

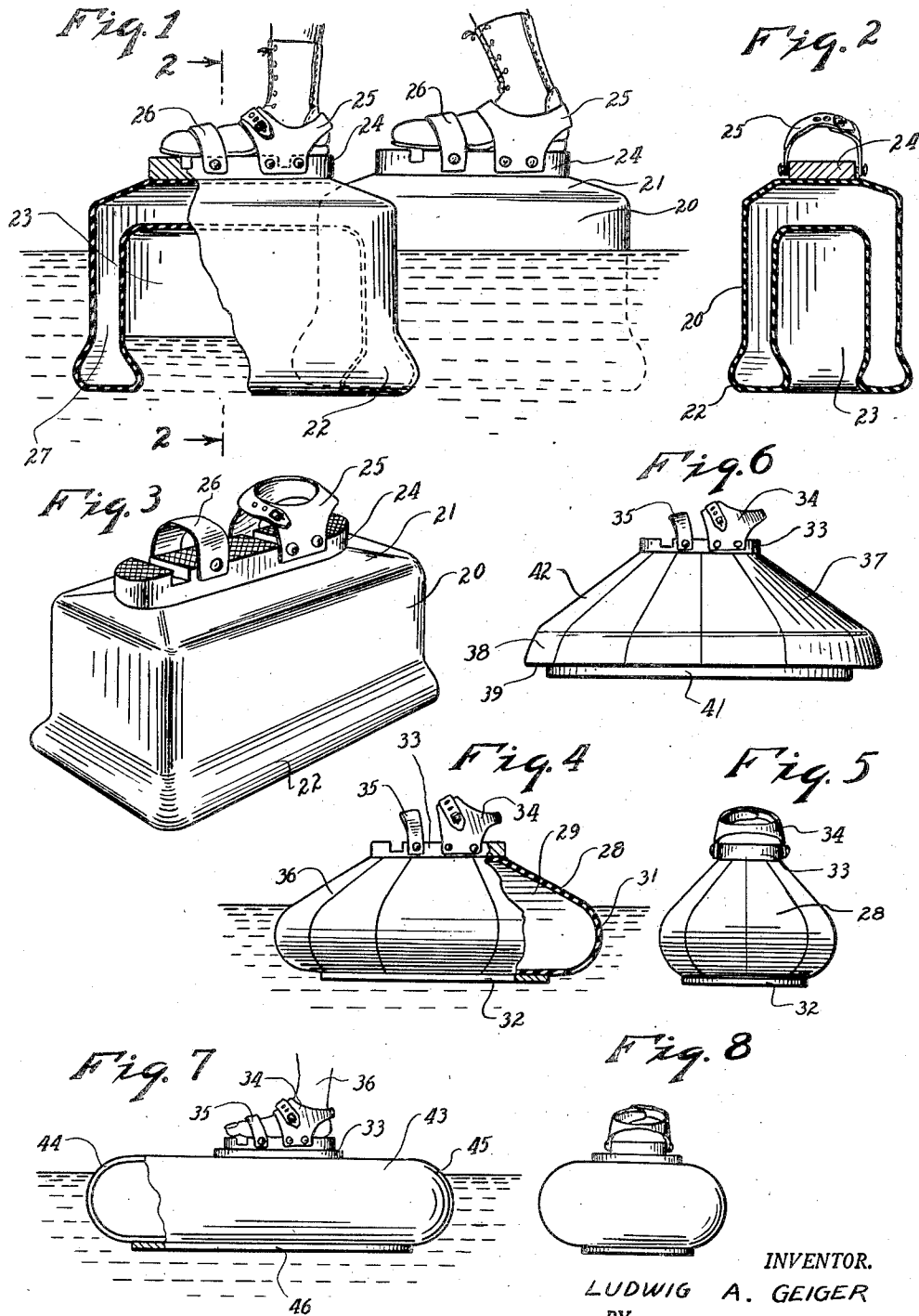
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L. A. GEIGER
WATER SHOE

2,651,790

Filed May 24, 1950

2 Sheets-Sheet 1



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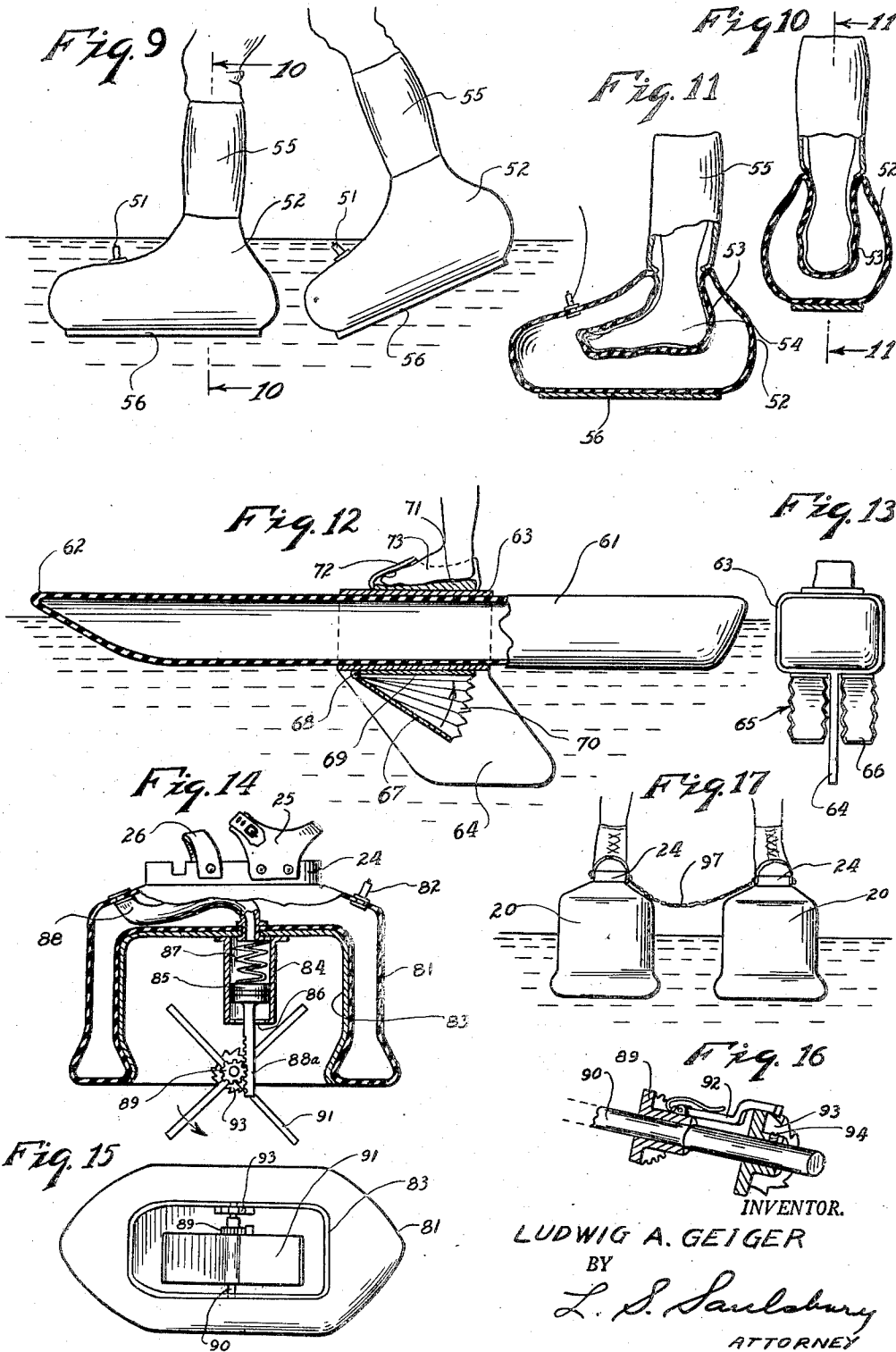
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UNITED STATES PATENT OFFICE

2,651,790

WATER SHOE

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2 Claims. (Cl. 9—21)

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This invention relates to water shoes for walking upon water.

It is an object of the present invention to provide water shoes which can be attached to the feet of a person to enable such person to walk upon water and thereby provide a means by which one can travel over the water without the need for swimming or a boat and which has for its purpose, as well as to give recreation, aiding in construction or rescue work and to be useful to Army engineers in bridging operations and to infantry personnel in making assault crossings of rivers and streams.

It is another object of the present invention to provide water shoes for walking upon water which can be used with little practice and without placing undue strain on the wearer while performing the motions of walking on the water.

It is another object of the present invention to provide a water shoe which can be made of light weight material that can be inflated with air when used and at other times deflated for the purpose of transport and storage and thereby to consume little space.

Other objects of the present invention are to provide a water shoe which is of simple construction, inexpensive to manufacture, easy to adapt to the foot, of small dimensions, light in weight, easy to control, durable and efficient in operation.

For other objects and for a better understanding of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawing, in which

Fig. 1 is an elevational view of a pair of water shoes embodying the features of the present invention and with one of the shoes broken away to show the interior construction thereof.

Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a perspective view of the water shoe shown in Fig. 1.

Fig. 4 is an elevational view of a modified form of the invention with a portion broken away to show the interior shape and construction.

Fig. 5 is an end elevational view of the form of the invention shown in Fig. 4.

Fig. 6 is a side elevational view of a still further form of the invention constructed similarly to the form of the invention shown in Figs. 4 and 5, but of slightly different shape.

Fig. 7 is a side elevational view of a still further form of the invention similar to the form of the invention shown in Figs. 4 and 6, but of still different shape.

Fig. 8 is an end elevational view of the shoe shown in Fig. 7.

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Fig. 9 is a side elevational view of a pair of water shoes formed to encompass the entire foot and to provide air underneath and over the top thereof.

Fig. 10 is a vertical transverse sectional view taken on line 10—10 view of Fig. 9.

Fig. 11 is a longitudinal view taken on line 11—11 of Fig. 10.

Fig. 12 is a side elevational view of a still further form of the invention with portions broken away and employing a blade control and means for preventing rearward slipping of the shoe while making forward steps.

Fig. 13 is a rear elevational view of the shoe shown in Fig. 12.

Fig. 14 is a longitudinal sectional view of a still further form of the invention wherein the action of stepping will cause the rotation of a water wheel and to give forward movement to the shoe.

Fig. 15 is a bottom plan view of the water shoe shown in Fig. 14.

Fig. 16 is a fragmentary perspective view of the ratchet mechanism utilized in the shoe shown in Figs. 14 and 15.

Fig. 17 is a front elevational view of a pair of water shoes, such as shown in Figs. 1 and 14, with chain means connected between the shoes to prevent the separation of the shoes one from the other when being used, but permitting forward, rearward and vertical displacement of one shoe relative to the other.

Referring now particularly to Figs. 1, 2 and 3, 20 represents a double wall casing having a top portion 21 and a bottom rim portion 22 with a chamber 23 opening from the bottom of the double wall casing member 20. This casing member is made of light weight material, such as hard rubber, plastic, canvas, balsawood, plywood, aluminum, or other suitable material. The double wall casing is air-tight to give buoyancy thereto. On the top portion 21 is a foot sole 24 having foot straps 25 and 26 connected thereto. With these straps secured to an ordinary shoe on a person's foot, the water shoe becomes a part thereof and can be manipulated over the water by taking the usual steps. Air will be accumulated in the space 23 and will be compressed to give further support to the shoe member 20. Since the air cannot escape from this compartment, the amount of water entering the same from the bottom of the body need not be great. Each shoe is so designed as to support the entire weight of the person's body whereby allowing the other shoe to be lifted out of the water to take a step.

The air caught between the inside hollow sur-

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face or space 23 makes it necessary to apply pressure to push the body into the water. If the water shoe is tilted or lifted in a manner to cause the escape of the compressed air, the buoyancy will either be ended entirely or will suffer a loss. Some buoyancy is given, however, by virtue of the air space 27 in the side and top portions of the body 20 and between the spaced walls thereof.

Referring now particularly to Figs. 4 and 5, there is shown a modified form of the invention wherein the shoe is formed of a rigid casing 28 providing for an air space 29. This casing is elongated and bulged at its lower elevation, as indicated at 31. On the bottom of the casing is a wear plate 32 which may have weight serving to hold the bottom of the casing in the water and the casing in an upright manner. On the top of the casing is a foot plate or sole 33 having the shoe straps 34 and 35. This casing is made of the materials as above mentioned and may be formed of parts which may be secured together at seams 36.

In Fig. 6, there is shown a shoe similar to that presently described, but wherein the casing, as indicated at 37, is of a slightly different shape. This casing has an enlargement near its bottom, as indicated at 38, to provide a sharp bottom shoulder 39 and a larger or longer bottom wear plate or weight 41. This casing is also formed of sections secured together along seams 42. The bodies 28 and 37 of these last two forms of the invention are air-tight, formed of light weight material, preferably plastic which can be molded and made secure by the application of heat. The top of the casing 37 is provided with the usual foot sole 33 and straps 34 and 35.

Referring now particularly to Figs. 7 and 8, there is shown another form of the invention wherein a body 43 is made of one composite piece. This body is elongated and is provided with rounded forward and rearward ends 44 and 45. This casing piece is rigid and air-tight to render the same buoyant. On the bottom of the casing is a wear or weight plate 46 that serves to keep the body in a vertical position. On the top of the casing 43, there is provided the usual foot plate 33 and straps 34 and 35 by which a foot 36 is secured to the foot plate.

Referring now particularly to Figs. 9, 10 and 11, there is shown a still further form of the invention wherein the casing is inflatable with air by the application of a bicycle pump to a valve arrangement 51 disposed on the top of casing 52. This casing 52 is provided with an inwardly extending portion 53, shaped and adapted to receive and confine a foot 54 upon the foot first being extended downwardly through a legging portion 55 that fits tight about the leg and in shoe fashion. A wear or weight plate 56 is secured to the bottom of the casing 52. Air will surround the entire foot 54. The casing 52 is formed of flexible rubber or plastic which will give the necessary buoyancy to support the person.

Referring now particularly to Figs. 12 and 13, there is shown a still further form of the invention in which there is provided an elongated casing 61 of generally pontoon shape pointed at its forward end as indicated at 62 and around which there is secured an elongated ring 63 which has a depending vane 64 which extends downwardly from the bottom of the frame and from the bottom of the casing 61 to keep the casing 61 on

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an even keel. Secured to the bottom of the ring at the opposite sides of the vane 64 are collapsible devices 65 and 66. Each device has a movable part 67 which is hinged at 68 to a stationary part 69 and flexible side pieces 70. The movable member 67 will be elevated as the shoe is passed through the water in a forward direction, but will be lowered to catch the water upon rearward displacement of the shoe being attempted. It will be apparent that each advancement of the shoe will be maintained. On the top of the ring 63 is a foot piece 71 and a casing 72 into which foot 73 can be placed.

In Figs. 14, 15 and 16, there is shown a still further form of the invention. This form of the invention has a casing body 81 of similar shape to the casing body shown in the form of the invention of Fig. 1 and wherein utilization is made of the compressed air to assist the propulsion and movement of the shoe through the water. This casing 81 is inflatable by the attachment of a bicycle pump to a valve arrangement 82. Within the hollow chamber there is fixed a rigid inverted cup-shaped member 83. Connected to the closed upper end of this casing 83 is a depending cylinder 84 which has a piston 85 workable therein. The lower end of the cylinder is open, as indicated at 86, to allow compressed air which is collected in the casing 83 to cause upward movement of a piston 85 against action of spring 87. Air within the cylinder will be delivered to the atmosphere through a hose connection 88 extending between the upper end of the cylinder 84 and the outer portion of the casing 81 for delivery of the air to the top of the casing 81 and to the atmosphere.

Depending from the piston 85 is a rack 88a that engages with a pinion 89 secured to shaft 90 whereby the shaft 90 will be rotated. This shaft carries water vanes 91 to give propulsion to the shoe. The gear 89 carries a spring pawl 92 connected to and a ratchet gear 93 secured by a set screw 94 to the shaft 90, Fig. 16. On the top of the casing 81 there is secured foot piece 24 with shoe straps 25 and 26. The shoe will be operated in the same manner as the shoes shown in Fig. 1 and by a stepping action. Air compressed within the inverted open member 83 will give buoyancy to the shoe and also at the same time cause the operation of the vanes 91 to obtain propulsion of the shoe through the water.

In Fig. 17 there is shown two shoes generally of the shape shown in Figs. 1 and 14, secured together by a chain 97 that is connected between the foot plates 24. This chain will prevent the shoes from spreading apart and assist the operator in keeping control of the shoes. At the same time, vertical and longitudinal displacement of the shoes will be permitted.

With the forms of the invention shown in Figs. 1, 2, 3, 14, 15 and 17, it will be understood that as the walking action is effected by the wearer, the water shoe is lifted free of the water in a vertical upward motion each time a step is taken so that a new supply of air is caught under the shoe as the shoe is pressed into the water with each vertical downward motion.

The wear plate provided in the several forms of the invention shown in Figs. 4 to 11 may be dispensed with if the casing material is of sufficient thickness to withstand any engagement of the shoe with the ground or beach surface.

It will be apparent that there have been provided water shoes adapted for use on water wherein one may easily manipulate the shoes to

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move over the water in a step by step fashion. It will also be apparent that the shoes are formed of hollow casing materials that are light in weight and which are air-tight in order to have the desired buoyancy to support the weight of the person.

It will be apparent also that the casing materials can be either rigid or flexible and may be inflated. It is also seen, according to one form of the invention, that in order to give good support for the foot and in order that the shoe can be controlled from the leg portions, that the casing is adapted to encompass the entire foot to provide an air pocket therearound.

While various changes may be made in the detail construction, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claims.

I claim:

1. A water shoe comprising an air-tight hollow casing having double-walled flat top and bottom portions respectively, means for securing a foot to the top of said top portion, said bottom portion being open at the bottom and surrounding an upwardly extending central chamber closed by said top portion for entrapping air, said top portion comprising the entrapped air to maintain buoyancy as the shoe is plunged into the water.

2. A water shoe comprising a hollow body, a chamber extending from the bottom of the body upwardly thereinto and serving to entrap air as the shoe is used, means for securing the foot to the top of the body, means connected to the body and lying within the bottom opening thereof and responsive to the compression of air in the bottom opening of the body as the shoe is brought

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onto the water to propel the shoe forwardly, said means connected to the body including a member fitted within the hollow opening and having an open bottom, a cylinder depending from the top of the member, a piston workable in the cylinder, spring means in the cylinder urging the downward displacement of the piston, air vent means extending from the cylinder to the hollow member and to the atmosphere, said cylinder being open at its lower end and adapted to receive compressed air collected under the pressure effected upon applying the shoe to the water, said piston having a rack, a shaft extending between the sides of said member lying within the opening, a pinion on said shaft for receiving said rack, a ratchet gear secured to said shaft pawl means connected between the pinion gear and the ratchet gear, vane means connected to the shaft to be operated thereby, said vane means movable in one direction whereby to propel the shoe through the water as the shoe is forced thereinto.

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