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SWIMMING APPARATUS

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Fig.1.

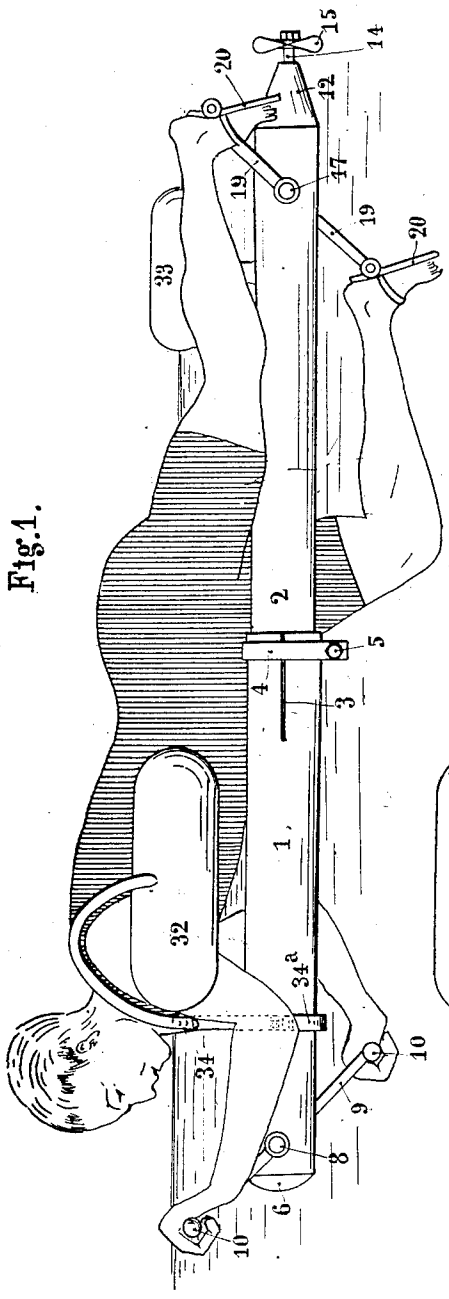
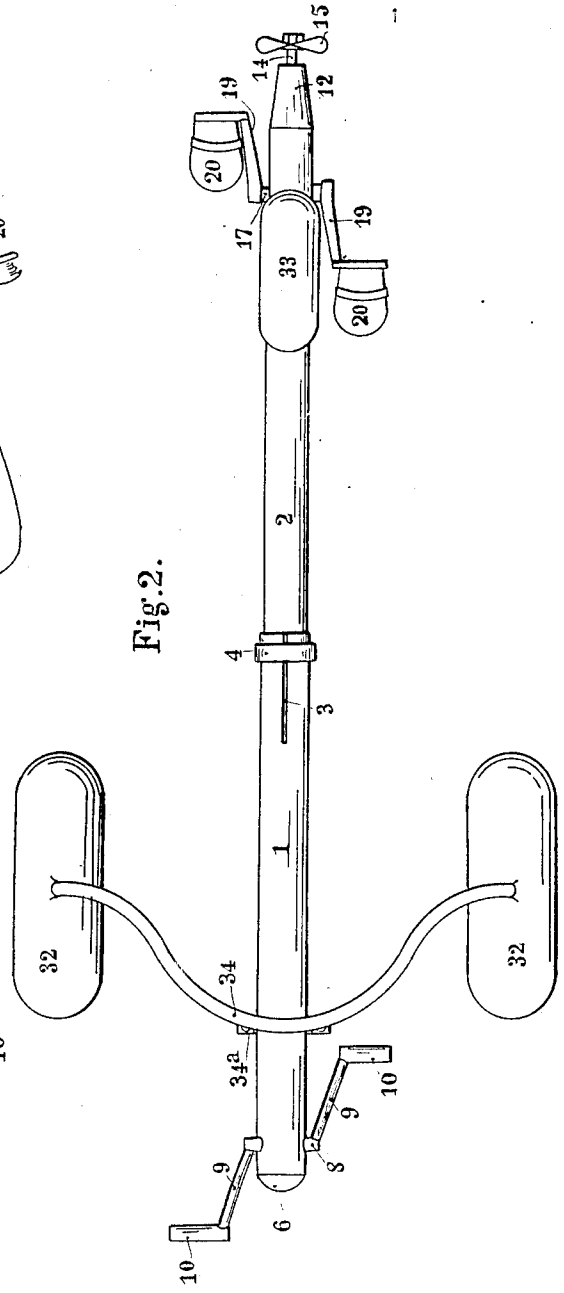


Fig.2.



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SWIMMING APPARATUS

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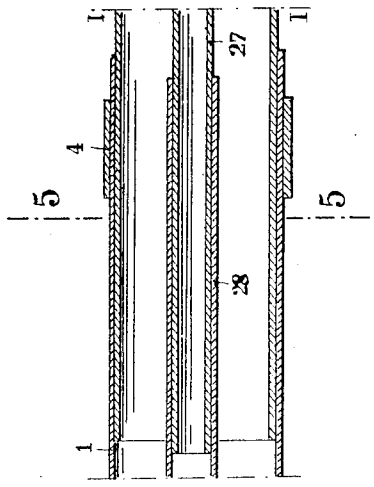

Fig. 4.

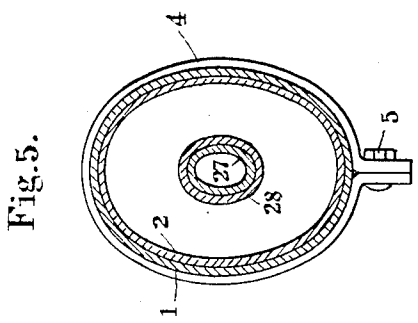

Fig. 5.

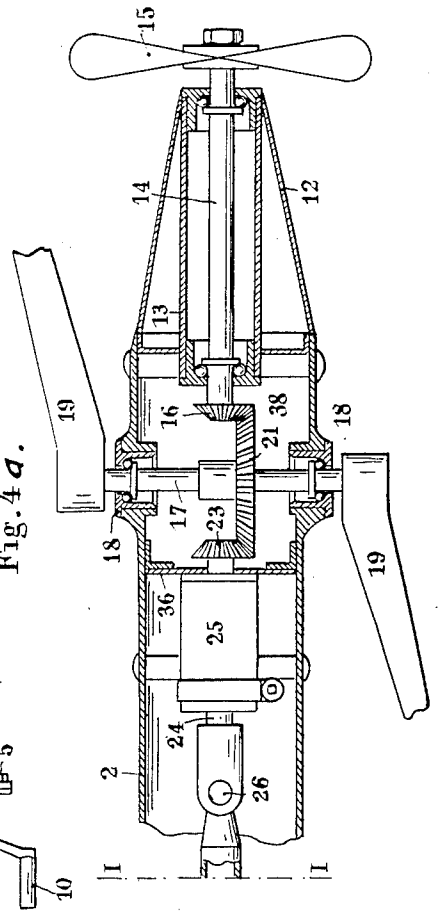

Fig. 4a.

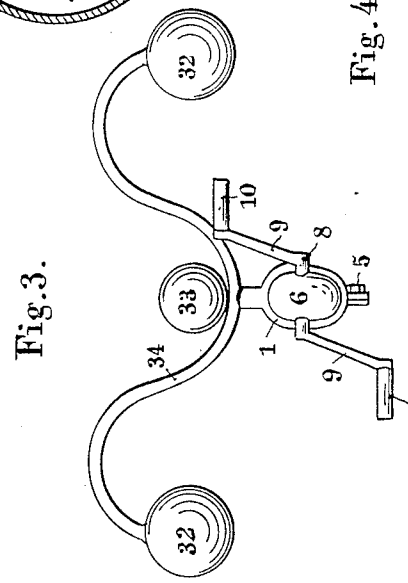

Fig. 3.

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Fig.6.

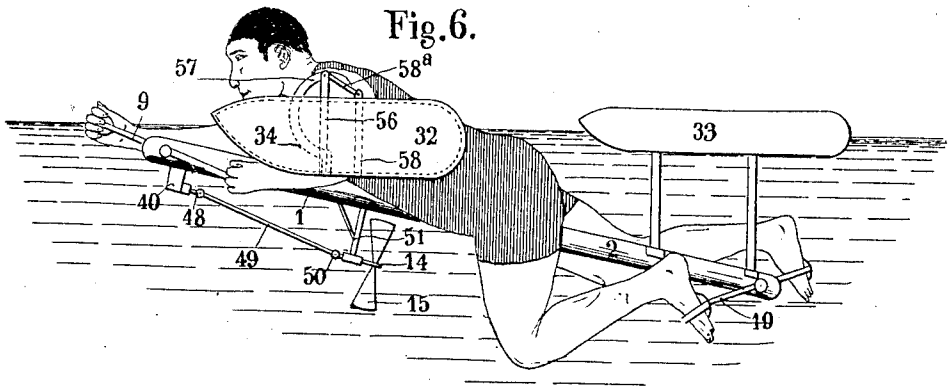

Fig.7.

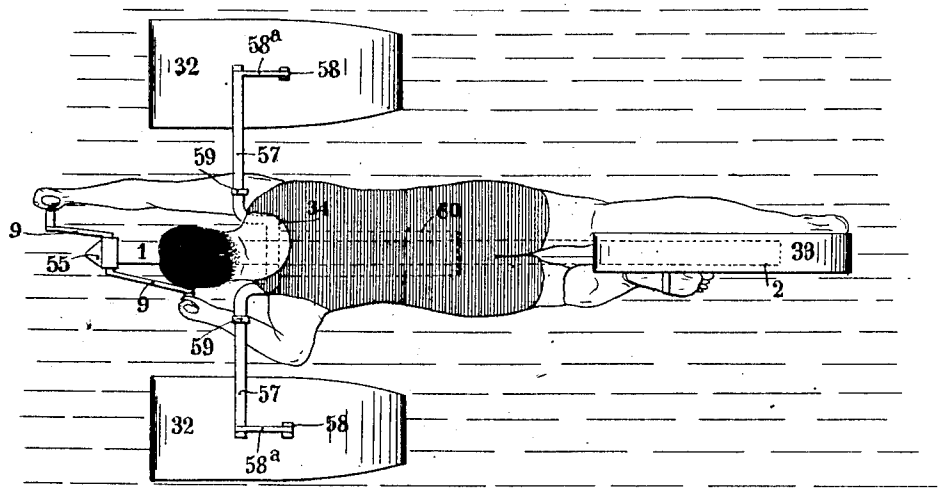

Fig.8.

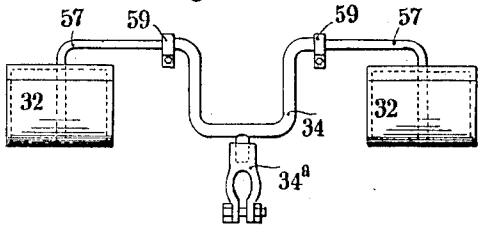

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Fig.9.

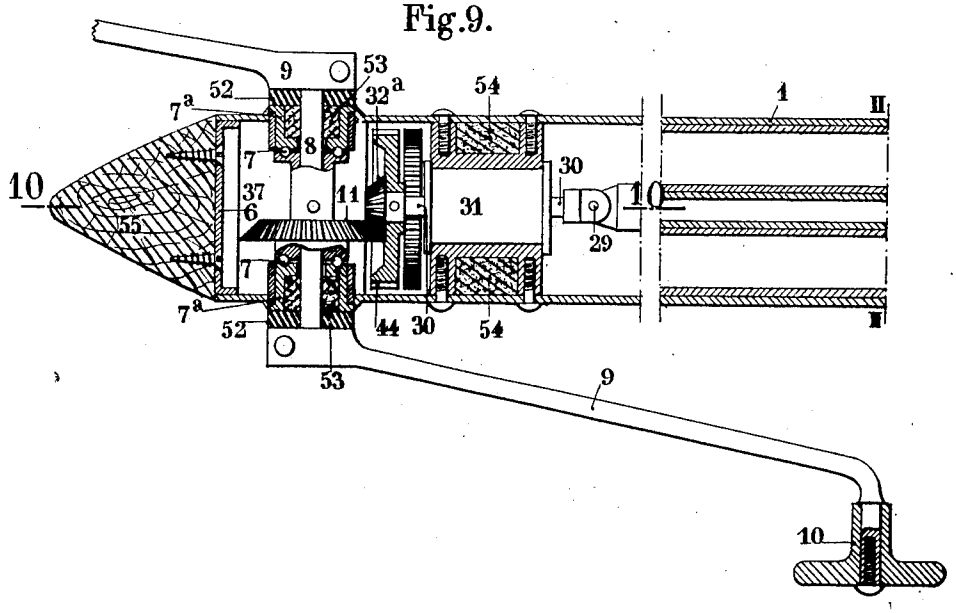

Fig.9a.

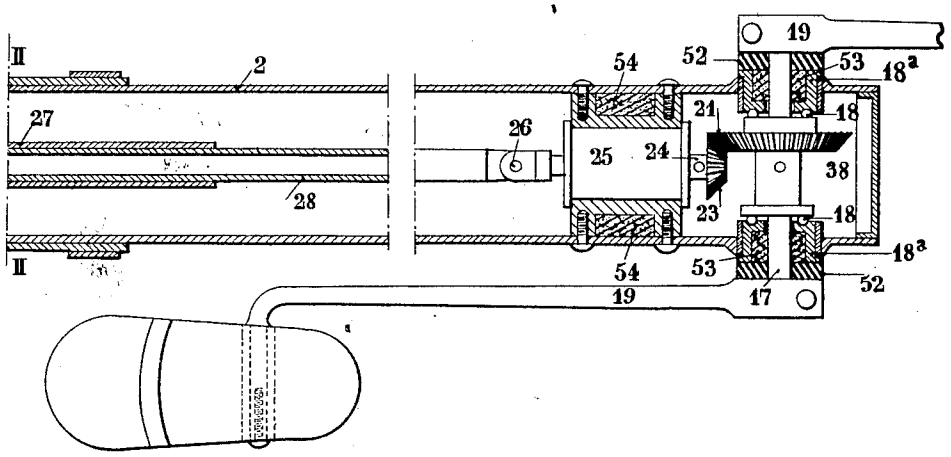

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Fig. 10.

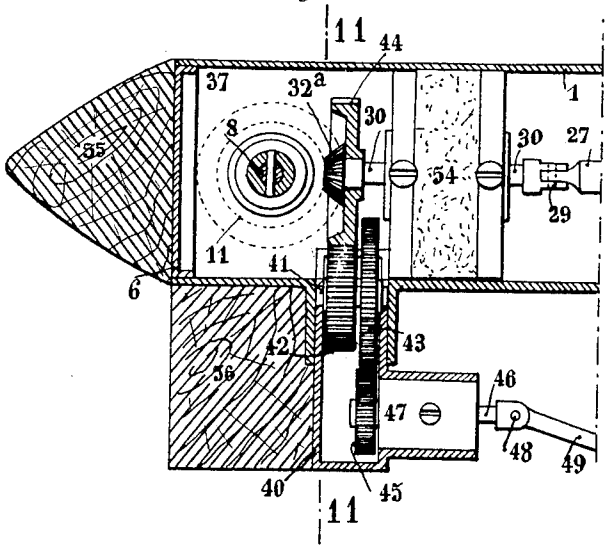
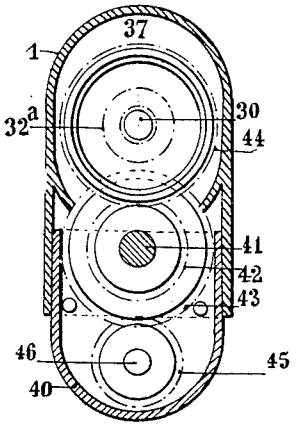


Fig. 11.



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Patented Sept. 10, 1929. 1,728,103

UNITED STATES PATENT OFFICE.

RÉNÉ GUSTAVE CHALIGNÉ, OF PARIS, FRANCE.

SWIMMING APPARATUS.

Application filed March 9, 1928, Serial No. 260,484, and in France March 24, 1927.

The present invention has for its object a swimming apparatus comprising a casing provided with floats and with a propeller which is so arranged as to receive its rotary movement by the simultaneous action exerted by the hands and feet of the swimmer on two pairs of opposite cranks, so as to allow of using in the best conditions the unbending action of the limbs of the swimmer.

The driving crank shafts which pass through the floating casing at its ends, are connected together by means of toothed wheels and of a counter-shaft enclosed in the said casing and actuate at a suitably multiplied speed the shaft of the propeller.

This floating casing as well as the shaft connecting, by means of gears, the driving crank shafts, are each constituted by two tubes of elliptical section sliding in each other so as to allow of folding the apparatus, for reducing to the minimum the space it occupies and placing it in a case, when it is not in use, and in the developed position, of adjusting its length according to the stature of the swimmer.

Both crank shafts are mounted in ball bearings and are enclosed in fluid-tight chambers, filled with oil and formed at the front and rear ends of the floating casing.

In order that the invention may be clearly understood, the apparatus forming the subject-matter of the same will be described hereinafter, by way of example with reference to the accompanying drawing, in which:

Fig. 1 is a front view of a first form of construction.

Fig. 2 is a plan view.

Fig. 3 is an end view.

Fig. 4 is a horizontal section, on an enlarged scale, showing the front end of the apparatus.

Fig. 4ª is a similar view of the rear end of the apparatus.

Fig. 5 is a cross vertical section made according to line 5—5 of Fig. 4.

Fig. 6 is a side view of a modification.

Fig. 7 is a corresponding plan view.

Fig. 8 is a front view of the front floats.

Figs. 9 and 9ª are a partial horizontal section on an enlarged scale.

Fig. 10 is a partial longitudinal vertical section of the front of the casing or hull, made according to line 10—10 of Fig. 9.

Fig. 11 is a cross vertical section made according to line 11—11 of Fig. 10.

As illustrated in the accompanying drawing, the swimming apparatus forming the subject-matter of the present invention, comprises a casing or hull which is essentially constituted by two sheaths 1 and 2 of elliptical cross section fitting and capable of sliding with slight friction in each other.

The tubular sheath 1 which covers the sheath 2 on an adjustable portion of its length, is slotted, as indicated at 3 and rigidly secured on the sheath 2 by means of a collar 4 provided with a tightening bolt 5.

The sheath 1 is closed, at its front end, by a cap 6 and carries a transverse shaft 8 mounted in ball-bearings 7; on this shaft 8 are rigidly secured, on the one hand two cranks 9 having a handle 10 and adapted to be actuated by the hands of the swimmer and, on the other hand, a bevel wheel 11.

The sheath 2 terminates and is closed, at the rear end of the casing or hull, by a conical part 12 within which is secured a ball-bearing 13 carrying the shaft 14 of the propeller 15 provided with a driving pinion 16.

This sheath 2 is also provided, as the sheath 1, with a transverse shaft 17 parallel to the shaft 8 rotating in ball-bearings 18 and on which are rigidly secured two cranks 19 having pedals 20 adapted to be actuated by the feet of the swimmer and arranged opposite the cranks 9, as clearly shown in Figs. 1, 2, 6 and 7.

On this driving shaft 17 is, moreover secured a bevel wheel 21 gearing with two pinions, one 16, rigid with the shaft 14 of the

propeller 15, and the other 23 secured on a trunnion 24 supported in a ball-bearing 25 secured in the tubular sheath 2.

This trunnion 24 is connected, by a Cardan joint 26, to a tube 27 of oval cross section, which fits and slides in another tube 28 of similar shape, and connected, by a Cardan joint 29, to a second trunnion 30 mounted in a ball-bearing 31 secured in the tubular sheath 1 of the casing or hull and carrying a pinion 32 gearing with the toothed wheel 11 of the driving shaft 8 actuated by the hands of the swimmer.

It will be seen from the foregoing, that the particular constitution of the casing or hull and of the counter-shaft 24—27—28—30 arranged in the latter allows, by completely telescoping the tubular sheaths 1 and 2 and 27—28, of reducing to the minimum the cumbersomeness of the apparatus, when it is not in use and, by developing more or less these sheaths, of giving to the apparatus any desired length, according to the stature of the swimmer.

It will also be seen that the elliptical cross section given to the sheaths 1 and 2 and to the tubes 27 and 28 of the counter-shaft ensures the fitting into each other of these various elements in such a manner that the latter cannot rotate relatively to each other and that the engagement of the tubular elements of the telescopic shaft is always ensured in a constant manner.

Finally, it will be understood that the connection by Cardan joints of the telescopic shaft 27—28 with the trunnions 24 and 30 allows, in case of flexure of the casing or hull and of this shaft, to always ensure in a perfect manner, the connection of the two driving shafts 8 and 17 and, the transmission of the movement imparted to this shaft, to the shaft 14 of the propeller.

The buoyancy and stability of the above described apparatus are ensured by two floats 32 arranged at the front and by a third float 33 arranged at the rear of the apparatus.

The front floats 32 are carried at the end of a bracket 34 which, rigid with a clamping collar 34^a allowing to adjust the position on the sheath 1 of the said bracket according to the stature of the swimmer, is so shaped as to allow the latter to easily place himself between the floats and to constitute a support for the swimmer; the said bracket extending on the shoulder-blades and partially surrounding the shoulders whilst leaving to the arms their complete freedom of movement. The rear float 33 is carried by the sheath 2 of the casing or hull and is disposed between the legs of the swimmer in such a manner that it does not hinder his movements, in any way whatever.

The three floats are constituted by air pockets which, when the apparatus is not in use, are caused to subside for allowing the said folded up apparatus to be placed in a case.

As illustrated in the drawing, the two tubular sheaths 1 and 2 of the casing or hull are respectively provided, at a certain point of their length, with a partition 35—36 limiting at the ends of these tubular sheaths, the chambers 37—38 which are hermetically closed and filled with oil so as to ensure the constant lubrication of the driving shafts 8 and 17 and of the transmission members which are enclosed in the said chambers sheltered from contact with the water.

Finally, the fluid-tightness of the casing or hull at the point where the two sheaths 1 and 2 overlap, the sheaths being maintained at the desired stretched out position, by the clamping collar 4, can be ensured by a sleeve made of rubber, placed on the said sheaths and covering the joint line.

In the form of execution illustrated Figs. 6 to 11, the front chamber 37 in which is mounted the shaft 8, is provided, at its base, with an opening in which is fitted and suitably secured a gear case 40. In this gear case is enclosed a multiplying gearing comprising, secured on an axis 41, a spur pinion 42 and a toothed wheel 43 which are respectively in engagement with a toothed wheel 44 integral with the shaft 30 and with a pinion 45 secured on the end of a shaft 46 mounted in a ball-bearing 47 and connected by a Cardan joint 48 to an inclined shaft 49 pivoted, by a Cardan joint 50, to the shaft 14 of the propeller 15 journalled in a support 51 secured in the sheath 1 of the casing or hull as clearly seen in Fig. 6.

The two chambers 37 and 38 in which are mounted the shafts 8 and 17 are filled with oil for ensuring the constant lubrication of the said shafts and of the driving pinions, and the fluid-tightness of these chambers is ensured by means of packings constituted by rubber rings 52 clamped between the cranks 9—19 and the cages 7^a and 18^a of the ball-bearings 7 and 18 in which are also placed other packings 53 made of cork.

For the same purpose, the ball-bearings 31 and 25 within which rotate the shafts 30 and 24 are surrounded by a cork packing or lining 54.

The floats ensuring the buoyancy and the stability of the apparatus and of the swimmer who takes his place on the latter, are constituted by three air pockets two of which 32 are arranged at the front and the other 33 at the rear.

These pockets are so formed as to present in cross section the shape of a rectangle; their bottom is suitably raised towards the front so as to form with their upper wall a sharp edge which presents itself slightly above the level of the water and

so as to thus constitute floats offering little head resistance.

For further reducing this resistance, the front end of the casing or hull is provided with wooden elements 55 and 56 which present, at the front, a sharp edge and are respectively secured on the bottom 6 of the sheath 1 and on the front face of the gear case 40 enclosing the speed multiplying gearing.

The rear float 33 is farther away from the sheath 2 than the floats 32 from the sheath 1 so that the apparatus takes in the water the inclined position shown in Fig. 6 and that the swimmer using this apparatus is immersed in such a manner that only the head and shoulders are above the level of the water; this also contributes, with the position given to the propeller, to the facility of advance of the apparatus.

For reducing the resistance to the penetration of the hands in the water, the front cranks 9 are provided with handles which are constituted by knobs 10 arranged in such a manner that the palm of the hand which grips them is vertically directed.

The front floats 32 are each internally provided with two tubular cross pieces; in one of these cross pieces 56 fits the vertical branch of a bent arm 57 which is connected to the second cross piece 58 by an inclined bar 58ª pivoted to the said cross piece 58 and which fits, by means of a collar 59 at each end of a U-shaped support 34.

This U-shaped support 34 is so shaped, as clearly seen in Fig. 1, as to pass in front of the shoulders of the swimmer and to support, in its middle part, the upper part of the thorax of the latter which, on the other hand, bears on an apron 60, made of rubberized fabric, secured to the said collar and at a suitable point of the sheath 1 (Fig. 7).

The support 34 fits in the socket of a clamping collar 34ª which fits on the sheath 1 at a point adjustable at will according to the stature of the swimmer.

Claims:—

1. A swimming apparatus capable of being folded up and of adjustable length comprising: a casing or hull constituted by two sheaths sliding one on the other without rotating,—two floats of adjustable position on the front sheath and a float on the rear sheath,—two chambers formed in the ends of the casing or hull and two shafts passing through these chambers and journalled in ball-bearings,—two cranks, outside the casing or hull, secured on each of these shafts, handles on the front cranks, pedals on the rear cranks,—toothed wheels secured on these shafts and enclosed in the chambers of the telescopic casing,—pinions in engagement with these toothed wheels and secured on trunnions mounted on ball-bearings arranged in the casing or hull,—a telescopic shaft in the casing and formed as the latter, by two tubes sliding one on the other without being capable of rotating, one relatively to the other, and connected by Cardan joints to the above mentioned trunnions,—a propeller, outside the casing, receiving its rotary movement from cranks actuated by the hands and feet of the swimmer.

2. A swimming apparatus capable of being folded up and of adjustable length, comprising: a casing or hull of adjustable length and constituted by two sheaths of elliptical cross section fitting and sliding one in the other, a rubber sleeve covering the joint of the two sheaths,—a bracket arranged so as to serve as a support for the upper part of the thorax of the swimmer and a clamping collar allowing to secure the bracket at any point of the length of the front sheath of the casing, two floats carried by this bracket and permanently secured on the rear sheath,—two chambers filled with oil formed respectively at the front end and the rear end of the telescopic casing, a shaft passing through each chamber and journalled in ball-bearings, fluid-tight packings ensuring the closure of these two chambers,—two cranks, outside the casing or hull, secured on each of these shafts, handles on the front cranks, pedals on the rear cranks,—toothed wheels secured on these shafts and enclosed in the chambers of the telescopic casing,—pinions in engagement with these toothed wheels and secured on trunnions mounted on ball-bearings arranged in the casing or hull,—a telescopic shaft in the casing and formed as the latter, by two tubes sliding one on the other without being capable of rotating, one relatively, to the other, and connected by Cardan joints to the above mentioned trunnions,—a propeller, outside the casing, receiving its rotary movement from cranks actuated by the hands and feet of the swimmer.

3. A swimming apparatus capable of being folded up and of adjustable length, comprising: a casing or hull of adjustable length and constituted by two sheaths of elliptical cross section fitting and sliding one in the other, a rubber sleeve covering the joint of the two sheaths,—a bracket to serve as a support for the upper part of the thorax of the swimmer and a clamping collar to secure the bracket at any point of the length of the front sheath of the casing, two floats carried by this bracket and permanently secured on the front sheath,—a chamber filled with oil formed at the front end, another chamber, at the rear end of the telescopic casing, a transverse shaft passing through each chamber and journalled in ball-bearings,—two cranks, outside the said casing integral with each of the above-mentioned shafts, handles on the front cranks, pedals on

the rear cranks, rubber rings threaded on the two shafts between the cranks and the boxes of the ball-bearings, cork rings or washers placed in these boxes for ensuring the fluid-tight closure of the oil chambers,—toothed wheels secured on the crank shafts and enclosed in the above-mentioned chambers,—a telescopic shaft arranged in the axis of the casing or hull and formed, as the said casing, by two tubes of elliptical cross section fitting and sliding one in the other, two trunnions extending the said shaft at both its ends, and connected by a Cardan joint to this latter, pinions integral with these trunnions and gearing with toothed wheels integral with the crank shafts,—a gear case secured in the front chamber of the casing, a multiplying gearing enclosed in the said gear case, the first movable element of this multiplying gearing engaging a toothed wheel secured on one of the above-mentioned trunnions and the last movable element gearing with a pinion integral with the shaft of the propeller.

4. A swimming apparatus capable of being folded up and of adjustable length, comprising a casing or hull of adjustable length and consituted by two sheaths of elliptical cross section fitting and sliding one in the other, a rubber sleeve covering the joint of the two sheaths, a bracket adapted to serve as a support for the upper part of the thorax of the swimmer, a clamping collar for securing this bracket at any desired point of the length of the front sheath of the casing, a rubberized box secured to the bracket and at the rear end of the front sheath so as to serve as a support for the swimmer, removable arms on the said bracket, two air pockets forming floats attached at the ends of the said arms, and a float permanently secured on the rear sheath at a greater distance from the said sheath than the front floats are, from the front sheath,—a chamber filled with oil formed at the front end, another chamber, at the rear end of the telescopic casing, a transverse shaft passing through each chamber and journalled in ball-bearings,—two cranks, outside the said casing, integral with each of the above-mentioned shafts, handles on the front cranks, pedals on the rear cranks, rubber rings threaded on the two shafts between the cranks and the boxes of the ball-bearings, cork rings or washers placed in these boxes for ensuring the fluid-tight closure of the oil chambers;—toothed wheels secured on the crank shafts and enclosed in the above-mentioned chambers,—a telescopic shaft arranged in the axis of the casing or hull and formed, as the said casing, by two tubes of elliptical cross section fitting and sliding one in the other, two trunnions extending the said shaft at both its ends, and connected by a Cardan joint to this latter, pinions integral with these trunnions and gearing with toothed wheels integral with the crank shafts,—a gear case secured in the front chamber of the casing, a multiplying gearing enclosed in the said gear case, the first movable element of this multiplying gearing engaging with a toothed wheel secured on one of the above-mentioned trunnions and the last movable element gearing with a pinion integral with the shaft of the propeller.

The foregoing specification of my "swimming apparatus" signed by me this 23rd day of February, 1928.

RÉNÉ GUSTAVE CHALIGNÉ.