An anchor tube for an injection-securable anchor includes a through-opening (13) for receiving a fastening element (8) and at least first connection element (32) provided on at least first end (14) of the anchor tube (12) for securing, on the anchor tube (12), a further part of the injection-securable anchor (11).
INJECTION-SECURABLE ANCHOR AND ANCHOR TUBE FOR THE INJECTION-SECURABLE ANCHOR

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to an injection-securable anchor for attaching a face brickwork to a loadbearing brickwork and, in particular, to an anchor tube for such an anchor and having a through-opening for receiving a fastening element.

[0003] 2. Description of the Prior Art

[0004] An injection-securable anchor is set after raising a two-wall brickwork usually through a joint in the face brickwork, which is also called a face wall, and transmits tension and compression forces acting on the face brickwork to the loadbearing brickwork which is also called a loadbearing wall. Frequent use of such an injection-securable anchor necessitates an additional reconnection of a two-wall brickwork. This is because of a forelocking connection of both brickworks with each other, due to the corrosion of the connection element that was walled in during formation of the two-wall brickwork, the connection is destroyed.

[0005] German Publication DE 30 04 276 A1 discloses an anchor tube for an injection-securable anchor and which has a through-opening for receiving a fastening element. The anchor tube can be provided in the regions of its ends with radial openings. For setting the injection-securable anchor, firstly a borehole is formed in the loadbearing brickwork through the face brickwork and the air layer between the face brickwork and the loadbearing brickwork. Then, the anchor tube is inserted in the borehole. Finally, the injection-securable anchor is filled with injection mortar through a through-opening of the anchor tube. Upon insertion of the fastening element, the injection mortar that fills the anchor is pressed out at the ends of the anchor tube. The length of the circumferentially closed section of the anchor tube is so selected that this section bridges the air layer between the face brickwork and the loadbearing brickwork.

[0006] The drawback of the anchor tube disclosed in DE 30 04 276 A1 consists in that in practice, different two-wall brickworks with different width of the stone and air layers are raised and, therefore, a large number of differently formed anchor tubes must be available to the user to ensure that advantages of such an injection-securable anchor are achieved.

[0007] German Publication DE 102 22 799 A1 discloses sieve sleeves having radial wall sections with connection means provided at their ends. Several of such sieve sleeves are assembled to form a dowel body. After setting of such a dowel body in a borehole, it is filled with an injection mortar, and then a fastening element is inserted, with the injection mortar being forced out outwardly through the sieve-shaped radial sections in a controlled manner.

[0008] An object of the present invention is an anchor tube for an injection-securable anchor for attaching a face brickwork to a loadbearing brickwork, which injection-securable anchor, which includes the anchor tube, is suitable for different types and embodiments of two-wall brickworks.

SUMMARY OF THE INVENTION

[0009] This and other objects of the present invention, which will become apparent hereinafter, are achieved by providing an anchor tube having a through-opening for receiving a fastening element and at least first connection element provided at least at the first end of the anchor tube for securing, on the anchor tube, a further part of the injection-securable anchor.

[0010] Dependent on the width of the air layer or the distance between the face brickwork and the loadbearing brickwork or between the brickwork walls of a two- or multi-wall brickwork, an anchor tube having a corresponding length is selected and is connected by the connection element, which is provided at its first end, with a further part to form an injection-securable anchor. The further part has a complementary, to the first connection element of the anchor tube, counter-connection element. As a further part, e.g., a sieve sleeve, which is formed in accordance with the borehole depth in the loadbearing brickwork and connectable with the anchor tube, can be selected. The anchor tube according to the present invention can be connected, e.g., with sieve sleeves disclosed in DE 102 22 799 A1.

[0011] Anchor tube of different types and lengths and/or sieve sleeves of different types and lengths can be associated to form injection-securable anchor for connecting a face brickwork with a loadbearing brickwork by the user, as needed, directly on the constructional site. An injection-securable anchor that includes an anchor tube according to the present invention is a modular structure. With a small number of differently formed anchor tubes and sieve sleeves, a large number of different constructions of two-wall brickworks can be reliably formed. The injection-securable anchor can be simply and quickly adapted to actual use conditions at the constructional site such as, e.g., stone type, thickness or quality of the loadbearing brickwork and/or the face brickwork, and/or width of the air layer.

[0012] Advantageously, a second connection element provided at a second end of the anchor tube opposite the first end for securing, on the anchor tube, a still further part of the injection-securable anchor. This permits to connect several anchor tubes according to the present invention with each other to bridge a correspondingly greater distance between the face brickwork and the loadbearing brickwork or a very wide air layer. Also a sieve sleeve can be mounted also on the second end of the anchor tube and which in a set condition of the injection-securable anchor, would be located in the face brickwork. This would insure an improved anchoring of the anchor in the face brickwork. The second sieve sleeve makes possible a purposeful anchoring of the anchor in the face brickwork. The above-discussed injection-securable anchor is particularly advantageous when the brickwork has joints with a poor grouting quality. It is particularly advantageous when a sieve sleeve is provided at each end of the anchor tube.

[0013] In addition, further connection or counter-connection elements can be provided at a free end of the sieve sleeve that is connectable with the inventive anchor tube. The further connection or counter-connection elements enable attachment of further sieve sleeves to the sieve sleeves already mounted on the anchor tube.

[0014] Advantageously, the connection element includes locking noses that form together with locking recesses forming the counter-connection elements, a connection device. The locking noses have each advantageously a section project from the outer profile and which insures a simple assembly of the elements of the injection-securable anchor. Advantageously, the locking noses fall off the elevated section transverse to the outer profile of a respective part.
Thereby, an advantageous undercut with an edge region of the locking recesses is produced in the assembled condition of anchor parts.

According to an alternative embodiment, the connection elements have locking recesses, cooperating with locking noses. This insures a reliable assembly of the parts of the injection-secureable anchor. The locking recesses can be simply produced.

Advantageously, locking noses are formed at one end of the anchor tube, and locking recesses are formed at the other end of the anchor tube. This insures an easy assembly of several anchor tubes according to the present invention with each other.

Advantageously, several connection elements are provided at an anchor tube end and which cooperate with a respective plurality of counter-connection elements. The connection devices, which are formed by cooperating connection and counter-connection elements, insure a reliable connection of the parts of the injection-secureable anchor with each other.

Advantageously, a plurality of connection elements is uniformly circumferentially rotationally-symmetrically distributed at an end of the anchor tube. Advantageously, the plurality of the counter-connection elements is likewise uniformly circumferentially rotationally symmetrically distributed on the further part of the anchor and which is connectable with the anchor tube. This insures an even more reliably connection of the parts of the anchor.

Advantageously, at an end of the anchor tube, there are provided at least three connection elements, with the same number of the counter-connection elements being provided at a respective end of the further part that is assembled with the anchor tube. This permits to insure a predetermined alignment of parts of the anchor relative to each other. In this way, the anchor part, that is assembled with the anchor tube, has the same number of counter-connection or connection elements.

Advantageously, the anchor tube is formed of a plastic material. The sieve sleeve, which is connectable with the anchor tube, is also formed, at least in some regions, also of a plastic material. It is particularly advantageous when all parts of an injection-secureable anchor are formed of a plastic material by an injection-molding process, which insures a simple production of the connection devices.

The novel features of the present invention, which are considered as characteristic for the invention, are set forth in the appended claims. The invention itself, however, both as to its construction and its mode of operation, together with additional advantages and objects thereof, will be best understood from the following detailed description of preferred embodiment, when read with reference to the accompanying drawings.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The drawings show:

- FIG. 1 a cross-sectional view along line I-I in FIG. 2 of a first embodiment of an injection-secureable anchor according to the present invention in a set condition;
- FIG. 2 a side view of an anchor tube according to the present invention for the injection-secureable anchor;
- FIG. 3 a side view of a first sieve sleeve of the inventive injection-secureable anchor;
- FIG. 4 a side view of a second sieve sleeve of the inventive injection-secureable anchor; and
- FIG. 5 a side view of a second embodiment of an injection-secureable anchor according to the present invention.

In the drawings, the same elements are designated with the same reference numerals.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

An injection-secureable anchor 11, which is shown in its entirety in FIG. 1 and details of which are shown in FIGS. 2 and 3, includes, according to the present invention, an anchor tube 12 with a through-opening 13 for receiving a fastening element 8, and a sieve sleeve 22 connectable with the anchor tube 12. First connection means 31 connects the sieve sleeve 22 with the anchor tube 12.

For attaching a face brickwork 5 to a loadbearing brickwork 6, a borehole 9 is formed in the loadbearing brickwork 6 through the joint of the face brickwork 5 and the air layer 7. After the borehole 9 has been rinsed, the modular, assembled injection-secureable anchor 11, together with the sieve sleeve 22, is passed through until the sieve sleeve 22 is located in the borehole 9. Then, the injection-secureable anchor 11 is filled with injection mortar, and the fastening element 8, e.g., a cut-to-length threaded rod is inserted in the injection-secureable anchor 11 through the through-opening 13 of the anchor tube 12. Then, the injection mortar is brought out, in particular, in the region of the sieve sleeve 22, reliably anchoring the anchor 11 in the loadbearing brickwall 6. The anchoring in the face brickwork 5 advantageously is carried out by filling or compressing the space between the anchor 11 or the fastening element 8 and the face brickwork.

The inventive tube 12, which is shown in FIG. 2, has, in addition to the through-opening 13, a first connection element 32 provided at a first end 14 of the anchor tube 12 and formed of four locking noses uniformly rotationally symmetrically distributed over the circumference of the anchor tube 12. On the opposite second end 15 of the anchor tube 12, there is provided a second connection element 53 formed of four locking recesses uniformly rotationally symmetrically distributed over the circumference of the anchor tube 12. The first connection element 32 and the second connection element 53 form part, respectively, of the first connection means 31 and second connection means 51.

On the outer circumference of the anchor tube 12, there are further provided a plurality of rings 16 which function as condensate-draining rings and prevent condensate flow from the face brickwork 5 to the loadbearing brickwork 6 along the anchor tube 12 in the assembled condition of the anchor 11.

The sieve sleeve 22, which is shown in FIG. 3, has, at its first end 23, a counter-connection element 33 displaceable together with a first connection element 32 of the anchor tube 12 and formed, similar to the second connection element 53 of the anchor tube 12, of four locking recesses uniformly rotationally-symmetrically distributed over the circumference of the sieve sleeve 22.

The sieve sleeve 42, which is shown in FIG. 4 is shorter than the sieve sleeve 22 shown in FIG. 3. The sieve sleeve 42 has, at its second end 44 opposite its first end 43, a second counter-connection element 52 formed of four locking noses uniformly rotationally-symmetrically distributed over the circumference of the sieve sleeve 42 and forming part of the second connection means 51.
FIG. 5 shows a modular assembled injection-secureable anchor 41 having, at the first end 14 of its anchor tube 12, the sleeve 22 and, at the second end 15 of the anchor tube 12, the sleeve 42. The sleeve 22 and the sieve sleeve 42 are secured on the anchor tube 12 with the first connection means 31 and the second connection means 51, respectively. The second connection means 51 is formed by the second connection element 53, which is provided on the second end 15 of the anchor tube 12 and by the counter-connection element 52 provided on the sieve sleeve 42. In the set condition of the anchor 41, the sieve sleeve 42 is located in the face brickwork 5, and the sieve sleeve 22 is located, as it was described with reference to the anchor 11, in the loadbearing brickwork.

Though the present invention was shown and described with references to the preferred embodiment, such is merely illustrative of the present invention and is not to be construed as a limitation thereof and various modifications of the present invention will be apparent to those skilled in the art. It is therefore not intended that the present invention be limited to the disclosed embodiment or details thereof, and the present invention includes all variations and/or alternative embodiments within the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

1. An anchor tube for an injection-secureable anchor for attaching a face brickwork to a loadbearing brickwork, comprising a through-opening (13) for receiving a fastening element (8); and at least first connection element (32) provided at least at a first end (14) of the anchor tube (12) for securing, on the anchor tube (12), a further part of the injection-secureable anchor (11).

2. An anchor tube according to claim 1, comprising a second connection element (53) provided at a second end (15) of the anchor tube (12) opposite the first end (14) for securing, on the anchor tube (12), a still further part of the injection-secureable anchor (11).

3. An anchor tube according to claim 1, wherein the first connection element (32) comprises locking noses.

4. An anchor tube according to claim 2, wherein the second connection element (53) comprises locking recesses cooperating with locking noses provided on the still further part of injection-secureable anchor (11).

5. An anchor tube according to claim 2, wherein the first connection element (32) and the second connection element (53) each comprises a plurality of connecting members.

6. An anchor tube according to claim 5, wherein the plurality of connecting members are uniformly circumferentially rotationally-symmetrically distributed at respective one of the first (14) and second (15) ends of the anchor tube (12).

7. An anchor tube according to claim 6, wherein the plurality of connecting members (32; 53) comprises at least three connecting members.

8. An injection-secureable anchor for attaching a face brickwork (5) to a loadbearing brickwork (6), comprising a fastening element (8); a further part (22); and an anchor tube (12) having a through-opening (13) for receiving the fastening element (8) and at least first connection element (32) provided on at least first end (14) of the anchor tube (12) and cooperating with a complementary counter-connection element (33) provided on the further part (22) for securing the further part (22) on the anchor tube (12).

9. An injection-secureable anchor according to claim 8, wherein the counter-connection element (33) is provided at a first end (23) of the further part (22).

10. An injection-secureable anchor according to claim 9, wherein the first connection element (32) comprises a plurality of locking noses, and the counter-connection element (33) comprises a plurality of locking recesses for receiving respective locking noses of the plurality of locking noses.

11. An injection-secureable anchor according to claim 10, wherein the plurality of locking noses and the plurality of locking recesses are uniformly circumferentially rotationally-symmetrically distributed at respective first ends (14, 23) of the anchor tube (12) and the further part (22), respectively.

12. An injection-secureable anchor according to claim 8, wherein the further part (22) is formed as a sieve sleeve.

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