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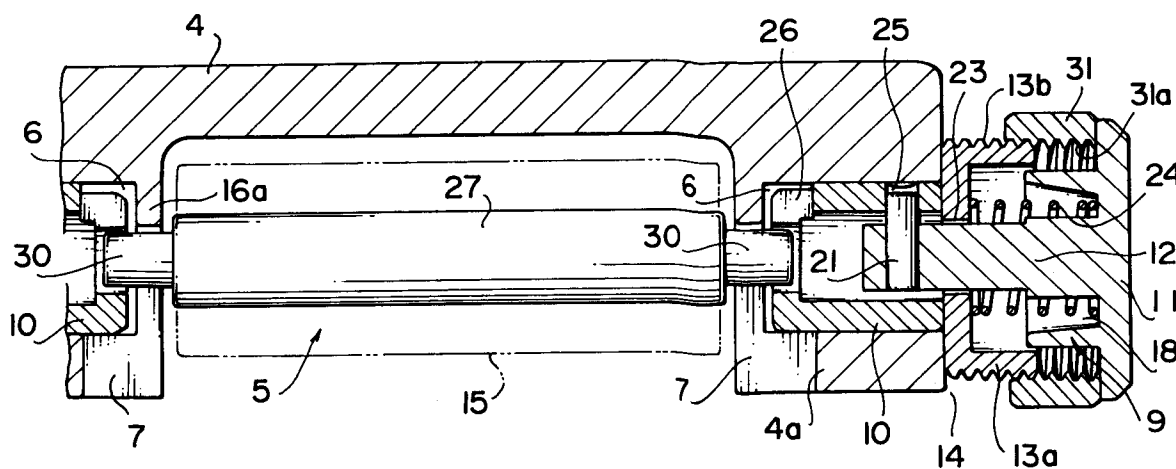
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D-80538 München (DE)(54) **Structure for connecting a band for watch case.**

(57) A band (3) has a pin with a pair of lateral projections (30) at both ends thereof, and a watch case (2) has a pair of supporting projections (4a) formed on each opposite side of the case. Each of the projections has a slit (7) formed at the bottom thereof. A cam tube (10) having a cam groove (25) and a circumferential opening (26) at an inner end portion thereof is rotatably mounted in a through

hole of the supporting projection. A push button (9) is slidably mounted in the through hole, and a pin (21) secured to the push button is slidably engaged in the cam groove so as to rotate the cam tube to confront the circumferential opening of the cam tube with the slit of the supporting projection when the push button is depressed.

**FIG. 14****EP 0 682 300 A1**

The present invention relates to a structure for connecting a band to a watch case, and more particularly to a connecting structure where the band is readily releasable from the watch case for changing the band with another band.

There has been proposed a connecting structure in which a band can be easily detached from a watch case without any special skills and tools, so that an ordinary user can change the band by himself. Hence the user can select a band from a plurality of bands he possesses and easily attach it to the watch case.

Swiss Patent 664663 discloses such a connecting structure of a watch band. In the structure, a watch case has a pair of legs on the opposite peripheral sides thereof, respectively. Each leg has a through hole having a slit opening. The band has an engaging link at the end thereof. A pair of push buttons, each having a shaft slidably mounted in a lateral hole of the engaging link, urged outward by a spring provided in the hole. The shaft of the push button has a large diameter portion at the inner side and a small diameter portion at the outer side of the large diameter portion. The slit openings of the through holes formed in the legs has a width smaller than the diameter of the large diameter portion but larger than that of the small diameter portion.

In a normal state, each push button projects out of the end link by the urging of the spring. As a result, the large diameter portion of the shaft engages with the through hole of the legs, unable to slip out through the opening. Thus the watch case and the band are securely engaged.

When the push buttons are depressed, sliding the shaft inward, the smaller diameter portion of each shaft enters the through hole. Since the small diameter portion is smaller than the opening, the shaft can be disengaged from the through hole passing through the opening. Hence the watch band can be easily released from the case, enabling the user without any skills nor tools to exchange the band.

However, since the large diameter portion of the push button must be able to slide in the through hole of the engaging link and the leg, the thicknesses thereof inevitably increase. Moreover, the opening formed in the legs also renders the thickness of the leg to be increased to maintain the rigidity of the leg. In addition, it is necessary to construct the engaging link in a shape totally different from that of the rest of links forming the band, so that the connecting portion of the band and the watch case has a mismatching appearance. Furthermore, due to the complicated construction, the band becomes expensive. If the user wishes to own various bands which can be attached to the watch case, he must incur a large

cost.

Japanese Patent Application Laid-Open 1-99504 discloses a watch in which a watch band can be removed from a buckle for displaying the watch in a showcase. A cover of the buckle has a plurality of holes on each longitudinal side thereof, each hole having a slit opened to the lower edge of the cover. At the end of the band is attached a pin having at each end, a rectangular engaging projections inclined in one direction with respect to the longitudinal direction of the band. When the band is held at a certain angle to the buckle, the projection can be inserted into the slit of one of the holes from the short side of the rectangular projection, thus engaging the pin with the buckle. The band is rotated about the pin, thereby rotating the projection so that the long side of the projection confronts the slit. Thus the pin cannot be disengaged from the hole.

However, the rotation of the projection is prevented only by the tension of the band which is generated when worn. Hence the projections may easily disengage from the hole, thereby causing the watch to fall off during use.

An object of the present invention is to provide an inexpensive but reliable structure for easily connecting a band to a watch case without deteriorating the appearance of the watch, so that the band can be readily exchanged without using any special skills or tools.

According to the present invention, there is provided a structure for connecting a band to a watch case, the band having a pair of lateral projections at both ends thereof, the watch case having a pair of supporting projections formed on each opposite side of the case, each of the projections having a pair of lateral holes, characterized in that at least one of the supporting projections has a slit formed at a bottom thereof, cam means having an opening is rotatably mounted in the hole, a push button is slidably mounted in the hole, and operatively engaged with the cam means so as to rotate the cam means to confront the opening of the cam means with the slit of the supporting projection when the push button is depressed, whereby the lateral projections of the band can be removed from the slit.

These and other objects and features of the present invention will become more apparent from the following detailed description with reference to the accompanying drawings, in which

Fig. 1 a plan view of a watch case and a band of the present invention as viewed from the back;

Fig. 2 is a sectional view showing a connecting portion of the watch case and the band;

Fig. 3 is a plan view of the connecting portion as viewed from the back;

Fig. 4 is an elevational view showing an end portion of a push button provided in the watch case of the present invention;

Fig. 5 is a sectional view of the push button taken along a line A-A of Fig. 4;

Fig. 6 is an elevational view of a cylindrical member provided in the watch case of the present invention;

Fig. 7 is a sectional view of the cylindrical member taken along a line B-B of Fig. 6;

Fig. 8 is a elevational view of a cam tube provided in the watch case of the present invention;

Fig. 9 is a sectional view of the cam tube taken along a line C-C of Fig. 8;

Fig. 10 is an illustration of the cam tube as viewed from the inner end thereof;

Fig. 11 is a sectional view of the watch case taken along a line D-D of Fig. 3;

Fig. 12 is a sectional view of the cam tube in a normal state where a slit is closed;

Fig. 13 is a sectional view of the cam tube in operation where the slit is opened;

Fig. 14 is a sectional view showing a connecting portion of a watch case and a band in a second embodiment of the present invention;

Fig. 15 is a sectional view of a watch case according to a third embodiment of the present invention; and

Fig. 16 is a sectional view of a watch case according to a third embodiment of the present invention.

Referring to Figs. 1 to 3, a watch 1 of the present invention comprises a watch case 2 having a back 8 and a pair of bands 3 detachably attached on the opposite peripheral sides of the case 2.

The case 2 has a pair of lugs 4 at the opposite sides for attaching the bands 3. Each lug 4 has a pair of supporting projections 4a on the underside thereof and a recess 5 between the projections 4a. An end link 15 of the band 3 can be inserted in the recess 5. A pair of through holes 6 are formed in each projection 4a in the lateral direction of the band 3 and extending from the side surfaces of the projection 4a to the recess 5 as shown in Figs. 2 and 3. The diameter of each through hole 6 at the inner end thereof is small, whereas the diameter at the outer end is large, forming a large diameter portion 14. An annular seat 16 is formed at the inner end of the large diameter portion 14. As shown in Figs. 3 and 11, the back of the projection 4a is further cut out to form a pair of slits 7, each of which communicating with the recess 5 and the hole 6. The slit 7 is inclined toward the center of the case 2 as shown in Fig. 11.

A push button 9 to be inserted in each hole 6 of the projection 4a comprises a head 11 adapted to project out of the projection 4a, and a shaft 12

integral with the head 11. As shown in Figs. 4 and 5, an annular groove 18 is formed in the head 11, thereby forming a peripheral wall 17. The shaft 12 has an end portion 19, the periphery of which is parallelly cut to form a pair of opposite side faces 19a. A hole 20 is further formed in the end portion 19 of the shaft 12 wherein a guide pin 21 is to be inserted as will be later described. The push button 9 is inserted in a cylindrical member 13 and a cam tube 10.

Referring to Figs. 6 and 7, the cylindrical member 13 having a slightly smaller diameter than the large diameter portion 14 of the hole is adapted to fit therein so that a bottom 22 of the cylindrical member 13 may rest on the seat 16. The cylindrical member 13 has an oblong hole 23 formed in a shape corresponding to the section of the end portion 19 of the push button 9, the area of which being slightly larger than the sectional area of the end portion 19, hence permitting the insertion thereof. In this manner, the shaft 12 and hence the push button 9 is prevented from rotating in the cylindrical member. The end portion 19 of the shaft 12 which projects out of the cylindrical member 13 extrudes into the cam tube 10. As shown in Fig. 2, a coil spring 24 is provided in the groove 18 between the head 11 of the push button 9 and the bottom 22 of the cylindrical member 13, surrounding the shaft 12. Since a part of the coil spring 24 is disposed in the annular groove 18 inside the head 11, the length of the push button 9 can be reduced, and as a result, the width of the end link 15 and the lug 4 can be reduced.

Referring to Figs. 8 and 9, the cam tube 10, having a diameter slightly smaller than the inner diameter of the hole 6, has an oblong cam groove 25 formed on the periphery thereof. The groove 25 is extends roughly in the axial direction of the cam tube 10, but also inclined that an outer end a and an inner end b thereof are 45 degrees apart from each other with respect to the circumference of the cam tube as shown in Fig. 10. An end portion of the guide pin 21 is slidably engaged with the cam groove 25 while the other end thereof is engaged in the hole 20 of the end portion 19 of the push button 9, thereby operatively connecting the push button 9 and the cam tube 10. Namely, when the shaft 12 slides inward into the cam tube 10, the guide pin 21 slides along the cam groove 25 from the outer end a to the inner end b, thereby rotating the cam tube 10 45 degrees.

As shown in Figs. 8 to 10, a half of the circumferential periphery of the cam tube 10 is cut away at the inner end portion thereof, forming an opening 26. In the end wall of the cam tube 10, a semicircular groove 26a is formed. The opening 26 and the groove 26a are so designed that the circumferential center thereof confronts the inner end

b of the groove 25.

The thus assembled push button 9, cylindrical member 13 and the cam tube 10 are inserted in each hole 6 of the lug 4. Upon assemblage, the push button 9 is so disposed as to project the head 11 out of the cylindrical member 13 as shown in Fig. 2, and the cam tube 10 is so positioned as to close the slit 7 by the periphery thereof as shown in Fig. 12. Whereas as the cylindrical member 13 is securely fixed in the projection 4a, the cam tube 10 is rotatably mounted therein. However, the cam tube 10 is held between the cylindrical member 13 and an inner wall 16a of the projection 4a, so as to be prevented from moving in the lateral direction of the band. Since the end portion 19 of the shaft 12 engages with the oblong hole 23 of the cylindrical member 13, the push button 9 is prevented from rotating.

As shown in Fig. 2, the end link 15 of the band 3 is provided with a lateral pin 27 for connecting the band 3 to the projection 4a. The pin 27 has a small diameter portion 28 at the middle on which a packing 29 is mounted. When the pin 27 is inserted in a hole (not shown) of the end link 15, the packing 29 is radially compressed against the walls of the hole. The frictional force of the packing 29 thus prevents the pin 27 from slipping out of the end link 27.

The pin 27 further has projections 30 at opposite ends thereof. The projection 30 is adapted to be inserted in the slit 6 formed in the projection 4a.

In order to attach the band 3 to the case 2, each push button 9 on either side of the projection 4a is depressed at the head 11. As the shaft 12 of the push button 9 is moved inward, the guide pin 21 on the end portion 19 thereof engaged with the cam groove 25 slides along the groove 25 from the outer end a toward the inner end b in Fig. 8, causing the cam tube 10 to rotate 45 degrees in a direction c in Fig. 13. Accordingly, opening 26 of the cam tube 10 coincides with the slit 7 so as to form a gap in the underside of the projection 4a. Each projection 30 of the band 3 is inserted into the hole 6 and the groove 26a of the cam tube 10 passing through the slit 7 and the opening 26 as shown in Fig. 2.

When the push button 9 is released, the coil spring 24 urges the push button 9 to its initial position, thereby causing the pin 21 to slide back to the inner end a of the groove 25. The cam tube 10 is consequently rotated to the position shown in Fig. 12, thereby closing the slit 7 by the periphery of the cam tube 10. Hence each projection 30 of the pin 27 is securely held in the projection 4a.

The push buttons 9 may happen to be accidentally depressed when worn. However, each slit 7 is designed to incline toward the watch case

2 as the slit extend downward to prevent the band 3 from releasing. More particularly, the band is tensed by the compressed wrist of the wearer in a horizontal direction opposite to the inclination of the slit 7, the pin 27 is urged to the right in Fig. 13. Thus, the pin 27 does not slip out through the slit 7.

A push button locking mechanism as a more reliable means is provided for preventing the above described accidents is provided in the second embodiment shown in Fig. 14.

Referring to Fig. 14, a cylindrical member 13a is secured to the outside of the case 2 and a screw thread 13b is formed on the periphery of the cylindrical member. A lock ring 31 having an inner screw thread 31a is screwed on the screw thread 13b of the cylindrical member 13a. In the embodiment described in Fig. 14, the pin 27 is not provided with the packing 29 of the first embodiment. Instead, the pin is fitted in the hole of the end link 15 by press fit, or by press fit adherence.

In a band connecting state when the push button 9 is not operated, the lock ring 31 is positioned at the outer most position where the outer end face thereof abuts against the inner surface of the head 11 of the push button 9 as shown. Thus the push button 9 cannot be depressed. When operating the push button 9, the lock ring 31 is rotated, thereby moving the ring toward the projection 4a. As a result, a space is formed between the outer end face of the ring 31 and the head 11, enabling depression of the push button 9. The other constructions and operations are the same as those of the first embodiment.

Referring to Fig. 15 showing the third embodiment of the present invention, push buttons 9a are completely hidden inside a projection 4b of the watch case. Namely, each cylindrical member 13c is completely embedded in the projection 4b so that a head 11a of the push button 9a is inserted even during the band connecting state. Such a watch has an improved appearance, and furthermore, there is no danger of the push button 9a being accidentally depressed. However, the push buttons 9a cannot be reached with the fingers. Hence it is necessary to use a simple tool such as a ball pen to depress a head 11a of the push button 9a in order to exchange the band.

In the fourth embodiment shown in Fig. 16, a lower portion of a projection 4c of the watch case is cut away at each end to expose a portion of a push button 9b. Hence, although a head 11b of the push button 9b is concealed from view when worn on a wrist, giving the watch a good appearance, the head 11b is easily accessible with the fingers from the back of the watch when operating the push button 9b.

The presently described embodiments all have push buttons at both sides of the lug, so that the pin of the watch band can be attached or released when both push buttons are intentionally depressed by the user. Hence there is little risk of the watch falling from wrist when worn.

However, the present invention may be modified to provide the push button only on one side of the lug. In order to attach the band to such a case, one of the projections 30 of the pin 27 is inserted in the hole 6 formed at one of the sides of the lug without the push button. The push button 9 on the other side is then depressed, thereby opening the slit 7 by the rotation of the cam tube 10 so that the other projection 30 of the pin 27 can be inserted. The hole 6 which is not provided with the push button need not be a through hole and is sufficient as long as the depth thereof is large enough to hold the projection 30. Such a structure renders it possible to reduce the numbers of the manufacturing processes and the parts of the watch, thereby decreasing the manufacturing cost.

The present invention may be applied to a watch having a pair of legs, instead of the lug 4, disposed apart from each other a distance corresponding to the width of the watch band.

In the case of a leather watch band, it is not necessary to provide an end link where the pin 27 is to be inserted. An end portion of the band can be simply folded so that the pin 27 is inserted in the folded portion.

From the foregoing, it will be understood that the present invention provides a structure for connecting a band to a watch case wherein the band can be easily attached and detached just by operating push buttons. Hence an ordinary user without special skills nor tools can easily exchange the band when the band is damaged, or when the user desires to change the band simply for the sake of the band design. The user is thus able to enjoy wearing the same watch with various bands. The band cannot be released from the case without operating the push buttons so that there is no danger of the watch falling off from the wrist.

Moreover, the band need not be equipped with any special member except the projections at the end thereof, so that the construction of the band is simplified. Hence, there is no difference between the end link and the rest of the links comprising the band, improving the appearance of the watch. In addition, the manufacturing cost of the band can be reduced, so that the user is able to purchase various bands.

Compared to the conventional structure where the push button comprises a large diameter portion and a small diameter portion which are inserted in the legs of the watch case, the thicknesses of the legs and the end link of the band can be de-

creased, thereby improving the appearance of the watch.

Claims

1. A structure for connecting a band (3) to a watch case (2), the band having a pair of lateral projections (30) at both ends thereof, the watch case having a pair of supporting projections (4a) formed on each opposite side of the case, each of the projections having a pair of lateral holes (6), characterized in that
 - at least one of the supporting projections has a slit (7) formed at a bottom thereof,
 - cam means (10, 25) having an opening (26) is rotatably mounted in the hole (6);
 - a push button (9) is slidably mounted in the hole (6), and operatively engaged with the cam means so as to rotate the cam means to confront the opening (26) of the cam means with the slit (7) of the supporting projection when the push button is depressed, whereby the lateral projections of the band can be removed from the slit.
2. The structure according to claim 1 wherein the slit is inclined downwardly toward a center of the watch case.
3. The structure according to claim 1 wherein locking means (13a, 31) is provided for locking the push button.
4. The structure according to claim 1 wherein the push button is disposed inside the supporting projection.
5. The structure according to claim 1 where the cam means comprises a cam tube (10) having a cam groove (25), and the push button (9) has a pin (21) slidably engaged with the cam groove.
6. The structure according to claim 1 wherein the push button has a head (11) projecting out of the hole, a shaft (12) having a smaller diameter than the head, and an annular groove formed in the inner side of the head, and a spring (24) is provided in the groove surrounding the shaft to urge the head and the shaft to the outside.
7. The structure according to claim 3 wherein the locking means comprises a cylindrical member (13a) fixedly mounted on the watch case (2), the cylindrical member having an outer screw thread (13b) on the periphery thereof, and a lock ring (31) having an inner screw thread (31a) is engaged with the outer screw thread of

the cylindrical member at the screw threads
(13b, 31a).

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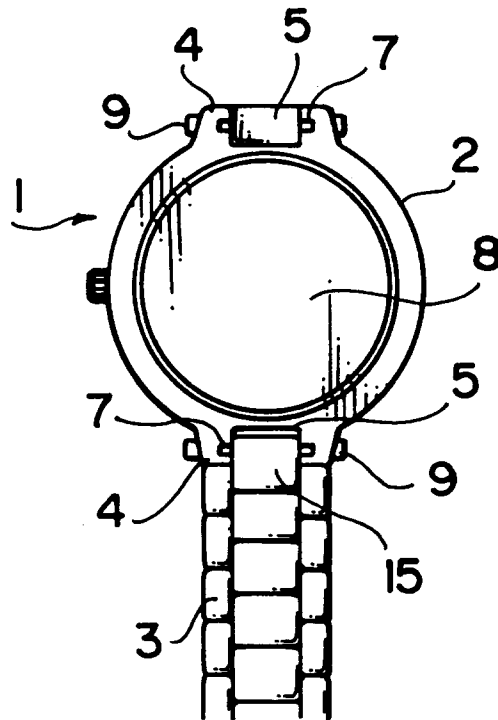


FIG. 1

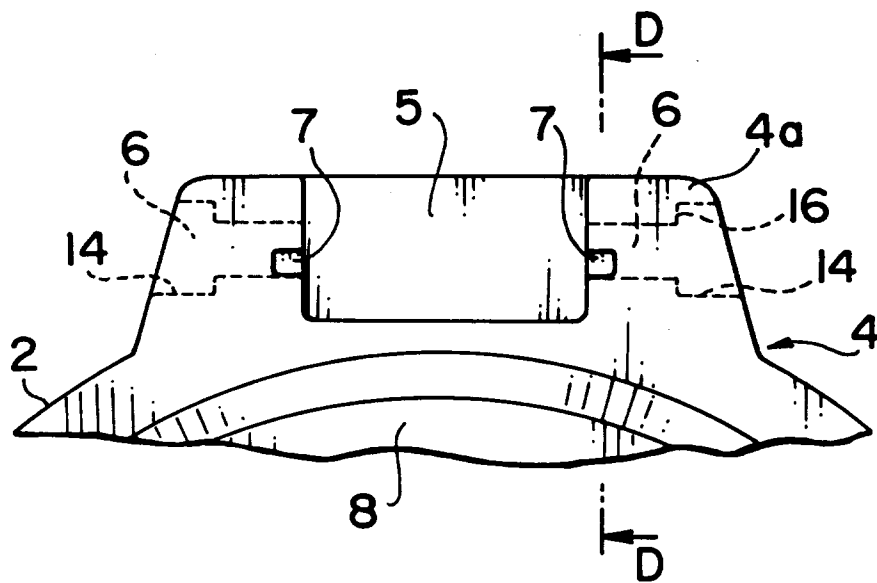


FIG. 3

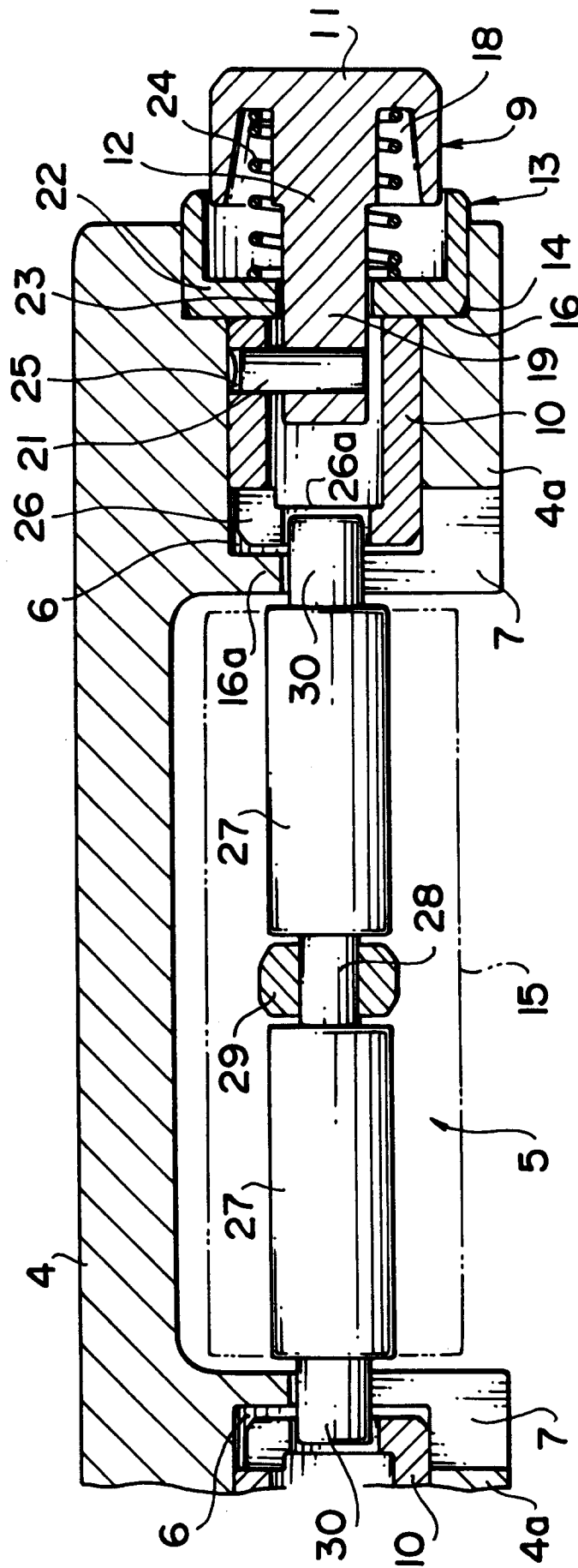


FIG. 2

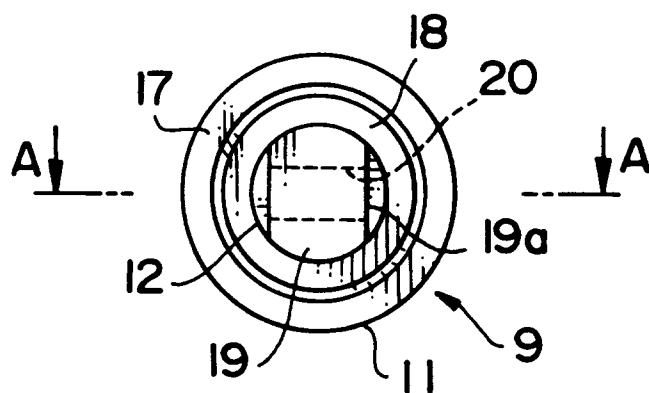


FIG. 4

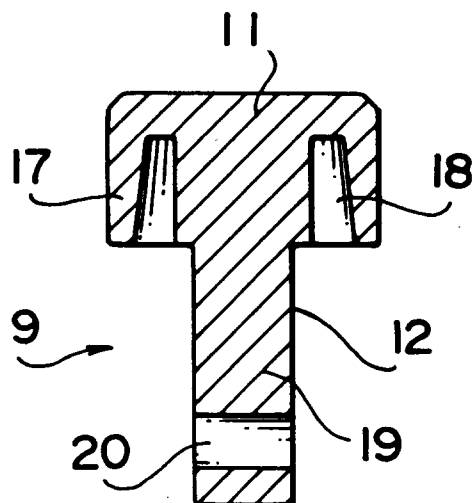


FIG. 5

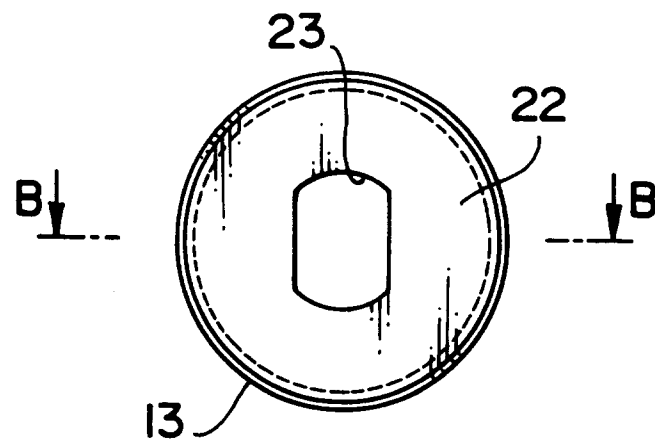


FIG. 6

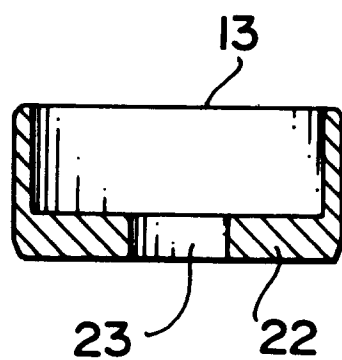


FIG. 7

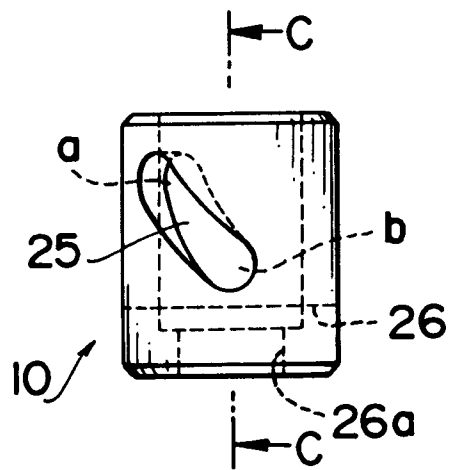


FIG. 8

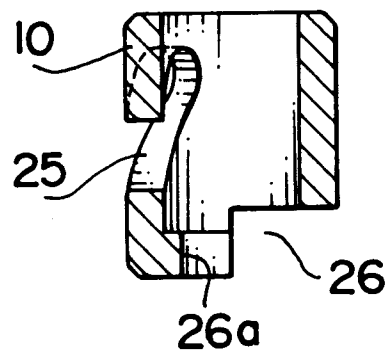


FIG. 9

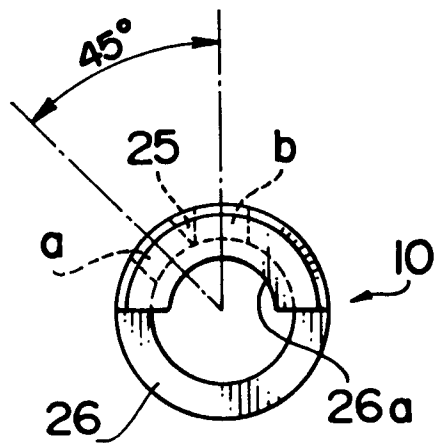


FIG. 10

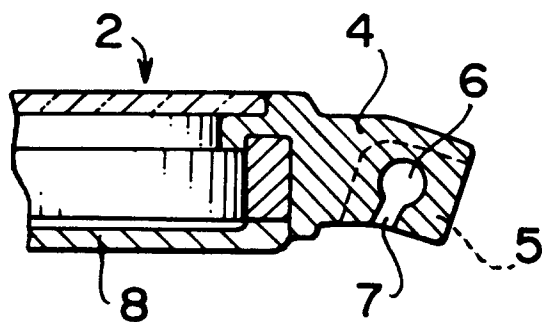


FIG. 11

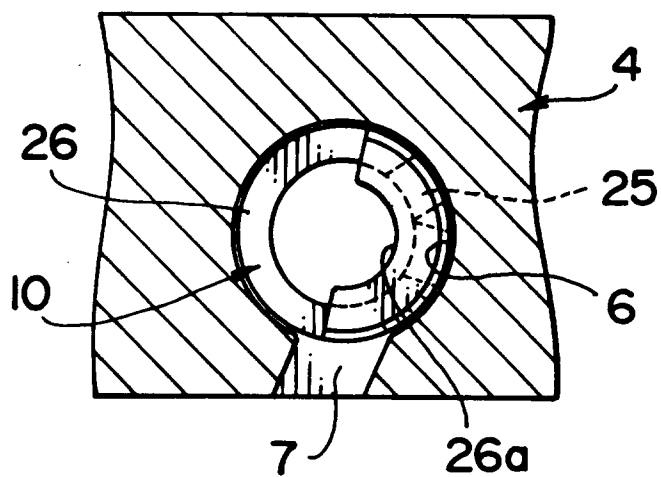


FIG. 12

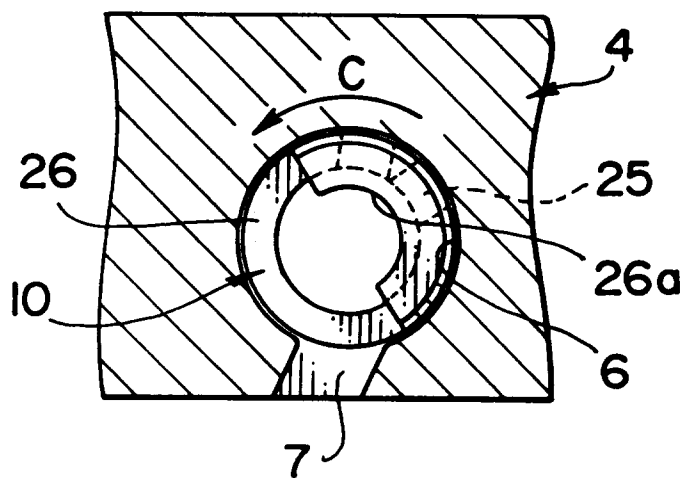


FIG. 13

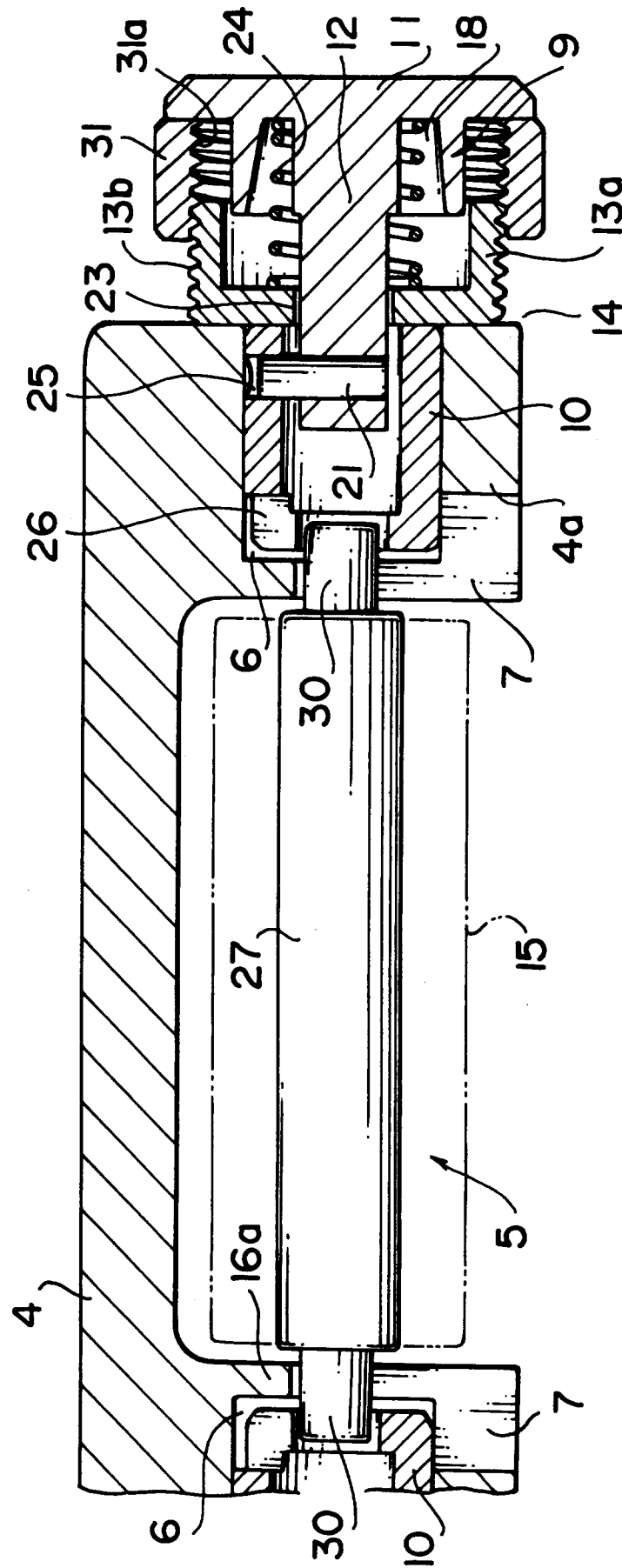


FIG. 14

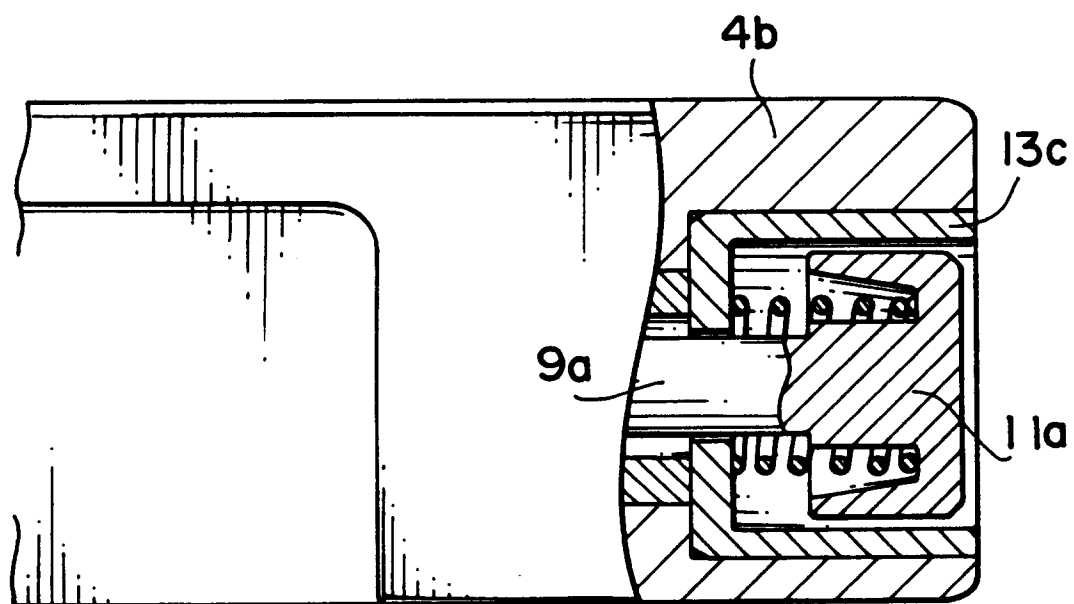


FIG. 15

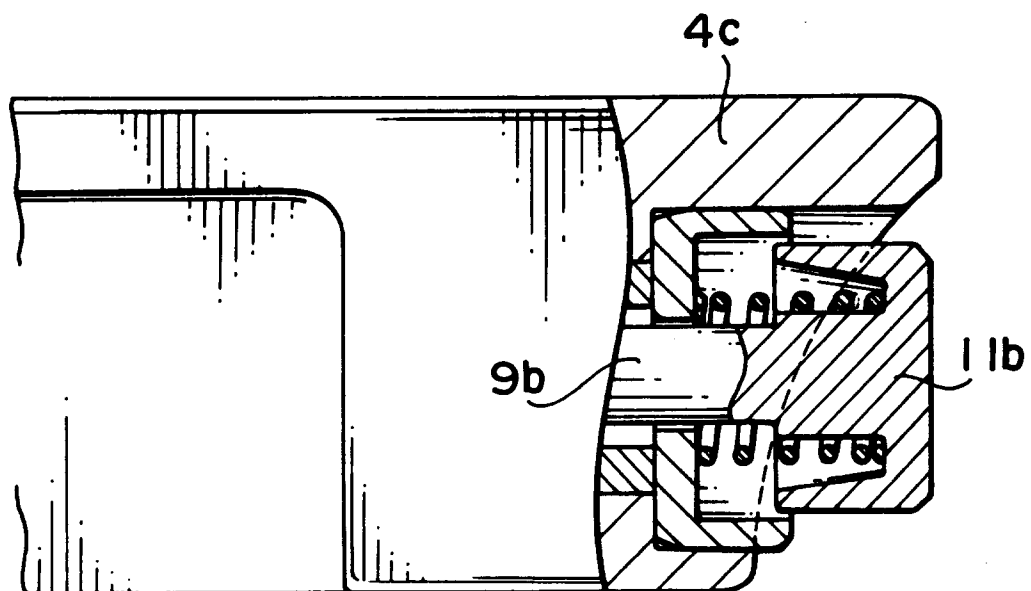


FIG. 16



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 95 10 7043

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	DE-C-959 859 (SPARN) * figures 2,3 * ---	1	G04B37/16
A	FR-A-2 634 360 (SUSSEX FRANCE S.A.) * claims 1,2; figures 1-6 * ---	1	
A	FR-A-2 694 484 (SUSSEX FRANCE S.A.) * figures 8A-10B * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			G04B A44C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 3 August 1995	Examiner Pineau, A
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