Oct. 12, 1926. 1,603,123

O. C. KUEHNE

VALVE

Filed July 27, 1925 2 Sheets-Sheet 1

Fig. 1.

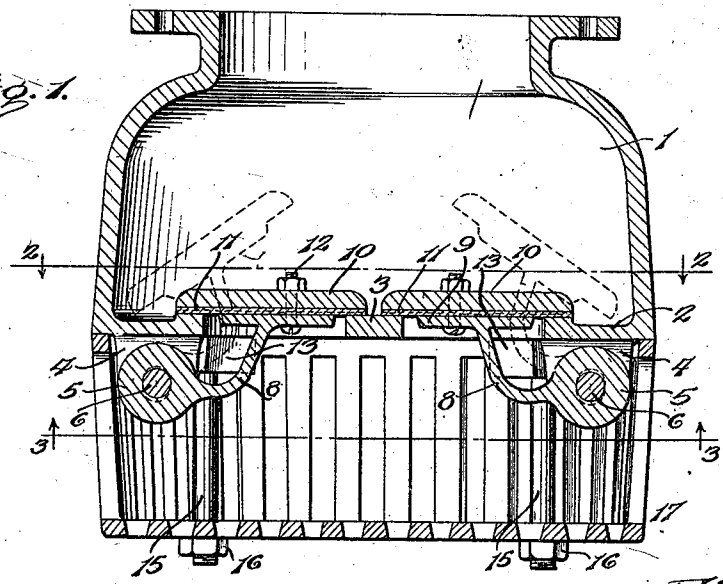
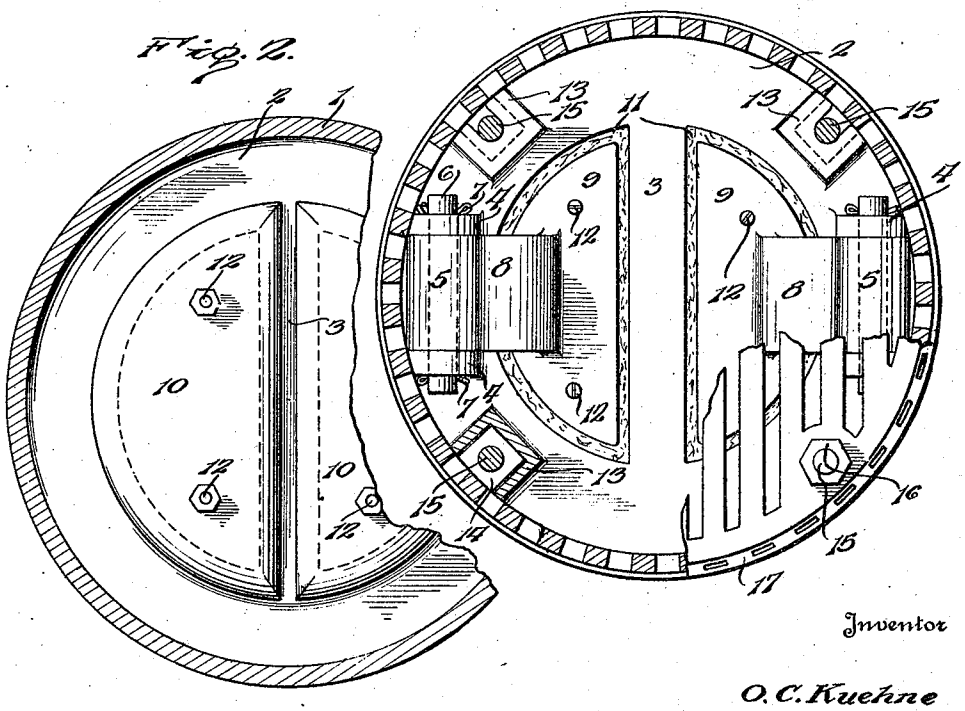


Fig. 3.

Fig. 2.



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Filed July 27, 1925 2 Sheets-Sheet 2

Fig. 4.

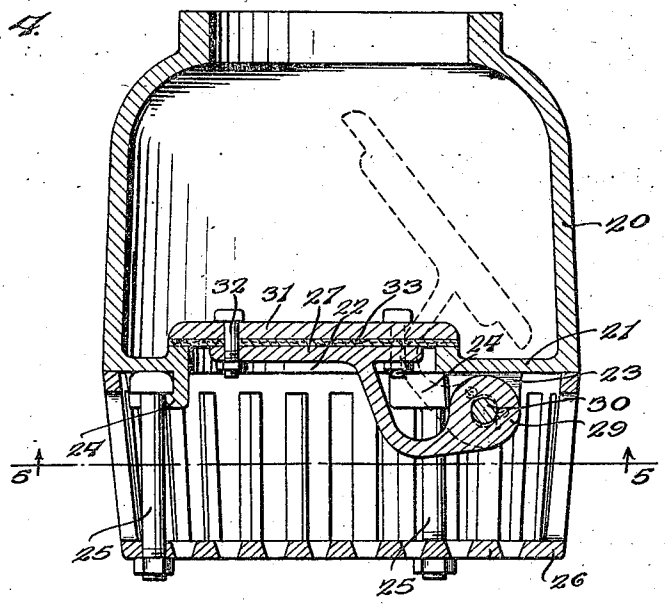
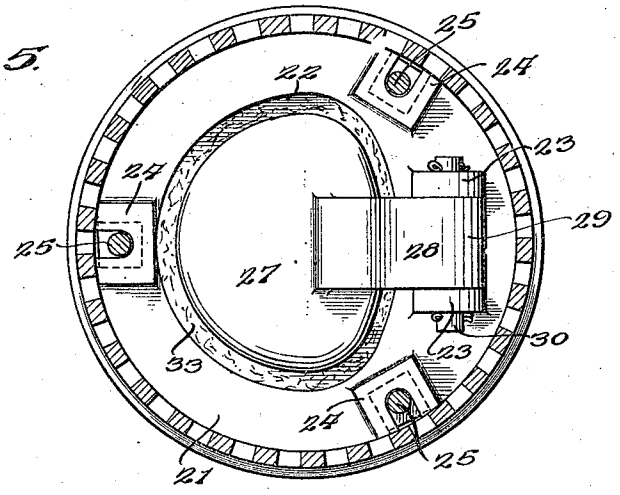


Fig. 5.



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UNITED STATES PATENT OFFICE.

OSCAR C. KUEHNE, OF SAN ANTONIO, TEXAS.

VALVE.

Application filed July 27, 1925. Serial No. 46,472.

This invention relates to foot valves which are employed at the lower end of a suction tube to control the flow of water drawn from a well or tank. The present invention has for its object the provision of a valve structure in which machining of parts will be minimized and substantially eliminated; in which it will not be necessary to break joints in renewing the packing upon the seating face of the valve and in which the working parts will be so disposed as to give maximum capacity. Other objects of the invention will appear incidentally in the course of the following description, and the invention resides in certain novel features which will be particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a vertical diametrical section of a valve structure embodying my present invention and including two valve plates or seating members;

Fig. 2 is a horizontal section on the line 2—2 of Fig 1;

Fig. 3 is a bottom plan view with the strainer in section on the line 3—3 of Fig. 1;

Fig. 4 is a vertical diametrical section of another embodiment of the invention in which only a single valve plate or seating member is employed, and

Fig. 5 is a horizontal section on the line 5—5 of Fig. 4.

Referring more particularly to the drawings, the reference numeral 1 indicates a valve body which may be secured to the lower end of a pump or suction tube in any convenient or preferred manner. This valve body is cast at its lower end with an inwardly projecting annular rim 2 constituting a valve seat and the said rim is bridged by an integral diametrical bar 3. On the under side of the rim or valve seat 2 and diametrically opposite are depending lugs 4 which are arranged in pairs and constitute hinge members for supporting the swinging valve plates. Disposed between the lugs of each pair is a sleeve or hub member 5 and extending through the bore of said sleeve or hub member and through the adjacent lugs 4 is a hinge pin 6 which may be retained in its operative engagement with the said lugs and sleeve or hub by any preferred means, such as the cotter pins shown at 7. Upon referring to Fig. 1, it will be noted that the bore of the lugs 4 is elliptical with its major axis normally extending vertically, as shown by dotted lines, this formation of the bore permitting ready compensation for wear upon the leather or facing of the valve seating member. Each hub or sleeve 5 is formed at the lower outer end of an arm 8 which extends inwardly and then upwardly, as clearly shown in Fig. 1, and is formed integral with the lower valve plate 9, the said plate being sector-shaped, as shown most clearly in Fig. 3, whereby it will fit within the opening defined by the bar 3 and the annular portion of the valve seat 2. Arranged over each lower plate 9 and of the same outline but of greater area is an upper valve plate 10, the edges of which are adapted to project over and rest upon the valve seat, a facing 11 of leather, rubber, fiber or other suitable material being disposed between the plates 9 and 10, as clearly shown, and the said facing and the two plates being securely fastened together by bolts 12 inserted therethrough in an obvious manner.

On the under side of the valve seat 2 and spaced from each other and from the lugs 4 are channeled open-sided lugs 13 which are adapted to receive the heads 14 of bolts 15 which secure the strainer 17 to the valve body 1, nuts 16 being fitted upon the lower ends of the bolts to be turned home against the bottom of the strainer, as will be understood. It will be noted that the open sides of the lugs 13 are presented outwardly so that, when the parts are assembled, the strainer will serve to retain the bolts within the lugs and the lugs, in turn, will serve to maintain the strainer in axial alinement with the valve body. This arrangement also obviates the formation of external flanges or attaching rims upon the valve body and the strainer so that the external diameter of the structure is reduced and there are no projections to interfere with or retard the descent of the device through a well or well casing.

The strainer may be of any approved design and may be omitted if the device is being used in clear water.

It is to be particularly noted that the valve plates or disks are supported pivotally at points below the valve seat and as a result of this arrangement the valves move more quickly to the side of the seat than is the case in previously used devices where the valves are pivoted above the seat or on the seat. This feature of my improved valve

gives a vastly increased open space through which the water may flow so that the capacity of the valve is much greater than in prior devices. It is further to be noted that in my present construction it is not necessary to machine any parts and no gaskets between the valve body and the strainer are needed inasmuch as the valve seat is integral with and on the inner side of the valve body or casing. It is not necessary to break any joints when renewing the leathers or other packing on the valve disks or plates inasmuch as the valve is accessible from the bottom, if the strainer be removed, and it is necessary merely to remove the few small bolts by which the valve disks are held together. In assembling the valves, the sector shape of the openings is advantageous inasmuch as the upper valve plate or disk is inserted through said opening with its lesser dimension presented to the length of the opening so that it is easily inserted therethrough and then turned to rest upon the lower plate.

The form of the invention shown in Figs. 4 and 5 differs from the form shown in Figs. 1, 2 and 3 and previously described mainly in employing a single valve disk instead of two valve disks. In these figures, the valve casing 20 is of the same general form as the first described valve casing and may be secured to the suction tube of the pump in any desired manner. At the lower end of the casing 20 is an integral inwardly projecting valve seat 21 having an elliptical or oval opening 22 formed therethrough. On the under side of the valve seat are lugs or ears 23 constituting hinge members and also channel lugs 24 corresponding in all respects to the lugs 13 in the previously described form. Bolts 25 are carried by these channel lugs and serve to secure the strainer 26 to the valve casing. The valve comprises a lower plate 27 formed integral with a curved arm 28 extending downwardly and outwardly and terminating in a hinge sleeve or hub member 29 disposed between the lugs 23 and suspended thereon by a pintle or pivot pin 30 inserted therethrough. The valve is completed by a disk or plate 31 of elliptical or oval outline to rest upon the seat 21 and secured to the plate 27 by bolts 32, a packing or facing 33 of leather or other suitable material being interposed between the plates 27 and 31. The operation of this embodiment of the invention is the same in all respects as that previously described.

Having thus described the invention, I claim:

1. A foot valve comprising a valve casing having an inwardly projecting valve seat, depending hinge lugs on the under side of the valve seat, a valve disk adapted to rest on the upper side of the valve seat and cover the opening therethrough, and a member carrying said valve disk and including a hub portion pivotally supported by and between said hinge lugs, said hub portion being bodily movable toward and from the valve seat to vary the distance between the seat and the center of the hub portion and compensate for wear.

2. A foot valve comprising a valve casing having an inwardly projecting valve seat, depending hinge lugs on the under side of the valve seat, a valve disk adapted to rest on the upper side of the valve seat and cover the opening therethrough, and a member carrying said valve disk and including a hub portion pivotally supported by and between said hinge lugs, the bore through said lugs being substantially elliptical with its longer diameter normally vertical.

3. A foot valve comprising a valve casing having an inwardly projecting valve seat at its lower end, a valve disk hingedly supported on the under side of the valve seat and adapted to rest on the upper side of said seat and cover the opening therethrough, channel lugs on the under side of the valve seat having their open sides presented outwardly, a strainer bearing against the lower end of the valve casing and covering the outer open sides of said lugs, and bolts having their heads engaged in said channel lugs and their lower ends fitted through the bottom of the strainer and equipped with means for securing the same.

In testimony whereof I affix my signature.

OSCAR C. KUEHNE. [L. S.]