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(54) **CONNECTOR, HOUSING AND BELT**

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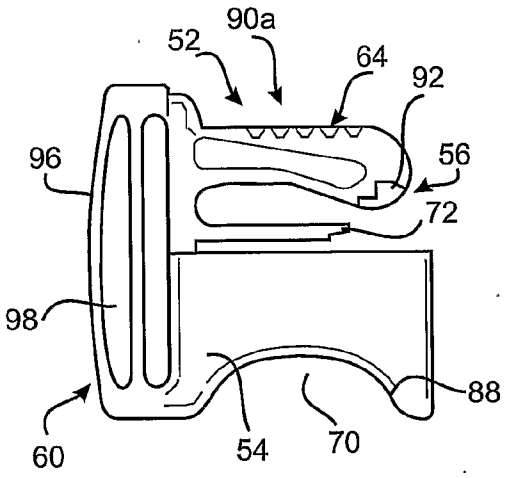
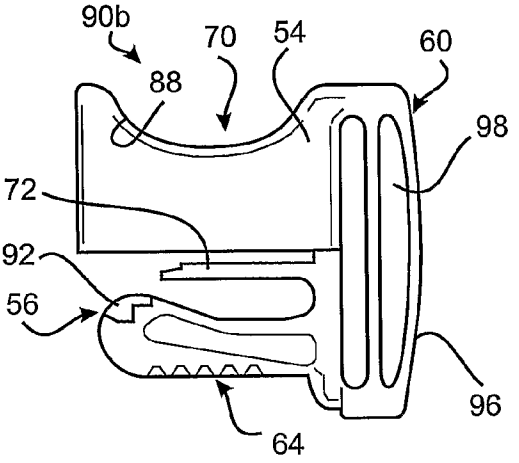
(57) **ABSTRACT**

A connector (**90**) consists of a first connector component (**52**) and a second connector component (**54**) and an engagement mechanism (**56**, **58**). A first connector component (**52**) and a second connector component (**54**) of a first connector (**90***a*) are releasably engageable with a second connector component (**54**) and a first connector component (**52**) of a second connector (**90***b*). In this way the first connector (**90***a*) and the second connector (**90***b*) are releasably connectable. The connector (**90**) of the present invention is releasably connectable with another like connector (**90**).





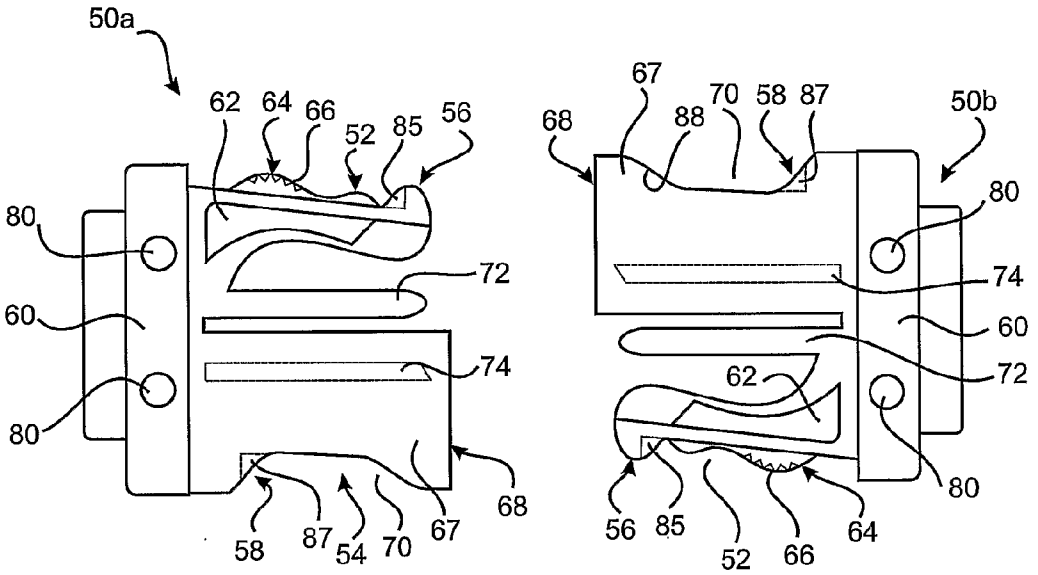


Fig. 1

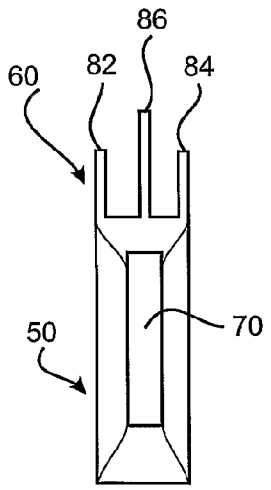


Fig. 2

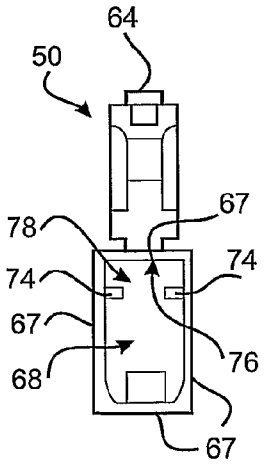
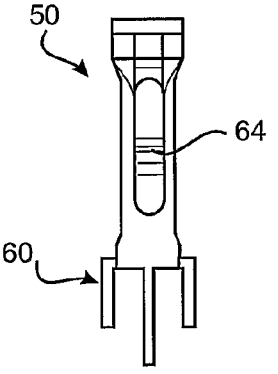


Fig. 3



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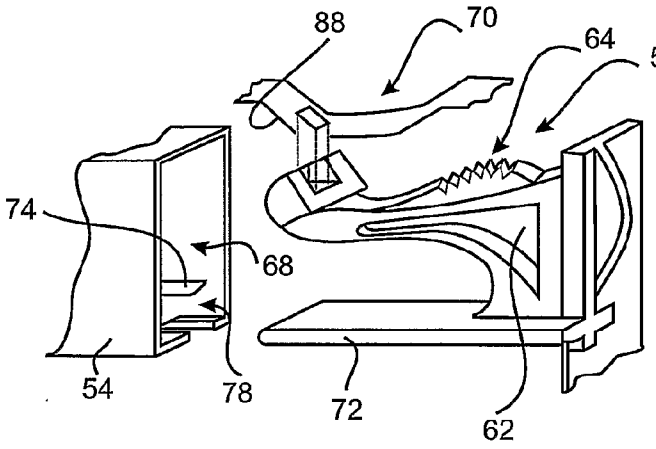

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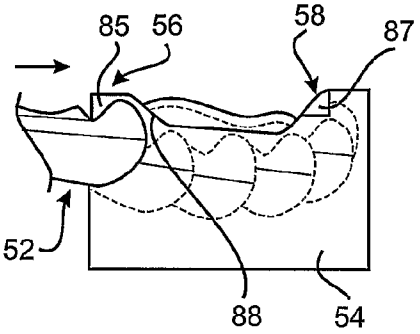

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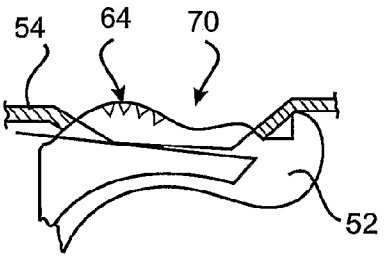

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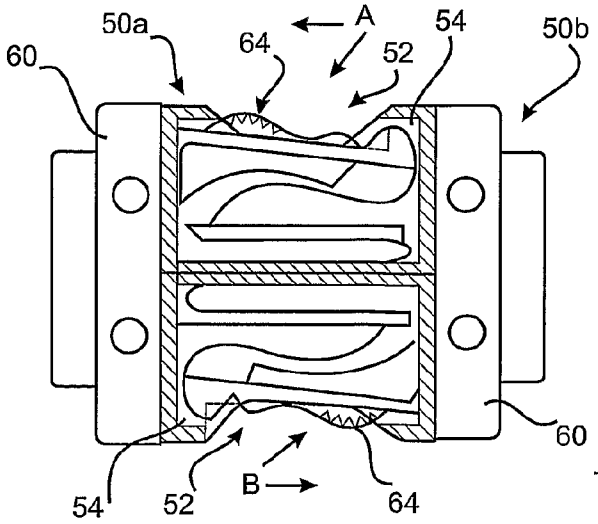

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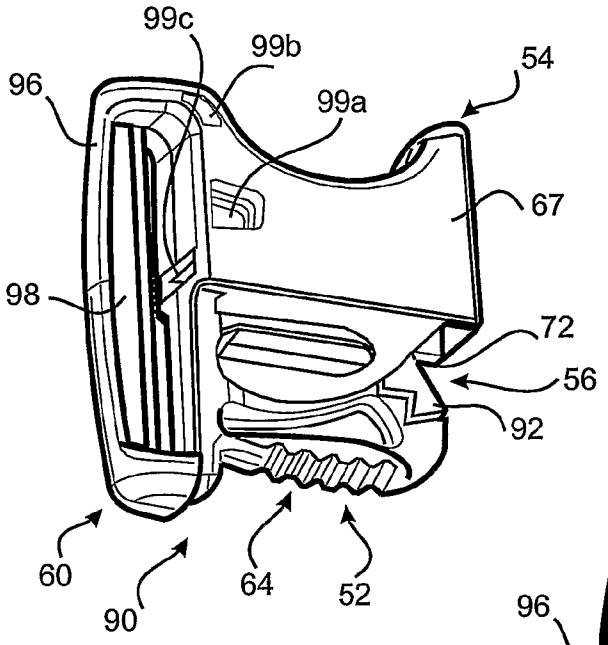

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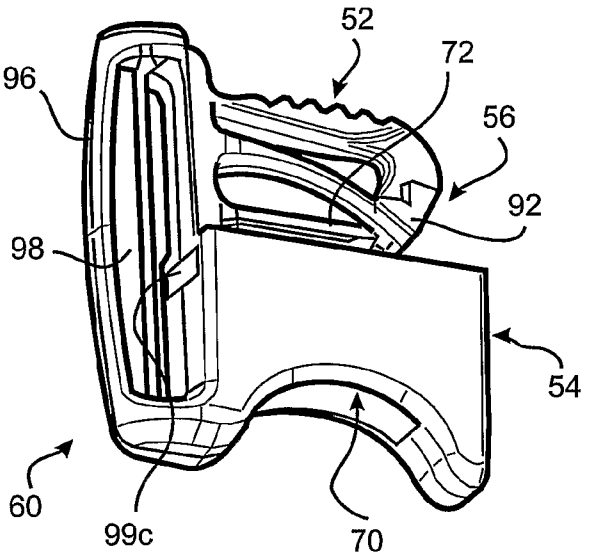

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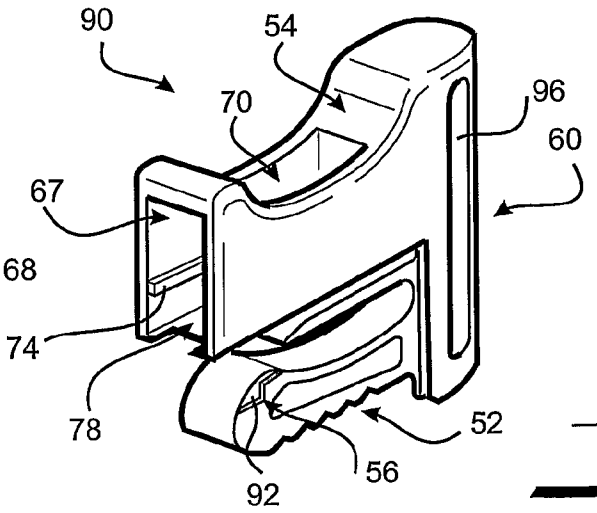

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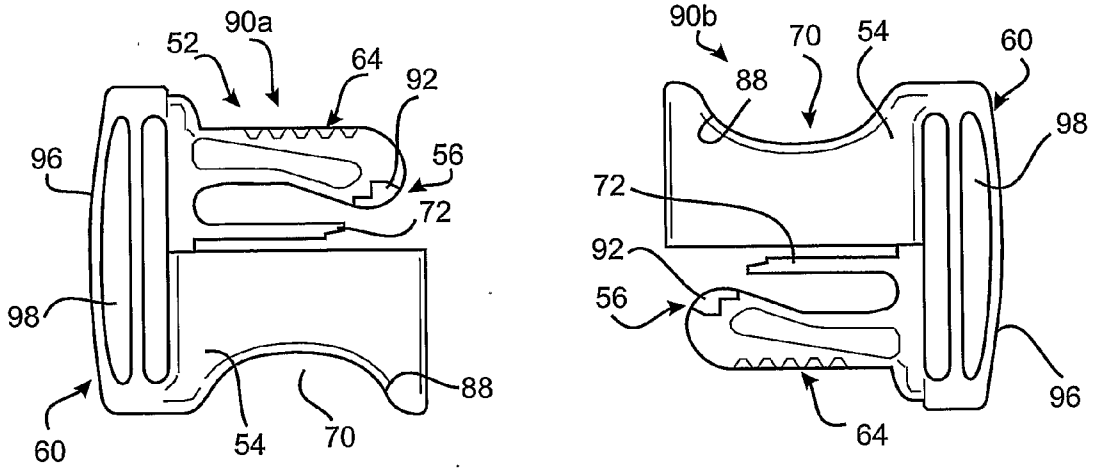
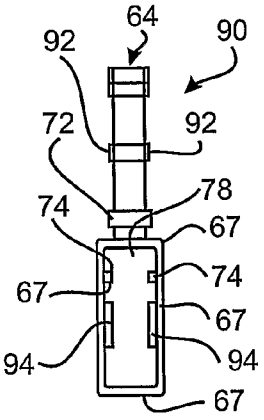


Fig. 12



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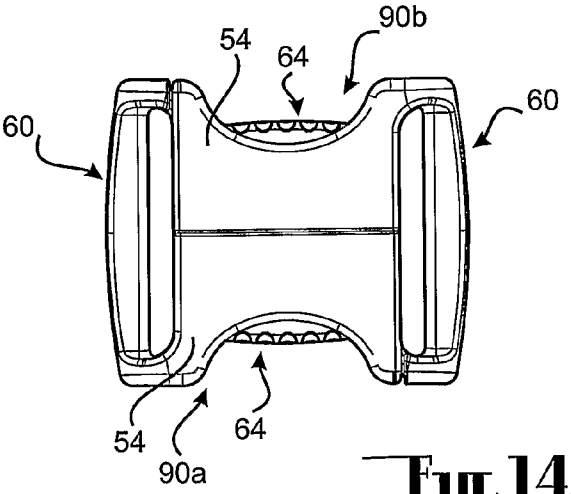

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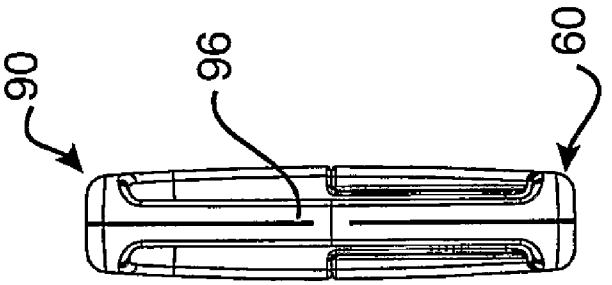
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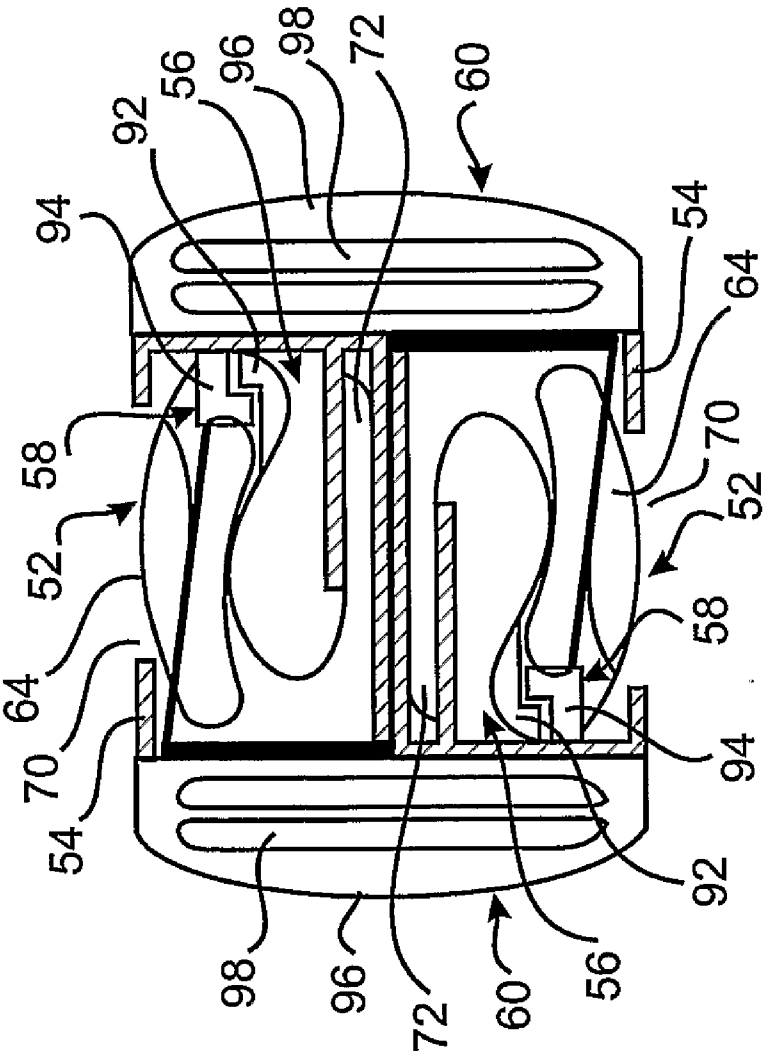
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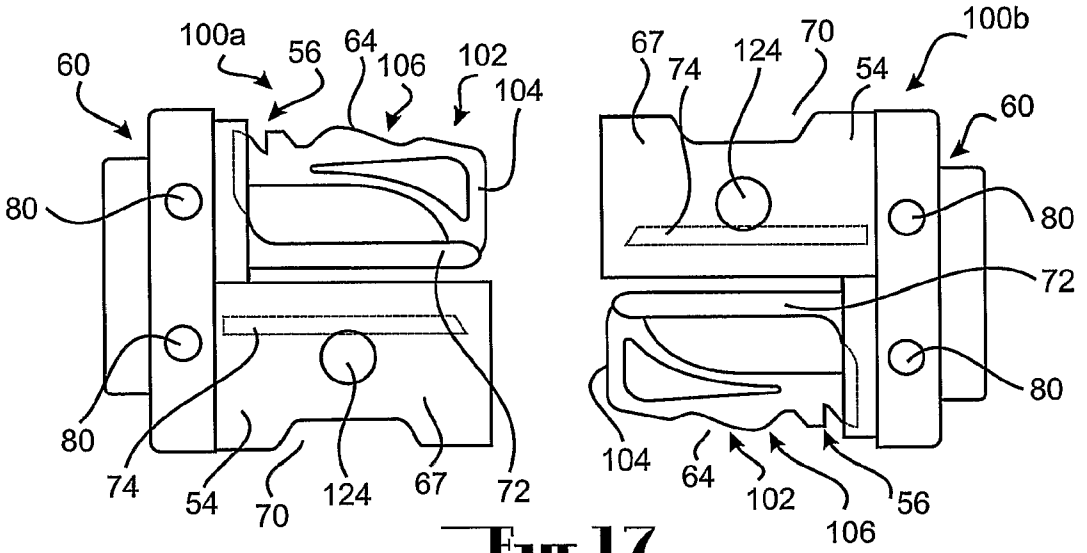
Fig. 15



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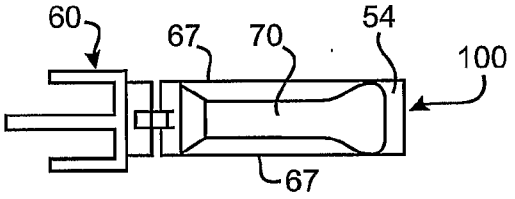

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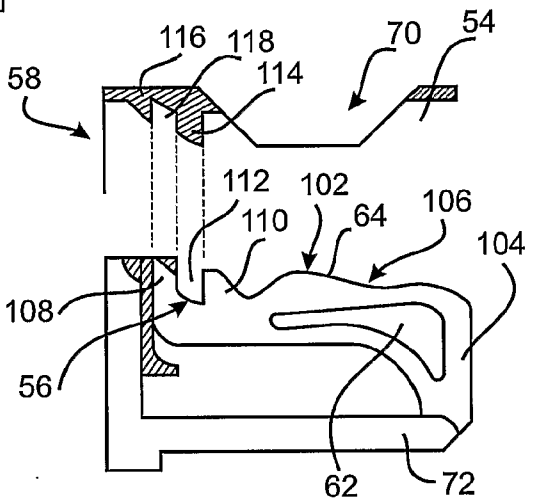

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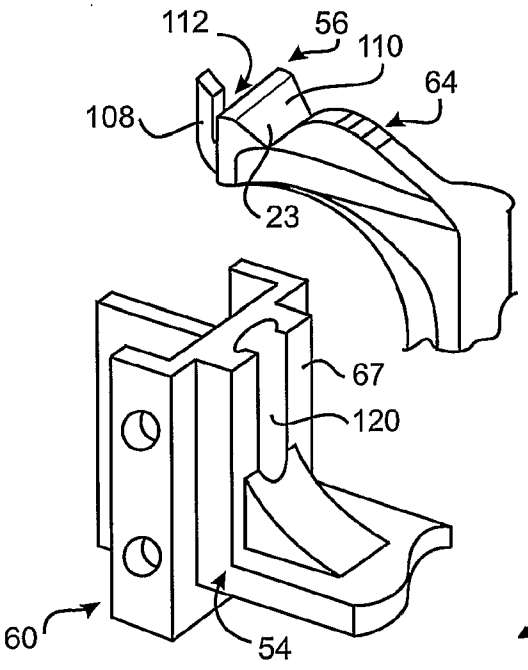

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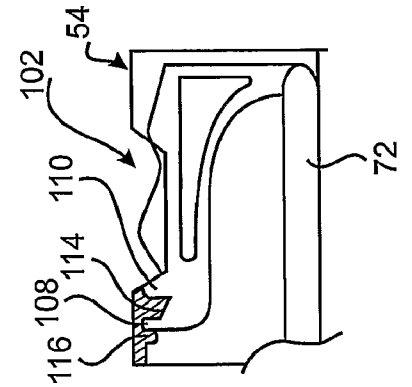

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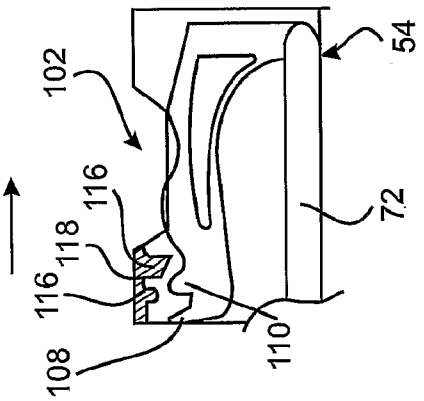

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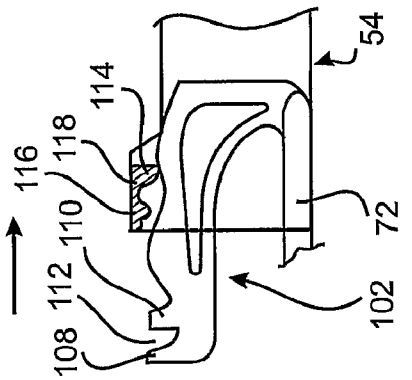

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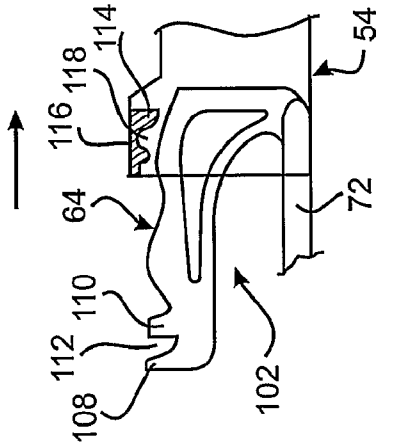

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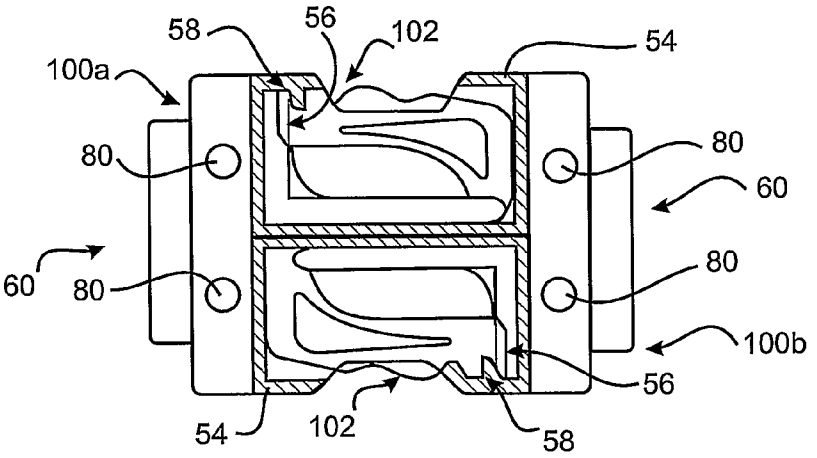
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Fig. 25

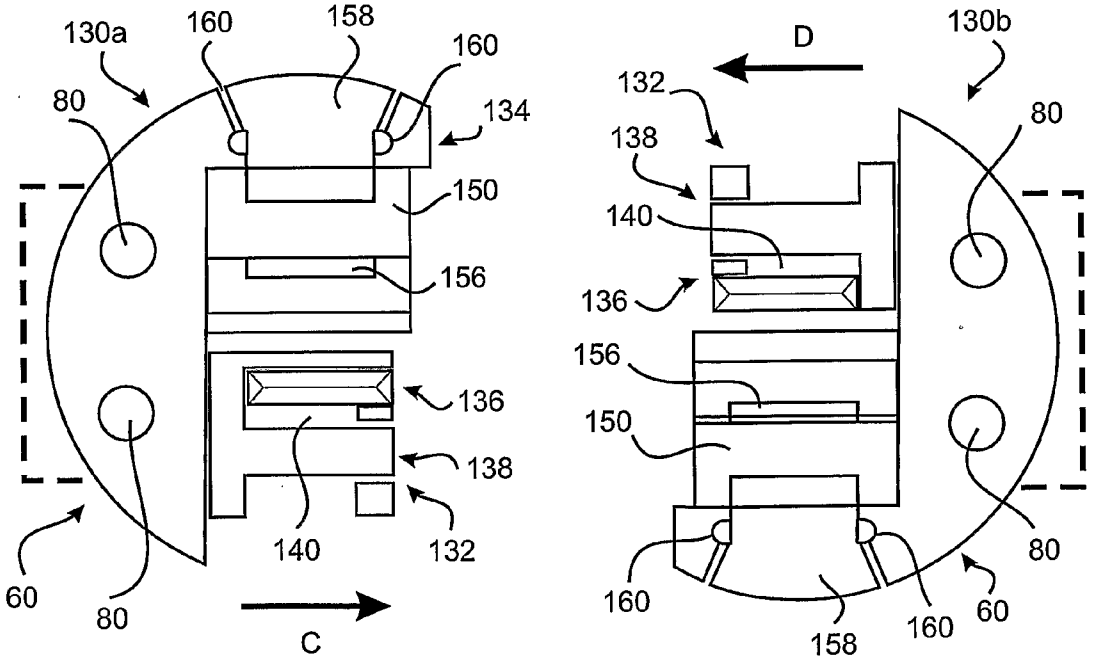
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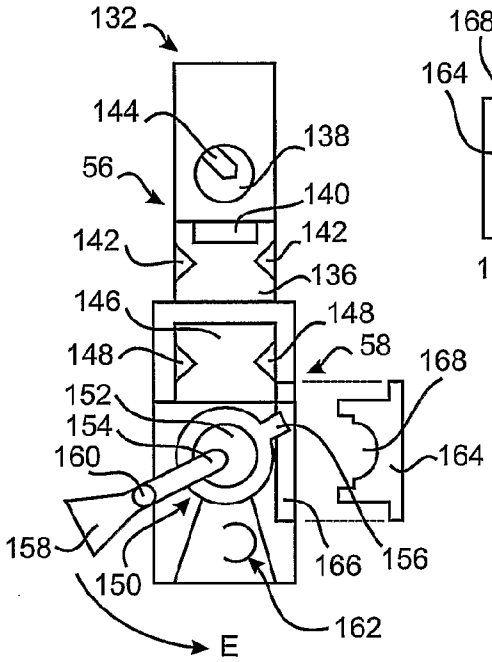
Fig. 26



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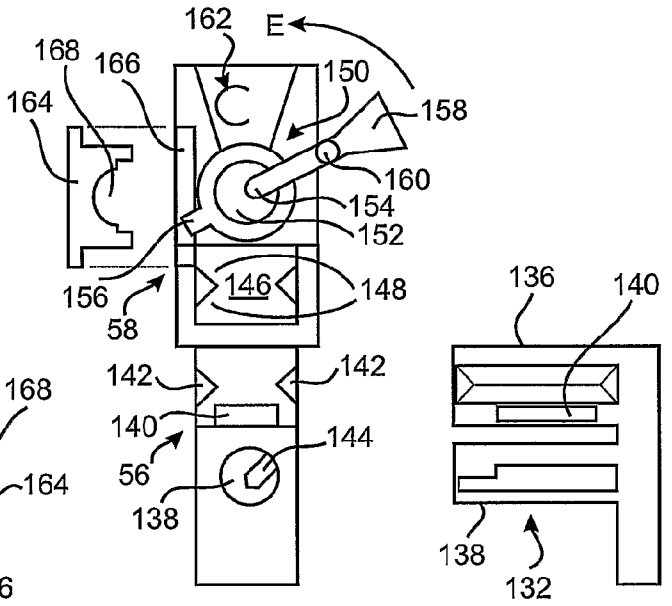

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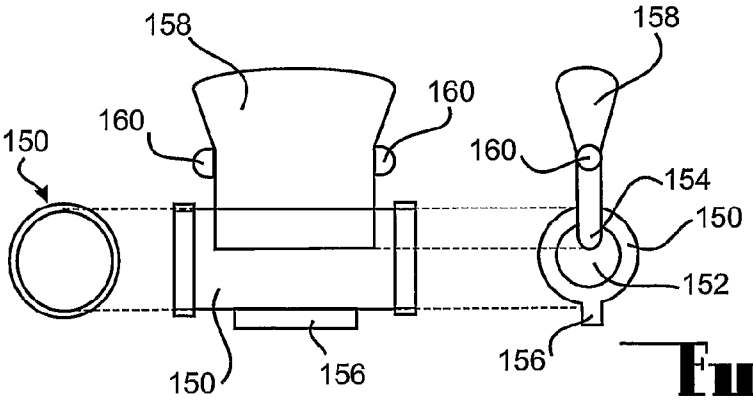

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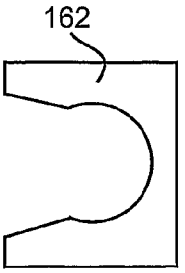
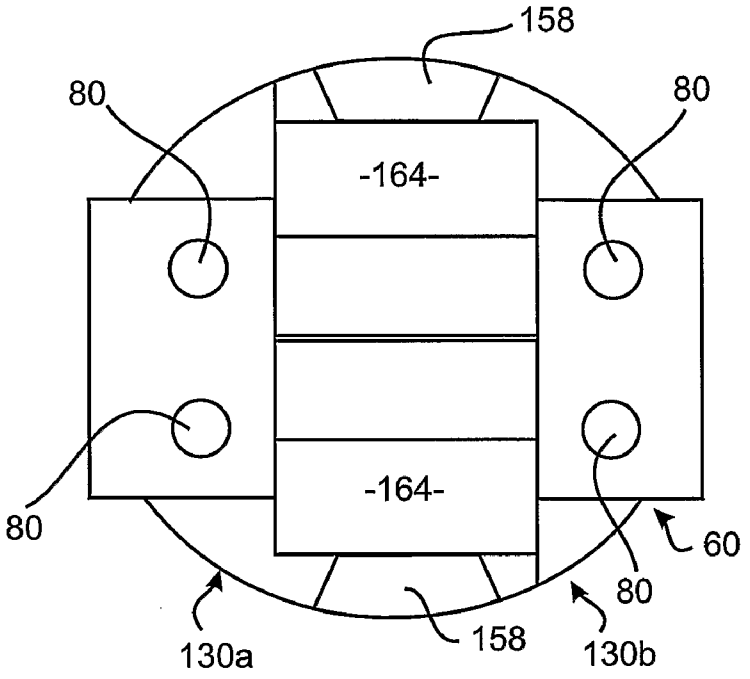


Fig. 30

Fig. 31



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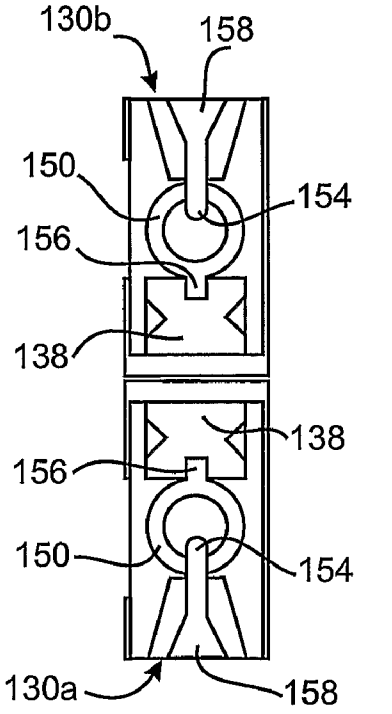

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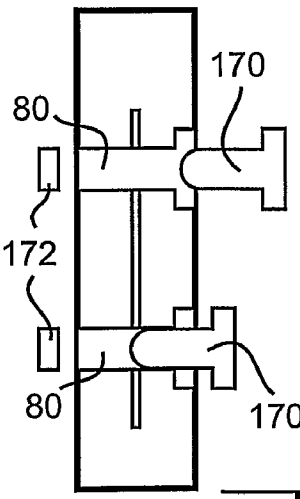

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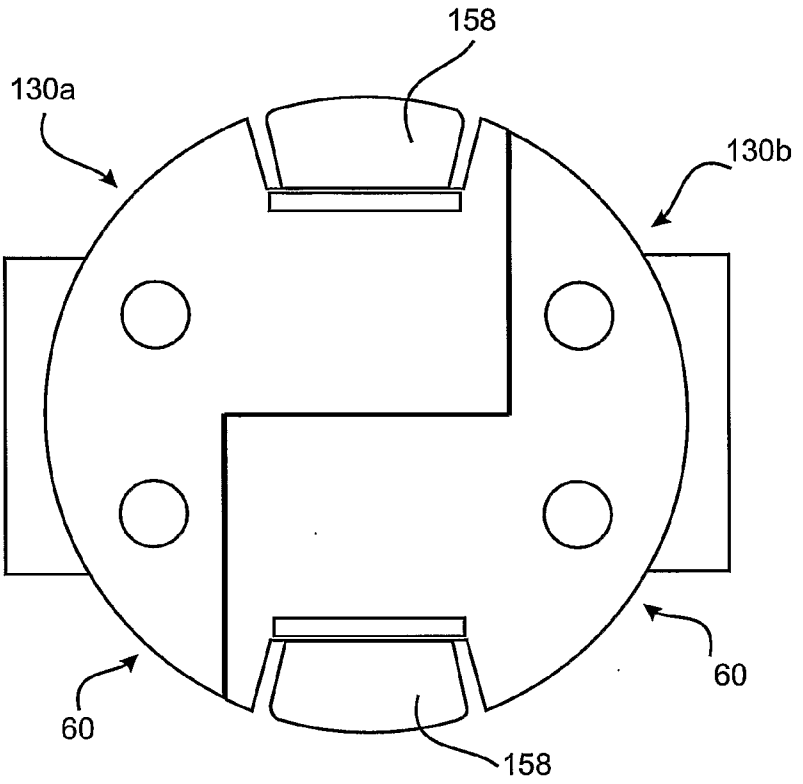

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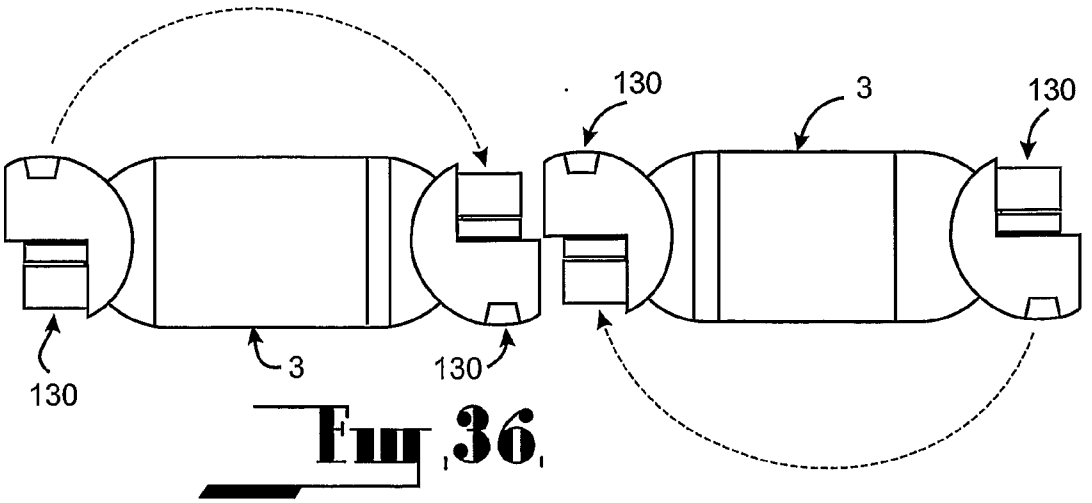

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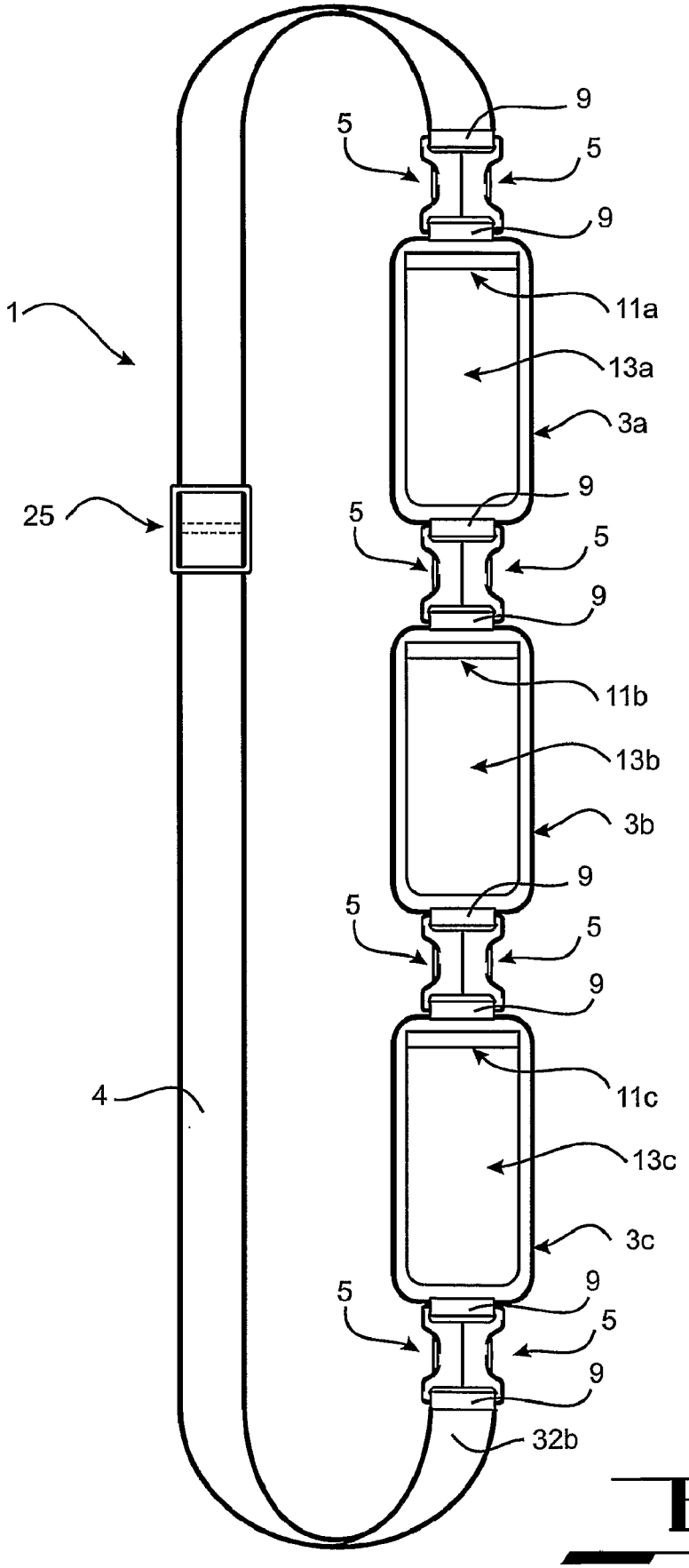

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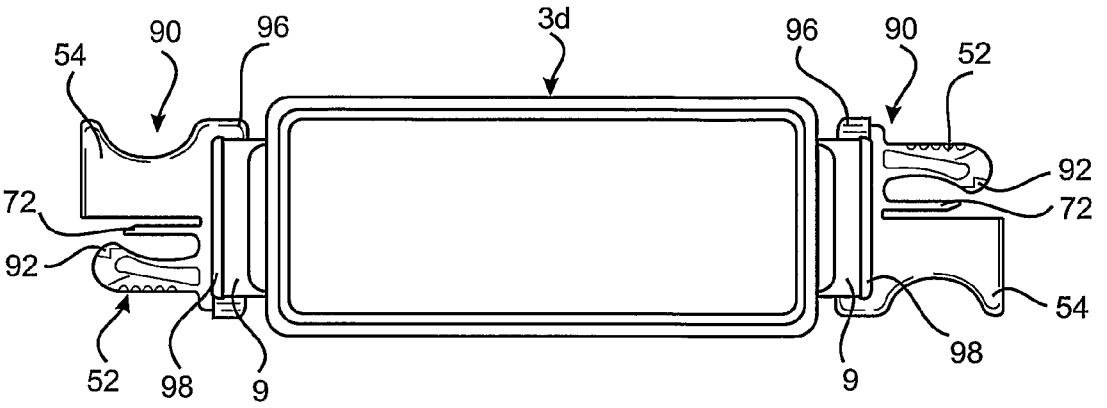

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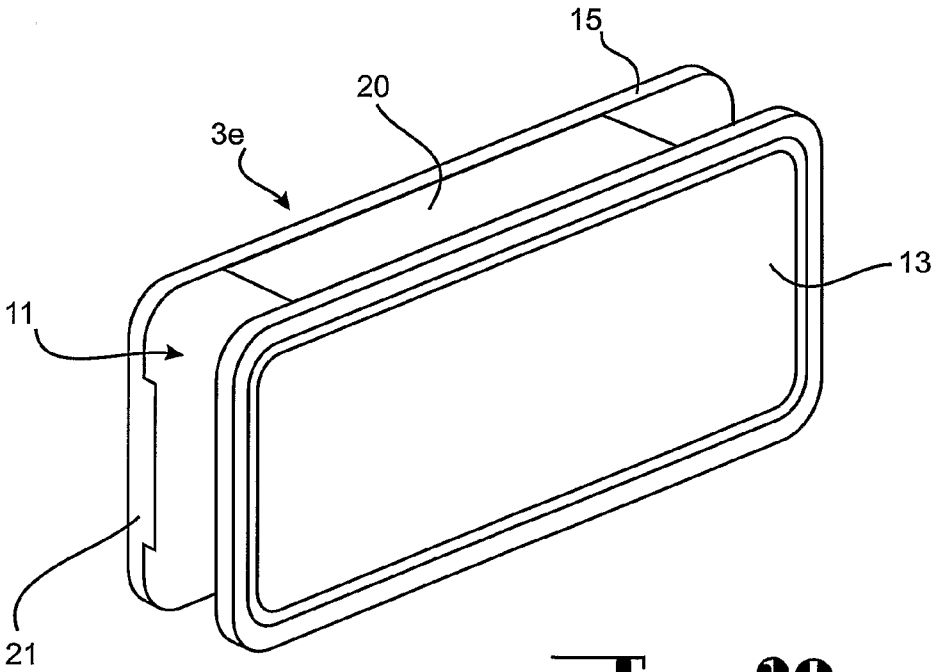


Fig. 39

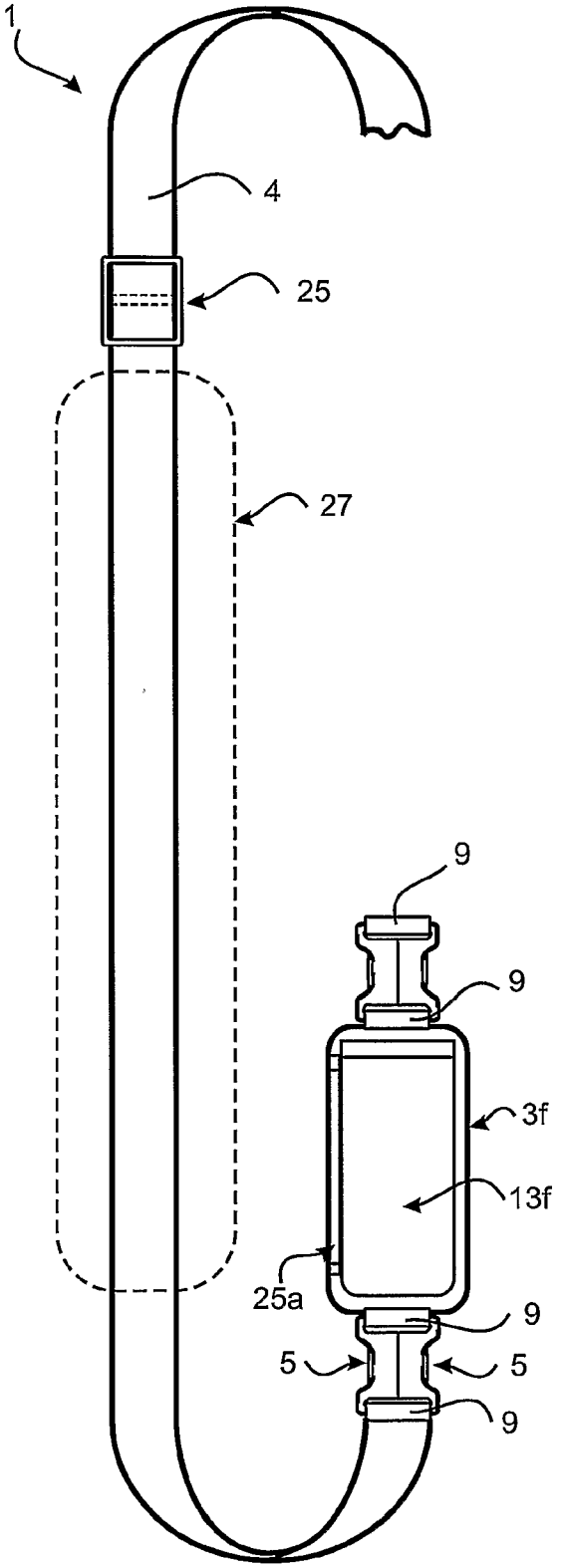


Fig. 40

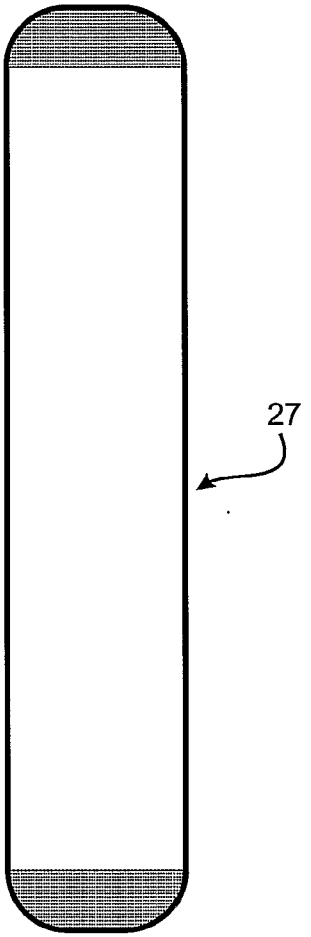
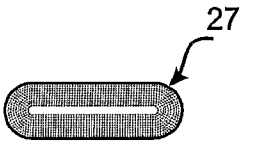


Fig. 41



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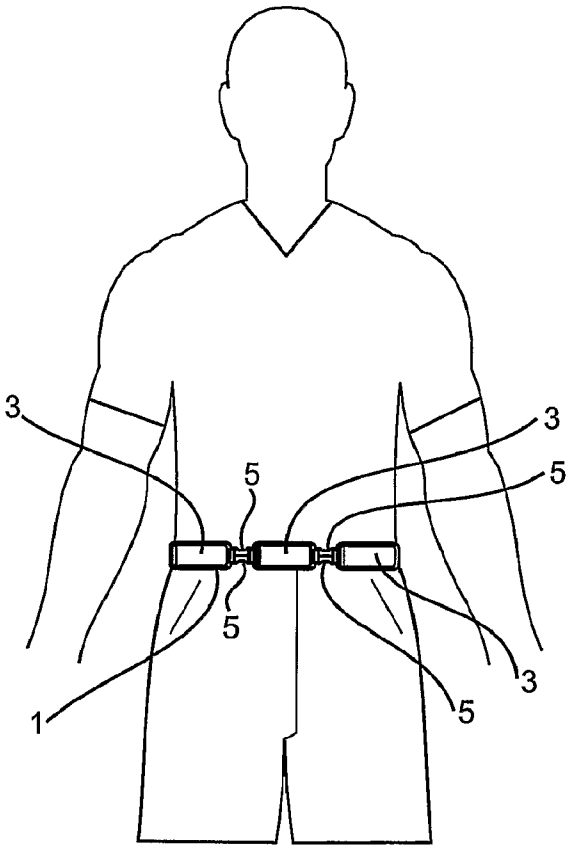

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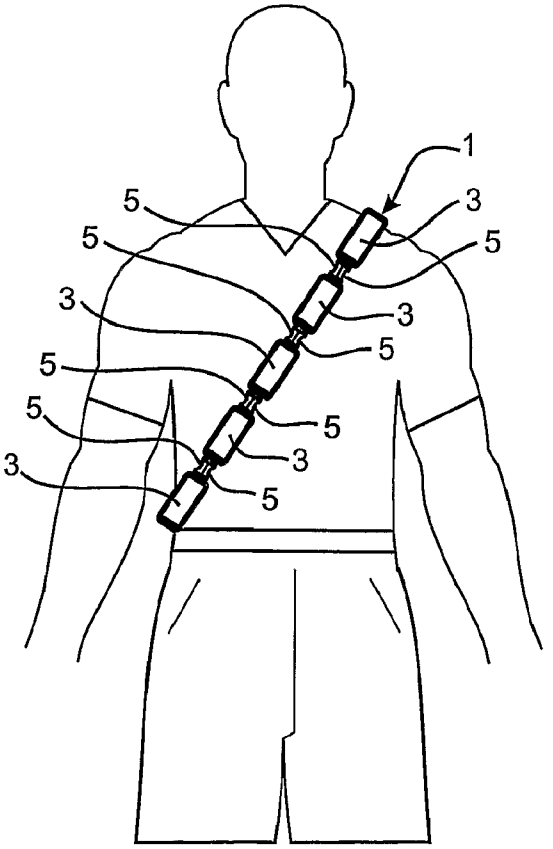

Fig. 44

CONNECTOR, HOUSING AND BELT

FIELD OF THE INVENTION

[0001] The present invention relates to a connector, a housing and a belt.

[0002] The connector of the present invention may be used in a belt having individual compartments, or housings, for retaining personal items of a wearer. Examples of such personal items include a mobile telephone, a personal music player, other personal electronic devices, money and keys. However, the connector of the present invention is not limited to use in such a belt and housing and may be used in any applications for which it is suitable.

DISCLOSURE OF THE INVENTION

[0003] In accordance with one aspect of the present invention there is provided a connector comprising first connector means, second connector means, and engagement means, wherein a first connector means of a first said connector and a second connector means of a second said connector are releasably engageable, and a second connector means of the first said connector and a first connector means of the second said connector are releasably engageable such that the first said connector and the second said connector are releasably connectable.

[0004] Accordingly, the connector of the present invention is releasably connectable with another like connector.

[0005] Preferably, said engagement means comprises a first engagement means and a second engagement means, wherein the first engagement means of a first said connector and the second engagement means of a second said connector are releasably engageable, and the second engagement means of the first said connector and the first engagement means of the second said connector are releasably engageable.

[0006] Preferably, the first connector means is provided with the first engagement means and the second connector means is provided with the second engagement means.

[0007] Preferably, the first and second connector means are arranged such that the first connector means of a first said connector is receivable in the second connector means of a second said connector and the first connector means of the second said connector is receivable in the second connector means of the first said connector.

[0008] Preferably, the second connector means has an opening at the distal region thereof to receive the first connector means of another said connector.

[0009] Preferably, said first connector means is flexibly resilient such that it is able to flex such that the first engagement means of said first connector means is able to engage with the second engagement means of the second connector means of another connector.

[0010] Preferably, guide means is provided to assist in the alignment of the first and second said connectors.

[0011] In one embodiment, the first engagement means comprises a recess provided at the leading (or distal) region of the first connector means and the second engagement means comprises a lug provided at the trailing (or proximal) region of the second connector means, such that the respective recess of first and second said connectors is engageable with the respective lugs of the second and first said connectors, respectively.

[0012] In another embodiment, the first engagement means comprises a first stepped surface provided at the leading (or distal) region of the first connector means and the second engagement means comprises a complimentary second stepped surface provided at the trailing (or proximal) region of the second connector means, such that the respective first stepped surfaces of first and second said connectors are engageable with the respective second stepped surface of the second and first said connectors, respectively.

[0013] In another embodiment, said first engagement means comprises first lug means provided at a trailing region of said first connector means and said second engagement means comprises second lug means provided at the leading (or distal) region of said second connector means, such that the respective first and second lug means of said first and second connectors are able to engage with respective second and first lug means of the second and first connectors, respectively.

[0014] In another embodiment of the connector, the first engagement means comprises a cut-out section provided in said first connector means and the second engagement means comprises latch means provided on said second connector means, such that the respective latch means of first and second said connectors are able to engage with the cut-out sections of the second and first said connectors, respectively.

[0015] Preferably, said latch means is carried by a moveable member that is moveable to bring said latch means and said cut-out section into engagement.

[0016] Preferably, locking means is provided to releasably lock said moveable member in a position such that said latch means and said cut-out section remain releasably engaged.

[0017] In accordance with a second aspect of the present invention there is provided a belt comprising:

[0018] at least a first housing to retain an object, each said housing having an opening for insertion of an object into, and removal of the object from, the housing, and

[0019] a strap having connection means,

[0020] wherein each said housing has connection means to detachably engage with said connection means of said strap to thereby releasably connect said housing with said strap.

[0021] Preferably, the belt further comprises a second said housing that is releasably connectable to said first housing and said strap by said connection means of said strap and the respective connection means of said first housing and said second housing.

[0022] Preferably, the belt further comprises a third housing that is releasably connectable to said first housing and said second housing by respective said connection means of said first housing, said second housing and said third housing.

[0023] In accordance with a third aspect of the present invention there is provided a belt comprising:

[0024] a plurality of housings, each of said housings having an opening for insertion of an object into, and removal of an object from, the housing, and

[0025] each said housing having connection means to detachably engage with connection means of another housing to thereby releasably connect one said housing with another said housing.

[0026] The belt of the third aspect of the present invention is similar to the belt of the second aspect of the present invention except that the strap is omitted such that the belt of the third aspect of the present invention comprises housings that are releasably connectable to one another to thereby form the belt.

[0027] Preferably, said connection means of said strap comprises a first connector and a second connector provided at respective ends of said strap.

[0028] Preferably, said connection means of each said housing comprises two connectors provided at respective spaced apart locations of each said housing.

[0029] Preferably, the opening of each said housing extends substantially in the direction of the width of the belt.

[0030] Preferably, closure means is provided to close off the opening of each said housing.

[0031] Preferably, each said housing comprises a front wall and support means such that said front wall is attached to the support means.

[0032] Preferably, end members are provided at respective ends of each said housing and said connectors of each said housing are supported by said respective end members.

[0033] Preferably, said front wall is made of resiliently stretchable material.

[0034] The resiliently stretchable material may be of a type that permits objects contained in the housing to be at least partially visible from outside a said housing. The resiliently stretchable material may, alternatively or additionally, be of a type that permits objects contained in a said housing to be accessible through the material.

[0035] Preferably, the resiliently stretchable material is a mesh-like fabric.

[0036] Alternatively, the resiliently stretchable material may be of a type that is substantially opaque.

[0037] Preferably, the width of a said housing is substantially the same as the width of the strap.

[0038] In accordance with a fourth aspect of the present invention there is provided a housing to retain an object comprising an opening for insertion of the object thereinto, and removal of the object from, the housing, and a connector at respective spaced apart locations of the housing such that one of the connectors of the housing may be connected to a another connector.

[0039] The connectors of the belt and housing in accordance with the second, third and fourth aspects of the present invention may be a connector as previously hereinbefore described.

BRIEF DESCRIPTION OF THE DRAWINGS

[0040] The present invention will now be described, by way of example, with reference to the accompanying drawings in which:

[0041] FIG. **1** is a top view of two connectors in accordance with a first embodiment of the present invention in position to be connected;

[0042] FIG. **2** is a first side view of one of the connectors shown in FIG. **1**;

[0043] FIG. **3** is a cross sectional view of a connector shown in FIG. **1**;

[0044] FIG. **4** is a second side view of one of the connectors shown in FIG. **1**;

[0045] FIG. **5** is an exploded view partially showing the first and second engagement means of two connectors;

[0046] FIG. **6** shows a sequence of positions of the first connector component of a first connector as it moves into engagement with the second connector component of a second connector;

[0047] FIG. **7** is a detailed partial view of first and second connector components of respective connectors in engagement;

[0048] FIG. **8** is a partly internal plan view of the two connectors shown in FIG. **1** connected together;

[0049] FIG. **9** is a first perspective view of a connector in accordance with a second embodiment of the present invention;

[0050] FIG. **10** is a second perspective view of the connector shown in FIG. **9**;

[0051] FIG. **11** is a third perspective view of the connector shown in FIG. **9**;

[0052] FIG. **12** is a plan view of two connectors, shown in FIG. **9**, orientated to be connected together;

[0053] FIG. **13** is an end view of the connector shown in FIG. **9**;

[0054] FIG. **14** is a plan view of two connectors, shown in FIG. **9**, in a connected together condition;

[0055] FIG. **15** is a partly internal plan view of the connectors shown in FIG. **12** in a connected together condition;

[0056] FIG. **16** is an end view of the connectors shown in FIG. **14**;

[0057] FIG. **17** is a top plan view of two connectors in accordance with a third embodiment of the present invention;

[0058] FIG. **18** is a side view of one of the connectors shown in FIG. **17**;

[0059] FIG. **19** is an exploded view of portions of two connectors of the type shown in FIG. **17**, showing the engagement means;

[0060] FIG. **20** is an exploded perspective view of a portion of one of the connectors shown in FIG. **17**;

[0061] FIGS. **21**, **22**, **23** and **24** are sequential views showing consecutive positions of the first connector component of a first connector and the second connector component of a second connector, of the type shown in FIG. **17**, as they move into engagement;

[0062] FIG. **25** is a partly internal plan view of the connectors shown in FIG. **17** in a connected together condition;

[0063] FIG. **26** is a top plan view of a pair of connectors in accordance with a fourth embodiment of the present invention;

[0064] FIG. **27** shows two end views of the connectors shown in FIG. **26**;

[0065] FIG. **28** is a plan view of one of the connector components of one of the connectors shown in FIG. **26**;

[0066] FIG. **29** is a set of views of one of the engagement members of a connector shown in FIG. **26**;

[0067] FIGS. **30** and **31** are plan and end views, respectively, of a locking pin holder of a connector shown in FIG. **26**;

[0068] FIG. **32** is a bottom plan view of the connectors shown in FIG. **26** when connected together;

[0069] FIG. **33** is a cross sectional view through the connectors shown in FIG. **32**;

[0070] FIG. **34** is an end view of one of the connectors shown in FIG. **26**;

[0071] FIG. **35** is a top plan view of two connectors shown in FIG. **26** when connected together;

[0072] FIG. **36** shows a pair of housings with a connector, of the type shown in FIG. **26**, at each end thereof;

[0073] FIG. **37** is a perspective view of an embodiment of a belt in accordance with second aspect of the present invention;

[0074] FIG. **38** is a frontal view of one of the housings of the belt shown in FIG. **37**;

[0075] FIG. **39** is an embodiment of an alternative housing for the belt shown in FIG. **37** with the connectors omitted;

[0076] FIG. **40** is a perspective view of a portion of an embodiment of a belt in accordance with the second aspect of the present invention showing an alternative embodiment of a housing and a cover;

[0077] FIG. **41** is a plan view of the cover of the belt shown in FIG. **40**;

[0078] FIG. **42** is an end view of the cover shown in FIG. **41**;

[0079] FIG. **43** shows the belt shown in FIG. **37** being worn by a wearer in a first arrangement; and

[0080] FIG. **44** shows the belt shown in FIG. **37** worn by a wearer in a second arrangement.

BEST MODE(S) FOR CARRYING OUT THE INVENTION

[0081] In FIG. **1**, there are shown two connectors **50***a* and **50***b* (also referred to as connector/s **50**). Each connector **50** comprises a first connector component, or member, **52**, a second connector component, or member, **54**, and engagement means to releasably engage the first connector component **52** and the second connector component **54** of respective connectors **50***a* and **50***b*. The two connectors **50** are identical. The reference numerals **50***a* and **50***b* have been used only to distinguish between the two connectors **50** in the drawings to assist with identifying the connectors **50** being described in the description of the manner of use and operation of the connector **50**.

[0082] The engagement means comprises a first engagement means **56** and a second engagement means **58**. The first connector component **52** is provided with the first engagement means **56** and the second connector component **54** is provided with the second engagement means **58**.

[0083] The first engagement means **56** is provided near the end region of the first connector component **52** that is remote from the end portion **60**. This is the leading, or distal, end of the first connector component **52**. The first engagement means **56** is provided as a recess **85** near the end region of the first connector component **52**.

[0084] The second engagement means **58** is provided near the end region of the second connector component **54** that is proximate to the end portion **60**. This is the trailing, or proximal, region of the second connector component **54**. The second engagement means **58** is provided as a lug **87** near the end region of the second connector component **54**.

[0085] The first and second connector components **52** and **54** extend from an end portion **60** of the connector **50**. The first and second connector components **52** and **54** are adjacent each other. The first connector component **52** extends from the end portion **60** as a finger-like member.

[0086] The first connector component **52** has a cut-out section **62**. The cut-out section **62** provides the first connector component **52** with an enhanced flexible resilience such that it is able to flex at its proximal region adjacent the end portion **60**. The first connector component **52** is also provided with a grip **64** that can be manipulated by a user as will be later herein described. The grip **64** is provided at a side of the connector **50**. The grip **64** may be provided with serrations **66** to provide a frictional gripping surface for the user.

[0087] The second connector component **54** comprises walls **67** and is provided with an opening **68** at its end opposed to the end portion **60**. The walls **67** and end portion **60** enclose a space which is accessible via the opening **68**. The second connector component **54** is provided with a second opening **70** at one side thereof. The opening **70** is provided in a wall **67** of the second connector component **54** at the side of the connector **50** opposite to the side having the grip **64**.

[0088] A guide member **72** is provided between the first and second connector components **52** and **54**. The second connector component **54** is provided with a pair of internal ledges **74**. An internal ledge **74** is provided on the respective opposed walls **67**, neither of which is provided with the second opening **70**. The internal ledges **74** and an internal wall surface **76** of the second connector component **54** define a guide space **78**.

[0089] The end portion **60** is provided with apertures **80**. The end portion **60** comprises three narrow plate members **82**, **84** and **86**. The intermediate plate **86** is slightly longer than the other plates **82** and **84**. The apertures **80** extend through the plates **82**, **84** and **86**.

[0090] The second connector component **54** is provided with a sloped internal surface **88** adjacent the opening **70**. The sloped internal surface **88** slopes inwardly of the second connector component **54** in the general direction from the opening **68** to the end portion **60**.

[0091] The leading end of the first connector component **52** is provided with a recess **85**. The second connector component **54** is provided with a lug **87** near the end portion **60** and adjacent an edge of the opening **70**.

[0092] The manner of use and operation of a connector **50** will now be described.

[0093] A connector **50** can be connected to another identical connector **50**. FIG. **8** shows two connectors **50***a* and **50***b* that are connected together.

[0094] To connect together two connectors **50**, the connectors **50** are first aligned with one another as shown in FIG. **1**. In this arrangement the leading, or distal, end of the first connector component **52** of a first connector **50***a* is aligned with the opening **68** of the second connector component **54** of a second connector **50***b;* similarly, the leading, or distal end, of the first connector component **52** of the second connector **50***b* is aligned with the opening **68** of the second connector component **54** of the first connector component **50***a.* The leading end of the first connector component **52** is the end that is first received into the opening **68** of the second connector component **54** of another connector **50**.

[0095] The first and second connectors **50***a* and **50***b* are then moved toward each other such that the first connector components **52** of the respective connectors **50***a* and **50***b* are received into the openings **68** of the respective second connector components **54** of the connectors **50***b* and **50***a*. As the first connector components **52** are inserted into the second connector components **54**, the guide members **72** of the respective connectors **50***a* and **50***b* are received in the guide spaces **78** of the respective connectors **50***b* and **50***a*. As the first connector components **52** are inserted into the second connector components **54**, the respective distal ends of the first connector components **52** bear against the sloped internal surface **88** of the second connector components **54** adjacent the opening **70**. Due to the first connector components **52** being flexibly resilient, they are able to flex in the direction toward the guide members **72** as the first connector components **52** are inserted into the second connector components **54**. The ends of the first connector components **52** bear against the sloped internal surfaces **88** of the second connector components **54** adjacent the openings **70**.

[0096] Sequential positions of the distal end of a first connector component **52** as it flexes as it is inserted into a second connector **54** are shown in FIG. **6**. As the first connector

component **52** is continued to be inserted into the second connector component **54**, the distal end of the first connector component **52** will pass the lug **87** of the second connector component **54** and the lug **87** will be received in the recess **85** of the first connector component **52**. This occurs as the first connector component **52** snaps back to its unflexed condition whereby the recess **85** and the lug **87** engage. In this condition the first connector components **52** of the respective connectors **50***a* and **50***b* are engaged with the second connector components **54** of the connectors **50***b* and **50***a*, respectively. This condition is shown in FIG. **8**. The first connector components **52** are thereby retained within the second connector components **54**.

[0097] The connected together condition of the first and second connectors **50***a* and **50***b* is shown in FIG. **8**. In this condition, the grips **64** of the respective first connector components **52** protrude through the openings **70** of the respective second connector components **54**. The grips **64** slope away from the sides of the connectors **50***a* and **50***b* in the direction of the respective end portions **60** of the connectors **50***a* and **50***b*. The first and second connectors **50***a* and **50***b* can be disconnected by disengaging the respective first and second connector components **52** and **54** of the first and second connectors **50***a* and **50***b*. This can be done by a user gripping the grips **64** of the respective first connector components **52** between his/her thumb and forefinger and simultaneously squeezing in the directions shown by the dual arrows A and B in FIG. **8**. This causes the first connector components **52** to flex at their proximal regions such that the lugs **87** and recesses **85** disengage. The connectors **50***a* and **50***b* can then move away from one another with the first connector components **52** sliding out of the second connector components **54** and out through the respective openings **68**.

[0098] FIGS. **9** to **16** show a connector **90** in accordance with a second embodiment of the present invention. The connector **90** of the second embodiment is substantially similar to the connector **50** of the first embodiment and the same reference numerals are used to identify features in the second embodiment as were used for the same or analogous features in the first embodiment.

[0099] The major differences between the connector **90** of the second embodiment and the connector **50** of the first embodiment are the first engagement means **56** and the second engagement means **58**. Another difference between the connector **90** of the second embodiment and the connector **50** of the first embodiment is the end portion **60**.

[0100] The first engagement means **56** comprises a lug **92** having a first stepped surface and the second engagement means **58** comprises a lug **94** having second stepped surface. The lugs **92** and **94** are complimentary in shape. The lug **92** is provided at the leading, or distal, end of the first engagement component **52**. The lug **94** is provided at the proximal end of the second engagement component **54**, i.e. near the end portion **60**.

[0101] The portion **60** is provided in the form of a D ring, or loop, **96** that extends the width of the connector **90**. The D ring **96** extends from the first connector component **52** to the second connector component **54** and defines an opening **98**.

[0102] End portion **60** of the type in the connector **90** may alternatively be used in any embodiment of the connector of the present invention. Correspondingly, the connector **90** of the second embodiment may alternatively be provided with an end portion of the type used in other embodiments of the connector of the present invention.

[0103] The connector **90** is provided with openings **99***a*, **99***b* and **99***c* in the second connector component **54**. These openings **99***a*, **99***b* and **99***c* are provided as they are required in the manufacturing and assembly process for the connector **90**.

[0104] In other respects, the connector **90** of the second embodiment is similar to the connector **50** of the first embodiment.

[0105] In use, two connectors like **90***a* and **90***b* are aligned and the first connector components **52** are inserted into the second connector components **54** of respective connectors **90***a* and **90***b*. As the first connector components **52** are inserted into the second connector components **54**, the leading ends of the first connector components **52** bear against the sloped internal surfaces **88** of the second connector components **54**, and the first connector components **52** flex in a similar manner as previously described with reference to the connectors **50** of the first embodiment. With further insertion of the first connector components **52** into the second connector components **54**, the lugs **92** and **94** engage due to the complimentary shape of the stepped surfaces of the lugs **92** and **94**. In this way, the first and second connector components **52** and **54** of the respective connectors **90***a* and **90***b* engage to thereby connect the connectors **90***a* and **90***b*. The guides **72** are received in the guide spaces **78** in similar manner as previously hereinbefore described with reference to the connector **50** of the first embodiment.

[0106] The connectors **90***a* and **90***b* are disconnected in similar manner to the connectors **50***a* and **50***b*. Thus, a user presses against the grips **64** to disengage the lugs **92** and **94** to allow the first connector components **52** to be removed from the second connector components **54**.

[0107] FIGS. **17** to **25** illustrate a connector **100** in accordance with a third embodiment of the present invention. Similar reference numerals are used for the features of the connector **100** of the third embodiment as are used for the same and analogous features in the connectors **50** and **90** of the first and second embodiments.

[0108] The main differences between the connector **100** of the third embodiment and the connectors **50** and **90** of the first and second embodiments are the first connector component **52** and the first and second engagement means **56** and **58**.

[0109] In FIGS. **17** to **25**, the first connector component has been identified with reference numeral **102**. The first connector component **102** has a leading, or distal, first portion **104** and a second portion **106** that extends toward the end portion **60**.

[0110] The first portion **104** extends from the leading, or distal, end of the guide member **72**.

[0111] The first connector component **102** is thus different from the first connector components **52** of the first and second embodiments in that its proximal region is not located adjacent the end portion **60**. Instead, its proximal region is spaced from the end portion **60** and is located at the leading end of the first connector component **102**. In this sense, the orientation of the first connector component **102** has been reversed compared with the first connector components **52** of the first and second embodiments.

[0112] The end of the second portion **106** that carries the first engagement means **56**, i.e. the first engagement means **56** is provided at the trailing end (and not the leading end) of the first connector component **102**. The first engagement means **56** comprises a finger-like lug **108** extending from a wedge-

like lug **110**. The wedge-like lug **110** has a tapered surface **123**. A space **112** is formed between the lugs **108** and **110**.

[0113] The second engagement means **58** of the second connector component **54** comprises first and second lugs **114** and **116**. A space, or recess, **118** is provided between the lugs **114** and **116**.

[0114] As can be send from the drawings of the first, second and third embodiments of the connectors **50**, **90** and **100**, the first engagement means **56** of the first and second embodiments of the connectors **50** and **90** are located at the distal region (or leading region) of the first connector components **52**, whilst in the third embodiment of the connector **100** the first engagement means **56** is located at the end of the second portion **106** so that it is proximate the end portion **60**. Correspondingly, the second engagement means **58** of the first and second embodiments of the connectors **50** and **90** are located proximate the end portions **60**, whilst in the third embodiment of the connector **100**, they are located at the region of the second connector component **54** that is spaced from the end portion **60**, i.e. near the openings **68**.

[0115] The end of the first engagement component **102** adjacent the end portion **60** is provided with a groove **120** to accommodate the lug **108**. The groove **120** restricts the degree of lateral movement available to the lug **108**, but allows the lug **108** to move in its axial direction. The axial direction of the lug **108** is the direction in which the first engagement component **102** is able to flex.

[0116] In use, two like connectors **100***a* and **100***b* can be aligned as shown in FIG. **17**. The end portions **104** are the first parts of the first connector components **102** that are inserted into the openings **68** of the connector components **54**.

[0117] With continued insertion of the first connector components **102** into the second connector components **54**, the lug **114** will bear against the portion **106** of the first connector component **102**. This is shown in FIGS. **21** and **22**. Continued insertion of the first connector components **102** into the second connector components **54** will result in the lugs **110** and **114** approaching contact with one another, as shown in FIG. **23**. The tapered surface **123** of the lug **110** bears against the lug **114**. This causes the first connector component **102** to flex at the junction of the guide member **72** and the portion **104**. Once the lug **110** passes the lug **114**, the lug **114** is received in the space **112** between the lugs **108** and **110** and the lug **108** is received in the space **118** between the lugs **114** and **116**, as the first connector component **102** snaps back into it unflexed condition. This is shown in FIG. **24**. In this condition, the first and second engagement means **56** and **58** of the respective connectors **100***a* and **100***b* are engaged. This is shown in FIG. **25**.

[0118] As can also be seen from FIG. **25**, the grips **64** protrude though the openings **70** in the second connector components **54**. As with the connectors **50** and **90** of the previous embodiments, depressing the grips **64**, in the manner previously herein described with reference to the first embodiment, disengages the first and second engagement means **56** and **58** and the connectors **100***a* and **100***b* can be disconnected.

[0119] The connector **100** is provided with apertures **124** extending through walls **67** of the second connector component **54**. When two connectors **100** are connected together, a padlock can be passed through the apertures **124** of the second connector component **54** of each connector **100**. Each padlock passes through a void in the first connector component **102**. The use of one or two padlocks in this way ensures that the connectors **100** cannot be disconnected without first unlocking the padlocks. This provides security to the user of the connectors **100**. Similar apertures **124** can be used in any embodiment of the connector of the present invention, even though they are not shown.

[0120] FIGS. **26** to **36** show a connector **130** in accordance with a fourth embodiment of the present invention. Similar reference numerals are used for the features of the connector **130** of the fourth embodiment as are used for the same and analogous features of the connectors **50**, **90** and **100** of the first, second and third embodiments.

[0121] The main differences between the connector **130** of the fourth embodiment and the connectors **50**, **90** and **100** of the first, second and third embodiments are the structure of the first and second connector components **52** and **54** and the first and second engagement means **56** and **58**. In FIGS. **26** to **36**, the first connector component has been identified with reference numeral **132** and the second connector component has been identified with reference numeral **134**.

[0122] The first connector component **132** comprises two portions **136** and **138** that extend from the end portion **60** of the connector **130**.

[0123] The first engagement means **56** is provided as a cut-out section **140** in the portion **136**. The portion **136** is also provided with guide spaces **142**. The portion **136** is substantially square in cross section as best seen in FIG. **27**.

[0124] The portion **138** is provided with a cut-out guide **144**.

[0125] The second connector component **134** is provided with an opening **146** having guide members **148**.

[0126] The second connector component **134** further comprises a rotatable member **150** with a hollow core **152**. A guide vane **154** projects into the hollow core **152**. The second engagement means **58** is provided as a latch member **156** extending from the rotatable member **150**, outside the hollow core **152**.

[0127] The rotatable member **150** is provided with a lever **158** having locking pins **160**. The locking pins **160** are receivable in housings **162**.

[0128] A cover plate **164** is provided to cover an opening **166** in the second connector component **134**. The cover plates **164** have cut-outs **168**. The opening **166** is provided for insertion of the rotatable member **150** into the second connector component **134** during assembly of the connector **130**.

[0129] Openings **80** are provided in the end portions **60**. The openings **80** permit the connector **130** to be attached to another item as will be later herein described. The connector **130** can be retained with the item by way of plugs **170** passing through the apertures **80** and corresponding apertures in the item. Similar plugs **170** are also shown in some figures of some of the other embodiments of the connectors of the present invention. Caps **172** may be provided to close the open ends of the apertures **80**.

[0130] In use, two connectors **130***a* and **130***b* are aligned as shown in FIG. **26**. The connectors **130***a* and **130***b* are then moved toward one another in the respective directions shown by arrows C and D. The first connector components **132** of the respective connectors **130***a* and **130***b* are received in the second connector components **134** of the connectors **130***b* and **130***a*, respectively. The first portion **136** of each first connector component **132** is received in the opening **146** of the second connector component **134** of the respective connectors **130***a* and **130***b*. The guide members **148** of the second connector components **134** are received in the guide spaces

142 of the first connector components 132. Simultaneously, the second portion 138 of each first connector components 132 is received in the hollow core 152 of the rotatable members 150. The guide vane 154 is received in the cut-out guide 144.

[0131] Once the first connector components 132 have been fully inserted into the second connector components 134, the end portions 60 of the respective connectors 130 and 130*b* will abut. The rotatable members 150 of each connector 130*a* and 130*b* can then be rotated in the direction of arrow E shown in FIG. 27 such that the latch members 156 of connectors 130*a* and 130*b* engage in the cut-out sections 140 of connectors 130*b* and 130*a*, respectively. In this way, the first and second engagement means 56 and 58 are engaged such that the first connector components 132 are releasably engaged with the respective second connector components 134. The pins 160 are receivable in the housings 162 in a snap-fit engagement to releasably lock the rotatable member 150 in position whereby the latch members 156 are retained in the cut-out sections 140.

[0132] The connectors 130*a* and 130*b* can be disconnected by rotating the rotatable members 150 in a direction opposed to arrow E such that the pins 160 are first disengaged from the housings 162. The rotatable members 150 are then further rotated such that the latch members 156 are disengaged from the cut-out sections 140 and are received in the cut-outs 168 in the plates 164. The connectors 130*a* and 130*b* can then be moved away from each other with the first connector components 132 being removed from the second connector components 134.

[0133] The connector of the present invention may be used as a connector for a belt made up of modular housings.

[0134] In FIG. 37 there is shown a belt 1 comprising housings 3*a*, 3*b* and 3*c* (referred to generally as housings 3) to hold respective objects, and a strap 4.

[0135] The belt 1 extends in a substantially longitudinal direction and has a width substantially transverse to this longitudinal direction. The housings 3*a*, 3*b* and 3*c* have respective openings 11*a*, 11*b* and 11*c* (also referred to generally as the openings 11) for insertion of an object into, and for removal of the object from, the respective housing 3*a*, 3*b* and 3*c*.

[0136] The strap 4 has first and second connectors 5 at respective ends thereof. Each housing 3 has first and second connectors 5 provided at spaced apart locations thereof, e.g. at respective ends of each housing 3.

[0137] The connectors 5, are shown "schematically", and designate a connector in accordance with the present invention as hereinbefore described. Specific examples of such a connector have already been described in the embodiments in relation to the connectors 50, 90, 100 and 130. The following description of the belt 1 is with reference to the connectors 5 being a connector of any one of the embodiments of a connector in accordance with the present invention as previously hereinbefore described.

[0138] The housings 3 are provided with end members 9 that support and retain the first and second connectors 5. The end members 9 are preferably made of a more rigid material than the remainder of the housings 3.

[0139] The end members 9 may be accommodated in the end portions 60 of the connectors 5.

[0140] These end members 9 may be received between the plates 82 and 86 and the plates 84 and 86, for example, of the connector 50 of the first embodiment.

[0141] Alternatively, when the end portion 60 is of the form of a D ring 96, as is the case in the connector 90 of the second embodiment, the end members 9 loop through the openings 98. These end members 9 may be provided as short straps that are attached at respective ends of the housings 3. The end members 9 may be attached to the housings 3 by stitching.

[0142] The housings 3*a*, 3*b* and 3*c* have front, or outer, walls 13*a*, 13*b* and 13*c*, respectively, (also referred to generally as the front walls 13).

[0143] The front walls 13*a*, 13*b* and 13*c* may be made of a resiliently stretchable material. The resiliently stretchable material may be of a type that permits the objects contained in the housings 3*a*, 3*b* and 3*c* to be visible from outside the housings 3*a*, 3*b* and 3*c* and/or accessible through the material, e.g. for operation thereof. The resiliently stretchable material may, for example, be a mesh-like fabric.

[0144] Alternatively, the resiliently stretchable material may be of a type that is substantially opaque.

[0145] In a further alternative, the front walls, 13*a*, 13*b* and 13*c* may be made of a waterproof material, e.g. plastics.

[0146] The housings 3, each further comprise an underlying backing support 15 (visible in FIG. 39) to which the respective front walls 13 are attached, either directly or by side walls—as shown in FIG. 39. The sides of the housings 3 extend in the longitudinal direction of the belt 1. The other end of each respective front wall 13 is left unattached to a backing support 15 to thereby form the openings 11. The housings 3 thus have a pocket-like or bag-like structure. The backing supports 15 form the rear, or inner, walls of the housings 3.

[0147] The housings 3 have a respective closure for closing the openings 11. The closure may, for example, comprise drawstrings 16 to close the respective openings 11.

[0148] As an example of an alternative form for the closure, the closure may be provided as a zipper or as releasable tongue and groove closure strips. The releasable tongue and groove closure strips are particularly suitable when the front walls 13 of the housings 3 are made of a waterproof material.

[0149] The strap 4 may be made of a woven synthetic material that is flexibly resilient, yet light and resistant to tearing and fraying. The backing support 15 is made of a more rigid material, that preferably still has at least a degree of flexibility or resilience.

[0150] The openings 11*a* and 11*b* of the housings 3*a* and 3*b* extend substantially in the direction of the width of the belt 1. In this way, objects are inserted into and withdrawn from, the housings 3 in the longitudinal direction of the belt 1. Furthermore, the housings 3 extend substantially in-line with the longitudinal direction of the belt 1 and are substantially the same width as the strap 4.

[0151] The belt 1 may be provided with fasteners (not shown) which are releasably engageable to connect together the respective ends of the belt 1 together so that the belt 1 can be worn by a wearer. The fasteners may also be in the form of connectors 5. The strap 4 is provided with adjustment means to adjust the length of the belt 1. The adjustment means may, for example, comprise an adjustment buckle 25 so that the length of the belt 1 can be adjusted.

[0152] FIG. 38 shows an embodiment of a housing 3*d* which is provided with connectors in the form of the connectors 90 of the second embodiment. The connectors 90 are connected at respective ends of the housing 3*d*.

[0153] FIG. 39 shows an embodiment of a housing 3*e* in which the front wall 13 is attached to the backing support 15

by side wall **20**. The front wall **13** of the housing **3***e* may be made of a more rigid material than the front walls of the embodiments previously hereinbefore described. The side walls **20** may be made of an elasticated material. In addition to the side walls **20**, an end wall (obscured in FIG. **39**) is provided. The end wall may also be elasticated. Providing the side walls **20** and the end wall **20** of an elasticated material means that the housing **3***e* expands when an item is inserted into it thereby retained the item. The housing **3***e* may further be provided with a rib **21** at the opening **11** to assist in retaining the item in the housing **3***e*. The connectors **5** have been omitted from the housing **3***e* for clarity. However, it is to be understood that connectors **5** would be attached to the backing support **15** at respective ends thereof.

[0154] The housing **3***f* (shown in FIG. **40**) has a different structure from that of the housings **3***a*, **3***b*, **3***c*, **3***d* and **3***e* and is particularly intended to store valuable items such as money and keys. -For that reason, the housing **3***f* is provided with a front wall **13***f* made of an opaque material. The housing **3***f* may, however, also have a mesh-like material cover over the front wall **13***f*. This is primarily to provide a similar visual appearance, if desired, to the housing **3***f* as may be possessed by the housings **3***a*, **3***b*, **3***c*, **3***d*, **3***e* and **3***f* when the housings **3***a*, **3***b*, **3***c*, **3***d*, **3***e* and **3***f* have front walls **13**, **13***a*, **13***b* and **13***c* that are made of a mesh-like material.

[0155] The opening **11***f* of the housing **3***f* may be provided along a side, rather than an end, of the housing **3***f* as shown in FIG. **40**. A zipper **25***a* may be provided to close off the opening **11***f*. As an alternative, however, the opening **11***f* may be provided at an end of the housing **3***f* in a similar position to the openings **11***a*, **11***b* and **11***c* of the housings **3***a*, **3***b* and **3***c*, respectively. However, the opening **11***f* would nevertheless retain a zipper **25***a* to close the opening **11***f* rather than a drawstring as used in the housings **3***a*, **3***b* and **3***c*.

[0156] The belt **1** may be provided with a sleeve **27**. The sleeve **27** is able to slide along the belt **1**. The purpose of the sleeve **27** is that it can be slid into position so as to cover the housings **3***a*, **3***b*, **3***c*, **3***d*, **3***e* and **3***f*. The sleeve **27** thus further protects the contents of the housings **3***a*, **3***b*, **3***c*, **3***d*, **3***e* and **3***f*, e.g. from rain. For this reason, it is preferable that the sleeve **27** is made from a substantially waterproof material.

[0157] The backing supports **15** of one or more housings **3** may be provided with loops (obscured) on the reverse face thereof. The loops are provided so that the electrical wires leading from a device, such as personal music player that is retained in one of the housings **3** can be fed through the loops. Another loop may be provided on the front face **32***b* of the strap **4** for a similar purpose. In this way, the electrical wires do not inconvenience the wearer.

[0158] The belt **1** may be provided with one or more loops (not shown). Such loops are provided at the front face **32***b* of the strap **4**. Items such as keys may be suspended from these loops.

[0159] The belt **1** may be made of material in colours and patterns as required, making the belt suitable as a fashion accessory.

[0160] The use and operation of the belt **1** will now be described with particular reference to the drawings.

[0161] In use, the belt **1** is worn by a wearer as depicted in FIGS. **43** and **44**. The belt **1** may be worn around the waist of the wearer or cross shoulder (as shown in FIG. **44**). The belt fasteners, when provided, provide a secure yet releasable, fastening of the belt **1** so that it is retained in place on the wearer. The buckle **25** enables the length of the belt **1** to be adjusted to suit individual wearers.

[0162] The first and second connectors **5** of the strap **4** and the housings **3** allows a wearer to attach together the required number of housings **3** and the strap **4**. In the alternative, where a strap **4** is not used, the belt would consist entirely of connected housings **3**.

[0163] The housings **3** may vary in shape and size to accommodate different sizes and types of items. However, the use of the first and second connectors **5** of the housings **3** permits the various housings **3** to be connected together.

[0164] Since the housings **3** and strap **4** of the belt all use the same type of connector **5**, the housings **3** are completely interchangeable so that a user can select whichever housings are required and connect them together to form the belt. The use of a single type of connector **5** at both ends of each housing **3** and at each end of the strap **4** means that the belt **1** of the present invention may be oriented in any desired manner, e.g. around the waist of a user, or over the left or right shoulder of the user, with whichever housings the user requires. This inter changeability is illustrated in FIG. **36** by way of the broken lines signifying that each of the housings **3** illustrated in FIG. **36** can be connected at any end, as required by the user. The connector of the present invention thus overcomes the problem that would be encountered if conventional connectors, which consist of a pair of different connectors that are able to engage to connect together, were used as such conventional connectors would not allow the interchangeability of the housings **3** in a belt **1** as previously hereinbefore described.

[0165] With the belt **1** being worn by the wearer, the contents of the housings **3** are readily accessible via the openings **11**. In the embodiment in which the front walls **13** are made of a material that permits the objects in the housings **3** to be visible from outside the housings **3** and accessible through the material of the front walls **13** of the housings **3**, devices, such as a mobile telephone, are readily accessible through the material of the front walls **13**. For example, it permits the screen of the mobile telephone to be viewed and keys/buttons to be pressed. That is, the devices do not need to be removed from the housings **3** to be accessible for operation.

[0166] Throughout the specification, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

[0167] Modifications and variations such as would be apparent to a skilled addressee are deemed to be within the scope of the present invention.

1. A connector characterised in that it comprises first connector means, second connector means, and engagement means, wherein a first connector means of a first said connector and a second connector means of a second said connector are releasably engageable, and a second connector means of the first said connector and a first connector means of the second said connector are releasably engageable such that the first said connector and the second said connector are releasably connectable.

2. A connector according to claim **1**, characterised in that said engagement means comprises a first engagement means and a second engagement means, wherein the first engagement means of a first said connector and the second engagement means of a second said connector are releasably engageable, and the second engagement means of the first said

connector and the first engagement means of the second said connector are releasably engageable.

3. A connector according to claim **2**, characterised in that the first connector means is provided with the first engagement means and the second connector means is provided with the second engagement means.

4. A connector according to any one of the preceding claims, characterised in that the first and second connector means are arranged such that the first connector means of a first said connector is receivable in the second connector means of a second said connector and the first connector means of the second said connector is receivable in the second connector means of the first said connector.

5. A connector according to any one of the preceding claims, characterised in that the second connector means has an opening at the distal region thereof to receive the first connector means of another said connector.

6. A connector according to any one of the preceding claims, characterised in that said first connector means is flexibly resilient such that it is able to flex such that the first engagement means of said first connector means is able to engage with the second engagement means of the second connector means of another said connector.

7. A connector according to any one of the preceding claims, characterised in that guide means is provided to assist in the alignment of the first and second said connectors.

8. A connector according to any one of claims **2** to **7**, characterised in that the first engagement means comprises a recess provided at the leading or distal region of the first connector means and the second engagement means comprises a lug provided at the trailing or proximal region of the second connector means, such that the respective recess of first and second said connectors is engageable with the respective lug of second and first said connectors, respectively.

9. A connector according to any one of claims **2** to **7**, characterised in that the first engagement means comprises a first stepped surface provided at the leading or distal region of the first connector means and the second engagement means comprises a complimentary second stepped surface provided at the trailing or proximal region of the second connector means, such that the respective first stepped surface of first and second said connectors is engageable with the respective second stepped surface of the second and first said connectors, respectively.

10. A connector according to any one of claims **2** to **7**, characterised in that said first engagement means comprises first lug means provided at a trailing region of said first connector means and said second engagement means comprises second lug means provided at the leading or distal region of said second connector means, such that the respective first and second lug means of said first and second connectors are able to engage with respective second and first lug means of the second and first connectors, respectively.

11. A connector according to any one of claims **2** to **7**, characterised in that the first engagement means comprises a cut-out section provided in said first connector means and the second engagement means comprises latch means provided on said second connector means, such that the respective latch means of first and second said connectors are able to engage with the cut-out sections of the second and first said connectors, respectively.

12. A connector according to claim **11**, characterised in that said latch means is carried by a moveable member that is moveable to bring said latch means and said cut-out section into engagement.

13. A connector according to claim **12**, characterised in that locking means is provided to releasably lock said moveable member in a position such that said latch means and said cut-out section remain releasably engaged.

14. A belt comprising:

at least a first housing to retain an object, each said housing having an opening for insertion of an object into, and removal of the object from, the housing, and

a strap having connection means,

wherein each said housing has connection means to detachably engage with said connection means of said strap to thereby releasably connect said housing with said strap.

15. A belt according to claim **14**, characterised in that it further comprises a second said housing that is releasably connectable to said first housing and said strap by said connection means of said strap and the respective connection means of said first housing and said second housing.

16. A belt according to claim **15**, characterised in that further comprises a third housing that is releasably connectable to said first housing and said second housing by respective said connection means of said first housing, said second housing and said third housing.

17. A belt comprising:

a plurality of housings, each of said housings having an opening for insertion of an object into, and removal of an object from, the housing, and

each said housing having connection means to detachably engage with connection means of another housing to thereby releasably connect one said housing with another said housing.

18. A belt according to any one of claims **14** to **16**, characterised in that said connection means of said strap comprises a first connector and a second connector provided at respective ends of said strap.

19. A belt according to any one of claims **14** to **18**, characterised in that said connection means of each said housing comprises two connectors provided at respective spaced apart locations of each said housing.

20. A belt according to any one of claims **14** to **19**, characterised in that the opening of each said housing extends substantially in the direction of the width of the belt.

21. A belt according to any one of claims **14** to **20**, characterised in that closure means is provided to close off the opening of each said housing.

22. A belt according to any one of claims **14** to **21**, characterised in that each said housing comprises a front wall and support means such that said front wall is attached to the support means.

23. A belt according to claim **22**, characterised in that said front wall is made of resiliently stretchable material.

24. A belt according to any one of claims **14** to **23**, characterised in that end members are provided at respective ends of each said housing and said connectors of each said housing are supported by said respective end members.

25. A belt according to claim **23** or **24**, characterised in that the resiliently stretchable material is of a type that permits objects contained in each said housing to be at least partially visible from outside said housing.

26. A belt according to any one of claims **23** to **25**, characterised in that the resiliently stretchable material is of a type that permits objects contained in a said housing to be accessible to through said material.

27. A belt according to any one of claims **23** to **26**, characterised in that the resiliently stretchable material is a mesh-like fabric.

28. A belt according to any one of claims **23** to **26**, characterised in that the resiliently stretchable material may be of a type that is substantially opaque.

29. A belt according to any one of claims **17** to **28**, characterised in that the width of a said housing is substantially the same as the width of the strap.

30. A belt according to any one of claims **14** to **29**, characterised in that said connection means comprises at least one connector according to any one of claims **1** to **13**.

31. A housing to retain an object comprising an opening for insertion of the object thereinto, and removal of the object from, the housing, and a connector at respective spaced apart locations of the housing such that one of the connectors of the housing may be connected to a another connector.

32. A housing according to claim **31**, characterised in that said connection means comprises a connector in accordance with any one of claims **1** to **13**.

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