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(54) Toggle latch

(57) A toggle latch lever mechanism comprises a first member (1), formed from a single flat strip of material and bent so as to form a lever portion (2) at one end, a latch portion (3) at its other end, and a connecting portion (5) disposed between its two ends. A second mem-

ber (6) is pivotally connected to the connecting portion (5) of the first member at one end and shaped at its other end for attachment to a support block (7) of the toggle latch or directly to one (8) of two parts (8,9) to be latched together by the toggle latch.

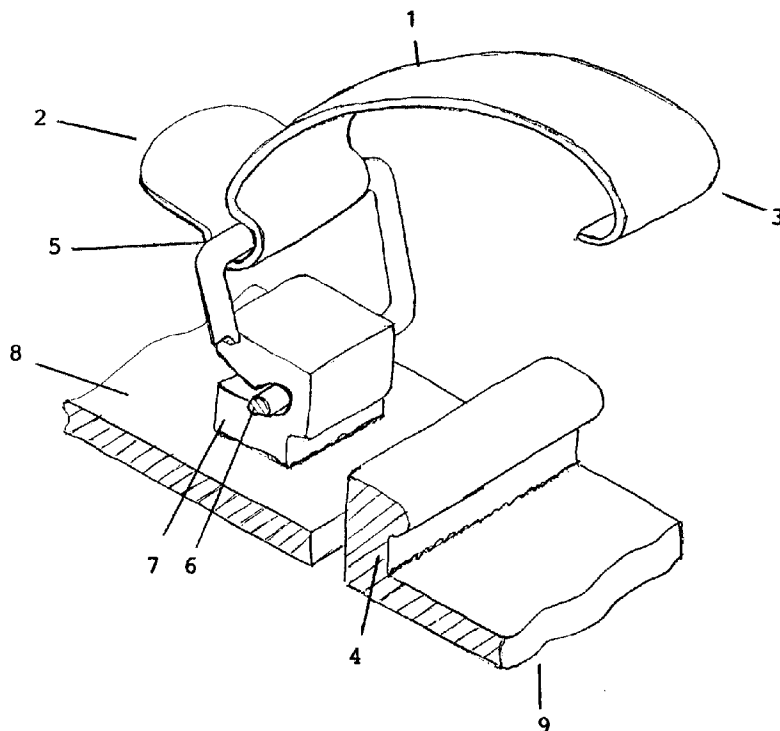


Fig. 1

Description

This invention relates to a toggle latch of the type often used to latch together two parts of an item, such as the lid and main body of a container.

A number of variations of the standard toggle latch are available. Latches with links made from wire or strip material, latches which, when engaged, conceal their assemblies, and latches with lever portions for ease of opening, are all well known.

Such latches do have the problem that, although mechanically quite simple and containing few parts, the required components are not easily machined and that their manufacture produces a large amount of waste, increasing their manufacturing costs. Assembly of the components can also be difficult.

Simple, one-piece C-shaped clips are known for similar uses, but do not provide sufficient clamping force.

The object of the present invention is to provide a toggle latch which is very easy to manufacture yet strong and reliable.

According to the present invention there is provided a toggle latch lever mechanism comprising;

a first member, formed from a single flat strip of material and bent so as to form a lever portion at one end, a latch portion at its other end, and a connecting portion disposed between its two ends; and a second member, pivotally connected to the connecting portion of the first member at one end and shaped at its other end for attachment, in use, to one of two parts to be latched together by the mechanism.

The second member may be formed from a single wire and may have coils incorporated into its sides to introduce additional compliance into it. The second member may also be shaped so as to form a snap-fit assembly with a support block attached to one of the parts to be latched.

Also, the first member may be pinched, formed, pierced or shaped around the connecting area, in order to control the fits required for manufacture, processing and function, whilst at the same time retaining the second member securely within it.

The toggle latch lever mechanism may further comprise a third member arranged for attachment to one of the two parts to be latched together and pivotally attached to the second member. This third member may be pinched, formed, pierced or shaped around the area in which it connects to the second member. The third member may be arranged such that it forms a compliant connection between the part to be latched and the second member to enable the toggle latch to operate over a solid, non-compliant joint to be connected. This compliance also enables the latch to be used for a variety of widths of gap to be latched.

The third member may be arranged to connect to the part to be latched in a snap-fit arrangement, or by the use of rivets or screws.

The pivotal connection between the first and second member and/or the pivotal connection between the second and third member may be provided by channels having protrusions which allow the passage of a finishing media, such as plating metal or paint, to flow through and around the component to be connected.

Forming the lever, link and connecting portions from a single strip of material greatly improves the ease of manufacture of the toggle latch and reduces waste from machining. This also provides for manufacture to be easily automated and enables the first member to be made integrally with the second member on a single machine, with one machine cycle providing a completed toggle assembly. A similar process could also be used to form a latch assembly with an integral support block on a single machine.

Examples of a toggle latch lever mechanism according to the present invention will now be described with reference to the accompanying drawings, in which:

Fig. 1 shows the toggle latch lever mechanism when connected to a support block;

Fig. 2 shows a side view of the toggle latch in an open position;

Fig. 3 shows a side view of the toggle latch in a partially closed position;

Fig. 4 shows a side view of the latch assembly when in a closed position.

Fig. 5 shows the latch assembly before it is fixed to a support block;

Fig. 6 shows the second member;

Figure 7 is a side view of a second example of a latch according to the invention; and

Figure 8 is a top view of the example of figure 7.

Referring to Figure 1, the toggle latch lever mechanism of the present example has a first member 1, formed from a single flat strip of spring steel or the like and comprising three portions, a lever portion 2, which is used to enable opening and closing of the latch assembly, a latch portion 3, which is shaped to form a hook engageable with a lip 4 on one of the two parts 8,9 to be latched, and a connecting portion 5, for connecting a second member 6. The second member 6 is formed from a single bent wire (see fig. 6) and is pivotally retained at one end within the retaining portion 5 of the first member 1 and at its second end in a support block 7 attached to a second part 8 to be latched. The support block 7 provides a snap-fit type assembly for the second member 6.

To operate the latch, the latch portion 3 of the first member 1 is placed over the lip 4 and pressure applied to the lever portion 2 to move the retaining portion 5 towards the surface of the second of the two parts 8,9 to be latched, in accordance with the usual toggle latch

method of latching (see Figures 2 to 4). Once in the latched position, the first member 1 conceals the support block 7, thus providing the overall assembly with a pleasant appearance when closed.

To open the latch, a force is applied to the lever 2 to urge it away from the surface of the second part 8 to be latched, and the first member 1 and second member 6 pivot to move the retaining portion 3 away from the lip 4 and thus allowing the two parts 8,9 to be separated.

The latch assembly is easily manufactured by forming the first member 1 around the second member 6. The provision of a snap-fit type assembly on the second end of the second member 6 on the support block enables the end user of the latch assembly to easily connect the assembly to whatever type of product is desired.

As can be seen from figure 7, a second example latch, in which components corresponding to those of figure 1 are numbered identically, is shown in a closed position in which a first member 1, formed from a single flat strip of spring steel or the like has a lever portion 2, and a latch portion 3. A lip 4 is formed on one of the two parts, 8, 9 to be latched. A connecting portion 5 pivotally connects a second member 6. The second member is, in turn, pivotally attached to a third member 7, which can be formed either from the single flat strip of spring steel from which the first member 1 is formed or independently. The third member 7 is attached, in this example, by being clipped to one of the members 8 to be latched. This third member 7 is formed so that it has a sprung section 12. This can provide the latch with compliance.

As can be seen from figure 8, protrusions 13 can be formed in the connecting portions 5, 11 so that application of paint or plating metal does not clog and/or jam the connecting portions 5,11.

Claims

1. A toggle latch lever mechanism comprising;

a first member, formed from a single flat strip of material and bent so as to form a lever portion at one end, a latch portion at its other end, and a connecting portion disposed between its two ends; and

a second member, pivotally connected to the connecting portion of the first member at one end and shaped at its other end for attachment, in use, to one of two parts to be latched together by the mechanism.

2. A mechanism according to claim 1, wherein the second member is formed from a single wire.

3. A mechanism according to claim 1 or claim 2, wherein the second member has coils incorporated into its sides to introduce additional compliance into it.

4. A mechanism according to any of claims 1 to 3, wherein the second member is shaped so as to form a snap-fit assembly with a support block attached, in use, to one of the parts to be latched.

5. A mechanism according to any of claims 1 to 4, further comprising a third member arranged for attachment to one of the two parts to be latched together and pivotally attached to the second member.

6. A mechanism according to claim 5, wherein the third member is shaped around the area in which it connects to the second member in order to control the fits required for manufacture, processing and function.

7. A mechanism according to claims 5 or 6 wherein the third member is arranged such that it forms a compliant connection between the part to be latched and the second member to enable the toggle latch to operate over a solid, non-compliant joint to be connected.

8. A mechanism according to claims 5 to 7, wherein the third member is arranged to connect to the part to be latched in a snap-fit arrangement, or by the use of rivets, screws or welds.

9. A mechanism according to any of the preceding claims, wherein the pivotal connection between the first and second member and/or the pivotal connection between the second and third member may be provided by channels having protrusions which allow the passage of a finishing media to flow through and around the component to be connected and/or to control the fits required for manufacture, and function.

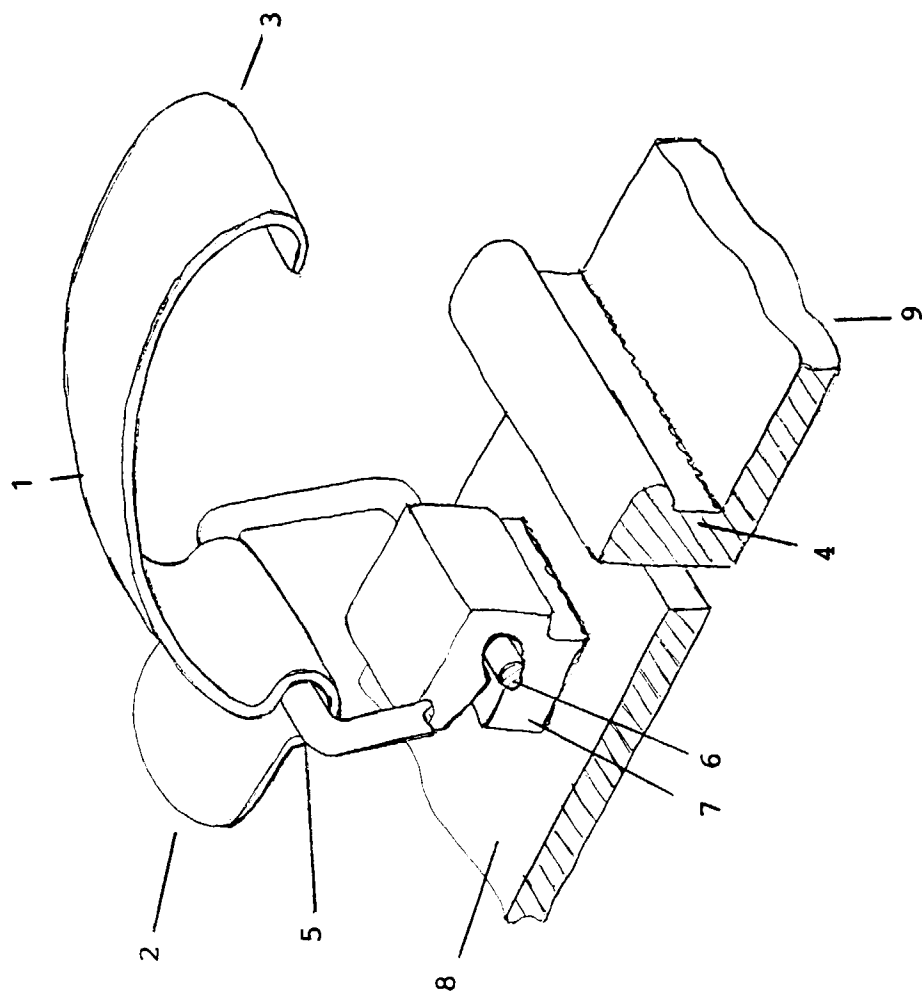


Fig. 1

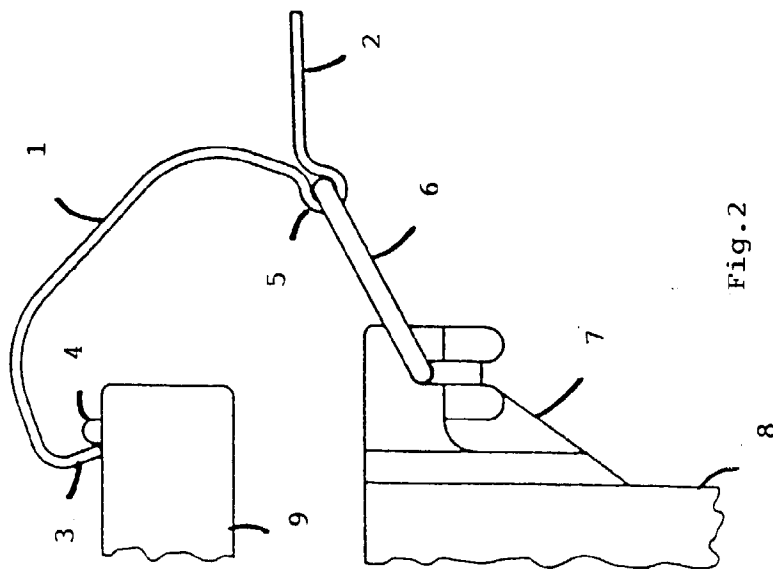


Fig. 2

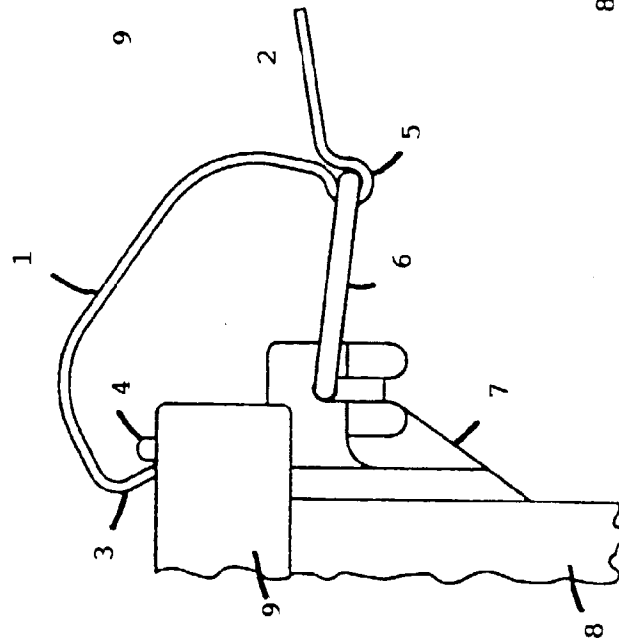


Fig. 3

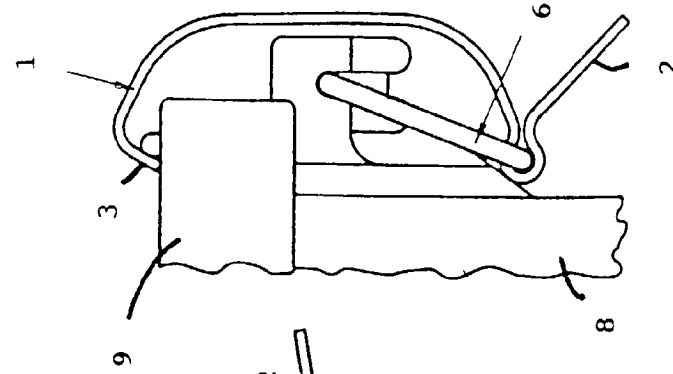


Fig. 4

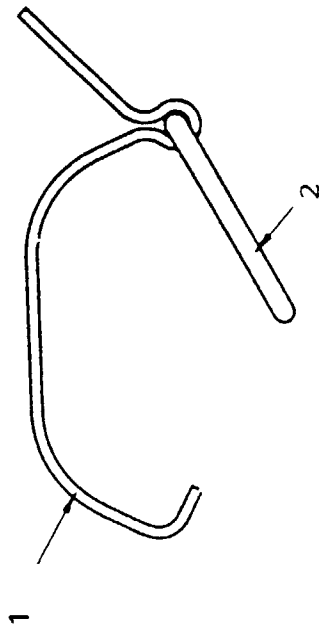


Fig. 5

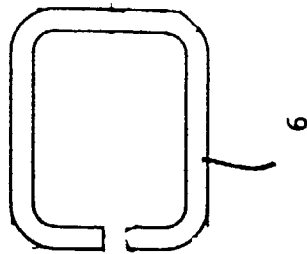
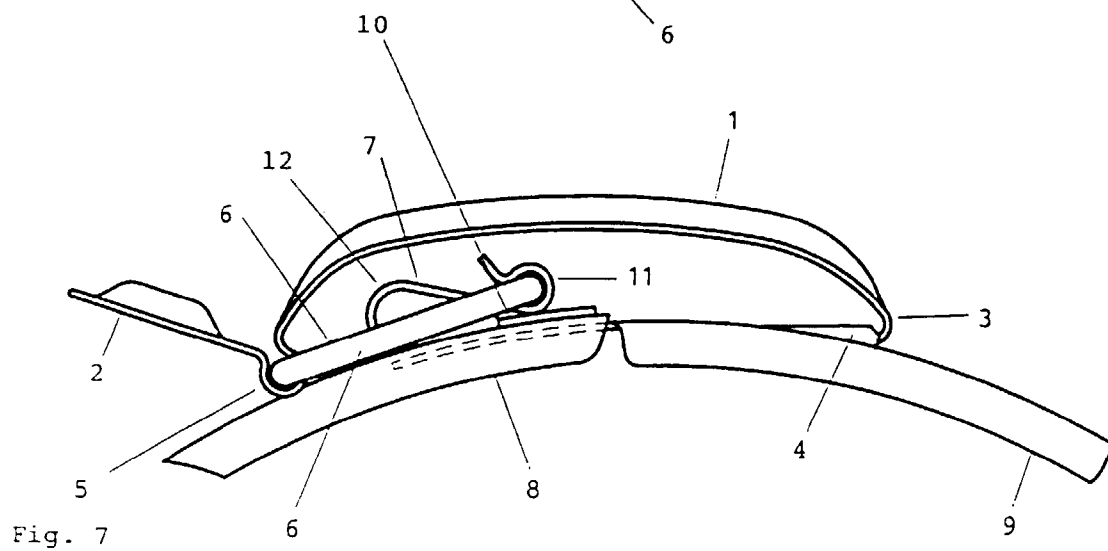
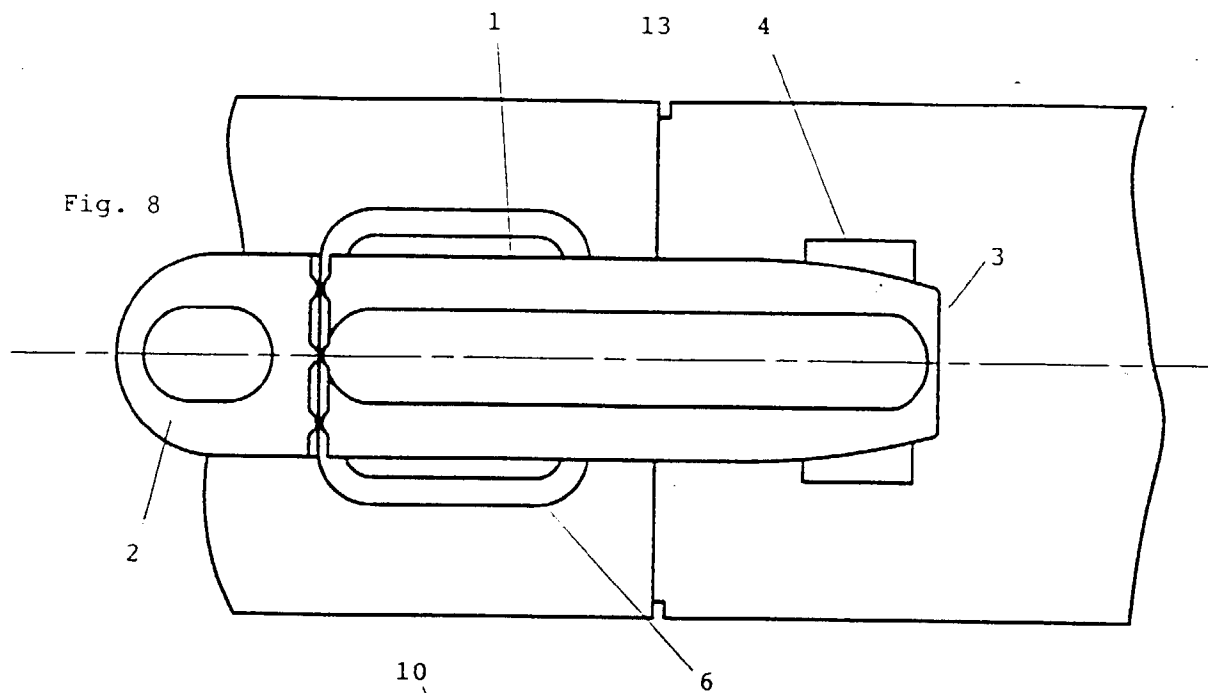


Fig. 6





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EUROPEAN SEARCH REPORT

Application Number
EP 97 30 9622

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	BE 375 161 A (PAMEN NÉE MICHIELS) * the whole document *	1,5,6,8	E05C19/14
X	GB 556 551 A (GREENMAN) * the whole document *	1,2,5,6,8	
X	DE 27 36 930 A (CAMLOC FASTENER GMBH) * the whole document *	1,3,5,6,8	
A	KINNEY ET AL: "two-piece snap on over-center latch" IBM TECHNICAL DISCLOSURE BULLETIN, vol. 24, no. 3, 1981, NEW YORK, pages 1422-1423, XP002061042 * the whole document *	1,2,4	
A	FR 1 282 646 A (MONIN & CIE) * the whole document *	1,3	
A	US 1 948 263 A (GREEN) * the whole document *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	US 4 917 421 A (WIGHTMAN ET AL.) * column 4, line 3-8 *	1,4	E05C
A	US 4 023 840 A (SOUZA ET AL.) * column 2, line 35-39 *	1,4	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 1 April 1998	Examiner Westin, K
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