US 20080210830A1

(19) **United States**

(12) **Patent Application Publication**

Sedivy et al.

(10) **Pub. No.: US 2008/0210830 A1**

(43) **Pub. Date: Sep. 4, 2008**

(54) **DEVICE FOR FASTENING AT LEAST ONE OBJECT TO A SUPPORTING PART PROVIDED WITH A FASTENING BOLT**

(75) Inventors: **Jiri Sedivy**, Jablonec nad Nisou (CZ); **Sylvain Giraud**, Echirolles (FR)

Correspondence Address:
BAKER & DANIELS LLP
111 E. WAYNE STREET
SUITE 800
FORT WAYNE, IN 46802 (US)

(73) Assignee: **A. RAYMOND ET CIE**, Grenoble (FR)

(21) Appl. No.: **11/914,258**

(22) PCT Filed: **Apr. 27, 2006**

(86) PCT No.: **PCT/EP2006/003897**

§ 371 (c)(1),
(2), (4) Date: **Nov. 13, 2007**

(30) **Foreign Application Priority Data**

Jun. 10, 2005 (DE) 10 2005 026 855.2

Publication Classification

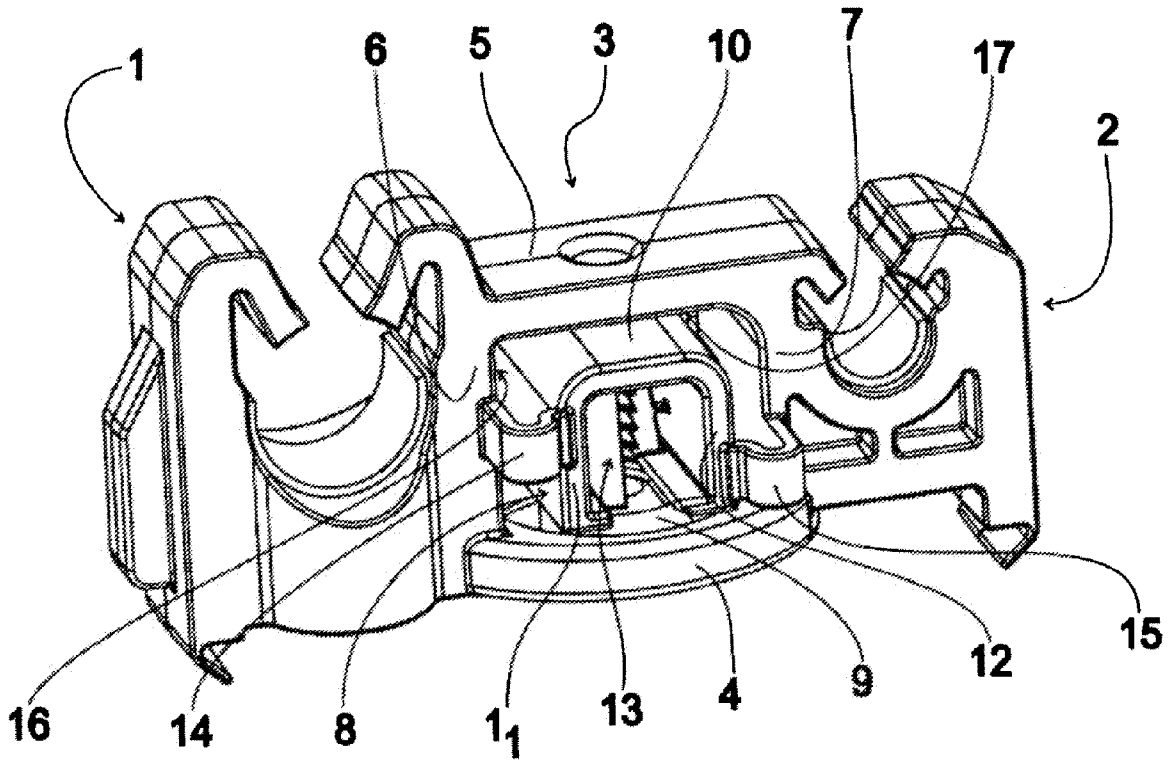
(51) **Int. Cl.**

F16L 3/12	(2006.01)
F16B 37/08	(2006.01)
F16L 3/237	(2006.01)
F16L 3/22	(2006.01)

(52) **U.S. Cl.** **248/73**

(57) **ABSTRACT**

A device for fastening at least one object to a supporting part provided with a fastening bolt comprises an engaging arrangement (**13**) that can be brought into engagement with the fastening bolt. The engaging arrangement (**13**) is mounted on an inner cage (**8**) connected via a number of bent flexible connecting pieces (**14**, **15**, **16**, **17**) to an outer cage (**3**), on which, in turn, at least one holding arrangement (**1**, **2**) for holding the or each object is formed. This results in good tolerance compensation with regard to the position of the fastening bolt.



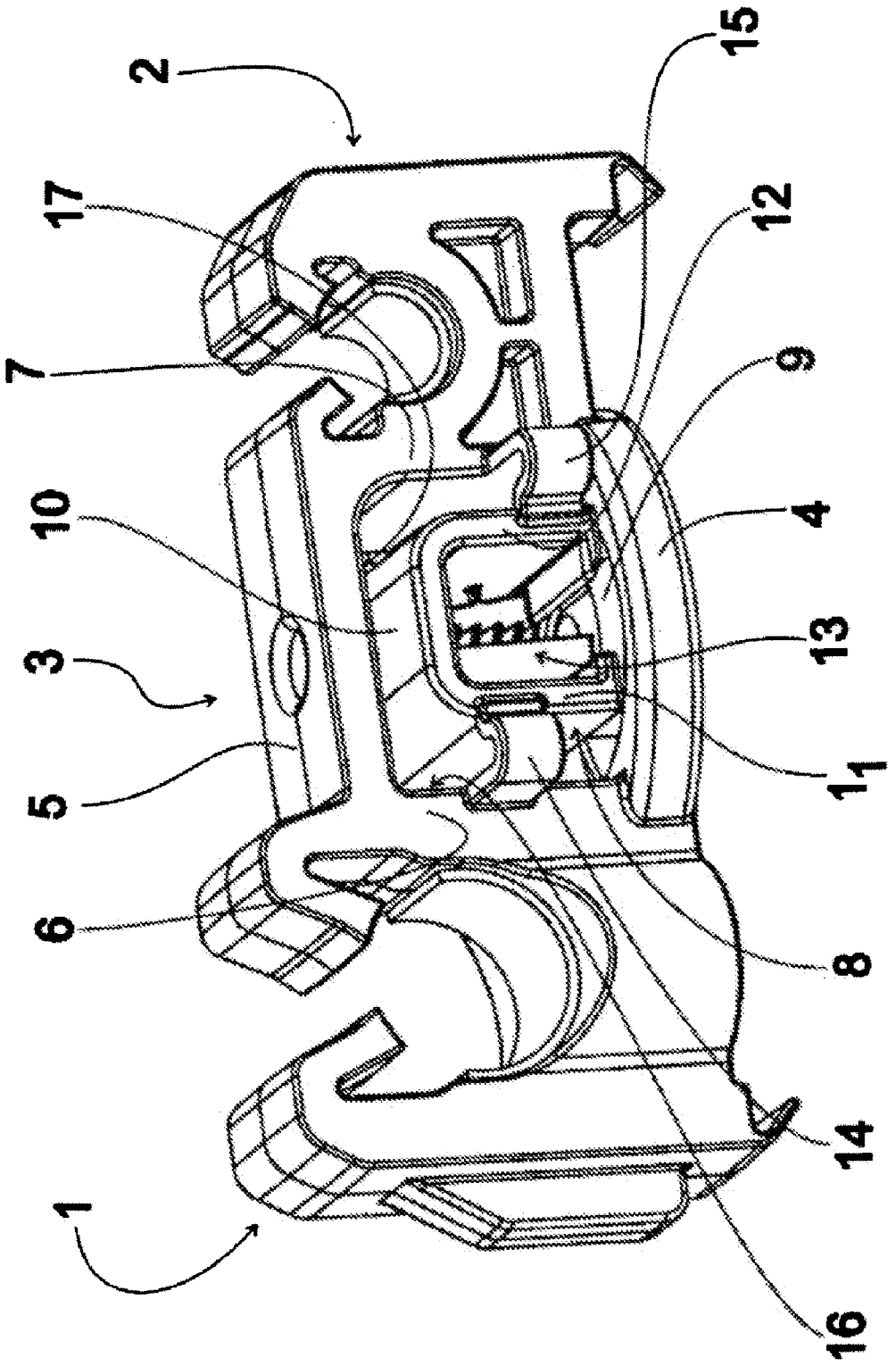


Fig. 1

Fig. 2

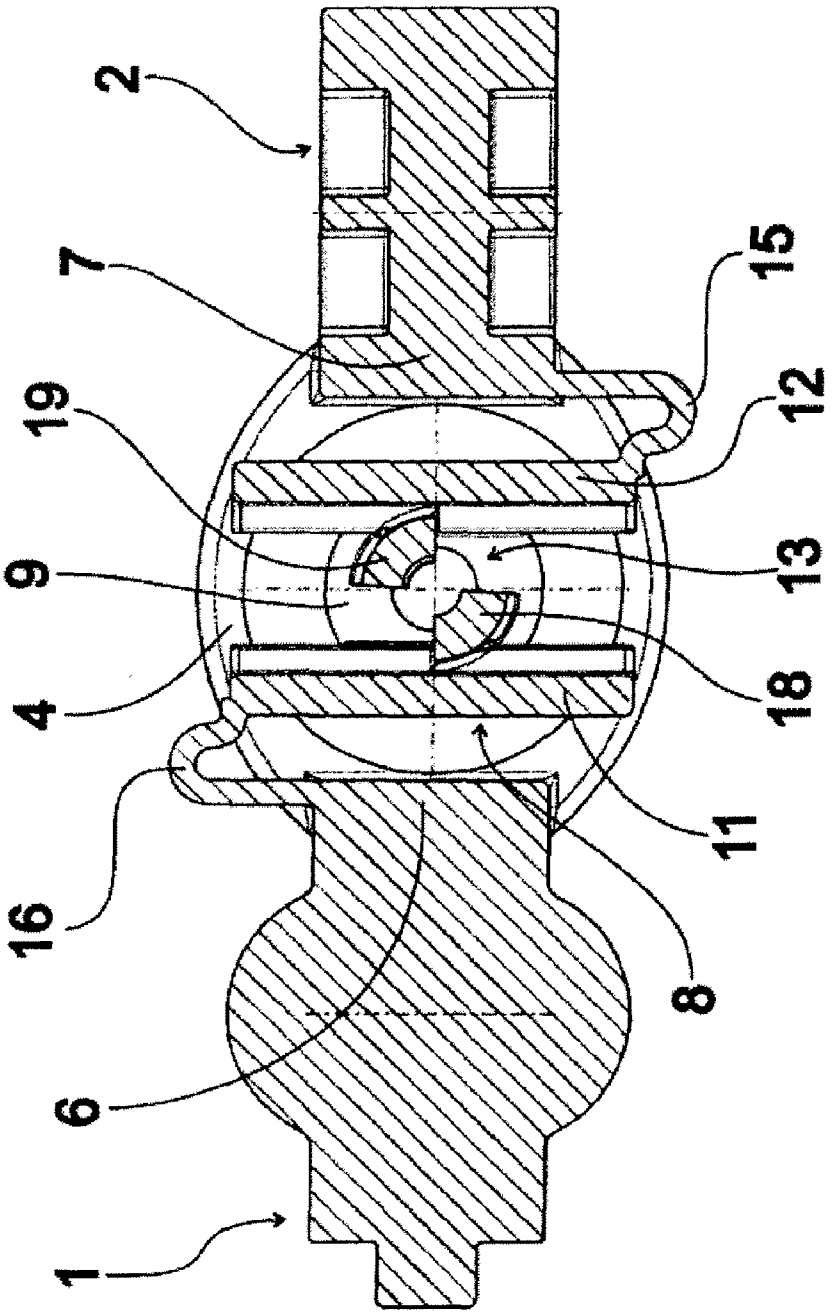
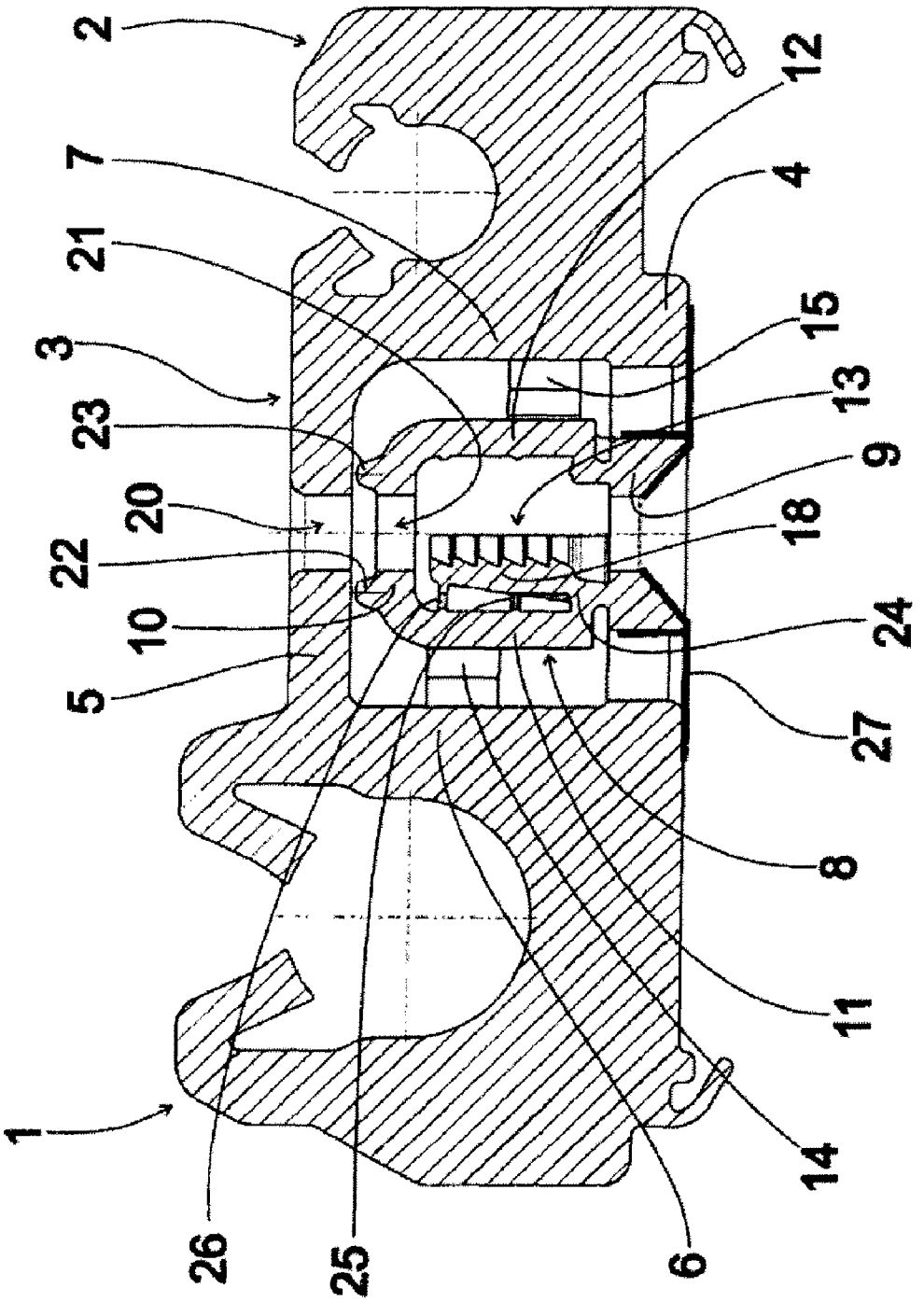


Fig. 3



DEVICE FOR FASTENING AT LEAST ONE OBJECT TO A SUPPORTING PART PROVIDED WITH A FASTENING BOLT

[0001] The invention relates to a device according to the preamble of Claim **1**.

[0002] Such a device is known, for example, from DE 196 34 309 A1. The prior device comprises an engaging arrangement that can be brought into engagement with the fastening bolt. Said engaging arrangement is surrounded by an outer cage to which is joined a holding arrangement for the objects to be fastened, particularly conduits.

[0003] The object underlying the invention is to specify a device of the initially cited kind that affords efficient tolerance compensation with regard to the position of the fastening bolt.

[0004] This object is achieved according to the invention, in a device of the initially cited kind, by means of the characterizing features of Claim **1**.

[0005] By virtue of the fact that the engaging arrangement is mounted on an inner cage and the inner cage is connected to the outer cage via bent flexible connecting pieces, the inner cage is able to move relative to the outer cage in such a way that tolerances in the position of the fastening bolt can be compensated, within the scope of the relative mobility of the inner cage.

[0006] Further suitable configurations of the invention are the subject matter of the dependent claims.

[0007] Other suitable configurations and advantages will become apparent from the following description of a preferred exemplary embodiment of the invention, taken with reference to the figures of the drawing. Therein:

[0008] FIG. **1** is a perspective view of an exemplary embodiment of a device according to the invention,

[0009] FIG. **2** shows the exemplary embodiment according to FIG. **1** in a section taken at right angles to an insertion direction of a fastening bolt, and

[0010] FIG. **3** shows the exemplary embodiment according to FIG. **1** in another section, extending at right angles to the section of FIG. **1**.

[0011] FIG. **1** is a perspective view of an exemplary embodiment of a device according to the invention, which comprises holding arrangements **1**, **2**, known per se, in which can be fastened, as preferably elongate objects, for example conduits in the form of electrical wiring or fluid lines. The holding arrangements **1**, **2** are connected to an outer cage **3** comprising an annular base portion **4**, a top portion **5** disposed spacedly from said base portion **4**, and two side portions **6**, **7** interconnecting said base portion **4** and said top portion **5**.

[0012] Disposed within outer cage **3** is an inner cage **8**, comprising an annular base portion **9**, a flattened top portion **10** and two side portions **11**, **12** interconnecting said base portion **9** and said top portion **10**. Inside the inner cage **8** is an engaging arrangement **13**, which can be brought into engagement with a fastening bolt (not illustrated in FIG. **1**) that is typically mounted on a supporting part (also not shown in FIG. **1**).

[0013] The device according to the invention additionally comprises a number of bent flexible connecting pieces **14**, **15**, **16**, **17**, it being the case in the illustrated exemplary embodiment that two connecting pieces **14**, **15** are disposed on what is the front side in the representation of FIG. **1** and two connecting pieces **16**, **17** on what is the back side in the representation of FIG. **1**. Thus, the inner cage **8** is mounted movably in spaced relation to the outer cage **3**.

[0014] FIG. **2** shows the exemplary embodiment according to FIG. **1** in a section taken at right angles to an insertion direction of a fastening bolt, at a level occupied by the connecting pieces **14**, **17** disposed adjacent to base portions **4**, **9**. It can be seen from FIG. **2** that the respectively similarly configured connecting pieces **14**, **15**, **16**, **17** are bent outward, they being arranged in pairs diametrically opposite each other in two mutually offset planes on both sides of the inner cage. This also produces a certain torsionability of the inner cage **8** relative to the outer cage **3** in the longitudinal direction of the fastening bolt.

[0015] It can further be understood from FIG. **2** that the engaging arrangement **13** comprises a number—for example two, as in the illustrated exemplary embodiment—of bolt claws **18**, **19**, which can be brought into engagement with the fastening bolts. The bolt claws **18**, **19** are disposed diametrically opposite each other and each extend over a circumferential angle of approximately 90 degrees.

[0016] FIG. **3** shows the exemplary embodiment according to FIG. **1** in a further section, which extends at right angles to the section of FIG. **1**. It can be seen from the representation according to FIG. **3** that the connecting pieces **14**, **15**, **16**, **17** are arranged in pairs in two planes. It can further be appreciated from FIG. **3** that a respective recess **20**, **21** is provided in each of the top portions **5**, **10** of outer cage **3** and inner cage **8**, respectively, in order, during the production of the device, to draw the female mold for the bolt claws **18**, **19** through the top portions **5**, **10** by the action of a mandrel and permit the ejection of the device.

[0017] It can further be understood from FIG. **3** that configured on the top portion **10** of inner cage **8** are projections **22**, **23** directed toward the top portion **5** of outer cage **3**, in order to limit the relative movement of inner cage **8** in relation to outer cage **3** in the insertion direction when the device is pushed onto a fastening bolt.

[0018] In the representation according to FIG. **3**, it can be seen that the bolt claws **18**, **19** are connected to inner cage **8** via a number of connecting ribs **24**, **25**, **26**.

[0019] It can additionally be understood from FIG. **3** that the base portion **9** of inner cage **8** is conically beveled on the inside, to produce a guiding effect when the device is pushed onto a fastening bolt. To prevent [word(s) apparently missing] from occurring should the fastening bolt initially be positioned improperly in the clearance between outer cage **3** and inner cage **8**, a cover plate **27** is present that is connected to the base portion **9** of inner cage **8** and is floatingly mounted in relation to outer cage **3**. The cover plate **27** extends from base portion **9** of inner cage **8** radially outward at least far enough so that the clearance between the base portions **4**, **9** is covered even in the event of the maximum possible relative movements of inner portion **8** relative to outer portion **3**.

1-8. (canceled)

9: A device for fastening an object to a supporting part which includes a fastening bolt, said device comprising: an engaging arrangement adapted to be brought into engagement with a said fastening bolt; an outer cage surrounding said engaging arrangement; an inner cage on which said engaging arrangement is mounted, said inner cage disposed

inside said outer cages; said inner cage connected to said outer cage by a plurality of outwardly bent flexible connecting pieces.

10: The device of claim **9** wherein four connecting pieces are arranged in pairs diametrically opposite each other in two mutually offset planes on opposite sides of said inner cage.

11: The device of claim **10** wherein said connecting pieces which are located in one plane are arranged diagonally opposite each other relative to said inner cage.

12: The device of claim **9** wherein said engaging arrangement comprises a plurality of bolt claws that are adapted to be brought into engagement with a said fastening bolt, said bolt claws connected to said inner cage via connecting ribs.

13: The device of claim **9** wherein said inner cage includes a floor portion comprising a recess that tapers conically in the insertion direction.

14: The device of claim **13** including a cover plate which is connected to said inner cage and which is floatingly mounted in the direction of insertion from said base portion, and which covers the clearance between said outer cage and said inner cage.

15: The device of claim **9** wherein said device is made from a foamed synthetic material.

16: The device of claim **15** wherein said synthetic material is a PP/EPDM copolymer.

* * * * *