

The invention concerns a compound anchor having an anchoring member which can be introduced with a rotary movement into a borehole which can be filled with hardenable mortar material, on the peripheral surface of which anchoring member is arranged a cover means which scrapes along the wall of the borehole when the compound anchor is pushed into the borehole and which has a plurality of radial openings.

A compound anchor of that kind which is described in German laid-open application (DE-OS) No 26 25 492 has a cover means in the form of a gauze-like sleeve which serves as a carrier for a hardener for hardening of the mortar material. In that arrangement the gauze-like sleeve comprises steel, plastics material or glass fibre. In the operation of setting the compound anchor synthetic resin which is distributed at the wall of the borehole comes into contact with the hardener of the sleeve, in which case mixing of the hardener and the synthetic resin occurs by virtue of the rotary movement of the anchoring member. That initiates a hardening effect so that after the synthetic resin has hardened, adhesion throughout is achieved.

A compound anchor which is known from DE 32 38 751 A1 has at the front end of its anchoring member a non-rotatably connected, conical disc which faces with its opening towards the rearward end of the compound anchor and the edge of which, when the compound anchor is inserted into the borehole which is filled with the mortar material, scrapes along the wall of the borehole due to elasticity in respect of shape and/or material of the disc, and in so doing destroys microcapsules contained in the mortar material by pressing them against the wall of the borehole.

Taking that state of the art as its starting point the invention is based on the problem of providing a compound anchor of the kind set forth in the opening part of this specification, which is distinguished by good bonding of the hardened mortar material with the wall of the borehole and by virtue of particularly high extraction values.

In accordance with the invention that problem is solved in that the cover means is non-rotatably connected to the anchoring member and extends at least over a peripheral portion in the axial direction along the anchoring member.

In that case, in the simplest situation the cover means on the anchoring member of the compound anchor may comprise a wire mesh strip which encloses the peripheral surface on one side or preferably on oppositely disposed sides in a channel-like configuration. Increasing the width of the wire mesh strip in the peripheral direction affords a sleeve-like cover means over an angle of up to 360°. Instead of being formed by wire mesh the cover means with a plurality of openings can also be afforded by other metal members which are provided with apertures therethrough, in particular apertured sheet metal strips or apertured sheet metal sleeves. By virtue of the fact that the cover means extends

over a comparatively great length in the axial direction, a borehole cleaning effect is produced simultaneously at many locations when the compound anchor is being inserted with a rotary movement. In that case the material which is to be removed from the wall of the borehole can be
 5 carried away through the openings in the cover means into the annular space between the inside of the sleeve and the surface of the compound anchor which is provided with cones or a screwthread.

The fixing element which is surrounded by the apertured cover
 10 means of the compound anchor can be in the form of a screwthreaded rod or in the form of an anchor rod with one or more cones in the fixing portion.

In an advantageous embodiment the cover means is in the form of
 15 a mesh sleeve and is connected to the screwthread crests of a screwthreaded rod by spot welds. Alternatively or additionally the mesh sleeve may have an entrainment lug which engages into an axially extending radial groove provided on the compound anchor.

The cover means which serves in particular as a cleaning
 20 element, in the form of a channel-shaped strip or a sleeve, can be formed in particular as a wire mesh sleeve with a plurality of axial wires and a plurality of wires extending in the peripheral direction. A preferred embodiment of the invention uses a wire mesh sleeve which is welded at
 25 its front end and at its rear end respectively at two diametrically oppositely disposed locations to an anchoring member having a plurality of cones. In the welding operation, in each case five wires extending in the peripheral direction but only two wires extending in the axial direction are involved within the weld area. That arrangement affords a
 30 higher load-carrying capacity in the peripheral direction than in the axial direction, as between the wire mesh sleeve and the peripheral surface of the anchoring member. That arrangement, after hardening of the mortar shell, provides that in the event of a crack through the mortar shell, by virtue of an axial pull applied to the compound anchor,
 35 the mortar shell can experience an outward spreading effect, in which case the welding which involves only two axial wires breaks as a desired-fracture location. In order to enhance the effectiveness of the desired-fracture location, in addition to the welding of the wire mesh sleeve, it is also possible to provide a positively locking engagement which is
 40 operative in the peripheral direction. A configuration which is quite particularly suitable for that purpose is for the front end of the anchoring member to be in the form of a roof-shaped cutting edge which, besides the possibility of carrying torsional forces, affords the advantage that good mixing of the mortar in the borehole is promoted.

45 Instead of using wire mesh sleeves with axial and peripherally extending wires, it is also possible to use wire mesh sleeves in which the wires which extend at a right angle to each other extend inclinedly relative to the longitudinal axis of the wire mesh sleeve.

Another possibility involves producing the cover means from an expanded rib-bearing metal sheet.

5 The cover means may also have a surface in the configuration of a grater plate and may be provided with a plurality of radially projecting sheet metal points which are arranged around openings in an apertured metal sheet. It is also possible for the cover means to be made from an apertured metal sheet with a plurality of holes and a smooth surface.

10 Embodiments of the invention are described hereinafter with reference to the drawing in which:

15 Figure 1 is a side view of the front end of a screwthreaded rod,

Figure 2 is a side view of a mesh sleeve made from mesh wire,

20 Figure 3 is a side view, partly in section, of the front end of the screwthreaded rod with the wire mesh sleeve non-rotatably fixed thereto, after insertion to a borehole filled with mortar material,

25 Figure 4 is a view in radial section through part of the screwthreaded rod in the region of weld points for connecting the mesh wire to the screwthread crests,

Figure 5 is a side view of an anchor rod with a cone portion having a plurality of cones,

30 Figure 6 shows a mesh sleeve of mesh wire for axial fitting onto the anchor rod shown in Figure 5,

35 Figure 7 is a side view of the anchor rod non-rotatably connected to the mesh sleeve shown in Figure 6, in a borehole filled with mortar material,

Figure 8 is a view in section taken along line VIII-VIII in Figure 7,

40 Figure 9 is a side view of a mesh sleeve of expanded rib-bearing metal,

Figure 10 shows a portion of the surface of the sleeve shown in Figure 9 on an enlarged scale,

45 Figure 11 is a view in radial section through the mesh sleeve shown in Figure 9,

50 Figure 12 is a view in axial section to show the weld points between the mesh sleeve shown in Figure 9 and the crests of a rod,

Figure 13 shows a mesh sleeve with a grater plate-like surface,

Figure 14 is a view in radial section through the mesh sleeve shown in Figure 13,

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Figure 15 is a portion of an axial section through the mesh sleeve shown in Figure 13 to illustrate the weld points and the surface configuration of the mesh sleeve shown in Figure 13,

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Figure 16 shows a mesh sleeve comprising an apertured metal sheet,

Figure 17 is an end view of the sleeve shown in Figure 16,

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Figure 18 shows a portion of a view in axial section through the mesh sleeve shown in Figure 16 to illustrate the weld connection between the screwthread crests of a screwthreaded rod and the inside of the sleeve shown in Figure 16,

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Figure 19 shows a screwthreaded rod with a mesh wire cover means of strip configuration, which extends along the peripheral surface of the screwthreaded rod in the axial direction in a channel-like configuration to the front end thereof on two radially oppositely disposed sides of the peripheral surface,

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Figure 20 is a view in section taken along line XX-XX in Figure 19 to show the symmetrical cover effect by the wire mesh strip on a screwthreaded rod,

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Figure 21 shows the front end of a screwthreaded rod with two oppositely disposed axially extending grooves and a respective wire mesh strip which is bent along its edge that faces in the direction of rotation and is pushed or clamped into the groove,

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Figure 22 is a view in cross-section through the anchoring member of the compound anchor shown in Figure 21,

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Figure 23 is a side view of a preferred embodiment for a compound anchor with a wire mesh sleeve shown in cross-section,

Figure 24 is a plan view of a weld location of the wire mesh sleeve for a compound anchor as shown in Figure 23,

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Figure 25 shows a further embodiment for a compound anchor with a wire mesh sleeve which is positively lockingly non-rotatably fixed in position,

Figure 26 is a side view of a wire mesh sleeve with a sheet metal strip for reinforcement purposes, and

Figure 27 is a view on an enlarged scale of the configuration of the wires of a wire mesh sleeve with inclinedly extending mesh wires.

Figure 1 shows a compound anchor which is in the form of a screwthreaded rod 1 and which serves for fixing an article (not shown in the drawing). The screwthread 2 of the screwthreaded rod 1 extends from the rear end (not shown in the drawing) of the screwthreaded rod 1 to the front end 3 of the screwthreaded rod 1 in the manner shown in Figure 1.

Associated with the screwthreaded rod 1 as a cover means is a mesh sleeve 4 which in the embodiment illustrated in Figure 2 is in the form of a wire mesh sleeve. A mesh sleeve 4 of that kind comprises round axial wires 5 which are arranged in crossing relationship with each other and wires 6 which extend in the peripheral direction. The wires 5, 6 are preferably of a wavy shape and provide approximately rectangular openings 23 between the wires 5, 6. Before the screwthreaded rod 1 is fixed in a fixing base 7 which is shown in Figure 3, a cylindrical borehole 8 is bored into the fixing base 7 and partially filled with a mortar material 9.

Before the screwthreaded rod 1 is rotationally driven into the borehole 8 which is partially filled with mortar material 9, the mesh sleeve 4 on the peripheral surface of the screwthreaded rod 1 is connected immovably and non-rotatably relative to the screwthread 2 by welding the wires 5, 6 at weld locations 25 to the screwthread 2 in the manner diagrammatically shown in Figure 4. When the screwthreaded rod 1 which is covered by the mesh sleeve 4 is inserted with a rotary movement into the borehole 8 which is filled with mortar material 9, the cover means which is formed by the mesh sleeve 4 with the openings 23, in the rotational setting operation, serves as a cleaning sleeve and produces a highly effective borehole cleaning action. In the rotational setting operation, the meshes of the mesh sleeve 4 which consists of the wires 5, 6 scrape along the wall of the borehole 8 and produce a specific cleaning effect over the entire length of the borehole 8. In addition the mesh sleeve 4 produces highly intensive mixing of the mortar material 9 as the mesh sleeve 4 with its mesh wire encasement acts like a mixing whisk.

After the mortar material 9 in the borehole 8 has set the screwthreaded rod 1 is very firmly fixed in the fixing base 7 as the wires 5, 6 of the mesh sleeve 4 provide for strengthening of the hardened mortar material 9 in the manner of reinforcement thereof. When carrying out tests involving attempting to pull out the compound anchor, it could be shown that cone break-out when using the mesh sleeve 4 extends deeper into the fixing base 7, the tip of the cone break-out effect occurring only at the end of the screwthreaded rod 1 and not for example already occurring at the middle of the anchorage depth. Therefore the mesh sleeve 4 not only provides a borehole cleaning action and mixing of the mortar material 9, but it is also affords an increase in the load-carrying capacity of the screwthreaded rod 1 fitted into the fixing base 7.

The ratio of the diameter of the screwthreaded rod 1 to the diameter of the borehole 8 corresponds to the usual ratios used in relation to mortar systems for compound anchors, but the insertion of the mesh sleeve 4 into the annular gap between the peripheral surface of the screwthreaded rod 1 on the one hand and the inside of the borehole 8 on the other hand reduces the volume of the annular gap. The screwthread 2 of the screwthreaded rod 1 forms the inside of a plurality of annular spaces which are delimited outwardly by the mesh sleeve 4, as can be seen from Figure 4.

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Instead of the non-rotatable connection between the mesh sleeve 4 and the screwthreaded rod 1 by welding, as diagrammatically shown in Figure 4, it is also possible to use other methods of connecting those parts. In particular the mesh sleeve 4 which is used to cover the anchoring member of the screwthreaded rod 1 may be provided with an axially extending lug which projects inwardly along the inside of the peripheral surface of the mesh sleeve and which rests in an axial groove extending along the peripheral surface of the screwthreaded rod 1 and can thus be pushed in an axial direction onto the screwthreaded rod 1.

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Figure 5 shows a compound anchor in the form of an anchor rod 10 having a smooth fixing portion 11 and a cone portion 12 comprising a plurality of spreader cones 13. Between each of the spreader cones 13 there are annular spaces, between a respective inner transitional zone 14 in the region of the smallest diameter and an outer transitional zone 15 in the region of the largest diameter. Figure 5 also shows a groove 17 which extends axially from the front end 16 along the peripheral surface of the cone portion 12 and the smooth fixing portion. The groove 17 extends in the axial direction to a screwthreaded portion 18 having a screwthread 19 and in the radial direction to the inner transitional zones 14.

Before the anchor rod 10 is inserted into the borehole 8 shown in Figure 7 in the fixing base 7, the mesh sleeve 20 of which a side view is shown in Figure 6 is axially pushed onto the anchor rod 10 to cover the fixing portion and the cone portion 12.

An entrainment lug 21 which can be seen from Figure 8 extends along the inside peripheral surface of the mesh sleeve 20 and comprises for example a sufficiently stable wire which is fixedly connected to the mesh sleeve 20. In the mounted condition of the mesh sleeve 20 the entrainment lug 21 is disposed in the groove 17 and provides a non-rotatable connection of the mesh sleeve 20 to the anchor rod 10. In that respect the groove 17 forms a support means for the entrainment lug 21. In the manner shown in Figure 8, the entrainment lug 21 can comprise an additional portion or it may comprise a sufficiently stable, radially inwardly facing formation of the mesh sleeve 20.

The mesh sleeve 20 is thus fixed in the peripheral direction by

means of the entrainment lug 21 and the groove 17, but it is freely movable in the axial direction until it bears against the screwthreaded portion 18.

5 In the case of the anchor rod 10 shown in Figure 5 the mesh sleeve 20 which is non-rotatably arranged to provide the cover action and the cleaning effect has two further functions, in addition to the above-mentioned functions. The first of those two further functions lies in a protective function as the wires 5, 6 of the mesh wire of the mesh sleeve
10 20 form a protective casing for the surface of the cones 13 of the anchor rod 10. In the case of the anchor rod 10 shown in Figure 5 the cone surfaces of the cones 13 are in the form of non-adhering low-friction peripheral surfaces which are protected from damage upon assembly by the mesh sleeve 20.

15 The second additional function of the mesh sleeve 20 occurs when the anchor rod 10 is anchored in the manner shown in Figure 7 with mortar material 9 in a fixing base 7 in which a crack 22 as shown in Figure 8 is formed after the mortar material 9 has hardened. Due to the axial wires
20 5 of the mesh sleeve 20, formed in the hardened mortar material 9 are separation lines which provide that the hardened mortar shell can be expanded with a comparatively low force and in that way, upon axial relative movement of the cones 13, permits the hardened mortar shell to be subsequently spread in a satisfactory manner. When that happens, in
25 the gap formed by the crack 22, the wires 6 of the meshes formed by the wires 5, 6 suffer from a deformation effect by the wavy configuration of the wires 6 being slightly straightened in the region of the crack 22 upon expansion of the hardened mortar shell.

30 When using mortar materials 9 which have not been pre-mixed, such as for example compound anchor cartridges, two-component mortars or mortar materials with encapsulated hardener, the wire surface of the mesh sleeves 4 and 20 acts as a particularly effective mixing element. In addition, the wire surface with the wires 5, 6 provides for good
35 destruction of the individual capsules of the mortar material 9 containing one or more components in capsules, and particularly good activation of such mortar materials 9.

40 Thorough mixing as is required for the chemical reactions involved is achieved in the case of all known mortar systems such as polyester mortars, vinyl ester mortars, epoxy resin mortars and also hydraulic mortars, irrespective of whether the materials are introduced into the borehole 8 in the form of a glass cartridge or in the form of a cartridge-type mortar.

45 Instead of the above-described mesh sleeves 4, 20 of mesh wire, it is also possible to use a screwthreaded rod 1 or an anchor rod 10 with a mesh sleeve 30 comprising an expanded rib-bearing metal. Figure 9 shows a side view of a mesh sleeve 30 of that kind. Figure 10 shows a

view on an enlarged scale of the structure of the expanded rib-bearing metal, with approximately square openings 23.

5 The entrainment lug 21 of the mesh sleeve 30, which is formed by a bend configuration, is shown in Figure 11 which illustrates a view in cross-section through the mesh sleeve 30. The entrainment lug 21 serves for non-rotatably connecting the mesh sleeve 30 to the screwthreaded rod 1 or the anchor rod 10.

10 Figure 12 shows weld points 25 which are additionally or alternatively provided for fixing the expanded rib-bearing metal of the mesh sleeve 30 to the screwthread crests of the screwthread 2 of the screwthreaded rod 1.

15 Figures 13, 14 and 15 serve to illustrate the configuration of a mesh sleeve comprising apertured metal sheet with holes stamped therethrough. Figure 13 shows a multiplicity of sheet metal points 41 which project along the peripheral surface of the mesh sleeve 40 and which act like a grater plate and which surround openings 42. Figure 14 shows an entrainment lug 21 which is formed by bending over the metal sheet of the mesh sleeve 40 which, like the mesh sleeve 30, has an axially extending gap 45.

25 The mesh sleeve 50 of apertured metal sheet, which is shown in Figures 16, 17 and 18, is also highly effective as a cleaning sleeve, in spite of its comparatively smooth surface. Four slots 51 which extend in the axial direction from one end of the mesh sleeve 50 into the vicinity of the oppositely disposed end permit adaptation in terms of diameter of the mesh sleeve 50 to conical anchor rods. Figure 17 is a radial plan view onto the mesh sleeve 50 from the enlarged end and Figure 18 shows how the mesh sleeve 50 is connected with its smoothly edged holes 52 in the region of the lands between the holes 52 to the crests of the screwthread 2 by weld spots 25.

35 Instead of the above-described sleeves it is also possible to use an apertured metal strip together with an anchor rod 10 or in particular with a screwthreaded rod 1, instead of an apertured sleeve. Figure 19 shows a screwthreaded rod 1, with a mesh wire strip 60 extending along the anchoring portion thereof. The mesh wire strip 60 is adapted in respect of its shape to the shape of the peripheral surface of the screwthreaded rod 1, as is shown in Figure 20. As a result of the curvature of the peripheral surface of the screwthreaded rod 1 the mesh wire strip 60 is of a channel-like configuration in order to cover the peripheral surface of the anchoring portion of the screwthreaded rod 1. 40 As can be seen from Figure 20 the mesh wire strip 60 extends in the peripheral direction over about 90° and not over 360°, as is the case with a closed mesh sleeve.

The mesh wire strip 60 extends to the front end 3 of the

screwthreaded rod 1, over which it is laid, so that the mesh wire strip 60 covers two radially oppositely disposed regions of the peripheral surface of the screwthreaded rod 1, in the manner shown in Figure 20. The wider the strip 60 shown in Figure 20 are, the more the cover means approximates to the configuration of a closed mesh sleeve.

The mesh wire strip 60 comprises wires 5 extending in the axial direction and wires 6 extending in the peripheral direction. Weld spots 25 provide for secure non-rotatable fixing of the mesh wire strip 60 on the screwthread crests of the screwthreaded rod 1.

Instead of the mesh wire strip 60 being of a one-piece configuration and welded to the screwthreaded rod 1 in the manner shown in Figures 19 and 20, it is also possible to use two mesh wire strips 60 and to provide longitudinal grooves 17 in the screwthreaded rod 1 in the manner shown in Figures 21 and 22, the longitudinal grooves 17 being provided in diametrically opposite relationship in the peripheral surface of the screwthreaded rod 1. The grooves 17 serve to accommodate the respective bent-over edge, which faces in the direction of rotary movement, of the mesh wire strips 60. The choice of the width of the groove provides that the mesh wire strip 60 can be fitted into the grooves 17 and clamped in position therein to provide the non-rotatable fixing action.

A preferred embodiment for a compound anchor is shown in Figure 23. The compound anchor illustrated therein has an anchor rod 10 with a screwthreaded portion 18 having a screwthread 19, a smooth fixing portion 11 and a cone portion 12. The cone portion 12 has a plurality of cones 13 but it differs from the cone portion 12 of the embodiment shown in Figure 5 by virtue of the fact that there is no groove 17 and that a roof-shaped cutting edge 70 is provided at the front end 16.

Similarly to the embodiment described with reference to Figures 5 to 8 the compound anchor shown in Figure 23 has a mesh sleeve 20 which extends along the peripheral surface of the anchor rod 10 and which is connected thereto at four weld locations 71 to 74.

The weld locations 71 to 74 are sufficiently stable to ensure a non-rotatable connection between the mesh sleeve 20 and the anchor rod 10. In that respect the positively locking connection which is obtained in the region of the front end 16 by virtue of a shape which differs from rotational symmetry has an assisting effect. As can be seen from Figure 23 the last cone 13 of the anchor rod 10 merges with a prolonged transitional zone into the roof-shaped cutting edge 70 which can involve an angle of 30 to 60°. As the mesh sleeve is adapted on the one hand to the peripheral surface and on the other hand to the inclination of the roof-shaped cutting edge in the manner shown in Figure 23, that arrangement affords at the front end 16 of the anchor rod 10 a positively locking engagement which carries a part of the torsional forces which

occur in the operation of inserting the anchor rod 10 with a rotational movement, with the mesh sleeve 20 which is fixed on the peripheral surface of the anchor rod 10. Figure 23 also shows a plurality of annular spaces 75 which are formed between the conical surfaces of the spreader cones 13 and the cylindrical inside of the mesh sleeve 20. Those annular spaces make it possible to accommodate mortar material as well as material which has been scraped off on the wall of the borehole.

In a manner comparable to Figure 8, the compound anchor shown in Figure 23 permits subsequent spreading movement of a hardened mortar material when a crack occurs as the weld locations 71 to 74 are in the form of desired-fracture locations which on the one hand are admittedly sufficiently strong to carry the rotational forces which occur in the peripheral direction when inserting the anchor but which on the other hand are sufficiently weak to release the anchor rod 10 when a tensile force occurs.

Figure 24 is a view on an enlarged scale of the weld location 74 as a representative weld location. The weld location 74 connects two axial wires 5 and five peripherally extending wires 6 to the smooth fixing portion 11. As a result of the configuration of the weld location 74 differing from a square shape, it has a higher load-carrying capacity in the peripheral direction than in the axial direction. More specifically, in the event of a loading in the axial direction, force is transmitted by only two axial wires which however in the event of a crack being formed in the hardened mortar shell can be comparatively easily torn by the tensile forces acting on the anchor rod 10. The axial wires 5 of the weld locations 71 to 73 tear in a corresponding manner to permit spreading movement of the hardened mortar shell.

As a result of the asymmetrical configuration at the front end 16 of the anchor rod 10, with the shape of the mesh sleeve 20 adapted to the shape of the roof-shaped cutting edge 70, that arrangement affords a non-rotatable connection between the mesh sleeve 20 and thus the mortar shell on the one hand and the anchor rod 10 on the other hand, and that connection is still effective even when the weld locations 71 to 74 permit axial movement for subsequent spreading movement of the mortar shell, by virtue of the axial wires 5 tearing. Accordingly, after the setting operation, in the hardened condition of the mortar, it is also possible to apply a torque to the screwthreaded portion 18. There is no need to mention the point that the axial wires 5 and the peripherally extending wires 6 are only connected together by frictional forces and are not welded together, at the points of intersection.

Figure 25 shows a further embodiment of an anchor rod 10 having a screwthreaded portion 18 and a screwthread 19. The smooth fixing portion 11 of this anchor rod 10 merges into a spiral portion 80 which is formed by a recess 81 of spiral configuration. The mesh sleeve 20 encloses the smooth fixing portion 11 and the spiral portion 80 in the

manner shown in Figure 25 and permits a non-rotatable connection to be made, by virtue of the positively locking engagement. The non-rotatable nature of the connection is enhanced in that arrangement by virtue of the fact that provided at the front end 16, as in the case of the embodiment shown in Figure 3, is a roof-shaped cutting edge 70 against which the associated region of the peripheral surface of the mesh sleeve 20 is also closely fitted.

10 In order to provide for better stability of the mesh sleeve 20 in regard to twisting, it can be provided with a thin sheet metal strip 85, in the manner shown in Figure 26, the strip 85 being spot-welded to the mesh sleeve at the locations 82.

15 A further possible way of enhancing the stability of the mesh sleeve 20 is that of arranging the wires 83, 84 of the mesh sleeve 20 at an angle of 30 to 60° relative to the longitudinal axis of the sleeve, in the manner shown in Figure 27.

20 The features described with reference to Figures 23 to 27 make it possible to supply a complete fixing element which upon assembly prevents improper setting, that is to say setting of the anchor rod 10 without mesh sleeve 20.

CLAIMS

1. A compound anchor comprising an anchoring member which can be introduced with a rotary movement into a borehole which can be filled with hardenable mortar material, on the peripheral surface of which anchoring member is arranged a cover means which scrapes along the wall of the borehole when the compound anchor is pushed into the borehole and which has a plurality of radial openings, characterised in that the cover means is non-rotatably connected to the anchoring member (2, 11, 12) and extends at least over a peripheral portion in the axial direction along the anchoring member (2, 11, 12).

2. A compound anchor according to claim 1 characterised in that the cover means is a wire mesh strip (60) of a channel-like configuration.

3. A compound anchor according to claim 2 characterised in that the wire mesh strip (60) extends in the axial direction as far as the front end (3) of the anchoring member (2, 11, 12) of the compound anchor (1, 10).

4. A compound anchor according to claim 2 characterised in that the wire mesh strip (60) is laid over the front end (3) of the anchoring member (2, 11, 12) and extends along radially oppositely disposed regions of the peripheral surface.

5. A compound anchor according to one of claims 1 to 4 characterised in that the cover means is welded to the peripheral surface of the anchoring member (2, 11, 12) at a plurality of points (25).

6. A compound anchor according to one of claims 1 to 5 characterised in that at least at the edge which faces in the direction



of rotary insertion movement the cover means (60) has a radially bent portion which is clamped or inserted into a groove (17) extending axially in the peripheral surface of the anchoring region.

7. A compound anchor according to one of the preceding claims wherein the cover means is a sleeve which entirely encloses the anchoring member of the compound anchor characterised in that the sleeve (4, 30, 40, 50) is connected to the screwthread crests (2) of a screwthreaded rod (1) by spot welds (25).

8. A compound anchor as set forth in the classifying portion of claim 7 characterised in that the sleeve (20, 30, 40) has an entrainment lug (21) engaging into the axially extending radial groove (17) provided on the compound anchor (10).

9. A compound anchor according to one of claims 7 and 8 characterised in that the sleeve (4, 20) is in the form of a wire mesh sleeve with axial wires (5) and wires (6) extending in the peripheral direction around the sleeve.

10. A compound anchor according to one of claims 1 to 8 characterised in that the cover means (30) is made from an expanded rib-bearing metal sheet.

11. A compound anchor according to one of claims 1 to 8 characterised in that the cover means (50) comprises an apertured metal sheet.

12. A compound anchor according to claim 11 characterised in that the apertured sheet is provided with openings (42) with sheet metal points (41) in the configuration of a grater plate.



13. A compound anchor according to one of the preceding claims characterised in that the anchoring member is an anchor rod (10) having one or more spreader cones (13).

14. A compound anchor according to claim 1 or claim 13 characterised in that the front end (16) of the anchor rod (10) is in the form of a roof-like cutting edge (70).

15. A compound anchor according to claim 13 or claim 14 characterised in that the cover means (20) is connected at its front and rear ends to the anchor rod (10) by way of desired-fracture locations (71 to 74) which fracture when the anchor rod (10) is subjected to a tensile loading.

16. A compound anchor according to claim 15 characterised in that the cover means is a wire mesh sleeve (20) which at each of the desired-fracture locations (71 to 74) which are weakened in the axial direction is welded to the anchor rod (10) by the welding involving only a few axial wires (5) but a plurality of peripherally extending wires (6).

17. A compound anchor according to claim 16 characterised in that two axial wires (5) and the five peripherally extending wires (6) are respectively welded to the anchor rod (10) at the front end and the rear end of the wire mesh sleeve (20) at diametrically oppositely disposed locations (71, 72; 73, 74).

18. A compound anchor according to claim 1 characterised in that the anchor rod (10) has an anchoring member which is in the form of a spiral (80) and at its front end (16) a roof-shaped cutting edge (70) which is surrounded by a wire mesh sleeve (20) non-rotatably held by positively locking engagement.



19. A compound anchor according to claim 1 characterised in that the cover means is a wire mesh sleeve (20) stabilised by a thin sheet metal strip (85) which extends in the axial direction and which is welded spot-wise (82) to the wire mesh sleeve (20).

20. A compound anchor according to claim 1 or claim 19 characterised in that the cover means is a wire mesh sleeve (20) whose wires (83, 84) which extend substantially at a right angle to each other are arranged at an angle of between 30° and 60° relative to the longitudinal axis of the sleeve.

21. A compound anchor according to one of the preceding claims characterised in that the cover means has openings (23, 42, 52) for the removal of material which has been scraped off the wall of the borehole into annular spaces (2, 14, 75) of the anchoring member (1, 11, 12).