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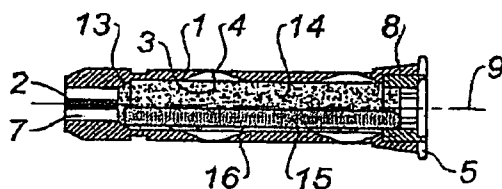
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(54) Title: RESIN ANCHOR WITH A COMPRESSIBLE ENVELOPE CONTAINING CURABLE PRODUCTS, AT LEAST ONE OF WHICH IS SACHETED



element may be a screw that cooperates with the end element (6) of the bushing CD forming a nut (7). The anchor is fastened both mechanically and chemically, for either solid material or hollow material.

(57) Abstract: The resin anchor comprises an apertured (3) tubular envelope (1) designed to be compressed by a traction element, characterized in that it includes, on the inside of the envelope (1), a resin component (14) and a hardener component (15) that are intended to be mixed together and to cure under the action of the compression of the envelope (1), in order to fasten the anchor, at least one (15) of the two components being sacheted (16), the mix formed from the two components being expelled out of the envelope via its apertures (3), during its compression. The traction

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RESIN ANCHOR WITH A COMPRESSIBLE ENVELOPE CONTAINING
CURABLE PRODUCTS, AT LEAST ONE OF WHICH IS SACHETED

The present invention relates to resin anchors, that is to say anchors that are fastened to a support material by means of resin and a hardener for curing the resin.

- 5 Resin anchors exist for solid materials and for hollow materials.

In a solid material, a hole may be drilled and a resin capsule, in which a stick of hardener is embedded, may
10 be slipped thereinto, before the combination is crushed and the two components mixed together. It is also possible to drill a hole and inject resin and a hardener thereinto, the resin and hardener mixing together. A threaded rod or a screw may serve as
15 fastening element.

In a hollow material, after a hole has been drilled in the wall of the material, a tubular screen may be introduced into said hole, resin and a hardener then
20 being injected into said screen, and the resin, expelled out of the screen and after curing, fastening the screen to the rear of the wall. Threaded rods or screws may also be used as fastening elements.

- 25 All the abovementioned anchors may be used both in a solid material and in a hollow material.

Also known, for a hollow material, is an element with a bearing flange to which a slit skirt is firmly
30 attached, the skirt being designed i) to be pressed against the rear face of the wall through the action of the tie connecting it to the flange that bears against the front face of the wall and ii) to receive, by injection, a resin/hardener mix for fastening the
35 element to the rear of the wall.

All the abovementioned anchors, which have been known for a long time, are fastened by purely chemical means.

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Many of these resin anchors require a resin injection step to be carried out, and the Applicant has sought to dispense with this relatively tedious injection operation. In addition, the Applicant has sought to
5 provide a resin anchor that is not only suitable both for a hollow material and a solid material but that is able to be fastened no longer by purely chemical means but also by mechanical means.

10 Thus, what it proposes is a resin anchor comprising an apertured tubular envelope designed to be compressed by a traction element, characterized in that it includes, on the inside of the envelope, a resin component and a
15 hardener component that are intended to be mixed together and to cure under the action of the compression of the envelope, in order to fasten the anchor, at least one of the two components being
20 sacheted, the mix formed from the two components being expelled out of the envelope via its apertures during its compression.

It should be emphasized that nothing could have encouraged a person skilled in the art to put, into a resin anchor also having mechanical fastening, thanks
25 to the compression of the compressible envelope, and usable both in a hollow material and a solid material, two components intended to be cured as was done in a hole of a solid material for receiving a fastening element of the threaded rod or tapped bushing type.

30 In the first embodiments of the anchor of the invention, the two components are sacheted, for example in two sachets fixed together, or one in a sachet, for example the resin, and the other, the hardener, in a
35 capsule.

In other embodiments of the anchor of the invention, only one of the components is sacheted - *a priori* this will be the hardener component - and the apertures in

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the tubular envelope are obstructed by retaining membranes that can be torn off under the action of the compression of the envelope. In this case, the hardener component is placed in a rod or capsule embedded in the resin.

The invention will be more clearly understood with the aid of the following description of several embodiments of the anchor, with reference to the appended drawing in which:

- Figure 1 is a side view of a first embodiment of the anchor of the invention with its compression/fastening screw;
- Figure 2 is a view in axial section of the anchor of Figure 1;
- Figure 3 is a view in axial section of a second embodiment of the anchor of the invention;
- Figure 4 is a view in axial section of a third embodiment of the anchor of the invention and;
- Figure 5 is a view in axial section of the anchor of the invention, after fastening.

With reference to Figures 1-2 relating to the first embodiment and to Figure 5, the anchor comprises a bushing 1, here made of plastic, of axis 9.

The bushing 1 extends between a bearing flange 5 and another end 6 on the opposite side from that of the flange and forming traction nut 7, as will be explained later, thanks to axial internal ribs 2, here there are four ribs, projecting inside this thicker wall end 6, forming a small chamfered internal shoulder 13.

The tubular envelope of the bushing is apertured by helical slits 3 extending over most of the axial length of the bushing, between the two ends 5, 6. These slits are obstructed by tearable retaining membranes 4, coming from the same mould.

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The bushing part adjacent to the flange 5 also has a thicker wall, through the outside of which antirotation ribs 8 extend.

- 5 The bushing 1 of the anchor is intended to be put into compression by a traction screw 10 (which here is also a fastening screw) intended to engage on the ribs 2 of the nut part 7 of the end 6 of the bushing.
- 10 The screw 10 includes an intermediate flange 11 beyond which a threaded end portion 12 extends, said end portion 12 being intended to receive a part to be fastened to the screw 10 by a nut to be screwed onto this threaded portion 12. When the flange 11 of the
- 15 screw bears against the flange 5 of the bushing and when the screw is rotated into the nut part 7 of the bushing by means of a screwing end-piece of a suitable tool, the end 6 of the bushing is pulled towards the flanges, that is to say the tubular envelope of the
- 20 bushing is compressed. This is why the screw 10 is termed a traction element.

The inside of the bushing includes the two curable components and is filled with resin 14, which is

25 retained by the membranes 4 and in which a rod 16 of hardener 15 is embedded, being easily destroyable and extending axially and able to bear on the internal shoulder 13.

- 30 Having described the resin anchor in terms of its various elements, we will now deal with its use, here in a hollow material 20 with an outer wall 21.

After a hole 22 has been drilled into the wall 21 with

35 a diameter very slightly larger than the outside diameter of the envelope of the bushing 1, the anchor is introduced into the hole 22 as far as the point when the flange 5 of the bushing bears against the external surface 23 of the wall 21. The screw 10 is then

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rotated, using a tool with a screwing bit 24. The traction end 6 of the bushing 1 is pulled back along the screw 10, thereby compressing the envelope of the bushing 1, causing it to expand, and creating a "lump" at the rear of the wall 21, so as already to mechanically fasten the anchor to the wall 21.

Concomitantly, the compression of the envelope causes i) the destruction of the rod 16 of hardener 15 and the mixing of the two components and ii) the tearing of the retaining membranes 4. During compression of the envelope of the bushing, the mix is partly expelled via the apertures made up of slits 3 in order to form, at the rear of the wall 21, a substance that will cure in order to achieve, by chemical means, perfect fastening of the anchor to the wall 21.

The embodiment shown in Figure 3 differs from that of Figures 1 and 2, where the same references denote the same means, by the fact that the resin 4 is also sacheted in a tearable pouch 36 and the hardener 15 is sacheted in another tearable pouch 17, the two pouches being housed inside the envelope 1, side by side along the axis 9 and fastened together via their adjacent sides 18, 19, purely for convenience. In this embodiment, the slits 3 do not need to be obstructed by membranes for retaining the resin, since the resin is sacheted. Otherwise, the retaining membranes 4 would have to be kept.

The embodiment shown in Figure 4 is quite similar to that shown in Figure 3.

The resin 14 is sacheted in a tearable oblong sachet 25 bearing on a transverse wall 26, which is likewise easily destroyable, which separates the thin-wall tubular portion of the envelope of the bushing from the nut end part 6, 7 at the chamfered shoulder 13.

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The sachet 25 narrows down at its two ends and is obstructed by two small plugs 27, 28. The hardener 15 is placed in an easily destroyable rod 29, which also extends axially alongside the resin sachet 25. In this
5 example, the slits 3 again do not need to be obstructed by a retaining membrane

Of course, the use of the embodiments shown in Figures 3 and 4 is identical to that of the first embodiment
10 and is also illustrated by Figure 5.

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CLAIMS

1. Resin anchor comprising an apertured tubular envelope (1) designed to be compressed by a traction
5 element (10), characterized in that it includes, on the inside of the envelope, a resin component (14) and a hardener component (15) that are intended to be mixed together and to cure under the action of the compression of the envelope (1), in order to fasten the
10 anchor, at least one of the two components being sacheted, the mix formed from the two components being expelled out of the envelope (1) via its apertures (3) during its compression.
- 15 2. Anchor according to Claim 1, in which the two components (14, 15) are sacheted.
3. Anchor according to Claim 2, in which the two components (14, 15) are sacheted in two pouches (36,
20 17) that are fixed together.
4. Anchor according to Claim 2, in which the resin component (14) is sacheted in a pouch (25) and the hardener component (15) in a rod (29) extending
25 alongside the pouch (25).
5. Anchor according to Claim 1, in which only one (15) of the components is sacheted.
- 30 6. Anchor according to Claim 1, in which the envelope (1) of the bushing is apertured by slits obstructed by retaining membranes (4) that can be torn off under the action of the compression of the envelope.
- 35 7. Anchor according to Claim 6, in which the hardener component (15) is placed in a rod (16) or a bag (17).

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8. Anchor according to one of Claims 1 to 7, which includes an end part (6) forming a nut (7) and includes axial internal ribs (2).

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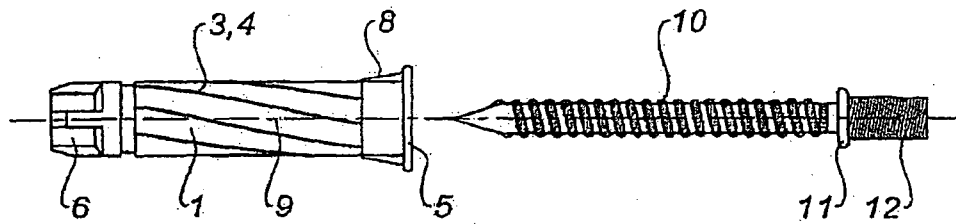


Fig. 1

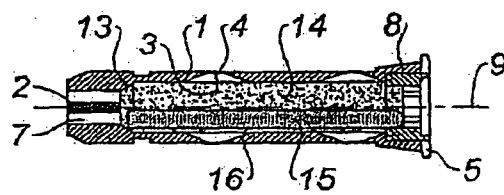


Fig. 2

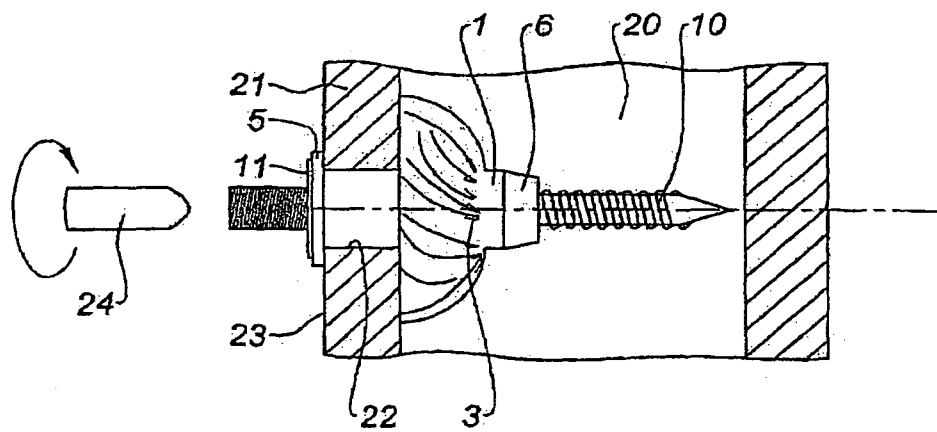


Fig. 5

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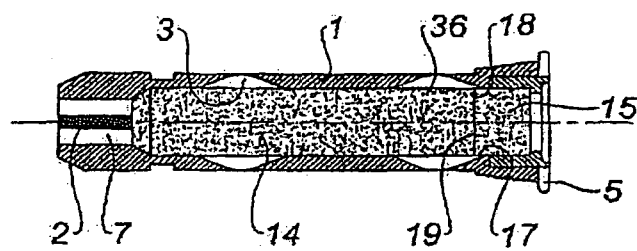


Fig. 3

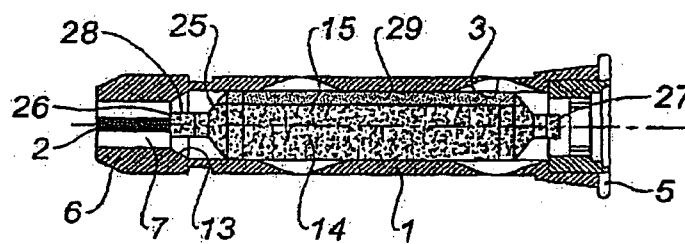


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No

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A. CLASSIFICATION OF SUBJECT MATTER

INV. E04B1/48 F16B13/14 F16B13/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E04B F16B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 100 10 473 A1 (TOX DUEBEL WERK [DE]; ENGESSER WERKZEUG U FORMENBAU [DE]) 20 September 2001 (2001-09-20) abstract; claims 3,4,7-17; figures 1-9 column 4, line 34 - line 66	1-8
A	GB 1 425 852 A (HILTI AG) 18 February 1976 (1976-02-18) page 4, line 60 - line 106; figure 6	1-8
A	FR 2 776 722 A1 (GUEX SOC NOUV ENTREPRISES [FR]) 1 October 1999 (1999-10-01) figures 4,5	8



Further documents are listed in the continuation of Box C.



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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 10010473	A1	20-09-2001	NONE
GB 1425852	A	18-02-1976	AT 327489 B 10-02-1976
		AT 93473 A 15-04-1975	
		AU 5176073 A 08-08-1974	
		BE 794800 A1 16-05-1973	
		CA 985936 A1 23-03-1976	
		CH 604024 A5 31-08-1978	
		DE 2205289 A1 09-08-1973	
		JP 1215657 C 27-06-1984	
		JP 48084259 A 09-11-1973	
		JP 58046617 B 18-10-1983	
		SE 396121 B 05-09-1977	
FR 2776722	A1	01-10-1999	CN 1230638 A 06-10-1999