The present invention is directed to a releasing mechanism. More particularly, the invention is directed to a releasing mechanism for releasing a second body from a first body. In its more specific aspects the invention is concerned with a releasing mechanism for releasing a float releasably attached to a caisson.

The present invention may be briefly described as a releasing mechanism which comprises a housing adapted to be attached to a first body. A slide member is movable longitudinally within the housing and the slide member is provided with at least one slot having a larger dimension at one end than at the other end. A key member is releasably arranged in the slot and is maintained in the slot when the key member is in the end of smaller dimension and is releasable therefrom when in the end of larger dimension. Flexible means are connected to the key member for attaching the key member to a second body. Means are attached to the slide member for moving the slide member from a first to a second position in the housing and relative to the key member whereby the key member is placed in the end of the slot of larger dimension and is releasable therefrom.

The present invention is particularly adapted to use as a float releasing mechanism wherein floats or pontoons are releasably attached to a caisson or to a vessel. When floats are attached to a vessel or a caisson and it is desired to sink the vessel or caisson, it is quite hazardous to personnel and equipment when the floats or pontoons are released from the caisson or vessel in that the sudden freeing of the floats from the weight of the caisson or vessel causes the pontoons or floats to be released nearly explosively. It is, therefore, desirable and quite useful to provide a float releasing mechanism which may be operated from a remote location, such as a boat, a barge, or platform.

The present invention will be further illustrated by reference to the drawings in which:

FIG. 1 is a view of a caisson having floats releasably attached thereto;
FIG. 2 shows the releasing of the floats and the sinking of the caisson;
FIG. 3 illustrates the caisson placed over an underwater chamber;
FIG. 4 is a view taken along the lines 4-4 of FIG. 1;
FIG. 5 is a view of the releasing mechanism with the key member in the small end of the slot;
FIG. 6 is a similar view to FIG. 5 showing the key member in the larger end of the slot for release therefrom;
FIG. 7 is a view taken along the lines 7-7 of FIG. 5; and
FIG. 8 is a view taken along the lines 8-8 of FIG. 5.

Referring now to the drawings, in which identical numerals will be employed to designate identical parts, numeral 11 designates a caisson in a body of water 12 supported in a floating position therein by floats 13 and 14, which are releasably attached to the caisson 11 as will be described further hereinafter. A piston cylinder 15 is provided on the caisson 11 and is interconnected by a conduit or flexible tube 16 to a hydraulic jack or pump mechanism 17 on the vessel 18. The caisson 11 is provided with flexible lines 19 threaded through the caisson 11 and attached to the reels 20 for positioning the caisson 11 on the underwater chamber 21 connected to a conductor casing 22 through which a well is to be drilled.

In the showing of FIG. 2, the floats 13, which were releasably attached to the caisson 11 by flexible means such as cables 23, are shown floating free of the caisson 11 on the water surface 12 with the floats 14 also released from attachment by cables 23 but still attached to the caisson 11 by cables 24 attached to attaching means 25. In FIG. 3 the caisson 11 has assumed a vertical position on the chamber 21 with the floats 13 moved away. The floats 14 have assumed a position shown in FIG. 3 and attached to the caisson 11 by means of cables 24, the releasing cables 23 having been disconnected from the caisson 11 as will be described further.

Referring to FIG. 4, it will be seen that the cables 23 attached to the floats 13 and 14 are attached to a housing 26. A plurality of housings 26 are shown in FIG. 3 spaced apart vertically on the caisson 11 and interconnected by means of rods 27.

The FIGS. 5 through 8 show the details of the releasing mechanism with the housing 26 connected to the caisson 11, the rods 27 being connected to a slide bar 28 which is movable longitudinally within the housing 26. The slide bar 28 is provided with a plurality of key-hole slots 29 which have a larger dimension on one end and a smaller dimension on the other end as shown as a slot and a circular opening. The key-hole slots 29 may be in the form of a T or in any form having one dimension on one end larger than the dimension on the other end. The key member also in a form to be connected thereto and released therefrom. The slide bar 28 is connected to the housing 26 against longitudinal movement by a shear pin 30 or other frangible means. Stop members 31 are arranged on the housing 11 to restrict the longitudinal travel of the slide bar 28 in the housing 26.

From the showing of FIG. 5 the slide bar 28 has been moved to the right and the key members 32 are in the small end of the slots 29 and are attached to the housings 26. In the showing of FIG. 6, the rod members 27 have moved the slide members 28 to the left, fracturing the shear pin 30 and causing the key members 32 to move into the larger ends of the slots 29, allowing the release of the key members 32 from the slots 29. In FIGS. 7 and 8, the key members 32 are shown attached by anchor bolts 33 to cables 23.

In employing the apparatus of the present invention, an operator on the vessel 18 will actuate the hydraulic pump 17 to cause the piston in the piston cylinder 15 to move to the right, which will pull the rod 27 and cause same to move the slide bar 28 relative to the key members 32, which thereby will be moved into the larger ends of the slots 29 causing release of the cables 23 from the attachment to the caisson 11 allowing the caisson 11 to be sunk as illustrated in FIGS. 6 to 3.

The releasing mechanism of the device of the present invention has been employed successfully in releasing floats such as 13 and 14 from a caisson such as 11 having dimensions sufficiently great for protecting wellhead equipment which may be placed in the chamber 21 and allowing access thereto through the caisson 11 when it is in the position shown in FIG. 3.

The device of the present invention is therefore of great utility and advantage in that it allows the release of floats from a caisson by operation from a remote location and avoids danger to personnel and equipment.

The nature and objects of the present invention having been completely described and illustrated, what I wish to claim as new and useful and secure by Letters Patent is:

1. In combination with an elongated caisson provided with a float releasably attached thereto, a releasing mechanism for said float which comprises a housing attached to the exterior of said elongated caisson, a slide member...
movable longitudinally within said housing, said slide member being provided with at least one slot having a larger dimension at one end than at the other end, frangible means interconnecting the slide member and the housing, a key member sized to move out of said slot when positioned in the end of larger dimension and retained in said slot when in the other end, flexible means connecting said key member to said float, movable means on said caisson flexibly attached to said slide member for moving said slide member from a first to a second position in the housing on rupturing said frangible means to free the float from the caisson through said flexible means by release of said key member from said slot, and power means remotely located relative to said caisson and said movable means and flexibly attached to said movable means for operating said movable means.

2. In a combination as described in claim 1 in which the power means is a hydraulic jack and pump.

3. In a combination as described in claim 1 in which the movable means comprises a piston and a cylinder.

4. In a combination as described in claim 1 in which stop means is provided on said caisson restricting the movement of said slide member.

5. In a combination as described in claim 1 in which the frangible means interconnecting the slide member and the housing is a shear pin.

References Cited in the file of this patent

UNITED STATES PATENTS

1,910,138 Van Hooydonk .......... May 23, 1933
2,627,272 Segal ................. Feb. 3, 1953
2,645,586 Colvin ................ June 30, 1953
2,770,950 Collins ................ Nov. 20, 1956
2,906,500 Knapp ................ Sept. 29, 1959