Feb. 5, 1935. S. GADE 1,990,179

APPARATUS FOR MANUFACTURING CORES FOR VALVE BODIES

Filed Dec. 15, 1933 2 Sheets-Sheet 1

Fig:1

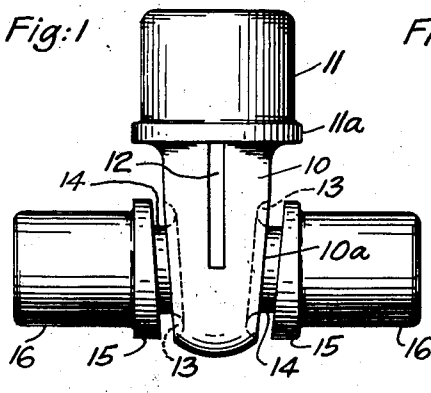


Fig:2

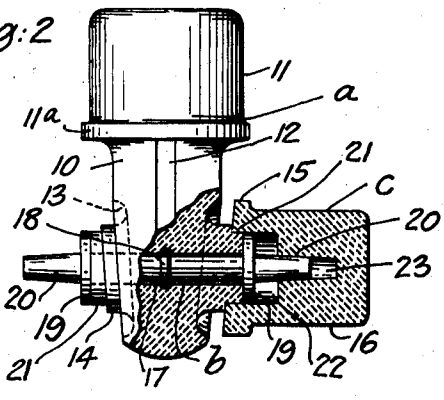
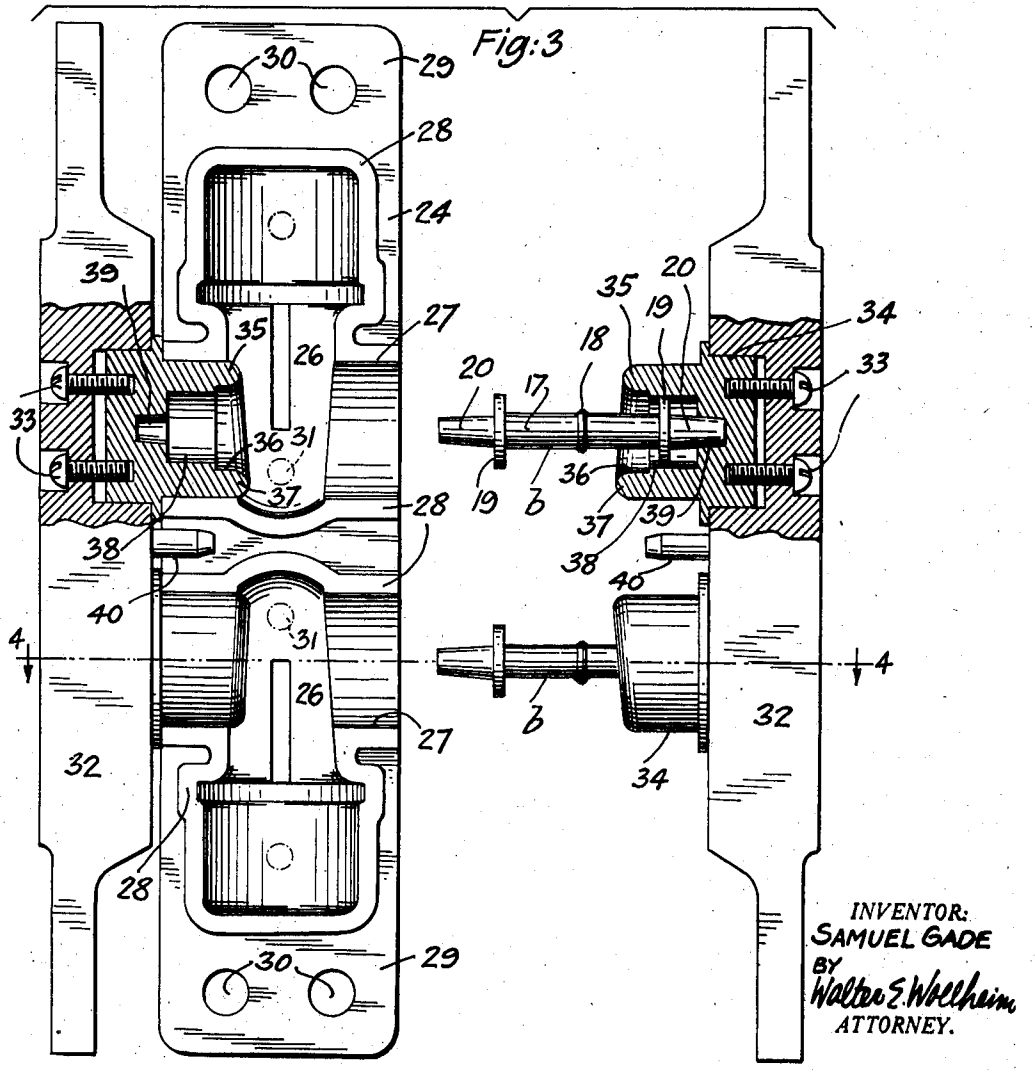


Fig:3



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Feb. 5, 1935. S. GADE 1,990,179

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Filed Dec. 15, 1933 2 Sheets-Sheet 2

Fig: 4

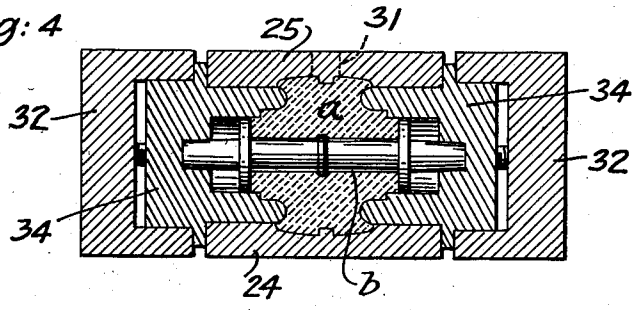


Fig: 6

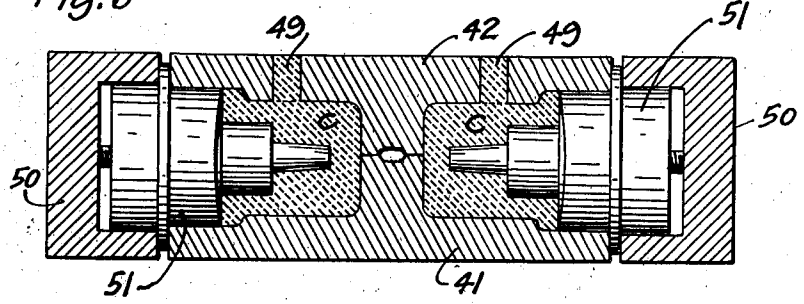
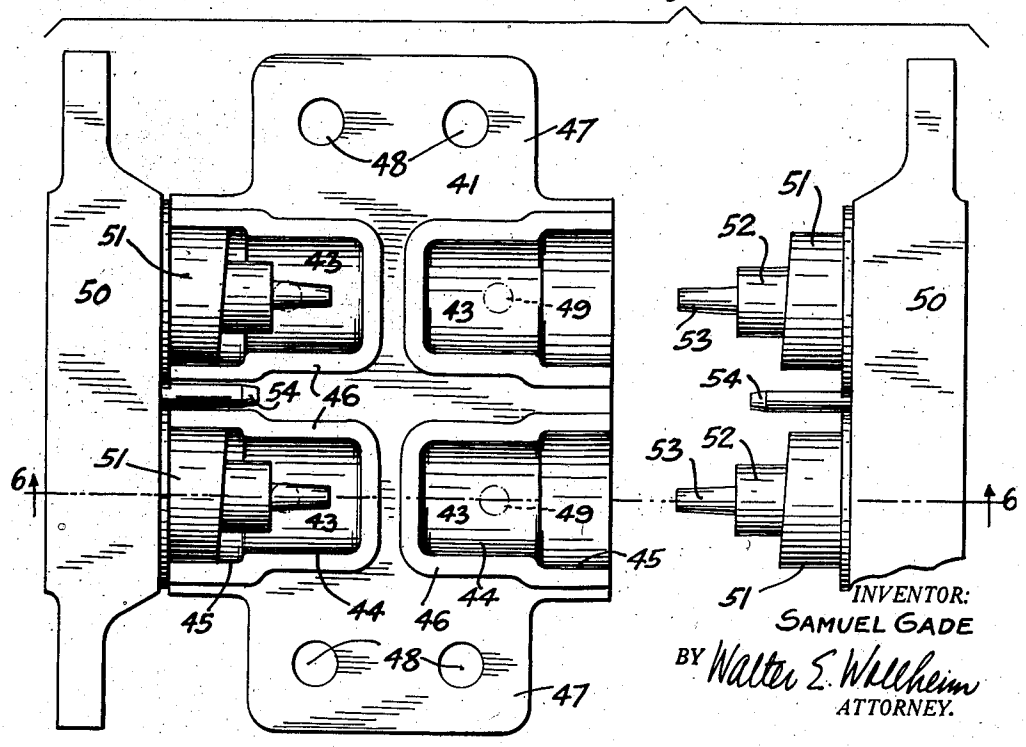


Fig: 5



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UNITED STATES PATENT OFFICE

1,990,179

APPARATUS FOR MANUFACTURING CORES FOR VALVE BODIES

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Application December 15, 1933, Serial No. 702,526

5 Claims. (Cl. 22—13)

This invention relates to processes used in making cores for valve bodies, particularly gate valve bodies and has for one of its principal objects to provide a process by means of which cores of this kind can be made rapidly and with the least percentage of breakage. Another object is the making of the cores with metal inserts that form those parts most easily broken. Still another object is to provide means for the use and application of these inserts that are easily manipulated and quickly handled. A further object is to arrange for the metal inserts within the cores in such a position that they may be used over again after the cores have been used for making castings. Still a further object is to use the process for the production of a single core when in its final form that easily can be inserted into the mold for casting purposes. Still other objects will become apparent in the following specification illustrated with the aid of the accompanying drawings, in which

Fig. 1 is an elevational view of a complete body core of a conventional gate valve made in accordance with my processes;

Fig. 2 is an elevational view of the same core having one of its end bushings removed and having a portion shown in sectional view;

Fig. 3 is a plan view of a corebox partly in section used for the production of the main part of the core with the upper half of its center section removed and one of its side members shown just prior to insertion into the central part of the box;

Fig. 4 is a cross sectional view along the plane of line 4—4 in Fig. 3, showing the corebox completely assembled with the core within it;

Fig. 5 is a plan view of a corebox partly in section used for the production of the end bushings with the upper half of its center section removed and one of its side members moved away from the center section to show its construction more clearly; and

Fig. 6 is a cross sectional view along the plane of line 6—6 in Fig. 5 showing the corebox completely assembled with the bushing cores within it.

Like characters of reference refer to similar parts throughout the several views and the following specification.

The core shown in Fig. 1 is that for a body of a conventional gate valve, the construction of which is well known in the art. 10 is the core for the central body portion proper having slightly tapering sides 10*a*. 11 is the core for the bonnet opening also serving as a core print or support, its enlarged section 11*a* providing thread clearance for a bonnet. 12 are grooves serving as guides for the separate valve member within such valves. Annular recesses 13 make the seat portions, and cylindrical core portions 14 form the inlet and outlet ports. 15 make recesses or clearances for the pipe threads at either end of the body, while cylindrical ends 16 serve as cores for the inlet and outlet ends of the body as well as core supports.

The core is made up of essentially four parts, namely the main core *a*, a central preferably metallic insert *b*, and two end bushings *c*, as is clearly illustrated in Fig. 2, in which for sake of clearness one end bushing has been omitted, and the main core is shown partly in section.

The insert *b* extends through the main core in axial alignment with its inlet and outlet ports. It consists of a central round part 17 within the main core 10, a web 18 in its center, and two circular disc-shaped flanges 19 at both ends. 20 are frusto-conical ends projecting outwardly of the flanges 19. Cylindrical core portions 14 at both sides of the main core 10 are slightly reduced in diameter at 21 to the size of flanges 19.

End bushings *c* are bored out at 22 to fit snugly over reduced core portions 21, and coaxially therewith at 23 to fit the conical ends 20 of the metal insert *b*, bushings *c* externally forming cylindrical ends 15 and 16 of the body core, as explained above.

24 is the bottom half, and 25 the top half of a central part of a corebox used to produce the main core *a*. In Fig. 3 a view of the bottom half only is shown. The style of corebox illustrated is of the so called mutiple type, that is more than one core can be made at one time. While I have shown a box making two cores at the same time, the number of cores can be greater being limited only by the facilities needed to handle the size of the box conveniently. The box shown has two impressions 26, each half having semi-cylindrical side portions 27. 28 are surfaces slightly raised over the body of each core half machined smoothly to form contacting surfaces for the two halves of the box, as is well known in the art. 29 are lugs projecting from the ends of the body of the corebox, provided with holes 30 for dowel pins. The upper half 25 of this central part of the box is exactly symmetrical with the lower half 24 just described except that in place of the holes 30, the lugs have dowel pins projecting therefrom to enter these holes. Moreover, the top half 25 is provided with sand inlets 31, the relative positions of which are shown in dash and dot lines in the lower half 24 in Fig. 3.

32 are side members disposed at both sides of the central box 24 and 25, each having fastened

thereto by screws 33 cylindrical plugs 34. These plugs are slidably fitted within the side portions 27 of the central box, projecting into the box at 35 and being hollowed out at 36 to form semi-circular ends 37 that conform in size and depth to the seats 13 and portions 14 of the main core 10. The plugs 34 are bored out further at 38 to a diameter about corresponding to that of the circular flanges 19, and still further at 39 to fit the conical ends of insert *b*. 40 are dowel pins engaging corresponding holes in either the top half 25 or bottom half 24 of the central part of the box.

In Fig. 5 is shown a multiple box to be used for making the end bushings *c*. A central part of the box consists of a lower half 41 and an upper half 42. Similarly to the view in Fig. 3, the upper half has been omitted. 43 are impressions in each half of the box having portions 44 and 45 to correspond to the outside diameters 15 and 16 of end bushings *c*. Raised contact surfaces 46 surround the impressions 43 and lugs 47 project from the ends of each half of the box, the lower one being provided with holes 48 for the reception of dowel pins forming part of the upper half. 49 are sand inlets into the upper half indicated in dash and dot lines in the lower half.

50 are side members at each side of the central part of the box, each having fastened thereto solid plugs 51, adapted to be fitted into impressions 43, defining the end of each of the bushings *c* within impressions 43. 52 is a cylindrical extension of plug 51 within the impression 43 corresponding in diameter and length to recess 22, and 53 is a conical extension corresponding to recess 23 of the bushing *c*. 54 are dowel pins engaging corresponding holes in either the top or bottom half of the central part of the box.

My process for making gate valve cores by means of the coreboxes and other instrumentalities described, is as follows.

The metal inserts *b* are placed within one of the side members as shown in Fig. 3. The upper and lower halves 25 and 24 of the central part of the main box having been closed and the other side member having been placed in the position shown, the first mentioned side-member with the metal rods *c* in place is then inserted to close the box, as shown in Fig. 4. In this closed position, the box is placed on one of the core-making machines well known in the art, and sand is forced into the box through inlets 31 filling the box with sand up to the opposed faces of flanges 19 of the insert *c*. The side members 32 are then withdrawn and the upper half 25 of the central part of the box is lifted off, and the lower part 24 with the core with its insert *c* in place is put into a core oven to dry.

Similarly end bushings *c* are made by assembling the top half 42 and bottom half 41 of the central box and side members 50, as is clearly shown in Fig. 6. In this position sand is blown into the box through inlets 49. These cores are also dried in a core oven while resting upon the lower half 41 of the central box after having removed its upper half 42 and its side members 50.

After the main and end cores are dried, the end core or bushings *c* are pasted upon the reduced ends 21 and fitted over flanges 19 and ends 20 of the insert *b*, thus completing the main body core of a gate valve.

After bodies have been made from cores made according to my invention, the metal insert can easily be reclaimed when shaking out the core sand from completed bodies.

Cores made in accordance with this process are easily made. Instead of the usual loose pieces, requiring delicate handling and skilled labor, the cores can be made by comparatively unskilled help. While ordinarily the projecting portions from the main core over which the end bushings are placed, were made of sand and were subject to an extraordinary high loss due to breaking these small ends when handling, these projecting ends now being of metal, can be handled quite roughly, thus reducing the percentage of loss to a practical minimum.

While I have mentioned the inserts *c* to be made of metal, it is conceivable that other materials may be used, as long as they are harder than sand so that they do not break as easily, the designation "metal" therefore should not be interpreted too literally, but quite broadly. Moreover, while I have illustrated the application of my process to the common form of gate valves, it is obvious that the same may be used in connection with other forms of valves where similar conditions exist. Furthermore, while the design of corebox is specially adapted for use on core-making machines, it is understood that the same may be modified to suit hand operation. I therefore want it to be understood that various changes in form, proportions, minor details and combination of parts may be resorted to as well as in the steps of the process in its details, without departing from or sacrificing any of the advantages of the invention as defined in the appended claims.

What I claim as new, is:

1. A corebox for gate valve bodies consisting of a split central box and side members, metal inserts across core impressions in the central box supported by the said side members, the side members having bushings partially projecting into the said central box defining seats in the gate valve body.

2. A corebox for gate valve bodies consisting of a split central box and side members, bushings in the said side members partially projecting into the said central box defining seats in the gate valve body, and metal inserts across core impressions in the central box supported by the said bushings.

3. A corebox for gate valve bodies consisting of a central box having an upper and lower half with core impressions therein having side openings, side members adapted to close the said openings, bushings fastened to the said side members and projecting through the side openings partially into the impressions in the said central box defining seats in the gate valve body, and elongated metal inserts across the said core impressions supported at both ends within the said bushings.

4. A body core for gate valves comprising a main central core, a metal insert having flanges across the central core coaxial with inlet and outlet ports of the valve, the said main central core being disposed between the said flanges, and end cores defining inlet and outlet ports of the valve fastened over ends of the metal inserts and portions of the main core.

5. A metal insert for body cores for gate valves comprising a central round section adapted to be placed within the core, circular flanges to define the ends of the core, and frusto-conical ends projecting from each of the circular flanges for supporting end cores thereupon.

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