DETAILED DESCRIPTION

To all whom it may concern: 1,396,885.

Be it known that I, LEONARDO SANCHEZ, a citizen of the Republic of Cuba, and a resident of Habana, Cuba, have invented certain new and useful Improvements in Devices for Raising Sunken Vessels, of which the following is a specification.

The invention relates to a device for raising sunken vessels such as submarines and the like.

The object of the present invention is to provide a simple, practical and efficient device for raising sunken vessels and the like equipped with magnets for attaching the device to the metal hull or other metallic portion of a sunken object and with a bit provided with a boring portion and a tapping portion, and adapted to cooperate with the magnets for enabling the device to obtain a firm hold on a sunken vessel so that the latter may be lifted without liability of the device accidentally slipping and becoming detached through such displacement.

A further object of the invention is to provide a device of this character equipped with means for positively operating the bit and for automatically and yieldably feeding the same so that the bit will operate as rapidly as possible without liability of feeding the bit too rapidly for the cutting or threading action of the same.

With these and other objects in view the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion, size and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

In the drawings, in which like characters of reference designate corresponding parts in the several figures:

Figure 1 is a vertical sectional view of a lifting device constructed in accordance with this invention.

Figure 2 is an enlarged detail sectional view illustrating the construction of the feeding means for rotating the bit, and for permitting the same to progress in its feeding action.

Figure 3 is a horizontal sectional view illustrating the arrangement of the planetary speed reducing gearing.

Figure 4 is a reverse plan view of the lifting device.

In the accompanying drawing in which is illustrated the preferred embodiment of the invention, the feeding device comprises in its construction a metallic casing 1 preferably of conical form and provided with a detachable upper section 2 and having depending legs or projections 3 at the base which are hollow to form chambers 4 for the reception of magnets 5. Sections of the casing are flanged and bolted together as shown at 6 and a suitable gasket is interposed between the sections to provide a water tight joint or connection. The upper section 2 which constitutes a removable cap for affording access to the interior of the casing is provided at the top with an eye 8 preferably integral with the upper section and adapted to enable a hoisting cable or similar line to be readily attached to the device.

The hollow legs which may be of any desired number are spaced apart and the chambers 4 are preferably elliptical to receive electromagnets. Each magnet 5 is shown consisting of a pair of coils having metallic cores 9 and an armature plate 10 to form a path for the magnetic flux. The legs are provided with marginal elliptical frames or plates 11 arranged in an overlapping relation with the armature plates 10, the plates 10 and 11 being correspondingly recessed at their overlapping portions between the plates to provide a water tight joint or connection to exclude water from the interior of the chambers 4 of the legs 3.

The magnets are also provided at the top with a plate or bar 15 to provide a path for the magnetic flux and the wires 16 for conducting the current to the magnets may be arranged in any desired manner. The marginal plates or frames 11 are secured by screws 17 or other suitable fastening means to the lower ends of the legs and may be readily detached to afford access to the magnets. The magnets which may of any desired power are adapted to secure the device firmly to a metal portion of a sunken object, as will be readily understood.

The casing 1 is provided at the bottom with a central opening 18 receiving a bear-
ing 19 for a shaft 20 and counterbored at the bottom for a metallic gland 21 and a gasket 22 to provide a stuffing box for excluding water from the interior of the casing. The shaft 20 which is adapted to be rotated to operate a bit 23 and to move vertically to permit the bit to feed downwardly. The bit consists of a lower boring portion 24 and an upper tapping portion 25, and it is provided with a shank 26 which is secured in a socket 27 by a key 28 or other suitable means. The socket is formed in a head or enlargement of the lower end of the shaft 20, which is also provided with a fixed collar or flange 30 located above the bottom of the casing and adapted to be supported by the same when the shaft is at the limit of its downward movement. This will enable the strain incident to lifting a sunken object to be sustained by the shaft and the casing without subjecting any of the operating mechanism to such strains. The shaft 20 extends upwardly through a stand 31 which supports planetary shaft rotating gear, a suitable ball bearing 32 being interposed between the shaft actuating device and the stand. The device for rotating the shaft comprises a disk or wheel 33 preferably provided with a gear rim 34 and a plurality of intermediate gears 35 located at the upper face of the disk or wheel 33 and meshing with the gear rim 34 thereof and with a central pinion 36 which slidably receives the shaft 20. The intermediate gears 35 are mounted upon pins 37 which are carried by a fixed support 37a and a central pinion is provided with an upwardly extending sleeve 38 which is connected with the rotary armature of an electric motor 39. By this construction, rotary motion at a reduced speed is transmitted from the electric motor through a planetary gearing to the shaft section, which carries the drill. The disk 33, which has a central opening 40 to receive the shaft, is provided with opposite keys 41 which operate in grooves 42 of the shaft 20 whereby the shaft is slidable interlocked with the disk 34 and is adapted to be rotated by the same, the sliding connection between the disk and the shaft permitting the same to be fed downwardly by a weight 43. The weight 43 which is located within the upper portion of the casing 1 is preferably tapered as shown, and is mounted on an upper shaft 44 having a supporting shoulder 45 and carrying a suitable ball bearing 46 interposed between the weight 49 and the shoulder 45. The weight 43 is provided with a central vertical opening 47 and is secured on the upper portion of the shaft by a key or pin 48. The lower end of the upper shaft is provided with a semi-spherical socket or recess 49 and the upper end of the shaft 20 has a similar socket 50. An antifriction thrust ball 51 is arranged in the said sockets 49 and 50 and interposed between the upper and lower shafts. This will enable the lower shaft to be subjected to the action of the weight to produce a constant pressure on the bit 23 for feeding the same.

The motor casing is provided with suitable brackets 52 which are bolted to the walls of the casing 1, as clearly illustrated in Fig. 1 of the drawings. The wires 53 for supplying the motor with current are preferably arranged in the form of a cable with the wires 16.

In the operation of the device a cable or other supporting line is connected with the eye 8 and the device is lowered into the water and the energized magnets 5 will be attracted by the metallic hull or other metallic portion of the vessel and will be maintained in contact with the same and held firmly in position while the motor is being operated for actuating a bit to drill into the ball or other metallic part. After the drilling portion of the bit has made a hole in such metallic portion of the submerged vessel the tap or threading portion will be carried into the hole and owing to its taper will thread itself within the hole and securely fasten the device to the sunken vessel. After the bit has been properly attached to the vessel the current to the magnets is cut off, leaving the bit as the connecting means between the device and the vessel. Any number of the devices may of course be employed and they may be constructed in various sizes so that submerged vessels and other metallic objects may be readily brought to the surface.

It will be seen that the device is equipped with means for finding a sunken metallic vessel or other object and that when the magnets are attracted by and attach themselves to such metallic object they will exert a jerk or pull upon the cable or line which readily indicates that the sunken object has been located.

It will also be apparent that the gearing for transmitting motion from the motor to the shaft 20 not only reduces the speed but provides a yieldable drive adapted to permit the shaft 20 with its drilling and tapping means to operate with a variable speed which may be required or occasioned by the character of the material operated on by the bit and which will eliminate all liability to injury that might result from a positive feed or a feed proportional to the speed or rotation of the bit and the shaft 20. In operation the pinion 36 which is driven by the motor meshes with the planetary gears 35 at the inner portions of the peripheries thereof radially of the disk between the axis thereof and the axes of the gears 35 whereby the planetary gears set up a frictional en-
engagement at the inner sides of the shafts 37, which results in a rotary movement of the disk. As the disk increases in speed and gains momentum the action of the device in transmitting motion from the motor to the bit will be practically continuous with a uniform application of power. However, should the bit meet with resistance its rotary movement may be retarded without injuring the driving connections between the bit and the motor. This will also enable the motor to rotate without injury to the mechanism after the tapping operation has been completed and it is impossible for the bit to penetrate any further into the material drilled and tapped by it.

What is claimed is:

1. A device of the class described including a casing provided with spaced depending legs adapted to support the device in an upright position and having chambers or compartments, magnets located within the chambers or compartments of the legs and drilling and tapping mechanism for securing the device to a sunken vessel or other object, said drilling or tapping mechanism having gravity means for feeding the same.

2. A device of the class described including a casing provided with hollow depending legs, magnets located within the legs, marginal plates secured to the legs at the lower ends thereof, and gaskets interposed between portions of the magnets and the marginal plates for excluding water from the interior of the hollow legs.

3. A device of the class described including a casing, upper and lower contiguous vertical shafts, means connected with the upper vertical shaft for yieldably urging the same and the lower shaft downward, a motor surrounding the upper shaft and gearing connecting the motor with the lower shaft.

4. A device of the class described including a casing, a motor housed within the casing, upper and lower vertical shafts, the lower vertical shaft being provided with a bit, a weight carried by the upper vertical shaft for feeding the bit, and means for transmitting motion from the motor to the lower shaft for actuating the bit.

5. A device of the class described including a casing, a motor contained within the casing, a shaft movable vertically independently of the motor and mechanism for connecting the shaft with the motor for rotating the shaft and for permitting vertical movement of the shaft, and a weight for urging the shaft downwardly independently of the motor.

6. A device of the class described including a casing, a motor contained within the casing, a vertically movable shaft, mechanism for connecting the shaft with the motor for rotating the shaft and for permitting vertical movement of the shaft, an upper shaft located above said shaft, a thrust ball interposed between the shafts, and a weight carried by the upper shaft for urging the lower shaft downwardly.

7. A device of the class described including a casing having an opening in the bottom, a vertical shaft extending through the opening and provided within the casing with a fixed collar and having a head at its lower end adapted to receive a bit, said shaft being also provided above the collar with longitudinal grooves, a disk having an opening to receive the shaft and provided with means for engaging the grooves thereof, a motor, and means for transmitting rotary motion from the motor to the said shaft.

8. A device of the class described including a casing, a vertical shaft, a motor, and speed reducing means for transmitting rotary motion from the motor to the shaft including a disk slidably interlocked with the shaft, a center pinion connected with the motor, and a plurality of gears mounted on the disk and meshing with the pinion.

9. A device of the class described including a casing provided in its bottom with an opening, a vertical shaft extending through the opening and having a fixed collar, a hollow stand mounted upon the bottom of the casing and receiving the said collar, a motor for operating the shaft, and speed reducing gearing mounted on the stand and connected with the motor and slidably interlocked with the shaft.

10. A device of the class described including a casing, a motor, a tool carrying shaft movable independently of the motor and speed reducing means for reducing rotary motion from the motor to the shaft including a pinion driven by the motor, a disk and a plurality of gears mounted on the disk and meshing at their inner sides with the pinion.

11. A device of the class described including a motor, a vertical tool carrying shaft and speed reducing means for transmitting rotary motion from the motor to the shaft including a pinion driven by the shaft, a disk slidably interlocked with the shaft and a plurality of gears mounted on the disk and meshing with the said pinion.

In testimony whereof I have hereunto set my hand.

LEONARDO SANCHEZ.