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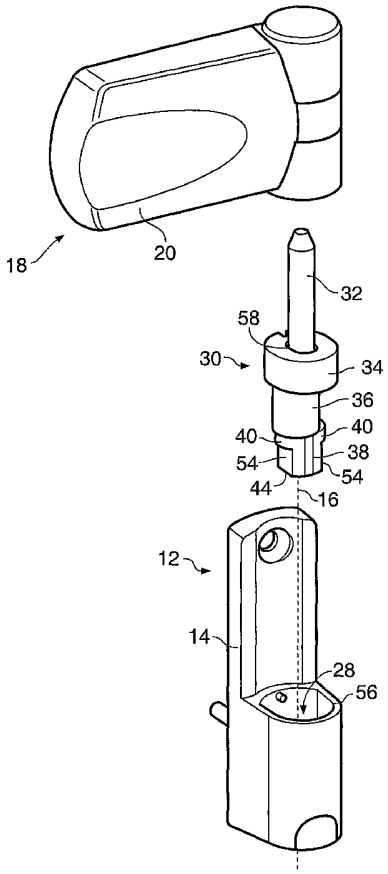
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(54) Title: HINGE ARRANGEMENTS



(57) Abstract: A hinge arrangement (10) has first and second portions (12, 18) and a spindle (32). The position of the spindle (32), in the socket (28) is adjustable parallel with and transverse to its axis. Parallel adjustment is by means of a screw thread. Transverse adjustment is by interaction between a circular feature (36) and a slot (58). The geometry of these features converts rotation of the spindle (32) into displacement perpendicular to the axis (16).

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Hinge Arrangements

The present invention relates to hinge arrangements.

Hinge arrangements are used in many circumstances, including the mounting of windows and doors in frames. Modern window and door frame hinges are desirably adjustable in various ways, to ensure correct alignment of the door or window in the frame, and to adjust the compression of seal strips when the door or window is closed. In addition, the hinges are required to be secure against tampering, particularly as the hinges are conventionally exposed to the outside of the building and thus vulnerable to attack in an attempt to remove the door or window.

In accordance with the present invention, there is provided a hinge arrangement comprising:

a first hinge portion having a base supporting a hinge spindle which defines a hinge axis;

the spindle being rotatable about the axis relative to the base and carrying a projection which turns with the spindle, the projection having a rotational symmetry when viewed along the axis and being eccentrically disposed relative to the axis;

first confinement means which confine the axis of the spindle along a line which extends transverse of the axis;

second confinement means which confine the centre of the projection along a second line which extends transverse of the axis;

whereby the hinge spindle is transversely adjustable by rotation of the spindle.

Preferably the projection has at least one part which is circular when viewed along the axis. The projection may have at least one part which is a regular polygon when viewed along the axis.

The first confinement means preferably comprises a collar carried by the spindle, the collar cooperating with corresponding surfaces of the base to confine the spindle axis as aforesaid. The collar is preferably rotatable relative to the spindle, and is located within a socket formed in the base, the socket and collar cooperating to provide confinement. The socket and collar may have cooperating flat surfaces which move across each other as the spindle moves, and which prevent rotation of the collar, relative to the socket.

Alternatively, the first confinement means may comprise guide surfaces between which the spindle is confined, the guide surfaces defining the line of confinement. The guide surfaces may define a slot in the base, or in a member carried by the base, the spindle being movable along the slot.

The second confinement means are preferably provided by the walls of a socket in the base, within which the projection is contained. The second confinement means may be provided by walls of the collar.

The spindle preferably has a thread which carries a threaded collar, there being means preventing the threaded collar moving in at least one direction relative to the base and parallel with the hinge axis, whereby rotation of the spindle causes axial movement of the spindle.

In another aspect, the invention provides a hinge leaf arrangement for providing hinged attachment of a door or window to a frame, comprising:

a leaf member;

attachment means operable to attach the leaf member to the door or window;

cover means operable to cover the attachment means after the leaf arrangement has been attached, to prevent access to the attachment means;

and wherein the cover is pivotally mounted on the leaf member, to be movable to and from the closed position while remaining mounted on the leaf member.

Preferably, lock means are provided, operable to lock the cover in position as aforesaid. The lock means may be releasable for removal of the cover means, by accessing the lock means at a position which is inaccessible when the door or window is closed in the frame. The lock means may include a resilient catch member which engages as the cover is closed, and which is accessible at the said position to be withdrawn to release the cover. The resilience may cause the catch member to enter a catch recess as the cover approaches the closed position, thereafter preventing the cover being opened until the catch member is withdrawn from the catch recess.

The cover member is preferably free to move transversely of the pivot axis to reach the closed position. The cover member and leaf member may come into mechanical engagement as the cover member moves transversely to the closed position, the mechanical engagement serving to prevent the cover member pivoting relative to the leaf member, and the lock means serving to prevent the cover member moving transversely away from the closed position.

In a third aspect, the invention provides a hinge leaf arrangement for providing hinged attachment of a door or window to a frame, comprising:

a body for mounting to the frame, the body having a recess to receive a pivot shaft arrangement;

a pivot shaft arrangement removably received in the recess to project from the recess to provide a shaft around which another leaf arrangement is received, in use, to form a hinge;

the body being mounted by means of at least two fixing screws, access to at least one fixing screw being obstructed by the pivot shaft arrangement when in its use position, and access to at least one other fixing screw being obstructed by the said other leaf when the hinge is formed.

The recess may be elongate and generally parallel to the hinge axis, access to the said at least one fixing screw being across the recess, to be obstructed when the pivot shaft arrangement is installed in the recess. The access may be generally perpendicular to the hinge axis. The pivot shaft arrangement is preferably adjustable to set the relative positions of the leaves in the axial direction, the pivot shaft arrangement obstructing access to the said other fixing screw or screws except when at one extreme of its adjustment range.

The invention also provides an arrangement which has the features, and optionally one or more sub-features, of any combination of the aspects set out above.

An embodiment of the present invention will now be described in more detail, by way of example only, and with reference to the accompanying drawings, in which:

Fig. 1 is a front elevation of a hinge arrangement incorporating the present invention;

Fig. 2 is a base view of the hinge arrangement of Fig. 1;

Fig. 3 is a perspective view from below, during adjustment of the arrangement;

Fig. 4 is an exploded view of the pivot arrangement;

Figs. 5a and 5b, 7a and 7b, and 8a and 8b are vertical and horizontal sections of the arrangement in various stages of adjustment;

Figs. 6a to 6e are schematic diagrams of the geometry of the arrangement during adjustment;

Fig. 9 corresponds with Fig. 5b, illustrating an alternative arrangement, and Fig. 10 shows Fig. 9 on a larger scale;

Figs. 11 and 12 are perspective views from different angles, showing the base and spindle during fitting;

Fig. 13 is an exploded view of the flag leaf and its components;

Figs. 14 and 15 and Figs. 16 and 17 are, respectively, horizontal sections and front elevations of the hinge arrangement with the flag leaf cover in various conditions;

Fig. 18 is a horizontal section with the flag leaf cover fully closed; and

Fig. 19 is a perspective view from the rear, showing the hinge arrangement with the flag leaf cover fully closed.

Figs. 1 and 2 show a hinge arrangement 10 in its assembled condition, ready for use to mount a window or door in a frame. The arrangement 10 has a first hinge portion 12 for mounting, in use, to a door or window frame. The

first portion 12 has a base 14 which provides support for a hinge spindle (not visible in Fig. 1) which defines a hinge axis 16. The second leaf arrangement 18 is, in this example, in the form of a "flag" hinge leaf, a term which is commonly used in view of the generally rectangular shape of the leaf 18. The arrangement 18 includes a cover 20 which covers arrangements for attaching the leaf 18 to the door or window, for security and aesthetic reasons.

The base 14 is attached, in use, to a window or door frame by fixing screws (not shown in Fig. 1) located generally towards each end of the base 14, as will be described.

The arrangement being described provides enhanced security against tampering, in various ways. In addition, the flag leaf 18 is adjustable in two ways. The axial position of the flag leaf 18 along the axis 16, relative to the base 14, can be adjusted. In a typical installation, with a vertical hinge axis 16, this allows the height of the door or window to be adjusted in the frame.

A second adjustment facility can be best explained with reference to Fig. 2, which shows an end view (from below) of the arrangement 10. Broken lines are used to indicate a typical frame profile 22 and door or window profile 24 with which the arrangement 10 may be used. A seal strip 26 is provided between the frame 22 and the door or window 24. The strip 26 is compressed as the door or window 24 closes in the frame 22. In the arrangement 10, the transverse separation of the hinge axis 16, from the frame 22 is adjustable, so that the degree of compression of the seal strip 26 can be adjusted, as will be described.

Fig. 2 additionally shows a tool 27 being used to make these adjustments.

Height Adjustment

The arrangements which provide for height adjustment can initially be best described by reference to Figs.3, 4 and 5.

The base 14 provides a socket 28 to receive the hinge spindle arrangement 30. The spindle arrangement 30 includes a spindle 32, a collar 34 located around the spindle 32, a projection 36 fixed to the spindle 32 to rotate with it, and a T-piece 38.

The T-piece 38 sits at the bottom of the socket 28 (Fig. 5a) and has side limbs 40 which rest for support on ledges 42 at the bottom of the socket 28. The main body 44 of the T-piece 38 sits below the socket 28 in a passage 46, through which the T-piece 38 is visible from below the base 14, when a suitable cover 48 is open (Fig. 3). The T-piece 38 is non-circular, as is the passage 46. Further details of this will be set out below, but at this stage it is sufficient to note that this prevents the T-piece 38 turning, once in position, as shown in Fig. 5a.

Above the T-piece 38, the collar 34 rests on the projection 36 (Fig. 5a) and in turn, the flag leaf 18 rests on the collar 34, when the hinge arrangement 10 is assembled.

The T-piece 38 is internally threaded to cooperate with an externally threaded part of the spindle 32. This end of the spindle 32 is also provided with a hexagonal socket 50 (Fig. 3) to receive an Allen key 27 by which the spindle 32 can be turned about its axis.

As the spindle 32 turns, the T-piece 38 is prevented from turning with it, as noted above. Consequently, the spindle 32 will rise or fall in the T-piece 38. The T-piece 38 will remain in the position shown in Fig. 5a, by virtue of

the weight bearing on it, through the flag leaf 18, collar 34, projection 36 and spindle 32. Consequently, as the spindle is turned, the projection 36 is raised or lowered, causing the collar 34 to lift or lower the flag leaf 18, thereby adjusting the height of the door or window to which the flag leaf 18 is attached. Thus, height adjustment is provided within the hinge arrangement 10 by simple rotation of the spindle 32.

Transverse Adjustment

Additional features of the arrangement shown particularly in Figs. 4 and 5 allow the transverse position of the axis 16 to be adjusted relative to the base 14, to adjust the compression of the seal strip 26, as can now be described.

First, the T-piece 38 has flat, parallel side faces 54. The thickness of the T-piece 38, in a direction parallel with the side faces 54, is less than the extent (in the same direction) of the passage 46, so that the T-piece 38 is able to slide within the passage 46, transversely to the axis 16.

The collar 34 has a non-circular outer shape, when viewed along the hinge axis 16, which cooperates with a complementary shape at the mouth 56 of the socket 28, so that the collar 34 is prevented from rotation. However, the collar 34 is free to move in the mouth 56 in a direction parallel with the axis 16. The spindle 32 is received in the collar 34 in a slot 58, which has a major axis perpendicular to the axis 16, and parallel with the faces 54.

Consequently, the spindle 32 is confined by the collar 34 so that the axis of the spindle moves along a line defined by the shape of the slot 58.

In an alternative arrangement, the spindle may be a close fit in a circular aperture in the collar 34, and the collar 34 and mouth 56 are adapted

to allow the collar 34 to slide transversely of the axis 16, so that the collar 34 is carried with the spindle as the transverse position is adjusted, and the line along which the spindle is confined is defined by the cooperating surfaces of the collar 34 and the mouth 56.

The projection at 36 is a circular cylinder with an axis parallel to the hinge axis 16, but offset from it. The projection 36 is located in a part 60 which has parallel side walls 62 which are, in this example, perpendicular to the major axis of the slot 58, when viewed along the axis 16. The separation of the side walls 62 is equal to the diameter of the projection 36. Consequently, the projection 36 is able to move transversely of the axis 16, between the side walls 62, but the axis of the projection 36 is confined by the walls 62 along a line which is transverse of the axis 16, and different to the confinement line of the spindle 32. In this example, the two confinement lines are straight and perpendicular to each other and to the hinge axis 16.

This arrangement allows the rotation of the spindle 32 to adjust the lateral position of the spindle 32, relative to the base 14, as can be seen from Fig. 6, which represents a simplified diagram of the geometry of the arrangement just described.

In Fig. 6, the side walls 62 are shown confining the centre of the projection 36 along a line 64, midway between the walls 62. Fig. 6 also shows the line 66 along which the spindle axis is confined by the slot 58. Consequently, the position of the projection 36 within the socket part 60 must meet two requirements. First, the centre 68 of the projection 36 must be on the line 64. Secondly, the spindle axis 16, which is offset from the centre 68, must be on the line 66.

One intermediate position is illustrated in Fig. 6a. The spindle axis 16 is at the mid-point of its range. If the projection 36 is now turned (by turning

the spindle 32) the projection 36 will move to a different position in which the two requirements are still fulfilled, with the projection 36 at the new orientation. An alternative position of this nature is illustrated in Fig. 6b. The centre 68 has moved along the line 64. The axis 16 has moved away from the line 64, toward one of the walls 62, but remaining on the line 66. An extreme position is eventually reached (Fig. 6c) in which the centre 68 is on the line 66 at its intersection with the line 64 and the spindle axis 16 has moved to one end of its range. Further turning of the projection 36 in the same direction (indicated by the arrow 70) will eventually move the projection 36 to the other intermediate position (Fig. 6d) in which the axis 16 has moved back to the line 64, and the centre 68 is displaced to the other side of the line 66, as compared with Fig. 6a.

Still further rotation in the same direction 70 will cause the projection 36 to move back to the position of Fig. 6a. However, it is to be noted that in this movement, the axis 16 will deflect in the opposite direction from the line 64, as illustrated by the alternative mid position reached (Fig. 6e).

Thus, it can be understood from Fig. 6 that by confining the hinge axis 16 along a line 66, and simultaneously confining the centre 68 along a different line 64, rotation of the projection 36 is turned into movement of the axis 16 along the line of confinement.

The arrangements being described provide these confinements in the ways described. Accordingly, rotation of the spindle 32 (as described above in relation to height adjustment) will move the hinge axis 16 transversely (in addition to adjusting the height of the flag leaf 18), thus adjusting the compression achieved in the seal strip 26 when the door or window is fully closed.

As will now be understood, the single action of turning the spindle 36 is providing two forms of adjustment, firstly to the height of the flag leaf 18, and secondly to the transverse position of the axis 16. It is to be noted that the full range of axis positions is reached during each full turn of the spindle 32. Consequently, it is envisaged that by using a fine thread between the T-piece 38 and the spindle 32, the hinge arrangement 10 can be set up by first setting the height of the flag leaf 18 by turning the spindle 32 and ignoring the position of the axis 16. Once the correct height has been achieved, the desired seal strip compression can be achieved by turning the spindle 32 by a maximum of a further half turn in one direction or the other (because a full turn moves the spindle through its full range). With a suitably fine thread, it is envisaged that the consequential height adjustment will be negligible.

Figs. 5a and b, Figs. 7a and b, and Figs. 8a and b illustrate the application of the geometry of Fig. 6 to the arrangement being described, in more detail. Figs. 5a and 5b show the hinge axis 16 at one intermediate position (corresponding, for example, with Fig. 6a). Note from Fig. 5a that the projection 36 is primarily to the left of the spindle 32 (as viewed in that drawing). Figs. 7a and 7b show the other intermediate position, (corresponding with Fig. 6d) achieved by turning the spindle 32 by means of the tool 27. Thus, in both Figs. 5 and 7, the axis 16 is at the mid-point of its range. Fig. 8 shows an extreme position corresponding with Fig. 6e, in which the projection 36 is symmetrically disposed about the spindle 32 (as viewed in Fig. 8) and the hinge axis 16 has deflected from the mid-point of its range (as can be seen in Fig. 8b), to one end of its range.

Alternative Arrangement

In the arrangements described above, the projection 36 is a circular cylinder. Minimal friction therefore arises between the surface of the projection 36, and the parallel side walls 62. The collar 34 sits over the

projection 36, with the projection 36 received in a recess 37 having the same outline (transverse to the axis 16) as the part 60. Accordingly, minimal friction arises between the projection 36 and the collar 34, in the recess 37.

It has been found that in practical installations, use of the hinge can result in the spindle 32 being turned. This may arise, for example, by friction between the spindle 32 and the leaf 18, particularly if the leaf is supporting a heavy item, such as a heavy door. If this friction results in the spindle turning, the effect will be to change the adjustment which is achieved in the manner described above.

Figs. 9 and 10 show a modification which tends to resist inadvertent adjustment occurring in this way. Many features shown in Figs. 9 and 10 correspond with features shown in the previous drawings and accordingly, the same reference numerals are used. Where there are differences between the corresponding features, the suffix A is used.

In the arrangement of Figs. 9 and 10, the projection 36 is a circular cylinder along that part of its length which sits between the parallel side walls 62, so that adjustment is effected as described above. In the end section 36A, in which the projection 36 sits in the recess 37, the projection is not circular in this modification, but is polygonal in outline. In the example shown, the outline is a regular ten-sided polygon. The dimensions of the polygon are such that opposite parallel faces of the polygon will rest against opposite parallel faces 37A of the recess 37. Consequently, there is resistance against the end 36A turning in the recess 37, because an opposite pair of corners of the polygon are separated by a greater distance than an opposite pair of polygon sides, so that some distortion of the end 36 or of the collar 34, or both, is required to allow the end 36 to turn from a position at which one pair of opposite polygon sides are against the parallel faces 37A, to a position at which the next pair of polygon faces are against the faces 37A. Thus, by

appropriate choice of materials for the cylinder 36 and collar 34, a simple form of ratchet mechanism is formed to provide a greater resistance to turning the projection 36, than is provided when the whole of the cylinder is circular in section.

Accordingly, the spindle 32 cannot turn about its axis 16 unless the resistance of the end 36A and faces 37A is overcome. It is envisaged that this resistance can be sufficiently high to be greater than any friction likely to arise in practice between the leaf 18 and the spindle 32, so that inadvertent re-adjustment during use is unlikely to arise, but that deliberate adjustment, in the manner described above, can readily be achieved by turning the spindle 32 sufficiently forcefully to overcome the resistance provided by the end 36A and the faces 37A.

Although the end 36A is not circular, the regular polygon shape provides a rotational symmetry, so that the adjustment geometry described above in relation to Figs. 6a to 6e remains valid except that infinitesimal adjustment of the axis position is no longer possible, as the rest positions of the cylinder 36A will be confined to those angles at which the polygon sides are resting parallel with the faces 37A.

Installation of the Base

Having discussed the adjustment available within the base and spindle arrangement, it is appropriate to describe further the installation of the base 14, with reference to Figs. 11 and 12. The base 14 is attached to the frame 22 by means of screws (not shown) received in screw apertures 72. When in position, the screws extend generally perpendicular to the hinge axis 16.

The apertures 72 are at opposite ends of the base 14. In Figs. 11 and 12, the spindle 32 has been pulled up (by hand), to raise the collar 34,

projection 36 and T-piece 38. This provides access to the lower aperture 72, when the cover 48 is open, allowing a fixing screw to be inserted and tightened. In this position, the upper aperture 72 is obstructed by the top of the spindle 32.

Once a fixing screw has been inserted through the lower aperture 72, a spindle 32 can be lowered. This will cause the lower aperture 72 to be obstructed (as can be seen in Fig. 3), and may be sufficient to expose the upper aperture 72 but it is preferred that the geometry is such as to require the spindle 32 to be fully lowered (as described above) before the aperture 72 is sufficiently unobstructed to allow a fixing screw to be introduced.

Consequently, in the completed and installed arrangement, the screw through the lower aperture 72 will be prevented from tampering by the presence of the T-piece 38, which is in turn held in that position by the weight of the door or window. The upper aperture 72 is protected from tampering by the presence of the spindle 32, and the presence of the flag leaf 18. The aperture 72 can only be accessed if the spindle 32 is fully lowered and the flag leaf 18 (and thus the door or window) removed.

Hinge Leaf and Cover Arrangement

The description above has primarily related to the hinge leaf intended to be attached to the frame 22, namely the base 14 and associated components.

Fig. 13 illustrates the flag leaf 18 in more detail.

The leaf 18 is for attachment to the door or window 24. A leaf member 74 rests against the door or window 24 (which will hereafter be termed only the "door", for simplicity). An attachment arrangement 76 secures the leaf

member 74 in position, as follows. A plate 78 sits in a recess 80 in the leaf 74 and carries pegs, pins, screws or other fixings 82 which extend through slots 94 in the leaf 74 to secure the plate 78 to the door 24, trapping the leaf 74 therebetween. A bolt 86 engages with a threaded bore 88 in the plate 78 and has a head 90 which is received in a cradle 92 in the leaf 74, so that the bolt 86 is free to turn in the cradle 92, but not to move axially relative to the leaf 74. Consequently, turning the bolt 86 pushes or pulls the plate 78 toward or away from the axis 16, thereby adjusting the lateral position of the door 24, relative to the axis 16.

The leaf member 74 has two knuckles 94 which receive bearing sleeves 96, which in turn receive the spindle 32 when the hinge arrangement 10 is assembled, to articulate the leaf 74 to the base 14. The cover 20 has a third knuckle 98, which is located between the knuckles 94. The ends of the bearing sleeves 96 reach sufficiently far through the knuckles 94 to provide a bearing for the knuckle 98. Accordingly, the cover 20 is permanently attached to the leaf 74 by means of this pivot arrangement, which provides for the cover to swing away from the leaf 74, to expose the plate 78, for fixing or adjustment. Alternatively, the cover 20 can be swung over the leaf 74, to cover the plate 78 and associated components.

Locking the Cover

Arrangements are provided for locking the cover closed, thereby protecting the plate 78 from adjustment or tampering, as follows.

The end sections 100 of the sleeves 96, which provide bearings for the knuckle 98, have flats 102. The sections 100 are received in a passage 104 in the knuckle 98. The passage 104 has a circular section 104A and a parallel sided section 104B. Accordingly, the knuckle 98 is constrained to turn about the end sections 100, except when the flats 102 line up with the walls of

the passage section 104B, at which orientation, the cover 20 is free to move perpendicular to the axis 16. This orientation corresponds with the fully closed position of the cover 20.

The end of the leaf member 74, furthest from the axis 16, is stepped at 106 to provide a lip 108 under which a corresponding lip formed in the cover 20 may engage, upon transverse movement of the cover 20 toward the axis 16. The lip 110 on the cover 20 is visible in Fig. 16, for example.

The engagement of the lips 108, 110 holds the cover 20 against pivoting away from the leaf 74, unless the cover 20 is moved transverse to the axis 16, sufficiently to clear the lip 110 from the lip 108. However, transverse movement of this nature is controlled by a spring latch arrangement, which will now be described. A spring member 112 has two yokes 114 which sit around the sleeves 96, in respective gaps between the knuckle 98 and the neighbouring knuckles 94. The yokes 114 are connected by a latch bar 116. A spring finger 118 extends away from the latch bar 116.

The yokes 114 provide some freedom for the bar 116 to turn about the axis 16. The spring finger 118 provides some resistance to this movement by engagement with the cover 20, as follows.

Turning to Figs. 16 and 17, when the cover 20 is moved to the closed orientation, but before being slid transversely to the fully closed position, the knuckle 98 is close to an edge 120 of the leaf member 74. The bar 116 sits above the edge 120. The spring member 112 bears against the inside face of the cover 20 and is relatively strongly flexed, so that the bar 116 is being pressed against the edge 120.

As the cover 20 is slid toward the axis 16, the knuckle 98 moves away from the edge 120, opening a gap 122 (Fig. 18) between the knuckle 98 and

the edge 120. As this gap 122 widens, a point will be reached at which the spring 112 can push the bar 116 into the gap 122. The cover 20 is thereafter prevented from returning in the opposite direction (transverse to the axis 16), being blocked by the presence of the bar 116 between the edge 120 and the knuckle 98. This prevents the cover 20 being slid to release the lips 108, 110 and thus, the cover 20 is locked in the fully closed position of Figs. 18 and 19. Furthermore, as can readily be understood from Figs. 18 and 19, in conjunction with Fig. 2, the lips 108, 110 and the latch bar 116 are inaccessible from the outside of the arrangement, when the window or door is fully closed. This provides a security function in preventing the plate 78 being accessed to adjust it or release it from the window or door.

However, when the door is swung open (by a legitimate user unlocking it), the bar 116 becomes accessible through the gap 122, allowing the bar 116 to be pushed clear of the gap 122, against the action of the spring 112, thereafter allowing the cover 20 to slide away from the axis 16 to clear the lips 108, 110 and thereafter retain the bar 116 out of the gap 122, by abutment with the edge 120. The cover 20 is then free to turn to its open position, allowing access to the plate 78, for adjustment etc.

It is envisaged that correct assembly and installation of the hinge arrangement described above will be facilitated by the provision of the cover 20, permanently mounted to the leaf 74. Once the plate 78 has been attached to the door, it becomes a simple matter to close the cover 20 and move it to its locked position. No additional parts are required to be assembled and consequently, the security of the final arrangement is assured by removing the risk of parts being lost or incorrectly assembled.

Variations and Modifications

It is envisaged that many variations and modifications can be made to the apparatus described above, without departing from the scope of the present invention. In particular, many different sizes and shapes of components could be devised. It is envisaged that the arrangements for spindle adjustment could be used without the arrangements for covering the flag leaf, and vice versa. The provision of two screw holes at opposite ends of the base could be incorporated with any of these combinations, or omitted.

The confinements described above are along straight perpendicular lines. Other arrangements could be used, including curves, to create more complex adjustment.

Whilst endeavouring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

CLAIMS

1. A hinge arrangement comprising:

a first hinge portion having a base supporting a hinge spindle which defines a hinge axis;

the spindle being rotatable about the axis relative to the base and carrying a projection which turns with the spindle, the projection having a rotational symmetry when viewed along the axis and being eccentrically disposed relative to the axis;

first confinement means which confine the axis of the spindle along a line which extends transverse of the axis;

second confinement means which confine the centre of the projection along a second line which extends transverse of the axis;

whereby the hinge spindle is transversely adjustable by rotation of the spindle.

2. An arrangement according to claim 1, wherein the projection has at least one part which is circular when viewed along the axis.

3. An arrangement according to claim 1 or 2, wherein the projection has at least one part which is a regular polygon when viewed along the axis.

4. An arrangement according to any preceding claim, wherein the first confinement means comprises a collar carried by the spindle, the collar cooperating with corresponding surfaces of the base to confine the spindle axis as aforesaid.

5. An arrangement according to claim 4, wherein the collar is rotatable relative to the spindle, and is located within a socket formed in the base, the socket and collar cooperating to provide confinement.

6. An arrangement according to claim 5, wherein the socket and collar have cooperating flat surfaces which move across each other as the spindle moves, and which prevent rotation of the collar, relative to the socket.

7. An arrangement according to any of claims 1 to 3, wherein the first confinement means comprise guide surfaces between which the spindle is confined, the guide surfaces defining the line of confinement.

8. An arrangement according to claim 7, wherein the guide surfaces define a slot in the base, or in a member carried by the base, the spindle being movable along the slot.

9. An arrangement according to any preceding claim, wherein the second confinement means are provided by the walls of a socket in the base, within which the projection is contained.

10. An arrangement according to any of claims 4 to 6, wherein the second confinement means is provided by walls of the collar.

11. An arrangement according to any preceding claim, wherein the spindle has a thread which carries a threaded collar, there being means preventing the threaded collar moving in at least one direction relative to the base and parallel with the hinge axis, whereby rotation of the spindle causes axial movement of the spindle.

12. A hinge leaf arrangement for providing hinged attachment of a door or window to a frame, comprising:

a leaf member;

attachment means operable to attach the leaf member to the door or window;

cover means operable to cover the attachment means after the leaf arrangement has been attached, to prevent access to the attachment means;

and wherein the cover is pivotally mounted on the leaf member, to be movable to and from the closed position while remaining mounted on the leaf member.

13. An arrangement according to claim 12, wherein lock means are provided, operable to lock the cover in position as aforesaid.

14. An arrangement according to claim 13, wherein the lock means are releasable for removal of the cover means, by accessing the lock means at a position which is inaccessible when the door or window is closed in the frame.

15. An arrangement according to claim 14, wherein the lock means includes a resilient catch member which engages as the cover is closed, and which is accessible at the said position to be withdrawn to release the cover.

16. An arrangement according to claim 15, wherein the resilience causes the catch member to enter a catch recess as the cover approaches the closed position, thereafter preventing the cover being opened until the catch member is withdrawn from the catch recess.

17. An arrangement according to any of claims 12 to 16, wherein the cover member is free to move transversely of the pivot axis to reach the closed position.

18. An arrangement according to claim 17, wherein the cover member and leaf member come into mechanical engagement as the cover member moves transversely to the closed position, the mechanical engagement serving to prevent the cover member pivoting relative to the leaf member, and the lock

means serving to prevent the cover member moving transversely away from the closed position.

19. A hinge leaf arrangement for providing hinged attachment of a door or window to a frame, comprising:

a body for mounting to the frame, the body having a recess to receive a pivot shaft arrangement;

a pivot shaft arrangement removably received in the recess to project from the recess to provide a shaft around which another leaf arrangement is received, in use, to form a hinge;

the body being mounted by means of at least two fixing screws, access to at least one fixing screw being obstructed by the pivot shaft arrangement when in its use position, and access to at least one other fixing screw being obstructed by the said other leaf when the hinge is formed.

20. An arrangement according to claim 19, wherein the recess is elongate and generally parallel to the hinge axis, access to the said at least one fixing screw being across the recess, to be obstructed when the pivot shaft arrangement is installed in the recess.

21. An arrangement according to claim 19 or 20, wherein the access is generally perpendicular to the hinge axis.

22. An arrangement according to any of claims 19 to 21, wherein the pivot shaft arrangement is adjustable to set the relative positions of the leaves in the axial direction, the pivot shaft arrangement obstructing access to the said other fixing screw or screws except when at one extreme of its adjustment range.

23. An arrangement according to any of claims 19 to 22 and any of claims 12 to 18.

24. An arrangement according to any of claims 12 to 23 and any of claims 1 to 11.

25. An arrangement substantially as described above, with reference to the accompanying drawings.

26. Any novel subject matter or combination including novel subject matter disclosed herein, whether or not within the scope of or relating to the same invention as any of the preceding claims.

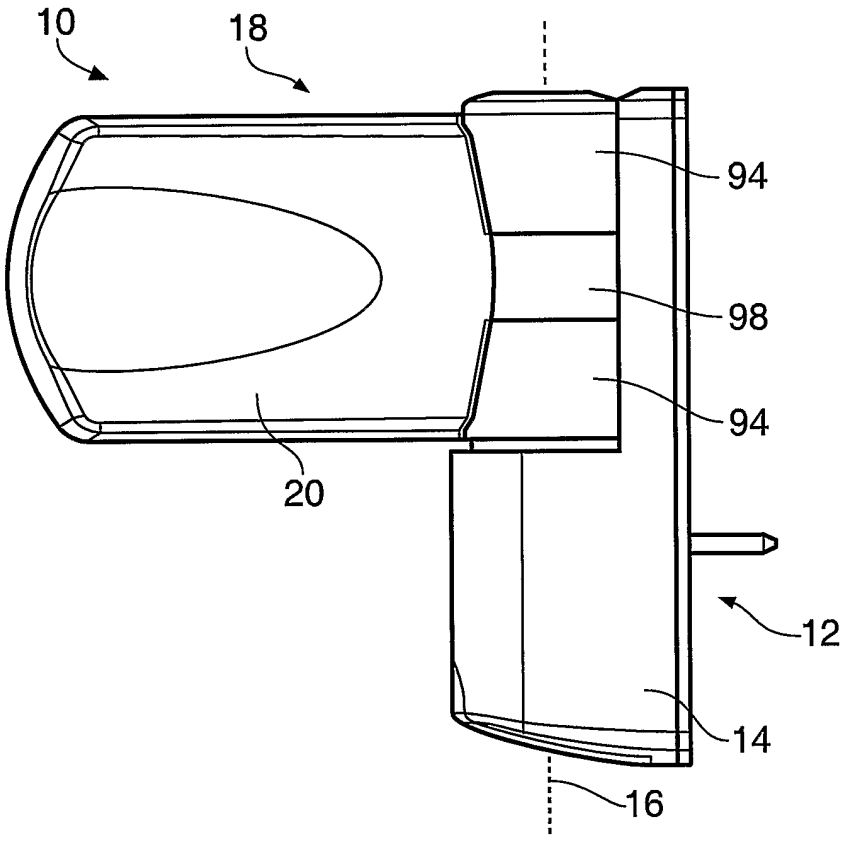


Fig. 1

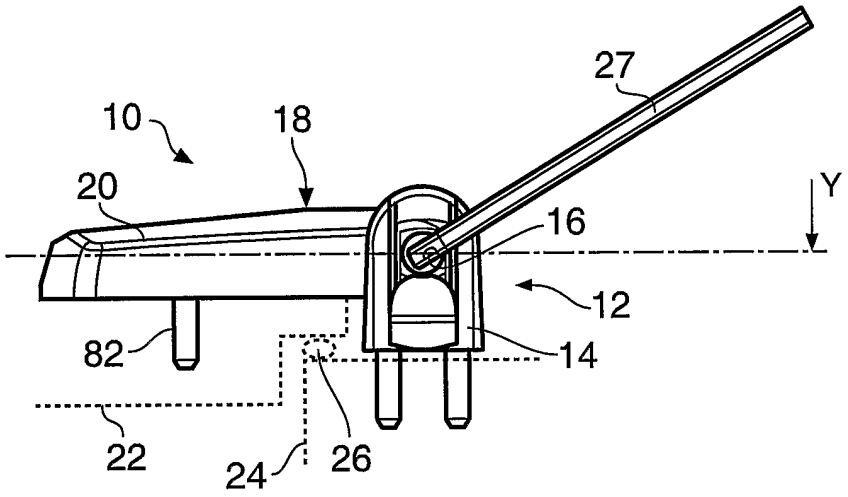


Fig. 2

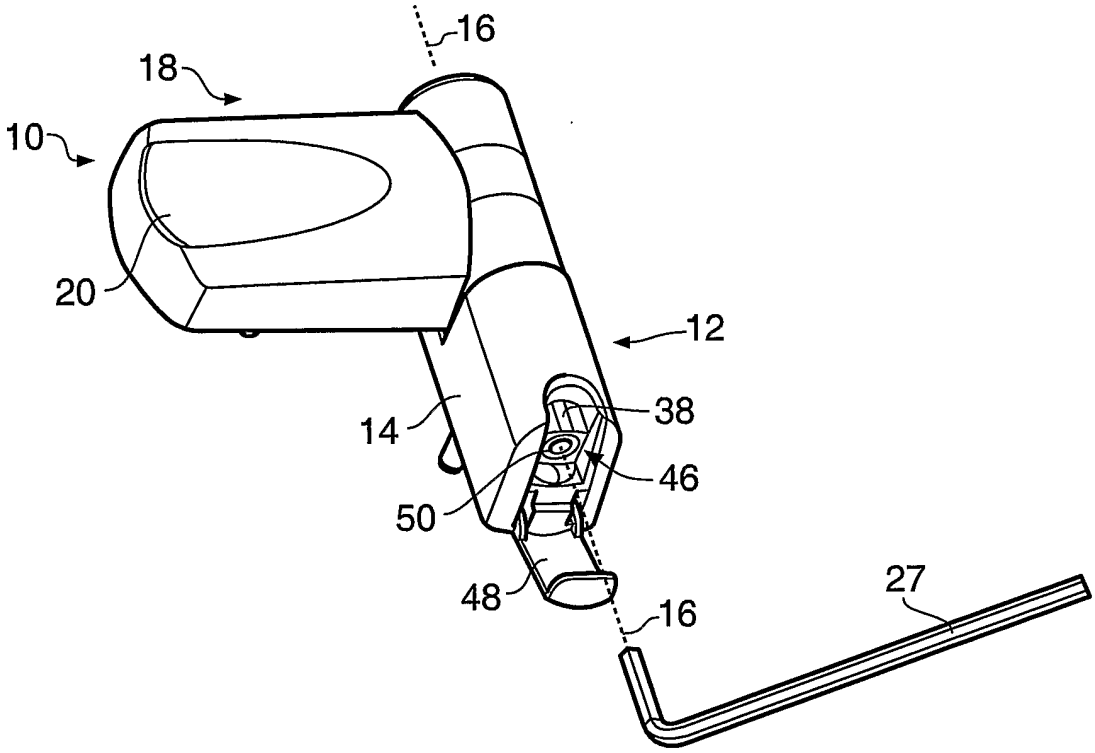


Fig. 3

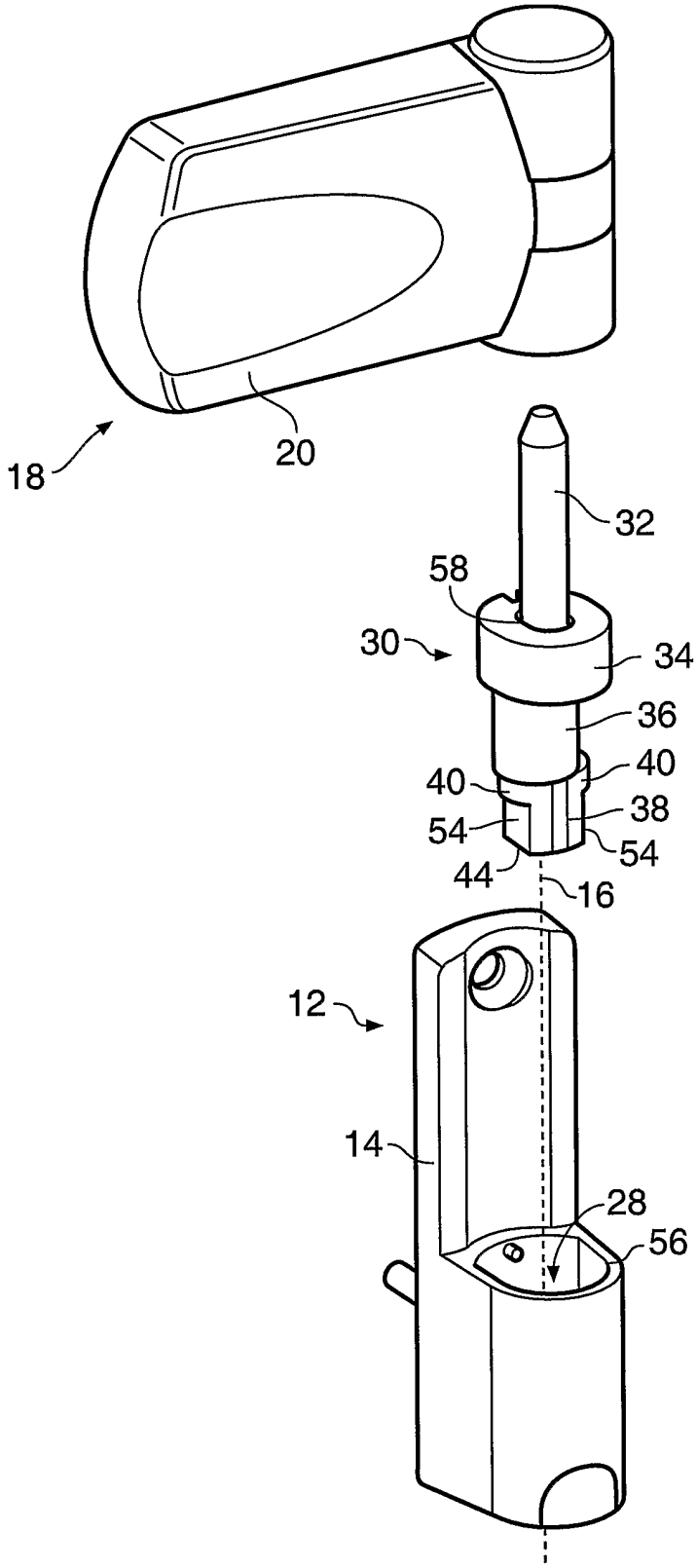


Fig. 4

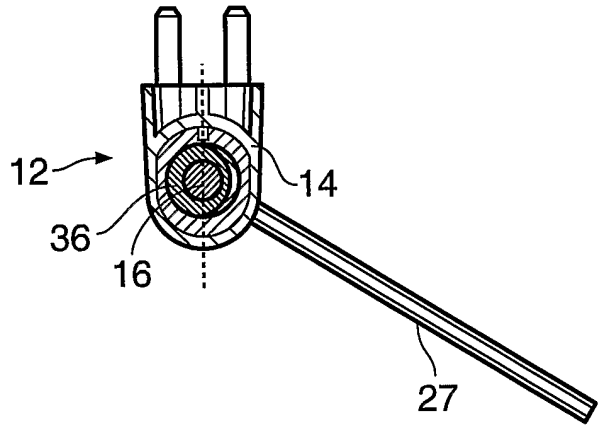

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Fig. 5b

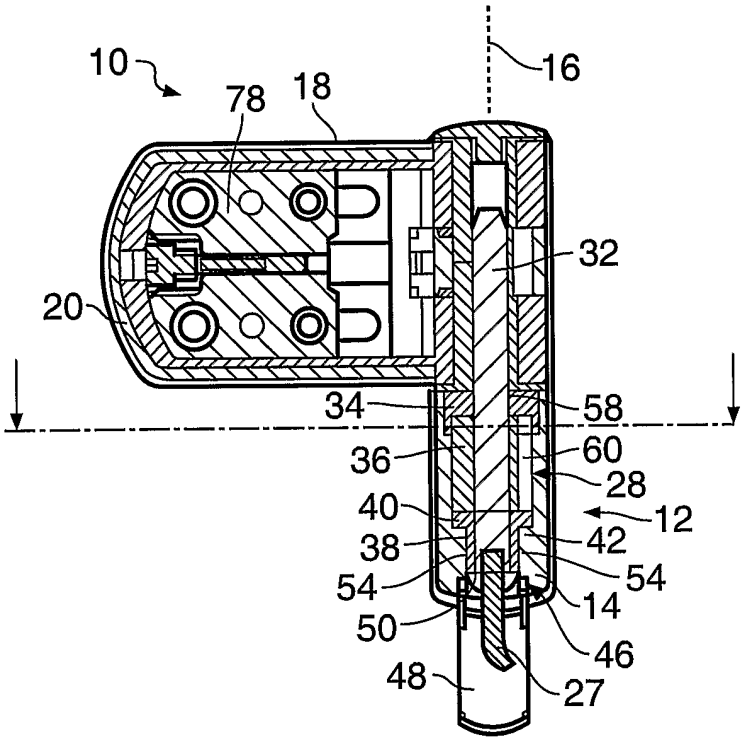

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Fig. 5a

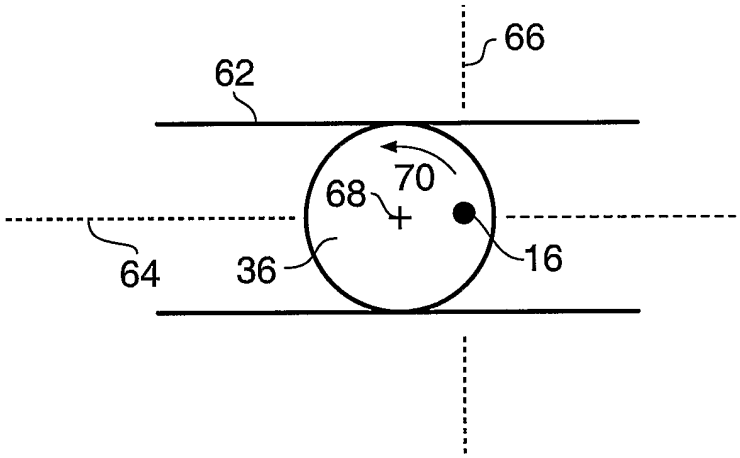


Fig. 6a

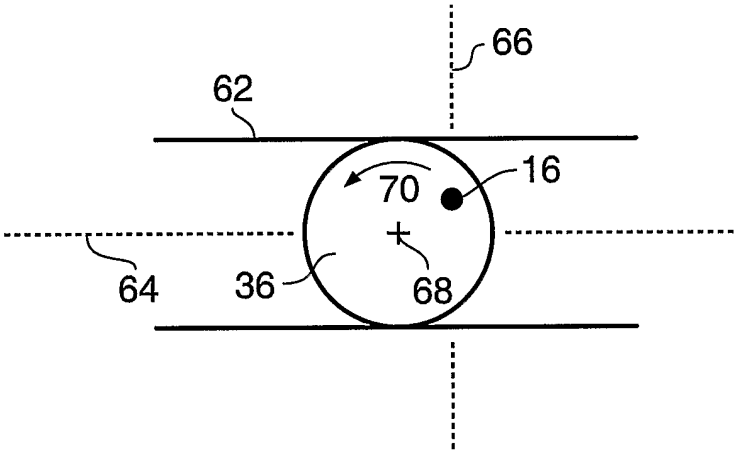


Fig. 6b

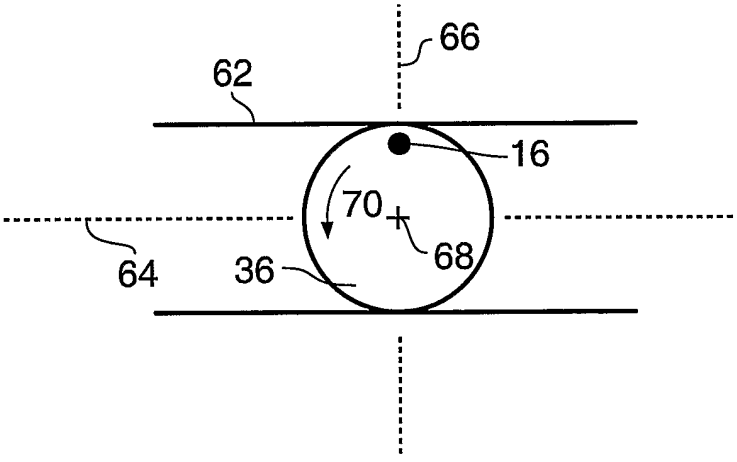


Fig. 6c

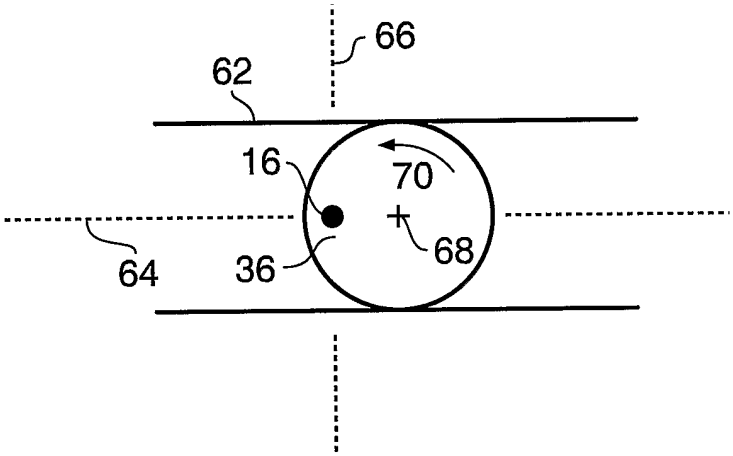


Fig. 6d

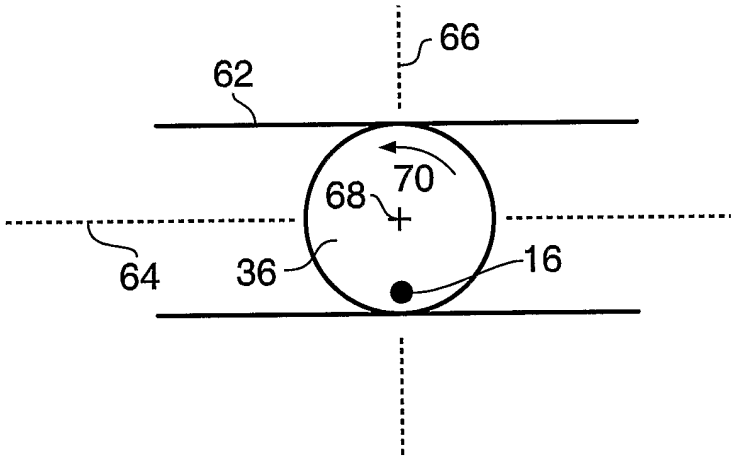


Fig. 6e

Fig. 7b

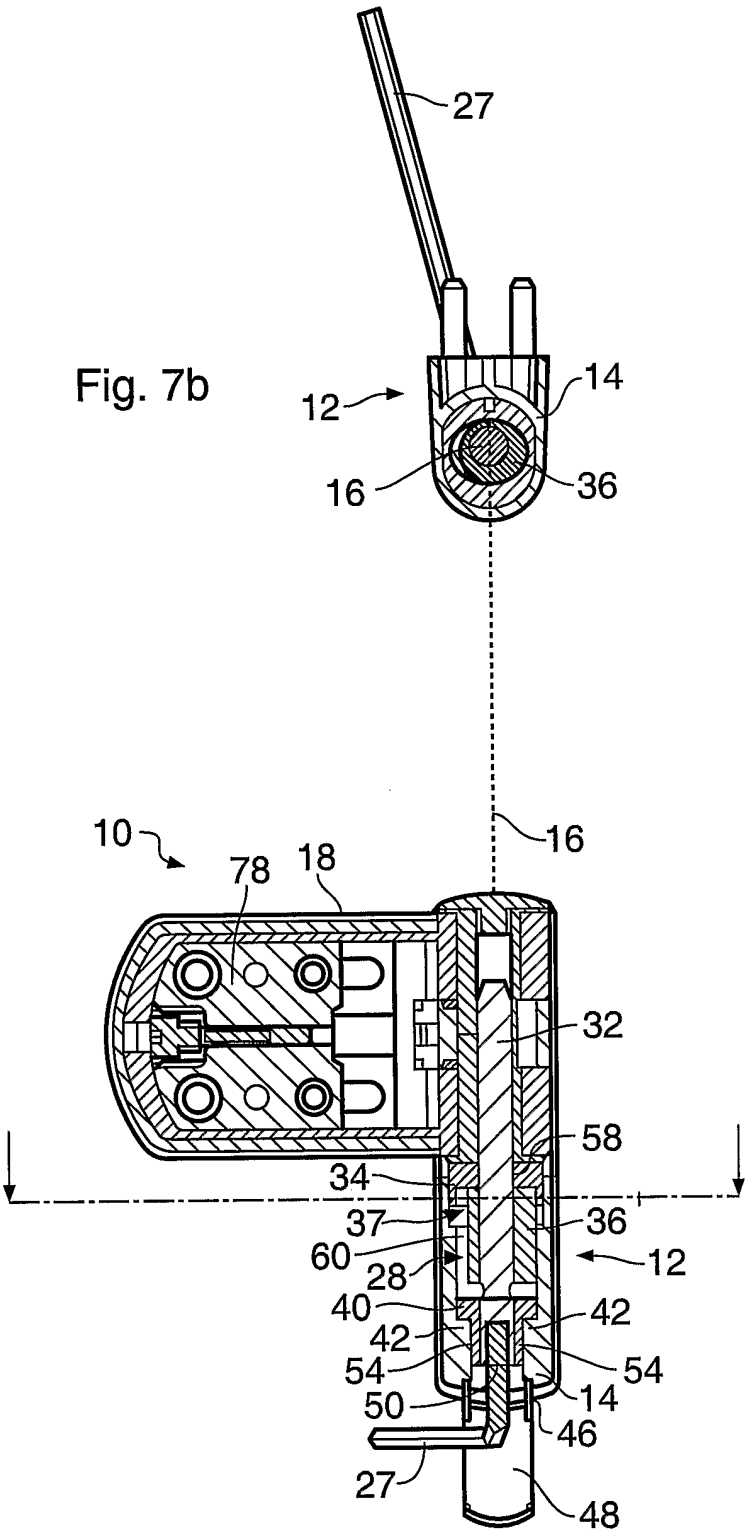
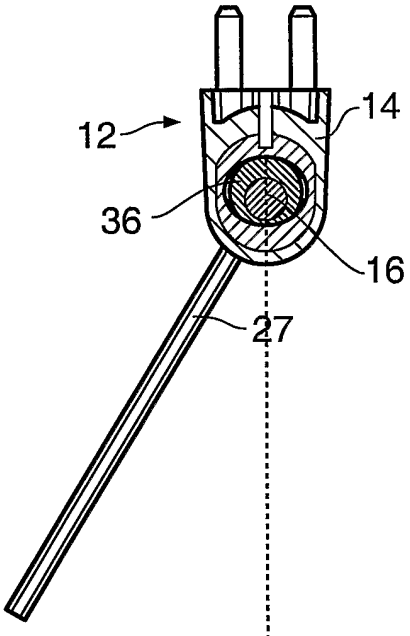

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Fig. 7a

Fig. 8b


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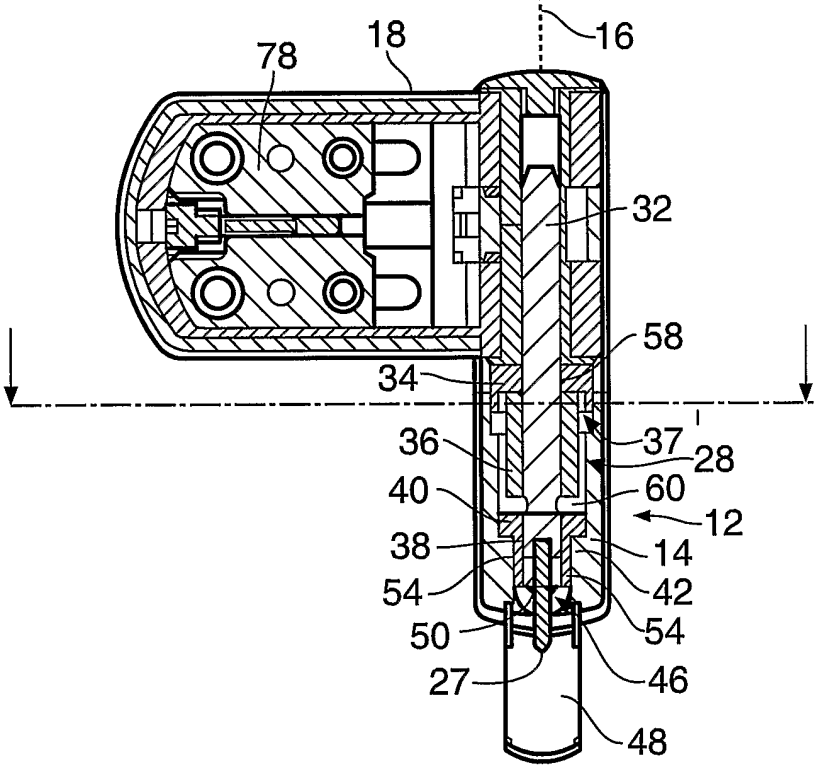
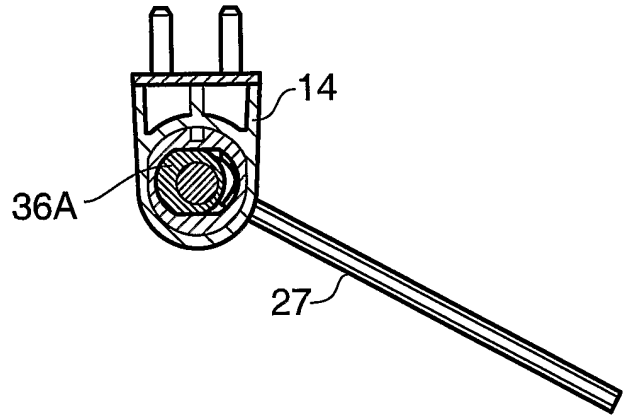

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Fig. 8a

Fig. 9



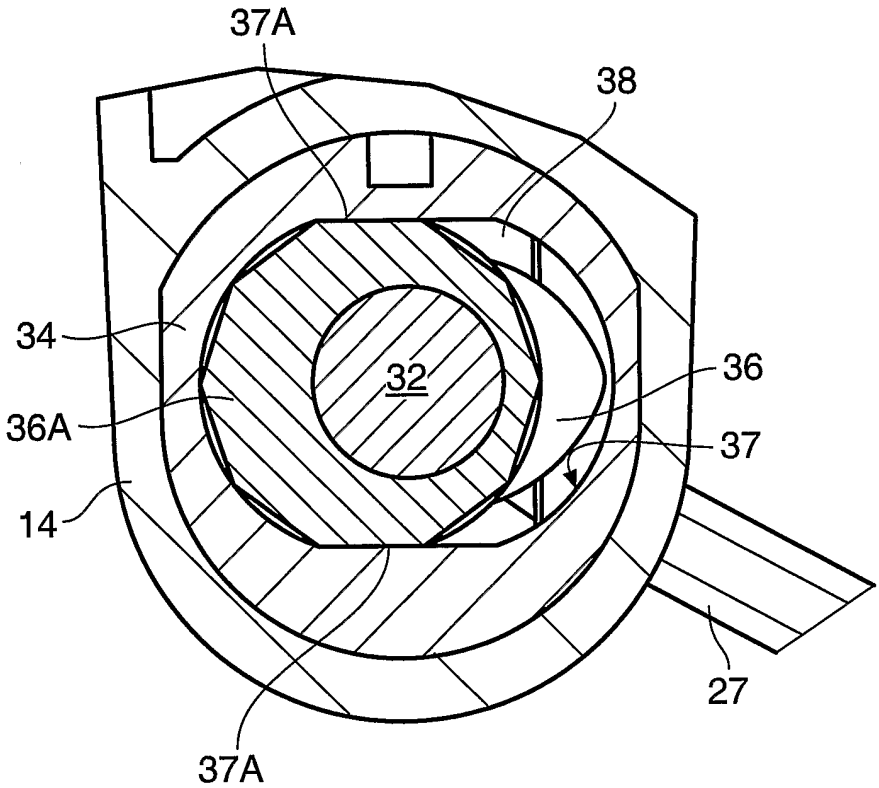


Fig. 10

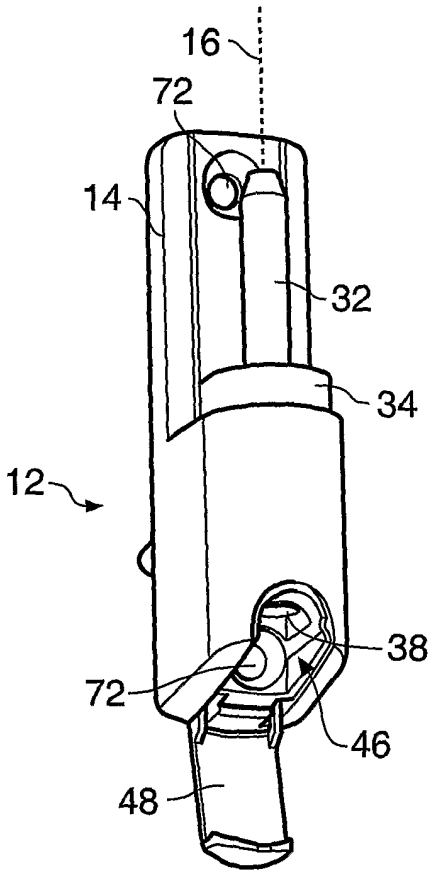


Fig. 11

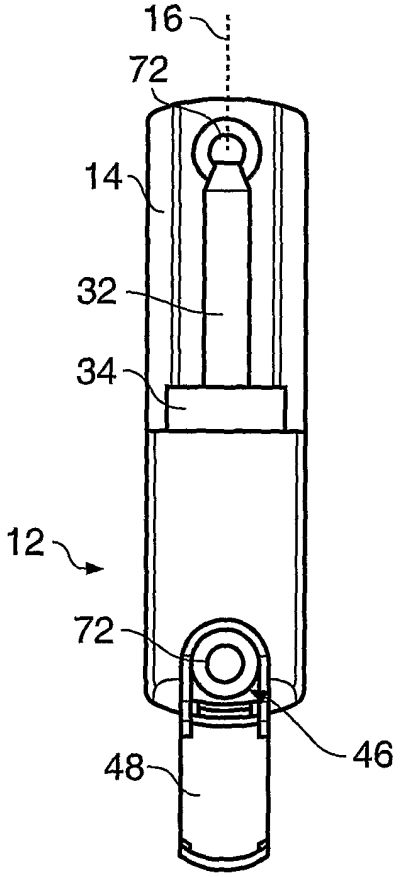


Fig. 12

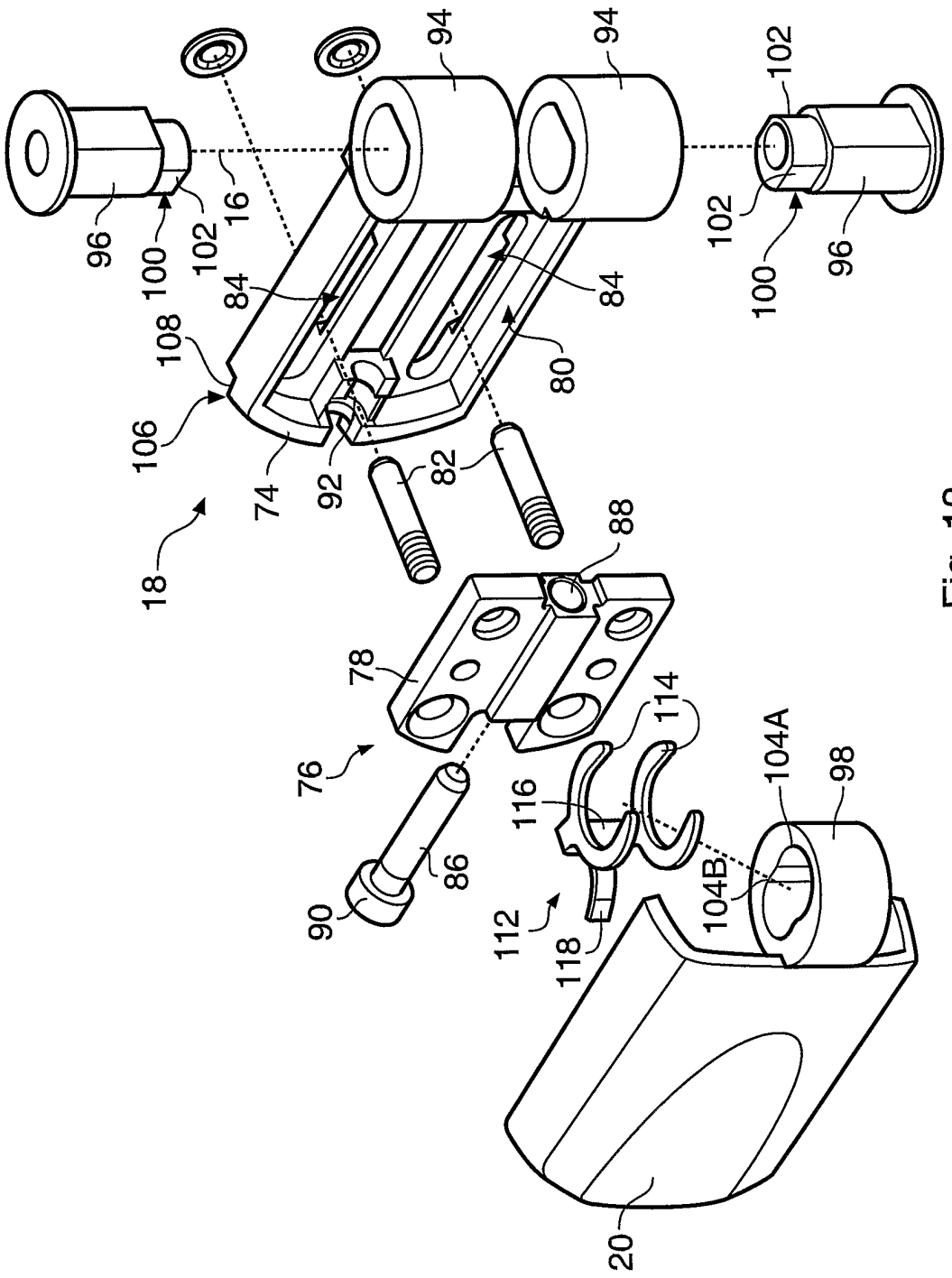

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Fig. 13

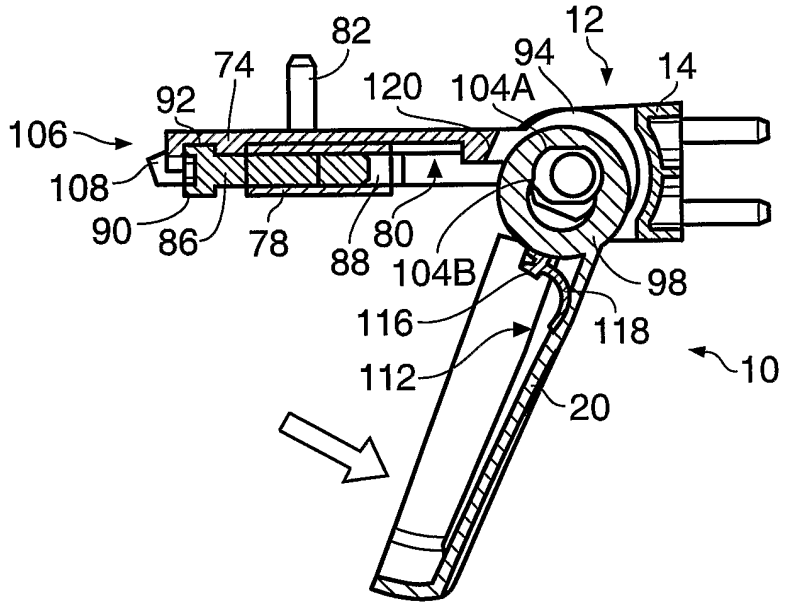

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Fig. 14

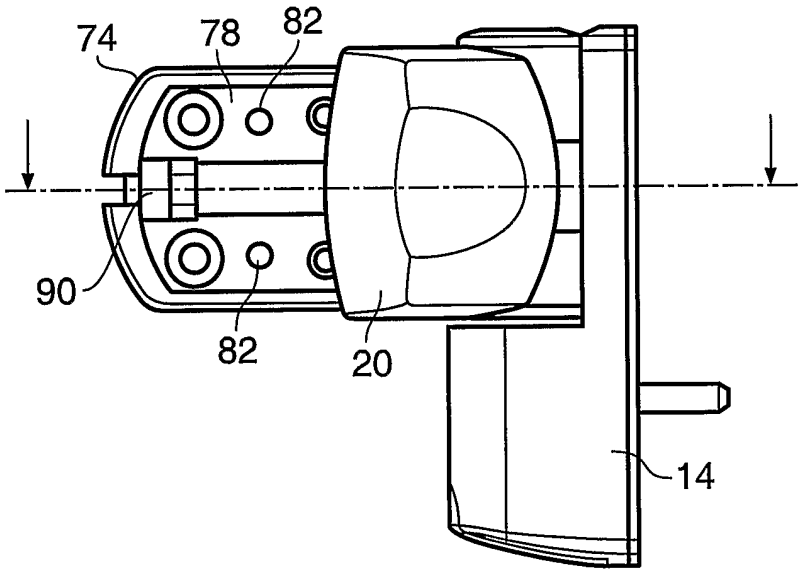

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Fig. 15

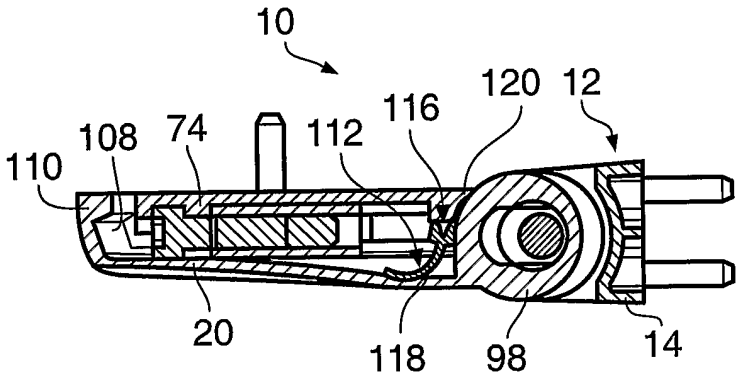


Fig. 16

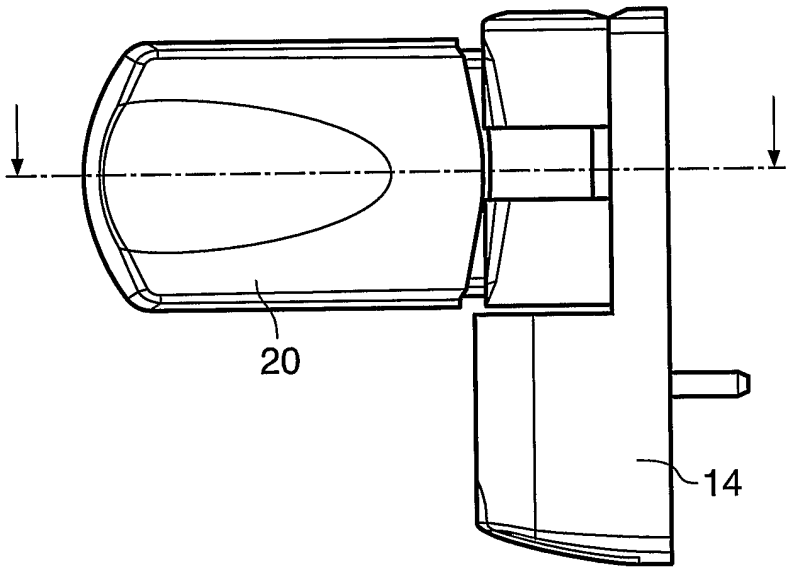


Fig. 17

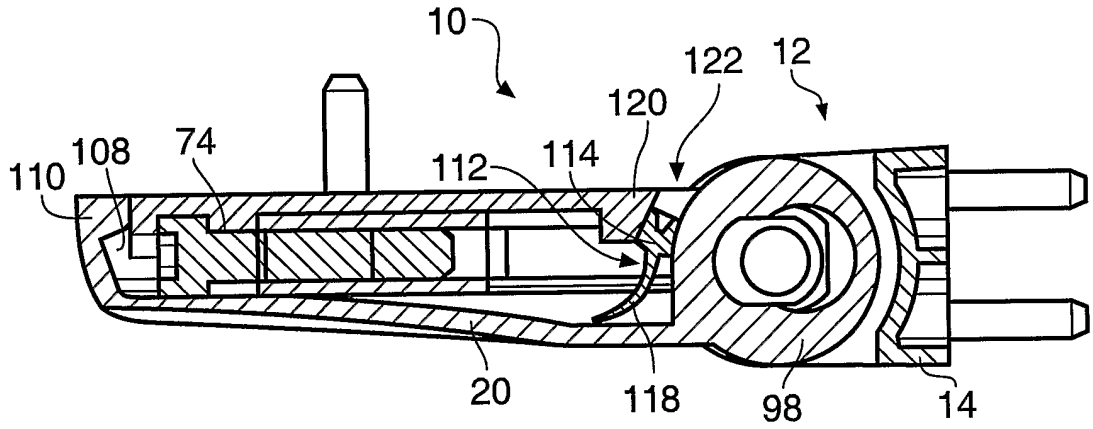


Fig. 18

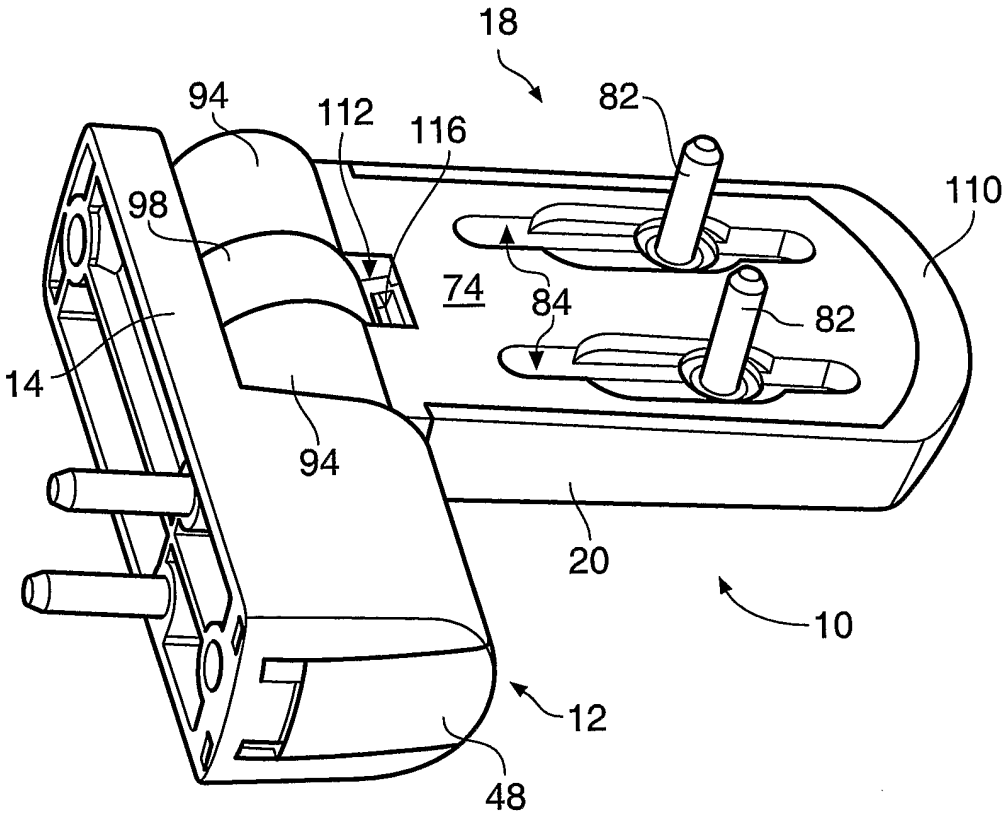


Fig. 19