ABSTRACT

An automatic latch/unlatch mechanism comprising a housing having a plurality of latches pivotally attached thereto. A probe inserted into the housing, a specific first distance and moved in the opposite direction a specific second distance, is engaged by the latches and prevented from being extracted from the housing. Then, if the probe is moved a specific third distance into the housing, the probe may be extracted therefrom.

7 Claims, 7 Drawing Figures
Fig. 1.

Fig. 2a. LATCHES ARE COCKED (NOTE SPRING ON LEFT HAND SIDE OF PIVOTS)

Fig. 2b. LATCHES CAM OPEN WHEN PASSING OVER PROBE

Fig. 2c. LATCHES SNAP CLOSED AFTER PASSING OVER PROBE HEAD

Fig. 2d. LATCHES MOVE TO LEFT CAUSING LATCH FINGERS TO ENGAGE PROBE HEAD AND CAUSING LATCHES TO SHIFT RELATIVE TO PINS

Fig. 2e. LATCHES SNAP OPEN WHEN PULLED TO THE RIGHT

Fig. 2f. LATCHES MAY THEN PASS BACK OVER PROBE HEAD
AUTOMATIC LATCH/UNLATCH MECHANISM

BACKGROUND OF THE INVENTION

1. Field of the Invention
The present invention relates generally to latch mechanisms and more particularly to automatic latch/unlatch mechanisms.

2. Description of the Prior Art
There are a wide range of latch mechanisms in the prior art having applications in such diverse areas as seat belts, safety buckles and emergency releases for parachutes. Such prior art devices have latch members or hooks which engage tongues or probe heads, preventing their extraction. Also such prior art devices employ a multiple variety of additional mechanisms to effect disengagement of the tongue or probe head from the latch members or hooks. This additional mechanism often requires a human in close proximity to the latch mechanism in order to actuate the disengagement mechanism. Such disengagement mechanisms are often complex, difficult to operate, and bulky. In addition, such prior art latch mechanisms cannot be latched and unlatched solely by the movement of the tongue or probe.

SUMMARY OF THE INVENTION

The general purpose of the present invention is to provide an automatic latch/unlatch mechanism that is smaller, less expensive, simpler to operate, requires fewer parts, and is less complex than prior art latch mechanisms. Also, the present invention may be remotely operated as is not the case with most prior art latch mechanisms. To attain this, the present invention provides a housing having a plurality of latch members pivotally attached thereto. The latch members are movable with respect to their pivot points. A spring creates a force on the latch members, tending to rotate them about their pivot points in either a clockwise or counter-clockwise direction, depending upon the position of the latch member with respect to its pivot point. A probe having a head inserted into the housing a first specific distance and then moved in the opposite direction a second specific distance, engaging the latch members, may not be extracted. However, if the probe is moved in the insertion direction a specific third distance, after being in the position not allowing extraction, it may be extracted.

Accordingly, one object of the present invention is to provide a latch and unlatch capability solely by movement of the tongue or probe.

Another object of the present invention is to eliminate the necessity of having a human operator in close proximity to the latch mechanism in order to actuate the latch and the unlatch functions.

Another object of the present invention is to reduce the number of parts, hence reducing complexity, cost, and size.

Another object of the present invention is to make a safer latch mechanism.

Another object of the present invention is to ensure easier and simpler operation.

Another object of the present invention is to provide for faster latch and unlatch time.

Another object of the present invention is to eliminate the necessity of utilizing any additional mechanisms to effect disengagement of the tongue or probe head from the latch mechanism or hooks.

Other objects and a more complete appreciation of the present invention and its many attendant advantages will develop as the same becomes better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

BRIEF DESCRIPTION OF THE DRAWINGS
FIG. 1 is a partial sectional view of a specific embodiment of the present invention.
FIG. 2, a-f, f, is a step-by-step illustration of the operation of a specific embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Ships at sea require underway replenishment of food, fuel, etc. from time to time. One method replenishment uses a constant tension highline connected between a receiving ship and a sending ship to support a load and tensioned hauling lines to move this load. The motion between ships is automatically compensated for by winches.

FIG. 1 illustrates a mechanism for accomplishing underway replenishment. A traveling surf 10 is connected to a housing 12 by a bolt 14. Housing 12 is shown in sectional view. Latch members 16 are connected to housing 12 at pivot points 18. Latch members 16 contain slots 20 in which pivot points 18 fit. Slots 20 permit latch members 16 to move with respect to housing 12 about pivot points 18. A spring 21 is connected between latch members 16. Spring 21 applies a force in latch members 16, tending to rotate them about pivot points 18 in a clockwise or counter-clockwise direction, depending upon the position of pivot points 18 in slots 20. Spring 21 may also be connected between housing 12 and each latch member 16.

Forming part of highline 26 is a probe 22 having a head 24. Probe 22 is connected to pelican hook 28. Pelican hook 28 is attached to receiving ship 30 at point 32. Note that housing 12 has an opening 19 through which probe head 24 may freely pass.

A messenger line 34 is attached to housing 12 at point 36. Traveling surf 10 contains two pulley wheels (not shown) upon which hauling lines 40 ride. Traveling surf 10, housing 12 and latch members 16 are not connected to probe head 24. Traveling surf 10 and housing 12 are pulled from the sending ship by messenger line 34. Upon reaching probe head 24, latch members 16 engage probe head 24, preventing probe head 24's extraction from housing 12.

Now turning to FIG. 2, a-f, f, the operation of latch members 16 is illustrated. FIG. 2a illustrates the position of latch members 16 before probe head 24 is engaged. Spring 21 places a force on top latch member 16, tending to rotate it about its pivot point 18 in a counter-clockwise direction while placing a force on bottom latch member 16, tending to rotate it about its pivot point 18 in a clockwise direction.

Next, as illustrated in FIG. 2b, probe head 24 engages latch members 16, coming them open.

FIG. 2c illustrates the position of probe head 24 after latch members 16 have passed over probe head 24. Probe head 24 must be inserted into housing 12 of FIG.
3,868,922

3

a specific distance to allow latch finger 42 to pass over probe head 24.

Next, as illustrated in FIG. 2d, probe head 24 is moved a specific distance in a direction opposite the insertion direction, thereby allowing latch fingers 42 to engage probe head 24 and moving pivot points 18 to the opposite ends of slots 20. This causes spring 21 to apply a force on top latch member 16, tending to rotate top latch member 16 in a clockwise direction about pivot point 18 and on bottom latch member 16, tending to rotate bottom latch member 16 in a counterclockwise direction about pivot point 18. However, latch members 16 are retained in their position by probe head 24.

But, as illustrated in FIG. 2e, when probe head 24 is moved a specific distance in the insertion direction, latch members 16 rotate about their respective pivot points 18, thereby allowing probe 24 to be extracted from housing 12 of FIG. 1, as illustrated in FIG. 2f.

Latch members 16 are then reset, as illustrated in FIG. 2a, and the automatic latch/unlatch mechanism is ready for operation once again.

Note that the automatic latch/unlatch mechanism requires no human in close proximity to the automatic latch/unlatch mechanism, thereby achieving an unparalleled degree of safety.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

I claim:

1. An automatic latch/unlatch mechanism comprising:

   a. a probe having a head;

   b. a housing having an opening capable of permitting the insertion and exit of said probe; and

   c. means pivotally attached to said housing for engaging said probe head and preventing said probe's extraction therefrom when said probe head is inserted into said housing a specific first distance and then moved in the opposite direction a specific second distance, but allowing said probe's extraction therefrom after said probe head is inserted into said housing said specific first distance, then moved in the opposite direction said specific second distance, and then inserted into said housing a specific third distance.

2. The automatic latch/unlatch mechanism of claim 1 wherein said pivotally attached means includes:

   a. a plurality of latch members, each having a finger for engaging said probe head, each said latch member being pivotally connected to said housing;

   b. means attached to each said latch member for permitting each said latch member to move with respect to its pivot point; and

   c. means connected between each said latch member and said housing for applying a force to each said latch member about its pivot point either clockwise or counter-clockwise, depending upon the physical relationship of each said latch member with respect to its pivot point.

3. The automatic latch/unlatch mechanism of claim 2 wherein means attached to each said latch member for permitting each said latch member to move with respect to its pivot point includes a slot.

4. The automatic latch/unlatch mechanism of claim 2 wherein said means connected between each said latch member and said housing for applying a force to each said latch member includes a spring.

5. The automatic latch/unlatch mechanism of claim 1 wherein said pivotally attached means includes:

   a. a plurality of latch members, each having a finger for engaging said probe head, each said latch member being pivotally connected to said housing;

   b. means attached to each said latch member for permitting such said latch member to move with respect to its pivot point; and

   c. means connected to each said latch member for applying a force to each said latch member, tending to rotate each said latch member about its pivot point either clockwise or counter-clockwise, depending on the physical relationship of each said latch member with respect to its pivot point.

6. The automatic latch/unlatch mechanism of claim 5 wherein said means attached to each said latch member for permitting each said latch member to move with respect to its pivot point includes a slot.

7. The automatic latch/unlatch mechanism of claim 5 wherein said means connected to each said latch member for applying a force to each said latch member, tending to rotate each said latch member, includes a spring.

* * * * *