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(54) SELF DRILLING FASTENER

(71) We, SOCIETE DE PROSPECTION ET D'INVENTIONS TECHNIQUES SPIT, a French Body Corporate of Bourg-les-Valence, (Drôme) France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

10 The invention relates to a self-drilling fastener. Conventional self-drilling fasteners are arranged so as to be used as trepans and drill, for instance with the aid of an electric or pneumatic tool, holes in 15 which they are intended to be anchored. With such fasteners, one is sure to obtain anchoring holes suitably gauged to receive them.

20 Usually, these fasteners comprise an expansion core, e.g. conical, and an anchoring member acting as trepan as well as being intended to be forcibly inserted on said core by an expandable end hollowed out to this effect and often formed with 25 longitudinal grooves for facilitating the expansion.

30 Further to the drilling operation and once the anchoring member has been removed from the hole drilled by said member, the anchoring of one of these fasteners can be achieved by introducing the anchoring member into the hole and by forcibly inserting the anchoring element by its hollowed-out end onto the expansion core 35 which is resting on the bottom of the hole, the expansion of said member ensuring its anchoring in said hole.

40 As no means are provided with such fasteners to ensure the cooperation of the expansion core with the inner walls of the hollowed-out end of the anchoring member, after introduction into the previously drilled anchoring hole, the core can assume a wrong position thereby rendering difficult 45 the insertion of the anchoring member onto

said core and, consequently, to proceed with the expansion operation.

An attempt can be made to engage the core into the anchoring member before 50 jointly introducing them into the hole. But a mere shock can recreate the previous situation. This is one of the disadvantages of such fasteners, all the more so as it is not always easy to find this out, the rubbing 55 forces of the outer walls of the anchoring member against the hole being at the start sometimes sufficient to ensure a certain grip of the fastener in the hole, thereby leading to the belief that the anchoring is correct.

60 An object of the present invention is to obviate such a disadvantage and, therefore, relates to a self-drilling fastener comprising an anchoring member with at least one hollowed-out end and an expansion core, 65 provided for resting on the bottom of the hole drilled by the anchoring member, and onto which said member is intended to be forcibly driven so that its hollowed-out end is expanded by the core, characterized in that there is provided a flexible means 70 arranged so as to permit the connection of said core with said member after the drilling of the hole.

75 Due to this arrangement, during the final handling of the fastener, it is possible to make the core sufficiently integral with the anchoring member and to avoid loosing it and, before introducing the expansion core into the previously drilled hole, to render 80 integral the core and the anchoring member through an engagement of the expansion core with the inner walls of the hollowed-out end of the anchoring member, whereby the expansion of said member shall be 85 ensured.

In a preferred embodiment of the fastener according to the invention, said means is integral with the core.

The connecting means can be made of a sleeve formed, at least at one of its ends, 90

with a deformable flange for cooperating, for instance, with either the core or the anchoring member.

In another embodiment of the fastener 5 according to the invention, wherein the inner walls of the hollowed-out end of the anchoring member are formed with a shoulder portion, said flexible means is arranged so as to cooperate with said 10 shoulder portion.

The invention will become more apparent from the description of one preferred embodiment of the fastener according to the invention, with reference to the accompany- 15 ing drawing wherein:

Fig. 1 is a sectional view of the fastener according to the invention, before expansion of its anchoring member in a support- ing material, and

20 Fig. 2 is a perspective view of the flexible connecting means of the fastener of Fig. 1.

Fig. 1 represents a fastener 1 in its anchoring hole 2 in a supporting material M, the hole being previously drilled with 25 the anchoring member 3 of the fastener 1, before expansion of member 3 but after insertion of the expansion core 4 into the hole 2.

The anchoring member 3 is a cylindrical 30 body hollowed-out throughout its length and formed with longitudinal grooves 16, with a tapped portion 5 provided on part of its inner wall for cooperation with a threaded bolt not shown on the drawing, 35 and a shoulder portion 6 which can be, for instance, formed as a groove. The expansion core 4 comprises a body 7, e.g. frustoconical, for engagement with the inner wall of end 8 of the anchoring member 3, and 40 whose tapered end is provided with a rod 9 projecting therefrom and formed with a flat head 15.

The anchoring member 3 and the expansion core 4 are made integral through a 45 sleeve 10 provided at one of its ends with an outer flange 11 and at the other end with an inner flange 12. Slots 13, 14 have been formed respectively at both ends of sleeve 10 in order to make it flexible where- 50 by the respective portions of flanges 11 or 12 can be brought nearer or spread aside.

Once the anchoring hole 2 has been drilled in the material M with the aid of member 3, and said member 3 has been 55 removed from hole 2, and the hole 2 has been cleaned, member 3 and core 4 are assembled through sleeve 10. To this effect, head 15 of the core 4, whose diameter is superior to that of the central hole of flange 60 12, is inserted inside sleeve 10 by spreading

apart the portions of the flange 12 owing to the slots 14, whereby head 15 can now rest on the flange 12 whose central hole has resumed its initial shape. The sleeve 10 is next inserted into the hollowed-out portion 65 formed at the end 8 of the anchoring member 3 by pressing flange 11 past the shoulder portion 6, the initial outside diameter of the flange 11 being superior to that of the shoulder portion 6, and, owing 70 to the slots 13, by bringing nearer the portions of flange 11 which is able, once back to its forms shape, to rest against shoulder 6.

Obviously, sleeve 10 could be delivered 75 engaged with the anchoring member 3, or, preferably, with the expansion core 4.

In such manner, and taking into account the lengths of rod 9, core 4 and sleeve 10, and the location of shoulder 6 inside the 80 central hollowed-out part of anchoring member 3, cooperation of sleeve 10 with anchoring member 3 and expansion core 4 entails by way of consequence the cooperation of body 7 of core 4 with the inner 85 walls of end 8 of the anchoring member 3 as well as it prohibits core 4 from assuming any other position inside hole 2.

With the fastener according to the invention, one is sure to insert the anchoring 90 member onto the expansion core and to actually complete this expansion.

In order to simplify, one can avoid providing shoulder 6 as core 4 will fit inside anchoring member 3 due to the friction of 95 flange 11 of sleeve 10 on the inner walls of end 8 of the anchoring member.

It is to be noted that the above described sleeve 10 could be of a different make-up and its flexibility obtained not from a particular structure with slots for instance, but from a supporting material already flexible such as, for instance, an elastomer or a flex- 100 ible plastic material. In this respect, it is possible to put into engagement the expansion core with the anchoring member by means of a ring lodged inside a groove formed in the anchoring member or better still in the expansion core.

WHAT WE CLAIM IS:— 110

1. Self-drilling fastener comprising an anchoring member with at least one hollowed-out end and an expansion core, provided for resting on the bottom of the hole drilled by the anchoring member, and 115 onto which said member is intended to be forcibly driven so that its hollowed-out end is expanded by the core, characterized in that there is provided a flexible means arranged so as to permit the connection of 120

said core with said member after the drilling of the hole.

2. Self-drilling fastener according to claim 1, wherein said means is integral with said core.

3. Self-drilling fastener according to any of claims 1 and 2, wherein said means is a sleeve provided at least at one of its ends with a deformable flange.

4. Self-drilling fastener according to any of claims 1 to 3, in which the inner walls of said hollowed-out end are formed with a

shoulder portion, wherein said means is arranged so as to be engageable with said shoulder portion.

5. Self-drilling fastener substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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