July 31, 1928. 1,679,156

W. FISCH

ARTIFICIAL SURF BATHING POOL

Filed Nov. 22, 1926 2 Sheets-Sheet 1

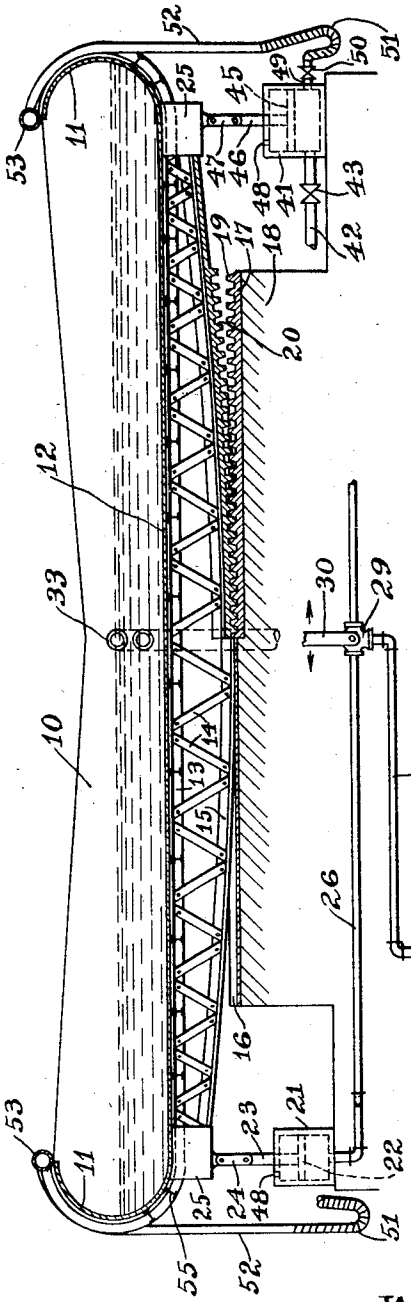

Fig. 1

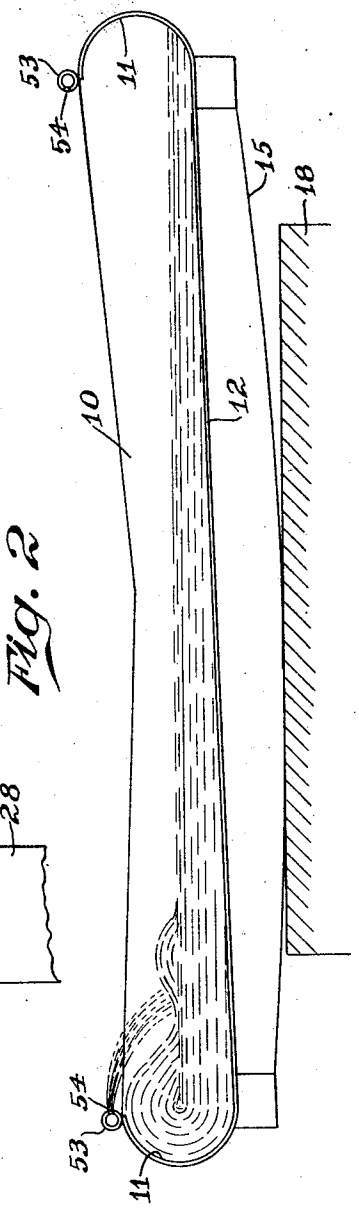

Fig. 2

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ARTIFICIAL SURF BATHING POOL

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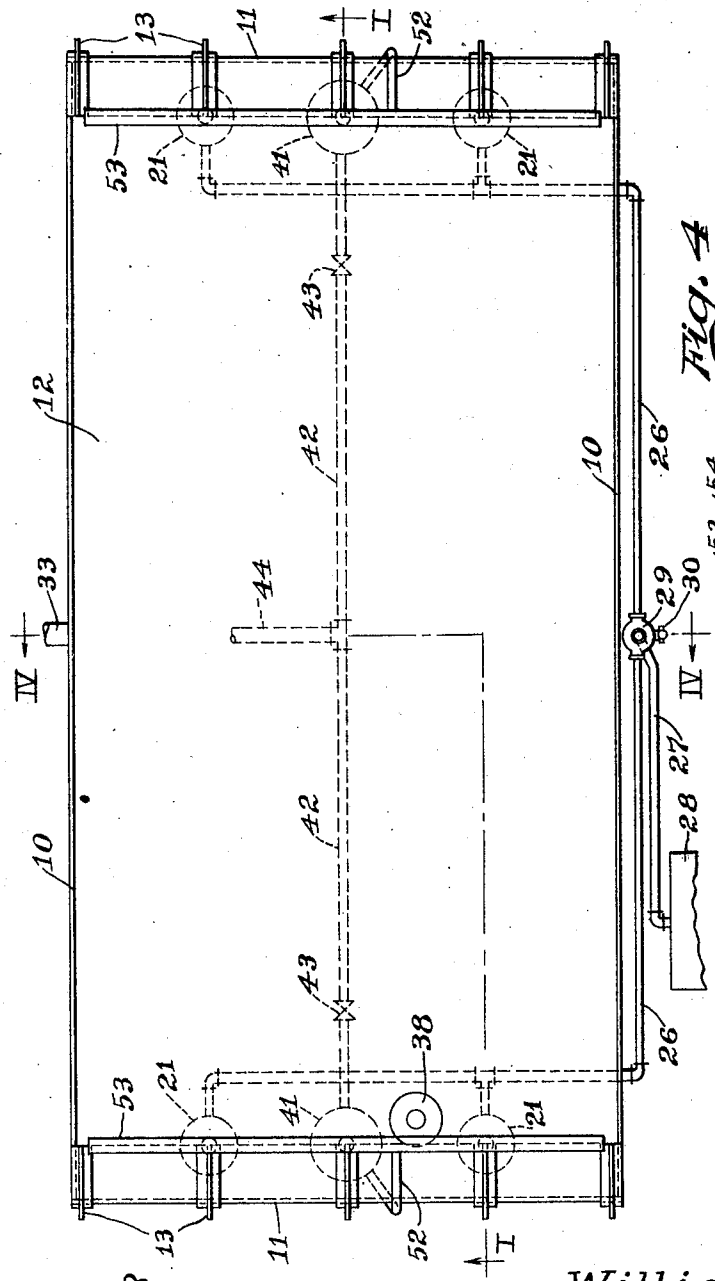

Fig. 3

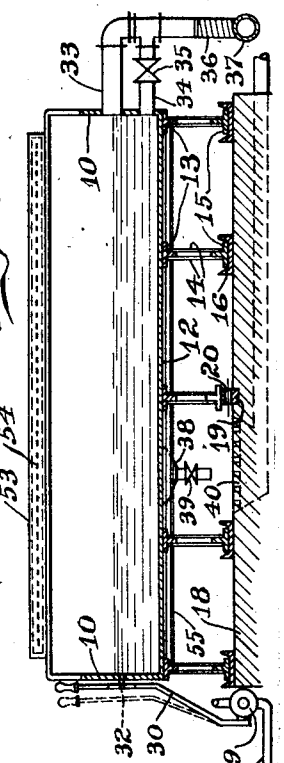

Fig. 4

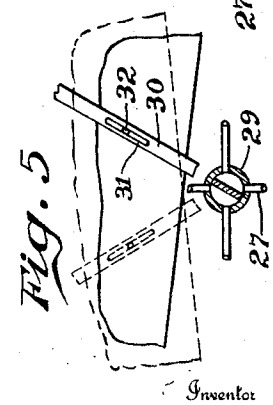

Fig. 5

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Patented July 31, 1928. 1,679,156

UNITED STATES PATENT OFFICE.

WILLIAM FISCH, OF ATLANTA, GEORGIA.

ARTIFICIAL-SURF BATHING POOL.

Application filed November 22, 1926. Serial No. 150,108.

My invention relates to bathing pools or swimming tanks, provided with means for artificially producing the effect of surf to make the bathing more attractive and enjoyable.

My invention contemplates the provision of a movable bathing pool or tank so designed and operated that its movement will produce, by the displacement of water therein, the effect of surf at its marginal edge or edges.

More particularly, my present invention is directed towards a bathing pool or tank of water adapted to have a limited rocking motion from side to side with pool walls designed to convert the rush of water towards them into a breaking wave, thus giving the effect of surf to the bathers.

My invention further contemplates the provision of a bathing pool adapted to rock on curved supports, struck on a very large radius curve, so that a limited vertical displacement of its ends will cause an elongated zone throughout which the fulcrum of the pool will shift as it rocks, which enables me to utilize the shift of the fulcrum point to assist in counterbalancing the rush of water towards the lowered end of the tank since the fulcrum shifts towards the lowered end and thereby increase both the weight at and the leverage effect of the mass of tank and water at the higher end of the tank. This makes easier the production and control of the rocking motions of the tank.

My invention also contemplates a new and improved manner of introducing fresh or treated water back into the tank, such water being introduced along with and adapted to supplement the surf effect at the lowered end of the tank.

My invention further contemplates the utilization of the inertia of the moving tank itself to force the fresh or return water back through the jet sprays at the lowered end of the tank.

My invention further contemplates the provision of novel and effective means, which are simple in their nature and readily controlled, for the stopping, starting and control of the rocking motions, of the tank, such means preferably employing a compressible fluid pressure means so that it may be utilized with cushioning effect in stopping the tank or checking its rocking motions.

My invention further contemplates the mounting of the tank upon rockers adapted to serve as longitudinal trusses for the tank and the provision of tracks upon which said trusses will rock, preferably in combination with means to prevent the tank creeping. I propose a toothed engagement between one or more of the rockers and its respective track as a suitable means to prevent creeping.

My invention further comprises the novel details of construction and arrangements of parts, which in their preferred embodiment only are illustrated in the accompanying drawings, which form a part of this specification, and in which:—

Fig. 1 represents a longitudinal vertical section through the tank taken on the line I—I of Fig. 3.

Fig. 2 is an outline view corresponding to Fig. 1 showing the tank in operation with one end lowered so as to produce the wave effect and the spray.

Fig. 3 is a plan view of the tank.

Fig. 4 is a cross-section taken on the line IV—IV of Fig. 3; and

Fig. 5 is a detail of the compressed air cylinder control mechanism with a diagrammatic layout of a three-way air control valve.

In the embodiment of my invention illustrated, in which corresponding parts bear similar reference numerals, I show a bathing pool or tank having side walls 10, which slope from its center upwardly towards its curved end walls 11, which latter walls merge into a substantially flat bottom 12 that can be braced in any desired manner. In the preferable arrangement, the tank is supported upon longitudinal rocker trusses. These trusses may be built up of any suitable standard shapes, those shown comprising an upper horizontal T-bar 13 connected by lattice-work braces 14 with a bottom curved T-bar 15, the said latter bar being struck on such a curve as will produce the desired shift of fulcrum, and relative vertical displacement between the ends, of the tank as it rocks. It will be understood that the tank may be caused to rock more or less according to its length and depth and the desired amount of surf effect to be produced. The rocker trusses, in order to reduce friction, are preferably arranged to ride upon tracks 16 and 17 which are supported upon suitable foundations 18, preferably of concrete. The tracks 16 are of channel shape to hold the rockers in line. As the preferred means for preventing the tank creeping

lengthwise on its track supports 17 are provided with rack teeth 19 and the rocker truss that rests thereon can be provided with corresponding teeth 20. This is merely the preferred means for preventing the tank shifting bodily along its track supports as the toothed engagement will bring back always to the center of its supports when at rest in balanced condition.

As the preferred operating mechanism for the tank, I employ a plurality of air cylinders 21, four being shown for purposes of illustration merely and these are arranged at or near the four corners of the tank. Each of these cylinders is provided with a plunger piston 22 having the upper end of its piston rod 23 pivotally connected by a link 24 to a block 25 at or near the end of the adjacent overhead rocker truss. Air pressure is delivered to the lower end of each of the cylinders at each end by an air pipe 26, which pipes connect to a common pipe 27 leading from a suitable source of compressed air, such as the tank 28, the cylinders at each end of the tank being connected in multiple to their respective air line 26, and the delivery of air pressure to said lines being controlled by a three-way control valve 29 adapted to admit pressure to the cylinders at one end of the tank when exhausting pressure from the cylinders at the other end of the tank. This valve may be set by hand control of its operating lever 30 to hold pressure in the cylinders at all ends so as to hold the tank balanced in the center or the air can be controlled to bring the tank to rest at either end of its rocking motion or in the center, and to start it up from whatever position of rest it may have been last stopped in. Also this three-way valve handle is adapted to rock into position for a slot 31 therein to engage a pin 32 on the side of the tank so that the motion of the tank will automatically control the operation of the air motors at its ends so as to keep it rocking. Also the valve action may be timed to use the cylinders for a dash-potting function in arresting the rocking motion of the tank. The tank can, if desired, be cross braced by the I-beams 55 connected to truss rockers and arranged to support the tank bottom.

I contemplate providing near the center of one side of the tank, an overflow pipe 33 having a connection near the mean water level of the tank, and also having a connection 34 at the bottom level of the tank with a control valve 35 that is normally closed, the latter connection being used for emptying the tank. The pipe 33 is connected by a flexible hose 36 to a main 37 leading to a suitable water treatment apparatus (not shown), for its purification, or to the waste, and this pipe may be used for refilling the tank from the treatment apparatus or from the city water mains. At either end of the tank desired I provide a special cleanout port 38 having a valve 39 which is intended to be opened when the tank is tilted in that direction so that the bottom may be flushed and cleaned out and all dirt and sediment discharged therethrough will enter a sump 40 and flow off to a suitable waste or to sewage connections.

In order to supplement the wave action produced by the surge of water against the curved ends 11 of the tank and also to assist in stopping or dash-potting the rocking motions of the tank, I provide at each end a reservoir, water-tight chamber or cylinder 41 having a connection through a pipe 42 past an outwardly closing check valve 43 to a supply main 44 leading from the fresh or treated water supply. A plunger 45 is provided for each of these chambers or cylinders which has its piston 46 flexibly connected by a link 47 to the block 25 at the end of the adjacent overhead rocker truss. The cylinder at its top is provided with a relief port 48 and at its bottom is provided with a discharge pipe 49 having an outwardly opening check valve 50 and connected by a flexible hose 51 to a pipe 52 connected to the adjacent end of the tank and discharging into a transfer spray pipe 53 mounted at or near the top edge of the adjacent end 11 of the tank and having its jet or spray ports 54 so disposed as to throw a spray over the surf wave when formed at its respective end of the tank. These pipes 53 preferably extend the width of the tank. The air cylinders are likewise provided with top ports 48 to prevent the trapping of air above them.

In the operation of the device described, assuming the tank in balanced position as shown in Fig. 1, by disengaging the valve lever 30 from the pin 32 and throwing it first to one side and then to the other, the air pressure can be thrown to the air motors 21 at the ends of the tank so as to build up the rocking motion of the tank, whereupon the lever can be engaged with the pin 30 and the tank will continue its rocking motion, opening the air cylinders to the pressure supply at the end of the tank as it falls below mean level position, thus putting the pressure in these cylinders to assist in checking the rocking motion of the tank and at the same time accomplishing this without a rebound due to the fact that the pressure trapped under the lowering pistons as forced down by the tank passes back into the pressure supply tank 28. When the downward motion of one end of a tank stops, immediately the tank pressure acts on the pistons at that end of the tank to lift it and until the tank reaches a level position the pistons at the other end of the tank will move down freely, due to the fact that their cylinders are exhausting to the atmosphere. After the tank

rocks past center position the valves are closed on the last mentioned cylinders and their cushioning function commences. To stop the tank the lever 30 can be manually controlled to trap the pressure in the desired cylinders until the tank is brought to rest in either tilted or level position. As the tank rocks there will be a displacement of the mass of water therein as indicated in Fig. 2, and such mass, traveling along the substantially flat bottom of the tank, will rush against the curved end wall 11 and arch over into one or more breaking waves, simulating surf as indicated in Fig. 2. The back rush of water at times provides a preliminary wave ahead of the main wave at the tank end. At the same time as the tank end lowers to produce the surf wave, the water cylinder plunger 45 at that end is depressed and the water which has been drawn into the cylinder past check valve 43 by the upward motion of the plunger is on its downward motion discharged past check valve 50 into the spray pipe 53 and is jetted into the tank in the form of a spray or multiplicity of fine jets which accentuate or blend in with, the wave effect. The replacement water is thus sprayed in at the ends of the tank and is thoroughly aerated and the surplus water is drawn out through the overflow pipe 33 at the center of the tank. It will be obvious that all sediment and floating matter will tend to collect at the center of the tank and thus pass off readily with the overflow.

It is to be noted that as the tank rocks, its fulcrum point shifts and approaches the lowered end of the tank. This results in maintaining the tank at all times substantially balanced except for the rush of water and I thus avoid excessive duty on the mechanism for effecting, and for controlling the rocking motions of the tank. The extent to which the fulcrum point is displaced will depend on the curvature of the rocker trusses and this can be designed so that as the tank rocks with a slow motion, the weight of the tank and mass of water thereon on the higher side of the tank will at all times substantially counter-balance the lower side of the tank with the mass of water thereon, leaving a slight overbalancing on this latter side, due to the rush of water provided to create the wave.

It is to be understood that the mechanisms disclosed for actuating and controlling the tank are suggestive of suitable means to attain the ends in view and may be widely varied without departing from my present invention, which is concerned essentially with the production of a novel type of amusement apparatus wherein a bathing pool of commercial size can be actuated and controlled to produce artificially the effect of surf.

Without therefore intending to limit myself to the specifically structural details shown, what I claim, is:—

1. A bathing pool comprising an elongated tank, longitudinally extending truss rockers disposed beneath the tank, power means to impart a rocking motion to the tank to displace water therein, means to convert the rush of displaced water into a breaking wave, and means to control the movement of the tank.

2. A bathing pool of the character described in claim 3, in which the tank is mounted on longitudinally extending truss rockers having tracks, and means to prevent the creeping of the tank on the tracks.

3. A bathing pool of the character described, comprising an elongated substantially flat bottom tank, rocker trusses supporting the tank and extending substantially from end to end thereof beneath the tank, and actuating and control agencies flexibly connected to the tank near an end thereof, the ends of the tank being concave for the purpose of converting the rush of displaced water into a wave effect.

4. A bathing pool according to claim 3, in which the actuating and control agencies are connected to both ends of the tank.

5. A bathing pool according to claim 3, in which the actuating and control agencies are connected to both ends of the tank and have a common control means.

6. A bathing pool of the character described having rocker supports and curved ends, power means for rocking the tank, and automatic means responsive to motion of the tank to control said power means.

7. A bathing pool according to claim 6, in which said automatic control means are adapted to be disengaged from the tank, and manual means for controlling the tank when the automatic control means is disengaged.

8. A bathing pool of the character described, comprising a substantially flat bottom tank having marginal walls which overhang the bottom on a curve, power means to tilt the tank to produce a rush of water against said curved walls, and automatic means to control the movement of the tank.

9. A bathing pool of the character described, comprising a substantially flat bottom tank having curved end walls which overhang the bottom, means to tilt the tank to produce a rush of water towards said end walls, and means to dash-pot the tilting motions of the tank.

10. A bathing pool of the character described, comprising a tiltable tank mounted on arcuate rockers, flat tracks for the rockers, means to prevent creeping of the tank on the tracks and fluid pressure actuating means flexibly connected to the end of the tank for actuating and controlling it.

11. A bathing pool according to claim 10,

in which the fluid pressure actuating means comprises a plurality of compressed air motors having a common control.

12. A bathing pool according to claim 10, in which the fluid pressure actuating means are connected to both ends of the tank and comprise compressed air motors having a common control for the motors at each end of the tank.

13. A bathing pool according to claim 10, in which the actuating means comprises a plurality of compressed air motors connected to both ends of the tank and having a common three-way valve control for all motors.

14. A bathing pool of the character described, comprising a tank mounted to rock and having curved end walls, a spray pipe adjacent to the top of each curved wall, and means utilizing the rocking motion of the tank to discharge a spray of water through the spray pipe at the lowered end of the tank.

15. A bathing pool of the character described, comprising a tank mounted to rock and having curved end walls, a spray pipe adjacent to the tops of said curved walls, and means utilizing the rocking motion of the tank to discharge a spray of water through the spray pipe at the lowered end of the tank, said means comprising water cylinders having a check valve controlled inlet and outlet, with the outlet connected to the spray pipe and the inlet to a source of replacement water supply.

16. In a bathing pool of the character described, means to rock said pool, means to introduce replacement water at its ends, and means to draw off by overflow the surplus water at or near its middle portion.

17. A bathing pool of the character described, comprising an elongated substantially flat bottom tank, longitudinal truss supports for the tank having curved bottoms, curved end walls for the tank, a support for the trusses upon which they are adapted to rock with a shifting fulcrum point, and power means flexibly connected to the tank to actuate and control it.

18. A bathing pool of the character described, comprising a tank, means to move the tank to produce a displacement of the water therein, and means responsive to the movement of the tank to produce a marginal water spray, in which spray means is adapted to act at the lowered edge of the tank and to deliver the spray above the surge of water at said lowered portion of the tank.

19. A bathing pool of the character described, comprising a tank movable to raise and lower a marginal edge thereof, and a shower for introducing replacement water in the tank having a controlling valve movable responsive to the lowering of the adjacent tank edge.

In testimony whereof I affix my signature.

WILLIAM FISCH.