Sept. 15, 1964 F. H. GROEN, JR., ETAL 3,148,695

BALL VALVE

Filed June 14, 1963

Fig. 1.

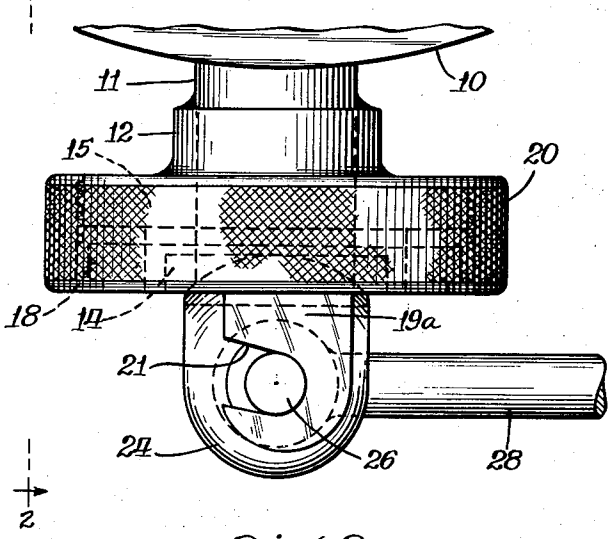
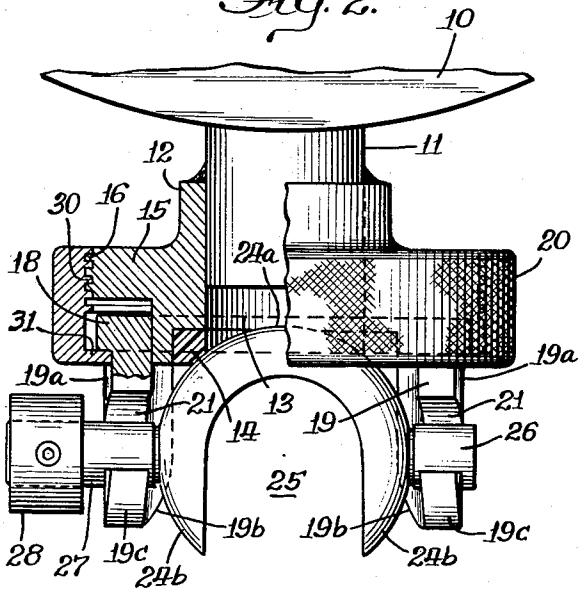


Fig. 2.



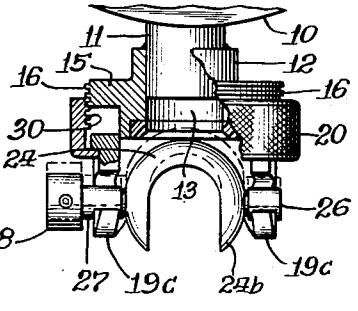
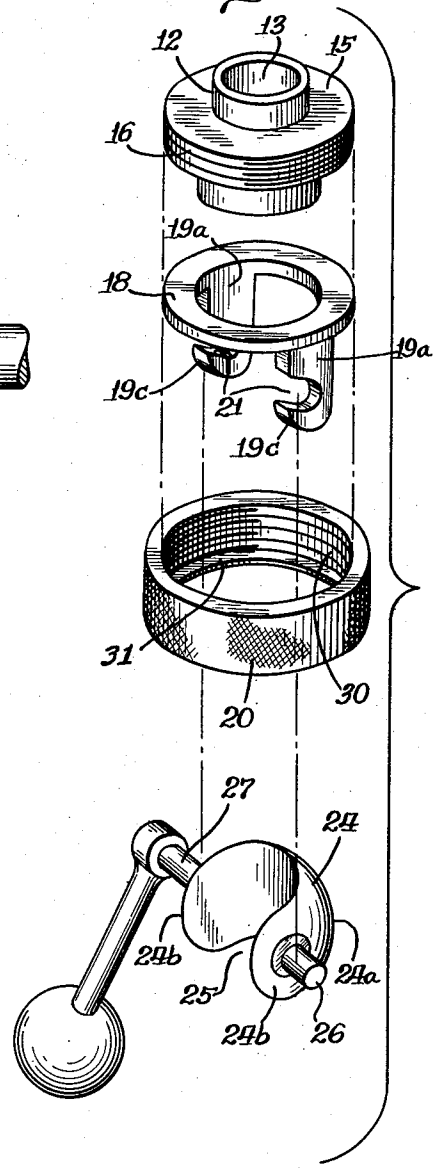


Fig. 3.

Fig. 4.



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United States Patent Office 3,148,695 Patented Sept. 15, 1964

3,148,695

BALL VALVE

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Filed June 14, 1963, Ser. No. 287,872
5 Claims. (Cl. 137—315)

The present invention relates to a ball valve characterized in that it is readily disassemblable for effective cleaning, and the following disclosure thereof is offered for public dissemination upon the grant of a patent therefor.

In many installations an important feature of a valve is the ability to clean it after use. The ability to clean it is directly related to the extent to which all of the parts are readily accessible, or conversely, the extent to which there are hidden pockets or parts which may not easily be reached for cleaning. For example, in a draw-off valve for a cooking vessel as for example a jacketed food cooking kettle such as is illustrated in Patent No. 2,792,941 or 2,328,210, a valve is employed to hold the foods to be cooked in the kettle. After use and after the contents of the kettle have been removed, it is important for sanitation purposes that all parts which would contact the foods during subsequent use be thoroughly cleaned. These parts would include the valve through which at least part of the food contents of the kettle would be discharged.

The principal object of the present invention is to provide a valve for this and other applications. The valve of this invention is characterized by the fact that it may be readily disassembled for cleaning. No tools are required to perform this operation or to reassemble the valve. Upon being disassembled, there are no hidden pockets or crevices which are not easily cleaned. The disassembled parts may be put in a dish-washer or the like for cleaning. The single part remaining on the kettle may be as easily cleaned as can be the remainder of the kettle. As a matter of fact, as compared to prior valves, it is remarkably easy to clean even without disassembly. From the illustrated embodiment, there are no hidden pockets within the valve in areas which would be contacted by the contents of a kettle to which the valve was affixed. One can see completely through the valve to determine whether or not the inside is adequately cleaned and unobstructed. While the present invention is described particularly in connection with its application to cooking kettles, this is not to infer than this is the sole application therefor.

Another feature of the invention is the ability to tightly seal the discharge opening of the valve. As a matter of fact, the valve may be tightened to obtain a secure seal much in the manner in which a globe valve is securely closed. For applications where relatively low pressures are controlled, a relatively low pressure contact between the ball and the seat may be maintained. This permits the valve to be easily operated with little wear on the parts even after long service. For applications where the control of pressures substantially above atmospheric is required, this may be achieved by increasing the contact pressure between the ball and its seat.

When used on a processing or cooking vessel, the fact that the valve is closely coupled to the vessel can be important to the user. In the first place there is little space or head room lost by the presence of the valve. No less significant is the point that there is not a large pocket to catch and hold a part of the contents of the vessel. For example, when the contents are individually put into the vessel, the one that is first in will fill the bottom pocket. Should this pocket be deep as is the case with a valve that cannot be closely coupled, the initial ingredient which fills the pocket may not properly or adequately mix with the remaining ingredients.

An additional important feature is that when the valve is initially opened or only just cracked for a partial flow, the flow will be directly downwardly. This is achieved by reason of the U shaped configuration of the ball forming the closure member. Without this feature the contents of the vessel would be directed to one side, rather than directly down, when the valve was only partially open.

Further objects and advantages will become apparent from the following description taken in conjunction with the drawings in which:

FIGURE 1 is an elevation of an embodiment of the invention;

FIGURE 2 is an elevation as viewed at line 2—2 of FIGURE 1 with portions broken away;

FIGURE 3 is a view similar to FIGURE 2 showing the initial stage of disassembly of the valve; and

FIGURE 4 is an exploded view of the valve.

Although the following disclosure offered for public dissemination is detailed to ensure adequacy and aid understanding, this is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how others may later disguise it by variations in form or additions or further improvements. The claims at the end hereof are intended as the chief aid toward this purpose; as it is these that meet the requirement of pointing out the parts, improvements, or combinations in which the inventive concepts are found.

In FIGURES 1–3 an embodiment of the invention is shown mounted on the bottom of a kettle or the like generally **10** having a discharge pipe **11**. The body **12** of the valve is fixed to discharge pipe **11** as by means of welding. An opening **13** in the body extends between the two ends thereof. An annular seat **14** is secured to body **12** and forms a part thereof at the external end of opening **13**. Body **12** has an external annulus **15** with threads **16** about the periphery thereof.

Slidably received on body **12** between the external end thereof and annulus **15** is a ring **18**. The outside diameter of ring **18** is smaller than the external diameter of annulus **15**. Ring **18** has a pair of supports **19** secured thereto. These supports are positioned at opposite sides of opening **13** and project away from the body of the valve. The non-adjacent sides **19***a* of supports **19** are spaced a distance apart that is smaller than the diameter of ring **18**. To permit the collar **20** to be received about the supports, as hereinafter described, the supports are curved as seen at **19***b*. Each support has a slot **21** therein which slot defines a hooked finger **19***c* at the projecting end of the support.

A modified ball **24** is positioned against seat **14** to close opening **13**. Ball **24** has a slot **25** therein whereby the ball is generally U shaped in cross sectional configuration with a semi-spherical base **24***a* and two sides **24***b*. Trunnions **26** and **27** are secured to and project from sides **24***b* respectively. The trunnions extend into slots **21** of supports **19** and are journaled in the supports. A handle **28** is affixed to trunnion **27**.

Collar **20** has internal threads **30** which engage threads **16** of annulus **15**. The collar also has a flange **31** that overlies ring **18** between the periphery of the ring and supports **19**.

As will be apparent, opening **13** is opened or closed by rotating ball **24**. When ball **24** is positioned as illustrated in FIGURES 1 and 2 so that the semi-spherical base **24***a* is in full contact with seal **14**, the valve is closed. By rotating ball **24** to move slot **25** thereof more or less into registry with opening **13**, the valve may be opened to any desired degree. Seat **14** is formed of a touch plastic having a low coefficient of friction. A plastic particularly suited for this purpose is polymerized tetrafluoro ethylene such as that sold under the trademark Teflon. By screwing collar **20** further onto body **12**, flange **31** draws ring

18 toward annulus 15. This increases the contact pressure between ball 24 and seat 14. Conversely loosening collar 20 will decrease the contact pressure of the ball on its seat.

When it is desired to disassemble the valve for cleaning, collar 20 is unscrewed to an extent such that there is sufficient clearance to permit trunnions 26 and 27 to be moved in slots 21 and out of the supports. This is illustrated in FIGURE 3. This manipulation may be performed before collar 20 is completely disengaged from annulus 15 although this is not necessary. In any event collar 20 may be completely disengaged from annulus 15. With trunnions 26 and 27, and ball 24, removed from supports 19, collar 20 may be separated from ring 18 as seen in FIGURE 4. The ball, ring and collar now may be placed in a dishwasher for example for cleaning. While body 12 remains mounted in place, it will be apparent that it has no hidden crevices or parts that are difficult to wash.

The parts of course are reassembled in the reverse order in which they were removed. First collar 20 is slipped over ring 18. After this is done, the trunnions of the ball may be reseated under hooked fingers 19c, either before or after the collar is threaded onto annulus 15.

The invention claimed is:

1. A ball valve which may be readily disassembled for cleaning comprising: a body having one end adapted to be fixedly mounted, said body having a fluid opening therethrough from said one end to the other end, a seat about said opening at the other end, and engaging means on the periphery of said body about said opening; a ring movably mounted on the body about the opening, said ring having external abutment means; a pair of support members attached to said ring, positioned at opposite sides of said opening and projecting away from the body; a collar surrounding the ring, said collar having internal abutment means abutting said external abutment means and engaging means releasably engaging the engaging means of the body; and a ball in contact with said seat and closing said opening, said ball having trunnion members projecting from two sides thereof and journaled in said support members, and an opening through the ball normal to the trunnion members; said members having means to permit the trunnion members to be separated from the support members; whereby by releasing said collar from said body and the trunnion members from the support members, the ball, collar and ring may be readily disassembled from the body for cleaning.

2. A valve as set forth in claim 1, wherein said opening in the ball is a slot with the ball being generally U shaped in cross section, and said engaging means are threads.

3. A valve as set forth in claim 1, wherein said means of said members comprises a slot in each support member and receiving a trunnion member, said slots extending from a side of each support member.

4. A ball valve which may be readily disassembled for cleaning comprising: a body having two ends with an opening extending therebetween, a seat about said opening at one of said ends, and an annulus extending outwardly about the body between the two ends, the periphery of said annulus being threaded; a ring movably mounted about said body between said end and said annulus, said ring having an external diameter less than that of the annulus; a pair of supports affixed to the ring, positioned at opposite sides of the opening, and extending away from the body, the non-adjacent sides of the supports being spaced apart a distance smaller than the external diameter of the ring, each support having a slot parallel to said sides and defining a hooked finger at the projecting end of the support; a ball having a slot therein with the ball being generally U shaped in cross section with two sides and a semi-spherical base, said base being seated on said seat and closing the body opening; trunnions projecting outwardly from the ball sides and journaled in said supports at the slots therein; and a collar about said ring and annulus, said collar having internal threads engaging the annulus threads, and an inwardly projecting flange overlying said ring between said supports and the periphery of the ring.

5. A valve as set forth in claim 4, wherein said seat is defined by an insert of a tough plastic having a low coefficient of friction; and including handle means affixed to one of said trunnions.

References Cited in the file of this patent

UNITED STATES PATENTS

676,526	Anderson	June 18, 1901
1,784,381	O'Stroske	Dec. 9, 1930