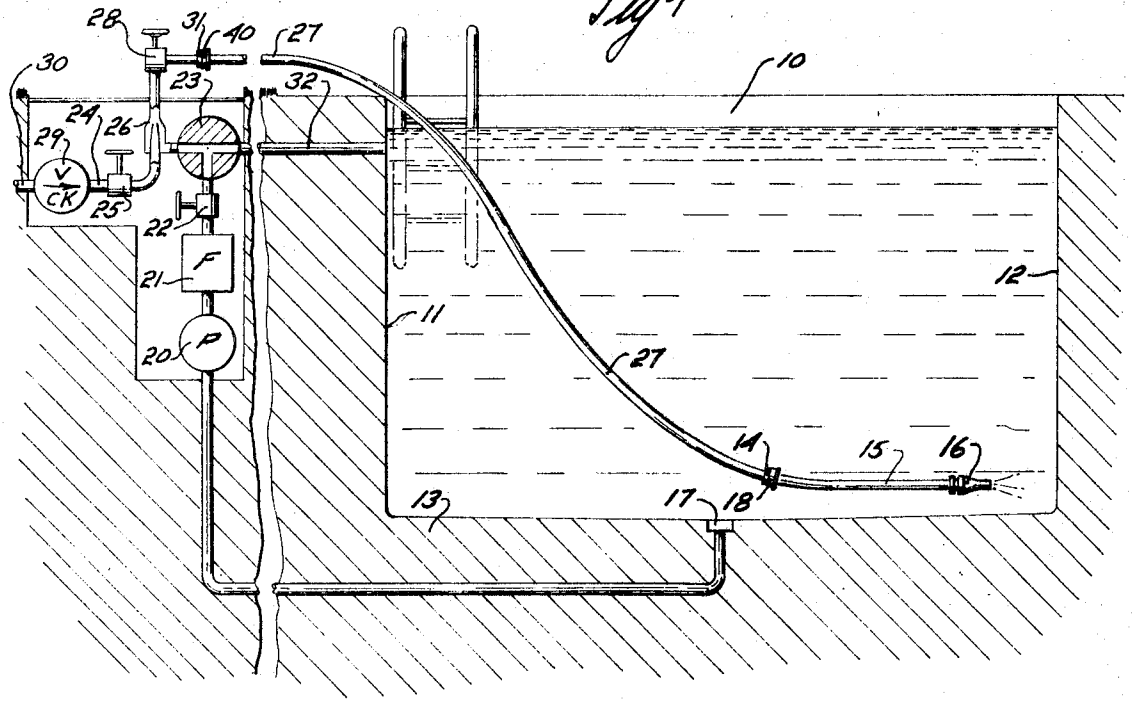
May 19, 1970 W. L. HUGHES 3,512,540

APPARATUS FOR CLEANING SWIMMING POOLS

Filed May 27, 1968

Fig-1



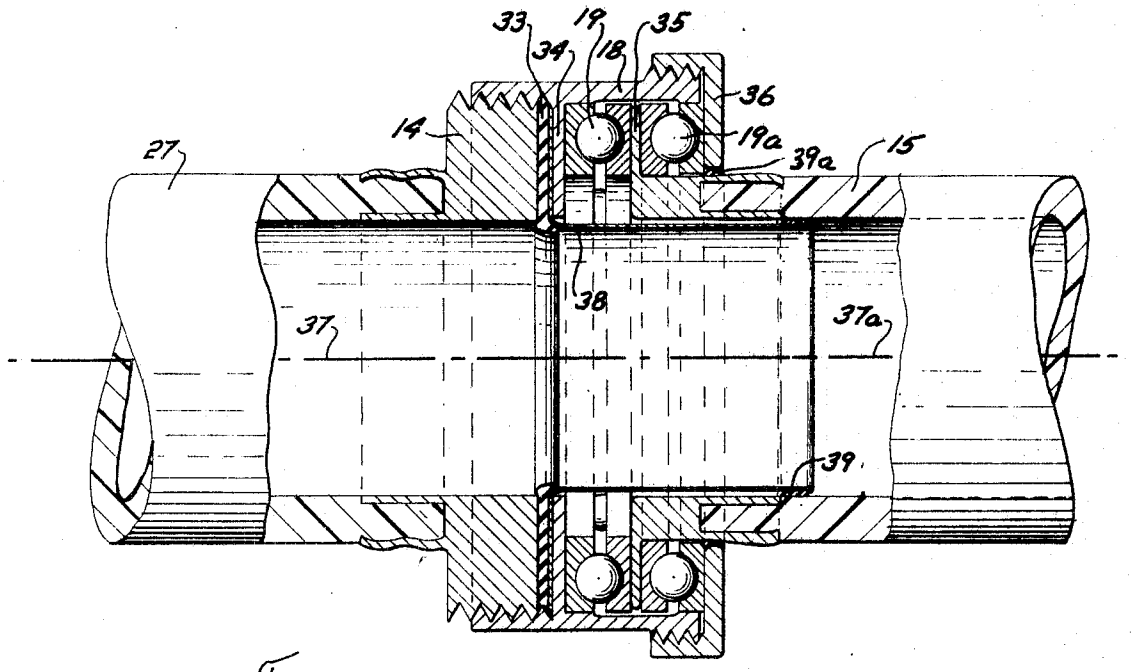


Fig-2

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APPARATUS FOR CLEANING SWIMMING POOLS

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ABSTRACT OF THE DISCLOSURE

A flexible hose, at least about three feet long, and preferably not exceeding about 50 feet, having a reaction nozzle at one end has been adapted for automatically cleaning a pool by stirring up dirt and sediment in a swimming pool, then passing the water through a filter and back into the pool. An antifriction type swivelled connection between said hose and said source greatly reduces the danger of kinking when the hose is free to rotate about the axis of such connection, said connection including either a ball or roller bearing.

BACKGROUND

Swimming pools go back into antiquity. Half a century and more ago it was common practice to clean pools seldom more often than once a week, with the result that dirt and sediment collected on the bottom of the pool and was conspicuously visible when the pool was not in use. All the water was withdrawn from the pool and the sides and bottom cleaned before the pool was refilled. Considerable time was consumed for both the cleaning and filling of the pool in addition to the time required for emptying the pool. All such time was often more than 24 and even 36 hours before the pool could be used again. No such period of inactivity is necessary with this invention.

Pansini 2,975,791 dated Mar. 21, 1961 for Automatic Swimming Pool Cleaner illustrates an apparatus that was cumbersome consisting of both rigid overhead piping and a flexible hose to stir the dirt and sediment on the bottom of a pool.

Ruston 3,217,886 dated Nov. 16, 1965 exemplifies more elaborate piping that is more difficult to install and remove and is objectionably in the way of users if not removed during use. This also shows the common expedient of filtering some portion of the pool water.

Possibly the closest prior art may be Varian 3,074,078 using a single piece of flexible hose extending from a side wall of a pool and simulating a reptile while only incidentally stirring dirt before some of the water is pumped through a filter. The major portion of this hose is not adapted to be adjacent to the bottom of the pool and the problem of the hose kinking was not appreciated.

DESCRIPTION OF INVENTION

The present invention has substantially reduced any tendency for the length of flexible hose at the bottom of a pool between a source of incoming water and the reaction nozzle to become kinked as it is moved around the bottom of the pool under influence of said nozzle. Since many and probably most pools today have a filter system, this invention may be used for a few hours during a period of non-use of the pool. It has been discovered the variable path taken by the nozzle and hose at the bottom of the pool can be effective in stirring up dirt and sediment at the bottom to such an extent that the usual filter will remove much of that dirt and sediment without the necessity for the inflexible and bothersome overhead piping that has characterized previous efforts with this type of automatic cleaning of swimming pools. The reaction nozzle is preferably of the sort having a discharge orifice

adjustable in size to conform to a particular pool and the pressure on the incoming water.

Referring to the single sheet of drawing:

FIG. 1 illustrates one embodiment of this invention for cleaning a swimming pool.

FIG. 2 exemplifies one type of swivelled connection between a source of water supply and a length of flexible hose.

The pool **10** shown as a cross section in FIG. 1 of a conventional form having side walls **11** and **12** and bottom **13** which is usually sloping to provide a deeper portion at one end than at the other. A source **14** of water supply is connected to a length of flexible hose **15** provided with a reaction nozzle **16** at the discharge end whereby a jet action of said nozzle is able to move hose **15** around the bottom of the pool stirring much of any dirt and sediment into the water being drawn out of the pool through a usual outlet passageway **17** leading through a usual pump **20** and filter **21** before being returned to the pool.

Instead of an ordinary connection to a first source **14** of water supply, a preferred type of such connection is shown in FIG. 2 as comprising an antifriction connection **18** whereby the end of hose **15** opposite said nozzle **16** is free to rotate about the axis **37–37***a* of such connection with the flexible hose **15**.

To enable the water from the filter **21** to be either returned to the pool or to be mixed with drinking water to make up for loss of water through evaporation and splash from the pool, it is passed from filter **21** and pump **20** through a shut-off valve **22** to valve **23**. This valve is of the type shown enabling perhaps a major portion of the filtered water to pass from filter **21** into the pool **10** through passageway **32**. The rest of the filtered water is passed into the jet type mixer **26** and mixed with drinking water usually under higher pressure from a pipe **30** through a check valve **29**, pipe **24** and shut-off valve **25**. Turning valve **23** in a clockwise direction about 45° cuts off all flow from the filter **21**, thus duplicating the function of valve **22**. Where all flow through the valve **23** is desired to be passed through hose **27**, something rarely needed, a shut-off valve, not shown, may be located in the passageway **32**. Inasmuch as the volume of drinking water is usually small in quantity compared to the volume of drinking water is usually small in quantity compared to the volume of filtered water, the jet type mixer **26** will usually have the drinking water jet in the center of the filtered water for mixing as shown. From mixer **26** the water passes through a shut-off valve **28** to swivelled connection **40** similar to connection **18** in FIG. 2 and attached to a second source **31** to which flexible hose **27** of considerable length is connected. The break in hose **27** merely indicates that it may lead a substantial distance across a lawn or other ground to some house having drinking water therein.

To avoid some unforeseen contingency in which the drinking water pressure may drop below the pressure of the filtered water in the mixer **26** with danger of the filtered water getting into the drinking water supply pipe and getting mixed with the drinking water, the check valve **29** is of a usual type to close promptly and prevent that contingency from happening by precluding the filtered water from passing that check valve.

Referring to FIG. 2 of the drawing some of the flexible hose portion **27** is free to lie adjacent the bottom of the pool and connect the first source of water supply **14** for the pool with second source **31**. The metal end **14** is preferably threaded on its outer surface to hold the metal connection cover **18** in place for ball bearings **19** and **19***a*. A compressible washer or gasket **33** is clamped in position between the end **14** and a radially inwardly extending flange **34** on connection cover **18**. A metal radially out-

wardly extending flange **35** is secured to flexible hose portion **15** in any well known manner to allow swivelling. Thus anti-friction bearings are provided between metal ends **14** and **35** and their flanges. The flanges **34** and **36** for cover portion **18** for the ball bearings are provided with some known type means to prevent the water from having free access to the ball bearings from either the inside or outside of the hose portions, inasmuch as the water though filtered nevertheless is believed to contain enough dirt and sediment to prevent the best operation of said bearings for their intended use without such means. One such means contemplates a thin but heavy metal foil cylinder **38** being provided with a radially outwardly extending flange clamped between flange **34** and gasket **33** and extending axially to adjacent the metal end **35** on flexible hose **15** and having on its radially outer surface a small smooth pad of Teflon or nylon **39**. The pressure of water within this cylinder **38** keeps water from getting into the bearings **19** and **19***a*. A somewhat similar pad **39***a* at the radially inner end of flange **36** functions to keep out water but allow free sliding of flange **36** longitudinally.

In event the connection between the first source **14** of water and flexible hose **15** may not allow rotation of hose **15** about the axis **37–37***a* of said connection as freely as desired, hose connection **27** should be capable of receiving and absorbing some torque between said first and second sources **14** and **31**, the end of hose **27** secured to the second source **31** should also be similar to the antifriction bearings in FIG. 2. Thus two antifriction type bearings are provided to reduce the danger of kinks forming in a flexible hose anywhere. Should hose **15** not be able to swivel freely about the source **14**, hose **27** should be capable of turning about the axis of the second source **31** when the connection **40** to such second source is of the general type shown in FIG. 2. One factor of difference between these two connections may be due to the greater length of hose section **27** and the fact that its greater length results in greater friction between it and the ground opposing any torque in it. As long as hose section **15** is free to swivel about metal end **14**, there should be no need for hose section **27** to swivel about said second source **31**.

By closing valve **22** in the filter line, it is possible to

feed only drinking water into the pool, something rarely needed. On closing valve **25** and opening valve **22** only the filtered water can be supplied to the pool. By keeping all three valves **22**, **25** and **28** open, a mixture of both drinking and filtered water will be supplied to the pool.

What is claimed is:

1. A flexible hose line for cleaning a swimming pool having at one end of said hose line a reaction nozzle, a swivelled connection about which said hose line may rotate, a source of water supply and a second hose line connected to said source and to said swivelled connection, and means for enhancing the antifriction and leakproof character of said swivelled connection, said means including at least two pairs of ball bearing raceways, and means securing said pairs of raceways together, said means including a radially outwardly extending flange secured to one hose line and located between said pairs of raceways, two radially inwardly extending flanges, longitudinally spaced and serving as clamping abutments for said raceways, one of said last mentioned flanges being longitudinally adjustable by being threaded to a cover enclosing said pairs of raceways, a foil cylinder radially within said pairs of raceways and having a clamped flange on an upstream end portion of said cylinder extending toward said hose line leading to said nozzle, and plastic packing material around a downstream end of said cylinder.

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U.S. Cl. X.R.

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