed to initially cut transversely the port indent 21′, as shown in Fig. 7 after which the metal at the point of the indent, on the seat 22, is removed, as by boring, to uncover the same, thus providing a ported valve chamber.

Referring to Figs. 9, 10, 11 and 12, show-

ing an insert seat, the same steps are employed, that is, the blank member 23, Fig. 9, is provided with a cavity 24 beneath the seat portion, the tool being employed to first form the transverse indent 25, see Fig. 10, and then remove the excess metal on the seat portion proper, as shown in Fig. 11, to provide the ported seat shown in Figs. 11 and 12.

In the ported valve bushing 26, shown in Fig. 13, the port 27 thereof is first formed by cutting the port indent 27 transversely in the outer surface, and then removing metal from the interior 28 to uncover the indent and thus provide a communicating port.

In the ported plug valve 29, shown in Fig. 14, the same method of porting is employed, by first cutting the port indent 30 and then removing the surplus metal from the outer surface 31, thus providing a port extending therethrough.

It will be noted that the point of the tool for this form of indent is tapered on its sides to a wedge shape, with the cutting point inclined, the longer point portion entering first in forming the indent, and when finished the longer portion of the point will form the base portion of the acute angular shape.

In the drawings, I have shown the valve seats as each having a port of like contour, but it is evident that ports of other angular or elongated contour may be made, by providing a tool having a corresponding form of point.

The tool here shown for forming or shaping the indent, is one of simple form for hand use, but it is evident that any suitable tool may be mechanically or otherwise employed to cut or punch, stamp or otherwise form the port indent.

Again, it may be possible to puncture the valve seat and then remove the surplus metal therefrom, but it is found in practice that the indent gives better results, as it avoids possible injury to the seat, such as forming a fracture therein by the spread of the metal.

Furthermore, it will be obvious that the casings, seat inserts, etc., may be finished at parts thereof other than the seat portions before undergoing the steps in my method.

I have used the term "port" throughout the specification and claims, which is considered as equivalent to any form of angular or slit opening.

Such changes as above set forth, relative to forming the port, its shape, or other minor changes, I consider as within the scope of my invention.

What I claim is—

1. The method of porting valve seats or valves, which consists in initially shaping a transversely disposed port therein from the one side thereof by forcing the point of a port shaping tool therein, and finally finishing same by removing metal from the side opposite that where the tool entered.

2. The method of providing transverse ports in blank valve seats, which consists, while the seat is held stationary, in forcing into one side of the seat a sharp pointed cutting tool of a shape corresponding to that of the port, withdrawing said tool, and finally facing off the opposite side of the seat.

3. The method of forming angularly shaped ports in blank valve seats, which consists in positioning a cutting tool having a shape corresponding to the port at one side of the seat, then applying force to cause the tool to enter the seat, and then facing off the opposite side of the seat.

In testimony whereof I affix my signature.

ALBERT V. RIGBY.