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- (54) **Betonfalzsaluzat átkötési rendszere**

Az európai szabadalom ellen, megadásának az Európai Szabadalmi Közlönyben való meghirdetésétől számított kilenc hónapon belül, felszólalást lehet benyújtani az Európai Szabadalmi Hivatalnál. (Európai Szabadalmi Egyezmény 99. cikk(1))

A fordítást a szabadalmas az 1995. évi XXXIII. törvény 84/H. §-a szerint nyújtotta be. A fordítás tartalmi helyességét a Szellemi Tulajdon Nemzeti Hivatala nem vizsgálta.

Tie system of a concrete wall formwork

The invention relates to a formwork element with a formlining and a locking device for a tie rod of a tie system of a concrete wall formwork, wherein the locking device has a threaded nut element for threading the tie rod through a threaded nut thread of the threaded nut element.

Such tie systems are used in formwork technology for casting steel-reinforced concrete structures. Concrete formwork elements, or formwork elements for short, of concrete wall formworks are made up of one formlining and supporting elements, for example, longitudinal girders and tie beams. The two sides of a wall are each formed from one concrete formwork element, that is, a half-formwork, which are held together by tie rods. The tie rods are inserted through holes in the formlining and fixed at their ends to the elements supporting the formlining in such a way that the tensile force exerted on the tie rods during concrete casting is contained. Normally, the two ends of the tie rods have threads onto which threaded nuts are threaded on as tie fastenings. This determines the effective length of the tie rod and therefore the thickness of the wall to be concreted. At the same time, the pressure exerted during concrete casting by the liquid concrete on the formlining is redirected via the threaded nuts onto the tie rods. The tie rods are subject to tensile stress during this operation. Between the formlinings, spacer elements are included in the volume of the concrete wall to be cast that can absorb the compressive forces that occur during concrete casting and mounting of the tie rods, it being ensured that these compressive forces do not influence the wall thickness in an unwanted way, that is, reduce it.

With the known tie systems, there are problems with inserting the tie rod when the concrete wall formwork is erected, if the tie insertion holes of the formwork elements with their formlinings facing each other and forming the concrete wall are not sufficiently well-aligned opposite each other.

Because the tie rod is always inserted from the outside, as seen from the rear of a first formwork element, through the already erected formwork elements, the formwork erector who is positioning the tie rod cannot see the tie insertion hole of the second formwork element. The latter tie insertion hole is found relatively easily but, with poorly aligned tie insertion holes, the tie rod extends obliquely with respect to the formlining of the formwork elements, making it very difficult to locate the thread of a locking device on the rear of the second formwork element. Moreover, if the tie rod is oblique in this way, the locking devices cannot lie flat against the formwork elements around their entire circumference, which results in the forces that occur during concrete casting being transmitted from the concrete wall formwork to the locking devices concentrated at points only, which places a heavy load on the locking devices.

A solution to this problem is proposed in DE 10 2007 004 226 A1 which discloses all features of the preamble of claim 1. Here, too, a concrete wall formwork with a first and a second formwork element, each having a formlining, and with a tie system with a tie rod and locking devices is disclosed, wherein the formwork elements are disposed opposite each other with the front faces of their formlinings. The tie rod is inserted through one tie penetration hole in each formwork element. Furthermore, annular sealing elements are provided for sealing the tie penetration holes in the formlinings. Each of the locking devices for the tie rod of the tie system of the concrete wall formwork has a threaded nut element for

threading the tie rod through a threaded nut thread of the threaded nut element, and a cap plate. The cap plate is fastened by means of fastening elements to a rear face of one of the formwork elements of the concrete wall formwork. The cap plate has a spherically designed plate region having an opening in which the threaded nut element is disposed having radial clearance, wherein the threaded nut element comprises a groove-like radial circumferential receptacle in which the edges of the opening in the spherical plate region are received. One threaded nut element of each tie system that is disposed on the side of tie rod tip, has a tubular guiding device flush with the threaded nut thread of the threaded nut element provided on the end located at the concrete formwork side, which is used to more easily locate the thread opening of the threaded nut head when threading in the tie rod.

Here, however, the problem arises that due to the oblique position of the tie rod, excessive strain is exerted on the sealing element so that during concrete casting, liquid concrete can escape through the unsealed sections of the tie penetration holes.

DE 16 84 261 A discloses a device for erecting concrete formwork, wherein an abutment is provided on at least one side of the formwork, which forms a support for an element to be clamped.

DE 34 05 976 A1 moreover discloses a tie system for a concrete wall formwork. The tie system comprises tie nuts which are each provided with a clamping body. For this reason, the openings for the ties provided in the formwork elements can be selected to be relatively large, which facilitates setting of the ties from the outside.

The object of the invention is to provide a locking device for a tie system and a concrete wall formwork that avoids the disadvantages of prior art,

wherein sealing of the tie penetration holes, through which obliquely positioned tie rods are inserted, is improved.

This object is solved by the devices of the independent claim 1. The dependent claims are preferred embodiments of the invention.

The inventive formwork element with a formlining comprises a locking device for a tie rod of a tie system of a concrete wall formwork. The locking device has an annular sealing element for sealing a tie penetration hole in the formlining, a threaded nut element to thread the tie rod into a threaded nut thread of the threaded nut element, and a cap plate. The cap plate can be fastened by means of fastening elements to a rear face of the formwork element of the concrete wall formwork and has a spherically designed plate region having an opening in which the threaded nut element is disposed having radial clearance. Therein, the threaded nut element has a groove-like radially circumferential receptacle, which accommodates the edges of the opening in the spherical plate region. A tubular guidance device flush with the threaded nut thread of the threaded nut element is provided at the end of the threaded nut element to be located at the concrete formwork side. According to the invention, the sealing element has an inner sealing ring exhibiting rubber elasticity or viscoelasticity and the free end of the guiding device to be located at the formwork element side protrudes sealingly into the inner sealing ring.

When an inventive locking device is used, essentially no liquid concrete can escape through the tie penetration hole between the tie rod and the sealing element. Furthermore, the likelihood of damage to the sealing ring when inserting the tie rod into the guiding device is reduced. Additionally, the asymmetrical pressure load exerted on the rubber-elastic inner sealing ring if the tie penetration holes are not entirely

aligned is reduced, because a distribution of the load exerted by the forces generated by pressure load is made possible because the guiding device makes sealing contact with the inner sealing ring. The tie rod itself does not fit closely against the inner sealing ring.

In accordance with the invention, the free end of the guiding device to be located at the formwork element side is terminated by an outside edge of the inner sealing ring to be disposed on the formlining side or protrudes beyond the outside edge on the formlining side. This also permits use of a particularly thin inner sealing ring, that is, of an inner sealing ring of low material thickness, giving the sealing ring a high overall degree of elasticity.

The sealing element especially preferably has a metal sleeve, wherein the inner sealing ring is sealingly disposed in the metal sleeve. The metal sleeve prevents damage to the inner sealing ring and protects the inner sealing ring in tie penetration holes.

The metal sleeve very advantageously has a radial circumferential widening on the formlining side extending radially toward the outside, wherein an end stop for the defined positioning of the sealing element is constituted in a tie penetration hole.

The sealing element can have an outer ring preferably made of rigid plastic, wherein the outer ring is plugged or threaded onto the metal sleeve. This also permits sealing of the rear face of the formlining into the tie penetration hole of which the sealing element is inserted. Moreover, the outer sealing ring can also be used for thread tightening on the rear.

The free end of the guiding device to be located on the formwork element side can especially preferably rest against a radial circumferential and widened sealing lip of the inner sealing ring. In this case, the free end of the guiding device can serve as an end stop for a tie rod to be threaded on.

Particularly large deflections of the threaded nut element are made possible when the spherically designed plate region forms a spherical cup region with a sphere center on the formwork element side, wherein surface regions of the circumferential receptacle of the threaded nut element, which rest on the spherically designed plate region, are constituted such that they are complementarily shaped with respect to the spherically designed plate region.

An anti-rotation lock is preferably provided on the threaded nut element. This anti-rotation lock can, for example, be achieved by constituting the surfaces of the threaded nut element lying one upon the other and the cap plate with great anti-rotation friction, for example, by means of a studded surface. If such a locking device is used, the tie rod can, for example, be threaded on from the rear of the first formwork element into the locking device, which is fastened on the rear of the second formwork element, without a formwork erector on the rear of the second formwork element having to operate the locking device during threading on to prevent the threaded nut element from rotating with the tie rod. Such a locking device is therefore suitable, for example, for use in inaccessible regions of the concrete formwork. The anti-rotation lock preferably has a stop element, wherein the stop element prevents rotation of the threaded nut element by stopping on a stop preferably constituted by the fastening elements. This ensures especially simple and reliable locking against rotation. If the stop element is constituted as a wing, a stop located

further away from the threaded nut element can also prevent rotation. A stop element is described, for example, in DE 10 2007 004 226 B3.

A further inventive embodiment of the locking devices for fastening to the formwork element to be erected first could be to attach the locking device permanently to the formwork elements. This would have the advantage of obviating pre-assembly on the formwork element to be erected first.

An inventive concrete wall formwork has a first and a second formwork element each of which have a formlining, and a tie system with a tie rod, wherein the second formwork element is designed in accordance with the invention, and wherein the front faces of the formlinings of the formwork elements are disposed opposite each other. The locking device is disposed on the rear face in the region of a tie penetration hole in the formlining of the second formwork element, preferably using fastening means, and the sealing element of the locking device is used to seal the tie penetration hole in the formlining of the second formwork element. In this way, the tie rod is inserted from the rear face of the formlining of the first formwork element through a tie penetration hole in the formlining of the first formwork element and through the sealing element and can be or is threaded onto the threaded nut thread of the threaded nut element of the inventive locking device.

Here, the free end of the guiding device is constituted on the formwork element side and sealingly inserted with the inner sealing ring into the sealing element so that the free end of the guiding device is positioned in a way defined by the sealing element on the formlining.

The tie rod preferably has a rounded tie rod tip, which makes it easier to find the thread opening at the free end of the guiding device. The tie rod advantageously has a first thread in the end region of the tie rod facing

away from the tie rod tip and a second thread in the end region of the tie rod near to the tie rod tip. In the intermediate region, the tie rod advantageously has a smooth surface, which makes it more difficult for the concrete to become attached.

The tie rod very advantageously conically tapers between the first and the second thread, which facilitates removal of the tie rod after a cast concrete wall has set. The thread shape of the first thread can differ from the thread shape of the second thread so that the thread near to the tie point can be constituted very coarsely, which makes it easier to locate the threaded nut thread of the threaded nut element. The inventive tie rod has a stop in the region of the point, which, when threaded into the guiding device, fits closely in the free end of the guiding device.

Prescribed wall thicknesses are easier to set and imprecise thicknesses of the wall that is to be cast in concrete are avoided.

The free end of the guiding device of the locking device located on the formwork element side is very advantageously aligned with the outside edge of the inner sealing ring of the sealing element located on the formwork element side or projects beyond the outside edge on the formwork element side. In this case, the outside edge of the inner sealing ring of the sealing element located on the formwork element side is essentially aligned with the front side of the formlining of the second formwork element. In this way, the edges of the tie penetration hole are protected and any asymmetrical forces that are exerted on the inner sealing ring are optimally distributed across the width of the inner sealing ring. Here, only the guiding device fits closely in the inner sealing ring.

A further sealing element is especially preferably provided that is identical to the sealing element of the locking device, in particular, a sealing element with an identical inner diameter for sealing the tie

penetration hole in the formlining of the first formwork element. In this case, the tie rod is inserted through the further sealing element. The shape of a conically tapering tie rod is designed such that the largest diameter of the conical region is adapted to the sealing element such that it can be inserted into the inner sealing ring of the further sealing element to constitute a seal.

The embodiment of the tie system has the additional advantage that the same sealing elements can be used on both sides of the formwork elements. This is because the tie rod on one side and the guiding element on the other side have almost the same outside diameter in the region of the sealing element.

The invention is explained in more detail below based on an embodiment and referring to the drawings.

Figure 1 shows an inventive formwork element of a concrete wall formwork in cross-section in the region where tie holes are disposed opposite each other and not aligned.

Figures 2a and 2b each show an inventive formwork element with the locking device in various cross-sections as a detail of Figure 1, fixed in a position on the rear side of a concrete formwork element, wherein Figure 2b shows an enlarged detail of Figure 2a.

Figure 3 shows an enlarged detail of the locking device shown on the left in Figure 1.

The figures of the drawings show the inventive object highly schematically and are not scale drawings. The individual parts of the inventive object are shown in such a way that their structure is clearly visible.

Figures 2a, 2b and 3 each show detail views of the concrete wall formwork shown in Figure 1, wherein each figure shows a cross-section at the level of the longitudinal axis of a tie rod 2 of the tie system, which connects a first and a second formwork element 5,6 of the concrete wall formwork. The formwork elements 5,6 each have a formlining 7 and longitudinal beams. Any tie beams that may exist are not shown due to the detail selected. The formlining 7 is usually mounted on longitudinal beams and tie beams, in particular, riveted thereon. The tie rod 2 is aligned obliquely at an angle α with respect to the surfaces of the formlinings 7.

In each case, the sectional representation in Fig. 1 extends through a longitudinal beam so that each longitudinal beam is only represented by the wall 11 of the steel section from which the beam is made. The front sides of the formlinings 7 of the formwork elements 5,6 are disposed opposite each other to form a wall to be cast in concrete. One tie penetration hole 13 is provided in the region of each longitudinal beam in the formlinings 7. The tie rod 2 is inserted from the rear of the first formwork element 5 through the tie penetration holes 13 and the longitudinal beam, in whose region the tie penetration holes 13 are disposed. Annular sealing elements 15 are disposed and/or inserted in the tie penetration holes 13 that extend around the tie rod 2 in such a way that during concrete casting essentially no liquid concrete can exit through the tie penetration holes 13. On the rear of each of the formwork elements 5,6, one locking device 20,21 is positioned in the area of the tie penetration holes 13. The locking devices 20,21 each have a threaded

nut element 23,24 with a threaded nut thread, that is, a hole with an internal thread, through which the tie rod 2 is threaded. The locking devices 20,21 also each have a cap plate 26,27 with fastening elements 30 for fastening the cap plate 26,27 and therefore the locking device 20,21 on the rear of each one of the formwork elements 5,6. The fastening elements 30 are constituted by a hole in the edge region of the cap plate 26,27, through which a threaded bolt 32 can be or is threaded into a threaded hole on each longitudinal beam. Clamps, bayonet connectors, and similar fixtures are also conceivable as technically equivalent fastening elements 30. The cap plate 26,27 is made of a steel plate. It has a spherically designed plate region, that is, a plate region constituted as a spherical cup region, in which an opening is provided. Each spherical cup region constitutes a sphere center on the side of the formwork element. That is, the curvature of the spherical cup region is oriented in such a way that the center is located in the region of the formwork element 5,6 to which the associated locking device 20,21 is fastened. This center is preferably located in the formlining plane.

The concave surface of the cap plate 26,27 is disposed with radial clearance around its entire circumference toward the formlining 7 of each formwork element 5,6. The threaded nut element 23,24 of each locking device 20,21 is positioned in the opening. A radial groove around the entire circumference is provided on each threaded nut element 23,24 that constitutes a holder 40 in which the edges of the opening in the spherical plate region of the associated cap plate 26,27 are held. The holder 40 has a shape corresponding to the spherical plate region so that, within the radial clearance, deflection of the threaded nut element 23,24 is possible around the entire circumference on the cap plate 26,27, guided by the cap plate 26,27. The groove can, for example, be constituted by plugging or threading on a ring 41 (Fig. 2a) constituting

the groove wall on the concrete formwork side onto a tubular region of a part of the threaded nut element 23,24 formed as a domed cap nut.

A tubular guidance device 45 flush with the threaded nut thread of the threaded nut element 24 is provided on the locking device 21 positioned on the second formwork element 6, at the end of the threaded nut element 24 located on the concrete formwork side. This is, for example, a sleeve-like extension, which is constituted on the threaded nut element 24. The thread of the threaded nut element 24 can extend fully or partially inside the extension. In this case, the threaded nut element 24 is constituted as two pieces. It is comprised of the sleeve-like extension, which is constituted integrally together with the guiding device 45 and in which the threaded nut thread is located, and an anti-rotation lock 60 that is threaded on or plugged thereon and secured with a splint. The anti-rotation 60 has wing elements that stand radially away from the threaded nut element, so that even a stop that is located further away from the threaded nut element 24 can prevent the threaded nut element 24 from turning with the tie rod 2 when the latter is threaded on.

As can be seen clearly, in particular, in the detailed view of Figure 2b, the sealing elements 15 have a rubber-elastic inner sealing ring 46 with a widened sealing lip 46' and a metal sleeve 47, wherein the inner sealing ring 46 is sealingly disposed in the metal sleeve 47. The free end of the guiding device 45 located on the formwork element side is sealingly inserted with the inner sealing ring 46 into the sealing element 15, which is disposed in the tie penetration hole 13 of formlining 7 to which the inventive locking device 21 is fastened. The metal sleeve 47 is provided with a widened section 49, which is disposed radially on the formlining side and extends radially outward and which as a positioning aid defines the slot-in depth of the sealing elements 15 into the tie penetration holes 13 and forms edge protection. The guiding device 45 is inserted so far

into the associated sealing element 15 that it extends slightly beyond the outside surface of the formlining 7 and beyond an outside edge of the inner sealing ring 46 that widens in a bulging manner and is disposed on the formlining side. The protruding, projecting region is constituted as a free end 51 of the guiding device 45. Likewise, the free end 51 of the guiding device 45 and the widening 49 of the metal sleeve 47 slightly project beyond the outside surface of the formlining 7. The sealing elements 15 have an outside ring 48 made of rigid plastic, which is threaded onto the metal sleeve 47 from the rear of the formlining 7, wherein, in addition to additional rear sealing of the tie penetration hole 13, the sealing elements 15 are fixed in position.

The tie rod 2, which is inserted through the sealing element 15 by means of its tip 50, is inserted directly into the guiding device 45, which is fastened to the anti-rotation lock 60. The anti-rotation lock 60 is constituted as a cap nut. The pivot point (circle center), around which the cap nut 45 (guiding device 45, anti-rotation lock 60) can be swiveled, deflected, or displaced when a tie rod 2 is inserted, is therefore located in the region of the plane of the formlining 7.

Furthermore, one anti-rotation lock 60 is provided on each of the threaded nut elements 24 of the locking device 21, which are on the rear sides of the second formwork elements 6, that is, those formwork elements 6, through which the tie rods 2 are inserted from the front, i.e., from the formlining 7. These anti-rotation locks 60 are constituted such that an outer region of the threaded nut elements 24, during rotation of each threaded nut element 24, can hit a stop constituted, for example, by the fastening elements 30 of the associated cap plate 27, so that the threaded nut element 24 cannot turn further.

The tie rod 2 is completely threaded-on in the figures. The threaded nut thread 70 of the tie rod 2 therefore has, in the region of the tip 50 of the tie rod 2, a smaller diameter than the remaining tie rod 2, thus forming a thread stop 52 at the transition of the threaded nut thread 70 to the rest of the tie rod 2. With this thread stop 52, the fully threaded-in tie rod 2 abuts against the free end 51 of the guiding device 45. This determines the thread-in depth of the threaded nut thread 70 in the region of the tip 50 of the tie rod 2 into the threaded nut element 24 of the associated locking device 21. The diameter of the tie rod 2 in the region of the thread 70 is constant along the length of the thread (cylindrical thread section).

The threaded nut thread of the locking device 20 positioned on the rear of the first formwork element 5, where the tie rod 2 is inserted, receives a tie rod with a larger diameter than the threaded nut head of the locking device 21 on the rear of the second formwork element 6. The illustrated tie rods 2 also have, on their end regions facing away from the tip 50 of each tie rod, onto which the locking devices 20 fastened on the rear of the first formwork element 5 are threaded on, splint holes 75 for inserting locking splints. The wall thickness of the concrete wall to be cast can be defined by positioning these splint holes 75. The tie rods 2 are shaped conically along their entire length, with the exception of the thread sections constituted on each end.

To permit the tie system to also absorb the tilting forces exerted on the formwork elements 5,6 during concrete casting, which would cause a reduction in the wall thickness of the concrete wall to be cast, in Figure 1 a further fastening of the cap plates 26,27 is provided on the rear faces of the formwork elements 5,6. The latter fastening is provided in the figures by means of threaded bolts 32 with molded-on rings. The tie rod 2 has, in its region to be positioned between the formlinings 7, a shape

that conically tapers toward the relevant tie tip 50, making the tie rod 2, in particular, if it has been treated or oiled before application in the concrete wall formwork, easier to remove after the cast concrete wall has set.

The tie penetration holes 13 of the formwork elements 5,6 of the concrete wall form shown are not disposed opposite each other in such a way that they are aligned. The threaded nut elements 23,24 of the locking devices 20,21 are therefore not disposed centered in the openings of the spherical plate regions of the associated cap plates. The threaded nut elements 23,24 are instead deflected radially over the surfaces of the spherical regions of the cap plates guided by the associated cap plates, so that the tie rod 2 does not have to be aligned perpendicularly to the formlinings 7 of the formwork elements 5,6. Obliquely extending ties can be used permanently and multiple times with the locking device and also operated from one side only. The tie position facing away from the operator side can be securely sealed, wherein the tie rod itself no longer presses onto the sealing lip of the sealing element. In its final position, the tie rod is disposed above the thread stop at the free end of the guiding device. The inner sealing ring of the sealing element seals the guiding device.

The invention proposes a formwork element (5, 6) with a formlining (7) and locking device (21) for a tie rod (2) of a tie system of a concrete wall formwork (6), the locking device comprising:

- an annular sealing element (15) for sealing off a tie penetration hole (13) in the formlining (7),
- a threaded nut element (24) for threading on the tie rod (2) into a threaded nut thread of the threaded nut element (24), and
- a cap plate (27) that can be fastened by means of fastening elements (30) to a rear face of the formwork element (6) and comprises a

spherically designed plate region having an opening in which the threaded nut element (24) is disposed having radial clearance, wherein the threaded nut element (24) comprises a groove-like radially circumferential receptacle (40) in which the edges of the opening in the spherical plate region are received, wherein a tubular guiding device (45) which is formed in one piece with the threaded nut element and is flush with the threaded nut thread of the threaded nut element (24) is provided at the end of the threaded nut element (24) located on the concrete formwork side, the guiding device (45) having a free end into which the tie rod (2) to be threaded onto the threaded nut element (24) can be inserted, characterized in that the sealing element (15) comprises a rubber-elastic or viscoplastic inner sealing ring (46) and the free end (51) of the guiding device (45) located on the formwork element side sealingly projects into the inner sealing ring (46).

The invention is not restricted to the embodiments described above.

SZABADALMI IGÉNYPONTOK

1. Zsaluzati elem (5, 6) zsaluhéjjal (7) és rögzítő szerkezettel (21) egy betonfalzsaluzat (6) átkötési rendszerének átkötő szára (2) számára, amely rögzítő szerkezet magában foglal:

- egy gyűrű alakú szigetelőelemet (15) egy átkötő átmenőfuratnak (13) a zsaluhéjjban (7) való szigetelésére,

- egy csavaranya elemet (24) az átkötő szárnak (2) a csavaranya elem (24) csavaranya menetébe való becsavarozására, és

- egy tányéros anyát (27), amely rögzítőeszközökkel (30) van rögzítve a zsaluzati elem (6) hátulsó oldalán, és amelynek van egy szférikusán kialakított lemezrész egy nyílással, amelyben a csavaranya elem (24) sugárirányú játékkal van elhelyezve, továbbá

a csavaranya elemnek (24) van egy horonyszerűen sugárirányban körbemenő mélyedése (40), amely befogadja a szférikus lemezrészben lévő nyílás széleit, és a csavaranya elemnek (24) a betonzsaluzat felőli oldalon elhelyezett végén van egy, a csavaranya elemmel (24) egy darabból kialakított cső alakú vezetődőeszköze (45), amely egy vonalba esik a csavaranya elem (24) csavaranya menetével, és amely vezetődőeszköznek (45) van egy szabad vége, amelybe bevezethető a csavaranya elembe (24) becsavarozandó átkötő szár (2),

azzal jellemezve, hogy

a szigetelőelem (15) el van látva egy gumielasztikus vagy viszkoelasztikus belső tömítőgyűrűvel (46), és hogy a vezetődőeszköznek (45) a zsaluzati elem felőli oldalon elhelyezett, szabad vége (51) tömítően nyúlik be a belső tömítőgyűrűbe (46), továbbá a vezetődőeszköznek (45) a zsaluzati elem felőli oldalon elhelyezendő, szabad vége (51) a belső tömítőgyűrűnek (46) a zsaluhéj felőli oldalon elhelyezendő külső élével egy szintben végződik, vagy a zsaluhéj felőli oldalon túnyúlik a külső élen.

2. Az 1. igénypont szerinti zsaluzati elem, azzal jellemezve, hogy

a szigetelőelem (15) el van látva egy fémhüvellyel (47), és

a belső tömítőgyűrű (46) a fémhüvelyben (47) tömítően van elhelyezve.

3. A 2. igénypont szerinti zsaluzati elem, azzal jellemezve, hogy

a fémhüvelynek (47) van egy, a zsaluhéj felőli oldalon elhelyezendő, sugárirányban körbemenő és sugárirányban kifelé kiterjedő kiszélesedése (49).

4. A 2. vagy a 3. igénypont szerinti zsaluzati elem, azzal jellemezve, hogy

a szigetelőelemnek (15) van egy, előnyös módon merev műanyagból készült külső gyűrűje (48), amely külső gyűrű, (48) rá van húzva vagy rá van csavarva a fémhüvelyre (47).

5. Az 1-4. igénypontok egyike szerinti zsaluzati elem, azzal jellemezve, hogy a vezetőeszköznek (45) a zsaluzati elem felőli oldalon elhelyezett szabad vége (51) felfekszik a belső tömítőgyűrűnek (46) egy sugárirányban körbemenő, kiszélesített tömítőajkán (46').

6. Az 1-5. igénypontok egyike szerinti zsaluzati elem, azzal jellemezve, hogy a szférikusán kialakított lemezrész egy gömbhéjrészt képez egy, a zsaluzati elem felőli oldalon lévő gömbközépponttal, és a csavaranya elem (24) körbemenő mélyedésének (40) felületi részei, amelyek felfeksznek a szférikusán kialakított lemezrészben, úgy vannak kialakítva, hogy komplementerek a szférikusán kialakított lemezrésszel.

7. Az 1-6. igénypontok egyike szerinti zsaluzati elem, azzal jellemezve, hogy a csavaranya elem (24) van egy elfordulás elleni biztosító (60), amely elfordulás elleni biztosító (60) előnyös módon el van látva egy előnyös módon szárnyként kialakított ütközőelemmel, amely ütközőelemmel a csavaranya elem (24) elfordulása egy ütközőnek, előnyös módon rögzítőeszközöknek (30) való ütközés révén megakadályozható.

8. Betonfalzsaluzat, amely magában foglal:
egy első és egy második,
egy-egy zsaluhéjjal (7) ellátott zsaluzati elemet (5, 6), amely zsaluzati elemek (5, 6) zsaluhéjuk (7) elülső oldalával helyezkednek el egymással szemközt,

és egy átkötési rendszert egy átkötő szárral (2),
azzal jellemezve, hogy
a második zsaluzati elem az 1-8. igénypontok egyike szerint van kialakítva, és az átkötő szár (2), az első zsaluzati elem (5) zsaluhéjának (7) hátulsó oldalától indulva át van vezetve az első zsaluzati elem (5) zsaluhéjában (7) lévő átkötő átmenőfuraton (13) és a szigetelőelemen (15), továbbá az átkötő szár (2) be van csavarozva a rögzítő szerkezet (21) csavaranya elemének (24) csavaranya menetébe.

9. A 8. igénypont szerinti betonfalzsaluzat,
azzal jellemezve, hogy
az átkötő szárnak (2) lekerekített átkötőszár hegye (50) van, és el van látva az átkötő szárnak (2) az átkötőszár hegytől elfelé néző végrészén egy első csavarmenettel (71), az átkötő szárnak (2) az átkötőszár hegy közelében lévő végrészén pedig egy második csavarmenettel (70).

10. A 9. igénypont szerinti betonfalzsaluzat,

azzal jellemezve, hogy

az átkötő szár (2) az első és a második csavarmentet (70, 71) között az átkötőszár hegy (50) irányában kúposan elkeskenyedik, és/vagy hogy az első csavarmentet (71) menetalakja eltér a második csavarmentet (70) menetalakjától, és/vagy hogy a második menetnek (70) az átkötőszár hegytől elfelé néző végén egy csavarütköző (52) van kialakítva az átkötő száron (2), és az átkötő szár (2) második csavarmentete (70) az ütközőig teljesen becsavarozható a rögzítő szerkezet (21) csavaranya elemébe (24).

11. A 8-10. igénypontok egyike szerinti betonfalzsaluzat,

azzal jellemezve, hogy

a rögzítő szerkezet (21) vezetőeszközének (45) a zsaluzati elem felőli oldalán elhelyezett szabad vége (51) a szigetelőelem (15) belső tömítőgyűrűjének (46) a zsaluzati elem felőli oldalán elhelyezett külső élével végződik, vagy a zsaluzati elem felőli oldalán kiáll a külső él felett, illetve túlnyúlik rajta, a szigetelőelem (15) belső tömítőgyűrűjének (46) a zsaluzati elem felőli oldalán elhelyezett külső éle pedig lényegében a második zsaluzati elem (6) zsaluhéjának (7) előlő oldalával végződik.

12. A 9-11. igénypontok egyike szerinti betonfalzsaluzat,

azzal jellemezve, hogy

egy másik, a rögzítő szerkezet (21) szigetelőelemével (15) azonos szigetelőelem (15) van az első zsaluzati elem (5) zsaluhéjában (7) lévő átkötő átmenőfurat (13) szigetelésére az első zsaluzati elem (5) zsaluhéjában (7) lévő átkötő átmenőfuratban (13),

továbbá az átkötő szár (2) átvezethető a másik szigetelőelemen (15), és az átkötő szár (2) szerelt állapotában keresztül van vezetve a másik szigetelőelemen (15).

(A meghatalmazott)

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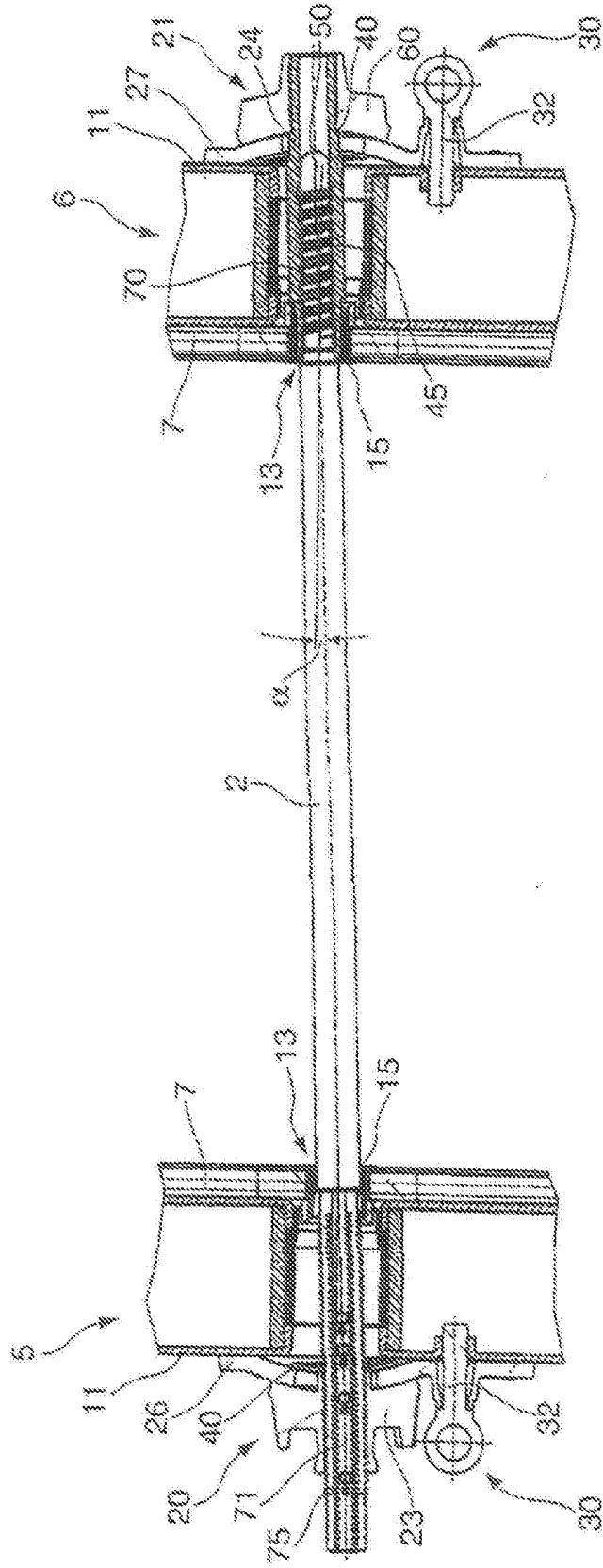


Fig. 1

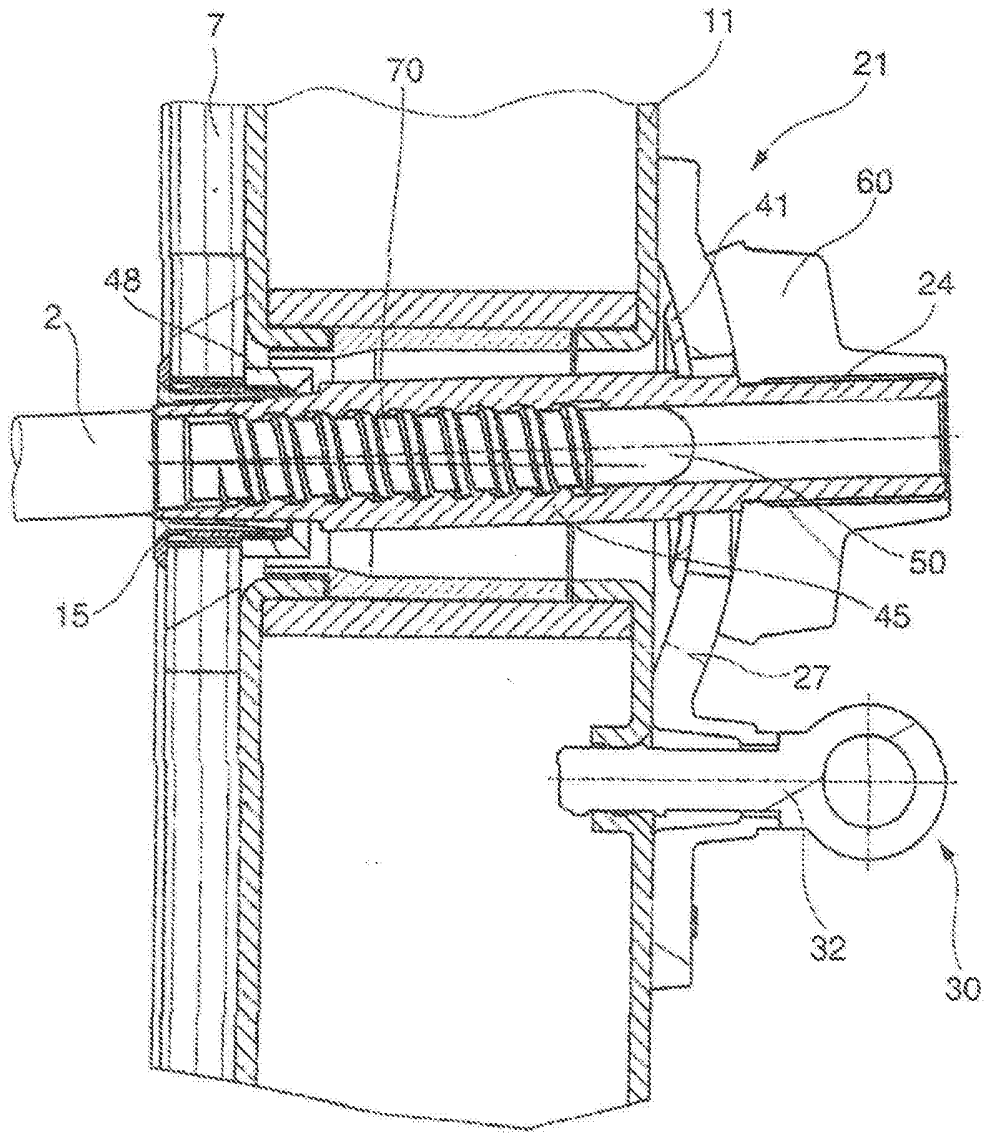


Fig. 2a

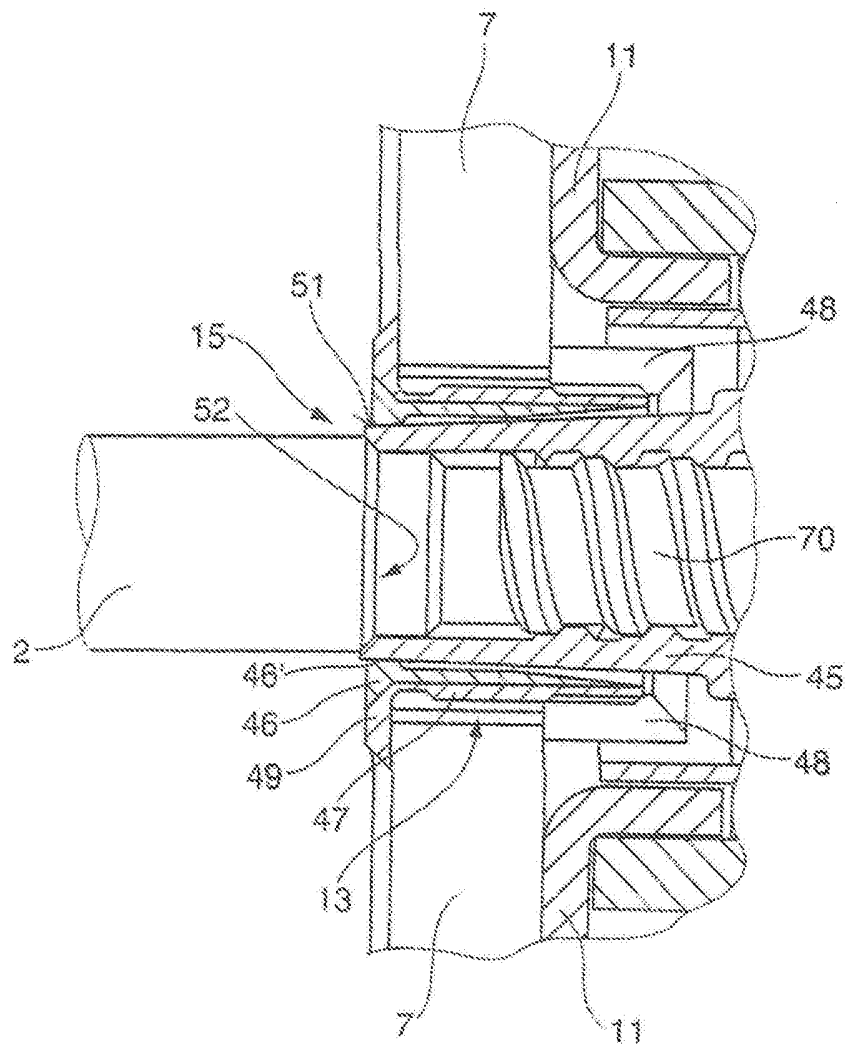


Fig.2b

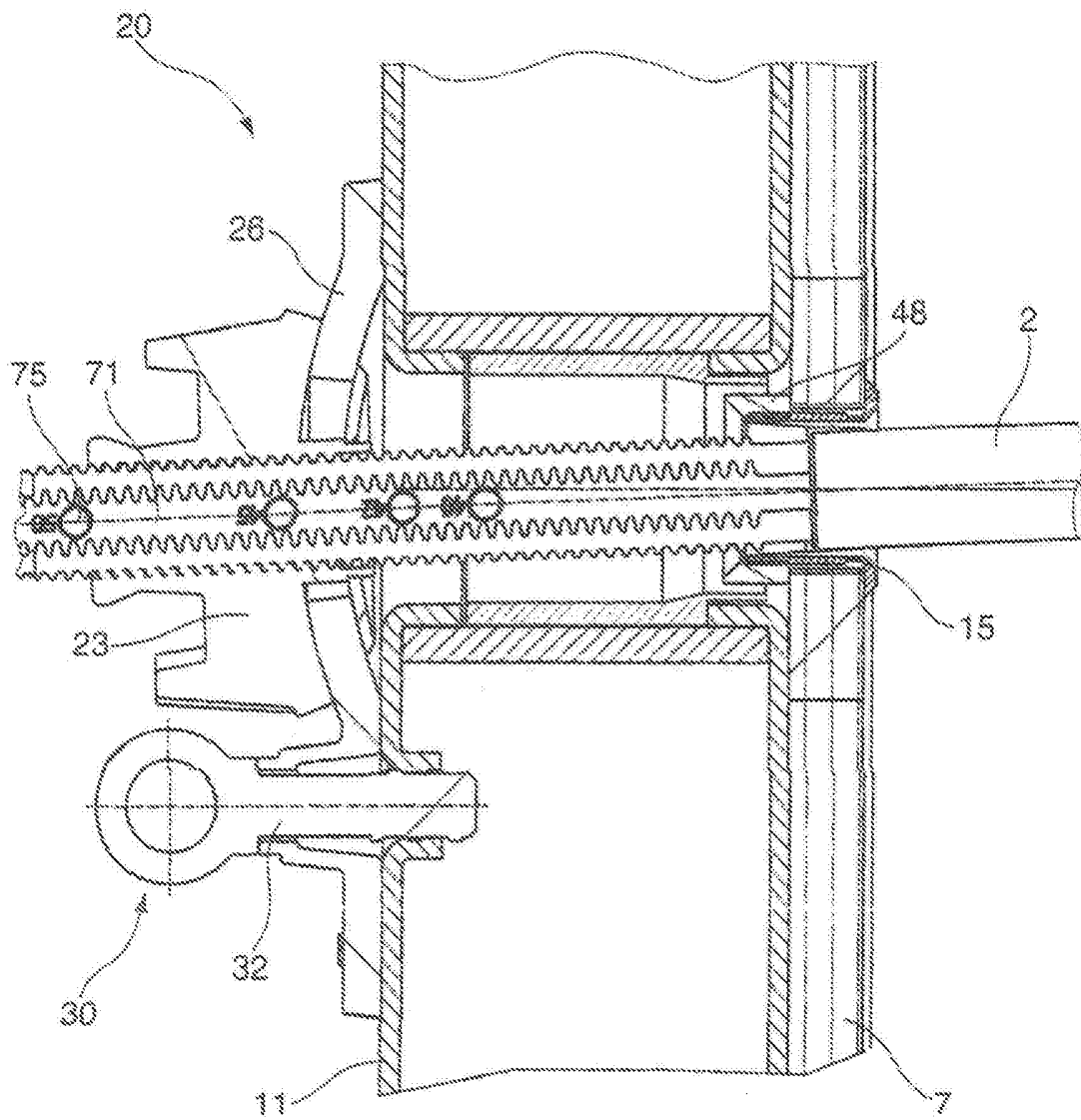


Fig. 3