

March 3, 1970

F. STEENSTRA ET AL

3,498,658

LATCH CONSTRUCTION

Filed Jan. 31, 1968

2 Sheets-Sheet 1

Fig. 1

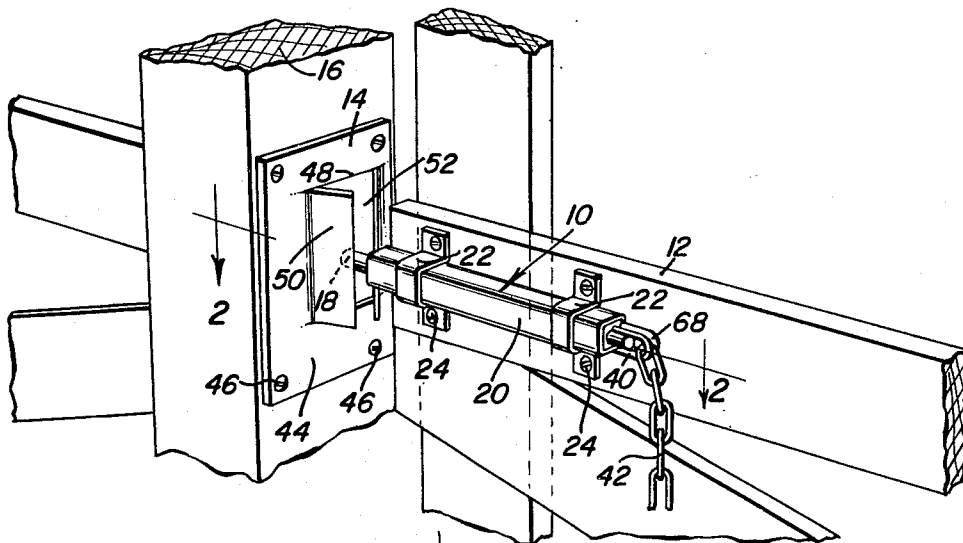


Fig. 2

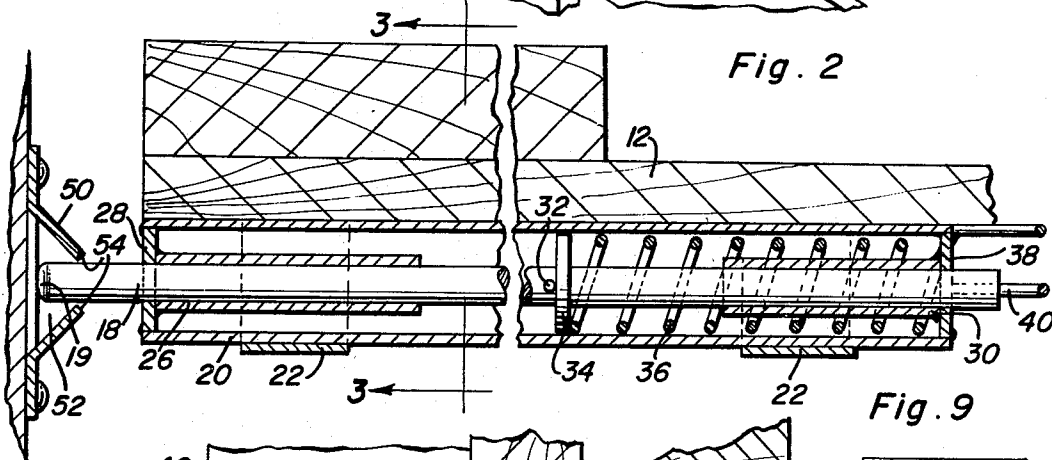


Fig. 9

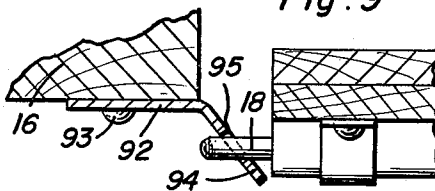
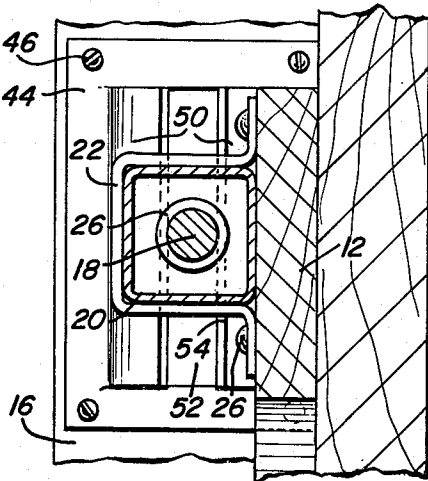


Fig. 3



Floyd Steenstra
Harold Steenstra
INVENTORS

BY *Alfred A. O'Brien*
and *Harvey B. Jacobson*
Attorneys

March 3, 1970

F. STEENSTRA ET AL

3,498,658

LATCH CONSTRUCTION

Filed Jan. 31, 1968

2 Sheets-Sheet 2

Fig. 4

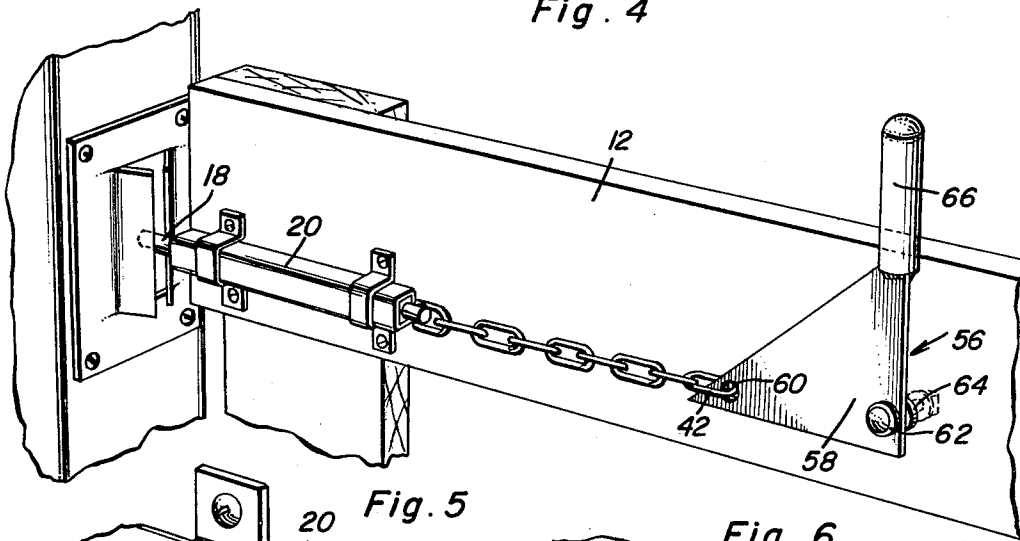


Fig. 5

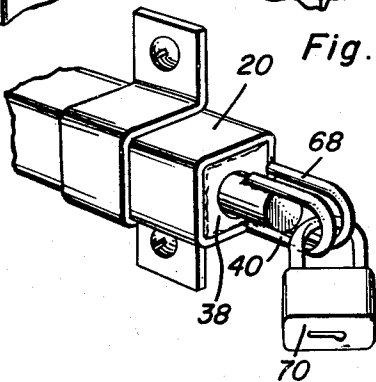


Fig. 6

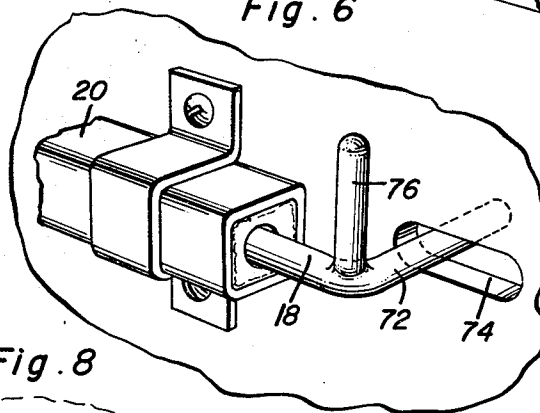


Fig. 7

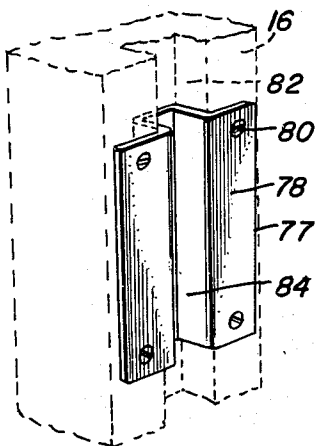
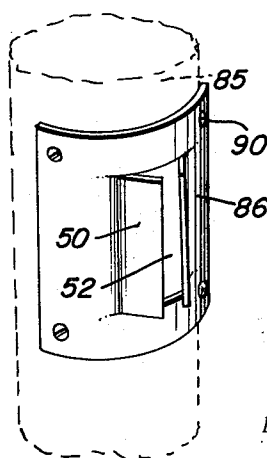


Fig. 8



Floyd Steenstra
Harold Steenstra
INVENTORS

BY *Clarence A. O'Brien*
and *Harvey E. Jacobson*
Attorneys

1

3,498,658

LATCH CONSTRUCTION

Floyd Steenstra and Harold Steenstra, Holland, Minn., assignors of one-third to Peter Sudenga, Magnolia, Minn.

Filed Jan. 31, 1968, Ser. No. 701,998

Int. Cl. E05c 19/02, 1/06; E05b 15/02

U.S. Cl. 292—74

3 Claims

ABSTRACT OF THE DISCLOSURE

A spring-loaded latch construction adapted for mount- upon a gate or door, the bolt of the latch being retract- able within the casing of the latch by means of a chain fixed to the actuating end of the latch. The opposite end of the chain is secured within a pivotable plate member which causes the bolt to retract when the plate is man- ually rotated. A modification of the bolt actuating end includes an L-shaped bolt end, the outward end of the L-shaped bolt being received within a slot in a door or gate. Upon application of a pulling force on this bolt end, the bolt is retracted within the latch casing. A latch keeper includes a central aperture therein with converging projections appending outwardly from the lateral sides of the aperture. An alternate keeper embodiment includes a generally U-shaped bracket which is recessed within a gate post or door frame. A ring member is fastened to the actuating end of the bolt and aligned with a stationarily fixed hasp thereby providing means for locking the latch.

The present invention relates to the field of door latches and more particularly to a spring-loaded latch with a mating elongated keeper.

The prior art has developed spring-loaded latch con- structions which are suited for employment on stockyard gates, barn doors and the like. In stockyard facilities it is customary to employ numerous gates, each to be used as either an alley way block or as entry-exit of a holding pen. It will be appreciated that the gate utilized in such facilities must be sturdy in construction and heavy in weight due to the battering forces encountered from livestock contained therein. Accordingly, the latches used in locking such gates must be capable of withstanding such forces as well as providing ease in operation thereof by a livestock handler. Further, it is noted that it is to the handler's advantage to be able to open such a gate in both directions thereby facilitating the movement of live- stock therethrough. Prior latch constructions are generally capable of withstanding the forces encountered by live- stock gates but they have failed to provide ample bearing support for the bolt of the latch enclosed within the casing. Thus, after extended use, the bolt within the casing wears rapidly when actuated by a chain member usually pulled at an acute angle with respect to the axial movement of the bolt. As the bolt wears to a point in- sufficient to withstand the aforementioned forces, it be- comes bent or broken under successive impacts, the latch eventually losing its utility. Further, the failure to pro- vide adequate bearing support for the bolt within the casing causes binding of the bolt as it is retracted by a pulling force exerted at an acute angle with respect to the axial motion of the bolt. The resultant difficulty in operation causes inconvenience to a livestock handler thereby causing delay in the pursuance of his task.

The prior art generally relies upon a keeper which requires proper alignment with a latch bolt. The require- ment for proper alignment consumes a significant amount of time in the installation thereof and more importantly may require frequent realignment as a gate changes its position due to the constant battering by livestock.

2

Briefly, describing the present invention, a spring-loaded latch construction is provided with a bolt supported along its intermediate length inwardly of the latch casing. This bearing support permits smooth operation over an extended period of time during which the bolt is actuated by a pulling force exerted at an acute angle with respect to the axial displacement of the bolt. In addition, the present invention embodies a pivotable plate actuator including a handle extending vertically therefrom thus permitting a horse-mounted handler to open a gate con- veniently without dismounting. An alternate embodiment includes an L-shaped extension of the actuating end of the bolt, this end of the L-shaped extension being received within a horizontally disposed slot within a gate. Thus, an outwardly displacement of this extension along the slot causes a retraction of the latch bolt within the casing. This slot insures an axial displacement of the bolt thereby eliminating binding of the same during retraction. The present keeper includes a central rectangular aperture with rectangular plate projections appending from the lateral edges of the aperture which extend convergingly outwardly therefrom. The engagement of the bolt within the keeper is facilitated by the converging plates be- cause the bolt end confronting the keeper cams along the outward surface of a plate until the bolt becomes positioned between the confronting plates at which time the bolt snaps into the keeper formed by the converg- ing plates. In use, it is possible for a handler to open and close the gate in either direction. Accordingly, among the salient objects of the present invention is to provide:

A spring loaded latch and keeper assembly permitting two-way opening and closing of a gate to which the assembly is attached;

A spring-loaded latch construction including a bear- ing support for the bolt of the latch in the interior of the latch casing;

A keeper for a latch construction which does not re- quire a precise alignment of the bolt and keeper;

A spring-loaded latch construction with an actuator located remotely of the latch;

A latch bolt construction wherein the outward end portion of the bolt is disposed within a horizontal slot formed within a gate or door thus providing axial sup- port of the latch bolt during retraction of the same with- in the latch casing.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully here- inafter described and claimed, reference being had to the accompanying drawings forming a part hereof, where- in like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view illustrating the latch and keeper construction mounted upon a gate.

FIGURE 2 is a sectional view of the latch and keeper construction along a plane passing through section line 2—2 of FIGURE 1.

FIGURE 3 is a transverse sectional view taken along a plane passing through section line 3—3 of FIGURE 2.

FIGURE 4 is a perspective view illustrating one em- bodiment of the present invention wherein a latch is actuated from a point remote from the latch.

FIGURE 5 is a perspective view illustrating a means for locking the latch.

FIGURE 6 is a perspective view illustrating an em- bodiment of the present invention wherein the actu- ating end of the latch is received within a horizontal slot within a gate.

FIGURE 7 is a perspective view illustrating a gen- erally U-shaped keeper retained within a post.

FIGURE 8 is a perspective view illustrating an alter-

nate keeper including a plate portion conforming to a cylindrical post.

FIGURE 9 is a top plan view of an alternate keeper construction receiving a latch bolt.

Referring to the drawings, FIGURES 1-3 illustrate one embodiment of the present invention utilizing a latch keeper which permits two-way opening and closing of a gate as explained hereinafter. Reference numeral 10 generally denotes a latch which is mounted upon a gate or barn door 12. The latch bolt is received by a keeper 14, the latter being mounted upon a gate or door post 16. Referring specifically to the latch construction, a cylindrical bolt 18 is disposed within a latch housing 20 the latter being interiorly hollow and disposed concentrically of the bolt 18. The latch is secured to the gate or door 12 by means of U-shaped clamps 22 which are fastened to the gate by means of suitable fasteners 24. The clamps 22 are disposed toward both ends of the latch. Referring specifically to FIGURE 2 of the drawings, a cylindrical sleeve bearing 26 is disposed inwardly of the casing 20 and appending perpendicularly of the forward end 28 of casing by means of a welded joint or other suitable attaching means.

Similarly, a cylindrical bearing sleeve 30 appends perpendicularly inwardly from the rearward end 30 of the casing. It is noted that an intermediately central section of the bolt 18 is not supported by either sleeve bearing. This intermediate section does however include a pin 32 depending perpendicularly from the bolt 18. A flat washer 34 is disposed concentrically of the bolt on a point along the length thereof, immediately rearwardly of the pin 32. A compression spring 36 is likewise disposed concentrically about the bolt 18 and in addition circumscribes the periphery of the rearward cylindrical sleeve 30. As seen in FIGURE 2 of the drawings, one end of the spring 36 bears against the flat washer 34 while the opposite end of the spring bears against the rearward end 38 of the casing, with the rearward ends suitably affixed to the longitudinal portion of the latch casing. As will be appreciated by examining FIGURE 2 of the drawings, the compression spring 36 exerts a compressive force upon the flat washer which in turn bear against the pin 32 which in turn yieldingly urges the forward end of the bolt 18 outwardly from the latch casing 20.

A generally U-shaped linkage or ring member 40 is fastened to the rearwardly outward end of the bolt 18 by means of a welded joint or other suitable form of attachment thereby permitting actuation of the present latch and keeper as illustrated in FIGURE 1 of the drawings. A chain 42 is connected to the ring member 40, the chain hangs downwardly therefrom in a manner permitting the grasping of the chain by one wishing to open the gate 12. An outward pulling motion on the chain will cause the forward end of the bolt 18 to retract inwardly of the latch casing thereby freeing the gate from securement.

Referring to FIGURES 1 and 3 of the drawings, the keeper 14 includes a rectangular plate portion 44 secured to a side of a post 16 by means of suitable fasteners 46. The keeper construction further includes a square aperture 48 formed within a central portion of the plate 44. Rectangular plate projections 50 append from the lateral edges of the aperture 48, the rectangular projections 50 converging outwardly from the aperture edges in a manner forming a vertical slit at the outwardly disposed edges 56 of the rectangular plates 50. This slot 52 so formed permits the intrusion of the forward bolt end 18 therein as clearly shown in FIGURE 2 of the drawings. Securement of the bolt within the keeper may best be appreciated by examining FIGURE 2 which clearly indicate the outwardly converging incline of the rectangular plate projections 50 of the keeper 14. Thus, it will be appreciated that when the gate 12 swings

inwardly toward the keeper from an open position, the forward chamfered tip 19 of the bolt 18 cams against the outward surface of a mating rectangular plate 50 causing the increasing retraction of the bolt 18 within the casing 20 until the bolt 18 becomes aligned between the outward edges 54 of the confronting rectangular plate projections 50 in which case the bolt 18 snaps into the slot 52 formed by the plate thereby retaining the bolt 18 therebetween.

FIGURE 4 illustrates an embodiment of the invention as explained in the prior paragraph with a modification in the fabrication thereof including an actuator generally denoted by reference numeral 56 which has particular utility at the top of the gate in a manner preferred in stockyards where handlers are mounted on horseback. This embodiment includes a triangular flat plate 58 normally disposed in overlying relation with the gate or barn door 12 and further disposed so that one leg of the triangular plate extends vertically while the other leg of the plate extends horizontally. An aperture 60 is formed within the angled corner defined by the hypotenuse and horizontal leg of the plate. A second aperture 62 is formed in the angular part defined by the vertical and horizontal legs of each triangular plate. A suitable pin 64 retains the triangular plate 58 in parallel overlying relation with the door 12 and further permits the rotation of the plate in a plane coplanar with the triangular plate 58. A cylindrical handle 66 is welded or otherwise suitably attached to the angular corner defined by the hypotenuse and vertical leg of the triangular plate 58. In operation of this embodiment, an outward rotation of the handle 66 causes the triangular plate 58 to pivot about the pin 64 which causes a commensurate outward displacement of the chain 42, the outermost link of which is secured within the aperture 60. This outward displacement of the chain 42 causes a commensurate retraction of the bolt 18 within the latch casing 20.

As may be seen by referring to FIGURE 5 of the drawings, a generally U-shaped hasp 68 is affixed to the outward end 38 of the casing 20 by means of a welded joint or other suitable connection. Thus, when the bolt resides in its usually extended position within the keeper, the U-shaped ring 40 affixed to the outward end of the bolt and the U-shaped hasp 68 affixed to the outward end of the casing are aligned thereby permitting the passing of a padlock 70 therethrough to prevent unauthorized unlocking of the latch.

FIGURE 6 of the drawings represents another embodiment of the present invention whereby the outward actuating end of the bolt 18 is deformed in the shape of an L-rod, the outward end 72 of the L-rod is passed through a horizontally disposed slot 74, the latter being formed in the gate or barn door 12 to which the casing 20 is fastened. In addition, a cylindrical handle or projection 76 suitably attached to the L-rod appends vertically therefrom to permit the grasping of the same by the user. Accordingly, an outward displacement of the handle 76 causes a similar displacement of the L-rod end 72 within the slot 74, the slot rendering axial support to the bolt 18 which becomes retracted within the casing 20.

As will be noted by studying FIGURE 7 of the drawings, another keeper embodiment is denoted by reference numeral 77. The keeper includes two parallel spaced rectangular plate portions 78 fastened to the latch confronting side of a post 16 by means of suitable fasteners 80. The post 16 is characterized by a generally U-shaped slot 82 extending inwardly from the confronting side of the post 16. A vertically elongated bight portion 84 of the keeper depends inwardly from the parallel plate portions 78 and is received within the U-shaped notch 82. The ends of the bight portion 84 are aligned with the corresponding ends of the rectangular plate portion 78.

FIGURE 8 represents another embodiment of the keeper 14 illustrated in FIGURE 1 of the drawings. The rectangular plate portions 50 are formed in a man-

5

ner resulting in a vertically elongated slot 52 as previously explained in connection with the keeper 14 of FIGURE 1. This particular embodiment is of great advantage when affixing a keeper to a cylindrical post 88 due to the fact that the plate portion of the keeper is formed arcuately as denoted by reference numeral 86 in FIGURE 8. The plate is fastened to the post 88 by means of suitable fasteners 90. FIGURE 9 of the drawings illustrates still a further embodiment of a latch keeper which is attached to a post 16 along a side generally coplanar with the surface to which the latch 20 is fastened. This latter keeper embodiment includes a plate portion 92 fastened to the post side by means of suitable fasteners 93. This plate portion 92 is integrally connected to an appending portion 94, the latter forming an obtuse angle with respect to the plate portion 92. The obtuse angle so formed is within a range between 90 and 180 degrees. The appending plate 94 includes a vertically elongated slot 95 therein thus permitting the passage of the forward bolt end 18 therethrough.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A heavy duty latch construction comprising a cylindrical housing having transverse ends, apertures being axially formed in both ends, elongated tubular journals axially connected in a cantilevered manner to the interior surfaces of the ends, a bolt slidably mounted in the journals to form extensive interfaces between the bolt and journals, the bolt further extending outwardly through the apertures, a first outward end of the bolt serving to engage a keeper, the opposite end being actuated to cause bolt plunging displacement, a washer axially mounted

6

on an intermediate point of the bolt and peripherally contacting the interior housing surface for sliding engagement therewith, a pin stop secured to the bolt and contacting one side of the washer for limiting displacement of the washer in one direction, a spring coaxially mounted on one of the journals for effecting a compact unit, the spring being positioned at one end thereof against the second side of the washer, the opposite spring end bearing against the interior surface of a housing end for normally biasing the keeper engaging bolt end outwardly, the biasing condition of the spring being overcome by the exertion of a pulling force on the actuating end of the bolt for retracting the keeper engaging end into a disengaged condition.

2. The structure set forth in claim 1 together with a pull chain connected between the lever and the actuating end of the bolt for enabling manual retraction of the bolt into the housing.

3. The structure set forth in claim 1 together with a lever pivotally mounted to a supporting surface, and a pull chain connected between the lever and the actuating bolt end, whereby bolt retraction occurs in response to lever rotation.

References Cited

UNITED STATES PATENTS

941,782	11/1909	Hubbard	292—74
952,411	3/1910	Billy	292—141
1,566,321	12/1925	Frantz	292—171
1,615,120	1/1927	Fischer	292—171 X
2,475,392	7/1949	Juszczak	292—74
2,726,112	12/1955	Conhagen	292—340 X
3,073,144	1/1963	Papanti	292—171 X

FOREIGN PATENTS

157,607 12/1932 Switzerland.

J. KARL BELL, Primary Examiner

U.S. CI. X.R.

292—139, 171, 340