Nov. 4, 1969 E. RITZ ET AL 3,476,106

DEVICE FOR PRODUCING WATER STREAMS IN SWIMMING POOLS

Filed Feb. 20, 1968 4 Sheets-Sheet 1

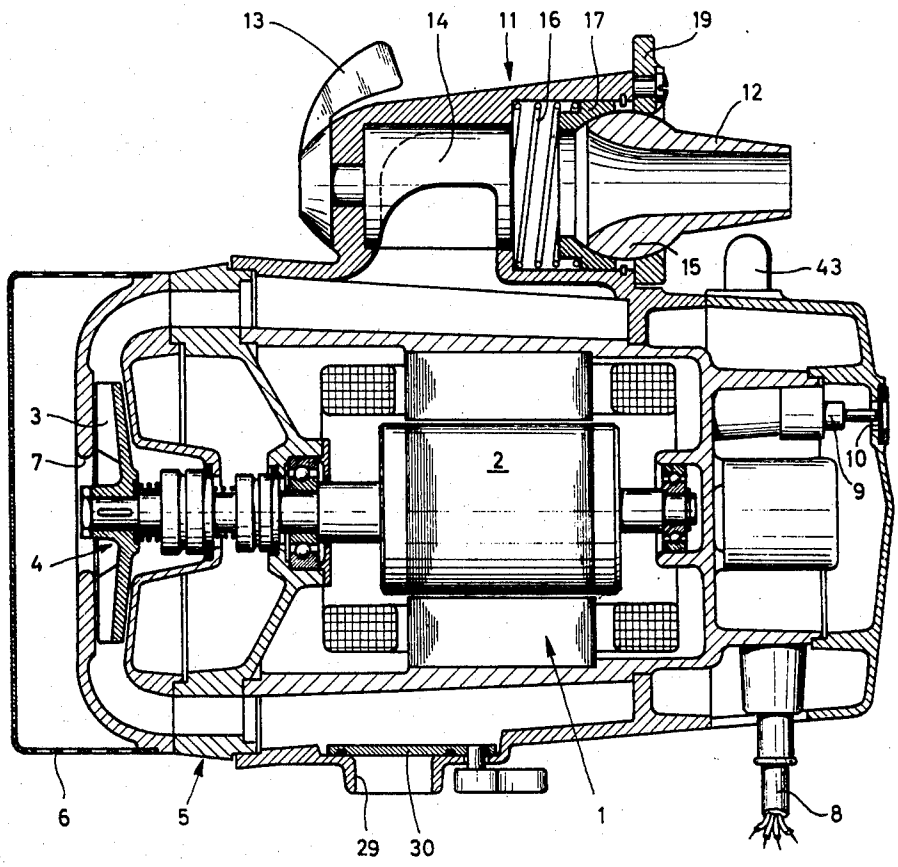


Fig. 1

Inventors:
Ernst RITZ
Rudolf BRAZEL
by: Arthur O. Klein
their Attorney

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DEVICE FOR PRODUCING WATER STREAMS IN SWIMMING POOLS

Filed Feb. 20, 1962 4 Sheets-Sheet 2

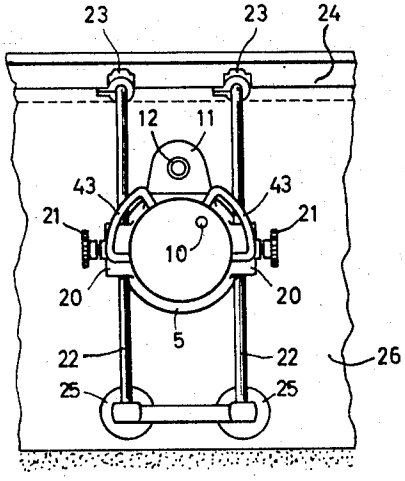


Fig. 2

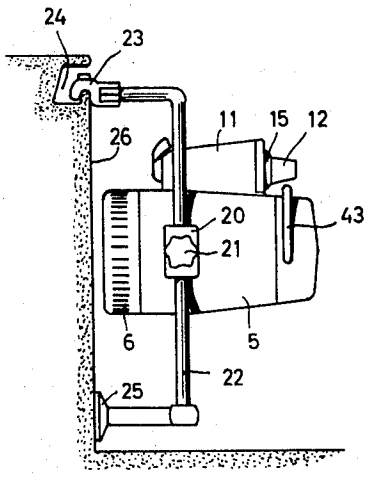


Fig. 3

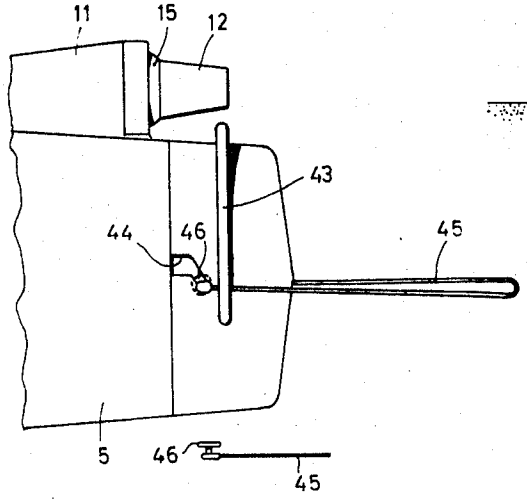


Fig. 9

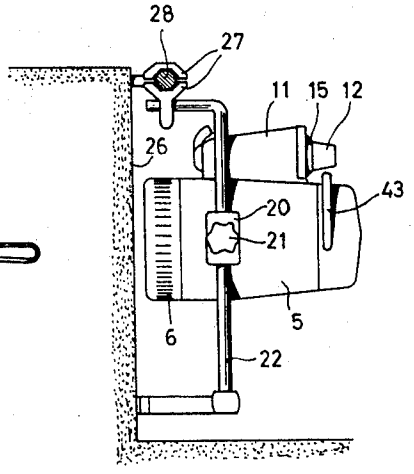


Fig. 4

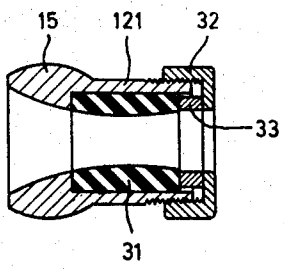
Inventors:
Ernst RITZ
Rudolf BRAZEL
by: Arthur O. Klein
their Attorney

Nov. 4, 1969 E. RITZ ET AL 3,476,106

DEVICE FOR PRODUCING WATER STREAMS IN SWIMMING POOLS

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Fig. 5



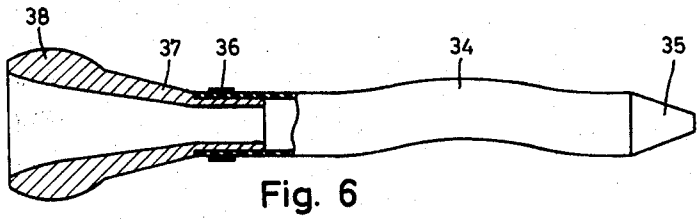


Fig. 6

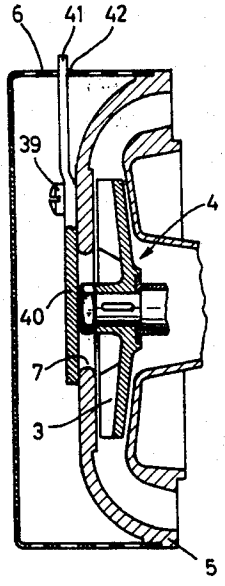


Fig. 7

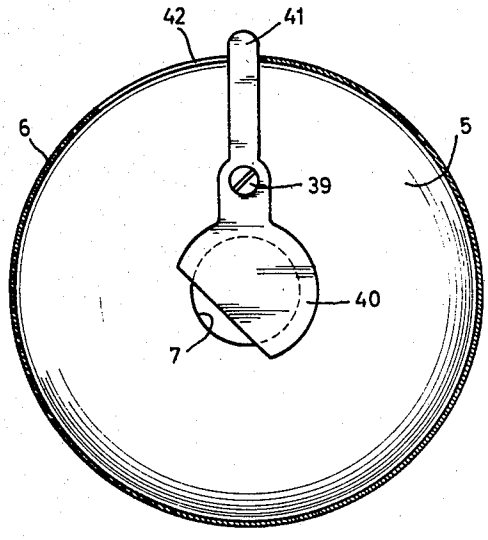


Fig. 8

Inventors:
Ernst RITZ
Rudolf BRAZEL
by: Arthur O. Klein
their Attorney

Nov. 4, 1969 E. RITZ ET AL 3,476,106

DEVICE FOR PRODUCING WATER STREAMS IN SWIMMING POOLS

Filed Feb. 20, 1968 4 Sheets-Sheet 4

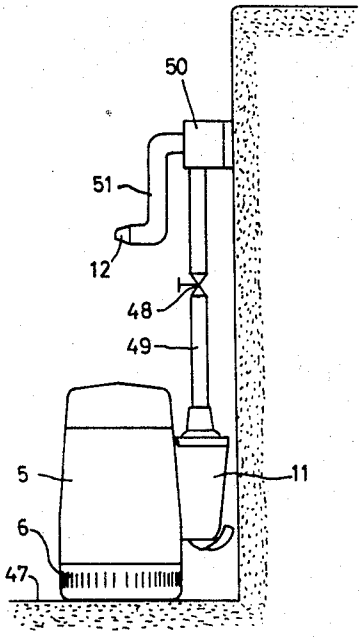


Fig. 10

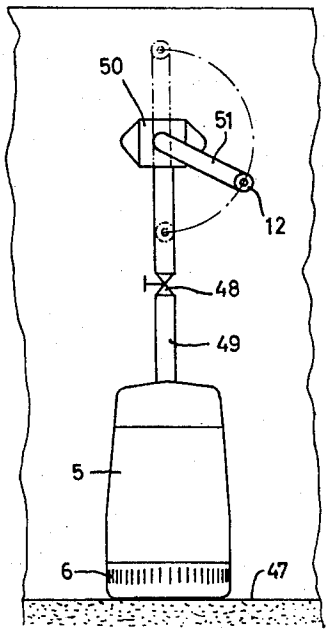


Fig. 11

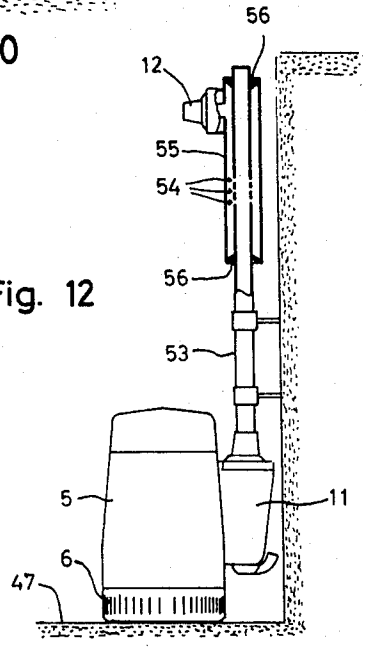


Fig. 12

Inventors:
Ernst RITZ
Rudolf BRAZEL
by: Arthur O. Kee
their Attorney

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DEVICE FOR PRODUCING WATER STREAMS IN SWIMMING POOLS

Ernst Ritz and Rudolf Brazel, Schwab. Gmund, Germany, assignors to Ritz-Motorenbau KG, a firm of Germany

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Int. Cl. A61h 9/00
U.S. Cl. 128—66 13 Claims

ABSTRACT OF THE DISCLOSURE

A device for producing a water stream in a swimming pool. An underwater electric motors means is operatively connected with a pump means to drive the latter, and this pump means has a suction inlet and a pressure outlet and forms a unitary structure with the motor means. A watertight housing means enclosures this unitary structure and carries at its exterior a suction strainer which covers the suction inlet of the pump means. A connecting means is connected to and communicates with the pressure outlet of the pump means, and a nozzle is connected by this connecting means to the pressure outlet of the pump means, so that when this assembly is situated beneath the surface of the liquid in a swimming pool, a jet will issue from the nozzle providing a predetermined water stream in the pool.

BACKGROUND OF THE INVENTION

The present invention relates to devices for producing streams of water in a swiming pool.

With devices of this type, it is possible to provide in a swimming pool a stream which flows in a given direction so that a swimmer can situate himself in this stream and swim in an opposed direction, thus going through swimming motions, while at the same time being situated in a counter-flowing stream so that the location of the swimmer in the pool does not change while he swims in opposition to the stream. Devices of this type also can be used, for example, to provide a jet of water for massage purposes.

Known devices of this type, as shown, for example, in German Gebrauchsmuster 1,840,163, German Patent 133,655 and U.S. Patent 1,637,423, have the disadvantage of requiring considerable cost in order to incorporate such devices into already existing swimming pools. There are known smaller devices, as shown, for example in German Patent 348,298, which are designed to achieve a given water flow in bathing tanks. These small devices, however, consist of a plurality of special components interconnected by long hoses or flexible shafts, so that these structures are relatively bulky and, therefore, unwieldy. They cannot be inserted in the form of a compact unit into a swimming pool but, instead, must be situated at least in part outside the water.

SUMMARY OF THE INVENTION

It is accordingly a primary object of the present invention to provide a compact unitary structure which will avoid the above drawbacks.

In particular, it is an object of the invention to provide a device of this type, which can be installed at relatively low cost in a simple manner in already existing swimming pools.

In accordance with the present invention, the structure includes a pump means operatively connected with an underwater electric motor means to form a unitary structure therewith, and this latter unitary structure is housed within a single water-tight housing, which carries at its exterior a strainer located over the suction inlet of the pump means and a connecting means communicating with the pressure outlet of the pump means and serving to connect a nozzle thereto.

As a result of this construction of the invention, there is the advantage of a compact, robust and reliably operating unit, which can be installed without difficulty into any type of already existing swimming pool. At the same time, this structure of the invention has the same output capacity as any conventional structure of this type.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated by way of example in the accompanying drawings which form part of this application, and in which:

FIG. 1 is a longitudinal sectional elevation of a preferred embodiment of a device of the invention;

FIG. 2 is a front elevation, and FIG 3 is a side elevation of one type of structure for mounting the assembly in a swimming pool, which is schematically illustrated in a fragmentary manner;

FIG. 4 is a partly sectional side elevation of another embodiment of a mounting structure for situating the device in a swimming pool which is fragmentarily illustrated in a schematic manner;

FIG. 5 is a longitudinal sectional elevation of a nozzle provided with a structure for adjusting the cross section thereof;

FIG. 6 is a partly sectional side elevation of another embodiment of a nozzle assembly of the invention;

FIG. 7 is a fragmentary sectional side elevation, and FIG. 8 is a transverse view of a structure for controlling flow of water into the inlet of the pump means;

FIG. 9 illustrates how a belt can be fastened to the structure of the invention;

FIGS. 10 and 11 are, respectively, side and front elevation views of a simplified embodiment of a structure of the invention; and

FIG. 12 is a side view, schematically illustrating, partly in section, yet another simplified embodiment of the structure of the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to FIG. 1, the device of the invention which is illustrated therein, includes a watertight electric motor means **1** having a rotor **2**, which is operatively connected with the impeller **3** of a pump means **4**, which is thus connected to the electric motor means **1** to form a unit therewith and to be driven thereby. The pump means **4** and motor means **1** are enclosed within a common, double-walled housing means **5**, which carries a suction strainer **6** situated over the suction inlet **7** of the pump means **4**. It will be noted that the section inlet **7** is concentrically arranged with respect to the impeller **3**.

The part of the housing means **5**, which is opposed to and directed away from the strainer **6**, is provided with a watertight electric cable **8**, through which current is supplied to the motor. Within the housing is situated a push-button type of watertight switch **9** for starting and stopping the motor **1**, this switch **9** being covered in a watertight manner by a flexible membrane **10**, which may be manipulated from the exterior so as to close and open the switch **9**.

A connecting means **11** is situated at the exterior of the housing **5**, in communication with the pressure outlet of the pump means **4**, and this connecting means **11** serves to connect a nozzle **12** to the pressure outlet of the pump means. It will be seen that the pressure outlet of the pump means is formed by the hollow space between the walls of the housing **5**, and the connecting means **11** serves to connect the nozzle **12** with the space between the outer and inner walls of the housing **5**. Thus, when the pump means **4** operates, the water is sucked through the strainer

6 and the suction inlet 7 to the impeller 3, which then discharges the water through the hollow space defined between the outer and inner walls of the housing 5, and from this latter space the water under pressure will reach the connecting means 11 to flow therethrough to the nozzle 12, from which the water issues in the form of a powerful jet.

The above-described structure of the invention is inserted into a swimming pool simply by situating the entire structure, composed of the motor 1, the pump 4, the connecting means 11, and nozzle 12, as well as the housing 5, beneath the surface of the liquid in the swimming pool and providing an electrical connection thereto so that the motor means 1 can be turned on. The pump means 4 can have an output on the order of 500–700 liters per minute, and in accordance with the cross section of the nozzle 12 it is possible to achieve a pressure of between, approximately, 0.5 and 2 atmospheres above atmospheric pressure. In order to achieve a desired flow of a stream of water in the swimming pool, the diameter of the interior of the nozzle means 12 can, for example, be 2.5 cm. or more. For massage purposes, nozzles of a smaller diameter are used, nozzles for this purpose having an inner diameter of up to, approximately, 10 mm.

The interior of the connecting means 11 accommodates a rotary valve 14 capable of being turned by a hand grip 13, and by way of this valve 14 it is possible to control the flow of liquid through the connecting means 11 which communicates with the space in the hollow wall structure of the housing means 5. In this way it is possible to regulate the amount of water which is delivered to the nozzle means 12.

The nozzle means 12 itself has a spherical inner head end 15 by means of which it it tiltably supported, in the form of a ball-and-socket joint, in the connecting means 11. This spherical head 15 of the nozzle is received in a ring 17, which is urged by a spring 16 to the right, as viewed in FIG. 1, and in this way the end 15 of the nozzle means 12 is urged against a swingable annular holder 19 with a suitable sealing ring situated between the holder 19 and the head 15 of the nozzle 12, if desired. By swinging the holder 19, it is possible to easily disassemble the nozzle 12 from the connecting means 11 and to replace it with a new nozzle having, for example, a different cross section so that in this way the connecting means 11 serves to interchangeably mount different nozzles in communication with the pressure outlet of the pump means 4.

As may be seen from FIGS. 2 and 3, the housing means 5 is provided with a pair of lateral elongated tubular guide openings or eyes 20, respectively carrying manually turnable set screws 21. A pair of guide bars 22 extend slidably through the elongated guide tubes or eyes 20 of the housing means 5, so that the entire housing means 5 and the structure carried thereby can be placed at a selected elevation along the vertically extending guide bars 22. These vertically extending guide bars 22 are fixed to a side of the swimming pool. In FIGS 2 and 3 there is illustrated a structure where each guide bar 22 forms part of a U-shaped assembly carrying at its top end a hook-shaped component 23 for hanging the assembly at the gutter 24 of the pool and carrying at its bottom end a foot member 25, which may take the form of a suction cup, for example, to engage the side wall 26 of the pool.

In the embodiment of FIG. 4, the top end of each U-shaped assembly, which includes the guide bar 22, carries a releasable clamp structure 27 for releasably clamping the guide bar to the side rail 28 of the pool.

In order to facilitate the adjustment of the elevation of the housing means 5, which encloses the motor means 1 and pump means 4, and which is movable along the bars 22, it is possible, as indicated in FIG. 1, to provide at a lower wall portion of the housing means 5 an additional nozzle-shaped opening 29 communicating with the space between the inner and outer walls of the housing means 5, and thus communicating with the pressure outlet of the pump means 4. A manually operable valve 30 is provided for, opening and closing the nozzle outlet 29. This valve 30 enables the outlet 29 to be completely closed or completely opened. When the nozzle outlet 29 is open, a powerful downwardly directed water jet is produced in order to oppose the downwardly directed weight of the structure and thus provide an easy elevational adjustment of the entire device along the guide bars 22. Once the structure has been situated at a selected elevation, the valve 30 is displaced to its position closing the lower outlet opening 29.

FIG. 5 shows a nozzle assembly suitable for use with the structure of FIG. 1 and capable of having the cross section of its interior adjusted. The nozzle body 121, which is provided with the spherical head 15, has an elongated tubular insert 31, made of an elastic deformable material, such as, for example, rubber or neoprene. Between the front end of the insert 31 and a cup nut 32, which is threaded onto the nozzle 121, is situated a spacer ring 33, which transmits force between the nut 32 and the insert 31. Thus, by threading the cap nut 32 onto the nozzle body 121, the insert 31 is compressed by the spacer ring 33 so that the effective cross section at the interior of the nozzle is reduced.

FIG. 6 shows an embodiment of a nozzle means, which is provided with an elongated tubular component 34, made of a plastic bendable material, which will retain the configuration to which it is bent by the operator. At its outer end the bendable tube 34 carries the nozzle outlet 35, while at its inner end it is fixed by a clamp 36 to the tubular portion 37 of the nozzle means, this portion 37 terminating at its inner end in the spherical head 38 corresponding to the head 15 and coacting in the same way with the connecting means 11.

FIGS. 7 and 8 illustrate a further possibility of changing the intake or output of the pump means 4. For this purpose, there is situated in front of the suction inlet opening 7 a swingable valve plate 40, supported for pivotal movement on the housing 5 by a screw 39, and in accordance with the angular position of the valve plate 40, the inlet 7 will be covered to a greater or lesser extent so that, in this way, the amount of water sucked into the pump can be regulated. The valve 40 is provided with a handle 41, which extends through a slot 42 of the strainer 6 so as to be conveniently accessible at the exterior of the latter for a convenient adjustment of the valve 40.

As is illustrated in FIGS. 2 and 9, the housing means 5 carries a pair of lateral hand grips 43, which can be grasped by a person so that he can hold himself in the region of the device so as to use the water issuing from the nozzle 12 for massage purpose. Moreover, the wall of the housing 5 is formed at opposed lateral portions with elongated tapered openings 44, in which the ends of a holding band or belt 45 may be hung so that this belt 45 may extend around the body of a person to hold the person in front of the nozzle 12 for massage purposes. The ends of the band or belt 45, respectively, carry small button-shaped fastening discs 46, which can be introduced into the wider ends of the slots 44 and displaced to the smaller ends thereof for releasably holding the band 45 connected with the housing 5.

FIGS. 10 and 11 illustrate a simplified embodiment of the structure of the invention. With this embodiment, the underwater motor and pump unit is enclosed within the common housing means 5 but does not require any particular holding bars or the like and, instead, simply rests on the floor 47 of the pool. The upwardly directed connecting means 11 of this embodiment is connected to and communicates with the lower end of a nozzle means, which includes an elongated conduit 49 provided with a valve 48, and the top end of the conduit 49 communicates with the interior of a fitting 50, which serves to support the rotary movement of a S-shaped pipe 51, which terminates in the nozzle outlet 12. The pipe 51 may be swung to any desired angular position with respect to the fitting

50, as shown schematically in FIG. 11 so that, in this way, the elevation of the nozzle outlet 12 in the pool can be adjusted.

A similar embodiment of the invention is illustrated in FIG. 12. In this embodiment, the upwardly directed connecting means 11 communicates with and is connected to the lower end of a nozzle means, which includes a conduit 53, which has at its upper wall portion a plurality of openings 54, and which is closed at its top end. A tubular sleeve 55 surrounds the conduit 53 and extends beyond the openings 54 thereof, this sleeve 55 being provided with fluid-tight seals 56 at its ends, enabling the sleeve 55 to be shifted longitudinally along the conduit 53, while having its interior in communication with the openings 54. Thus, the seals 56 provide a fluid-tight closure of the sleeve 55 around the conduit 53 along which the sleeve 55 can be shifted. The sleeve 55 carries at its upper end the nozzle outlet 12, which communicates with the interior of the sleeve 55 so that the water issuing from the pump means in the housing means 5 flows upwardly along the conduit 53 and out through the openings 54 thereof into the sleeve 55 to issue out of the nozzle outlet 12. In this way, a jet of water will issue from the nozzle outlet 12 into the body of water within the pool and, by shifting the sleeve 55 along the conduit 53, it is possible to adjust the elevation of the outlet 12.

Although the present invention has been described in conjunction with preferred embodiments, it is to be understood that modifications and variations may be resorted to without departing from the spirit and scope of the invention, as those skilled in the art will readily understand. Such modifications and variations are considered to be within the purview and scope of the invention and appended claims.

What is claimed is:

1. For use in a swimming pool, underwater electric motor means, pump means having a suction inlet and a pressure outlet and being operatively connected to said electric motor means to be driven thereby, said pump means and said motor means forming a unitary structure, watertight housing means enclosing said unitary structure, strainer means carried by said housing means over said suction inlet of said pump means, said housing means being formed with a pair of lateral openings, and guide bars, respectively extending through said lateral openings of said housing means to guide the latter for adjustable movement to a predetermined selected location within a pool, connecting means connected to and communicating with said pressure outlet of said pump means, and nozzle means connected by said connecting means to said pressure outlet of said pump means for providing beneath the surface of water in a swimming pool a jet of liquid producing in the pool a predetermined stream of water.

2. The combination of claim 1 and wherein said housing means has a lower wall portion formed with an opening which is directed downwardly, and which communicates with the suction outlet of said pump means so that water from said suction outlet of said pump means directed downwardly through said opening in said lower portion of said housing wall act to resist the weight with which the housing means is directed downardly, and valve means carried by said housing means for selectively closing said opening at said lower portion thereof.

3. The combination of claim 1 and wherein said connecting means houses in its interior an adjustable valve means for regulating the jet of water which issues from said nozzle means.

4. The combination of claim 1 and wherein said connecting means interchangeably mounts said nozzle means so that one nozzle means may be exchanged for another.

5. The combination of claim 1 and wherein said connecting means connects said nozzle means to said pressure outlet of said pump means for swinging movement with respect to said housing means.

6. The combination of claim 1 and wherein a watertight switch means is carried by said housing means and connected electrically with said motor means for controlling the latter.

7. The combination of claim 1 and wherein said nozzle means has an outlet portion provided with an elongated tubular insert of elastic material, and adjusting means for compressing said insert to change the cross section of the outlet portion of the nozzle means.

8. The combination of claim 1 and wherein an elongated bendable tube extends between and communicates with said connecting means and nozzle means.

9. The combination of claim 1 and wherein a valve means is situated at said suction inlet of said pump means for regulating the amount of water which is sucked into said pump means.

10. The combination of claim 1 and wherein a handgrip means is fixed to and extends from said housing means.

11. The combination of claim 1 and wherein fastener means are connected with said housing means for releasably fastening thereto a belt for holding a person in the region of said housing means.

12. The combination of claim 1 and wherein said nozzle means includes a nozzle outlet and an elongated conduit extending between and communicating with said connecting means and said nozzle outlet for providing communication between the latter and said pressure outlet of said pump means through said connecting means.

13. The combination of claim 12 and wherein an adjusting means mounts said nozzle outlet on said conduit for elevational adjustment with respect thereto.

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L. W. TRAPP, Primary Examiner

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