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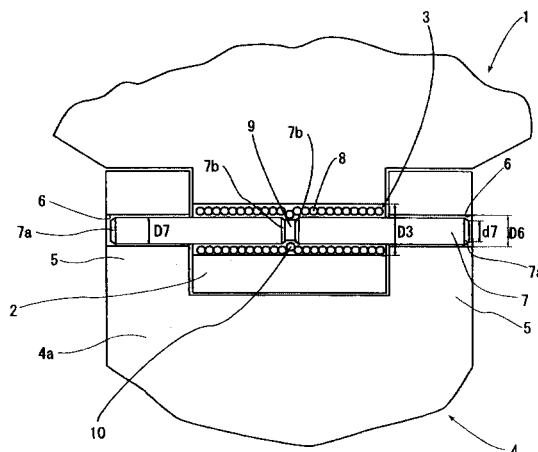
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(54) Joint structure for watch and watchband

(57) To obtain a joint structure for a watch and the watch that is produced in low cost, enhanced in a design aspect and more aesthetic and free watch, and which is simple in attachment/detachment work for each joint portion to avoid a fear that a joint pin would be fallen away in case of use, the watch joint structure and the watch using the joint structure are provided in which a case joint portion (2) for joint provided in a watch case (1) and a band joint portion (4a) for joint provided in a band (4) are arranged adjacent to each other in a lateral

direction, engagement holes (3), (6) and (6) in communication with each other in a lateral direction are provided in two joint portions (1) and (4a), respectively, and a joint pin (7) for coupling the watch case (1) and the band (4) is passed through the respective engagement holes (6), (3) and (6). Then, a coiled spring (8) is inserted into at least either one of the two engagement holes (3) and (6), and the joint pin (7) is inserted into an inner diameter of the coiled spring (8) so that the joint pin is retained by the inner diameter portion of the coiled spring and is applied to the two engagement holes (6), (3) and (6).

[Fig 2]



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Description

[0001] The present invention relates to a joint structure for a watch and a watch adopting the structure, and more particularly to a joint structure for fastening a joint pin to the joint portion for a watch.

[0002] Figs. 12 and 13 show an example of a conventional joint method used in a watch. A long pin 34 and a short pipe 35 are used as joint members. More specifically, when a joint portion 30 of a watch case and a joint portion 32 of a band are coupled with each other, first of all, a hollow pipe 35 is inserted into an insertion hole 31 of the joint portion 30 of the case in advance. Then, the joint portion 32 of the band is lifted and insertion holes 33 and 33 of the joint portion 32 of the band are in alignment with the insertion hole 31 of the joint portion 30 of the case. Then, a pin 34 is pressed into three holes 33, 31 and 33 and thus the case and the band of the watch are connected to each other.

[0003] A small annular recess 36 is formed in the middle of the pin 34 so that the pin 34 is prevented from falling away from the pipe 35 during use of the watch. When the joint portions 30 and 32 are coupled with each other, the recess 36 of the pin 34 fits into a small annular recess 37 in the middle of the pipe 35 so that the pin 34 is fixed.

[0004] Fig. 14 is a view showing the structure of another conventional joint structure of a watch shown in Japanese Patent Application Laid-Open No. Hei 08-224114. Pin insertion holes 41 and 41 into which an insertion pin 50, having stepped portions 53 and 53 at both ends, is inserted are formed in bifurcated joint portions 42 and 42 of a watch case 40. A through hole 46 having a cocoon-shaped cross-section is provided in a joint portion 45 of the band. A spacer 47 having the same cross-sectional shape is inserted into the through hole 46. Also, a ring 60 having a cocoon-shaped cross-section with a large diameter hollow portion 61 and a small diameter hollow portion 62 divided at a waist portion 63 of the central portion of the cross-section is inserted into hollow portions 48 and 49 of the spacer 47.

[0005] The large diameter hollow portion 61 of the ring 60 has an inner diameter such that large diameter portions 52 and 52 of the insertion pin 50 may be inserted loosely into the ring 60. The small diameter hollow portion 62 has an inner diameter that is substantially the same as a diameter of a small diameter portion 51 of the insertion pin 50. The waist portion 63 is formed so that it has a narrower width than the inner diameter of the small diameter portion 62. Then, the joint portion 45 of the band provided with the spacer 47 and the ring 60 is inserted in between the bifurcated joint portions 42 and 42 of the watch case 40. After the large diameter hollow portion 61 of the ring 60 is aligned with the pin insertion holes 41 and 41 of the bifurcated joint portions 42, the pin 50 is pushed in. Thereafter, when the watch case 40 and the band are fallen away from each other, the small diameter portion 51 of the pin 50 is shifted to

the small diameter hollow portion 62 of the ring 60 to thereby complete the joint work for both joint portions 42 and 45.

[0006] In the joint structure shown in Figs. 12 and 13, the structure of the pin 34 and the pipe 35 is simple and its manufacture is easy. However, when the pin 34 is inserted into the pipe 35, it is necessary to expand the small outer diameter portion 37 of the pipe 35, and an extremely large force is required therefor. For this reason, the assembling work is difficult and takes a long time. Also, if a force that is 5 kg or greater is applied to the thin pin 34, there are problems in structure that the pin 34 is bent, buckled or sometimes the surface of the watch or the band would be damaged. Also, in order to overcome the difficulty in assembling work, it is possible to use a jig. However, the jig is specialized to increase the cost. In addition, there is still the outstanding problem in that the pin 34 is likely to be bent.

[0007] If the fixing force of the pipe 35 is weakened in order for the pin 34 not to be bent (that is, the inner diameter of the small outer diameter 37 of the pipe 35 is increased), a risk that the pin 34 would be fallen away in case of use of the watch becomes remarkable. On the other hand, if, in order for the pin 34 not to be fallen away in case of use of the watch, the fixing force thereof is increased, the work is very difficult when the pin 34 is to be fallen away in order to release the joint. Also, the small outer diameter portion 37 of the pipe 35 is plastically deformed. The depression of the pin 34 having a larger outer diameter than the inner diameter of the small outer diameter portion 37 of the pipe 35 is rather difficult. In addition, in this case, the force for depressing the pin is likely to be varied.

[0008] With the joint structure shown in Fig. 14 in Japanese Patent Application Laid-Open No. Hei 08-224114, when the watch case 40 and the joint portion 45 of the band are attached/detached from each other, a large force is not required therefor, and in addition, if the band and the watch case 40 are shifted relative to each other, the attachment/detachment may readily be completed. However, this joint structure requires a large number of mechanical parts to increase the cost. Also, when the joint structure is disassembled, there is a high risk that the mechanical parts would be lost. Also, since the space for allowing the shift of the band has to be provided on the side of the watch case 40, there is a restriction in design.

[0009] A manufacturing method for the through hole 46 having the cocoon-shaped cross-section needs rather complicated steps, resulting in the increase of the cost. Incidentally, there is another method for the formation of the through hole 46, in which after the joint portion 45 of the band 5 is divided into upper and lower parts (see the dotted line in Fig. 14) and half holes for the through hole 46 are formed, both halves are bonded together. However, the number of the mechanical parts is increased and the number of the manufacturing steps is increased, resulting in the degradation in productivity

and the increase of the entire cost for the watch.

[0010] The present invention has been made in order to overcome the above-noted problems, and has an object to provide a joint structure for a watch and a watch using the joint structure in which the number of mechanical parts is decreased, the manufacture and assembly are simple and costs therefor are low, furthermore, the attachment/detachment is easy, and there is no fear that a joint pin would be fallen away in case of use of the watch.

[0011] In order to attain these objects, according to the present invention, there is provided a joint structure for a watch in which a case joint portion for joint provided on a case for the watch and a band joint portion for joint provided on a band are laterally disposed adjacent to each other, engagement holes in communication with each other in a lateral direction are provided in both the joint portions, respectively, and a joint pin for coupling the case for the watch and the band with each other is inserted into each of the engagement holes, the joint structure being characterized in that a coiled spring is inserted into at least either one of both the engagement holes, and the joint pin is inserted into an inner diameter of the coiled spring so that the joint pin is retained by the inner diameter portion of this coiled spring and applied to both the engagement holes.

[0012] With such a structure, since the number of the mechanical parts is small, the joint work may readily be attained. In addition, the coiled spring may be machined with ease so that the number of the manufacture steps is decreased and the cost therefor may be reduced. Also, since the joint pin is retained by utilizing the inner diameter portion of the coiled spring, the resiliency of the coiled spring may be utilized effectively, it is easy to couple the components with each other, and in addition, it is possible to realize a function to make it possible to remove the joint pin without any strong force but the joint is not easily released. When the overall inner diameter portion of the coiled spring is utilized, each coil wraps the outer surface of the outer diameter of the pin so that the total frictional force is increased and there is no fear that the pin would be accidentally fallen away. Furthermore, since the fixing force for the pin is the frictional force or the retaining force caused by the resiliency of the coiled spring, upon the attachment/detachment work, it is possible to easily perform the work without using a special tool or a large force. There is no fear that the watch would be damaged or the pin would be bent.

[0013] According to the present invention, there is provided another joint structure for a watch, including a joint structure for a band to be connected to a watch body in which at least two joint members are connected, comprising an engaging joint portion for joint provided on one of the joint members and an engaged joint portion for joint provided in a lateral direction adjacent to the engaging joint portion for the one joint member to be disposed in a connection direction adjacent to the other of the joint members, wherein engagement holes

in communication with each other in a lateral direction are provided in both joint portions, a coiled spring is inserted into at least either one of both the engagement holes, and a joint pin is inserted into an inner diameter of this coiled spring so that the joint pin is retained by the inner diameter portion of this coiled spring and applied to both the engagement holes.

[0014] With such a structure, when the joint members are coupled with each other, since the number of the mechanical parts is decreased, the weight of the overall band may be reduced. Since the attachment/detachment work of the joint portions may be simple, the work efficiency is enhanced and at the same time the band may be finished with an aesthetic design. Furthermore, since the coiled spring is used, the number of the manufacture steps is decreased to reduce the cost. Since the joint pin is retained by utilizing the inner diameter portion of the coiled spring, the resiliency of the coiled spring may be utilized effectively, it is easy to couple the components with each other, and in addition, it is possible to realize a function to make it possible to remove the joint pin without any strong force but the joint is not easily released.

[0015] According to another aspect of the invention, in addition to the watch joint structure of the above-described aspects, either one of the two joint portions is bifurcated projections, any other of the two joint portions is a projection to be inserted into the bifurcated projections, the engagement hole is formed as a through hole in each of the bifurcated projection and the projection, the coiled spring is inserted into the engagement holes of the projections, and the joint pin is disposed so as to be applied to the three through holes.

[0016] With such a structure, it is unnecessary to provide a gap in advance between the joint portions. Thus, there are no restrictions over the design and at the same time, the unity of design is enhanced, which is preferable for aesthetic design. Also, the coiled spring is inserted in the middle of the projections, it is possible to positively prevent the coiled spring from being fallen away. Also, since the three through holes have a diameter that is somewhat greater than that of the pin and the joint portions may be thinned, it is possible to enhance the aesthetic design.

[0017] According to another aspect of the invention, in addition to the watch joint structure of the above-described aspects, an inner diameter of a part of the coiled spring is formed into a small diameter spring portion that is smaller in diameter than the other portion, an outer diameter of a part of the joint pin is formed into a small outer diameter portion that is smaller in diameter than the other portion, and the small diameter spring portion is fitted around the small outer diameter portion to thereby retain the joint pin.

[0018] With such a structure, when the joint pin is passed through the small diameter spring portion of the coiled spring, since the small diameter spring portion is elastically deformed and expanded, it is possible to in-

sert the pin into the inner diameter of the coiled spring by pushing the pin with a light force. The portion that has been deformed by the resiliency of the small diameter spring portion is restored back to the original shape, when it is fitted with the small outer diameter portion of the joint pin, it is possible to obtain a click feeling to facilitate the confirmation of the assembly and the small diameter spring portion has a retaining function to make it possible to positively retain the pin.

[0019] The small diameter spring portion of the coiled spring is fitted with the small outer diameter portion of the joint pin to thereby retain the joint pin. Such a structure further enhances the force for fixture of the pin. Also, when the pin is pulled out, the pull-out is easy due to the resiliency of the spring and there is almost no fear that the force for removal would be varied. Also, since it is unnecessary to use a special tool, the cost will not be increased and there is no fear that the joint portions would be damaged.

[0020] According to another aspect of the invention, in addition to the watch joint structure of the above-described aspects, an inner diameter of the coiled spring is somewhat smaller than an outer diameter of the joint pin, and the joint pin is retained between the coiled spring and the joint pin by contact friction. In the case where the small diameter spring portion is not provided in the middle of the coiled spring, when the joint pin is inserted, it is preferable that the inner diameter of the coiled spring is somewhat smaller than the outer diameter of the pin. With such a structure, when the pin that is larger in diameter than the inner diameter of the coiled spring is inserted, the coiled spring is deformed and expanded and the frictional force to be applied to the surface of the pin is increased by the resiliency that forces the spring back to the original shape after the elastic deformation. Accordingly, the frictional force between the coiled spring and the outer surface of the pin, i.e., the fixing force for the joint pin is increased to avoid the disadvantage that the pin would be fallen away accidentally.

[0021] According to still another aspect of the invention, there is provided a watch comprising a watch body having a watch case where a case joint portion for joint is provided and a band having a band joint portion disposed adjacent to the case joint portion, wherein engagement holes for communication of the two joint portions in a side surface direction are provided in the two joint portions, respectively, a joint pin are passed through the engagement holes to thereby couple the watch case and the band, wherein a coiled spring is inserted into at least either one of both the engagement holes, and the joint pin is inserted into an inner diameter of the coiled spring so that the joint pin is retained by the inner diameter portion of the coiled spring and applied to both the engagement holes.

[0022] With such a structure, since the number of the mechanical parts is small, the joint work may readily be attained. In addition, the coiled spring may be machined

with ease so that the number of the manufacture steps is decreased and the cost therefor may be reduced. Also, since the joint pin is retained by utilizing the inner diameter portion of the coiled spring, the resiliency of the coiled spring may be utilized effectively, it is easy to couple the components with each other, and in addition, it is possible to realize a function to make it possible to remove the joint pin without any strong force but the joint is not easily released. Incidentally, when the overall inner diameter portion of the coiled spring is utilized, each coil wraps the outer surface of the outer diameter of the pin so that the total frictional force is increased and there is no fear that the pin would be accidentally fallen away. Furthermore, since the fixing force for the pin is the frictional force or the retaining force caused by the resiliency of the coiled spring, upon the attachment/detachment work, it is possible to easily perform the work without using a special tool or a large force. There is no fear that the watch would be damaged or the pin would be bent. For this reason, it is possible to provide the watch which may readily be assembled and in addition repaired, thereby making it possible to reduce the cost for the watch.

[0023] According to another aspect of the invention, in addition to the watch of the above-described aspects, either one of the two joint portions is bifurcated projections, any other of the two joint portions is a projection to be inserted into the bifurcated projections, the engagement hole is formed as a through hole in each of the bifurcated projection and the projection, the coiled spring is inserted into the engagement holes of the projections, and the joint pin is disposed so as to be applied to the three through holes.

[0024] With such a structure, it is unnecessary to provide gap in advance between the joint portions. Thus, a watch which has no restrictions over the design, having excellent aesthetic design, can be obtained and at the same time, the unity of design is enhanced, which is preferable for aesthetic design. Also, the coiled spring is inserted in the middle of the projections, it is possible to positively prevent the coiled spring from being fallen away. Also, since the three through holes have a diameter that is somewhat greater than that of the pin and the joint portions may be thinned and light, it is possible to enhance the aesthetic design.

[0025] According to another aspect of the invention, in addition to the watch of the above-described aspects, an inner diameter of a part of the coiled spring is formed into a small diameter spring portion that is smaller in diameter than the other portion, an outer diameter of a part of the joint pin is formed into a small outer diameter portion that is smaller in diameter than the other portion, and the small diameter spring portion is fitted around the small outer diameter portion to thereby retain the joint pin.

[0026] The invention may be carried into practice in various ways and some embodiments will now be described by way of example with reference to the accom-

panying drawings in which:

FIG. 1 is an exploded perspective view showing a joint structure for a watch and the watch according to a first embodiment of the present invention;
 FIG. 2 is a partially enlarged cross-sectional view showing the state in which a pin of the joint structure for the watch shown in Fig. 1 is inserted;
 FIG. 3 is a longitudinal sectional view showing the structure of a coiled spring to be used in the watch joint structure shown in Fig. 1;
 FIG. 4 is a transverse sectional view showing a small spring portion of the coiled spring taken along the line A-A of Fig. 3 and its periphery;
 FIG. 5 is a view showing another example of a small diameter spring portion for the coiled spring to be used in the watch joint structure shown in Fig. 1 and showing an example having an oblong small diameter spring portion;
 FIG. 6 is an exploded perspective view showing a joint structure for a watch according to a second embodiment of the present invention;
 FIG. 7 is a partially enlarged cross-sectional view showing the state in which a pin of the joint structure for the watch shown in Fig. 6 is inserted;
 FIG. 8 is a view showing the structure of a coiled spring to be used in the watch joint structure shown in Fig. 6;
 FIG. 9 is a partially enlarged exploded perspective view showing an example in which a watch joint structure is used for the joint member of a watch band;
 FIG. 10 is a view showing another modification of the present invention and another example of the joint structure between the watch case and the band;
 FIGs. 11A and 11B are views showing the structure of a joint pin to be used in the joint structure for the watch or the watch according to the present invention, Fig. 11A being a view showing another example of the joint pin having a small outer diameter portion and Fig. 11B being a view showing a joint pin having no small outer diameter portion;
 FIG. 12 is an exploded perspective view showing an example of a conventional joint structure for a watch;
 FIG. 13 is a partially enlarged cross-sectional view showing the state in which a joint pin is inserted in the conventional watch joint structure shown in Fig. 12; and
 FIG. 14 is an exploded perspective view showing another example of a conventional watch joint structure.

[0027] The present invention will now be described with reference to the accompanying drawings.

[0028] Fig. 1 is an exploded perspective view showing a joint structure for a watch and the watch according to

a first embodiment of the present invention. As shown in Fig. 1, a projection 2 is formed as a case joint portion in a watch case 1. A single engagement hole 3 is formed to pass through the projection 2 in a lateral direction. A band joint portion 4a which is connected to the watch case 1 is provided in a band 4 of the watch. Bifurcated projections 5 and 5 are provided at a tip end of the band joint portion 4a. The bifurcated projections 5 and 5 have engagement holes 6 and 6 that pass through in a lateral direction. The three engagement holes 6, 3 and 6 are arranged in a linear manner when the projection 2 and the bifurcated projections 5 and 5 are engaged with each other, and a joint pin 7 may be inserted to connect the case 1 and the band 4 to each other.

[0029] As shown in Fig. 2, an inner diameter D3 of the engagement hole 3 of the projection 2 of the watch case 1 is formed to be larger than an inner diameter D6 of the engagement holes 6 and 6 of the band joint portion 4a and a cylindrical coiled spring 8 is inserted in the engagement hole 3 in advance. An outer diameter D8 of the cylindrical coiled spring 8 (see Fig. 3) is provided to be smaller than the inner diameter D3 so that the coiled spring 8 may be smoothly inserted into the engagement hole 3. For instance, in the case where the inner diameter D3 of the engagement hole 3 is 1.40 mm, the outer diameter D8 of the coiled spring 8 is 1.37 mm.

[0030] Also, in this embodiment, as shown in Figs. 1 and 2, a small recess 9 that is smaller in diameter than the other portion is formed in the middle of the joint pin 7 made of stainless steel. On the other hand, a reduced diameter spring portion 10 is also formed in the middle of the coiled spring 8.

[0031] As shown in Fig. 2, beveled portions 7a and 7a are formed as tapers at both ends of the joint pin 7. Beveled portions 7b and 7b are provided as tapers having the same shape on both sides of the recess 9. The beveled portions 7a, 7a function to facilitate the insertion of the pin 7 through the coiled spring 8 through the small diameter spring portion 10 by facilitating the expansion of the small diameter spring portion 10 as the pin 7 is inserted through. The beveled portions 7b and 7b of the recess 9 work to disengage the small diameter spring portion 10 of the coiled spring 8 with a force that is large to some extent (i.e., the pull-out force or push force).

[0032] When the band 4 is assembled to the watch case 1, the coil spring 8 is inserted into the engagement hole 3 and then the three projections 5, 2 and 5 are located adjacent to each other in a longitudinal direction. The engagement holes 6 and 6 of the bifurcated projections 5 and 5 of the band joint portion 4a are in alignment with the engagement hole 3 into which the coiled spring 8 has been inserted. Then, the joint pin 7 is inserted from one of the engagement holes 6, and inserted into the inner diameter of the coiled spring 8. Furthermore, the joint pin 7 is inserted into the other engagement hole 6. This condition is shown in Fig. 2 and the case 1 and the band 4 are coupled together.

[0033] When the joint pin 7 is inserted into one of the

engagement holes 6, its tip end is brought into abutment with the small diameter spring portion 10. When the pin 7 is further inserted against the abutment force, the small diameter spring portion 10 is further advanced while being expanded by the beveled portion 7a. Then, when the joint pin 7 is inserted into the engagement holes 6, 3 and 6, the annular recess 9 of the joint pin 7 and the small diameter spring portion 10 of the coiled spring 8 are engaged with each other to thereby have a click feeling to finish the joint work.

[0034] It is preferable that, in order to insert the joint pin 7 into the engagement holes 6 and the coiled spring 8, the outer diameter D7 of the joint pin 7 has a constant room or idle space relative to the inner diameter D6 of the engagement holes 6 and the inner diameter D8 of the coiled spring 8. In one embodiment, the outer diameter D7 of the joint pin 7 is 1.00 mm, the inner diameter D8 of the coiled spring 8 is 1.05 mm, the inner diameter D6 of the engagement holes 6 is 1.10 mm, and the inner diameter D3 of the hole 3 is 1.40 mm. The length L8 of the coiled spring 8 is set substantially at the same length as that of the projection 2 that serves as the case joint portion.

[0035] In this embodiment, as mentioned above, the inner diameter D6 of the engagement holes 6 and 6 of the band joint portion 4a is 1.10 mm and the outer diameter D8 of the coiled spring 8 is 1.37 mm. For this reason, an inner edge of each engagement hole 6, 6 prevents the coiled spring 8 from moving in a lateral direction while just abutting both ends of the coiled spring 8. As a result, the coiled spring 8 is never fallen away from the engagement hole 3 so far as the joint pin 7 is not pulled out.

[0036] In this embodiment, an inner diameter S of the small diameter spring portion 10 of the coiled spring 8 is set at 0.95 mm. Also, a diameter d7 at a tip end of the tapered portions of both ends of the joint pin 7 is somewhat smaller than the inner diameter S. However, if the diameter D7 is smaller than a distance S1 between the centers of the line diameter, the insertion work is rather facilitated.

[0037] When the joint pin 7 is inserted into the coiled spring 8 so that the small diameter spring portion 10 is passed therethrough, the small diameter portion 10 is expanded by resiliency of the coiled spring 8. In this case, when it is fitted in the small outer diameter portion 9 of the joint pin 7 by the resilient force for restoration of the small diameter spring portion 10 and the worker feels a click, the joint pin 7 is retained.

[0038] In the case 1 and band 4 thus coupled with each other in such an engagement method, the number of the mechanical parts is decreased, the cost therefor is reduced and the work is enhanced. Also, it is possible to readily perform the insertion attachment/detachment work of the coiled spring 8 with a stable force of 1 kg or less. The working efficiency is enhanced. Also, since the machining of the respective engagement holes 6, 3 and 6 may readily be performed and the joint portions 5, 2

and 5 may be thinned, it is possible to obtain the joint portion having excellent aesthetic design. In the watch using such a joint structure, the small outer diameter portion 9 of the joint pin 7 is inserted into the small diameter spring portion 10 of the coiled spring 8 so that there is no fear that the joint pin 7 would be fallen away in case of use. Thus, it is possible to provide the watch that is in safety and may be produced in low cost. Also, it is easy to insert the joint pin 7 due to the provision of the beveled portion 7a. It is easy to pull the joint pin 7 out due to the provision of the beveled portions 7b and 7c.

[0039] In the embodiment, the coiled spring 8 is made of resilient stainless steel material. As shown in Fig. 4, the small diameter spring portion 10 is formed in a circular shape. The inner diameter S of the small diameter spring portion 10 is smaller than the inner diameter d8 of most of the portion of the coiled spring 8 by 0.1 mm, and the diameter is gradually increased toward both ends so that the diameter becomes the inner diameter D8 at a position apart from the small diameter spring portion 10 by about one twelfth of the entire length L8.

[0040] As shown in Figs. 5A and 5B, the small diameter spring portion 10 may be formed into an oblong small diameter spring portion 10a. A short inner diameter S of the oblong small diameter spring portion 10a is shorter than the inner diameter D8 of the other portion of the coiled spring 8 and a long inner diameter S2 is longer than the inner diameter D8. In case of such a structure, when the joint pin 7 is inserted and the small diameter spring portion 10a is passed, the insertion is performed with the short inner diameter S being expanded, and the short diameter portion thereof is fitted in the small outer diameter portion 9 of the joint pin 7 to thereby retain the joint pin 7.

[0041] A second embodiment of the present invention will now be described with reference to Figs. 6 and 8. Incidentally, the same reference numerals are used to indicate the like portions or parts as those of the first embodiment.

[0042] In the second embodiment, a cylindrical joint pin 12 that has no central diameter reduced portion and a cylindrical coiled spring 11 that has no small diameter portion are used. When the joint work for the watch case 1 and the band 4 is performed, in the same manner as in the first embodiment, the coiled spring 11 is inserted into the engagement hole 3 in advance, and the joint pin 12 is inserted while the engagement holes 6 and 6 of the bifurcated projections 5 and 5 of the joint portion 4a of the band 4 are in alignment with the engagement hole 3 provided in the projection 2 of the watch case 1.

[0043] In the embodiment, the inner diameter D3 of the respective engagement holes 3, 6 and 6 is 1.40 mm, an inner diameter D6 is 1.10 mm, an outer diameter D11 of the coiled spring 11 is 1.30 mm, and an inner diameter D11 is in the range of 0.98 to 0.99 mm. Thus, the coiled spring 11 is disposed within the engagement hole 3 and clamped between both inner edge portions of the engagement holes 6 and 6. The outer diameter D12 of the

joint pin 12 is greater than the inner diameter D11 of the coiled spring 11 by 0.01 to 0.02 mm and is 1.00 mm.

[0044] With such a setup, when the joint pin 12 is to be inserted into the inner diameter portion of the coiled spring 11, the coiled spring 11 is deformed and expanded due to the resiliency. After the expansion and deformation, a fastening force is applied to the surface of the joint pin 12 due to the resiliency for restoration. Accordingly, a frictional force is generated between the coiled spring 11 and the joint pin 12 so that the joint pin 12 is fixed in place. Thus, there is no fault that the joint pin 12 would be fallen away.

[0045] During the attachment/detachment work of the joint portions 2 and 4a, the pull-out and insertion work of the joint pin 12 may be performed with a force of 1 kg or less in a stable manner and any special tool or a large force is not necessary. The insertion and pull-out may readily be performed. In addition, it is possible to perform the work without any fear that the surface of the watch case 1 or the band 4 would be damaged.

[0046] The foregoing two embodiments are preferred embodiments of the present invention but the invention is not necessarily limited to those. It is possible to make various modifications and changes within the scope without departing from the point of the invention. For example, as shown in Fig. 9, it is possible to apply the invention to a joint structure of the watch band between a plurality of joint members 20 and 20. If the plurality of joint members 20 and 20 are arranged adjacent to each other in a connection direction, it is possible to provide a band.

[0047] In the joint member 20, one side in a longitudinal direction is formed into bifurcated projections 22 and 22 that serve as an engaged joint portion and the other side is formed into a projection 21 that serves as an engaging joint portion. The joint member 20 has the bifurcated projections 22 and 22 and the projection 21 at both ends in the same manner as in the joint member 20. In the same manner as in the foregoing two embodiments, a coiled spring 25 is inserted into engagement holes 23 and 23 of the projections 21 and 21. The projection 21 is inserted in between the bifurcated projections 22 and 22. A joint pin 26 is inserted into engagement holes 24, 23 and 24 of the two joint members 20 and 20 in a lateral direction.

[0048] The coiled spring 25 and the joint pin 26 used in the band 4 have the same shape as that of the coiled spring 11 and the joint pin 12 of the second embodiment but the combination of the coiled spring 8 and the joint pin 7 of the first embodiment may be applied thereto.

[0049] If such a joint structure is applied to the joint portion of the band 4 of the watch, the attachment and pin removal work are simple so that the work ability is enhanced and at the same time the number of the mechanical parts is decreased to realize the low cost. Also, since the attachment/detachment is easy, it is possible to avoid the fear that the band 4 is damaged during the assembling work. The adjustment of the length of the

watch band may readily be attained in comparison with the conventional case.

[0050] As shown in Fig. 10, the joint pin 12 that has no small diameter portion in the middle may be used in combination with the coiled spring 8 that has the small diameter spring portion 10 in the middle. The inner diameter of the small diameter spring portion 10 of the coiled spring 8 is smaller than the outer diameter of the joint pin 12 by about 0.01 to 0.03 mm. As a result, when the joint pin 12 is inserted into the small diameter spring portion 10, the small diameter spring portion 10 is expanded. The small diameter spring portion 10 fastens the joint pin 12 and exhibits a frictional force to the joint pin 12 due to the resilient force for restoration of the small diameter spring portion 10. For this reason, the joint pin 12 is retained on the coiled spring 8. There is no fear that the joint pin 12 would be fallen away.

[0051] As shown in Fig. 11, in order that the joint pins 7, 12, 26 may readily be inserted into the coiled springs 8, 11, 25 having the inner diameter smaller than the outer diameter thereof, it is preferable that the beveled portions 7a, 7a and 14, 14 are formed at both ends of the joint pins 7, 12, 26. However, it is possible to form the pin in the perpendicular state without providing any beveled portions 7a, 7a and 14, 14 or to form much longer beveled portions.

[0052] In the pin 7 having the small outer diameter portion 9, as shown in Fig. 11A, a slow beveled portion 7c and a steep beveled portion 7d that are different in slant angle may be provided instead of the beveled portions 7b and 7b having the same shape and connected to the outer diameter of the small outer diameter portion 9. With such a structure, when the joint pin 7 is inserted into the coiled spring 8 having the small diameter spring portion 10, the insertion may be attained smoothly. On the other hand, when the joint pin 7 is pull out, by utilizing the slow beveled portion 7c, it is possible to readily pull the joint pin 7 out without using any special tool or large force.

[0053] In the above-described respective embodiments, the small diameter spring portion 10 of the coiled spring 8 and the joint pin 7 having the small outer diameter portion 9 are provided at one position. However, it is possible to provide at a plurality (two or three) of portions. It is possible to make the coiled springs 8, 11, 25 of elastic material having a resistance against water such as rubber or resin in addition to the stainless steel. Also, the joint pins 7, 12, 26 may be made of any other material having a sufficient mechanical strength such as ceramics, engineering plastics or the like in addition to the stainless steel.

[0054] With respect to the place where the coiled springs 8, 11, 25 are laid, the coiled springs are not inserted into the engagement hole of the projection but coiled springs may be inserted into the engagement holes of the bifurcated projections one by one or may be inserted into all the engagement holes. The length and the diameter of the joint pins 7, 12, 26 and the coiled

springs 8, 11, 25 may be changed to be longer or shorter, thinner or thicker depending upon a kind of a mechanical part and work ability. Furthermore, not only the connection is made so that the projection 2 is inserted between the bifurcated projections 5 and 5, but also the bifurcated projections are provided on the side of the case 1 and a single projection may be provided on the side of the band 4. Furthermore, the connection may be made by any combination between a single projection and a single projection, between bifurcated projections and bifurcated projections, between the bifurcated projections and trifurcated projections or the like.

[0055] All of the engagement holes 3, 6, 23, 23 24 and 24 are through holes. However, in order to allow the insertion of the joint pin only from one direction, the other end may be clogged. Furthermore, in the embodiments, the connection between the case body and the band of the wrist watch and the connection between the respective joint members of the band have been described. However, the present invention may be applied to a decorative product such as a necklace or the like, a practical product such as a chain or the like in addition to the wrist watch.

[0056] As described above in detail, in the watch joint structure according to the present invention, since the joint pin is retained by the coiled spring, the number of the joint members is decreased, the assembling work may be simplified, the attachment/detachment work is simple, and there is no disadvantage that the joint pin would be fallen away in case of use of the watch. Furthermore, there is no fear that the joint pin would be bent in case of use. Also, the machining of the respective mechanical parts of the joint portions may be simplified and the miniaturization thereof is easy. Accordingly, there are no various limits to the joint portions. The design of the joint portion is free. The design may be enhanced.

[0057] In the watch according to the present invention, since the above-described joint structure is used, in addition to the above-described effect, the number of the manufacture steps and the number of the machining steps for the mechanical parts of the watch are decreased, it is possible to increase the manufacture efficiency and to obtain the watch in low cost. Also, since there are no various restrictions in design for the joint portions, it is possible to provide an aesthetic watch that is free from design restrictions. Since the work with a large force is dispensed with, the risk is largely reduced in which the watch body or case and the band portion or the like are damaged. Furthermore, the number of the mechanical parts for the joint portions is decreased and the miniaturization thereof is possible. Accordingly, it is possible to reduce the weight of the watch itself and at the same time, to enhance the touch feeling.

[0058] Furthermore, in the band portion of the watch using this joint structure, since the attachment and detachment of the joint portion may readily be attained, it is possible to simplify the adjustment of the length of the band and to quickly perform the work such as repair or

the like. Also, it is possible to provide a variety of types for the band shape and at the same time to provide a downsized and lightweight band.

Claims

1. A joint structure for a watch in which a case joint portion for joint provided on a case for the watch and a band joint portion for joint provided on a band are laterally disposed adjacent to each other, engagement holes in communication with each other in a lateral direction are provided in both the joint portions, respectively, and a joint pin for coupling the case for the watch and the band with each other is inserted into each of the engagement holes, characterized in that a coiled spring is inserted into at least either one of both the engagement holes, and said joint pin is inserted into an inner diameter of said coiled spring so that the joint pin is retained by the inner diameter portion of said coiled spring and engages both of the engagement holes.
2. A joint structure for a watch, including a joint structure for a band to be connected to a watch body in which at least two joint members are connected, comprising an engaging joint portion for joint provided on one of said joint members and an engaged joint portion for joint provided in a lateral direction adjacent to said engaging joint portion for the one joint member to be disposed in a connection direction adjacent to said other of the joint members, wherein engagement holes in communication with each other in a lateral direction are provided in both joint portions, said joint structure being characterized in that a coiled spring is inserted into at least either one of both the engagement holes, and a joint pin is inserted into an inner diameter of said coiled spring so that the joint pin is retained by the inner diameter portion of said coiled spring and engages both of the engagement holes.
3. The watch joint structure according to claim 1 or 2, characterized in that either one of said two joint portions is bifurcated projections, any other of said two joint portions is a projection to be inserted into the bifurcated projections, said engagement hole is formed as a through hole in each of said bifurcated projection and said projection, said coiled spring is inserted into said engagement holes of said projections, and said joint pin is disposed so as to be applied to the three through holes.
4. The watch joint structure according to any one of claims 1 to 3, characterized in that an inner diameter of a part of said coiled spring is formed into a small diameter spring portion that is smaller in diameter than the other portion, an outer diameter of a part

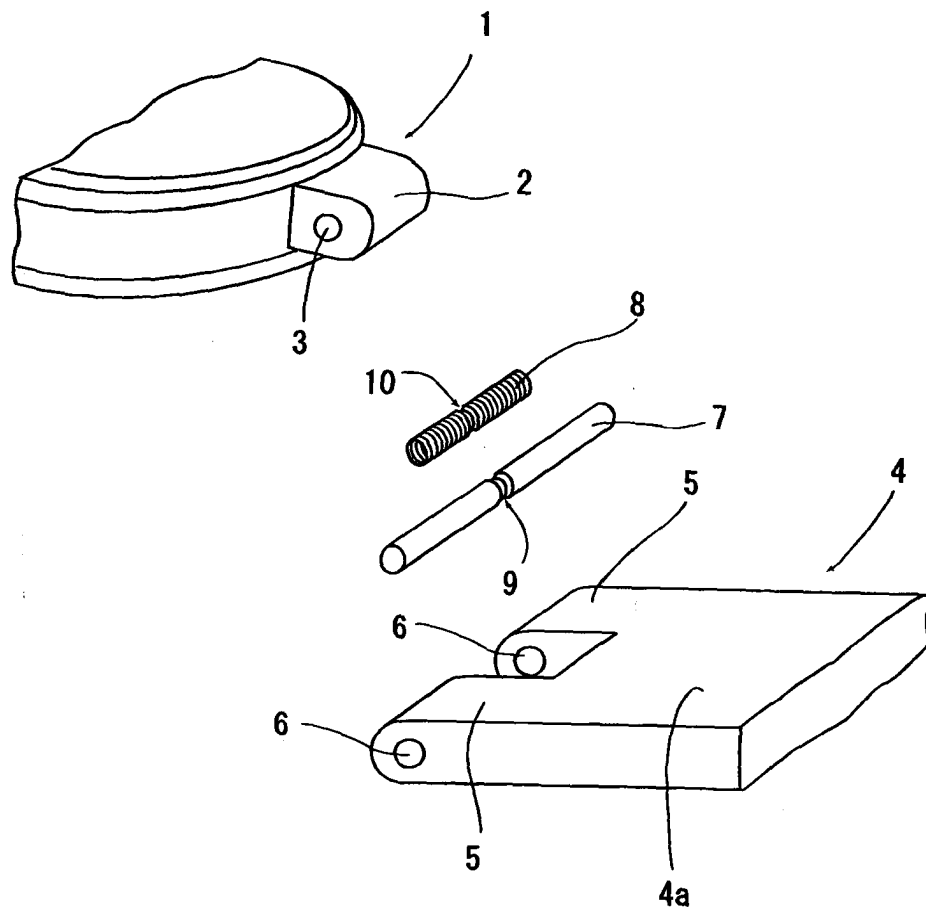
of said joint pin is formed into a small outer diameter portion that is smaller in diameter than the other portion, and said small diameter spring portion is fitted around said small outer diameter portion to thereby retain the joint pin.

5. The watch joint structure according to any one of claims 1 to 3, characterized in that an inner diameter of said coiled spring is somewhat smaller than an outer diameter of said joint pin, and said joint pin is retained by contact friction between said coiled spring and said joint pin. 10
6. A watch comprising a watch body having a watch case where a case joint portion for joint is provided and a band having a band joint portion disposed adjacent to said case joint portion, wherein engagement holes for communication of said two joint portions in a side surface direction are provided in said two joint portions, respectively, and a joint pin are passed through said engagement holes to thereby couple said watch case and said band, characterized in that a coiled spring is inserted into at least either one of both the engagement holes, and said joint pin is inserted into an inner diameter of said coiled spring so that the joint pin is retained by the inner diameter portion of said coiled spring and engages both of the engagement holes. 15 20 25
7. The watch according to claim 6, characterized in that either one of said two joint portions is bifurcated projections, any other of said two joint portions is a projection to be inserted into the bifurcated projections, said engagement hole is formed as a through hole in each of said bifurcated projection and said projection, said coiled spring is inserted into said engagement holes of said projections, and said joint pin is disposed so as to be applied to the three through holes. 30 35 40
8. The watch according to claim 6 or 7, characterized in that an inner diameter of a part of said coiled spring is formed into a small diameter spring portion that is smaller in diameter than the other portion, an outer diameter of a part of said joint pin is formed into a small outer diameter portion that is smaller in diameter than the other portion, and said small diameter spring portion is fitted around said small outer diameter portion to thereby retain the joint pin. 45 50
9. A joint structure for joining a watch and a watch band in which mating projections on the watch and watch band provide aligned holes on the projections, and in which a joint pin extends into the aligned holes, characterized by a coil spring around the joint pin engaging the joint pin and thus retaining the joint pin in the aligned holes. 55

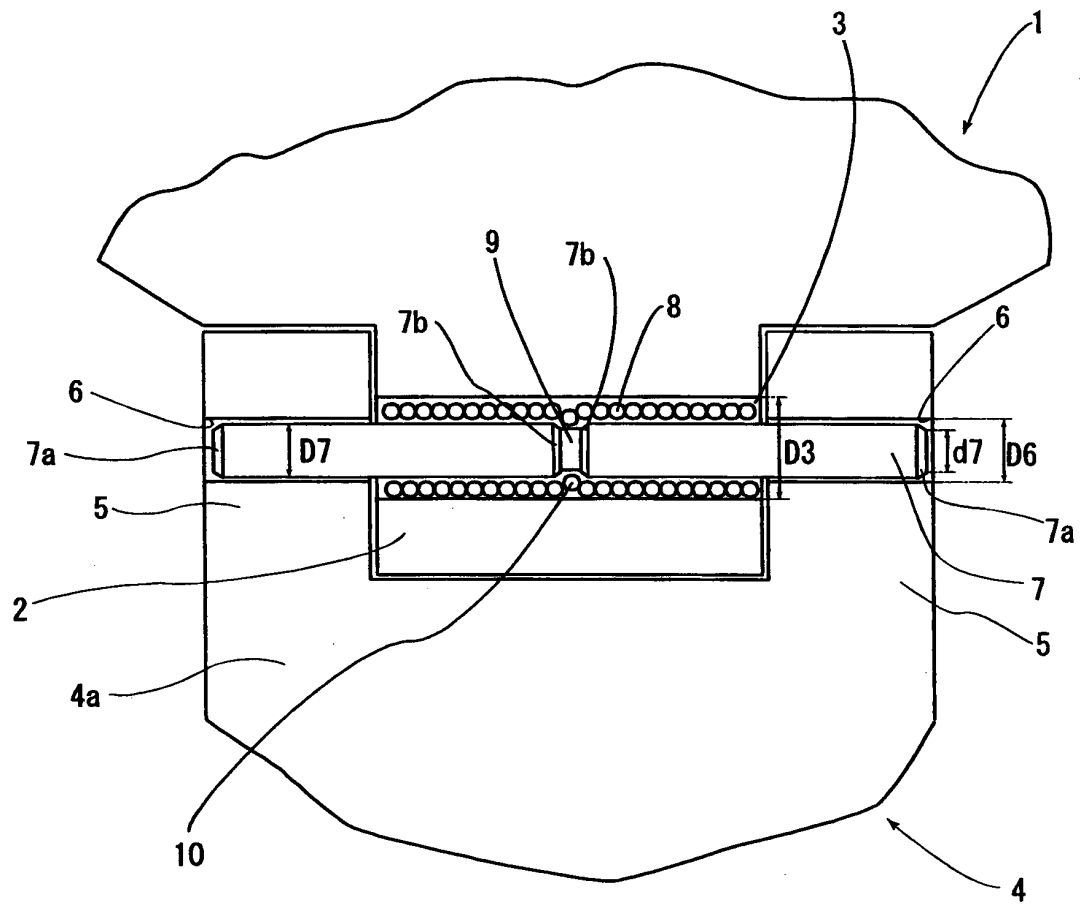
10. The joint structure of claim 9 wherein said coil spring frictionally engages the joint pin to retain the joint pin.

- 5 11. The joint structure of claim 9 wherein the joint pin has an annular recess and said coil spring has an annular reduced diameter portion which engages said recess to retain the joint pin.

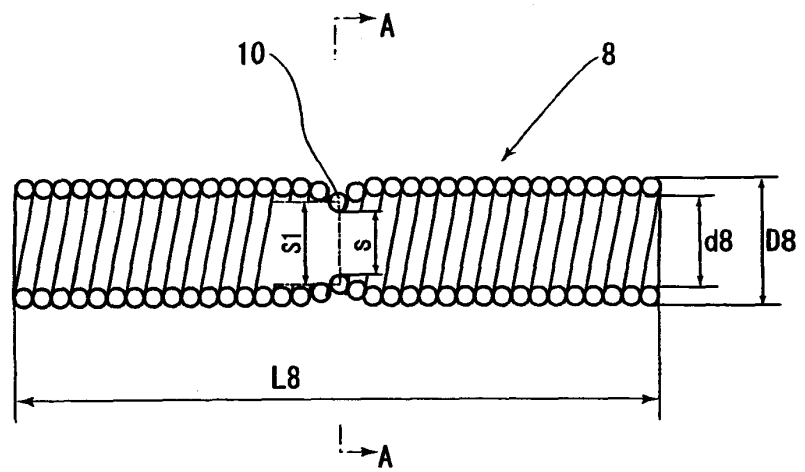
【Fig 1】



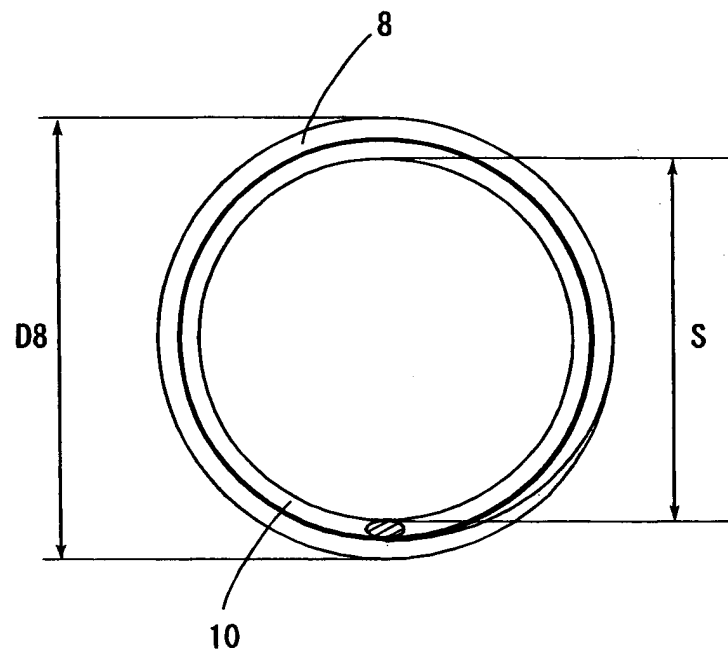
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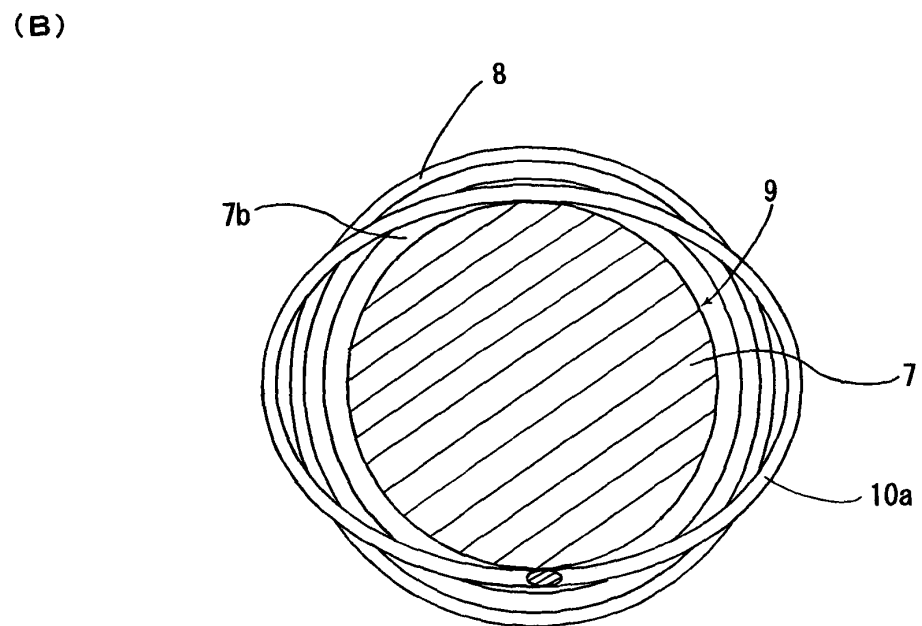
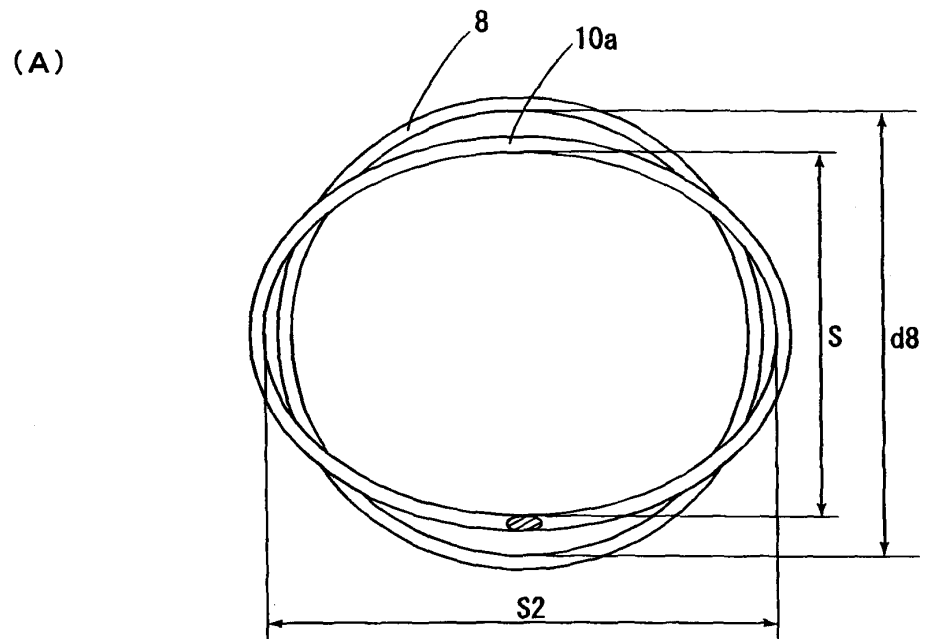
【Fig 3】



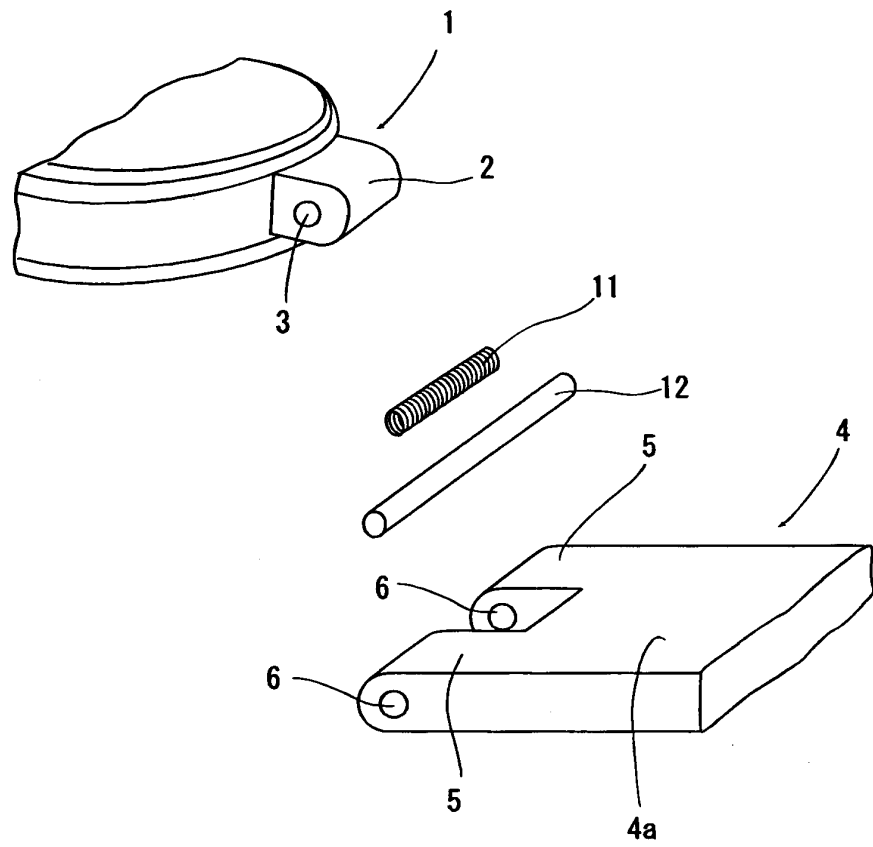
【Fig 4】



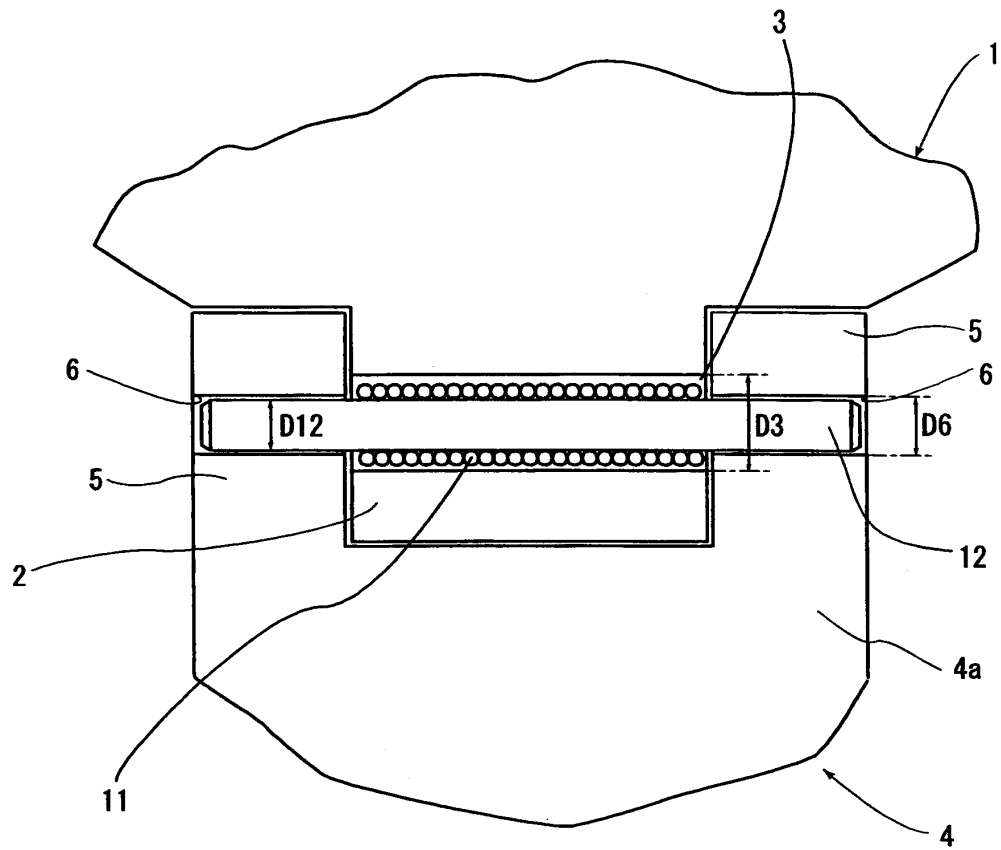
【Fig 5】



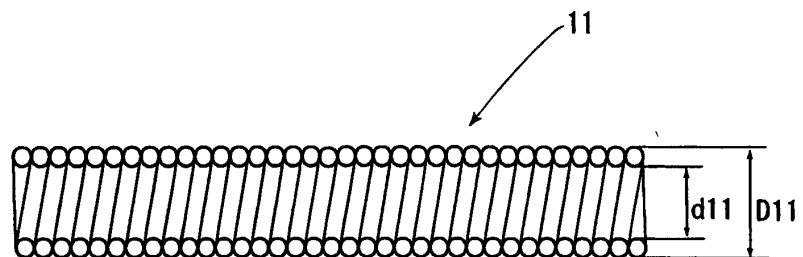
【Fig 6】



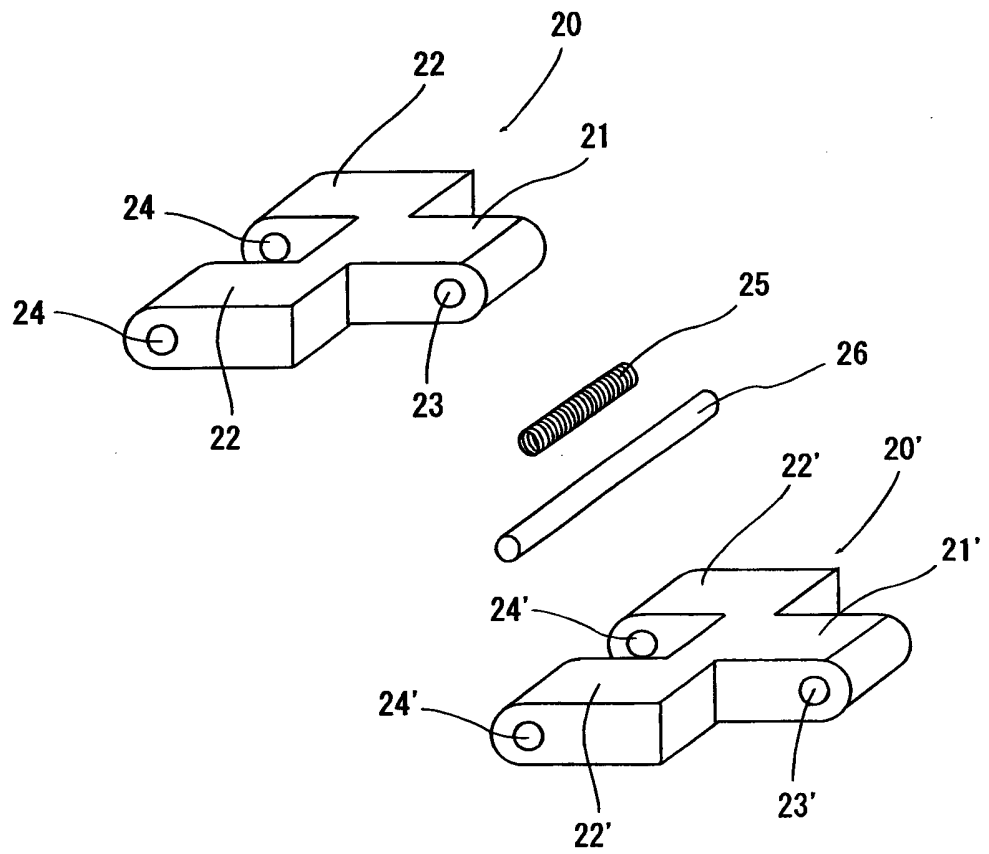
【Fig 7】



【Fig 8】



【Fig 9】



【Fig 10】

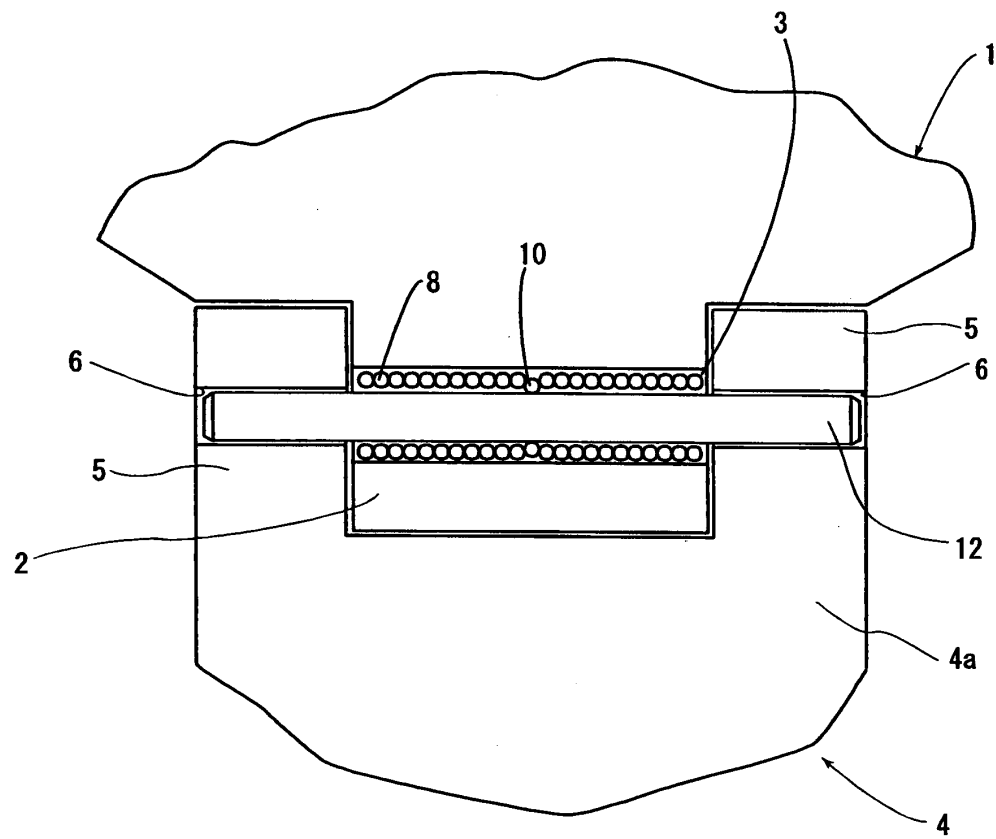
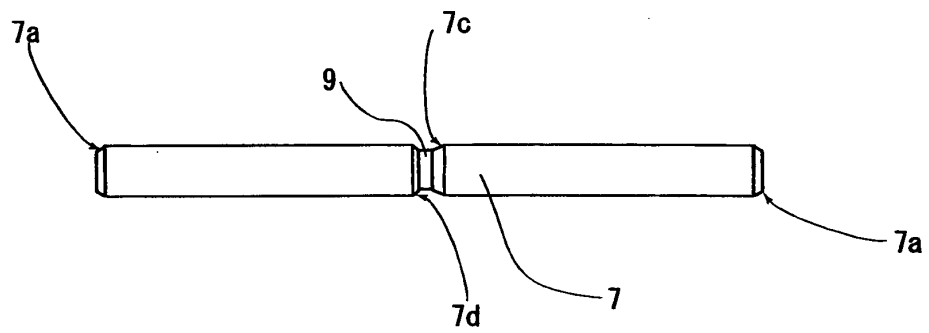


Fig 11

(A)



(B)

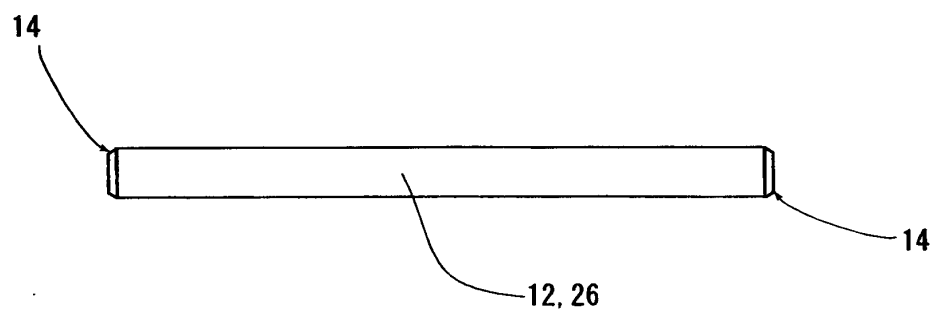
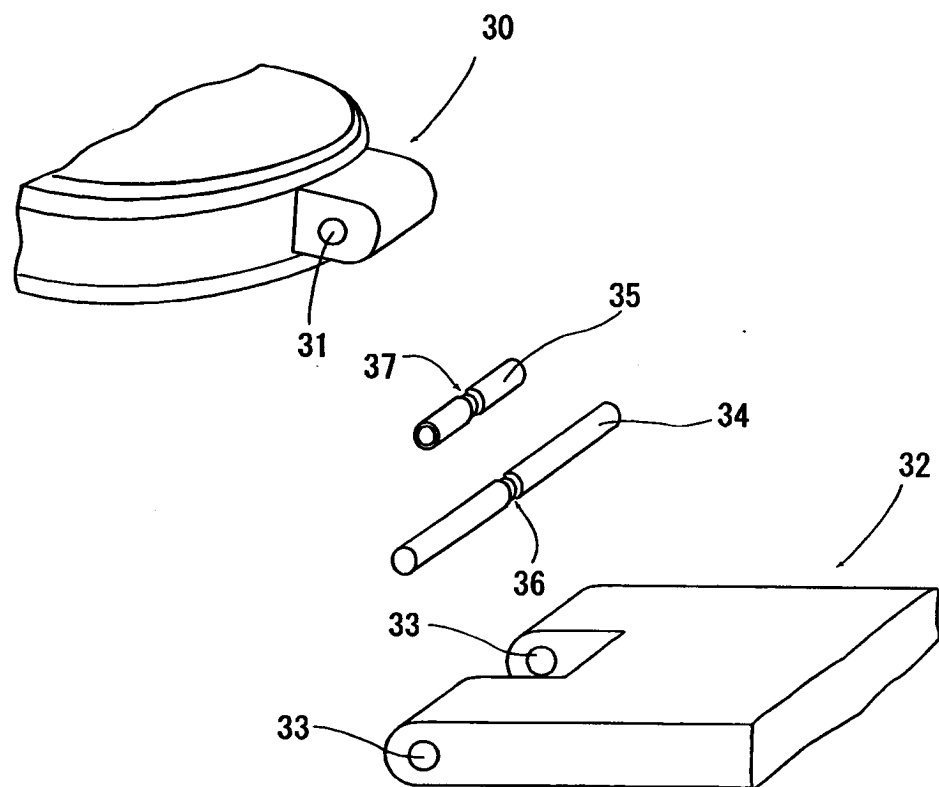
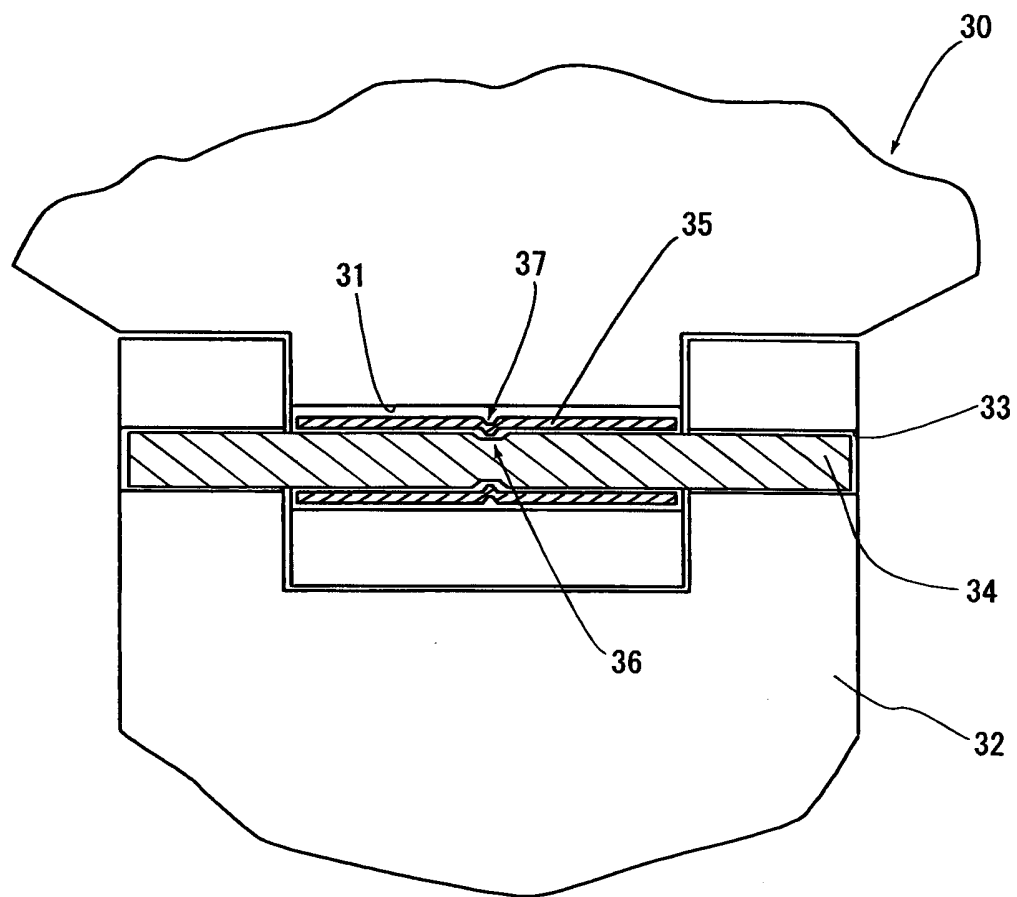


Fig 12



【Fig 13】



【Fig 14】

