May 2, 1967 J. FRIEDMAN ET AL 3,316,937

SIX-WAY SWIMMING POOL FILTER VALVE

Filed Jan. 14, 1965 2 Sheets-Sheet 1

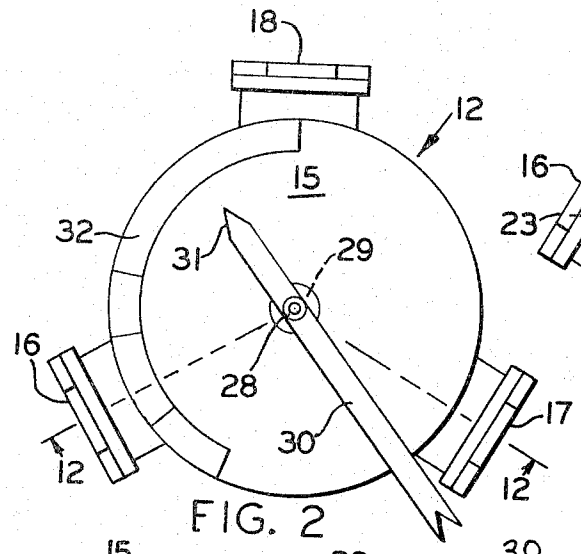

FIG. 2

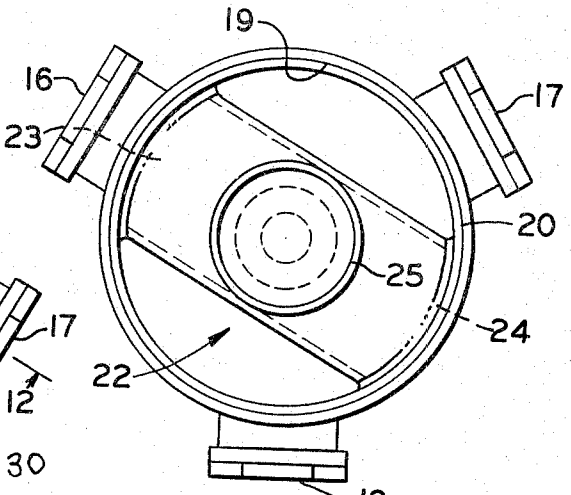

FIG. 3

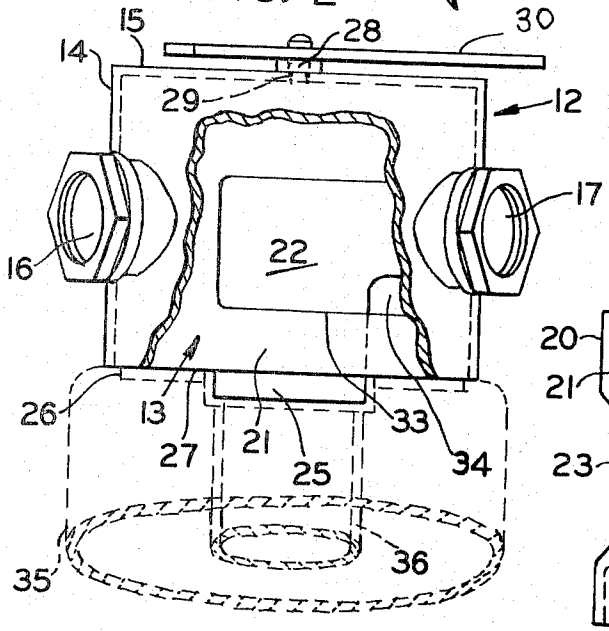

FIG. 1

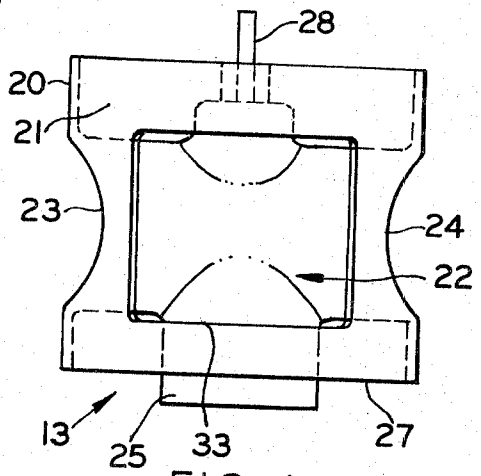

FIG. 4

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SIX-WAY SWIMMING POOL FILTER VALVE

Filed Jan. 14, 1965 2 Sheets-Sheet 2

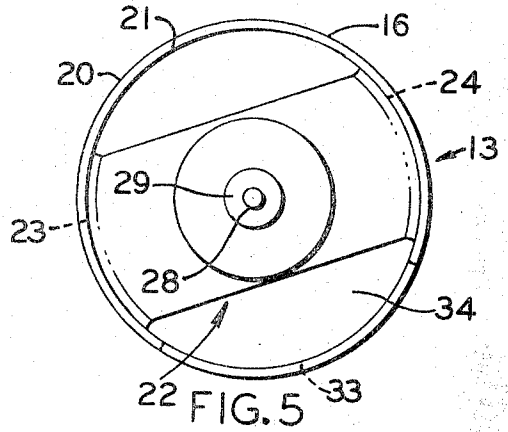

FIG. 5

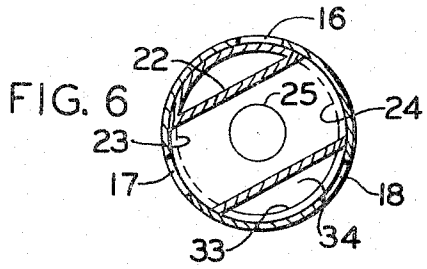

FIG. 6

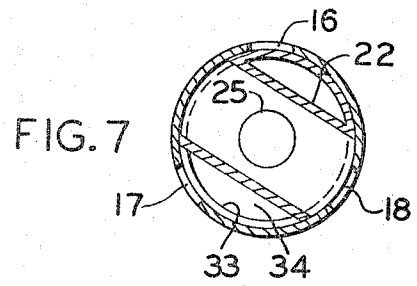

FIG. 7

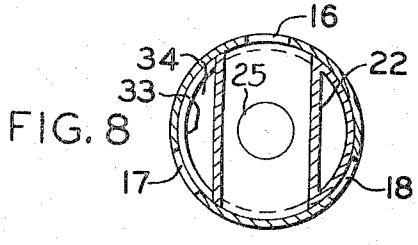

FIG. 8

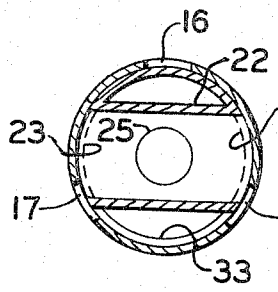

FIG. 9

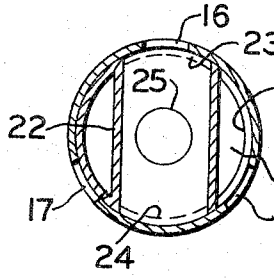

FIG. 10

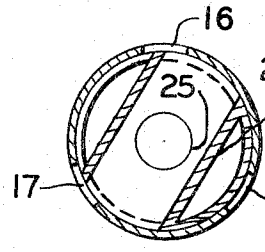

FIG. 11

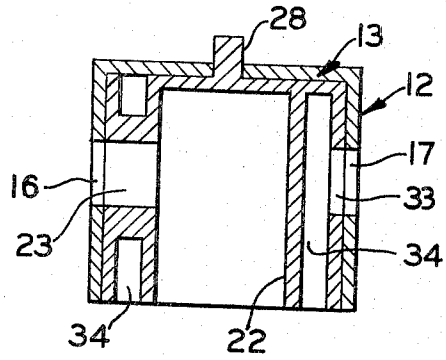

FIG. 12

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SIX-WAY SWIMMING POOL FILTER VALVE

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Filed Jan. 14, 1965, Ser. No. 425,406
2 Claims. (Cl. 137—625.29)

This invention deals with a valve suitable for swimming pool filters, water softeners, and the like, and having a six-way action. More specifically, it relates to a three-outlet cylindrical valve body having a rotary inner slide carrying an outlet and an inner pipe T, and designed to be flanged on to the container on which it is to operate.

A number of valves have been designed and used in the art which have multiple action operation and which have been used in the operation of swimming pool filters, water softeners, and the like. Unfortunately, they have a number of disadvantages, which include bulkiness, use of outside elbow connections, complexity, uncentered water feed, necessity for air bleed lines, and the like. Furthermore, they do not adapt themselves readily to a flanged installation without use of awkward auxiliary equipment.

According to the present invention, a six-way valve is provided which avoids these disadvantages, and which has the further advantage of low cost, ease of operation, as well as other advantages to be mentioned further in the discussion thereof. The invention will be more readily understood by reference to the accompanying drawings in which a preferred embodiment is described, as applied to a swimming pool filter, and in which FIGURE 1 presents a front elevational view, partly cut away, of a valve made in accordance with the present invention. FIGURE 2 illustrates a top or plan view thereof, while FIGURE 3 shows a bottom view thereof. FIGURE 4 depicts a side elevational view of the rotary slide disposed within the valve, and a top view of said slide is shown in FIGURE 5. FIGURES 6–11 show schematic views of the valve and its slide disposed in various positions to indicate the backwash, filter-to-waste, normal filtering, pump-to-waste, closed and recirculation positions, respectively. FIGURE 12 illustrates a schematic cross-sectional side view along the planes of lines 12—12 of FIGURE 2, depicting the slide in normal filter position. The same numerals refer to similar parts in the various figures.

Referring again to the drawing, numeral **12** indicates generally the outer housing of the valve, while numeral **13** indicates generally the inner rotary slide disposed therein. Housing **12** consists of a cylindrically-shaped body or chamber **14** having a top cover plate **15**. Body **14** has three equally-spaced openings or outlets, the pool opening **16**, the pump opening **17**, and the waste opening **18**. The inside cylindrical surface **19** of body **14** is ground to fit closely the greased and ground outer surface **20** of rotary slide **13**.

Slide **13** comprises a cylinder **21** closely fitting within cylindrical body **12**, and designed to rotate axially therein. Mounted within cylinder **21**, is a pipe T **22** having oppositely-disposed pipe outlets **23** and **24**, and an interconnected vertically-disposed outlet **25**. T outlets **23** and **24** penetrate cylindrical wall **20**.

A shaft **28** is attached to central portion **29** of slide **13** at the top of slide **13** or T **22**, and it projects, in outside sealing relation, through hole **29** in the cover plate **15** of body **12**. Attached to the outer projecting end of shaft **28**, and desirably in spring-loaded relation to the top of cover plate **15**, is handle **30**, one end **31** of which serves as an indicator to indicate the position of the rotary slide, as specified on dial **32**. Thus, as valve handle **30** is turned, rotary slide **13** is turned within body **12**, and the six flow or shut-off positions possible with the valve are determined by the position of slide **13** within body **12**.

Slide **13** also has an opening **33** cut out in an area between T openings **23** and **24** which, when slide **13** is properly rotated, enables liquid to pass therethrough from any of the body openings **16**, **17** or **18**, passing through the wall **20** of slide **13**, and around the outside of T **22** through space **34** within the slide.

The bottom **26** of body **12** is generally flanged, or otherwise connected, to a tank or other vessel **35**, such as the open top of a swimming pool filter, while the bottom of T outlet **25** is connected to a pipe, such as pipe **36** which may lead to the bottom of the filter (not shown).

Thus, it is seen that when slide **13** is rotated so that liquid flows from any one of body openings **16**, **17** or **18** into T opening **23** or **24**, the liquid will flow through the T and through pipe **36**. However, when slide **13** is rotated so that liquid flows through opening **33** in its side, then liquid flows around the outside of T **22**, through vessel **35** and around the outside of pipe **36**. Intermediate positions of the slide also are possible for bypassing purposes, as will be outlined further.

The operation of the valve during the use of a swimming pool filter can be outlined, for example, as follows: First the pool filter is assembled, the motor and pump are connected, and the conventional sand and gravel filter material are inserted into the filter tank **35**, and tube **36**, leading from the center bottom of the tank **35**, is connected to T opening **25**, in slidable but in outside-sealing relation and the bottom **26** of body **12** of the valve is connected in outside sealing relation to tank **35**. Thereafter, a backwash operation is effected to rid the sand bed of dirt and other foreign material, such as undesirable chemicals. In this operation, the valve elements are positioned as in FIGURE 6, wherein water is pumped through opening **17**, through T **22**, to the bottom of tank **35**, and then up through the sand to the top of the filter tank and out through space **34** around T **22**, and out through waste outlet **18**.

After the water appears clean, the valve is positioned as in FIGURE 7, wherein water is pumped through opening **17**, then through space **34** around T **22**, down through the filter in tank **35**, then through tube **36** and T opening **25**, and out through waste opening **18**. This operation cleans out the dirt in the bottom of the sand bed in tank **35**, and also settles the sand bed.

Then, when the water is clear and free of impurities, the valve is set for normal filtering operation, as in FIGURE 8, wherein water is pumped through opening **17**, then through space **34** on the outside of T **22**, to the top and down through the sand in the filter in tank **35**, then back up through tube **36** and T **22** and out through opening **16**, to the pool. When the pressure gauge, or other indicating instrument, shows that the filter is becoming clogged with impurities, the valve is positioned into backwash operation, as in FIGURE 6, until the waste water appears clean.

Thereafter, the valve is set for a short period as in FIGURE 7 to settle the sand bed, etc., and then to the normal filter operation, as in FIGURE 8. If a lowering of the pool level is desired, the valve is positioned as in FIGURE 9 wherein the filter is by-passed and water is pumped through opening **17** and through both T outlets 23–24 and also through space **34** around the T, thence through waste opening **18**. The closed position, for closing off the pump, is shown in FIGURE 10.

The valve also can be set into a recirculating position wherein the water is pumped through opening **17** and around and through T **22**, then out through pool outlet **16**. This operation is useful in mixing chlorine chemicals or other purifying material in the pool.

In order to operate the filter successfully, it is necessary, from time to time, to draw off air which accumulates at the top of filter tank **35**, as, otherwise, full efficiency of

he filter is not utilized. With conventional valves, this s done by bleeding air through a copper tube connected rom the top of the tank to the valve body. In the pres-nt case, such a tube and pipe are not necessary, since air s easily vented into the pool by use of a small hole in pipe 36 near the top of tank 35.

From the foregoing, it is apparent that a highly ver-satile valve is provided which, in spite of its multitudinous applications, is fairly simple in construction and is reason-ably low in cost.

We claim:

1. A valve, of the type described, and designed to be attached to a tank opening provided with a generally-centrally disposed tube, comprising,

a hollow cylindrical body open at the bottom for attachment to a tank opening, and having a top, and having three substantially equally-spaced openings in the cylindrical wall,

a cylindrical rotary slide axially disposed within said cylindrical body in close-fitting fluid-sealing relation therewith,

a pipe T mounted diametrically across the center of said slide and having its in-line outlets emerging from the cylinder wall thereof in outside sealing relation therewith and in register with a body opening, with

the angled outlet directed downwardly for movable connection to a central tube of a tank,

an aperture in the cylindrical wall of said slide between the two T outlets and of size and spacing adequate to enable fluid flow through a body opening and through said aperture, or through a body opening and through the aperture and a T outlet,

a shaft axially mounted on top of said slide and designed to project through said body top in outside sealing relation, and

a handle mounted on the projecting portion of said shaft and designed to enable turning of said slide.

2. A valve according to claim 1 in which the body top carries indicia for indicating slide positions, and the handle carries an indicator movable adjacent said indicia.

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