United States Patent

[11] **3,584,906**

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[54] **DRAW BOLT**
17 Claims, 13 Drawing Figs.

[52] **U.S. Cl.** **292/247,**
70/73, 70/76
[51] **Int. Cl.** **E05c 19/14,**
E05b 65/48, E05b 65/52
[50] **Field of Search** 70/73, 76;
292/113, 114, 246, 247, 248, 249, 250

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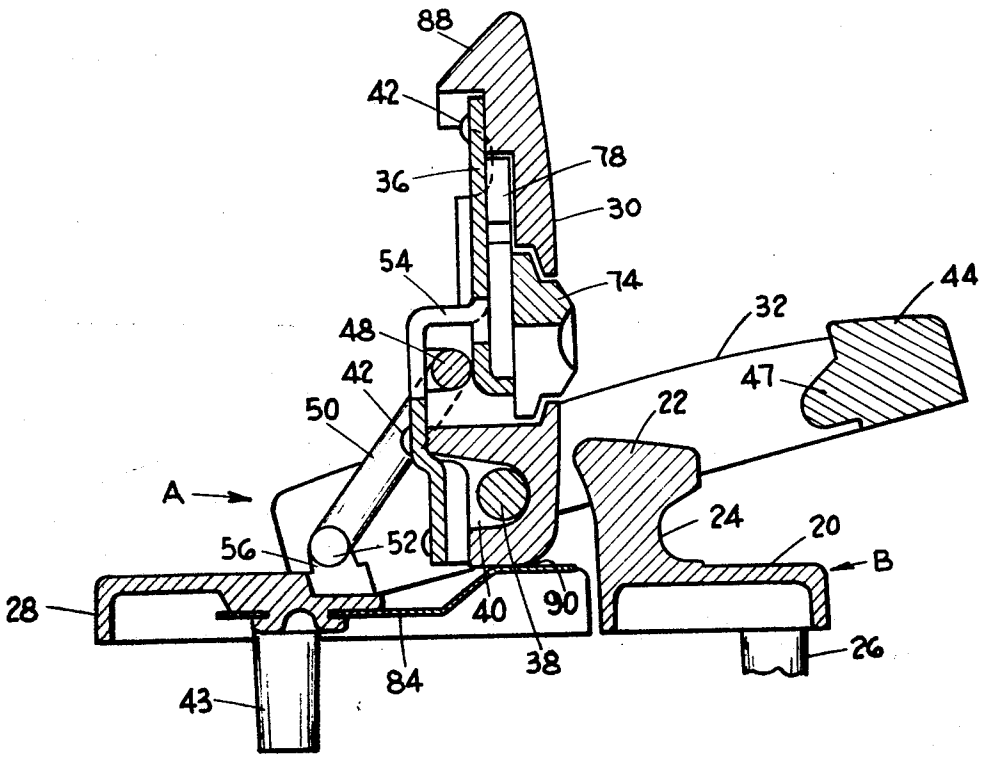
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ABSTRACT: A draw bolt for luggage, containers, receptacles, or the like cooperable with a hasp is constructed so that a manually operable latch member imparts a controlled, predetermined path of movement to an associated loop member to cause the loop member to automatically engage or disengage the hasp.



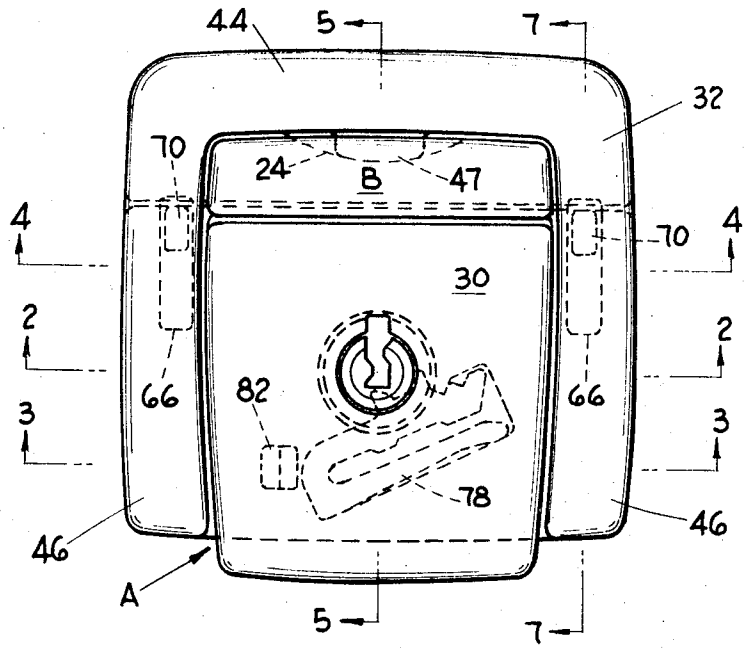


FIG. 1

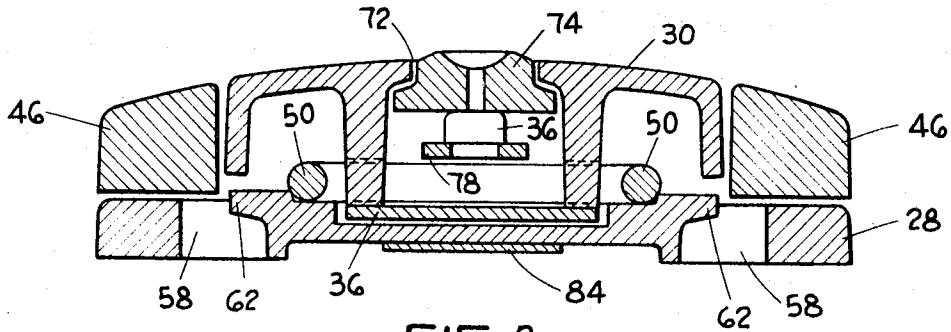


FIG. 2

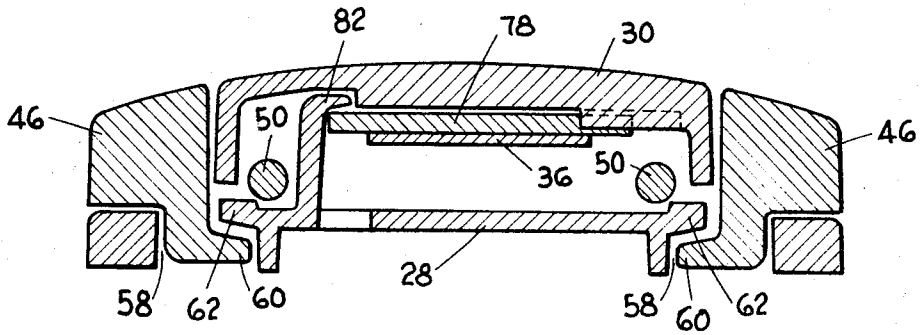


FIG. 3

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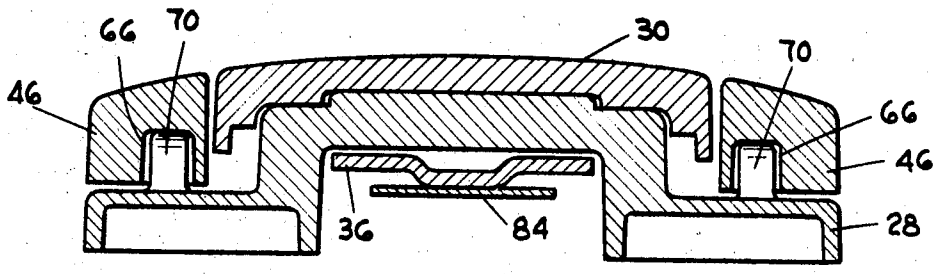


FIG. 4

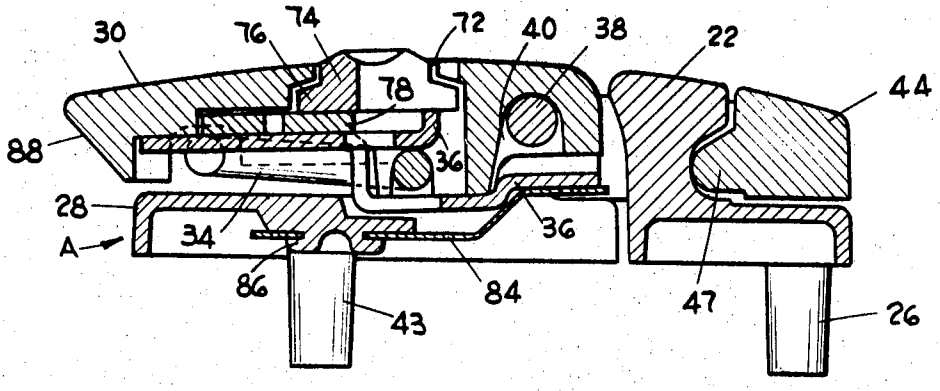
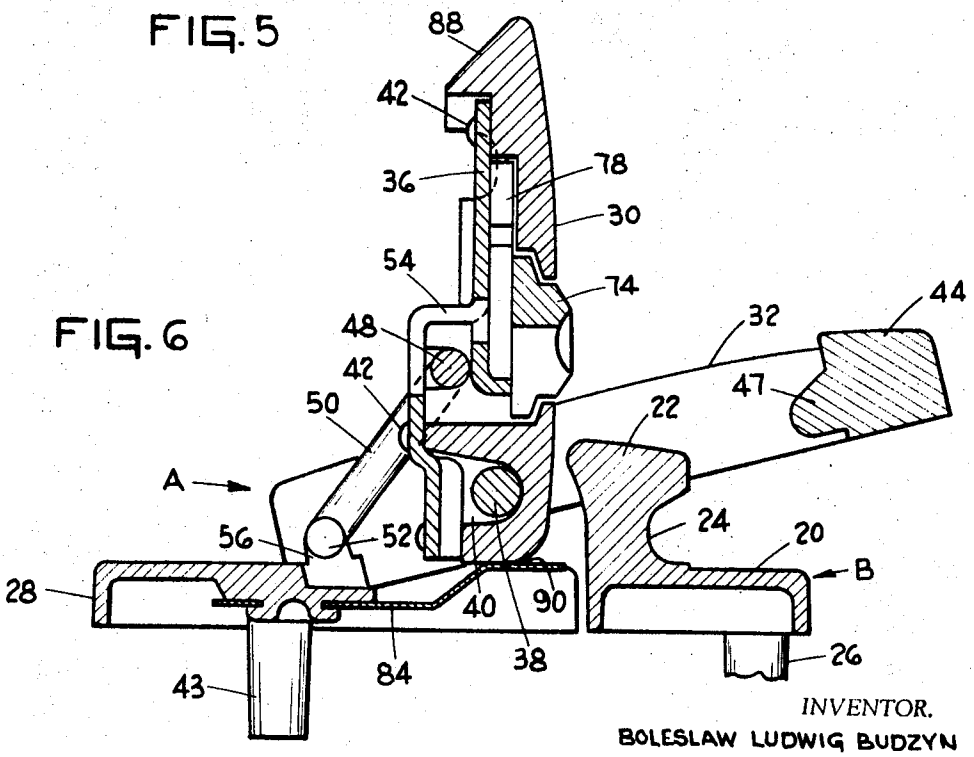


FIG. 5

FIG. 6



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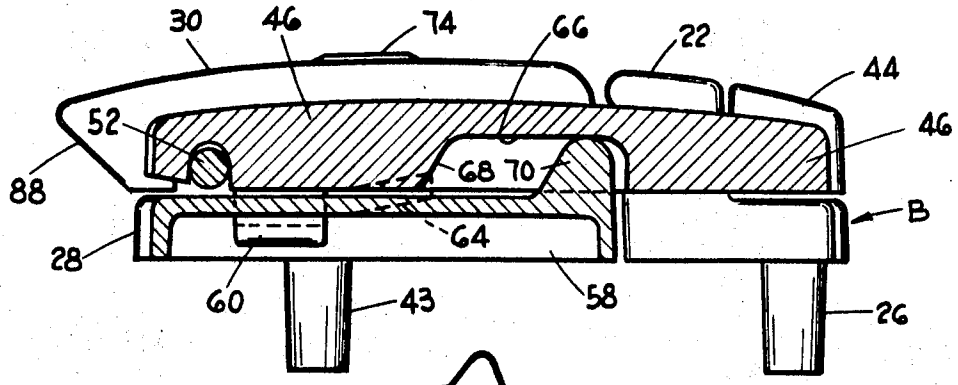


FIG. 7

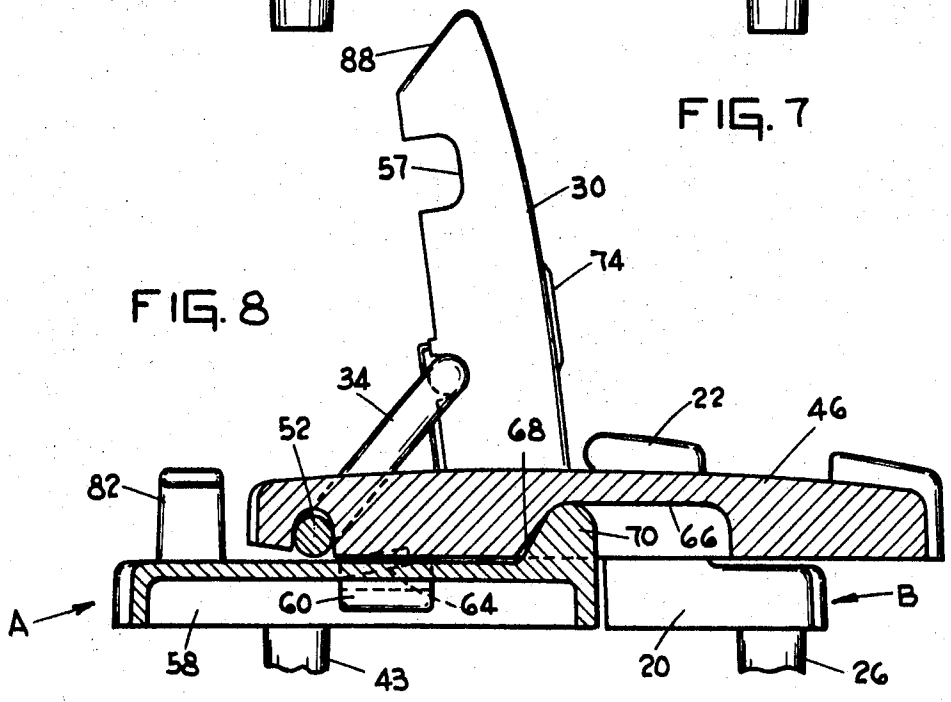


FIG. 8

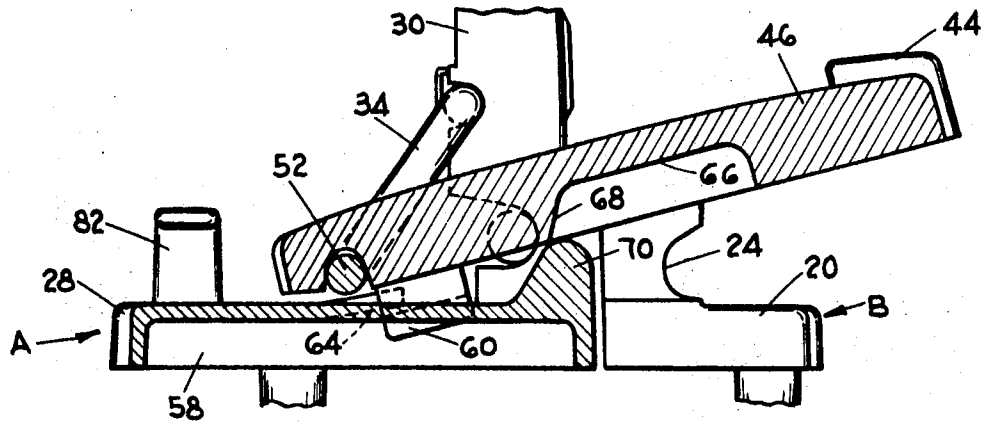


FIG. 9

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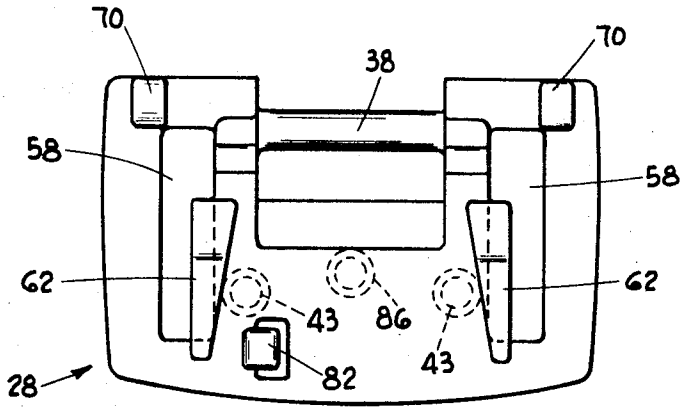


FIG. 10

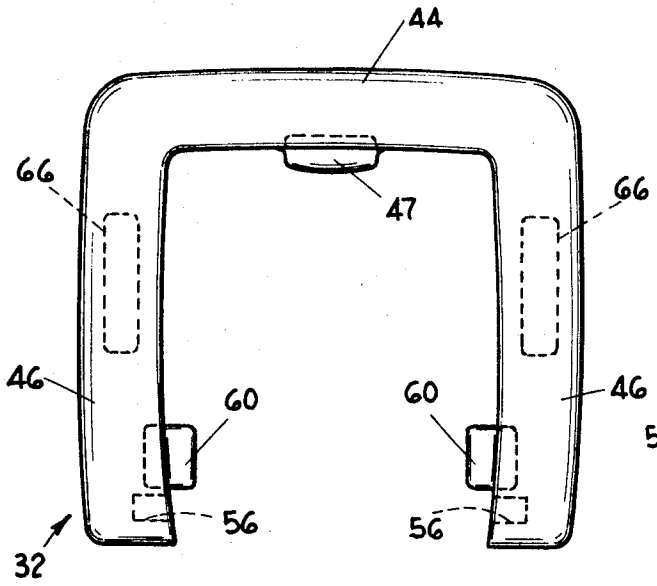


FIG. 11

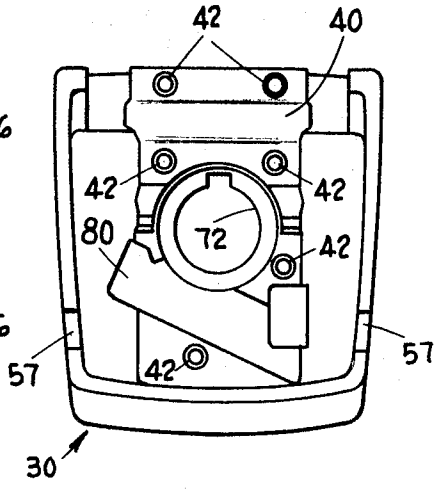


FIG. 12

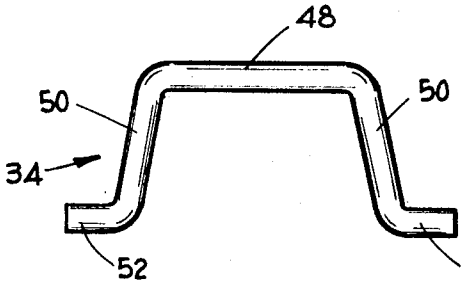


FIG. 13

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DRAW BOLT

The invention relates to improvements in draw bolts, and is more particularly directed to a draw bolt of improved construction to afford automatic engagement and disengagement of the draw bolt's loop member with a hasp.

BACKGROUND OF THE INVENTION

Draw bolts for releaseably latching together the cooperable sections or shells of a luggage case, container, receptacle or the like have long been in commercial use. With regard to luggage for example, a hasp is connected to one section of the case near the peripheral edge thereof and the cooperable draw bolt is connected to the opposite case section near its peripheral edge. As is common in the art, a latch member is pivotally connected to a base or mounting plate which is fixedly secured to the case section, and a loop member is pivotally related to the latch member. In the latched condition, with the latch member in the down position adjacent the plate member, the loop member engages or embraces the hasp. When the latch member is rotated to the up position, the loop member is disengaged from the hasp.

This type of device obtains its characterization as a "draw bolt" because of the action of the device; that is, when the loop member is positioned around the hasp, rotating the latch member from its raised position to its lowered or down position causes the loop member to embrace the hasp and to draw or tension the hasp toward the draw bolt.

In the usual draw bolt construction the loop member is pivotally connected to the latch member for free rotation with respect thereto; the movement of the loop member about its axis of rotation is uncontrolled. As a result, the proper positioning of the loop member so that it may embrace or engage the hasp, it is a hit or miss affair. Frequently, and though the case sections have their respective peripheral edges in abutting relationship, it is necessary to manually manipulate the loop member so that the hasp will be positioned for engagement before the latch member may then be manually rotated to the down position to cause the hasp member to be physically engaged and to draw the hasp member toward the draw bolt. Also, when the latch member is rotated from its down or latched position to unlatched position, the loop member must be grasped to lift it away from its position adjacent the hasp, though it is not firmly engaged therewith.

It has been proposed to construct a draw bolt to eliminate or obviate the undue manipulative effort commonly required to releasably connect and disconnect the draw bolt to and from the hasp. In a known prior art construction the usual generally U-shaped loop member is replaced by a solid or continuous hasp-engaging member having a hook on the underside at its forward end. The hasp is made with a portion which projects at the top which has a recess adapted to receive the hook. The mounting plate has an inverted boxlike member secured to and projecting from its top surface. A latch member is connected by a pivot pin to the rear end of the boxlike member. The front end of the protruding boxlike member is open to allow the passage of the hasp-engaging member. The inverted boxlike member also has longitudinally extending slots on each side. A link having a pair of transverse spaced arms is connected to the latch member with the ends of the arms extending into the slots and connected to the rear end of the hasp-engaging member having the hook. The arms of the link are exposed at the sides of the slotted boxlike member.

This known construction has the limitations of projecting and undesireably exposed parts—the inverted boxlike member projecting from the mounting plate, the associated latch member and the exposed slots and parts of the link. In the luggage art, it is desired to have the hardware project as little as possible from the case shells. This is not only a matter of design; projecting parts are likely to be damaged when luggage is subjected to the usual abuse it encounters in handling. Moreover, the draw bolt construction described above has a substantial number of parts. Also, the manner in which its parts are related to one another does not furnish a device which will well withstand the kind of abuse that it will receive in use on luggage.

SUMMARY OF THE INVENTION

A draw bolt made in accordance with the invention comprises a mounting plate and a manually operable latch member pivotally connected to the mounting plate to allow the latch member to be rotated with respect thereto. A loop member adapted to embrace a hasp is provided. The loop member is substantially U-shaped to provide a base portion and a pair of spaced arms. A link couples the latch member to the loop member arms. Cooperable means are provided by the mounting plate and the arms to slideably connect the loop member to the plate member and for imparting a controlled, predetermined path of movement to the loop member in response to the rotation of the latch member to cause the loop member automatically to embrace and to fully disengage a hasp.

The draw bolt of the invention is constructed of a minimum number of parts, there being but five essential parts related to one another in a manner to furnish a sturdy construction with no projecting parts and with the means for automatically controlling the movement of the loop member concealed and protected.

Where means for releasably locking the device in latched condition is desired, a key barrel and a locking bolt are provided.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a draw bolt made in accordance with the invention, this view showing the draw bolt associated with a hasp and latched thereto;

FIG. 2 is a transverse cross section view taken approximately in the plane of line 2–2 of FIG. 1;

FIG. 3 is a transverse cross section view taken approximately in the plane of line 3–3 of FIG. 1;

FIG. 4 is a transverse cross section view taken approximately in the plane of line 4–4 of FIG. 1;

FIG. 5 is a longitudinal cross section taken approximately in the plane of line 5–5 of FIG. 1;

FIG. 6 is a view similar to FIG. 5, except that the latch member is shown rotated to a position to disengage the loop member from the hasp;

FIG. 7 is a longitudinal cross section taken approximately in the plane of line 7–7 of FIG. 1;

FIGS. 8 and 9 are views also taken in the plane of line 7–7 except that these views show successive stages or relationships of the parts as the loop member is being moved to unlatched position;

FIG. 10 is a top plan view of the mounting plate element of the draw bolt assembly;

FIG. 11 is a top plan view of the loop member;

FIG. 12 is a bottom plan view of the latch member; and

FIG. 13 is a plan view of the link for connecting the latch member to the loop member.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring to the drawings, a draw bolt A is cooperable with a hasp B. The hasp may be of a usual or known construction and may comprise a base portion **20** having an upstanding boss **22**. A transversely extending recess **24** is provided on the side of the boss opposite the side which will face the draw bolt. Means are provided for connecting the hasp to a luggage case section or the like. The hasp preferably is die cast, and is formed with a pair of integral, spaced connecting studs **26**. In use, the studs are extended through openings provided in a luggage case section or like container part, and the ends of the studs are headed over to secure the connection of the parts.

The draw bolt of the invention essentially comprises a mounting plate **28**, a latch member **30**, a loop member **32**, a

link 34 and a back cover 36. For convenience of manufacture and assembly, the mounting plate, latch member and loop member are preferably made by die casting these parts.

Referring to FIGS. 5, 6, 10 and 12, the mounting plate 28, and the latch member 30 are provided with cooperable means for pivotally connecting the latch member to the mounting plate to allow the latch member to be rotated with respect to the mounting plate. As more particularly shown in FIGS. 10 and 12, the mounting plate is formed at the front end thereof with a transversely extending pivot pin portion 38. An open bearing recess 40 is provided near the front end of and on the underside of the latch member. The pivot pin portion 38 is positioned in the bearing recess 40, and is retained in the bearing recess by the back cover 36 which is secured to the underside of the latch member in any suitable manner. Preferably, and as shown in FIG. 12, the latch member is provided on its underside with a plurality of integral spaced connecting studs 42 which are extended through aligned openings provided in the back cover, the ends of the connecting studs being headed over to secure the connection of the parts. As will subsequently appear the back cover has the additional functions of connecting the link 34 to the latch member; also, the back cover supports means for releasably locking the device in latched position when it is desired to provide the device with locking means. The mounting plate is provided with any suitable means for connecting the draw bolt to a luggage case section, container or receptacle section. Where as preferred, the mounting plate is die cast, integral laterally spaced connecting studs 43 constitute the connecting means.

As shown in FIGS. 1 and 11, the loop member 32 is substantially U-shaped and has a base portion 44 and a pair of laterally spaced arms 46. A projection 47 is provided on the inner side of the base portion 44 for cooperation with the recess 24 of the hasp. The link 34 couples the latch member 30 to the loop member arms 46. As shown in FIG. 13, the link is a substantially U-shaped member, and it is made of wire stock. The link has a base portion 48 and a pair of laterally spaced, slightly diverging arms 50, at the ends of which there are respective outwardly extending trunnions 52. The link 34 is connected to the latch member 30 by the back cover 36 which overlies the base portion 48 of the link. As shown in FIGS. 5 and 6, the back cover is provided with a step at 54 so that the back cover functions to retain the pivot pin 38 in the bearing recess 40, to support the elements to releasably lock the device in its latched condition and to pivotally connect the link to the latch member. The trunnions 52 (FIG. 13) of the link are received in a pair of bearing recesses 56, each formed on the inner side of each loop member arm 46 near the end of each arm. The latch member 30 is provided with cutouts 57 at each side (FIG. 8) to allow the latch member to clear the trunnions of the link when the latch member is in latched position immediately adjacent the mounting plate.

The mounting plate 28 and the loop member arms 46 provide cooperable means to slideably connect the loop member to the plate member and for imparting a controlled, predetermined path of movement to the loop member in response to the rotation of the latch member to cause the loop member to automatically engage and to automatically fully disengage a hasp. As more particularly shown in FIGS. 10 and 11, the mounting plate is provided with a pair of laterally spaced, longitudinally extending guiding slots 58. Each loop member arm 46 is provided on the inner side thereof with a finger 60. The fingers are positioned in the slots and maintained in each slot by means provided by the plate member. As shown in FIGS. 2, 3 and 10, the plate member 28 is formed to provide a portion 62 which overhangs each slot 58 for a portion of the slot's width and length. The purpose of this arrangement is to permit the fingers 60 to be positioned in the slots near the front end of the mounting plate, and to be moved under the overhang portions 62 where they can not escape from the slots. As shown in FIGS. 7–9, the undersides of the overhang portions are each formed at their front ends with an upwardly inclined surface at 64. The inclined surfaces permit the fingers 60 to move longitudinally in the slots 58 and then allow an upward and rotary motion to be imparted to the loop member 32 near the end of its stroke. Such movement enables the loop member to be raised to fully clear the hasp when the loop member in its controlled movement is about to engage the hasp or to be disengaged therefrom.

To furnish the desired controlled longitudinal movement coupled with a pivotal or rotary movement of the loop member in response to the rotation of the latch member, each loop member arm 46 is provided on its underside with a groove 66, the rear end wall of which is angled to furnish a cam surface 68. As shown in FIGS. 7—10, the plate member 28 is provided with a cam 70 adjacent the front end of each guiding slot 58. The cams 70 within the grooves 66 also serve to guide the movement of the loop member. The parameters or dimensional relationship of the parts is such that the forward motion of the loop member is limited by the length of the link 34; the fingers 60 do not travel beyond the inclined surfaces 64.

Where its desired to provide means for releaseably locking the loop member 32 in its latched position about a hasp; that is, to prevent the rotation of the latch member away from the plate member, the latch member is provided with a central aperture 72, for a key barrel 74. The key barrel is inserted from the rear so that a portion thereof is exposed at the front of the latch member. As known in the art, the key barrel has an external flange 76 of a diameter larger than the aperture 72 so that, as shown in FIGS. 5 and 6, the key barrel will be properly related to the latch member. Immediately beneath the key barrel a locking bolt 78 is positioned for engagement by a key (not shown) inserted through the slot in the key barrel.

The locking bolt 78 is of a known construction and comprises a generally U-shaped member made of spring material one arm of which is provided with V-shaped recesses to receive the tang of a key. As shown in FIG. 12, the underside of the latch member 30 is provided with a mating recess 80 to receive the locking bolt. The recess is slightly larger than the external outline of the locking bolt to accommodate the sliding movement imparted to the bolt when moved, by turning the key from locked to unlocked positions and vice versa. The mounting plate is provided with blocking means 82 cooperable with the locking bolt. Such means comprises a projecting vertical portion from the mounting plate and a horizontally extending portion at its free end to provide a hook beneath which a portion of the locking bolt may be moved for the locking function. The locking bolt slides out beyond the edge of the back cover 36, which supports the bolt and key barrel, to engage the blocking means 82.

In the preferred form of the invention, a spring member or a leaf spring 84 is connected to the mounting plate 28 by any suitable means. As shown in FIGS. 5 and 6, the die cast mounting plate may be provided with an integral connecting stud 86 which is extended through an opening in the spring 84. The end of the stud is headed over to connect the spring to the plate member. As shown in FIGS. 5 and 6, the free end of the spring is positioned beneath the front end of the latch member 30. When the latch member is rotated, by manually engaging the rear end thereof at 88, the front or nose 90 of the latch member bears against the end of the spring and the latch member is resiliently maintained in the position shown in FIG. 6.

The operation of the draw bolt of the invention may be best explained with reference to FIGS. 7, 8 and 9. With the latch member 30 in the down position adjacent the mounting plate 28 the end 88 of the latch member is manually engaged to rotate the latch member 30 with respect to the mounting plate 28. When the latch member reaches the position shown in FIG. 8, the loop member has traveled forward in a longitudinal direction to cause the loop member to move away from the boss portion 22 of the hasp. Such longitudinal movement is imparted to the loop member by the link 34 which couples the latch member to the loop member arms 46. As will be evident

from a comparison of FIGS. 7 and 8, the grooves 66 are traversed so that the cam surfaces 68 at the rear end of each groove are immediately adjacent the cams 70 on the mounting plate. Continued rotation of the latch member 30 causes the cam surfaces 68 to ride up on the sloped surfaces of the cam 70 to the position shown in FIG. 9. This upward movement of the loop member is permitted by the upwardly inclined surfaces 64 along which the fingers 60 slide. As shown in FIG. 9, also FIG. 6, at this final stage of rotation of the latch member 30, the base portion 44 of the loop member clears the hasp to permit the draw bolt to be separated from the hasp. Also, in such position of the latch member the front or nose 90 of the latch member bears against the end of the spring 84 and is resiliently maintained in such position.

When the draw bolt is to be connected to the hasp, the reverse cycle obtains as shown in FIGS. 9, 8 and 7, respectively. Rotating the latch member from its fully raised position of FIG. 9 to the intermediate position shown in FIG. 8 causes the nose 90 to be disengaged from the spring 84, and the loop member to be lowered or rotated to the position where the loop member lies in a plane parallel to the plate member. Continued rotation of the latch member to its fully lowered or latched position, as shown in FIG. 7, causes the loop member to be drawn rearwardly to the point where the projection 47 on the loop member enters the recess 24 of the hasp to firmly engage the parts.

As will be evident from the illustration of the draw bolt of the invention, particularly FIGS. 1, 5 and 7, the device has no protruding parts which may be damaged in use. The means for providing the controlled movement of the loop member in its path of movement to automatically engage and disengage a hasp is concealed and out of harms way. The construction is comparatively simple and rugged. From the manufacturing standpoint the relatively small number of parts are readily assembled.

It is believed that the advantages and improved results afforded by the draw bolt of the invention will be apparent from the foregoing detailed description of the illustrated preferred embodiment thereof.

I claim:

1. A draw bolt cooperable with a hasp, the draw bolt comprising a mounting plate, a manually operable latch member, means pivotally connecting the latch member to the mounting plate to allow the latch member to be rotated with respect thereto, a loop member adapted to embrace a hasp, the loop member being substantially U-shaped to provide a base portion and a pair of spaced arms, a link coupling the latch member to the arms, a a pair of laterally spaced, longitudinally extending slots formed in the mounting plate, each loop member arm having a finger respectively positioned in each slot, means provided by the mounting plate to maintain the fingers in the slots upon longitudinal movement of the loop member and to allow the loop member to be pivoted with respect to the mounting plate, a groove on the underside of each loop member arm terminating in a cam surface at its rear end, and a cam provided by the mounting plate adjacent the front end of each slot, the cams being positioned in said grooves and cooperable with said cam surfaces.

2. A draw bolt according to claim 1, wherein the means pivotally connecting the latch member to the mounting plate is located near their respective front ends; and wherein the link coupling the latch member to the loop member arms is connected to the latch member rearward of the means pivotally connecting the latch member to the mounting plate and to the rear ends of the arms.

3. A draw bolt according to claim 1, wherein the link is substantially U-shaped to provide a base portion and a pair of spaced arms, the base portion being connected to the latch member rearward of the means pivotally connecting the latch member to the mounting plate, the ends of the link arms being pivotally connected to the ends of the loop member arms.

4. A draw bolt according to claim 2, wherein the means pivotally connecting the latch member to the mounting plate comprises a pivot pin portion provided by the mounting plate, an open bearing recess provided by the latch member having the pivot pin portion positioned therein, and a back cover secured to the rear face of the latch member overlying the bearing recess.

5. A draw bolt according to claim 3, wherein the means pivotally connecting the latch member to the mounting plate comprises a pivot portion provided by the mounting plate, an open bearing recess provided by the latch member having the pivot pin portion positioned therein, and a back cover secured to the rear face of the latch member, the back cover overlying the bearing recess and overlying the base portion of the link.

6. A draw bolt according to claim 1, including cooperable means carried by the latch member and means provided by the mounting plate to releasably lock the latch member to the mounting plate.

7. A draw bolt according to claim 4, including a key barrel and an associated locking bolt supported by the back cover, and blocking means provided by the mounting plate cooperable with the locking bolt.

8. A draw bolt according to claim 1, including a spring member connected to the mounting plate member positioned for engagement by the latch member to releasably maintain the latch member in raised position.

9. A draw bolt cooperable with a hasp, the draw bolt comprising a mounting plate, a manually operable latch member, means pivotally connecting the latch member to the mounting plate located near their respective front ends, a loop member adapted to embrace a hasp, the loop member being substantially U-shaped to provide a base portion and a pair of spaced arms, a substantially U-shaped link having a base portion and a pair of arms, the base portion of the link being connected to the latch member rearward of the means pivotally connecting the latch member to the mounting plate, the ends of the link arms being pivotally connected to the ends of the loop member arms, cooperable means provided by the mounting plate and the loop member arms to slideably connect the loop member to the mounting plate, and cooperable cam means provided by the mounting plate and the loop member arms.

10. A draw bolt according to claim 5, including a key barrel and an associated locking bolt supported by the back cover, and blocking means provided by the mounting plate cooperable with the locking bolt.

11. A draw bolt according to claim 9, including a spring member connected to the mounting plate member positioned for engagement by the latch member to releasably maintain the latch member in raised position.

12. A draw bolt according to claim 9, wherein the cooperable means provided by the mounting plate and the loop member arms to slideably connect the loop member to the mounting plate comprise longitudinally extending guide means provided by the mounting plate and finger means provided by the loop member arms positioned in the guiding means.

13. A draw bolt according to claim 9, wherein the cooperable means provided by the mounting plate and the loop member arms to slideably connect the loop member to the mounting plate comprises a pair of laterally spaced, longitudinally extending slots formed in the mounting plate and each loop member arm is provided with a finger respectively positioned in each slot, means provided by the mounting plate to maintain the fingers in the slots upon longitudinal movement of the loop member and to allow the loop member to be pivoted with respect to the mounting plate; and wherein the cooperable cam means provided by the mounting plate and the loop member arms comprises a groove on the underside of each loop member arm terminating in a cam surface at its rear end, and a cam provided by the mounting plate adjacent the front end of each slot, the cams being positioned in the grooves and cooperable with said cam surfaces.

14. A draw bolt according to claim 9, wherein the means pivotally connecting the latch member to the mounting plate comprises a pivot pin portion provided by the mounting plate,

an open bearing recess provided by the latch member having the pivot pin portion positioned therein, and a back cover secured to the rear face of the latch member overlying the bearing recess.

15. A draw bolt according to claim **12**, wherein the means pivotally connecting the latch member to the mounting plate comprises a pivot pin portion provided by the mounting plate, an open bearing recess provided by the latch member having the pivot pin portion positioned therein, and a back cover secured to the rear face of the latch member, the back cover overlying the bearing recess and overlying the base portion of the link.

16. A draw bolt according to claim **13**, wherein the means pivotally connecting the latch member to the mounting plate comprises a pivot pin portion provided by the mounting plate, an open bearing recess provided by the latch member having the pivot pin portion positioned therein, and a back cover secured to the rear face of the latch member, the back cover overlying the bearing recess and overlying the base portion of the link.

17. A raw bolt according to claim **13**, including a spring member connected to the mounting plate member positioned for engagement by the latch member to releasably maintain the latch member in raised position.