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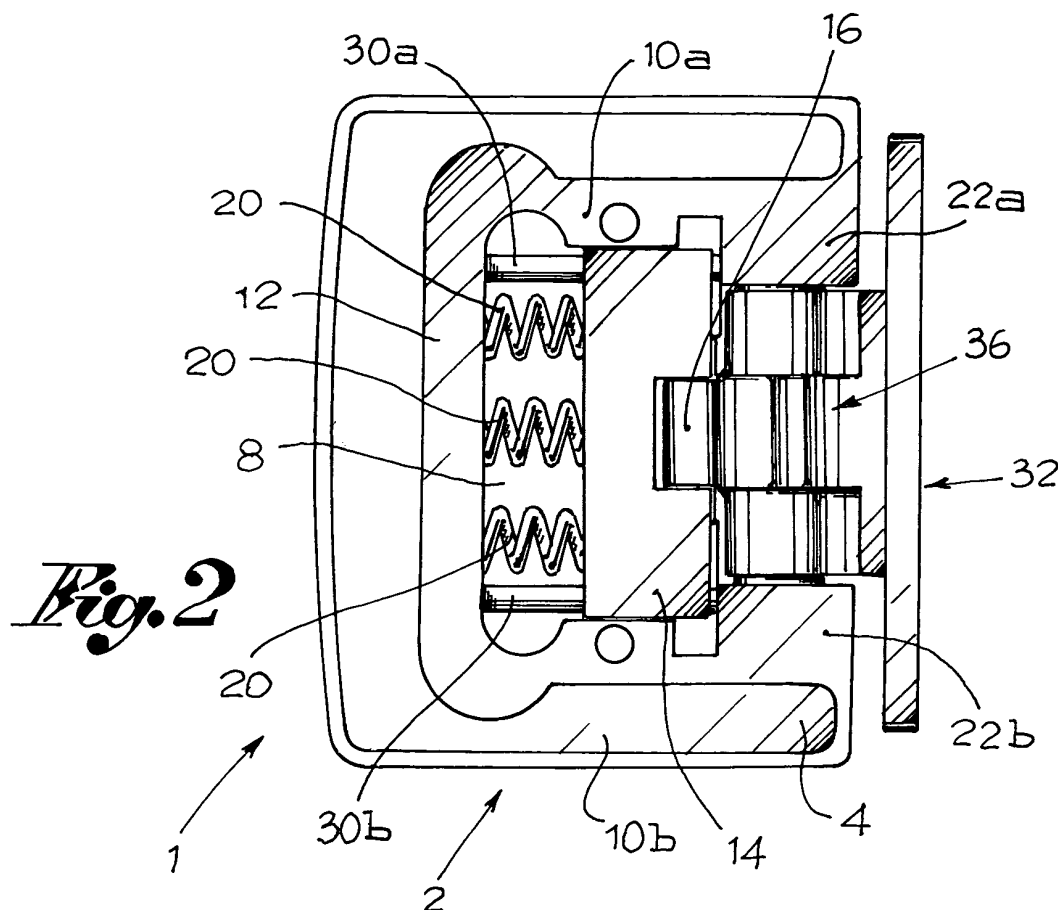
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(54) Hinge, in particular for glass door

(57) An automatic hinge (1) for glass door comprises a hinge body (2), connected to a glass wing, with a space (4) that takes a roller bearing body (14) in a sliding manner, and a pivot (32), connected to the door jamb, with a cam shaped portion (38). Some springs (20) influence the roller bearing body (14) to keep the roller (16) abutted

against the cam portion (38) of the pivot (32).

The hinge (1) also comprises at least one pole (30a, 30b) for guiding the roller bearing body (14) by means of shaft-hole coupling to this. It has been found that this hinge does not make a noise and screech when used and allows normal opening and closing of the door.



Description

[0001] A hinge in particular designed for connecting the glass wing of a glass door to the jamb of the frame constitutes the subject of the present invention.

[0002] In particular, an automatic hinge for glass door constitutes the subject of the present invention.

[0003] In the specific sector, an automatic hinge is understood as a hinge capable of bringing the wing of the door back from an open position to a closed position.

[0004] Numerous automatic hinge solutions for glass door are known in the state of the art.

[0005] An automatic hinge generally comprises a hinge body and a pivot. The hinge body comprises a first plate with a space, a roller bearing body, which can be contained in the space, and a free rotating roller supported in the roller bearing body.

[0006] The pivot, which can be connected to the jamb of the frame, comprises a cam body with a cam portion coupled to the roller of the hinge body.

[0007] The roller bearing body is constantly influenced by elastic means, such as springs and similar, so that the roller is fixed against the cam portion, developing the necessary action for the return of the wings from an open position to the closed position.

[0008] An example of embodiment according to the above is described in the Italian patent for invention IT 1262732.

[0009] However, automatic hinges known in this sector present some problems.

[0010] It has often been observed that considerable action is needed on the wing of the door in order to open it. Other times, it has been found that the return of the wing from an open position to a closed position is too slow.

[0011] Moreover, these problems are often accompanied by undesirable creaking and screeching noises.

[0012] It is the object of the present invention to realise an automatic hinge for glass door, which overcomes the aforesaid problems, with reference to the prior art.

[0013] This object is achieved by a hinge realised in keeping with the following claim 1. The claims depending on this describe embodiments.

[0014] The characteristics and advantages of the hinge according to the present invention will be recognised from the description reported below, given by way of example, which is not limiting, in keeping with the accompanying figures, wherein:

[0015] - figure 1 represents a three-dimensional view of a hinge according to the present invention, with partially separated parts, in a configuration corresponding to an intermediate position between the opening and closing of a glass door;

[0016] - figure 2 shows a flat view of the hinge in figure 1, in a configuration corresponding to a closed position of the glass door, and

[0017] - figure 3 represents a flat view of the hinge in figure 1, in a configuration corresponding to an open po-

sition of the open door, and

[0018] - figures 4a and 4b show a schematic section view of the hinge in figure 2 and figure 3 respectively.

[0019] With reference to the accompanying figures, a hinge according to the present invention is globally indicated with reference numeral 1.

[0020] The hinge 1 comprises a hinge body 2, suitable for being connected integrally to a glass wing of a glass door.

[0021] Said hinge body 2 comprises a bearing plate 4 and a covering plate 6.

[0022] The glass wing of the glass door is designed to be held between said bearing plate 4 and said covering plate 6.

[0023] The bearing plate 4 comprises a space 8, identified by side walls 10a, 10b and by a bottom wall 12.

[0024] Furthermore, said hinge 1 comprises a roller bearing body 14, suitable for being contained in said space 8 of the hinge body 2.

[0025] Said roller bearing body 14 is suitable for sliding in the space 8 of the hinge body 2. In particular, according to a preferred embodiment, the roller bearing body 14 presents a smaller width than the width of the space 8, in other words smaller than the distance between the side walls 10a, 10b of said space.

[0026] According to a preferred embodiment, the roller bearing body 14 is made of metallic material, for example brass or steel and similar.

[0027] Furthermore, the hinge 1 comprises a stop body, in other words a roller 16, which is contained in said roller bearing body 14.

[0028] Said roller 16 is supported by the roller bearing body 14 to allow rotation around its own axis.

[0029] Furthermore, the hinge 1 comprises influencing means, suitable for constantly influencing the roller bearing body 14.

[0030] According to a preferred embodiment, said means are elastic means. Said elastic means preferably comprise at least one spring 20.

[0031] Said springs 20 are preferably set in the space, between the bottom wall 12 and the roller bearing body 14.

[0032] The hinge also comprises 1 guiding means for the roller bearing body 14, suitable for guiding said roller bearing body between a first position or retracted position, corresponding to a closed configuration of the door, and a second position, or advanced position, corresponding to an open configuration of the door.

[0033] According to a preferred embodiment, said guiding means comprise at least one pole, which is coupled by means of shaft-hole type coupling to said roller bearing body 14, on which said roller bearing body slides.

[0034] Said guiding means preferably comprise two poles 30a, 30b, which are preferably cylindrical.

[0035] Said poles 30a, 30b are preferably arranged inside the space 8, extending longitudinally in the direction of movement of said roller bearing body 14 and are transversally spaced out.

[0036] Said guiding means are also suitable for guiding said roller bearing body along a straight path between said retracted position and said advanced position.

[0037] Said poles 30a, 30b are preferably inserted into the bottom wall 12 of the space 8 on a level with one of their ends and, on a level with the opposite end, in projections 22a, 22b of the side walls 10a, 10b of the space 8.

[0038] Furthermore, the hinge 1 comprises a pivot 32, suitable for being connected to the jamb of the door frame and hinged to said hinge 2, allowing the relative rotation around a vertical X-X axis between said pivot and said hinge body.

[0039] Said hinge 1 preferably also comprises a pin 34, suitable for hinging the pivot 32 to the hinge body 2.

[0040] The pivot 32 comprises a cam body 36 comprising a cam portion 38.

[0041] The roller 16 of the hinge 1 is constantly fixed to the cam portion 38 of the pivot 32 by the action of said influencing means.

[0042] Said cam portion 38 preferably presents at least one indentation in relation to the surface profile of said cam.

[0043] In a preferred embodiment, said cam portion 38 presents an active portion 39, a central indentation 40 and two side indentations 42, between which said central indentation 40 is set.

[0044] Advantageously, according to a preferred embodiment, the roller bearing body 14, the roller 16, the pin 34 and the cam shaped portion 38 are in axis.

[0045] In other words, the middle surface of the roller bearing body 14, the axis of rotation of the roller 16, the axis of rotation of the pin 34 and the axis of rotation of the cam shaped portion 38, are set on one same level (figures 4a and 4b).

[0046] When mounting the hinge 1, the pivot 32 is connected to the jamb of the frame of the glass door, in other words to a wall, and the hinge body 2 is connected to the glass wing of the door.

[0047] In the door closure configuration, the roller 16 is contained in the central indentation 40 of the cam portion 38. Said configuration is therefore stable, the roller 16 being unable to come out of the central indentation 40.

[0048] In said closure configuration, the influencing means push the roller bearing body 14 so that the roller 16 is pushed inside the central indentation 40 of the cam portion 38.

[0049] In an intermediate open configuration of the door, the influencing means push the roller bearing body 14, so that the roller 16 is forced against the active portion 39 of the cam portion 38.

[0050] This condition is unstable. In fact, when the user releases the wing, there is a return action between the roller 16 and the active portion 39 of the cam portion 18, caused by the thrust of the influencing means. Said return action brings the roller 16 back into the central indentation and consequently the door into the closed configuration.

[0051] In a limit open configuration of the door, the roller 16 sits in one of said side indentations 42 of the cam

portion 38.

[0052] This configuration is stable.

[0053] When the door moves from the closed configuration to an open configuration, the roller 16 rolls onto the active portion of the cam portion, and the roller bearing body moves from the advanced position to a retracted position.

[0054] Said roller bearing body is guided by said guiding means between an advanced position and a retracted position, thus guaranteeing a straight path.

[0055] In other words, unlike in the case of the known embodiments, the roller bearing body does not show a tendency to incline as a result of the action of the influencing means, in other words, stick between the side walls of the space.

[0056] Furthermore, as described above, the roller bearing body 14, the roller 16, the pin 34 and the cam shaped portion 38 are in axis. Consequently, there is no action by the roller 16 on the roller bearing body 14 when moving from the closed position of the door to an open position, which tends to undermine said roller bearing body 14 from its translation level.

[0057] This situation undoubtedly results in more stable working compared with the known solutions, in which said action that tends to undermine the roller bearing body 14 from its translation level causes striking, noise and excessive wear and tear, particularly of the roller bearing body.

[0058] Innovatively, the hinge according to the present invention overcomes the problems stated with reference to the prior art.

[0059] In particular, the hinge has shown normal working, resulting in an absence of noise and creaks of the door.

[0060] Furthermore, constancy in the force needed to open the door has been observed and a return of the door into the closed configuration without jamming.

[0061] Advantageously, the hinge according to the present invention means that the aforesaid advantages can be achieved by containing production costs in spite of realising close dimensional tolerances in the hole-shaft coupling.

[0062] According to a further advantageous aspect, the shaft-hole type coupling, which guides the roller bearing body, ensures elevated high reliability, with a duration of about 90% longer compared with the known solutions.

[0063] In particular, this is due to a distribution of the trolley action along a portion of the poles.

[0064] Also advantageously, the roller bearing body made of metal guarantees a longer duration.

[0065] Finally, the co-planarity between the middle surface of the trolley, the axis of the roller, the axis of the pin and the axis of the cam shaped portion prevent or reduce striking on the roller bearing body.

[0066] It is clear that those skilled in the art may make numerous variations and modifications to the above described hinge to satisfy specific, contingent needs.

[0067] For example, in a variation of use, the hinge

can be used on wings made of plastic material and similar.

[0068] These variations are also to be considered as contained in the scope of protection defined by the following claims.

Claims

1. Hinge (1) suitable for allowing the opening and closing of a door by rotating a wing of said door in relation to a jamb of a frame, wherein said hinge comprises:

- a hinge body (2), suitable for being connected to said wing, comprising a space (8) suitable for receiving a roller bearing body (14) in a sliding manner, wherein said roller bearing body is suitable for supporting a stop body (16) ;

- a pivot (32) suitable for being connected to said jamb of the frame and hinged to said hinge body (2) for allowing the relative rotation between said pivot (32) and said hinge body (2), wherein said pivot comprises a cam shaped portion (38), which is suitable for allowing an automatic return of the door from an open configuration to a closed configuration;

- influencing means suitable for constantly influencing said roller bearing body to keep said stop body fixed onto the cam portion (38) of the pivot (32);

said hinge being **characterised in that** it also comprises guiding means suitable for guiding said roller bearing body (14) between a retracted position, corresponding to an open configuration of the door, and an advanced position, corresponding to a closed configuration of the door.

2. Hinge according to claim 1, wherein said guiding means are suitable for guiding said roller bearing body (14) along a basically straight path.
3. Hinge according to claim 2, wherein said guiding means are suitable for guiding said roller bearing body, avoiding contact with the side walls (10a, 10b) of the space (8).
4. Hinge according to claim 1 or 2, wherein said guiding means comprise at least one pole (30a,30b) coupled to said roller bearing body in a sliding manner(14).
5. Hinge according to claim 4, wherein said pole (30a, 30b) is cylindrical.
6. Hinge according to claim 4 or 5, wherein said pole (30a,30b) is coupled to said roller bearing body by means of sliding shaft-hole coupling.

7. Hinge according to any one of the claims from 4 to 6, wherein said guiding means comprise two poles (30a,30b), which extend along a longitudinal direction, coinciding with the direction of movement of the roller bearing body from a retracted position to an advanced position.

8. Hinge according to claim 7, wherein said poles are transversally spaced out.

9. Hinge according to any one of the previous claims, wherein said guiding means are contained in said space.

10. Hinge according to claim 9, wherein said guiding means are supported by a bottom wall (12) and by projections (22a,22b) of the space (8).

11. Hinge according to any one of the previous claims, wherein the width of said roller bearing body (14) is smaller than the width of the space (8).

12. Hinge according to any one of the previous claims, wherein said influencing means comprise at least one spring (20).

13. Hinge according to claim 12, wherein said at least one spring is constantly compressed between the roller bearing body (14) and a bottom wall (12) of the space (8).

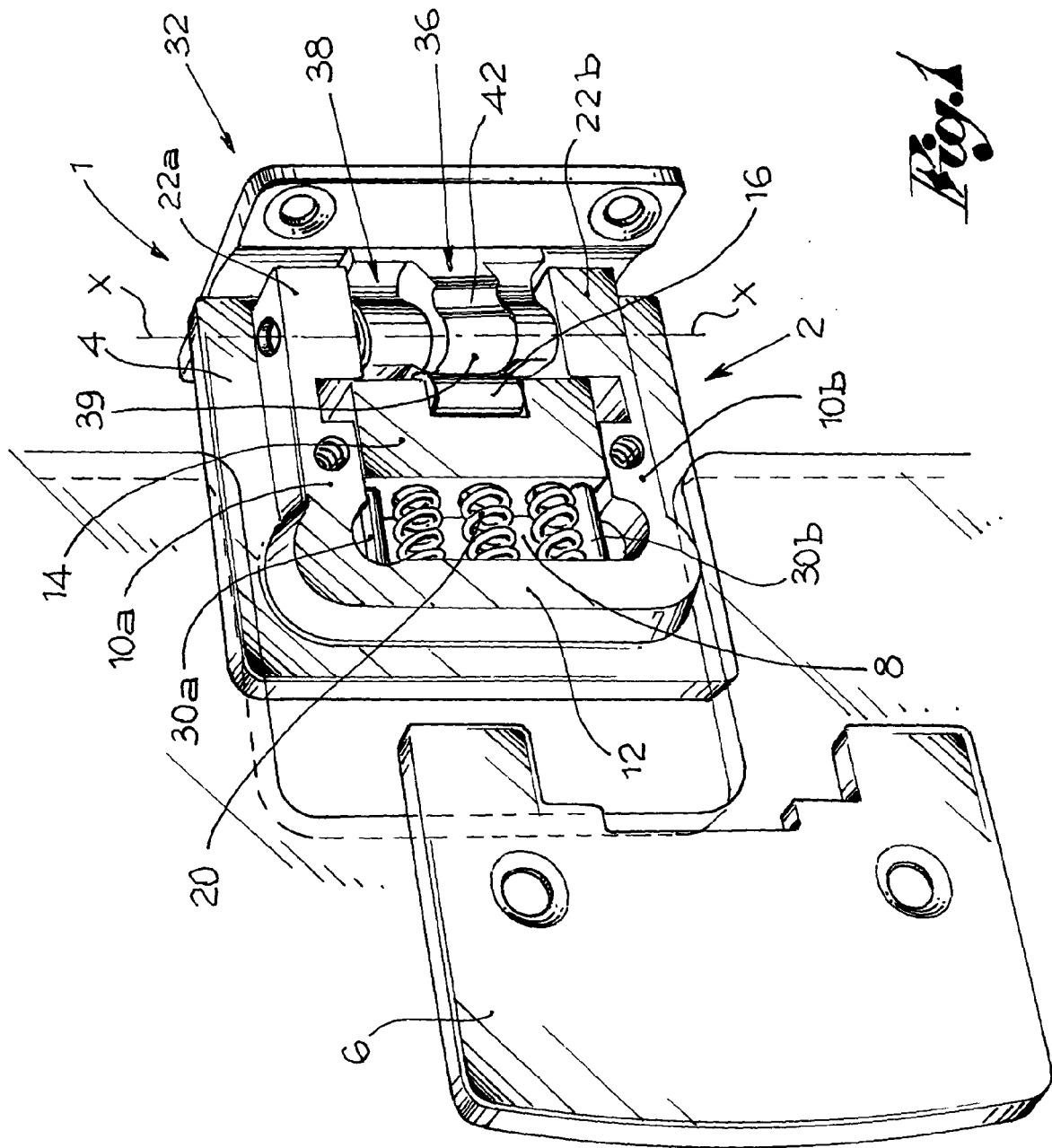
14. Hinge according to any one of the previous claims, wherein said hinge body (2) comprises a bearing plate (4) and a covering plate (6) between which a portion of the wing can be set to be connected to the hinge body (2).

15. Hinge according to any one of the previous claims, wherein said cam shaped portion (38) of the cam body (36) comprises an active portion (39) and at least one indentation (40,42).

16. Hinge according to claim 15, wherein said cam portion (38) comprises a central indentation (40), wherein said stop body (16) is received in the closed configuration of the door.

17. Hinge according to claim 15 or 16, wherein said cam portion (38) comprises at least one side indentation (42) in which said stop body (16) is received in the limit open configuration of the door.

18. Hinge according to any one of the previous claims, wherein said roller bearing body (14), said stop body (16), said cam portion (38) and said pin (34) are in axis.



Key:

Fig. 2

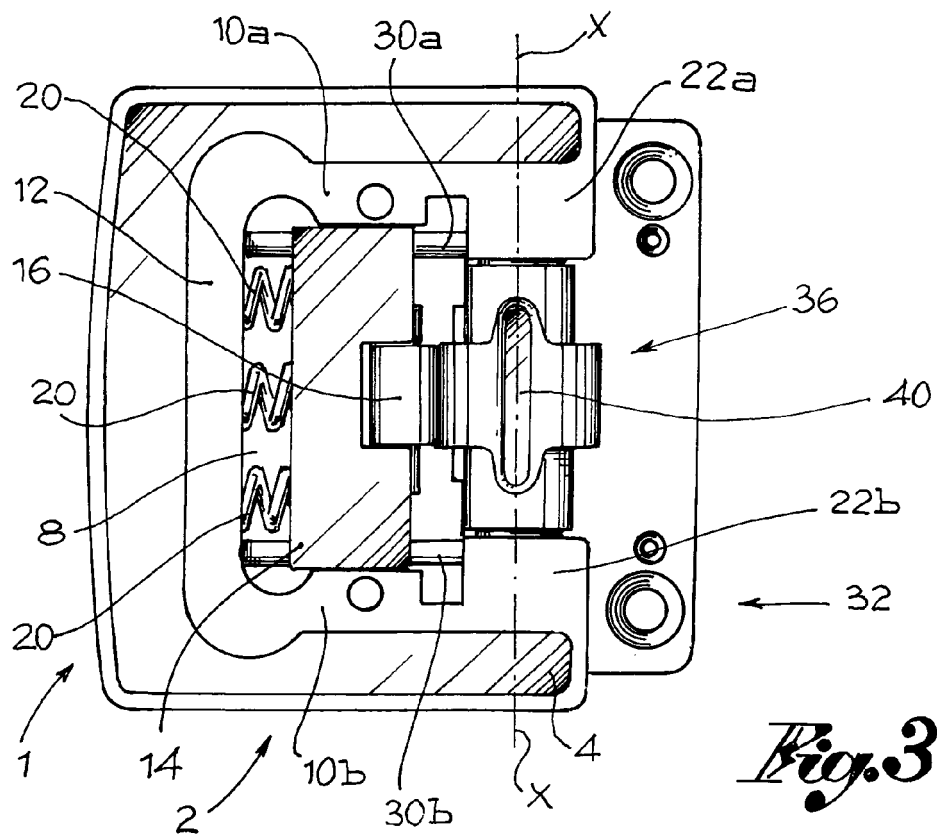
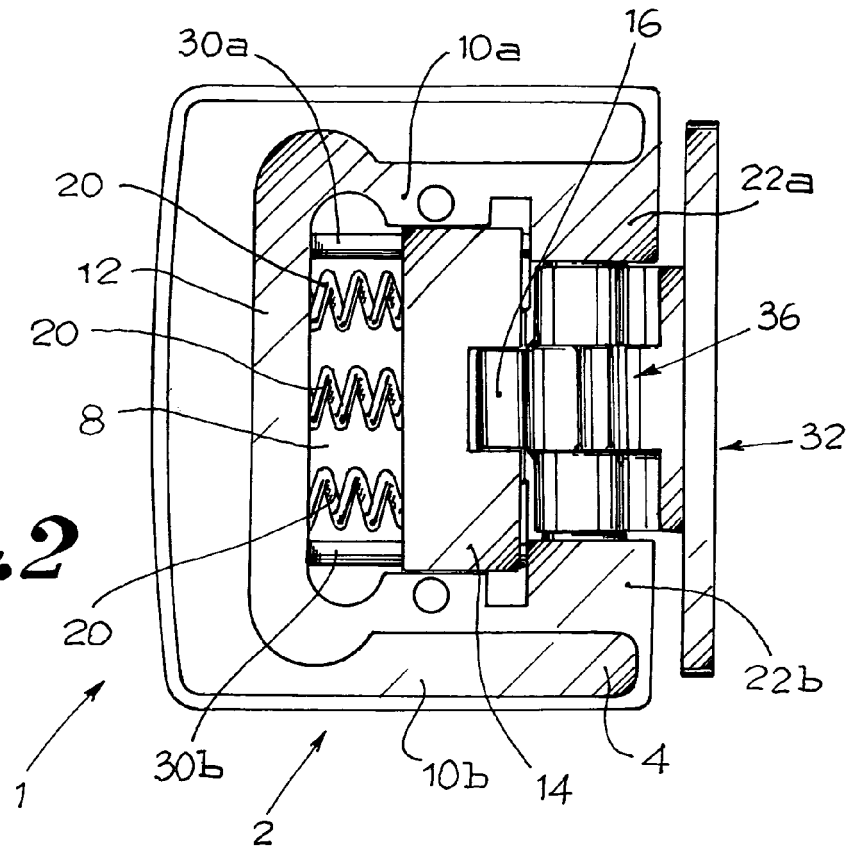
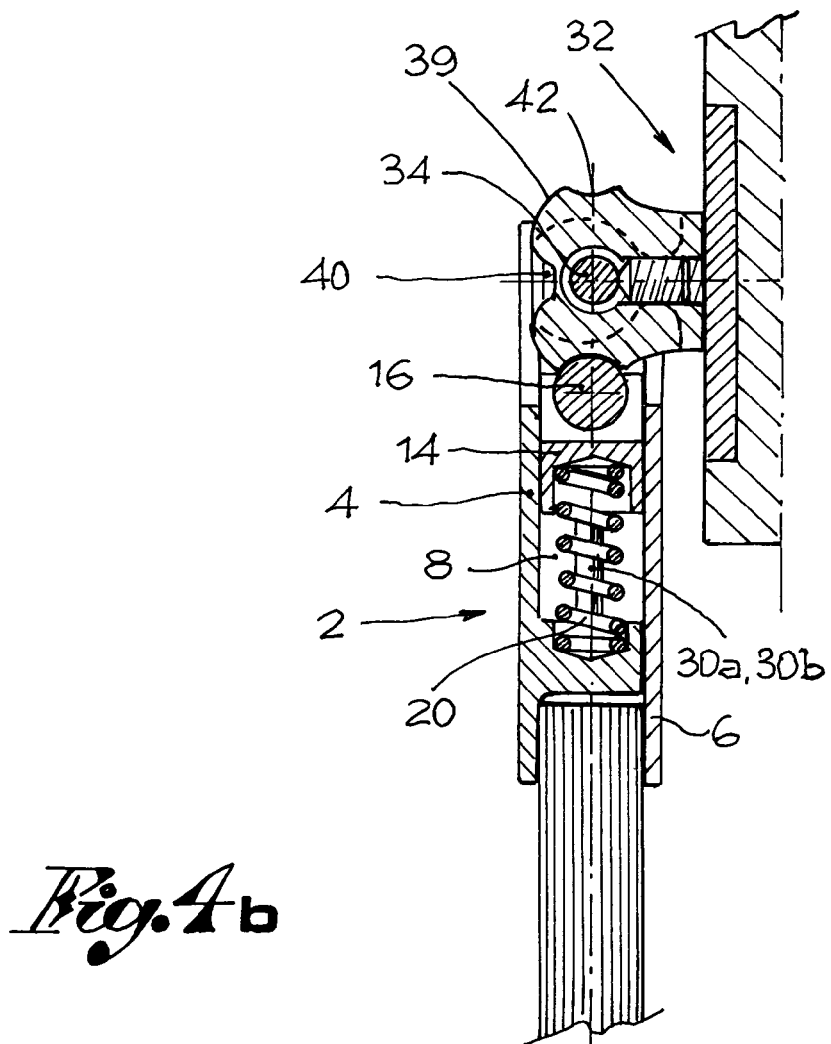
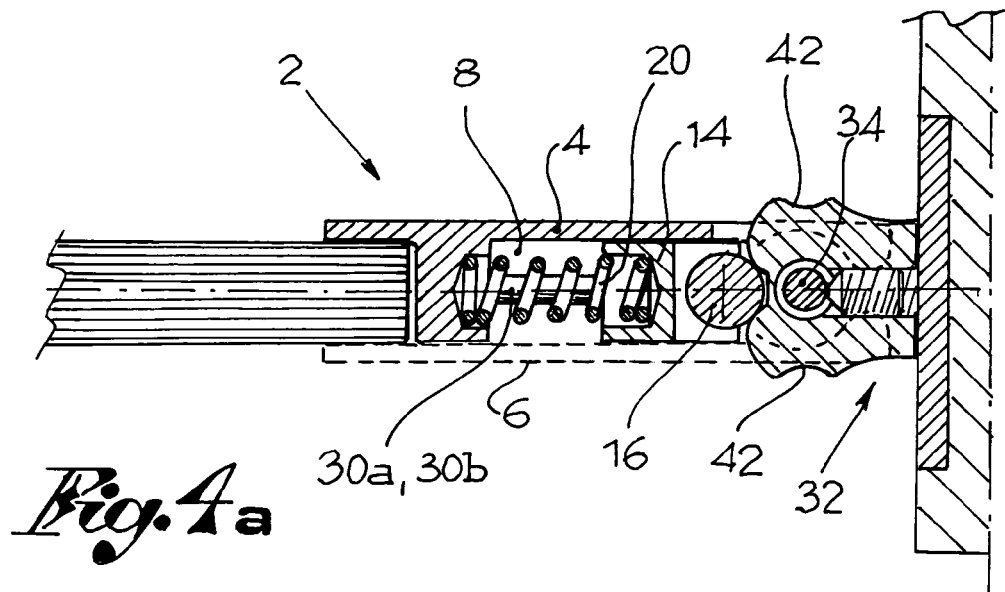


Fig. 3





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 42 5704

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 February 2005	Examiner Witasse-Moreau, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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