Patent claims

1. An underwater scooter for divers characterized in that the scooter is arranged to be installed to a scuba diving tank (JE), wherein the scooter comprises:
   - a thruster (SK) including a motor, a propeller and a hinge,
   - an interchangeable battery pack (BA) with ~~a~~the hinge arranged to be mounted on said scuba diving tank (JE), wherein the thruster (SK) is movably mounted to the interchangeable battery pack (BA) with ~~a~~the hinge,
   - a command joystick (UP) connected to the thruster (SK) with a cable,

   the motor being driven by said interchangeable battery pack (BA) and said command joystick (UP), which is adapted to be held by the diver or to be attached to the diver's diving suit,

   wherein the scooter has two positions:
   - an active position, in which the thruster (SK) is above the scuba diving tank (JE) in a radial sense of said scuba diving tank (JE) and
   - an inactive position, in which the thruster (SK) is placed below the scuba diving tank (JE) in an axial sense of said scuba diving tank (JE),

     which can be changed with the command joystick (UP), so that the active position is achieved by movement of the propeller, as it begins to push the water away upon activation with the command joystick (UP), wherein the active position is locked with a locking mechanism, which is preferably in the form of pins or screw balls engaging with grooves.

2. The underwater scooter for divers according to claim 1 characterized in that the thruster (SK) moves around the hinge from the inactive position into the active position and vice versa only by a push force of the thruster caused by the propeller rotation.

3. The underwater scooter for divers according to claim 1 or claim 2, characterized in that the command joystick (UP) has two operation modes, wherein the scooter is controlled by pressing and holding a push-button (UP.11), or by alternate pressing the push button (UP.16) to switch-on or switch-off the scooter.

4. The underwater scooter for divers according to any of the preceding claims, characterized in that the interchangeable battery pack (BA) is placed around the scuba dive tank (JE) at a bottom level so that the connection of thruster (SK) and interchangeable battery pack (BA) is enabled in ~~the~~a rotating part of ~~contact~~the hinge (SK.32) and a fixed part of ~~contact~~the hinge (BA.20) without any additional cables outside the device.

5. The underwater scooter for divers according to any of the preceding claims, characterized in that the ~~contact~~ hinge which comprises contact conductors, ~~a~~the rotating part of the hinge (SK.32) and ~~a~~the battery connector (BA.20), which connects the thruster (SK) and the interchangeable battery pack (BA), is designed so that among the electrical connection between the thruster (SK) and the interchangeable battery pack (BA) provides the rotation of the thruster (SK) around its transversal axis in both directions between both positions i.e. inactive position and active position.

6. The underwater scooter for divers according to any of the preceding claims, characterized in that a safety mechanism is further provided, which comprises a quick-release pin with a spring ball (BA.19), a locking part (BA.18), two screws (BA.17), two safety screws (BA.15) and two spring plungers with ball (BA.16) on the interchangeable battery pack (BA) and a bolt plate (SK.20) with two bolted holes and screws (SK.19) on the thruster (SK), the safety mechanism keeps the scooter in inactive position during e.g. transportation, storage in warehouse or preparing before the dive; and in that the quick release pin with the spring ball (BA.19) must be removed before the dive.

7. The underwater scooter for divers according to any of the preceding claims, characterized in that the scooter can operate in the water only since there are two stainless contacts inserted in ~~the~~a holder (SK.30) for safety reasons and connected with the electronic circuit of ~~the~~a motor controller, wherein the water establishes electrical circuit between the stainless contacts and thus enables the underwater scooter to operate.

8. The underwater scooter for divers according to any of the preceding claims, characterized in that the scooter is further provided with ~~a~~the locking mechanism, which is ~~preferably~~ suitably shaped pins or screw balls in order to lock the position of the thruster (SK), as the pins or screw balls interlock in grooves provided in an adapter holder (BA.25) of the battery pack (BA); and in that the connection between the pins or screw balls can be released upon selecting “inactivate” button on the command joystick (UP), when the motor starts to rotate in the opposite direction thereby forcing the pins or screw balls to leave the said grooves.

9. The underwater scooter for divers according to any of the preceding claims, characterized in that the scooter is further provided with an interchangeable tilt plate (BA.21), which in the active position assures the appropriate transversal angle between the driving part of the scooter i.e. thruster (SK) and the scuba dive tank (JE) for each diver.

10. The underwater scooter for divers according to any of the preceding claims, characterized in that the scooter can be dimensioned to be used with standardized scuba dive tanks with the diameter 203 mm of different heights, volumes and capacities of the compressed air and with standardized scuba dive tanks with the diameter 171 mm of different heights, volumes and capacities of the compressed air, wherein in the latter case an adapter ring (BA.01) is placed between the interchangeable battery pack (BA) and the scuba dive tank (JE).

11. The underwater scooter for divers according to any of the preceding claims, characterized in that a contact clamp (KS) is further provided as a connector adapter for charging of the interchangeable battery pack (BA) with a suitable battery charger.

12. The underwater scooter for divers according to any of the preceding claims, characterized in that the thruster (SK) comprises the motor, which is a brushless electric motor with a stator (SK.18), wherein on its circumference copper coils

(SK.17) are provided, while a rotor ring (SK.16) with magnets (SK.15) is installed inside the stator (SK.18), wherein said magnets (SK.15) are fixed to the rotor ring (SK.16) with fixing elements such as pins and/or suitable bonding glue; the propeller (SK.09) made of technical plastic is fixed with screws (SK.08) and nuts (SK.13) via an aluminium ring (SK.12) to the rotor ring (SK.16); ceramic bearings (SK.10) assure a bearing arrangement; an axle (SK.11) made of stainless steel is placed in the centre hole of the propeller (SK.09); and in that an outside aluminium ring (SK.21) is fixed with protection covers (SK.06 and SK.22) made of aluminium.

13. The underwater scooter for divers according to claim 12, characterized in that the stator (SK.18) and the rotor ring (SK.16) comprise the appropriate iron lamellas made of the transformer sheet metal; and in that the stator (SK.18) may be protected with epoxy powder coating and the rotor ring (SK.16) may be protected with the same coating having a suitable thickness to prevent corrosion.

14. The underwater scooter for divers according to any of the preceding claims, characterized in that the battery pack (BA) comprises a housing with a battery pack cover (BA.04), a battery pack bottom (BA.12), any type of cells, preferably NiMH or Li-ion cells, rubber o-rings (BA.05, BA.06, BA.09, BA.10) for sealing housing of the interchangeable battery pack (BA), and a load-bearing ring (BA.11) made of aluminium and fixed to the battery pack bottom (BA.12) with screws (BA.13) for bearing the weight of the diving scuba dive tank, wherein the housing comprises an inner ring of battery pack (BA.07), an outer ring of battery pack (BA.08), the battery pack bottom (BA.12) and the battery pack cover (BA.04) and can be made of aluminium or technical plastic.

15. The underwater scooter for divers according to any of the preceding claims, characterized in that the command joystick (UP) comprises three push buttons (UP.11, UP.15, UP.16), a rotation knob (UP.28) for controlling the speed of the scooter, a potentiometer (UP.19) and conical rubber washer (UP.02) and rubber rings (UP.04, UP.07, UP13, UP18, UP20, UP24, UP25) to ensure the command joystick (UP) is waterproof.