US008801051B2

(12) **United States Patent**
Hobbs et al.

(10) **Patent No.: US 8,801,051 B2**
(45) **Date of Patent: Aug. 12, 2014**

(54) **DOUBLE SWING LATCH ASSEMBLY**

(76) Inventors: **Kenneth Hobbs**, Yukon, OK (US); **Travis Gorbet**, El Reno, OK (US); **Bobby Key**, Tuttle, OK (US); **Tim Adams**, Yukon, OK (US); **Craig Starnes**, Piedmont, OK (US); **William Patchell**, Yukon, OK (US); **Lowell Miller**, Newcastle, OK (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 204 days.

(21) Appl. No.: **13/417,956**

(22) Filed: **Mar. 12, 2012**

(65) **Prior Publication Data**

US 2013/0234450 A1 Sep. 12, 2013

(51) **Int. Cl.**
E05C 1/08 (2006.01)

(52) **U.S. Cl.**
USPC **292/163**

(58) **Field of Classification Search**
USPC ..... 292/32, 137, 163, 164, 341.15, 341.18, 292/DIG. 29, DIG. 61
See application file for complete search history.

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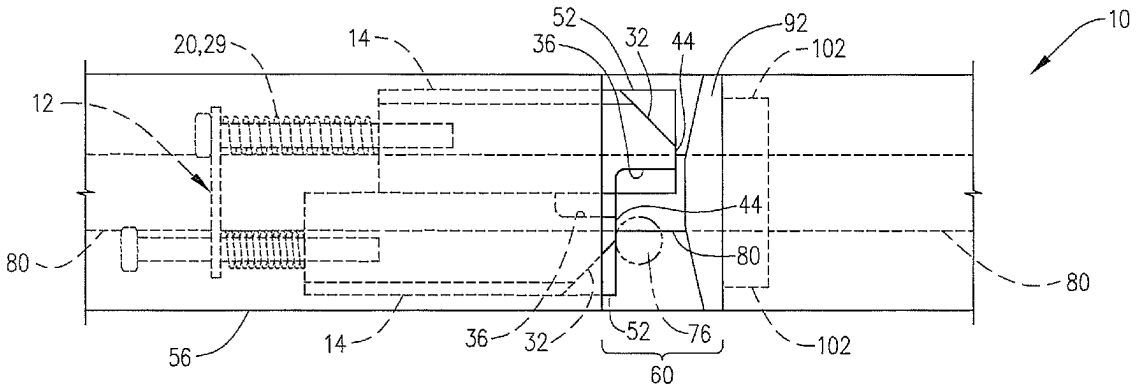
Primary Examiner — Kristina Fulton
Assistant Examiner — Christine M Mills
(74) *Attorney, Agent, or Firm* — McAfee & Taft

(57) **ABSTRACT**

A latch assembly for securing a gate or other pivotal structure that includes a pair of independently retractable outwardly biased latch members carried by a latch carriage. When in an extended position, the latch members define a striker retention slot. Cooperation of the latch members in the extended position provides for retention of a striker member in the striker retention slot. The latch members are supported by rods that pass through the latch carriage.

12 Claims, 11 Drawing Sheets



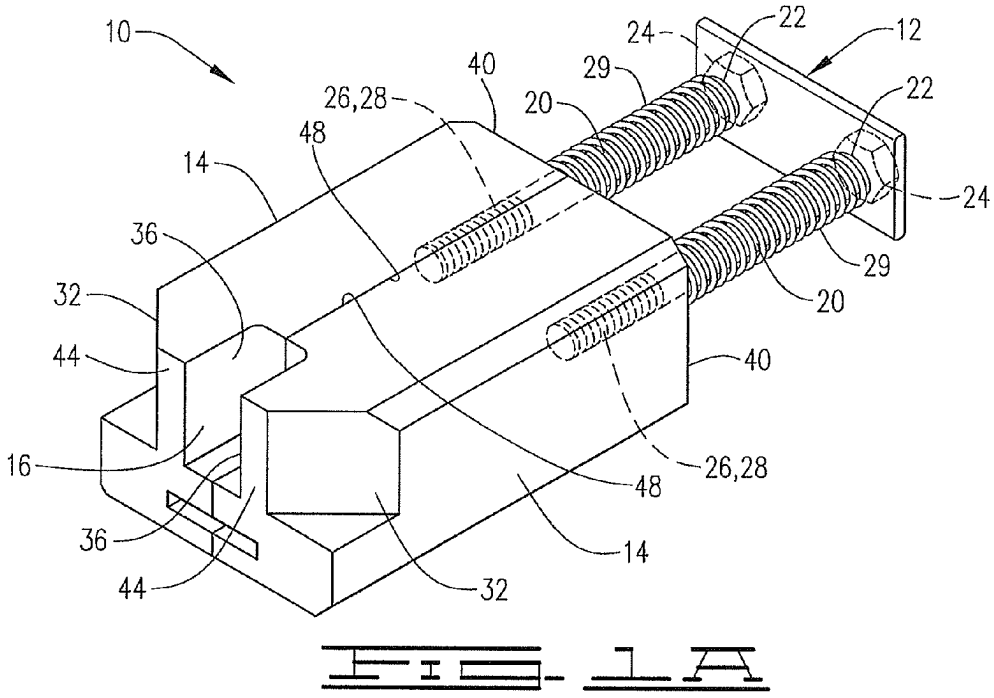

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FIG. 1A

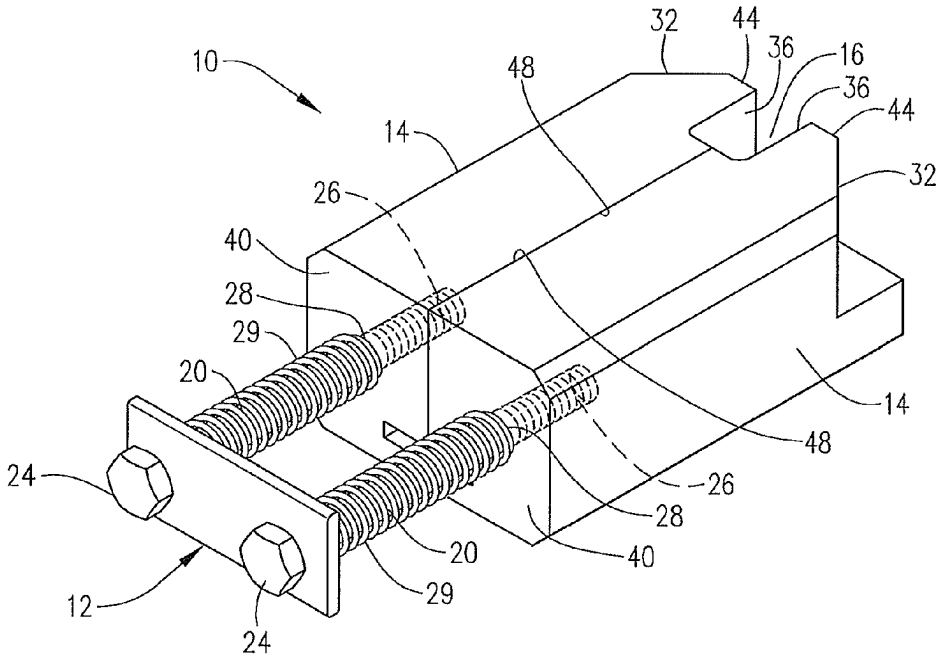
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FIG. 1B

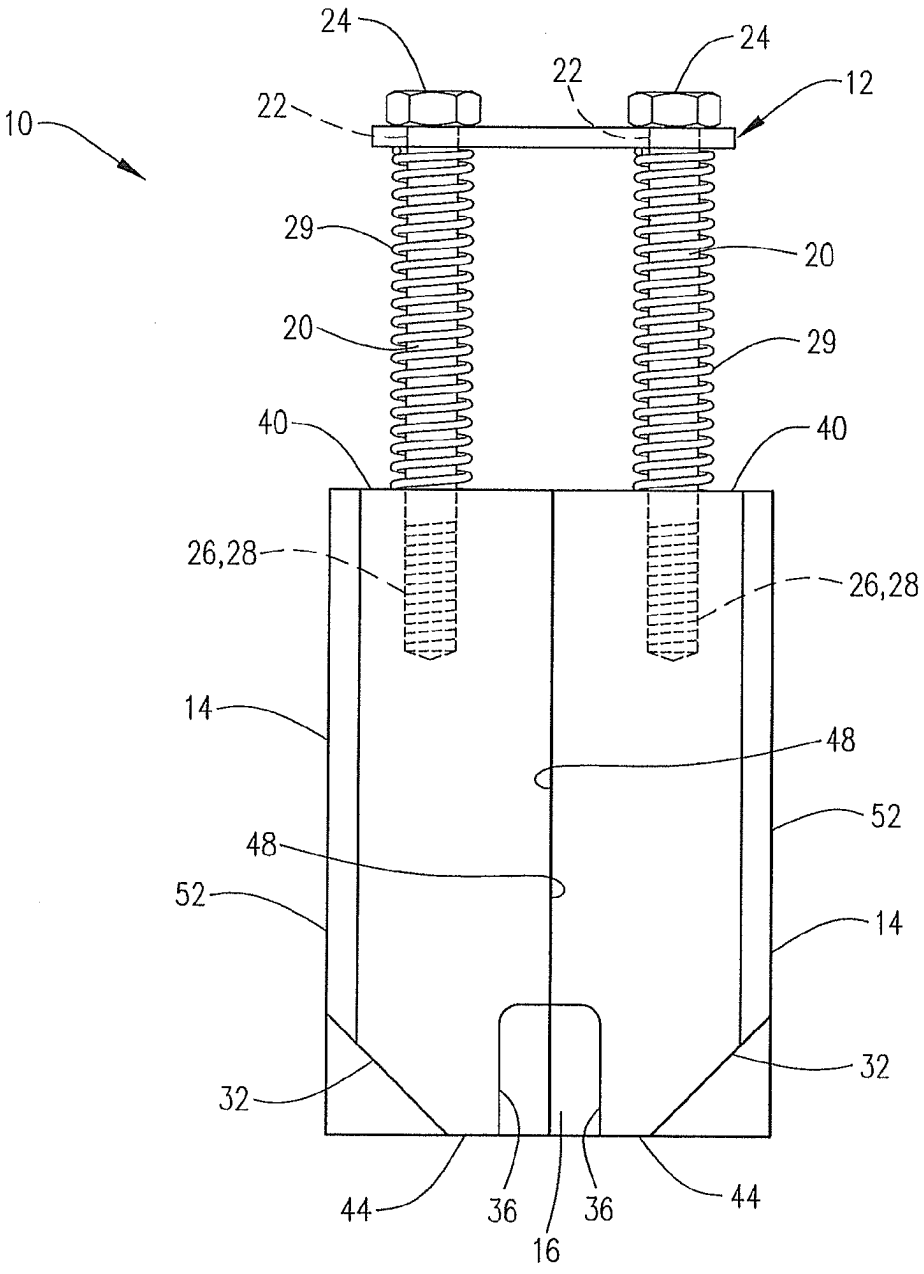
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FIG. 2

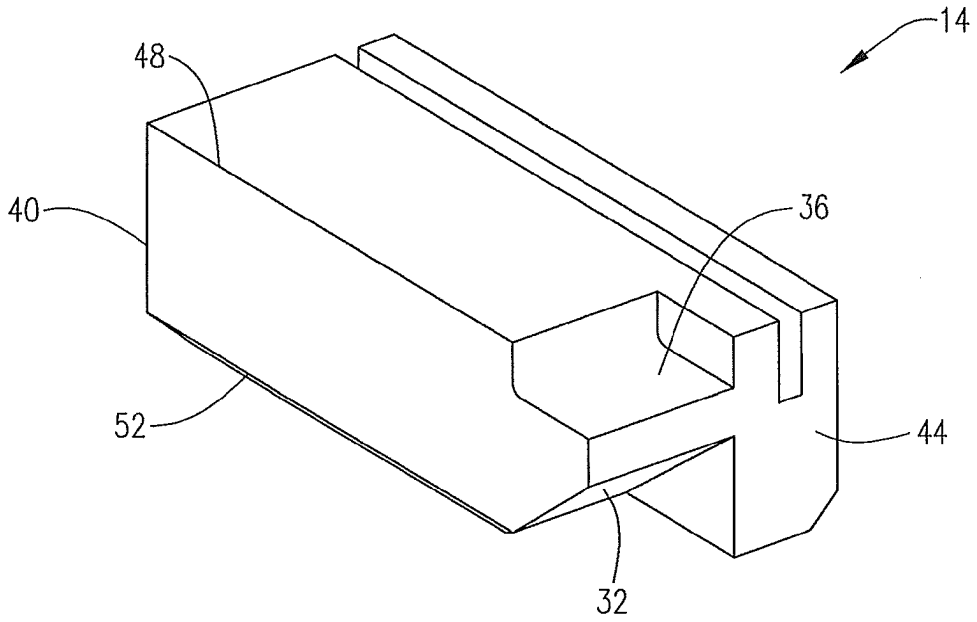


FIG. 3A

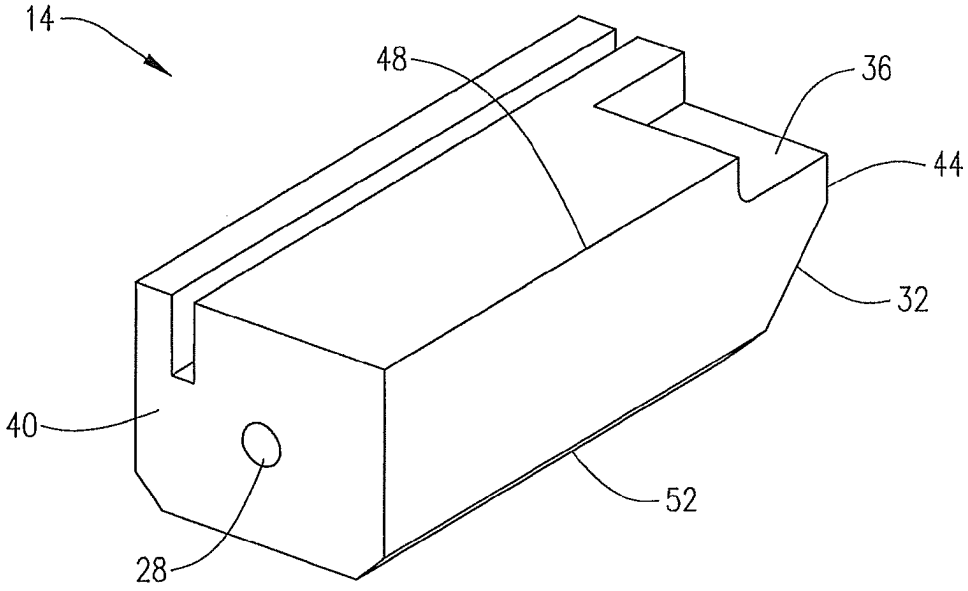


FIG. 3B

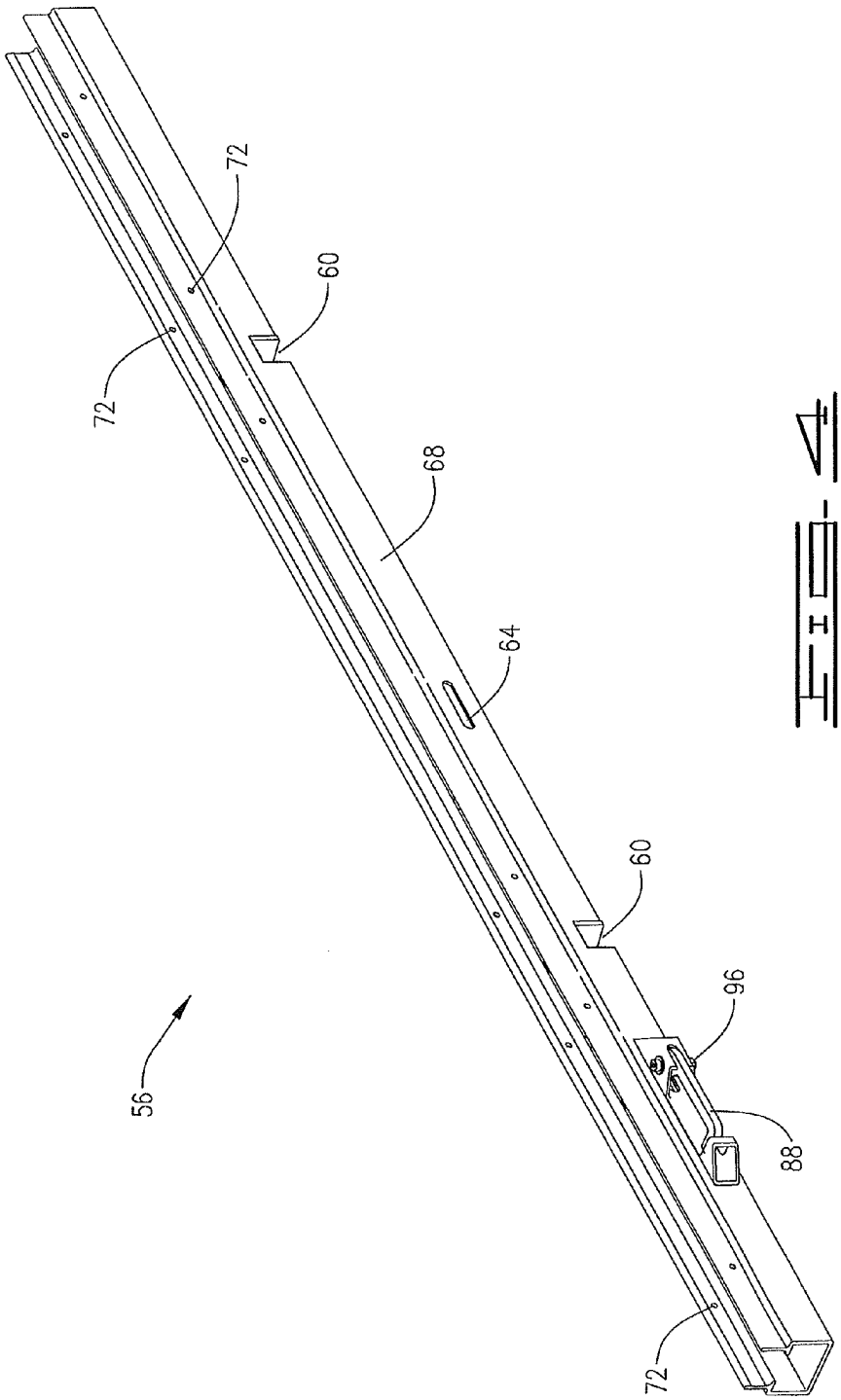


FIG. 4

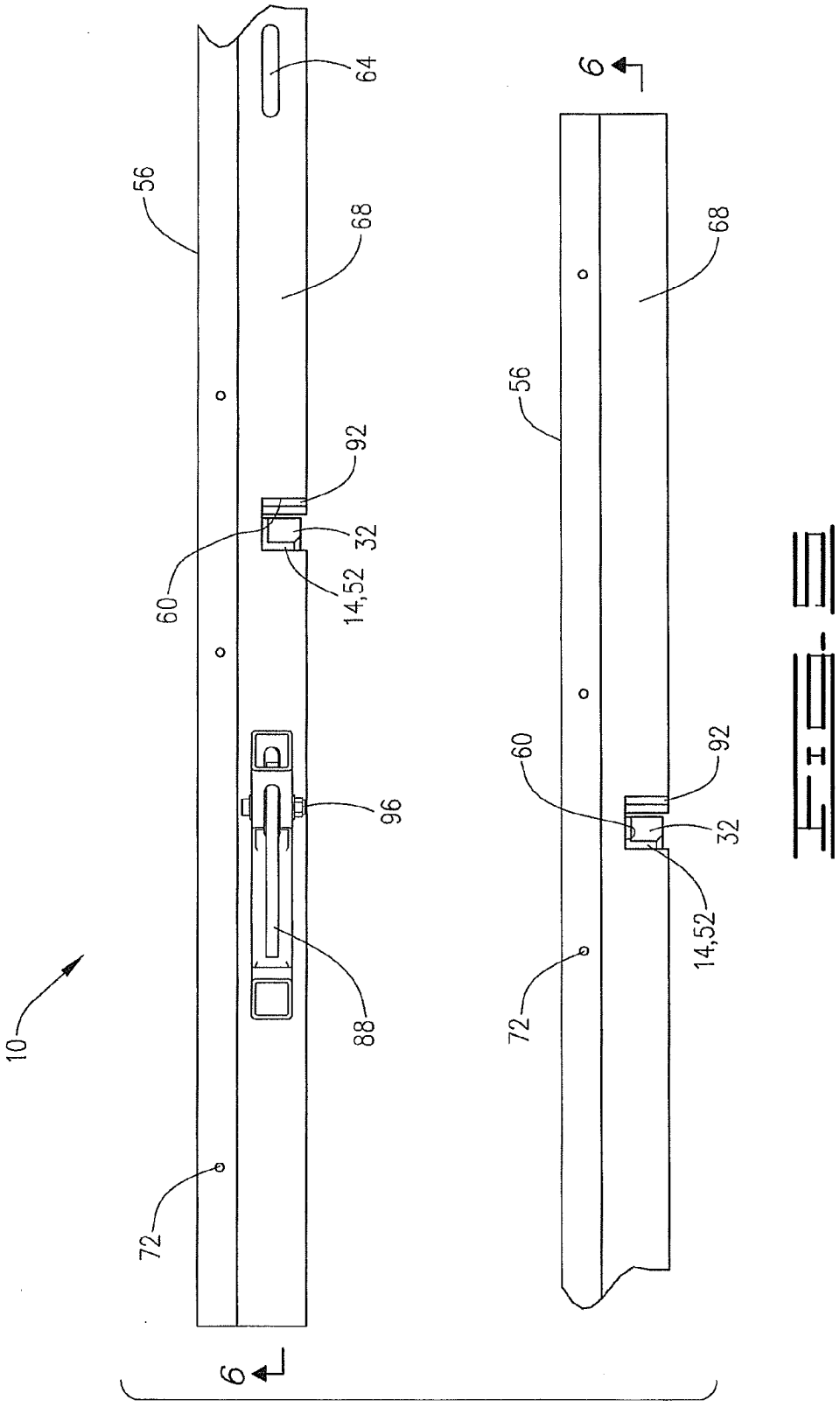


FIG. 5

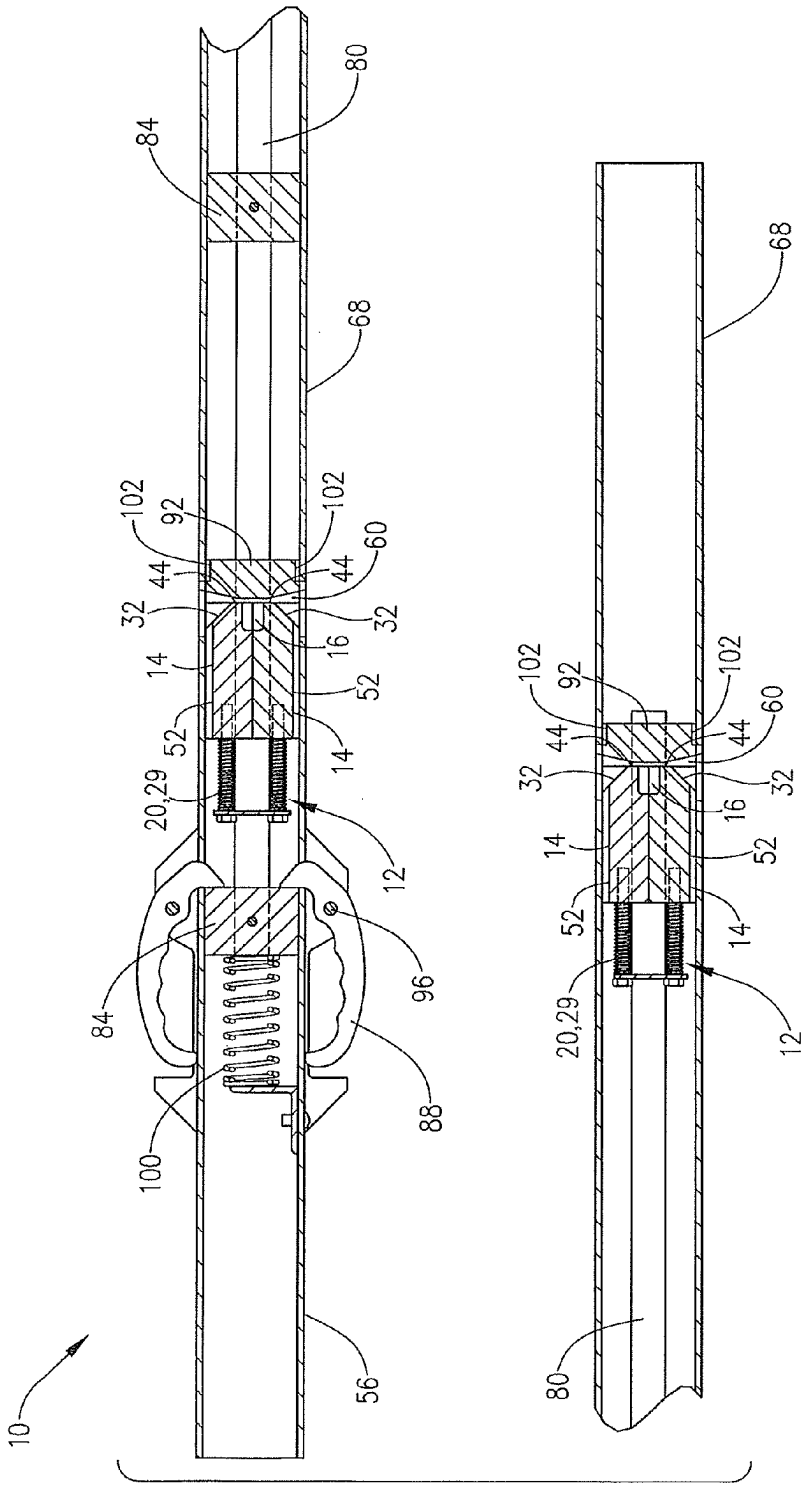


FIG. 5

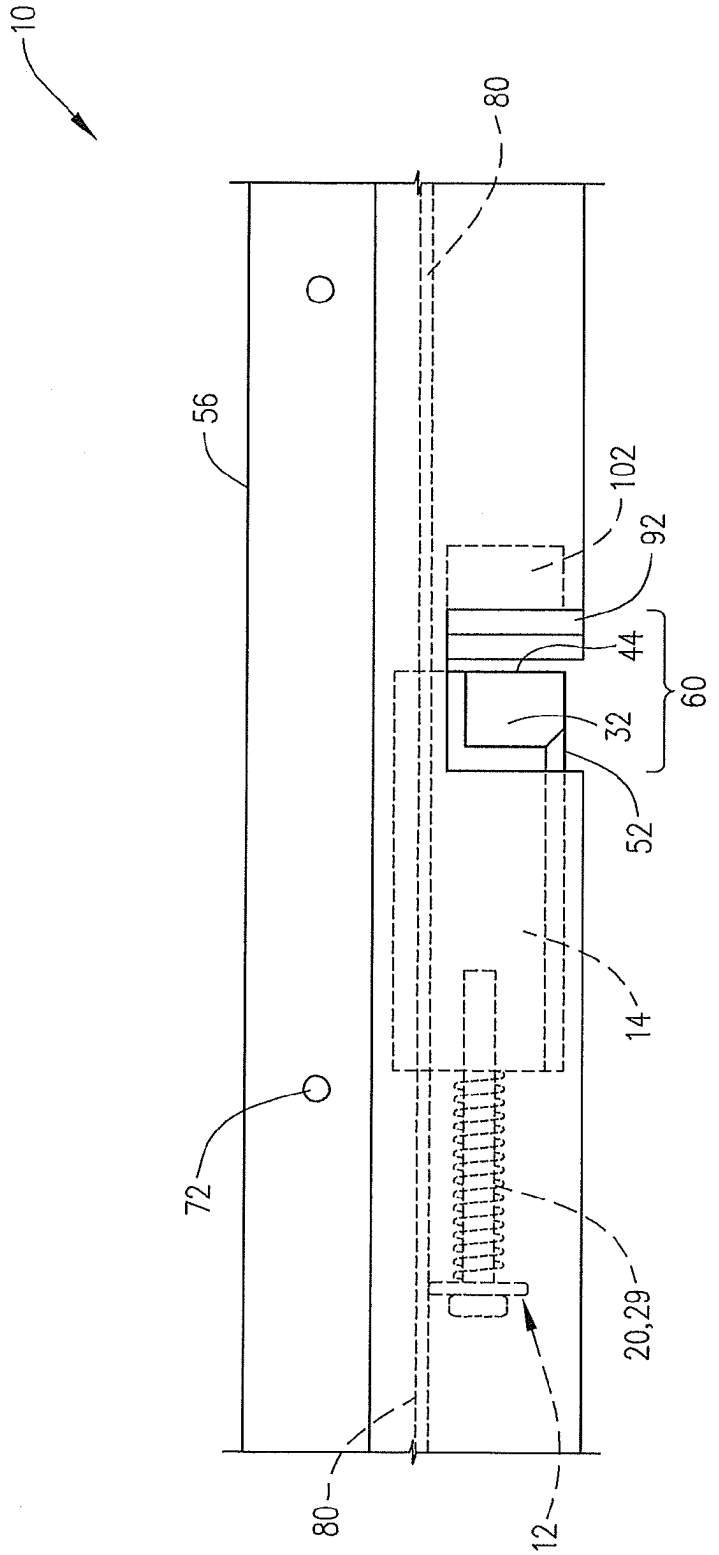
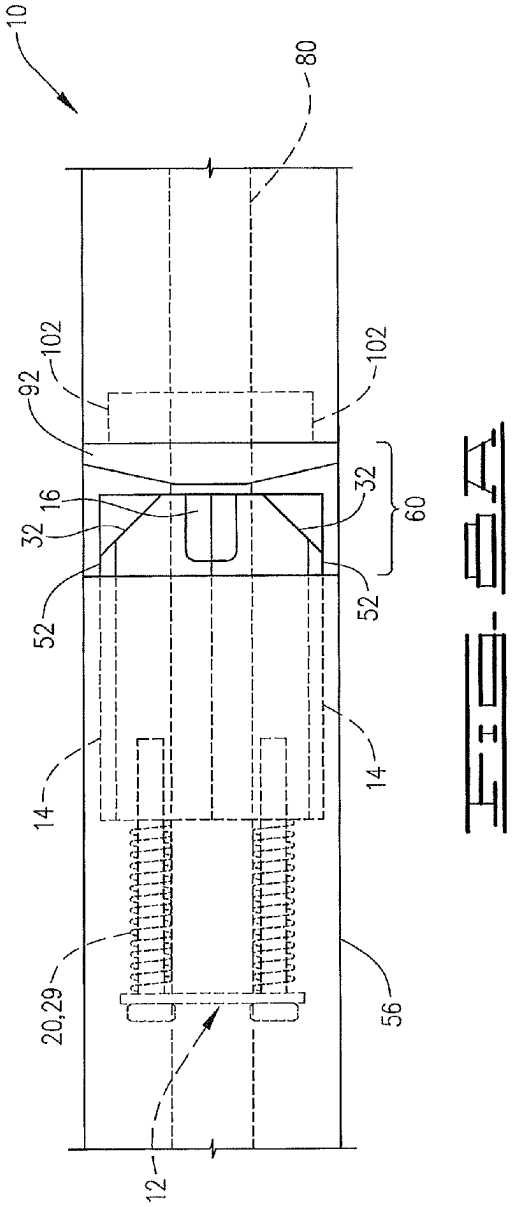


FIG. 7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92
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56
12

FIG. 8A

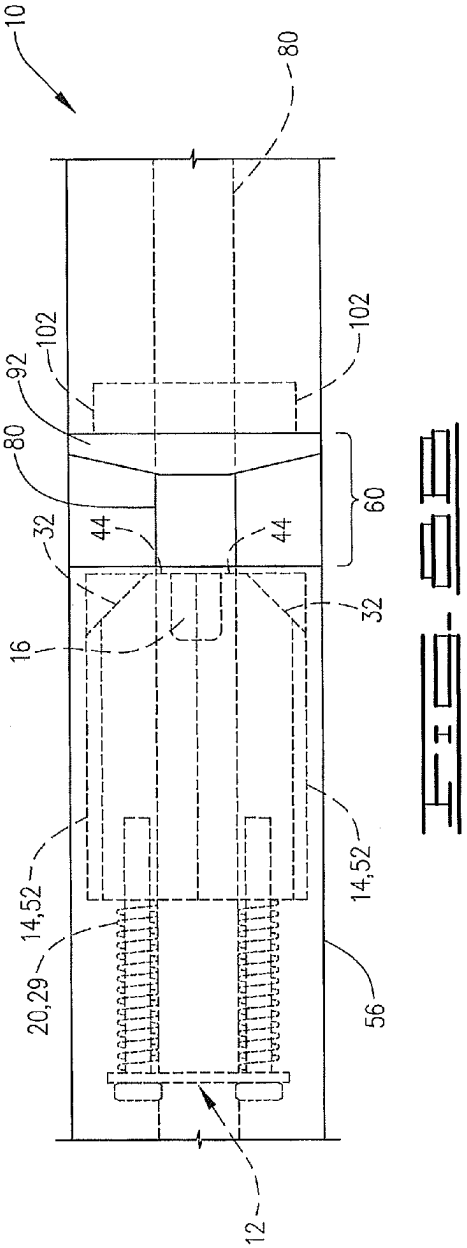
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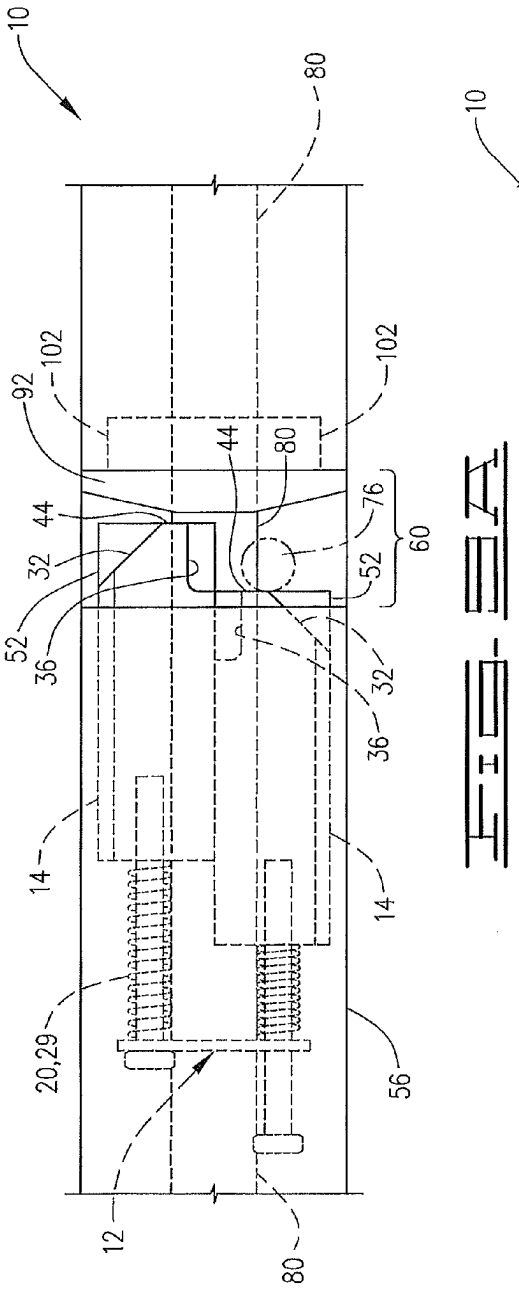
FIG. 8B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12
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FIG. 3A

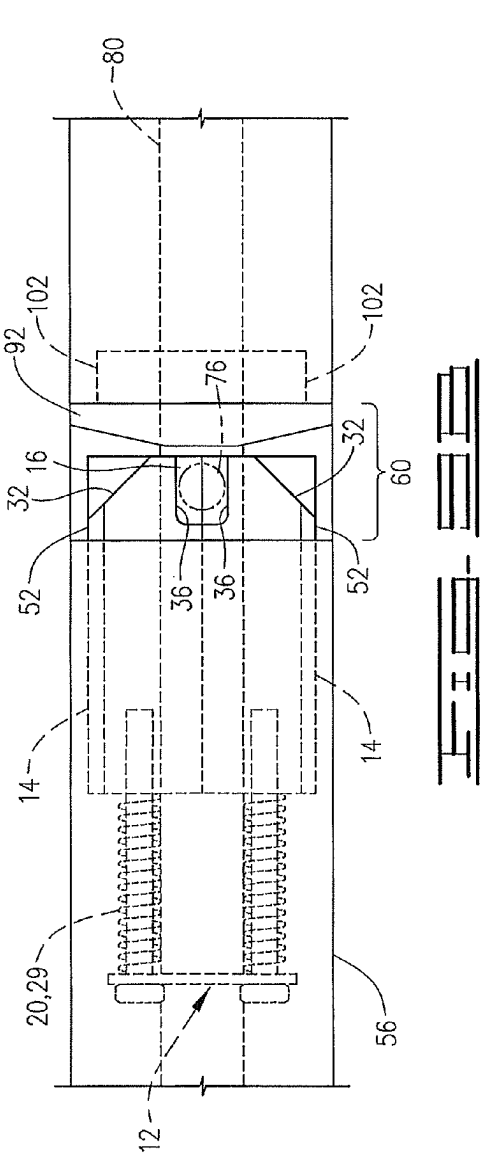
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FIG. 3B

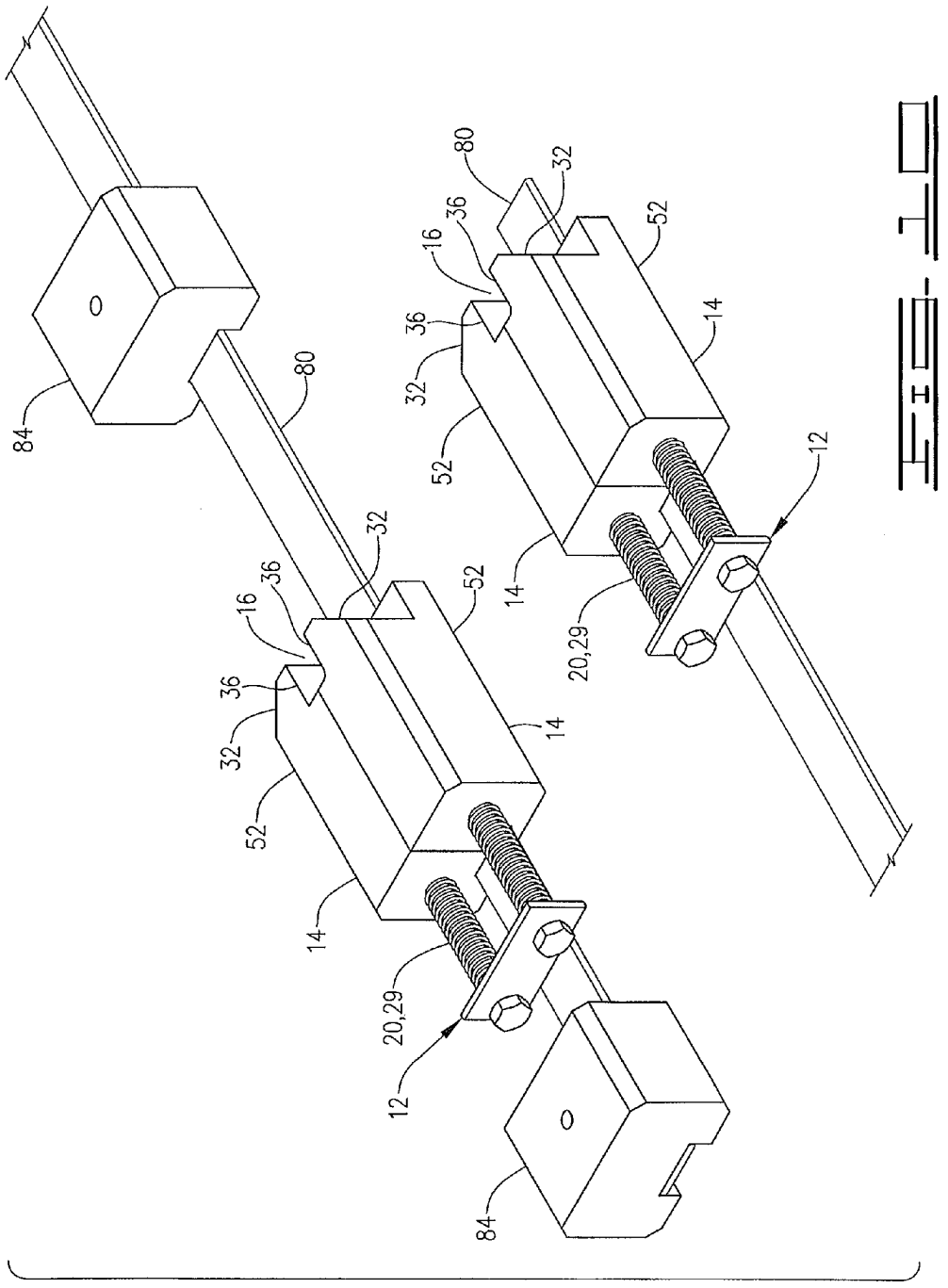

FIG. 10

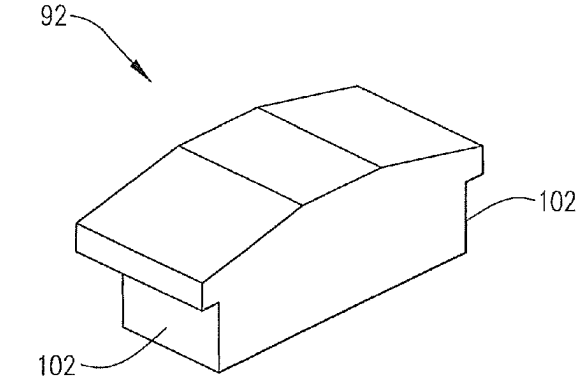

FIG. 11A

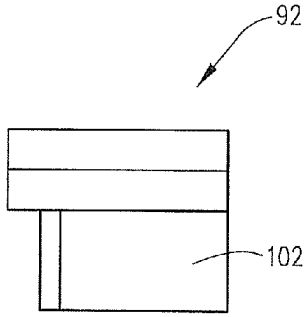

FIG. 11B

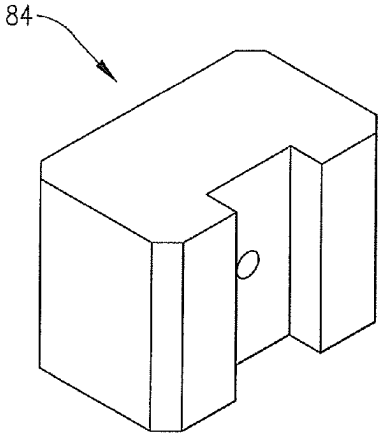

FIG. 12A

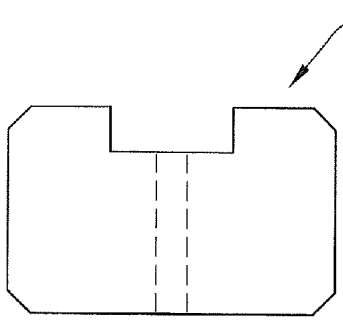

FIG. 12B

DOUBLE SWING LATCH ASSEMBLY

BACKGROUND

Latch assemblies are typically used to secure a gate or other moveable structure in a particular position or configuration. Common latch assemblies typically include a latch that retains a striker in a space defined between the latch and a frame carrying the latch. This latch assembly configuration only permits retention and release of the striker from one edge of the assembly, thereby limiting the travel and configurability of a gate or other moveable structure carrying the striker. Thus, a latch assembly providing improved configurability is desirable.

SUMMARY

The present disclosure provides a latch assembly for securing and releasing a gate or other moveable structure from either side of the latch assembly.

In one embodiment, the latch assembly includes a latch carriage, a pair of independently retractable, outwardly biased latch members, and a striker retention slot. The latch carriage carries the latch members. When in an extended position, the latch members define the striker retention slot. The cooperation of the latch members in the extended position provides for retention of a striker member in the striker retention slot.

In another embodiment, the latch assembly includes a housing supporting the latch assembly, a latch carriage, a pair of outwardly biased latch members, and a striker retention slot. The latch carriage carries the latch members. The latch carriage is axially moveable from a first position to a second position relative to the housing. The latch members are independently and axially retractable. The latch members define the striker retention slot. When the latch carriage is in the first position, the latch members cooperate to provide for lateral retention of a striker member in the striker retention slot. Conversely, locating the latch carriage in the second position separates the striker retention slot from the striker member by a sufficient distance to preclude retention of the striker member therein.

In yet another embodiment, the latch assembly includes a housing supporting the latch assembly, a latch carriage, a pair of independently retractable, outwardly biased latch members, and a striker retention slot. The latch carriage carries the latch members. The latch carriage is axially moveable from a first position to a second position relative to the housing. The configuration of the outwardly biased latch members permits retraction of the latch members upon lateral impact by a striker member. When in an extended position, the latch members define the striker retention slot. When the latch carriage in the first position, the latch members cooperate to provide for lateral retention of a striker member in the striker retention slot. Conversely, locating the latch carriage in the second position separates the striker retention slot from the striker member by a distance sufficient to permit release of the striker member from the striker retention slot.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1**A is a front perspective view of an embodiment of the latch assembly.

FIG. **1**B is a reverse perspective of the embodiment of the latch assembly of FIG. **1**A.

FIG. **2** is a front plan view of an embodiment of the latch assembly.

FIG. **3**A is a perspective view of an embodiment of a latch member illustrating a second end of the latch member.

FIG. **3**B is a perspective view illustrating a first end of the latch member of FIG. **3**A.

FIG. **4** is a perspective view of an embodiment of a housing.

FIG. **5** is a side view of an embodiment of the latch assembly including a housing.

FIG. **6** is a cross-sectional view of FIG. **5** taken at line **6**-**6**.

FIG. **7** is a detailed side view of the housing of FIG. **5** illustrating the latch assembly therein.

FIG. **8**A is a detailed front view of the housing of FIG. **5** illustrating a latch carriage in a first position and a pair of latch members in an extended position.

FIG. **8**B is a detailed front view of the housing of FIG. **5** illustrating a latch carriage in a second position and a pair of latch members in an extended position.

FIG. **9**A is a front view of an embodiment of a housing with a latch carriage in a first position, one latch member in an extended position, and one latch member in a retracted position upon receiving an impact from a striker member.

FIG. **9**B is a front view of the embodiment of FIG. **9**A with the retracted latch member returned to the extended position after receiving the impact from the striker member, and the striker member retained in a striker retention slot.

FIG. **10** is an embodiment of the latch assembly including a draw bar and a lift block.

FIG. **11**A is a perspective view of an embodiment of a striker support.

FIG. **11**B is a side view of the striker support of FIG. **11**A.

FIG. **12**A is a perspective view of an embodiment of a lift block.

FIG. **12**B is a top/bottom view of the lift block of FIG. **12**A.

DETAILED DESCRIPTION

The present disclosure provides a double swing latch assembly. The configuration of the latch assembly provides for securing and releasing a gate or other moveable structure from either side of the latch assembly. The latch assembly is particularly suitable for use in connection with a housing. The latch assembly may be supported on the exterior of the housing or, as depicted in FIGS. **4**-**9**B, supported within the interior of the housing. As used herein, the term housing includes without limitation, gate posts, gate frames, fence posts, pipes, channels, and tracks.

Referring generally to the drawings, latch assembly **10** includes a latch carriage **12**, a pair of independently retractable latch members **14**, and a striker retention slot **16**.

As used herein, the phrase "axially movable" refers to movement on a longitudinal axis.

Referring to FIGS. **1**-**2**, latch carriage **12** supports a pair of rods **20** with each rod **20** passing through a rod guide **22**. One end of rod **20** carries a head **24** in the form of a bolt head, nut, or other suitable device for retaining rod **20** rod guide **22**. The other end of rod **20** has a threaded portion **26**. Secured to threaded portion **26** of each rod **20** is latch member **14**. As depicted, latch member **14** has a rod mounting hole **28** to permit attachment to rod **20**. Each rod **20** is movable within associated rod guide **22** along the length of each rod **20** between head **24** and latch member **14**.

Alternative embodiments for securing latch member **14** to rod **20** may include any suitable mechanism. For example, adhesives and press fitting etc. will be appropriate for securing rod **20** within or to latch member **14**. Further, the present disclosure contemplates alternative embodiments for rods **20**.

For example, latch carriage **12** may alternately include a track or keyway for carrying latch members **14**.

As depicted in FIGS. **1-2**, each rod **20** carries a spring **29** positioned between rod guide **22** and latch member **14** to provide an outward bias of latch member **14**. Alternative embodiments for providing the desired outward bias of latch member **14** may include a single coil spring or leaf spring positioned between latch carriage **12** or rod guide **22** and latch members **14**, or a pair of hydraulic cylinders positioned between latch carriage **12** and each latch member **14**.

Referring now to FIGS. **1-3**B, each latch member **14** includes a beveled surface **32** and a recess **36**. Further, each latch member **14** has a first end **40**, a second end **44**, an inner edge **48**, and an outer edge **52**. First end **40** of each latch member **14** carries the previously described rod mounting hole **28**. Second end **44** and inner edge **48** of latch member **14** meet at recess **36**. Outer edge **52** and second end **44** of latch member **14** meet at beveled surface **32**. Recess **36** of one latch member **14** is complementary to recess **36** of the other latch member **14** when inner edges **48** of latch members **14** are facing one another. To reduce noise of operation, latch members **14** are generally manufactured from any suitable polymeric material; however, other materials including but not limited to steel are suitable for use as latch members **14**.

Each latch member **14** is independently retractable and outwardly biased to an extended position relative to latch carriage **12**. As discussed in further detail below, upon receiving a lateral impact, beveled surface **32** imparts axial force on latch member **14**, thereby axially and individually retracting latch member **14**. Each latch member **14** is axially moveable on the length between head **24** and first end **40** of latch member **14**. When each latch member **14** is in the extended position, head **24** engages rod guides **22** as shown in FIGS. **1-2**.

Continuing with FIGS. **1-3**B, striker retention slot **16** is defined between latch members **14** by cooperation of each recess **36** when inner edges **48** of latch members **14** are facing one another and when each latch member **14** is in the extended position.

Referring to FIGS. **4-9**B, latch assembly **10** may include a housing **56**. Housing **56** provides lateral support for latch carriage **12** and latch members **14** of latch assembly **10** while permitting latch assembly **10** to axially move relative to housing **56**. Housing **56** may be, for example, a gate post that when used in connection with the components of latch assembly **10** provides for securing a gate or other pivotal structure in a closed position. As shown, housing **56** is an elongate square tube having generally a rectangular cross-section. However, any configuration and material that will slidably accept the components of latch assembly **10** as described herein is acceptable.

In FIGS. **4-9**B, housing **56** has a latch opening **60**, an elongate opening **64**, a wall **68**, and a plurality of mounting points **72**.

Latch opening **60** is a cut-out portion in wall **68** of housing **56** having a sufficient size to provide clearance for a striker member **76**. FIGS. **9A-9**B depict the passage of striker member **76** through latch opening **60** for retention within striker retention slot **16**. Elongate opening **64** disposed through wall **68** of housing **56** provides external access to the interior of housing **56**. Mounting points **72** permit securing of housing **56** to, for example, a gate post or other suitable support (not shown).

Referring to FIGS. **8A-9**B, latch carriage **12** of latch assembly **10** is axially movable from a first position shown in FIGS. **8**A and **9**B to a second position shown in FIG. **8**B. When latch carriage **12** is in the first position and each latch member **14** is in the extended position as shown in FIGS. **8**A and **9**B, striker retention slot **16** resides in latch opening **60** of housing **56**. When latch carriage **12** is in the second position and each latch member **14** is in the extended position as shown in FIG. **8**B, a portion of striker retention slot **16** is withdrawn from latch opening **60**. Further, the axial movement of each latch member **14** from the extended position to a retracted position shown in FIG. **9**A is substantially parallel to the axial movement of latch carriage **12** from the first position to the second position.

Referring to FIGS. **8A-9**B, when latch carriage **12** is in the first position and each latch member **14** is in the extended position in latch opening **60**, beveled surfaces **32** of latch members **14** may receive a lateral impact from striker member **76**. The angle of beveled surface **32** transfers the force of impact in the axial direction defined by rod **20** carrying latch member **14**. Upon receiving a lateral impact sufficient to overcome the biasing force provided by spring **29**, latch member **14** axially retracts permitting passage of striker member **76** as shown in FIG. **9**A. Thereafter, the retracted latch member **14** returns to the extended position, thereby defining striker retention slot **16** about striker member **76** and laterally retaining striker member **76** therein as shown in FIG. **9**B. Subsequently, moving latch carriage **12** to the second position withdraws striker retention slot **16** from striker member **76** by a distance sufficient to preclude retention of striker member **76**. Moving latch carriage **12** a distance that provides clearance between second end **44** of each latch member **14** and striker member **76** is sufficient to preclude retention of striker member **76**.

Referring to FIGS. **6-12**B, embodiments of latch assembly **10** including housing **56** can include a draw bar **80**, a draw block **84**, a handle-operated cam **88**, and a striker support **92**.

Draw bar **80** is an elongate structure slidable in housing **56** and secured to latch carriage **12** therein. Draw bar **80** extends along the length of housing **56** and moves with latch carriage **12** from the first position to the second position thereof. As shown, draw bar **80** is an elongate metal bar or strap welded to latch carriage **12**. However, other known materials such as, for example, a rod, cable, or rope are suitable for draw bar **80**.

Secured to draw bar **80** in housing **56** and near elongate opening **64** is draw block **84**. Draw block **84** moves with draw bar **80** and latch carriage **12** from the first position to the second position in housing **56**. Elongate opening **64** provides access to draw block **84** from the exterior of housing **56**. As shown, draw block **84** is a block of polymeric material having generally a rectangular cross-section and sized to slidably fit in housing **56**. However, draw block **84** is not limited to any particular configuration or material. For example, draw block **84** may be a pin extending from draw bar **80** near elongate opening **64**.

Positioned exterior to housing **56** and near elongate opening **64** is handle-operated cam **88**. Handle-operated cam **88** is pivotal about a fulcrum **96** located between each end of handle-operated cam **88**. Fulcrum **96** pivotally secures handle-operated cam **88** to the exterior of housing **56** with one end of handle-operated cam **88** accessible exterior to housing **56** and the other end of handle-operated cam **88** positioned through elongate opening **64** and in contact with draw block **84**. With both latch carriage **12** and draw block **84** secured to draw bar **80**, pivotal movement of handle-operated cam about fulcrum **96** will engage draw block **84** and move latch carriage **12** from the first position to the second position. Housing **56** may include multiple handle-operated cams **88** operable on multiple draw blocks **84**.

As depicted in FIG. **6**, latch assembly **10** has a latch assembly spring **100** with one end secured to housing **56** and

another end in contact with draw block **84**. Latch assembly spring **100** biases latch carriage **12** to the first position. In this embodiment, handle-operated cam **88** requires enough pivotal force to overcome the spring tension of latch assembly spring **100** to move latch carriage **12** to the second position.

Housing **56** may optionally include a fixed striker support **92** positioned opposite and near second ends **44** of latch members **14** when latch carriage **12** is in the first position. Striker support **92** has a pair of outer edges **102** substantially aligned with outer edges **52** of latch members **14**. Typically, striker support **92** has a convex shape extending between outer edges **102** of striker support **92**. The previously described striker member **76** may ride upon the convex shape of striker support **92** when striker member **76** enters latch opening **60**. In the event of a slight misalignment of striker member **76** and latch members **14**, striker support **92** acts as a guide ensuring the contact of striker member **76** against bevel **32** of latch member **14**. Additionally, striker support **92** may cooperate with latch members **14** to further ensure retention of striker member **76** within striker retention slot **16**. For example, the convex shape of striker member **76** may apply a force directing striker member **76** toward latch members **14** and supporting striker member **76** in striker retention slot **16**. As shown, striker support **92** comprises a polymeric material. The polymeric material enhances quiet operation of latch assembly **10**. However, other known materials capable of forming striker support **92**, such as, without limitation, steel are suitable.

In operation, a user secures housing **56** in a fixed position, for example, to a gate post such that latch members **14** will receive the previously described lateral impact from striker member **76**. As discussed above, when latch carriage **12** is in the first position and each latch member **14** is in the extended position, beveled surfaces **32** of latch members **14** may receive a lateral impact from striker member **76**. Beveled surface **32** acts as a force transfer surface permitting closure of the gate carrying striker member **76** without manually actuating latch assembly **10**. Upon closing the gate carrying striker member **76**, striker member **76** will contact beveled surface **32**. The angle of beveled surface **32** transfers the force of impact in the axial direction defined by rod **20**. Thus, contact of striker member **76** upon beveled surface **32** overcomes the outward bias provided by spring **29**, thereby retracting latch member **14**. Once striker member **76** has moved beyond second end **44** of latch member **14**, the biasing force of spring **29** returns latch member **14** to the extended position thereby capturing striker member **76** in striker retention slot **16**. To release the gate from retention slot **16**, the user pulls handle-operated cam **88** against the bias of latch assembly spring **100** thereby engaging draw block **84** carried by draw bar **80** and moving latch carriage **12** from the first position to the second position. Thus, the configuration of latch assembly **10** permits opening or closing of the gate from either direction relative to latch assembly **10**.

Other embodiments of the current disclosure will be apparent to those skilled in the art from a consideration of this specification, or practice of the teachings disclosed herein. Thus, the foregoing specification is considered merely exemplary with the true scope and spirit of the disclosure being defined by the attached claims.

What is claimed is:

1. A latch assembly comprising:

a housing;

a latch carriage axially movable relative to the housing;

a pair of rods, each rod movable through said latch carriage,

an outwardly biased coil spring positioned around each rod such that each rod passes through the entirety of each coil spring;

a pair of latch members, one latch member of said pair of latch members secured to one of said rods and the other latch member secured to the other rod such that each spring is positioned between the latch carriage and one of said latch members, such that each spring biases one of said latch members to an extended position;

a striker retention slot defined by the latch members when the latch members are in the extended position, wherein the cooperation of the latch members in the extended position provides for retention of a striker member in the striker retention slot.

2. The latch assembly of claim **1**, wherein the latch carriage is axially movable relative to the housing from a first position in which the latch members provide retention of the striker member in the striker retention slot to a second position in which the latch members are separated from the striker member by a distance sufficient to preclude retention.

3. The latch assembly of claim **1**, wherein each latch member has a beveled surface configured to impart axial force on the latch member upon receiving a lateral impact on the beveled surface.

4. The latch assembly of claim **1**, wherein each latch member retracts independently of the other latch member upon receiving a lateral impact from the striker member and returns to the extended position after the striker member passes beyond the retracted latch member.

5. A latch assembly comprising:

a housing supporting the latch assembly;

a latch carriage axially moveable relative to the housing from a first position to a second position;

a pair of rods, each rod movable through said latch carriage,

an outwardly biased coil spring positioned around each rod such that each rod passes through the entirety of each coil spring;

a pair of latch members one latch member of said pair of latch members secured to one of said rods and the other latch member secured to the other rod such that each rod may move independently through said carriage, wherein the latch members are independently and axially retractable;

each spring is positioned between the latch carriage and one of said latch members, such that each spring biases one of said latch members to an extended position;

a striker retention slot defined by the latch members, wherein the cooperation of the latch members provides for lateral retention of a striker member in the striker retention slot when the latch carriage is in the first position, and wherein when the latch carriage is in the second position the striker member is located a distance from the striker retention slot, thereby permitting release of the striker member from the striker retention slot.

6. The latch assembly of claim **5**, wherein when the latch carriage is in the first position, the latch members retain the striker member in the striker retention slot, and wherein when the latch carriage is in the second position, the latch members are separated from the striker member by a distance sufficient to preclude retention of the striker member in the striker retention slot.

7. The latch assembly of claim **5**, wherein each latch member has a beveled surface configured to impart axial force on the latch member upon receiving a lateral impact on the beveled surface.

8. The latch assembly of claim 5, wherein each latch member retracts independently of the other latch member upon receiving a lateral impact from the striker member and returns to the extended position after the striker member passes beyond the retracted latch member.

9. A latch assembly comprising:

a housing supporting the latch assembly,

a latch carriage axially moveable relative to the housing from a first position to a second position;

a pair of rods, each rod movable through said latch carriage,

an outwardly biased coil spring positioned around each rod such that each rod passes through the entirety of each coil spring;

a pair of latch members, one latch member of said pair of latch members secured to one of said rods and the other latch member secured to the other rod such that each rod movably carried by the latch carriage such that each rod may move independently through said carriage;

each spring is positioned between the latch carriage and one of said latch members, such that each spring biases one of said latch members to an extended position and configured to retract upon receiving a lateral impact;

a striker retention slot defined by the latch members when the latch members are in the extended position, wherein the cooperation of the latch members provides for lateral retention of a striker member in the striker retention slot when the latch carriage is in the first position, and wherein when the latch carriage is in the second position the striker member is located a distance from the striker retention slot, thereby permitting release of the striker member from the striker retention slot.

10. The latch assembly of claim 9, wherein when the latch carriage is in the first position, the latch members retain the striker member in the striker retention slot, and wherein when the latch carriage is in the second position, the latch members are separated from the striker member by a distance sufficient to preclude retention of the striker member in the striker retention slot.

11. The latch assembly of claim 9, wherein each latch member has a beveled surface configured to impart axial force on the latch member upon receiving the lateral impact on the beveled surface.

12. The latch assembly of claim 9, wherein each latch member retracts independently of the other latch member upon receiving a lateral impact from the striker member and returns to the extended position after the striker member passes beyond the retracted latch member.

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