

PATENT SPECIFICATION

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(54) FASTENING DEVICE

(71) We, WALTER KIDDE & COMPANY, INC., a corporation organised and existing under the State of Delaware, United States of America of 35 Market Street, Elmwood Park, New Jersey 07407, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to fastening devices of the type including a rotary deadbolt for use with luggage cases or the like, and is more particularly directed to improvements in fastening devices of the type disclosed in British Patent Specifications No's. 958,082 and 893,031.

British Patent Specifications No's. 958,082 and 893,031 disclose fastening devices for releasably fastening together separable parts of a container or the like. Each device includes a pivot bar adapted to be attached to one of the separable parts. A rotary deadbolt is pivotally connected to the pivot bar for engaging a keeper mounted on the other of the separable parts when the longitudinal axis of the deadbolt is perpendicular to the axis of the pivot bar and for drawing the keeper toward the pivot bar when the deadbolt is rotated to a closed position wherein the longitudinal axis is parallel to the axis of the pivot bar. Each pivot bar includes an upstanding boss for engaging a locking bolt which is slidably supported by the deadbolt for locking the deadbolt in a closed position. Detent means are also provided for releasably maintaining the deadbolt in either one of the open and closed positions. In the device of Specification No. 958,082, the detent means comprises a plate attached to the deadbolt and having indentations thereon which are cooperable with a detent ball resiliently supported by a leaf spring in an opening in the pivot bar. In the device of Specification No. 893,031 a bent wire spring is secured to the deadbolt and is cooperable with a pin

projecting from the pivot bar to provide the detent action.

A primary object of the invention is to provide a fastening device of simplified and improved construction, and wherein the number of operations required for assembling the parts is reduced, thereby minimizing the cost of manufacturing the device.

A further object of the invention is to provide a fastening device wherein a single spring functions both to urge resiliently together the rotary deadbolt and the frame or plate upon which it is mounted and to maintain the deadbolt releasably in respective open and closed positions.

According to the present invention, there is provided a fastening device for use in releasably fastening together two separable parts of a container or the like, the device being adapted to be attached to one of said separable parts to co-operate with a keeper having a projecting boss arranged on the other of said separable parts, said device comprising a frame or mounting plate having an integral projection formed with an axially extending opening therethrough, a rotary dead-bolt extending in a plane parallel to that of the frame or mounting plate and having a boss extending through said opening to provide a pivotal mounting for the deadbolt, the deadbolt being provided so that in use, it is capable of engaging the boss of a keeper and to draw the keeper toward the frame as the deadbolt is turned angularly in one direction relative to the integral projection to a closed or operative position where the deadbolt overlies the frame, and of releasing the keeper as the deadbolt is turned angularly relative to the integral projection in the opposite direction to an open or inoperative position where the deadbolt lies perpendicular to the frame, the rotary deadbolt further having a top wall and two spaced side walls, and the integral projection having means cooperable with each of the side walls for limiting the extent of angular

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turning movement of the deadbolt, and a leaf spring having an opening through which the end of the deadbolt projects, the leaf spring co-acting with means provided by the frame and with means provided by the deadbolt to bias the deadbolt, in the direction of the axis of said pivotal mounting, and into engagement with said integral projection.

The invention is illustrated by way of example in the accompanying drawings in which,

Figure 1 is a top plan view of a fastening device made in accordance with the invention, this view showing the device associated with a keeper and fastened thereto;

Figure 2 is a longitudinal cross-sectional view taken approximately in the plane of line 2—2 of Figure 1, this view additionally showing the device mounted on the wall of a luggage case section;

Figure 3 is a transverse cross-sectional view taken approximately in the plane of line 3—3 of Figure 1;

Figure 4 is a transverse cross-sectional view taken approximately in the plane of line 4—4 of Figure 1, this view additionally showing the device and the keeper mounted on the walls of cooperable luggage case sections;

Fig. 5 is a transverse cross-sectional view taken approximately in the plane of line 5—5 of Fig. 1, one of the connecting studs being partially shown;

Fig. 6 is a cross-sectional view taken approximately in the plane of line 6—6 of Fig. 1 showing the detent ball, the other parts of the device being partially shown;

Figs. 7, 8 and 9 are top plan views of the device with the rotary deadbolt partly broken away for showing successive stages and relationships of the parts as the deadbolt is moved from an unfastened position to a fastened position;

Fig. 10 is a top plan view of the mounting plate or frame of the device;

Fig. 11 is a longitudinal cross-sectional view taken approximately in the plane of line 11—11 of Fig. 1, showing the locking bolt in unlocked position; and

Fig. 12 is a view similar to Fig. 11 except that the locking bolt is in locked position.

Referring to Figs. 1, 2 and 4 of the drawings, a fastening device A includes a frame or mounting plate B and a rotary deadbolt C which is pivotally connected thereto, the deadbolt being cooperable with a keeper E. A leaf spring D is provided for biasing the deadbolt C against the mounting plate B. For convenience of manufacture and assembly, it is preferred that the frame, rotary deadbolt and keeper be made by die casting these parts.

The keeper E may be of usual or known

construction and may comprise an elongated base 10 having thereon an up-standing boss 12. As shown in Fig. 4, the base 10 of the keeper is further provided with a recess 14 on the side which faces the fastening device A when the deadbolt is in a closed position. The base 10 further includes a pair of spaced connecting studs 16 and 19 for connecting the keeper to the edge of a luggage case section or the like. As also shown in Fig. 4, the stud 16 is received by an opening 17 extending through luggage section 20 and valance member 22 supported thereon and has an end portion 18 which is headed over to attach the keeper E to valance 22. Although not shown, stud 19 is attached to luggage section 20 and valance member 22 in the same manner.

Referring to Figs. 1 and 2, frame B includes a portion 24 adapted for connection with a carrying handle, a base 26, and an elevated portion or lateral projection 28 extending upwardly from base 26. Frame B further includes means for attaching the fastening device to the other of the luggage sections. Referring to Fig. 1, extending downwardly from the base 26 of frame B are two connecting studs 30 and 32 having tapered openings 34 and 36 respectively. As shown in Fig. 4, stud 30 is received by an opening 38 which extends through valance member 40 and luggage section 42 to which the valance member is attached. The opening 34 in stud 30 receives a headed, tapered rivet 44 for attaching fastening device A to the luggage section 42. Although not shown, it will be apparent that stud 32 of frame B is similarly connected to the luggage section 42. Fig. 4 also shows that valance member 40 includes a projecting portion 46 which is receivable by recess 47 in valance member 22 and to which is connected a decorative insert 48 which may be selected to match the color of luggage sections 20 and 42.

Referring to Figs. 1, 2 and 4, rotary deadbolt C is pivotally connected to projection 28 on frame B of the device. Rotary deadbolt C includes a substantially planar top portion 68 and pair of spaced sides 70 and 72. Extending downwardly from the center of top portion 68 is a boss 74 which is received by an opening 76 in the lateral projection 28 of frame B.

Fastening device A further includes a leaf spring D between means provided by the frame and means provided by the deadbolt for biasing the deadbolt against the lateral projection 28 of the frame. Fig. 2 shows leaf spring D attached to boss 74 of deadbolt C and received by a recess 82 in the bottom of base 26 of the frame for biasing top portion 68 of the deadbolt into contact with surface 78 of the lateral projection 28. As best shown in Fig. 1, leaf spring D is substantially

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in the form of a disc, part of which is cut away for forming a radially extending finger 152 which provides detent action for deadbolt C in a manner which will be discussed later. Referring to Figs. 2 and 4, the leaf spring is connected to boss 74 of the deadbolt C by means of annular washer 84 which is secured thereto by heading over the end 86 of boss 74 and is flexed to contact a shoulder 88 in the recess 82 for providing axial tension to the deadbolt.

As shown in Figs. 1, 4, and 7-10, the lateral projection 28 of frame B includes a stop 90 which extends outwardly from projection 28 on the keeper side of the frame. A first surface 92 on stop 90 contacts side portion 70 of the deadbolt C when the deadbolt is in the closed position, as shown in Figs. 1, 4 and 9. A second surface 94 on stop 90 is adapted for contacting side portion 72 of the deadbolt C when the deadbolt is in the open position, as shown in Fig. 7. Referring to Fig. 8, in addition to limiting rotation of deadbolt C to the open and closed positions, stop 90 acts to guide boss 12 of keeper B into its fastened position opposite surface 95 on the projection 28 as the hasp is moved toward the frame for fastening. Specifically, surfaces 96 and 98 on stop 90 are cooperable with boss 12 of the keeper for directing the boss into the fastened position shown in Fig. 9. Surface 100 of projection 28 also acts to guide boss 12 into its fastened position.

Referring to Figs. 1, 2 and 5, rotary deadbolt C includes a key-actuated locking bolt 102 having an end portion 104 which is cooperable with recess 106 in the lateral projection 28 for enabling the deadbolt to be locked in the closed position. Bolt 102 includes a notch 108 adapted to be engaged by a key (not shown) for moving the bolt along the longitudinal axis of the deadbolt C. As shown in Fig. 5, a bolt cover plate 110 contacts shoulders 113 and 114 of deadbolt C and is cooperable with shoulders 116 and 118 of the deadbolt for securing bolt 102 in the deadbolt with a small amount of clearance so that the bolt may be moved along the longitudinal axis of the deadbolt C. An opening 111 is provided in bolt cover plate 110 for receiving the end portion of a key which may be inserted in the opening 112 in top surface 68 of deadbolt C.

Bolt cover plate 110 is attached to deadbolt C in a manner sufficient to furnish a suitable connection of the parts. For example, as shown in Fig. 2, deadbolt C may include a stud 120 which is received by an opening 122 in the bolt cover plate and is headed over to secure one end of the cover plate to the deadbolt. As shown in Fig. 1, extending downwardly from deadbolt C are two studs 124 and 126 which are received by notches 128 and 130 respectively in bolt

cover plate 110 and are headed over to secure the bolt cover plate to the deadbolt at these points.

For releasably maintaining the key-actuated locking bolt 102 in either the locked or unlocked position, detent means are provided. Referring to Figs. 1 and 5, the bolt cover plate 110 has a longitudinally extending slot 131 to provide a resilient section 132 having longitudinally spaced indentations 134 and 136. As shown in Fig. 5, which is a cross-sectional view taken through indentation 134, locking bolt 102 is provided with a projection 138 which is adapted to be received by one or the other of indentations 134 and 136 in the bolt cover plate for positioning the bolt in either the locked or the unlocked position. Referring to Figs. 5, 11 and 12, the upper surface of the bolt 102 is further provided with an indentation 140 and a sloped surface 142, both of which are cooperable with a pin 144 which extends downward from top portion 68 of deadbolt C for providing detent action. When the bolt 102 is in the unlocked position, pin 144 is received by indentation 140 on the bolt, as shown in Fig. 11, and projection 138 of the bolt is received by indentation 136 on section 132 of the bolt cover plate. However, when locking bolt 102 is in the locked position, as shown in Fig. 12, the downwardly extending projection 138 of the locking bolt is received by indentation 134 on section 132 of the bolt cover plate and pin 144 contacts surface 142 of the bolt member for releasably maintaining the bolt in that position. Bolt cover plate section 132 flexes to oppose resilient movement of bolt 102 between the locked and unlocked positions.

Detent means are also provided for releasably maintaining rotatable deadbolt C in the open and closed positions. As shown in Figs. 1 and 6, base 26 of frame B includes an opening 148 in which is positioned a ball 150. Leaf spring D includes an extended finger 152 which faces ball 150 against the underside of deadbolt C. Referring to Figs. 6 and 9, when the deadbolt is in the closed position, ball 150 contacts deadbolt surface 113, which is shown in Figs. 5 and 6 as one of the surfaces with which bolt cover plate 110 is engaged.

Similarly, when the rotary deadbolt C is in the open position shown in Fig. 7, ball 150 contacts surface 114, which is shown in Fig. 5 as the other surface with which bolt cover plate 110 is engaged. However, as shown in Fig. 7, ball 150 rides on bolt cover plate 110 as the deadbolt C is rotated between the open and closed positions, thereby causing ball 150 to be displaced downwardly (with respect to its position when the deadbolt is either open or closed) by an amount equal to the thickness of the bolt cover plate. This

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downward movement of ball 150 is resiliently opposed by spring finger 152, which provides detent action for deadbolt C in the following manner. Referring to Fig. 9, when deadbolt C is in the closed position, ball 150 rests on surface 113 of deadbolt C and also resiliently contacts edge 154 of bolt cover plate 110, as shown in Fig. 6, for thereby maintaining side 70 of the deadbolt in contact with surface 92 on stop 90 of frame B. Similarly, when the deadbolt C is in the open position, shown in Fig. 7, ball 150 rests on surface 114 of the deadbolt and cooperates with edge 156 of bolt cover plate 110 for thereby maintaining side 72 of the deadbolt in contact with surface 94 on stop 90 of the frame. Rotation of deadbolt C out of the open or closed position requires that sufficient torque be applied thereto move ball 150 against spring finger 152 a distance equal to the thickness of the bolt cover plate 110 to thereby enable the ball to ride on the bolt cover plate.

The manner in which the fastening device A engages the keeper B and draws it into its fastened position will now be described with reference to Figs. 7, 8 and 9. In the position shown in Fig. 7, the boss 12 of keeper B may be moved between sides 70 and 72 of deadbolt C and toward surface 95 of the projection 28 of the frame B. When the boss 12 is in close proximity to surface 95 of projection 28, deadbolt C is rotated to effect fastening, thereby causing side 70 of the deadbolt to engage boss 12, as shown in Fig. 8. As the deadbolt is further rotated, side 70 forces boss 12 generally in the direction of surface 95 of projection 28. However, if the boss 12 is not positioned directly opposite surface 95, surfaces 98 and 100 on projection 28 will direct the boss 12 to that position as side 70 of deadbolt C pulls the boss toward the frame B. When the deadbolt is in the closed position, shown in Fig. 9, the boss 12 will be held in the fastened position by the side 70 of deadbolt C and by surfaces 95, 98 and 100 of projection 28 of frame B. The keeper is released by fastening device A when the deadbolt C is rotated to the open position, as shown in Fig. 7.

As shown in Figs. 1, 2 and 3, frame B may further include a portion 24 adapted for connection with a carrying handle. Handle connecting portion 24 includes a connecting post 50 around which a loop connected to the end of a carrying handle (not shown) may be connected. A connecting stud 51 projects downwardly from post 50 of frame B and is received by an opening 52 in projecting portion 46 and insert 48 of valance member 40 which is attached to suitcase section 42. An opening 53, which extends through stud 51 and into portion 24 of frame B, receives a screw 56 for securely mounting post 50 of the frame B on

projecting portion 46 of valance member 40.

A washer 58 is secured against surfaces 60 and 62 of the handle connecting portion 24 by the action of decorative insert 48 of valance member 40 which abuts the bottom surface of washer 58 when the fastening device A is connected to the valance member. As shown in Figs. 2 and 3, the washer 58 cooperates with top portion 63, side portions 64, 65 and 66, and post 51 of handle connection portion 24 for providing a substantially enclosed housing for receiving the connecting loop of the handle (not shown) when the handle is not being used.

It is believed that the advantages and improved results furnished by the fastening device of the invention will be apparent from the foregoing description of a preferred embodiment thereof. Various changes and modifications may be made without departing from the scope of the invention, as defined in the following claims.

WHAT WE CLAIM IS:—

1. A fastening device for use in releasably fastening together two separable parts of a container or the like, the device being adapted to be attached to one of said separable parts to co-operate with a keeper having a projecting boss arranged on the other of said separable parts, said device comprising a frame or mounting plate having an integral projection formed with an axially extending opening therethrough, a rotary deadbolt extending in a plane parallel to that of the frame or mounting plate and having a boss extending through said opening to provide a pivotal mounting for the deadbolt, the deadbolt being provided so that in use, it is capable of engaging the boss of a keeper and to draw the keeper toward the frame as the deadbolt is turned angularly in one direction relative to the integral projection to a closed or operative position where the deadbolt overlies the frame, and of releasing the keeper as the deadbolt is turned angularly relative to the integral projection in the opposite direction to an open or inoperative position where the deadbolt lies perpendicular to the frame, the rotary deadbolt further having a top wall and two spaced side walls, and the integral projection having means cooperable with each of the side walls for limiting the extent of angular turning movement of the deadbolt, and a leaf spring having an opening through which the end of the deadbolt projects, the leaf spring co-acting with means provided by the frame and with means provided by the deadbolt to bias the deadbolt, in the direction of the axis of said pivotal mounting, and into engagement with said integral projection.



downward movement of ball 150 is resiliently opposed by spring finger 152, which provides detent action for deadbolt C in the following manner. Referring to Fig. 9, when deadbolt C is in the closed position, ball 150 rests on surface 113 of deadbolt C and also resiliently contacts edge 154 of bolt cover plate 110, as shown in Fig. 6, for thereby maintaining side 70 of the deadbolt in contact with surface 92 on stop 90 of frame B. Similarly, when the deadbolt C is in the open position, shown in Fig. 7, ball 150 rests on surface 114 of the deadbolt and cooperates with edge 156 of bolt cover plate 110 for thereby maintaining side 72 of the deadbolt in contact with surface 94 on stop 90 of the frame. Rotation of deadbolt C out of the open or closed position requires that sufficient torque be applied thereto move ball 150 against spring finger 152 a distance equal to the thickness of the bolt cover plate 110 to thereby enable the ball to ride on the bolt cover plate.

The manner in which the fastening device A engages the keeper B and draws it into its fastened position will now be described with reference to Figs. 7, 8 and 9. In the position shown in Fig. 7, the boss 12 of keeper B may be moved between sides 70 and 72 of deadbolt C and toward surface 95 of the projection 28 of the frame B. When the boss 12 is in close proximity to surface 95 of projection 28, deadbolt C is rotated to effect fastening, thereby causing side 70 of the deadbolt to engage boss 12, as shown in Fig. 8. As the deadbolt is further rotated, side 70 forces boss 12 generally in the direction of surface 95 of projection 28. However, if the boss 12 is not positioned directly opposite surface 95, surfaces 98 and 100 on projection 28 will direct the boss 12 to that position as side 70 of deadbolt C pulls the boss toward the frame B. When the deadbolt is in the closed position, shown in Fig. 9, the boss 12 will be held in the fastened position by the side 70 of deadbolt C and by surfaces 95, 98 and 100 of projection 28 of frame B. The keeper is released by fastening device A when the deadbolt C is rotated to the open position, as shown in Fig. 7.

As shown in Figs. 1, 2 and 3, frame B may further include a portion 24 adapted for connection with a carrying handle. Handle connecting portion 24 includes a connecting post 50 around which a loop connected to the end of a carrying handle (not shown) may be connected. A connecting stud 51 projects downwardly from post 50 of frame B and is received by an opening 52 in projecting portion 46 and insert 48 of valance member 40 which is attached to suitcase section 42. An opening 53, which extends through stud 51 and into portion 24 of frame B, receives a screw 56 for securely mounting post 50 of the frame B on

projecting portion 46 of valance member 40.

A washer 58 is secured against surfaces 60 and 62 of the handle connecting portion 24 by the action of decorative insert 48 of valance member 40 which abuts the bottom surface of washer 58 when the fastening device A is connected to the valance member. As shown in Figs. 2 and 3, the washer 58 cooperates with top portion 63, side portions 64, 65 and 66, and post 51 of handle connection portion 24 for providing a substantially enclosed housing for receiving the connecting loop of the handle (not shown) when the handle is not being used.

It is believed that the advantages and improved results furnished by the fastening device of the invention will be apparent from the foregoing description of a preferred embodiment thereof. Various changes and modifications may be made without departing from the scope of the invention, as defined in the following claims.

WHAT WE CLAIM IS:—

1. A fastening device for use in releasably fastening together two separable parts of a container or the like, the device being adapted to be attached to one of said separable parts to co-operate with a keeper having a projecting boss arranged on the other of said separable parts, said device comprising a frame or mounting plate having an integral projection formed with an axially extending opening therethrough, a rotary deadbolt extending in a plane parallel to that of the frame or mounting plate and having a boss extending through said opening to provide a pivotal mounting for the deadbolt, the deadbolt being provided so that in use, it is capable of engaging the boss of a keeper and to draw the keeper toward the frame as the deadbolt is turned angularly in one direction relative to the integral projection to a closed or operative position where the deadbolt overlies the frame, and of releasing the keeper as the deadbolt is turned angularly relative to the integral projection in the opposite direction to an open or inoperative position where the deadbolt lies perpendicular to the frame, the rotary deadbolt further having a top wall and two spaced side walls, and the integral projection having means cooperable with each of the side walls for limiting the extent of angular turning movement of the deadbolt, and a leaf spring having an opening through which the end of the deadbolt projects, the leaf spring co-acting with means provided by the frame and with means provided by the deadbolt to bias the deadbolt, in the direction of the axis of said pivotal mounting, and into engagement with said integral projection.



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2. A device as claimed in claim 1, wherein the leaf spring is held between the frame and a washer supported on the end of the boss.

5 3. A device as claimed in claim 1 or claim 2, wherein one of the side walls is cooperable with the upstanding boss of a keeper for drawing the keeper toward the frame as the deadbolt is rotated in said one direction to the closed position.

10 4. A device as claimed in any preceding claim, including a detent ball positioned in an opening in the frame, wherein the leaf spring biases the detent ball into contact with the rotary deadbolt for releasably maintaining the deadbolt in either one of its open and closed positions.

15 5. A device as claimed in any preceding claim, further comprising a bolt cover plate attached to the rotary deadbolt for slidably supporting a locking bolt in the deadbolt, the locking bolt being cooperable with

means provided by the upstanding projection for releasably locking the deadbolt in a closed position.

6. A device as claimed in claim 5, wherein the bolt cover plate is cooperable with the detent ball for releasably maintaining the rotary deadbolt in either one of its open and closed positions, the detent ball being biased into contact with the bolt cover plate by the leaf spring.

7. A fastening device substantially as hereinbefore described with reference to the accompanying drawings.

8. A two-part container or the like having a fastening device as claimed in any one of claims 1 to 7.

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