Anchoring device for building components made of concrete or the like with easy-to-apply element for anchoring to the component

An anchoring device (1) for building components made of concrete, with an easy-to-apply element for anchoring to the component (3) comprises an anchoring section (2) which has, on its side designed to be directed toward the inside of a component (3), at least one opening (5) which can be crossed by an element (6) for anchoring the section to the component. The anchoring element (6) is pin-shaped and has a head (6a) which is larger than the opening (5) and a stem (6b) which is threaded at least in its region proximate to the head. A locking element (7) is also provided which has a threaded hole (7a) which can be coupled to the thread of the stem. The locking element (7) can be tightened on the stem of the anchoring element (6), inserted through the opening, in the direction of the head, in order to clamp between the head and the locking element the region of the anchoring section at the opening, so as to rigidly couple the anchoring element to the anchoring section.
Description

[0001] The present invention relates to an anchoring device for building components made of concrete or the like with easy-to-apply element for anchoring to the component.

[0002] Anchoring devices for interconnecting components made of concrete or the like or for rigidly coupling other elements to a concrete component are known. Such devices comprise anchoring sections which generally have a substantially C-shaped transverse cross-section and are designed to be partially embedded in the concrete component so that the open side of the C-shape is arranged at one face of the component. Inside the guide formed by the anchoring section it is possible to arrange and lock connecting elements for anchoring to the component other components or accessory elements of the building, such as for example pipes, raceways, cables, et cetera.

[0003] Anchoring sections generally have anchoring elements constituted by brackets or pin-like elements which are designed to be embedded in the concrete component in order to provide adequate strength of the connection between the anchoring section and the component.

[0004] In some cases, the anchoring elements are welded to the anchoring section. In other cases, the anchoring elements are fixed to the anchoring section by clinching or upsetting.

[0005] For example, German Patent DE-PS 26.31.396 discloses an anchoring section which is provided with substantially I-shaped anchoring elements. In this case, openings are formed beforehand in the back of the anchoring section, i.e., on its side that lies opposite the open side of the C-shape, and regions which are recessed on the inner side of the anchoring section are formed at the openings. The anchoring elements have, at one end of the I-shape, a protrusion which can be inserted in one of the openings and is clinched inside the anchoring section, so as to permanently couple the anchoring element to the anchoring section.

[0006] The welding operations and, even more so, the clinching or upsetting operations for associating the anchoring elements with the anchoring section significantly affect the overall production costs of these anchoring devices.

[0007] Moreover, particularly if the connection between the anchoring section and the anchoring elements is performed by upsetting or clinching, the anchoring devices must be assembled in a suitably equipped workshop and it is then necessary to transport the anchoring devices to the building site when they are already assembled, accordingly when they are considerably bulkier than the anchoring sections alone.

[0008] Another problem that can be noted in these anchoring devices is the fact that the anchoring elements to be used must be preset and cannot be replaced subsequently to adapt them to the various building site requirements. This entails holding in store a large number of anchoring elements to be used according to the various design requirements.

[0009] Anchoring devices are also known which are composed of anchoring sections and anchoring elements which can be assembled to the anchoring section without requiring welding, clinching or upsetting operations.

[0010] This type includes, for example, anchoring sections equipped with bracket arrangements constituted simply by variously shaped steel strips which are inserted in adapted holes formed in the anchoring section.

[0011] EP-154.157 also discloses an anchoring section which has anchoring elements which are substantially shaped like a pin with a threaded stem.

[0012] Such anchoring section has, on the inner side of its back, cone-shaped recesses which end with a substantially cylindrical neck. The substantially cylindrical neck is crossed by a threaded hole in which it is possible to couple an anchoring element which is shaped like a threaded pin. Substantially, the anchoring element is screwed into the neck of the corresponding recess so that the head of the pin is accommodated within the recess on the inner side of the anchoring section, while its threaded stem protrudes outward from the back of the anchoring section and is designed to be embedded in the concrete component. Other elements having a corresponding thread are associated with the threaded stem, by using the thread of said stem, in order to increase the grip of the anchoring element inside the body of the concrete component.

[0013] Although these anchoring sections are very practical in the assembly of the anchoring elements to the anchoring section body, they have the drawback of having a reduced strength of the connection between the anchoring section and the anchoring elements, since said connection is achieved simply by means of the threaded coupling provided between the anchoring element and the cylindrical neck of the cone-shaped recesses. In particular, said connection has a reduced resistance to compression, i.e., if the anchoring section is subjected to a force which pushes it toward the inside of the component, because in this stress condition the resistance of the connection between the anchoring element and the anchoring section is ensured only by the threaded coupling.

[0014] Moreover, the provision of the thread in the neck of the recesses of the anchoring section significantly affects the production costs of this device.

[0015] The aim of the present invention is to solve the above-cited problems, by providing an anchoring device for building components made of concrete or the like, constituted by an anchoring section and by one or more elements for anchoring the section to the concrete component, wherein the anchoring element or elements can be assembled very simply to the anchoring section,
achieving high strength of the connection of the anchoring element or elements to the anchoring section.

[0017] Within the scope of this aim, an object of the present invention is to provide a device in which the anchoring element or elements can be assembled to the anchoring section without requiring welding, upsetting or clinching operations.

[0018] Another object of the present invention is to provide an anchoring device in which the anchoring element or elements can be constituted by standardized elements which are easily available.

[0019] Another object of the present invention is to provide an anchoring device in which the connection of the anchoring elements to the anchoring section can be entrusted directly to the user at the building site.

[0020] These and other objects which will become better apparent hereinafter are achieved by an anchoring device for building components made of concrete or the like, with an element for anchoring to the component, comprising an anchoring section which has, on its side designed to be directed toward the inside of a component, at least one opening which can be crossed by an element for anchoring said section to the component; said anchoring element being pin-shaped, with a head which is larger than said opening and with a stem which is threaded at least in its region proximate to said head, characterized in that it comprises a locking element provided with a threaded hole which can be coupled to the thread of said stem, and in that said locking element can be tightened on said stem, inserted through said opening, in the direction of said head, in order to clamp between said head and said locking element the region of said anchoring section at said opening.

[0021] Further characteristics and advantages of the present invention will become better apparent from the following detailed description of an anchoring device according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a perspective view of the device according to the invention;
Figure 2 is a sectional view, taken along a transverse plane, of the anchoring device according to the invention, embedded in a concrete component;
Figure 3 is a sectional view of the anchoring device, generally designated by the reference numeral 1, comprises an anchoring section 2 designed to be directed toward the inside of a building, such as for example pipes, raceways, cables, etcetera.

[0022] With particular reference to Figures 1 to 4, the anchoring device, generally designated by the reference numeral 1, comprises an anchoring section 2 which can have, in a per se known manner, a substantially C-shaped transverse cross-section.

[0023] The anchoring section 2 is designed to be embedded in a concrete component 3 so that the open side of the C-shape lies at the level of one of the outer faces of the component 3.

[0024] Alternatively, the anchoring section 2 can protrude partially or fully from one of the outer faces of the component 3.

[0025] The anchoring section 2 has two lateral wings 4a and 4b which face each other and are connected by a back 4c. The lateral wings 4a and 4b have tabs which are folded toward each other above the back 4c, so as to form undercuts which can be engaged by conventional connecting elements, not shown for the sake of simplicity, which can be inserted in the anchoring section 2 and can be used to connect the component 3 to another component or to accessory elements of a building, such as for example pipes, raceways, cables, et cetera.

[0026] The anchoring section 2 has, on its side designed to be directed toward the inside of the component 3, at least one opening 5 which can be crossed by an anchoring element 6 in order to provide stable and rigid coupling of the anchoring section 2 to the component 3.

[0027] The anchoring element 6 is substantially pin-shaped and has a head 6a which is larger than the opening 5 and a stem 6b which is threaded at least in its region located proximate to the head 6a.

[0028] According to the invention, a locking element 7 is provided which is crossed by a threaded hole 7a which can be coupled to the threaded portion of the stem 6b of the anchoring element 6.

[0029] The locking element 7 can be tightened onto the stem 6b of the anchoring element 6, which is inserted beforehand through the opening 5 with the head 6a inside the anchoring section 2, toward the head 6a, so as to clamp, between the head 6a and the locking element 7, the region of the anchoring section 2 at the opening 5a, thus providing the stable and rigid coupling of the anchoring element 6 to the anchoring section 2.

[0030] Preferably, the stem 6b is threaded along its entire length. In this case, the anchoring element 6 can be constituted by a conventional screw whose dimensions can vary according to requirements and which is easily commercially available.

[0031] The opening 5 has an axis which is substantially perpendicular to the longitudinal extension of the anchoring section 2 and is formed in the back 4c of the component; Figures 9 to 11 are side elevation views of various embodiments of the anchoring element applied to an anchoring section.
anchoring section 2.
[0032] Preferably, around the opening 5 there is a region 8 which is recessed on the inner side of the anchoring section 2 and is designed to at least partially accommodate the head 6a of the anchoring element 6.
[0033] The recessed region 8 is preferably formed by plastic deformation of the back 4c of the anchoring section 2, generating a corresponding protrusion on the outer side of the back 4c of the anchoring section 2.
[0034] The recessed region 8 can have a substantially conical shape, with an axis which is perpendicular to the plane of arrangement of the back 4c of the anchoring section, as shown in Figures 1 to 4.
[0035] Alternatively, as shown in Figure 5, the recessed region, designated by the reference numeral 8a in said figure, can have a substantially cylindrical shape, with its axis arranged again at right angles to the plane of arrangement of the back 4c of the anchoring section 2. In this case, the opening 5 is formed in the bottom of the recessed region 8a and has smaller dimensions than the bottom, so as to form in any case a resting shoulder for the head 6a of the anchoring element 6.
[0036] The opening 5 is preferably constituted by a circular hole.
[0037] The plan shape of the recessed region 8, 8a can be, according to requirements, circular, as shown in Figure 6, oval as shown in Figure 7, or polygonal, as shown in Figure 8.
[0038] The head 6a can be conical, as shown in Figures 1 to 3, or polygonal or oval, so as to couple to, and be accommodated at least partially within, the recessed region 8, 8a.
[0039] The locking element 7 can be simply constituted by a nut or, as shown in Figure 9, it can be constituted by a nut with a collar 10a or, as shown in Figure 11, by a nut 10b provided, on its side designed to be directed toward the anchoring section 2, with a seat which is adapted to at least partially accommodate the protrusion formed on the outer side of the back 4c of the anchoring section 2 as a consequence of its deformation in order to obtain the recessed region 8, 8a.
[0040] An additional anchoring element can be screwed onto the stem 6b, proximate to its end that lies opposite the head 6a; said additional anchoring element can be constituted simply by a nut, or by a nut with a collar 11a, as shown in Figure 9, or by a blind nut 11b, as shown in Figure 10, or by a wing nut 11c, as shown in Figure 11, or by another variously shaped element provided with a threaded hole which can be coupled to said stem 6b.
[0041] In practice, the anchoring section 2 is produced in the workshop so as to be already provided with the openings 5 and the recessed regions 8, 8a around openings 5.
[0042] Then, by means of an operation which can be easily performed even directly on-site by the user, the anchoring elements 6 are associated with the anchoring section 2 by inserting the stem 6b through the openings 5 so that the head 6a remains on the inner side of the anchoring section 2 in the optional recessed region 8, 8a. The nut 7, 10a, 10b is then screwed onto the stem 6b until the region of the anchoring section 2 arranged around the opening 5 is clamped between the head 6a and said nut 7, 10a, 10b. In this manner, the anchoring element 6 is firmly and stably coupled to the anchoring section 2.
[0043] Finally, the nut 11a, 11b or 11c is optionally screwed onto the end of the stem 6b that lies opposite the head 6a.
[0044] At this point, the anchoring section 2, with the anchoring elements 6, is inserted in a form into which the concrete is poured to form the component 3. Such casting embeds the anchoring elements 6, which ensure adequate strength of the connection between the anchoring section 2 and the component 3.
[0045] It should be noted that the clamping of the region of the anchoring section arranged around the opening 5, performed by the nut 7, 10a, 10b, achieves high strength of the connection between the anchoring elements 6 and the anchoring section 2 in terms of both traction and compression, i.e., along two mutually opposite directions which are parallel to the axis of the anchoring element 6.
[0046] In practice it has been observed that the anchoring device according to the invention fully achieves the intended aim and objects, since it can be assembled simply and rapidly, even at the building site, and ensures high strength of the connection between the anchoring elements and the anchoring section.
[0047] In practice, the materials used, as well as the dimensions, may be any according to requirements and to the state of the art.
[0048] The disclosures in Italian Utility Model Application No. MI99U000444 from which this application claims priority are incorporated herein by reference.
[0049] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An anchoring device for building components made of concrete or the like, with an element for anchoring to the component, comprising an anchoring section which has, on its side designed to be directed toward the inside of a component, at least one opening which can be crossed by an element for anchoring said section to the component; said anchoring element being pin-shaped, with a head which is larger than said opening and with a stem which is threaded at least in its region proximate to
said head, characterized in that it comprises a locking element provided with a threaded hole which can be coupled to the thread of said stem, and in that said locking element can be tightened on said stem, inserted through said opening, in the direction of said head, in order to clamp between said head and said locking element the region of said anchoring section at said opening.

2. The anchoring device according to claim 1, characterized in that the stem of said anchoring element is threaded along its entire length.

3. The anchoring device according to claim 1, characterized in that said opening has an axis which is substantially perpendicular to a longitudinal extension of the anchoring section.

4. The anchoring device according to claim 1, characterized in that said anchoring section has a substantially C-shaped transverse cross-section, said at least one opening being formed on the back of the C-shape.

5. The anchoring device according to claim 1, characterized in that a region which is recessed on an inner side of the anchoring section is formed around said opening and is designed to at least partially accommodate said head of the anchoring element.

6. The anchoring device according to claim 5, characterized in that said recessed region is circular in plan view.

12. The anchoring device according to claim 5, characterized in that the head of said anchoring element is shaped complementarily to said recessed region.

13. The anchoring device according to claim 1, characterized in that said locking element is constituted by a nut.

14. The anchoring device according to claim 5, characterized in that said recessed region forms a corresponding protrusion on the outer side of the back of the anchoring section and in that said locking element has, on its face directed toward said back of the anchoring section, a seat which is adapted to at least partially accommodate said protrusion.

15. The anchoring device according to claim 1, characterized in that it comprises an additional anchoring element which is screwed onto the stem of said anchoring element.

16. The anchoring device according to claim 15, characterized in that said additional anchoring element comprises a nut.

17. The anchoring device according to claim 16, characterized in that said additional anchoring element comprises a nut with a collar.

18. The anchoring device according to claim 16, characterized in that said additional anchoring element comprises a blind nut.

19. The anchoring device according to claim 16, characterized in that said additional anchoring element comprises a wing nut.

8. The anchoring device according to claim 1, characterized in that said opening is constituted by a circular hole.

9. The anchoring device according to claim 5, characterized in that said recessed region is circular in plan view.

10. The anchoring device according to claim 5, characterized in that said recessed region is polygonal in plan view.

11. The anchoring device according to claim 5, character-