MULTIPLE PURPOSE LATCH MECHANISM

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ABSTRACT

A latch mechanism is disclosed which includes a generally rectangular housing having a U-shaped notch in one end thereof for receiving a chain link or other element to be restrained. The outer portion of the notch is selectively closed off by a laterally translating bolt such that the element to be contained is completely surrounded. The bolt is generally U-shaped and is provided with a rearwardly extending tag at the outer end of one of its legs. The tag is slotted to receive a pin fixed to a pivot member upon which spring bias may be applied to urge the bolt normally open or normally closed, as may be desired. Appropriate finger operated lock means are preferably included in both the normally open and normally closed variants optionally, a key operated lock mechanism may be provided at the housing end remote from the element receiving notch. To the extent possible, the entire mechanism, as well as the housing, is fabricated from stainless steel or a similar alloy whereby the unit is extremely sturdy and longlasting, even under adverse environmental conditions.

3 Claims, 10 Drawing Figures
MULTIPLE PURPOSE LATCH MECHANISM

This invention relates to the lock mechanism arts and, more particularly, to a lock mechanism in which an element to be contained is inserted into a longitudinal slot which is subsequently closed off to surround the element.

Numerable locking requirements exist for securely, yet readily detachably, containing an eye, chain link, pin, and the like. My invention is directed to a lock mechanism which can be utilized to carry out this function with great reliability for many years, even under conditions of severe use and adverse environment.

It is therefore a very broad object of my invention to provide an improved lock mechanism.

It is another object of my invention to provide an improved lock mechanism of the general type in which access to a slot is closed off by a laterally moving bolt to effect containment.

It is another object of my invention to provide such a mechanism which is extremely tough and durable.

It is yet another object of my invention to provide such a mechanism which closes with great integrity, but which may be easily manually released by an operator.

In another aspect, it is an object of my invention to provide such a mechanism which may be securely locked with a key to prevent unauthorized or unintended manual operation.

The subject matter of the invention is particularly pointed out and distinctly claimed in the concluding portion of the specification. The invention, however, both as to organization and method of operation, may best be understood by reference to the following descriptive drawings taken in connection with the accompanying drawings of which:

FIG. 1 is a partially cutaway perspective view illustrating the mechanism in a presently preferred embodiment.

FIG. 2 is a plan view of the mechanism with the housing partially cutaway to reveal the mechanism in an open position.

FIG. 3 is an exploded view of the mechanism illustrating the various main elements thereof.

FIG. 4 is a partially cutaway perspective view of a variant embodiment of the mechanism.

FIG. 5 is a partially cutaway plan view illustrating the variant mechanism in an open position.

FIG. 6 is an exploded view of the various working elements in the variant mechanism.

FIG. 7 is a partially cutaway perspective view directed to an optional key operated locking mechanism.

FIG. 8 is a cross-sectional view of the key operated mechanism taken along the lines 8-8 of FIG. 7.

FIG. 9 is a fragmentary view illustrating the key operated lock in the locked position; and

FIG. 10 is a fragmentary view illustrating the key operated lock in an open position.

Attention is now directed to FIGS. 1, 2, and 3 in which it will be observed that a generally rectangular housing 1 is provided at one end with a slot 2 for receiving an element to be contained. The outer end of the slot is selectively closed off according to the position of a laterally translating bolt 3. The bolt 3 is guided in its movement by a raised portion 4 of internal guide member 5.

The bolt 3 is generally U-shaped and is provided with a tab 6 extending rearwardly from the inner leg 7 thereof. The outer leg 8 of the bolt 3 closes off or permits access to the slot 2 according to its position. Crossmember 9 connects the legs 7 and 8 of the bolt 3.

The tab 6 is provided with a longitudinal slot 10 for receiving guide pin 11 which is carried on one end of a pivot member 12. The other end of the pivot member 12 is provided with an aperture 13 for loosely receiving a pin 14 which extends between the interior walls of the housing 1. An actuating lever 15 extends at an angle from the pivot member 12 as an appendage thereof. A spring 16 is arranged to urge the pivot member 12 counterclockwise as shown in the figures such that the pressure exerted by the guide pin 11 in the longitudinal slot 10 biases the mechanism toward the normally closed position illustrated in FIG. 1.

The internal guide member 5 carries a locking pin 17 disposed to secure the pivot member, and hence the entire mechanism, in the closed position by preventing the actuating lever 15 from rearward movement. Thus, to release the mechanism from the position illustrated in FIG. 1, the actuating lever 15 must be moved slightly forwardly and then away from the guide member 5 to a position at which it can be drawn rearwardly past the locking pin 17 to open the mechanism as shown in FIG. 2. Sufficient clearance must be provided between the aperture 13 and the pin 14 and between the slot 10 and the pin 11 to permit the slight amount of lateral play necessary.

With the mechanism held in the position illustrated in FIG. 2 by manual pressure upon the actuating lever 15, an element to be contained may be inserted to the slot 2. When the actuating lever 15 is released, the spring 16 forces the pivot member 12 counterclockwise until the forward edge of the actuating lever abuts the rearward surface of the locking pin 17. In this condition, the mechanism is closed but can be readily reopened by simple rearward pressure on the actuating lever 15. If more complete latching is intended, the actuating lever 15 is moved away from the internal guide member 5 sufficiently to clear the locking pin 17 to place the mechanism in the condition illustrated in FIG. 1. The locking pin 17 is preferably slanted forwardly to better contain the actuating lever 15 in this position.

The apparatus may be coupled to a reference element by any convenient means such as the T-shaped member 18 which includes arm 19 extending outwardly from a slot 20 at the end of the housing opposite the slot 2.

The variant embodiment of the mechanism illustrated in FIGS. 4, 5 and 6 differs from that illustrated in FIGS. 1, 2 and 3 principally in that it is biased normally open. The housing 33 contains a laterally translating bolt 21 which differs from the bolt 3 only in that the inner leg 22 is thicker than the corresponding inner leg 7 such that the internal guide member 23 only occupies the space within the housing 33 between the inner leg 22, the outer leg 24, and the crossmember 25 of the bolt 21 when the mechanism is in the closed position, illustrated in FIG. 4. The tab 26 extends rearwardly from the inner leg 22 includes a longitudinal slot 27 for receiving a guide pin 28 carried by pivot member 29. The other end of the pivot member 29 includes an aperture 30 for receiving pivot pin 31 which extends between the inner walls of the housing 33. A spring 32 is
disposed to urge the pivot member 29 clockwise in the
various presented FIGS. 4, 5, and 6. A snap latch 34 is
contained for longitudinal movement within the hous-
ing 33 by wing portions 35 which extend laterally into
longitudinal slots 36 of which only one is in view in
FIGS. 4 and 5. A locking notch 37 is provided in the
rear face of the inner leg 22 of the bolt 21 to receive
the forward edge 38 of the snap latch 34. The snap
latch 34 is biased forwardly by compression spring 39
which extends between the rear face 40 of snap latch
34 and the forward face 41 of spring support 42.

The method of operating the mechanism is apparent
from the foregoing description. Assuming that the
mechanism is closed, as illustrated in FIG. 4, it is only
necessary to draw the snap latch 34 rearwardly to with-
draw the leading edge 38 from the locking notch 37.
When the snap latch is thus engaged, the mechanism
will assume the open position illustrated in FIG. 5 by
virtue of the bias applied to the pivot member 29 by the
spring 32. In the open position, the forward edge 38 of
the snap latch 34 rides against the rearward edge of the
inner leg 22 of the bolt 21. To close the mechanism, the
bolt 21 is pushed downwardly by manual pressure on
the crossmember 25 until the leading edge 38 of the
snap latch 34 seats in the slot 37.

In addition to the readily operated locking means dis-
cussed above, it is desirable, for certain applications, to
provide a secondary, less accessible locking means. As
shown in FIGS. 7–10, this may be achieved by provid-
ing a key operated longitudinally sliding bolt 43 which
operates in and out of a receiver notch 44 disposed in
the rearmost section of a pivot member 45. The bolt
43 is slidable contained by an upper bolt guide 46 and a
lower bolt guide 47 and is urged downwardly by compres-
sion spring 48. A cam surface 49 along the lower edge
of the bolt 43 is proximate a keyhole 50 such that a key
51 may be inserted therein and seated in alignment
hole 52 to bring the actuating portion 53 of the key 51
into operative engagement with the cam surface 49.

FIG. 9 illustrates the mechanism in the locked posi-
tion with the bolt 43 seated within the receiver notch
44. In order to unlock the mechanism, the key 51 is in-
serted through the keyhole 50 and seated in the align-
ment hole 52 after which the key is rotated clockwise
in such a manner that the actuating portion 53 engages
the cam surface 49 to force the bolt 43 rearwardly as
shown in FIG. 10. In this position, the bolt 43 is with-
drawn well clear of the receiver notch 44 such that the
pivot member 45 is free to rotate if otherwise disen-
gaged. Return of the actuating portion 53 of the key 51
to the position shown in FIG. 7 at which the key may
be withdrawn through the keyhole 50 permits the bolt
43 to ride against the rearmost portion of the pivot
member 45. When the mechanism is manually closed
bringing the receiver notch 44 into longitudinal align-
ment with the bolt 43, the bolt will snap home to se-
curely lock the entire mechanism which can subse-
quently be unlocked only by withdrawing the bolt in
the manner discussed above.

Those skilled in the art will understand that certain
of the elements in the mechanism may take obvious
equivalent forms. This includes, particularly, the spring
members which bias the mechanism open or closed as
the case may be. Additionally, the materials and com-
ponents utilized may vary according to the specific intended use of the
mechanism. However, for use under severe operating
conditions and environments I prefer to utilize stainless
steel or alloys with comparable qualities throughout
in order to achieve an extremely sturdy and longlast-
ing mechanism. Size may also vary considerably accord-
ing to the specific intended use of the mechanism.

Thus, while the principles of the invention have now
been made clear in an illustrative embodiment, there
will be immediately obvious to those skilled in the art
many modifications of structure, arrangement, propor-
tions, the elements, materials, and components, used in
the practice of the invention which are particularly
adapted for specific environments and operating re-
quirements without departing from those principles.

I claim:
1. A latch mechanism comprising:
   A. a housing including first and second spaced-apart
      walls;
   B. a receiver slot disposed in a first end of said hous-
      ing and passing from an edge thereof through align-
      ed portions of said first and second walls;
   C. a generally U-shaped bolt captured between said
      first and second walls, said U-shaped bolt having an
      inner leg and an outer leg and a cross-member con-
      necting first ends thereof, said generally U-shaped
      bolt further having a tab portion extending from a
      second end of said inner leg in a direction away
      from said outer leg and parallel to said crossmem-
      ber, said U-shaped bolt being disposed within said
      housing such that said outer leg extends across an
      outer portion of said receiver slot when the mecha-
      nism is in a first position;
   D. an elongated pivot member disposed between said
      first and second walls, said elongated pivot member
      having first and second end portions, said first end
      portion thereof being pivotally fixed for rotation of
      said pivot member thereabout;
   E. linkage means coupling said tab to said second end
      of said pivot member for common movement therewith;
   F. means for applying torque to said pivot member, and
   G. manually operable retaining means for selectively
      fixing said mechanism in said first position, said re-
      taining means including:
      1. an appendage from said pivot member extending
         angularly therefrom and terminating beyond said
         housing proximate said first end of said inner leg;
      and
      2. a pin fixed within said housing and positioned to
         prevent rotation of said pivot piece when said
         mechanism is in said first position by constrain-
         ing said appendage against movement;
   whereby said U-shaped bolt translates between said
   first position thereof and a second position following a
   path transverse said receiver slot, said outer leg being
   withdrawn from across said outer portion of said re-
   ceiver slot in said second position.
   2. The latch mechanism of claim 1 which further in-
      cludes spring means tending to rotate said pivot mem-
      ber such that said U-shaped bolt is biased toward said
      first position through said linkage means.
3. A latch mechanism comprising:
   A. a housing including first and second spaced-apart
      walls;
   B. a receiver slot disposed in a first end of said hous-
      ing and passing from an edge thereof through align-
      ed portions of said first and second walls;
C. a generally U-shaped bolt captured between said first and second walls, said U-shaped bolt having an inner leg and an outer leg and a crossmember connecting first ends thereof, said generally U-shaped bolt further having a tab portion extending from a second end of said inner leg in a direction away from said outer leg and parallel to said crossmember, said U-shaped bolt being disposed within said housing such that said outer leg extends across an outer portion of said receiver slot when the mechanism is in a first position;

D. an elongated pivot member disposed between said first and second walls, said elongated pivot member having first and second end portions, said first end portion thereof being pivotally fixed for rotation of said pivot member thereabout; said pivot member including a receiver notch in an edge of said first end portion, said mechanism further including a key-operated retractable bolt disposed within said housing and positioned for longitudinal alignment and selective engagement with said receiver notch when said mechanism is in said first position;

E. linkage means coupling said tab to said second end of said pivot member for common movement therewith; and

F. means for applying torque to said pivot member;

whereby said U-shaped bolt translates between said first position thereof and a second position following a path transverse said receiver slot, said outer leg being withdrawn from across said outer portion of said receiver slot in said second position.