Jan. 10, 1967 E. G. GRIFFITHS ETAL 3,297,348

DEMOUNTABLE TOGGLE LATCH

Filed Dec. 23, 1963 3 Sheets-Sheet 1

Fig 1

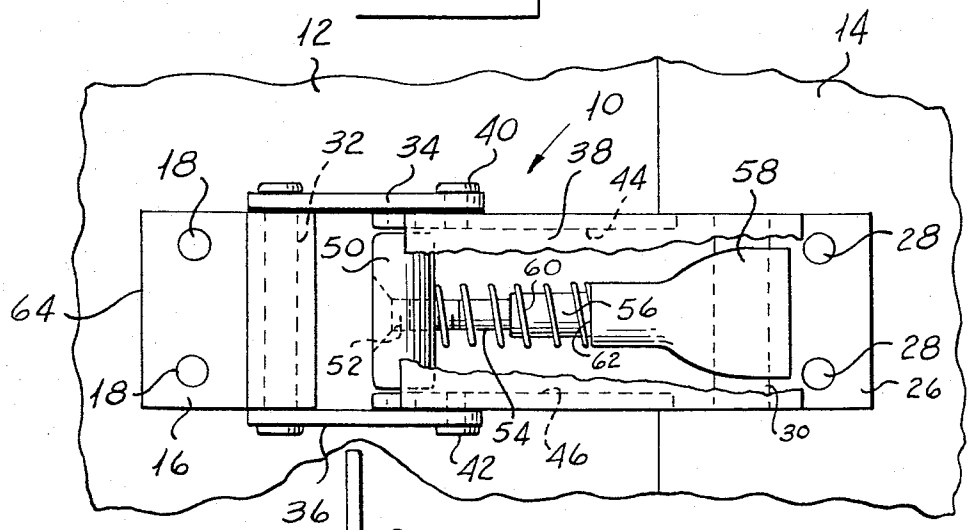


Fig 2

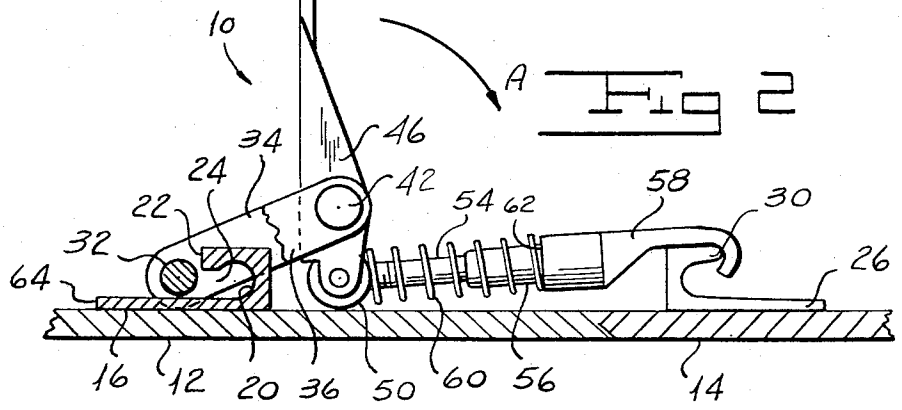
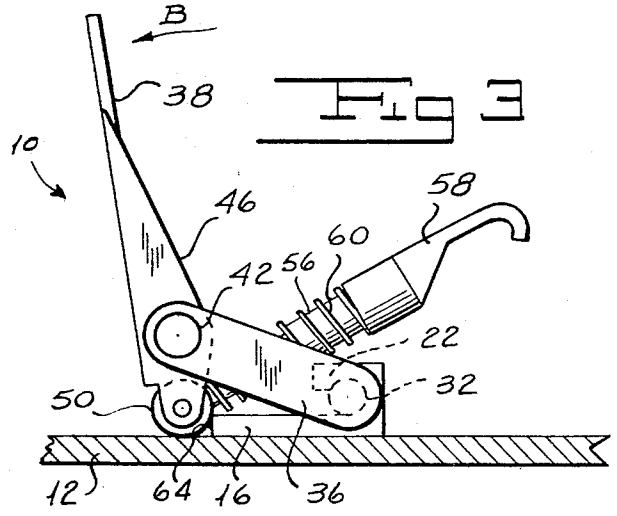


Fig 3



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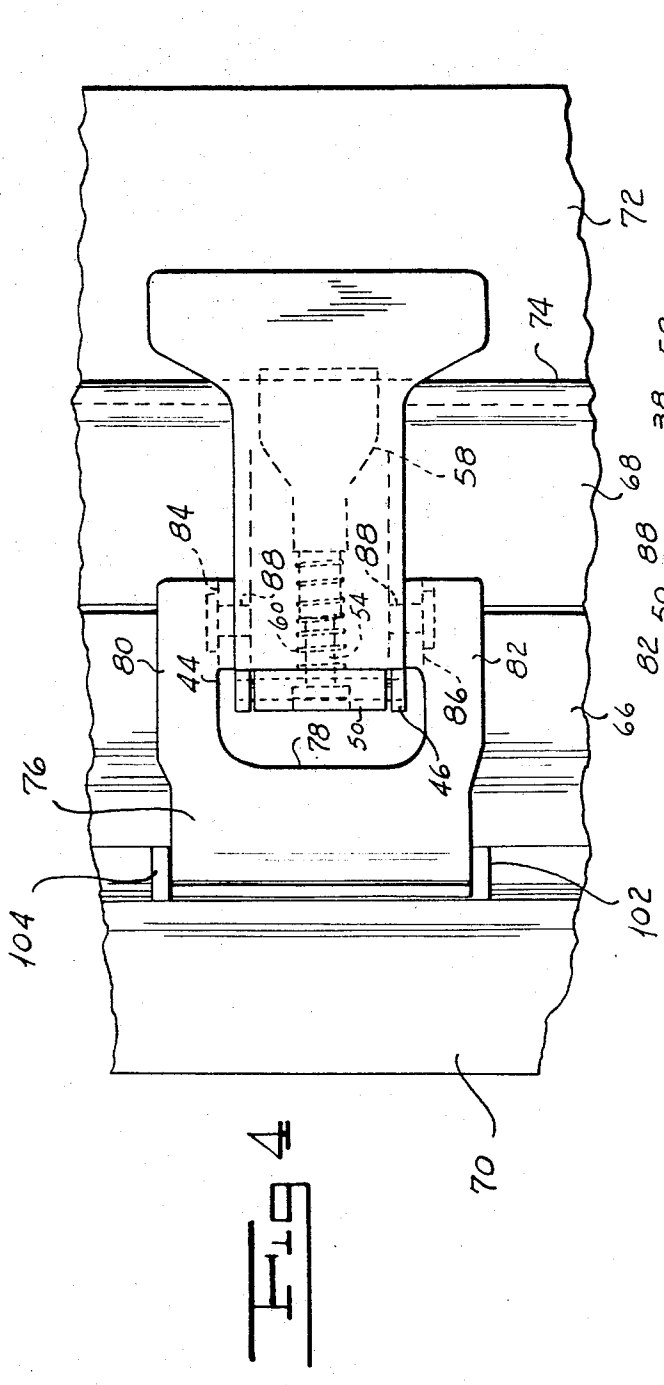


FIG 4

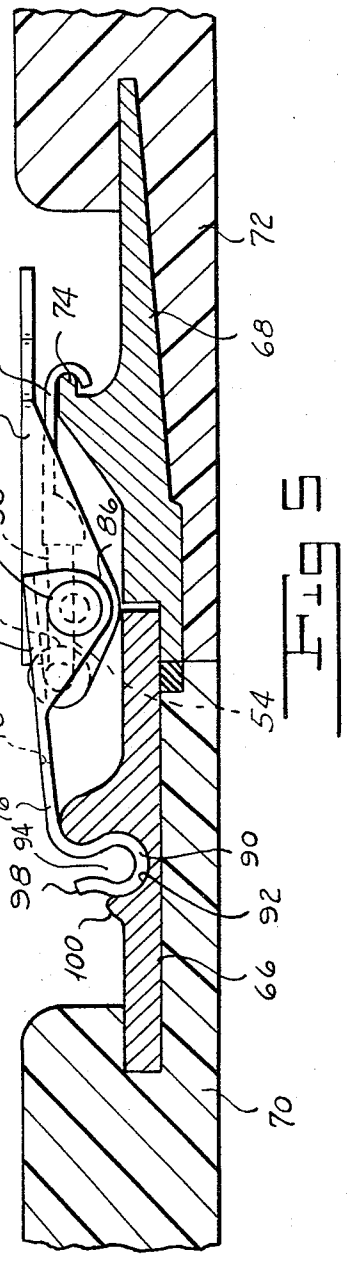


FIG 5

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DEMOUNTABLE TOGGLE LATCH

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Fig 6

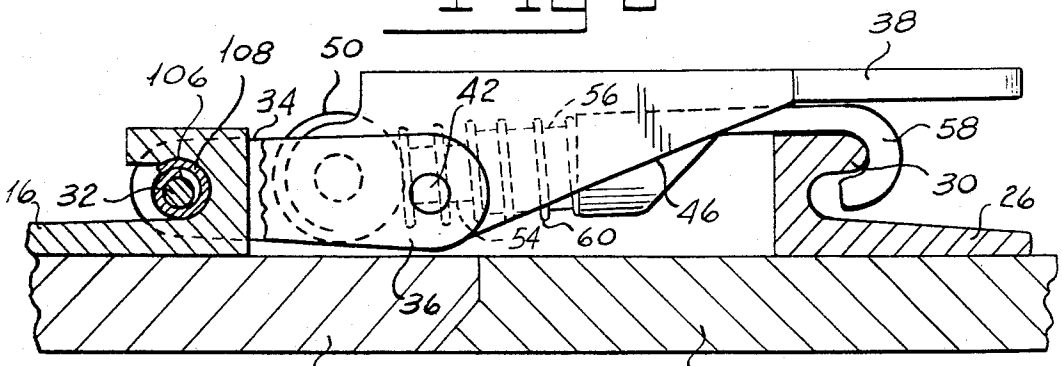
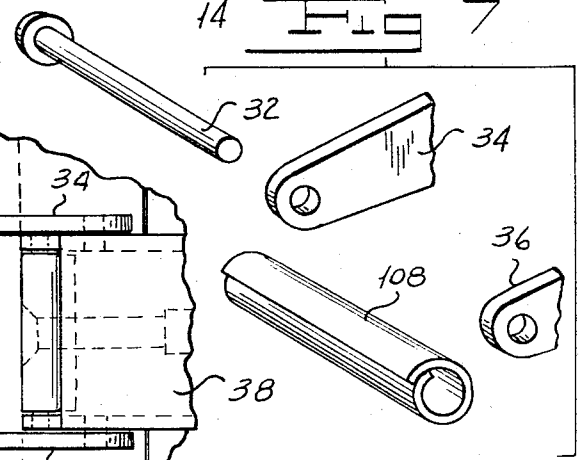


Fig 7



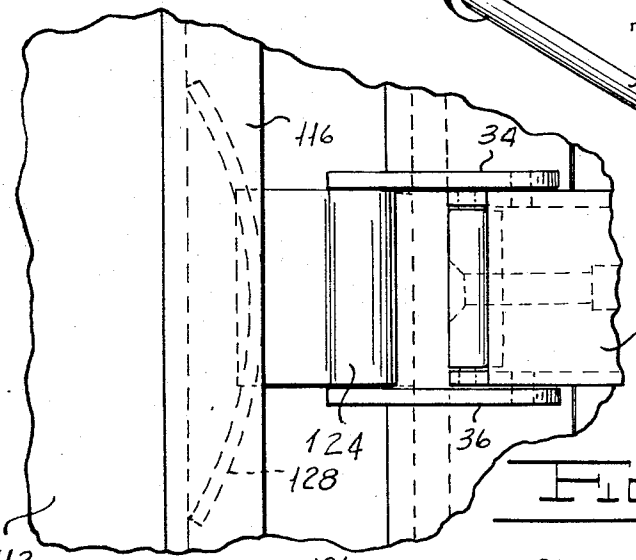


Fig 8

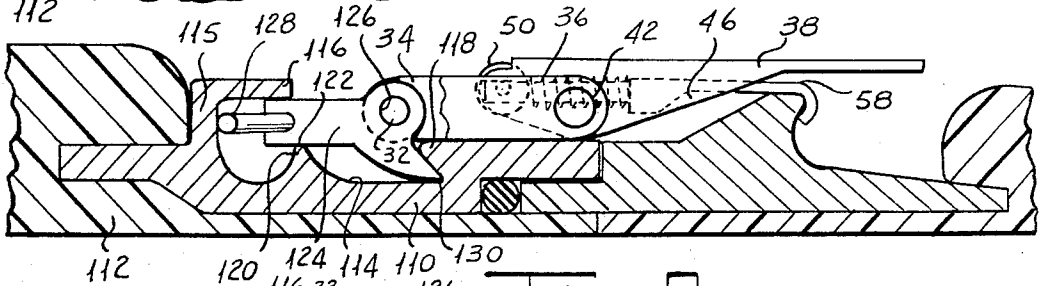


Fig 9

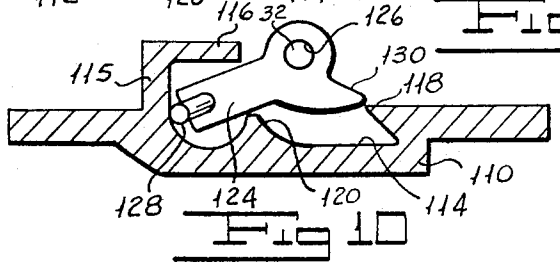


Fig 10

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DEMOUNTABLE TOGGLE LATCH

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4 Claims. (Cl. 292—113)

Our invention relates to a demountabe toggle latch and more particularly to a toggle latch assembly which can readily be assembled on and readily removed from the body with which it is used by a simple manual operation.

Various forms of latches are known in the prior art for holding two bodies in assembled relationship. One of the common types of latch assemblies is the toggle latch which is adapted to draw two bodies, such as the parts of a container, into engagement with each other with a predetermined force in response to operation of the latch. Latches of this type have found wide acceptance owing to their relatively high holding force, the ease of operation and the reliability thereof.

One use for which toggle latches of the type described above are intended is for use in closing instrument cases during shipment and handling. In applications of this kind, when the instrument or the like is installed in the location at which it is to be used, it often is a semi-permanent installation. In such a semi-permanent installation, the presence of the latches on the container often is inconvenient and annoying to the user of the instrument.

Many containers used to ship valuable instruments and the like are intended to be reused after the device shipped therein has been installed. In preparing such containers for reuse, they must be cleaned, painted and remarked before they are reused.

In some cases where a latch is over-loaded or where a container is dropped, the latch may become damaged so that it requires repair or replacement. In latch assemblies of the prior art, such an occurrence often renders the container useless.

We have invented a readily demountable toggle latch assembly which overcomes the defects of latch assemblies of the prior art. Our assembly can readily be mounted on a container body or the like in a rapid and expeditious manner. It does not require skilled labor to assemble the latch on the container. After having been assembled on the container, our latch can readily be removed therefrom by a simple manual operation. Thus, our latch assemblies can be removed from containers housing semi-permanent installations. Our assembly is especially adapted for reusable containers. The latch assemblies can readily be removed therefrom to permit painting, cleaning and re-marking of the container. They may then readily be reassembled thereon. Our assembly permits replacement or repair of a latch assembly which has been damaged by overloading or by dropping of the container carrying the latch.

One object of our invention is to provide a demountable toggle latch assembly which can be applied to and removed from a container body or the like by a simple manual operation.

Another object of our invention is to provide a demountable toggle latch assembly which is especially adapted for reusable containers.

A further object of our invention is to provide a demountable toggle latch which permits a damaged latch to be repaired or replaced in a rapid and expeditious manner.

Still another object of our invention is to provide a demountable toggle latch assembly which is simple in its construction and operation for the result achieved thereby.

Other and further objects of our invention will appear from the following description.

In general our invention contemplates the provision of a readily demountable toggle latch assembly in which resilient means permit the pivot pin of the assembly to be snapped intot semi-permanent engagement with a bearing recess on one of the members to be secured in response to latching engagement of the drawhook with a strike on the other member to be secured. Means responsive to rotation of the latch handle in an unlatching direction permits the assembly to be demounted against the action of the resilient means.

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

FIGURE 1 is a plan view of one form of our demountable toggle latch assembly with a part broken away.

FIGURE 2 is an elevation of the form of our demountable toggle latch assembly shown in FIGURE 1 with parts broken away and with other parts in section to illustrate the manner in which the latch assembly is applied to a container body or the like.

FIGURE 3 is an elevation of the form of our demountable toggle latch assembly shown in FIGURE 1 and illustrating the manner in which the assembly is removed from the container body or the like.

FIGURE 4 is a plan view of an alternate form of our demountable toggle latch assembly.

FIGURE 5 is a side elevation of the form of our demountable toggle latch assembly shown in FIGURE 4.

FIGURE 6 is a side elevation of yet another form of our demountable toggle latch assembly.

FIGURE 7 is a fragmentary exploded view of a portion of the form of our demountable toggle latch assembly shown in FIGURE 6.

FIGURE 8 is a plan view of a still further form of our demountable toggle latch assembly.

FIGURE 9 is an elevation of the form of our demountable toggle latch assembly shown in FIGURE 8.

FIGURE 10 is a fragmentary elevation of the form of our demountable toggle latch assembly shown in FIGURES 8 and 9 and illustrating the manner in which the assembly is applied to its support.

Referring now to FIGURES 1 to 3, one form of our demonutable toggle latch assembly, indicated generally by the reference character **10**, is adapted to join respective members **12** and **14** in assembled relationship. The two members **12** and **14** may, for example, be the two parts of a container or the like. The member **12** carries a base **16** secured thereto by any suitable means, such as by rivets **18**. We form the base **16** with a recess **20** providing a bearing surface for the pivot pin of my latch assembly to be described hereinafter. A lip **22** on base **16** partially closes the recess **20** to provide an opening **24** which is slightly narrower than the diameter of the pivot pin to be described. We secure a strike plate **26** to the member **14** by any suitable means, such as by rivets **28**. A lip **30** on the strike plate **26** is adapted to be engaged by a drawhook in a manner to be described.

The latch assembly includes a pivot pin **32** carrying a pair of connecting links **34** and **36**, the other ends of which are pivotally connected to a handle **38** by pins **40** and **42** extending into side flanges **44** and **46** of the handle **38**. Flanges **44** and **46** rotatably support a pin **50** adjacent one end of the handle **38**. A transverse bore **52** in the center of the pin **50** receives a bolt **54** which is threaded into the shank **56** of the drawhook **58** of our latch assembly. A spring **60** bearing between a shoulder **62** on shank **56** and the pin **50** normally urges the hook

58 away from pin 50. It will readily be understood that the effective length of the drawhook 58 can be varied by threading the bolt 54 into or out of the shank 56 against the action of spring 60.

In mounting the assembly 10 on the base 16, the parts are positioned in the manner shown in FIGURE 2 with the pin 32 at the mouth of the opening 24 and with the drawhook 58 in engagement with the lip 30. With the parts in the position shown in FIGURE 2, handle 38 is moved downwardly in the direction of Arrow A toward the hook 58. In the course of this movement, pin 50 moves slightly upward and pivot pin 42 moves to the right as viewed in FIGURE 2 to draw the parts 12 and 14 together. At the same time, pin 32 is drawn to the right and into the recess 20 against the action of resilient lip 22. It will readily be understood that the material of which the base 16 is formed is sufficiently resilient to permit this action. After the pin 32 moves into the recess 20, continued movement of the handle 38 moves the pin 42 downwardly until the latch snaps into its locked position by virtue of its toggle action.

When it is desired to remove the assembly 10 from the base 16 as, for example, in the case of a semi-permanent installation or when a reusable container is to be cleaned and painted, the handle 38 is moved away from the members 12 and 14. This action first moves the hook 58 out of engagement with the lip 30. The parts are then moved to the position shown in FIGURE 3. The dimension of the base 16 and the length of links 34 and 36 is such that the pin 50 or the end of handle 38 engages the edge 64 of the base 16. If, now, handle 38 is moved in the direction of the arrow B in FIGURE 3 while holding the handle in engagement with the edge 64, the pin 32 readily snaps out of the recess 20 and the assembly 10 has been removed from the base 16. It is to be noted that in the locked position of the parts the clamping force exerted by the latch assembly is in such a direction as tends to hold pin 32 in position within the recess 20.

Referring now to FIGURES 4 and 5, we have shown an alternate form of our latch assembly wherein a base 66 and a strike plate 68 are held by molded parts 70 and 72 of a container. The strike plate 68 has a lip 74 adapted to be engaged by drawhook 58. The drawhook 58, the pin 50, shank 56 and bolt 54, as well as the handle 38 of this form of our invention, are substantially the same as in the form of our invention shown in FIGURES 1 to 3. However, in this form of our invention, rather than employing a pair of links 34 and 36 to connect the assembly to the base 66 we use a single link 76 having an opening 78 therein forming arms 80 and 82. We provide the arms with respective flanges 84 and 86 respectively connected to the flanges 44 and 46 of handle 38 by pins 88. We form the end of the link 76 remote from opening 78 with a bend 90. The material of which link 76 is formed is resilient so that the bend 90 forms a spring. We provide the base 66 with a recess 92 for the reception of the spring 90. With the hook 58 in engagement with the lip 74 and with the spring 90 positioned at the mouth 94 of recess 92, as the parts are moved to latching position the spring snaps into the recess to mount the latch assembly on the base 66 in semi-permanent fashion. Now, when it is desired to remove the assembly, handle 38 is actuated to move the hook 58 out of engagement with the lip 72. When this has been done, link 76 is moved in a counterclockwise direction as viewed in FIGURE 5 to bring an extension 98 on spring 90 into engagement with a boss 100 on the base 66 at the mouth 94 of the opening 92. Then spring 90 can readily be snapped out of recess 92 to remove the latch assembly. In this form of our invention, preferably we provide the opening 92 with laterally spaced bosses 102 and 104 for properly locating the latch assembly on the member 70.

Referring now to FIGURES 6 and 7, still another

form of our assembly comprises latch parts generally similar to the parts shown in FIGURES 1 to 3 of the drawings. In this form of our invention, however, we form the base 16 with a recess 106 of a somewhat larger diameter than that of the recess 20 shown in FIGURE 1. Rather than engaging the pivot pin 32 directly in engagement with the recess 20, we dispose a compressible sleeve 108 of resilient material around the pin 32. As pin 32 moves into recess 106, spring 108 expands to engage the inner surface of the recess. When the assembly is to be removed by the inner engagement of the handle with the base, the sleeve 108 compresses to permit the disengagement.

Referring now to FIGURES 8 to 10, a still further form of our demountable toggle latch assembly includes a supporting member 110 formed from extruded aluminum or the like and bonded to the container body 112. The support 110 has a recess 114 therein, which recess has a wall 115 carrying a retaining flange 116 along one edge thereof and a retaining lip 118 along the other edge thereof. A rib 120 in the base of the recess 114 cooperates with flange 116 to form a mouth 122. Recess 114 is adapted to receive a base 124 formed from extruded aluminum or the like. We provide the base 124 with a bore 126 which receives the pivot pin 32 carrying the connecting links 34 and 36. Since the remaining structure of the latch assembly, per se, is similar to that shown in FIGURES 1 to 3, it will not be described in detail. We secure a wire spring 128 to the base 124. In assembling the base 124 on the support 110, we insert the end of the base 124 carrying the spring 128 into the mouth 122 and into engagement with the wall 115. In so doing, we flatten the spring 128 to such an extent as permits a foot 130 on the base 124 to be moved down under the lip 118. We then release the latch assembly and spring 128 acts against wall 115 to force the foot 130 under lip 118. It will readily be appreciated that when the latch is locked, the clamping force enhances the action of spring 128.

In operation of the form of our invention shown in FIGURES 1 to 3, with the hook 58 in engagement with lip 30 and with pin 32 at the mouth of the opening 24, I move handle 38 in the direction required to lock the latch. In response to this movement, pin 32 first snaps into the recess 20, this action being permitted by the resilience of the base 16. Further movement of handle 38 results in the toggle action which securely holds parts 12 and 14 in assembled relationship while locking the latch against accidental release.

To remove the assembly from the base 16, we first unlock the hook 58 and then bring the end of handle 38 into engagement with edge 64. We rotate the handle in the direction of the arrow B in FIGURE 3 while holding the handle end in engagement with edge 64. This action withdraws pivot pin 32 from recess 20 against the resilience of base 16.

The operation of the forms of our invention shown in FIGURES 4 to 7 is generally similar to that described above in connection with the form of the invention shown in FIGURES 1 to 3. In the form of the invention shown in in FIGURES 4 and 5, spring 90 is placed adjacent the mouth 94 of recess 92 and as the latch is locked it snaps into the recess. When it is to be removed, link 76 is rotated in a counterclockwise direction to bring extension 98 into engagement with lip 100 to snap the spring 90 out of the recess 92. In the form of our invention shown in FIGURES 6 and 7, it is the resilience of the sleeve 108 rather than that of base 16 which provides the releasable engagement. It will readily be appreciated that in the forms of our invention shown in FIGURES 4 to 7, base 16 need not be formed of resilient material. In the form shown in FIGURES 8 to 10, spring 128 is flattened against wall 115 to permit foot 130 to clear lip 118 to assemble or to disassemble the latch.

It will be seen that we have accomplished the objects

of our invention. We have provided a demountable toggle latch assembly which can be assembled on a support and removed from a support by a simple manual operation. Our latch is especially adapted for use on reusable containers and on containers for equipment which is semi-permanently installed. It permits removal of a damaged latch for repair or replacement thereof. It is simple in its construction and operation for the result achieved thereby.

It will be understood that certain features and subcombinations are of utility and may be empolyed without reference to ther features and subcombinations. This is contemplated by and is within the scope of our claims. It is further obvious that various changes may be made in details within the scope of our claims without departing from the spirit of our invention. It is, therefore, to be understood that our invention is not to be limited to the specific details shown and described.

Having thus described our invention, what we claim is:

1. A latch assembly for securing one member to a second member having a strike thereon including in combination a pivot pin, a handle, a link connecting said pivot pin to said handle at a point intermediate the ends thereof, a drawhook, a pivotal connection between said drawhook and said handle adjacent one end thereof, a bracket carried by said one member, said bracket having a pivot pin receiving recess with a mouth opening out of said recess in a direction away from said strike, a bracket base and resilient means retaining said pivot pin in said recess, said bracket base providing a shoulder spaced form said mouth in a direction away from said strike, said handle provided with a part adapted to engage said shoulder, the aggregate of the distance between the recess and said shoulder and the distance between the pivotal connection of the link and handle and said part being greater than the length of said link between the connection of the link and the handle and said pivot pin whereby said part thereon may be engaged with said bracket base to draw said pivot pin out of said recess against the action of said resilient means.

2. An assembly as in claim 1 wherein said resilient means comprises a resilient lip on said bracket at said mouth and wherein said pivot pin has a diameter greater than the height of the mouth.

3. An assembly as in claim 1 wherein said resilient means comprises a compressible sleeve carried by said pivot pin for releasably retaining said pivot pin in said recess.

4. A latch assembly for securing one member to a second member having a strike thereon including in combination a pivot pin, a handle, a link carried by said pivot pin, a first pivotal connection between said link and said handle at a point intermediate to the ends thereof, a drawhook, a second pivotal connection between said drawhook and said handle adjacent one end thereof, a bracket carried by said one member, said bracket having a pivot pin receiving recess with a mouth opening out of said recess in a direction away from said strike, said recess having an axis, said bracket having a shoulder spaced from said axis in said direction, and resilient means adapted to retain said pin in said recess, said handle being operable to engage said drawhook with said strike with said pivot pin adjacent said mouth to tension said drawhook to draw said pivot pin into said recess against the action of said resilient means, said handle being movable to engage said one end thereof with said shoulder to draw said pivot pin out of said recess against the action of said resilient means, the distance from said recess axis to said shoulder plus the distance between said one end of the handle and said first pivotal connection being greater than the length of said link.

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