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(54) **Vízzáró szerkezet**

Diaphragm wall

The present invention relates to the field of special underground work.

It relates more specially to the achievement of a sealing near a concrete element, particularly a unitary element of a concrete work, in particular a foundation or support work, accomplished by successive or alternate unitary elements, as known from FR 2 540 911 A1.

The invention relates to a sealing device and a structure comprising said sealing device, suitable to be included in a reinforced concrete element molded in the ground. It also relates to a manufacturing method of such an element and a work comprising the reinforced concrete element thus obtained.

The aforementioned element can for example be an elementary panel of a molded wall or an elementary pile of a curtain of secant or contiguous piles.

A molded wall is commonly constructed by pouring concrete into a trench in the ground after a reinforcing cage has previously been placed there. Often, the wall consists of a plurality of elementary panels constructed one after the other or alternately. To combat infiltrations of water between adjoining panels, different sealing systems have been developed.

Currently used is a system consisting, once the excavation is dug, in placing, against one of its lateral walls, formwork comprising a system for holding and protecting a sealing tab. During the setting of the concrete inside the excavation, the sealing tab is firmly attached to the primary panel thus concreted while still partially protruding from said panel. An excavation designed to form the following wall panel is dug near the formwork, which is then withdrawn, then the adjoining secondary panel is concreted, embedding in particular the portion of the sealing tab protruding from the primary panel. The installation and extraction of the formwork, however, increase the handling operations during the construction of the molded wall. Due to the adhesion between the concrete and the formwork, the extraction of the latter is made particularly difficult.

Also known, particularly from European patent application EP 0 304 415, are sealing elements designed to be disposed inside the excavation of a secondary panel, said sealing elements being driven against the wall of the already concreted primary panel under the influence of the pressure of the concrete poured into the excavation of the secondary panel. This type of device does not allow effective pressing of the seal against the concrete of the previously concreted adjoining element. Often, during concreting, the concrete embeds the seal, which then has no purpose. Moreover, these systems also require considerable handling operations specific to the installation of the seal.

The object of the present invention is to supply a system allowing effective sealing to be accomplished easily and rapidly at one end of a reinforced concrete element, particularly an end of said element adjoining another concrete element previously concreted.

This objective is attained with a sealing device for a reinforced concrete element molded in the ground, said device comprising at least one fluid-tight seal extending in a principal direction and connection means firmly attached to the fluid-tight seal and suitable for being connected to a reinforcement cage of the reinforced concrete element, said connection means being suitable for adjusting the width of the sealing device.

It is understood that a sealing device as defined above is designed to provide a fluid-tight connection at one end of a reinforced concrete element, particularly at its end adjoining a previously concreted concrete element.

The sealing device according to the invention is designed to be attached to a reinforcement cage, prior to the introduction of said cage into the trench delimiting the location of the concrete element.

The connection means of the sealing device are firmly attached to the fluid-tight seal and suitable for being connected to the reinforcement cage. They are suitable, generally by deforming and/or moving, for modifying the total width of the sealing device, measured in a direction not parallel to the principal direction in which the seal extends, generally in a lateral direction perpendicular to the principal direction. The connection means are interleaved completely or partially in this direction, between the seal and the reinforcing cage.

It will then be understood that by modifying the width of the sealing device, attached to the reinforcement cage, the separation distance between the reinforcing cage and the seal is also modified, and therefore the total width of a structure formed by the reinforcing cage and the sealing device.

It should be noted that, in one embodiment, the sealing device can include at least two seals connected to common or specific connection means, sealing then being ensured redundantly by said seals.

The connection means generally comprise at least one adjustment element, deformable and/or mounted movably with respect to the fluid-tight seal. Preferably, however, they comprise a plurality of adjustment elements distributed in the principal direction of the device.

According to one example, the connection means can also comprise an elongated attachment support to which are attached the adjustment elements, said support being suitable for being attached to the reinforcement cage. The support can for example be attached to the reinforcement cage by welding or by clipping. These dispositions allow the sealing device to be adapted to reinforcement cages with variable configurations, particularly as regards the spacing of the reinforcement. Preferably, the attachment support extends over a height substantially identical to that of the seal and the adjustment elements are regularly distributed at this height.

The sealing device preferably comprises support means for the fluid-tight seal, said support means allowing the seal to be connected more easily to the adjustment elements (by allowing attachment by welding in particular) and, in certain cases, protecting the seal during assembly in the trench.

Due to their deformability and/or mobility, the adjustment element(s) can pass from an initial position wherein the sealing device has a first width to a final position wherein the sealing device has a second width different from the first and the seal is pressed against the wall of the adjoining concreted element.

The deformability and/or mobility of all or a portion of the adjustment elements can also allow compensation of the differences in width between different altitudes along the excavation or errors in verticality and/or flatness of the wall on which the seal must be applied. In other words, the width of the sealing device may not be identical over the entire height of said device, particularly in the assembled or final position.

According to one example, the sealing device also comprises guiding means for the adjustment element from its initial position to its final position. These guiding means can be manual means such as a handle, or automatically controlled means.

According to one example, the connection means comprise at least one compressible adjustment element, preferably a plurality of compressible adjustment element, distributed in the principal direction of the sealing device.

More particularly, the connection means can comprise at least one flexible adjustment element, preferably a plurality of flexible adjustment element distributed in the principal direction of the sealing device. In this manner, the seal is applied firmly against the wall of the previously concreted adjoining element.

According to one example, the connection means comprise at least one jack having a body suited to being attached to the reinforcement cage, a movable piston inside said body and a rod firmly attached to the piston and extending outside the body, and the seal is firmly attached to said rod.

In this case, the aforementioned guiding means consist of the control unit of the jack.

According to an exemplary embodiment, the connection means comprise at least one adjustment element hinged with respect to the seal, preferably a plurality of adjustment elements hinged with respect to the seal, distributed in the principal direction of the sealing device.

Generally, each hinged adjustment element is suitable for pivoting with respect to the seal around a pivoting axis extending in a direction substantially orthogonal to the principal direction of the device.

According to an advantageous exemplary embodiment, the adjustment element is hinged at its two ends. It is thus mounted pivotally with respect to the seal at one of its ends, and with respect to the reinforcement cage at its other end, generally around pivoting axes substantially orthogonal to the principal direction of the device.

The hinged adjustment elements can also be moved, generally without deforming, from a retracted position in which they are folded back toward the reinforcement cage, reducing the width of the structure, to a deployed position in which they extend away from the cage.

The present presentation relates, secondly, to a structure for a reinforced concrete element molded in the ground, for example a panel or a pile, comprising a reinforcement cage, and characterized in that it also comprises at least one sealing device as previously defined attached to the reinforcement cage, the connection means being suitable for adjusting the separation distance between the fluid-tight seal and the reinforcement cage.

It is understood that the structure thus defined is designed to be introduced into an excavation in the ground before being embedded in concrete to form a reinforced concrete element, particularly a molded wall panel or a pile of a curtain of secant or contiguous piles.

Such a structure has an adjustable width, which allows, in a single handling phase, the excavation to be equipped with a reinforcement cage and at least one device providing a fluid-tight connection with an adjoining concrete element.

In the present presentation, the principal direction of the structure is defined as the direction in which it is designed to be lowered into the excavation prior to concreting.

Moreover, the lateral direction of the structure is defined as the direction perpendicular to the principal direction and oriented in the general direction of the work (i.e. the direction in which the unitary elements are aligned), once the structure is introduced into the excavation.

Finally, a transverse direction of the structure is defined as a direction orthogonal both to the principal direction and to the lateral direction.

Once the structure is installed in depth in the ground, its principal direction generally extends vertically, and its lateral direction horizontally.

Generally, the separation distance between the reinforcement cage and a fluid-tight seal of the structure will be measured in the lateral direction.

Generally, the principal direction of the sealing device is parallel to that of the reinforcement cage, i.e. the fluid-tight seal extends in the principal direction of the structure.

The structure according to the invention can include, depending on how it is used (successive or alternate unitary elements), a single sealing device or two sealing devices placed at opposite ends of the structure.

Preferably, the fluid-tight seal extends over the entire height of the reinforcement cage.

The present presentation also relates to a reinforced concrete element molded in the ground, for example a panel or a pile, comprising a reinforced concrete portion molded in situ and a structure of the type previously defined embedded at least partially in said concrete portion.

Finally, the present presentation relates to a reinforced concrete work molded in the ground, comprising at least a first concrete element and at least a second reinforced concrete element adjoining said first element, said second reinforced concrete element including a structure as defined previously, a seal of the sealing device forming the junction between the first and the second element to achieve the seal.

The present presentation also relates to a method for producing a reinforce concrete work molded in the ground, characterized in that it comprises the following steps: an excavation is formed in the ground with substantially vertical walls, delimited at least in part by a first concrete element; a structure as previously defined is lowered into the excavation, and the separation distance between the fluid-tight seal and the reinforcement cage is adjusted so that the fluid-tight seal is in contact with a wall of the first concrete element; concrete is poured into the excavation so as to form a second reinforced concrete element including said structure, the seal accomplishing a seal between the first and the second concrete element.

The adjustment of the separation distance can be accomplished during the lowering of the structure into the excavation.

In particular, the seal can cooperate with the wall of the first concrete element when the structure is lowered into the excavation, and the separation distance can be adjusted by a deformation of the adjustment system induced by this cooperation.

In other embodiments, the adjustment of the distance is carried out after lowering, once the reinforcement cage is in its final position.

According to one exemplary implementation, the structure is lowered into the excavation with the connection means in an initial retracted position wherein the separation distance is minimal and, once the reinforcement cage is positioned inside the excavation, the connection means are deployed into a final position wherein the fluid-tight seal is in contact with the wall of the first concrete element.

In this case, the deployment of the connection means into their final position can be induced by the sole effect of gravity exerted thereon and on the seal. It can also be accomplished by operating guiding means.

Other features and advantages of the invention will be revealed upon reading the following description of exemplary embodiments given by way of illustration and without limitation. This description refers to the appended sheets of drawings in which:

– Figure 1 illustrates the formation of a secondary trench between two primary panels of a molded wall,

– Figure 2 illustrates a structure for a reinforced concrete element molded in the ground, according to a first embodiment of the invention,

– Figures 3A and 3B illustrate the different steps of execution of the reinforced concrete element including the structure of figure 2,

– Figure 4 is a detail view of an adjustment element of figure 3B,

– Figure 5 illustrates a structure for a reinforced concrete element molded in the ground, according to a second embodiment of the invention,

– Figures 6A and 6B illustrate the different steps of execution of the reinforced concrete element including the structure of figure 5,

– Figures 7A and 7B shown in more detail the sealing device of figures 5, 6A and 6B in the initial position and in the assembled position,

– Figures 8A and 8B illustrate a structure according to a third embodiment of the invention, respectively before and after assembly,

– Figure 9 illustrates a variant of the first embodiment of the invention,

– Figure 10 illustrates another variant of the first embodiment of the invention,

– Figure 11 illustrates a curtain of piles made by means of a structure according to the first embodiment of the invention,

– Figure 12 illustrates a variant of the second embodiment of the invention.

A molded wall 10 is conventionally executed by elementary panels, either successive or alternating.

Figure 1 illustrates the construction of such a wall 10 by alternating panels. In this figure, two primary panels 12a, 12b, to the left and to the right, have already been concreted. The figure illustrates the construction of a secondary excavation 16 (hereafter, the excavation) between the two primary panels 12a, 12b and designed for constructing a secondary panel 14 which will be described in more detail hereafter.

The excavation 16 is dug vertically. Depending on the terrain and the specifications, different tools can be employed, for example cable grabs, Kelly grabs, hydrofraises (registered trademark), etc.

To ensure the stability of the excavation 16 during the drilling operation and in particular to avoid collapse of the walls, the excavation is filled, during drilling, with a mud generally based on bentonite.

As illustrated in figure 1, the excavation 16 thus made comprises principal vertical walls 18a, 18b of width L_s parallel in parallel pairs and separated by a distance l_s corresponding to the desired thickness of the molded wall 10. The excavation 16 marks the future location of a portion of the molded wall 10, and therefore delimits a zone to be cleared.

Figure 2 illustrates a structure 20 according to a first embodiment of the invention, designed to be introduced into the excavation 16 prior to concreting the secondary panel 14.

The structure 20 comprises a reinforcement cage 22 of known type, designed for the reinforcement of the molded wall 10.

In the example, the reinforcement cage 22 has a parallelepiped shape, its sides being suitable for running respectively along the walls 18a, 18b and 19a,19b of the excavation 16.

Hereafter, the principal direction z of the structure is defined as the direction in which it is designed to be inserted into the excavation.

Also defined is the lateral direction x as the direction orthogonal to this principal direction and extending in the general direction of the molded wall (i.e. in the direction in which the panels of the wall are aligned).

Finally, the transverse direction y of the structure is defined as the direction orthogonal to the two aforementioned directions.

The structure 20 includes, at each end of the reinforcement cage 22 in the lateral direction x, a sealing device 90, 90'.

Hereafter, a single lateral side of the structure 20 will be described in detail, the opposite side being, in the example illustrated, strictly identical. The elements of the second side are designated in the figures by numerical references identical to those of the first side described hereafter, with a prime added.

The sealing device 90 comprises a seal 30, for example of the water-swellable type, extending in the principal direction z, i.e. parallel to the sides of the reinforcement cage, and designed to be supported against the wall of the closest primary panel 12a,12b.

The sealing device also comprises a support 32 for the seal 30, here in the form of an angle-iron with a height equal to or greater than that of the seal. In the example, the seal 30 extends over a height substantially identical to that of the reinforcement cage.

Finally, the sealing device comprises connection means 40 connecting the assembly formed by the seal 30 and its support 32 to the reinforcement cage 22 and suitable, by deforming as will be described in more detail hereafter, for adjusting the width L_d of the sealing device 90 measured in the lateral direction x, and therefore, consequently, the separation distance d measured in the lateral direction x, between the end of the reinforcement cage 22 and the seal 30.

In the example, the connection means 40 comprises a plurality of adjustment elements 42 distributed regularly over the entire height of the seal 30.

Each adjustment element 42 consists here of a triangular metal hanger the base 43 of which is welded to a reinforcement 26 of the cage 22 and the top 44 of which is welded to the angle-iron 32.

The weld between the hangers 42 and the reinforcement cage 22 is accomplished in such a manner that at rest, each hanger 42 extends in a plane substantially orthogonal to the principal direction z of the reinforcement cage 22, i.e. in a substantially horizontal plane, when the reinforcement cage 22 is in a raised position above the excavation 16 as illustrated in figure 3A.

In this position, the separation distance d_1, measured between the reinforcement cage 22 and the seal 30, is maximum and substantially equal to the height of the triangle defined by the hanger 42.

It should be noted that the triangular shape and the dimensions of the hangers 42 illustrated is not limiting, these being able to have other shapes and features (diameter of the steel reinforcement for example) allowing a certain flexibility around a transverse axis to be imparted to it.

Figure 3A illustrates the structure 20 of figure 2 before its introduction inside the excavation 16.

At this time, the connection means 40 are in their initial position and the structure 20 has a width L_1 greater than the width L_0 of the excavation 16, by a few centimeters for example.

Figure 3B illustrates the introduction of the structure 20 inside the excavation 16. Under the influence of the friction of each angle–iron 32 with the wall of the adjoining primary panel 12a, 12b which it faces, the hangers 42 bend slightly. As illustrated in figure 2, the lower end 34 of the seal support 32 is beveled to start the deformation of the hangers 42 and facilitate the lowering of the structure 20 into the excavation 16. The separation distance d_2, measured in the lateral direction, between each seal 30 and the end 19a closest to the reinforcement cage 22, is reduced and the width L_1 of the structure 20 adapts itself to that of the excavation 16.

In the assembled state in the excavation 16, each seal 30 is pressed against the concrete of the adjoining primary panel 12a, 12b over its entire width, as illustrated in more detail in figure 4.

In a subsequent step, the excavation 16 is filled with concrete and the structure 20 is embedded in the concrete panel 14 thus formed. After hardening of the concrete each seal 30, 30' provided a fluid–tight connection between the secondary panel 14 and the primary panel 12a,12b which it faces.

Figure 9 illustrates a variant embodiment of the first embodiment of the invention, in which the connection means 340 no longer include triangular, but rather U–shaped hangers, each hanger 342 having a first branch 343 welded to a reinforcement of the reinforcement frame 322 (as in the example described previously) and a second branch 444 mounted pivotally inside a sleeve 347 welded to the angle–iron 332 and blocked in translation with respect to said sleeve 347 by means of a lock–washer 348. Relative pivoting provided between each hanger 342 and the sleeve 347 firmly attached to the seal support with which it cooperates makes it possible to limit the loads on the angle–iron compared to the case of direct welding to the hangers, during deformation of the hangers by cooperation with the wall of the excavation 16.

In a variant illustrated in figure 10, the connection means 440 also comprise a longitudinal attachment support 480, here in the form of a flat, with a height that is advantageously similar or substantially similar to that of the seal 430, and to which are attached the hangers 442. This variant allows the prefabrication of the sealing device 490, which can then be easily attached to the reinforcement cage on the construction site, for example by welding. In addition, the distance measured between two hangers, in the principal direction, is no longer necessarily indexed to the inter–reinforcement distance of the cage.

Figure 11 illustrates a structure 520 according to the first embodiment of the invention, suitable for the construction of a curtain of secant piles 510. Such a structure 520 differs from that described previously in connection with figures 2 to 4 only in that the reinforcement cage 522 has a substantially circular section. The connection means 540 and the principle of adjusting the cage/seal distance remain perfectly identical with the preceding.

Figure 5 illustrates a structure 120 according to a second embodiment of the invention, said structure 120 comprising a reinforcement cage 122 similar to that described previously and, at each end of the cage 120 in the lateral direction, a sealing device 190, 190' comprising a seal 130, 130', water-swellable for example, attaché to a support, here a flat 132, 132', and connection means 140, 140' of said support to the reinforcement cage 122.

As in the preceding embodiment, a single lateral side of the structure 20 will be described in detail, the opposite side being, in the example illustrated, strictly identical. The elements of the second side are designated in the figures by identical numerical references to those of the first side described hereafter, with a prime added.

Here the connection means 140 comprise a plurality of adjustment elements distributed over the entire height of the seal, and hinged between the reinforcement cage and the intermediate rigid bar, itself connected by spring means to the seal support 132.

Here the adjustment elements are U-shaped hangers 142.

Each hanger 142 includes a first branch 143 mounted pivotally inside a first sleeve 145 welded to a reinforcement 126 of the cage 122 and blocked in translation with respect to it by means for example of a lock-washer (not shown).

Each hanger 142 also comprises a second branch 144 mounted pivotally inside a second sleeve 147 and blocked in translation with respect to said sleeve 147, the sleeve being, for its part, welded to the intermediate rigid bar 150 extending over an entire height substantially identical to that of the seal.

A hanger 142 is thus mounted pivotally with respect to the reinforcement age 122 around a transverse axis P1 and, with respect to the intermediate bar 150, around a transverse axis P2.

The intermediate bar 150, mounted between the reinforcement cage 122 and the flat 132 is, in the example, connected to the flat 132 by means of a plurality of U-shaped spring blades 152.

Figure 6A illustrates the structure 120 in the initial position, prior to insertion in the excavation 16.

In this position, the width L_c of the structure 120 is less than that, L_e, of the excavation 16. The hangers 142 are brought back toward the reinforcement cage 122, and the separation distance d_i between the seal 130 and the cage 122, measured in the lateral direction x, is such that the cage 122 can be introduced into the excavation 16 without touching the lateral walls 19a, 19b of the adjoining primary panels 12a, 12b.

Once the structure 120 is positioned at its final height inside the excavation 16, the intermediate bar 150, held for example by a handle 154 provided at its upper end, is moved toward the edge of the excavation 16, driving with it the support 132 and the seal 130.

The pressing of the seal 130 against the wall of the excavation, on its entire height, results here from two distinct actions:

Thanks to a pivoting parallelogram system, the seal 130 is moved closer to the lateral wall 19a of the excavation.

If the plane of figures 6A and 6B is considered, in the initial position, the parallelogram defined by the pivoting axes P1, P2 and P1', P2' of two hangers 142 has a first height H1 in the lateral direction. The parallelogram is in the folded-back position against the cage 122.

By having the hangers 142 tilt away from the reinforcement cage 122, the height of the parallelogram is increased and assumes a value H2. The total width of the structure 120 is consequently increased, and the seal 130 is pressed against the wall of the excavation 16.

The surface irregularities of the wall are, on the other hand, compensated by the local compression of the U-shaped spring blades 152, mounted between the intermediate bar 150 and the seal support 132.

Depending on the variants, the spring blades 152 can also be replaced or completed by other compressible elements which can provide a damping function, particularly elements made of foam or of rubber.

According to another exemplary embodiment, the intermediate bar and the spring blades can be omitted. In other words, the second sleeve can be welded directly to the seal support.

Figure 12 illustrates an advantageous variant of the second embodiment of the invention, identical in all points to that described previously, except in that the connection means 640 comprise a longitudinal attachment support 680, in the form of a flat, with a height advantageously similar to that of the seal 630, and to which are attached the hangers 642.

Figures 8A and 8B illustrate a structure 220 according to a third embodiment of the present invention, in which the connection means of the sealing device 290, between the reinforcement cage 222 and each seal 230, running laterally along said cage, comprise a plurality of jacks 270.

Each jack 270 comprises a body 272 attached to the reinforcements of the reinforcement cage 222, a piston (not shown) mounted movable inside the body, and a rod 274 firmly attached to the piston and protruding outside the body. The rod is attached, at its distal end, to a support 232 carrying the seal 230.

In the example, the jacks connected to the same seal are controlled, simultaneously or not, by a control unit 276.

For the introduction of the structure 220 into the excavation 16, the rods 274 are in the retracted position and the seal is situated as close as possible to the reinforcement cage 222. Once the reinforcement cage 222 is positioned in the bottom of the excavation 16, the jacks are actuated so that their rods are deployed toward the outside of the structure, driving with it the seal 230, which presses against the wall of the excavation.

The jacks can, if appropriate, be coupled to compressible means suitable for effectively compensating the surface irregularities of the walls of the excavation.

Although, in the preceding examples, the connection means of a structure are identical on one side and the other of the structure, and what is more, over the entire height of the structure, the different embodiments described could also be combined on one structure. Thus, for example, it is possible to use a hinged system on one side of the structure and system using jacks on the opposite side.

Moreover, all the embodiments describe remains valid for structures including a single seal.

Vízzáró szerkezet

Szabadalmi igénypontok

1. Vízzáró szerkezet (90) egy a talajban kiöntött vasbeton elem (14) számára, amely vízzáró szerkezet (90) tartalmaz legalább egy vízzáró tömítést (30, 30'), amely a szerkezet egy főirányában terjed ki, valamint a vízzáró tömítéssel (30, 30') összeerősített összekötő eszközöket (40), amelyek összekapcsolhatók a vasbeton elem egy vasbetét-kosarával, ahol az összekötő elemek (40) arra szolgálnak, hogy beállítsák a vízzáró szerkezet (90) szélességét.

2. Az 1. igénypont szerinti vízzáró szerkezet (90), amelynél az összekötő eszközök (40) legalább egy beállító elemet (42) tartalmaznak, amely deformálható és/vagy mozgathatóan van felszerelve a vízzáró tömítéshez képest.

3. A 2. igénypont szerinti vízzáró szerkezet (90), amelynél az összekötő eszközök (40) több beállító elemet (42) tartalmaznak, amelyek a szerkezet (90) főirányában vannak elosztva.

4. A 3. igénypont szerinti vízzáró szerkezet (490), amelynél az összekötő eszközök (440) ezenkívül egy hosszúkás rögzítőtámaszt (480) is tartalmaznak, amelyhez a beállító elemek (442) vannak rögzítve, ahol a rögzítőtámasz (480) arra van kiképezve, hogy a vasbetét-kosárhoz legyen rögzítve.

5. A 2-4. igénypontok bármelyike szerinti vízzáró szerkezet (190), amelynek továbbá vezetőeszközei (154) is vannak a beállító elem (142) számára egy kezdeti helyzettől, amelyben a vízzáró szerkezet egy első szélességgel rendelkezik, egy végső helyzetig, amelyben a vízzáró szerkezet egy az elsőtől különböző szélességgel rendelkezik.

6. Az 1-5. igénypontok bármelyike szerinti vízzáró szerkezet (290), amelynél az összekötő eszközök tartalmaznak legalább egy munkahengert (270), amelynek az alapteste (272) arra van kiképezve, hogy rögzítve legyen a vasbetét-kosárhoz (222), tartalmaznak továbbá egy az alaptest belsejében mozgatható dugattyút, valamint egy a dugattyúval szervesen összekötött dugattyúrudat (274), amely kiáll az alaptestből (272), és a vízzáró tömítés (230) szervesen össze van kötve ezzel a dugattyúrúddal (274).

7. Az 1-6. igénypontok bármelyike szerinti vízzáró szerkezet (190), amelynél az összekötő eszközök (140) legalább egy, a vízzáró tömítéshez képest csuklósan felszerelt beállító elemet (142), előnyösen több beállító elemet (142) tartalmaznak, amelyek a vízzáró szerkezet (190) főirányában vannak elosztva.

8. Az 1-7. igénypontok bármelyike szerinti vízzáró szerkezet (90), amelynél a vízzáró tömítés (30) egy víz hatására duzzadó tömítés.

9. Vázszerkezet (20) egy a talajban kiöntött vasbeton elem (14), például egy panel vagy egy cövek számára, amely vázszerkezet egy vasbetét-kosarat (22) tartalmaz, ahol erre a vázszerkezetre ***az jellemző,*** hogy tartalmaz továbbá legalább egy, az 1-8. igénypontok bármelyike szerinti vasbetét-kosaras (22) vízzáró szerkezetet (90), ahol az összekötő eszközök (40) arra vannak kiképezve, hogy beállítsák a távolságot a vízzáró tömítés és a vasbetét-kosár között.

10. A 9. igénypont szerinti vázszerkezet (20), amelynél a vízzáró szerkezet főiránya párhuzamos a vasbetét-kosár (22) főirányával (z).

11. Műtárgy (10) talajban kiöntött vasbetonból, amely műtárgy tartalmaz legalább egy első betonelemet (12a, 12b) és legalább egy második vasbeton elemet (14), amely az első betonelemmel határos, ahol ez a második vasbeton elem magában foglal egy, a 9. vagy 10. igénypont szerinti vázszerkezetet (20), a vízzáró szerkezet (90) egy vízzáró tömítését, amely összeköttetést képez az első és a második betonelem között a tömítettség megvalósításához.

12. Eljárás egy talajban kiöntött vasbetonból (14) készült műtárgy előállítására, ***azzal jellemezve***, hogy a következő lépéseket tartalmazza:

- a talajban egy lényegében függőleges falakkal rendelkező munkagödröt (16) alakítunk ki, amely munkagödör legalább részben egy első betonelem (12a, 12b) által van határolva,

- leeresztünk a munkagödörbe (16) egy a 9. vagy 10. igénypont szerinti vázszerkezetet (20) és beállítjuk a távolságot a vízzáró tömítés (30) és a vasbetét-kosár (22) között, oly módon, hogy a vízzáró tömítés (30) érintkezésben legyen az első betonelem (12a, 12b) falával, és

- betont öntünk a munkagödörbe (16), hogy egy vasbetonból levő második elemet (10) képezzünk, amely magában foglalja a vázszerkezetet (20), ahol egy vízzáró tömítéssel hozzuk létre a tömítettséget az első és a második betonelem között.

13. A 12. igénypont szerinti eljárás, amelynél a távolság beállítását a vázszerkezetnek (20) a munkagödörbe (16) való lesüllyesztésével egyidejűleg végezzük.

14. A 12. vagy 13. igénypont szerinti eljárás, amelynél a vízzáró tömítés együttműködik az első betonelem (12a, 12b) falával, ha a vázszerkezetet (20) leeresztettük a munkagödörbe (16), és a távolságot az összekötő eszközök ezen együttműködés által kívánt deformálásával állítjuk be.

15. A 12. igénypont szerinti eljárás, amelynél a távolságot akkor állítjuk be, ha a vázszerkezetet (120, 220) elrendeztük a munkagödörben (16).

16. A 12. vagy 15. igénypont szerinti eljárás, amelynél a vázszerkezetet (120, 220) lesüllyesztjük a munkagödörbe (16), miközben az összekötő eszközök behúzott kiindulási helyzetben vannak, amelyben a távolság minimális, és ha a vasbetét-kosár (122, 222) már el lett helyezve a munkagödör (16) belsejében, az összekötő eszközöket egy véghelyzetbe hajtjuk szét, amelyben a vízzáró tömítés (130, 230) érintkezésben áll az első betonelem falával.

17. A 16. igénypont szerinti eljárás, amelynél az összekötő eszközök (140) széthajtását kiindulási helyzetükből a véghelyzetükbe csak a nehézségi erő hatásával váltjuk ki, amely az összekötő eszközökre (140) és a vízzáró tömítésre (130) hat.

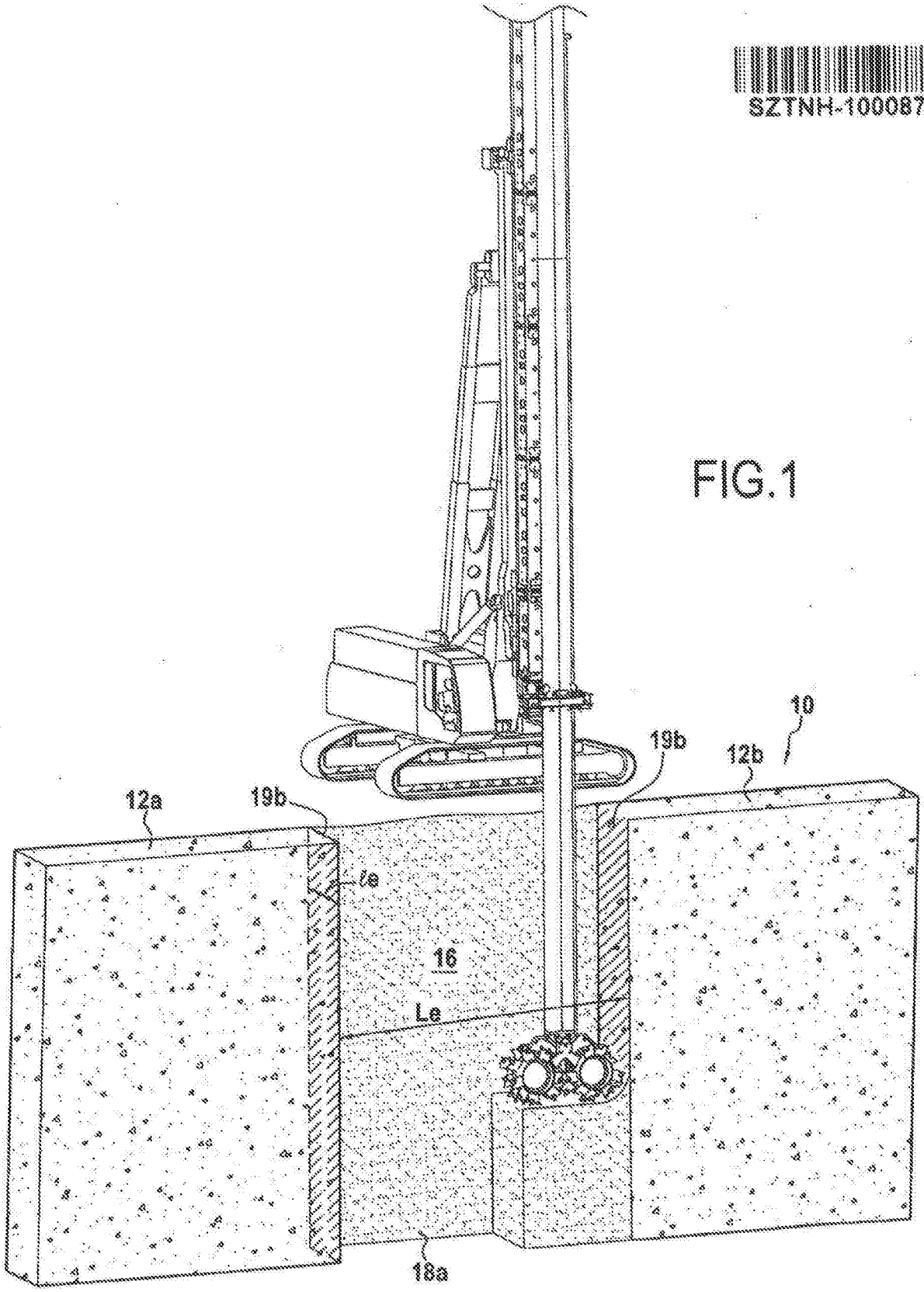


FIG.1

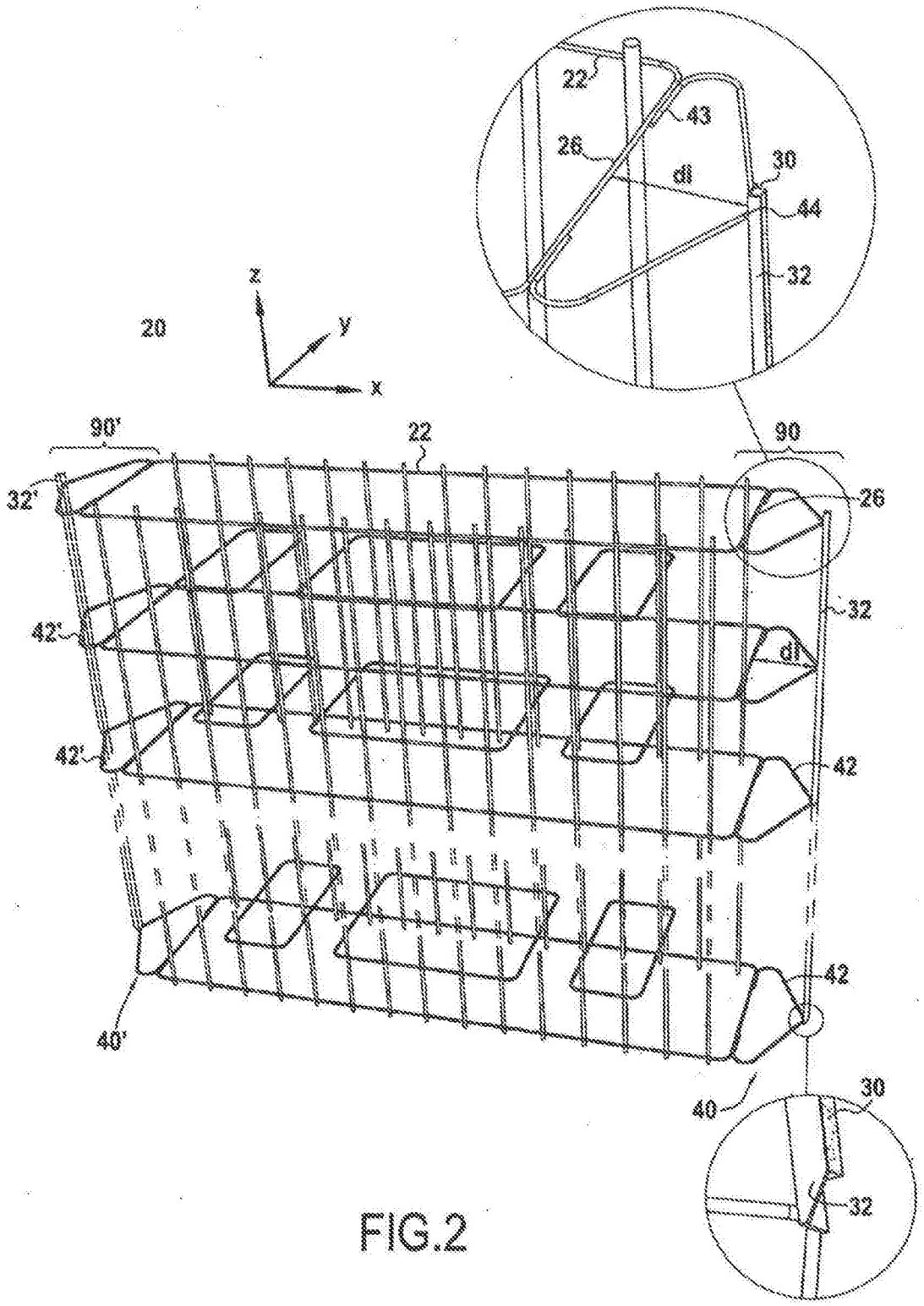


FIG.2

FIG.3A

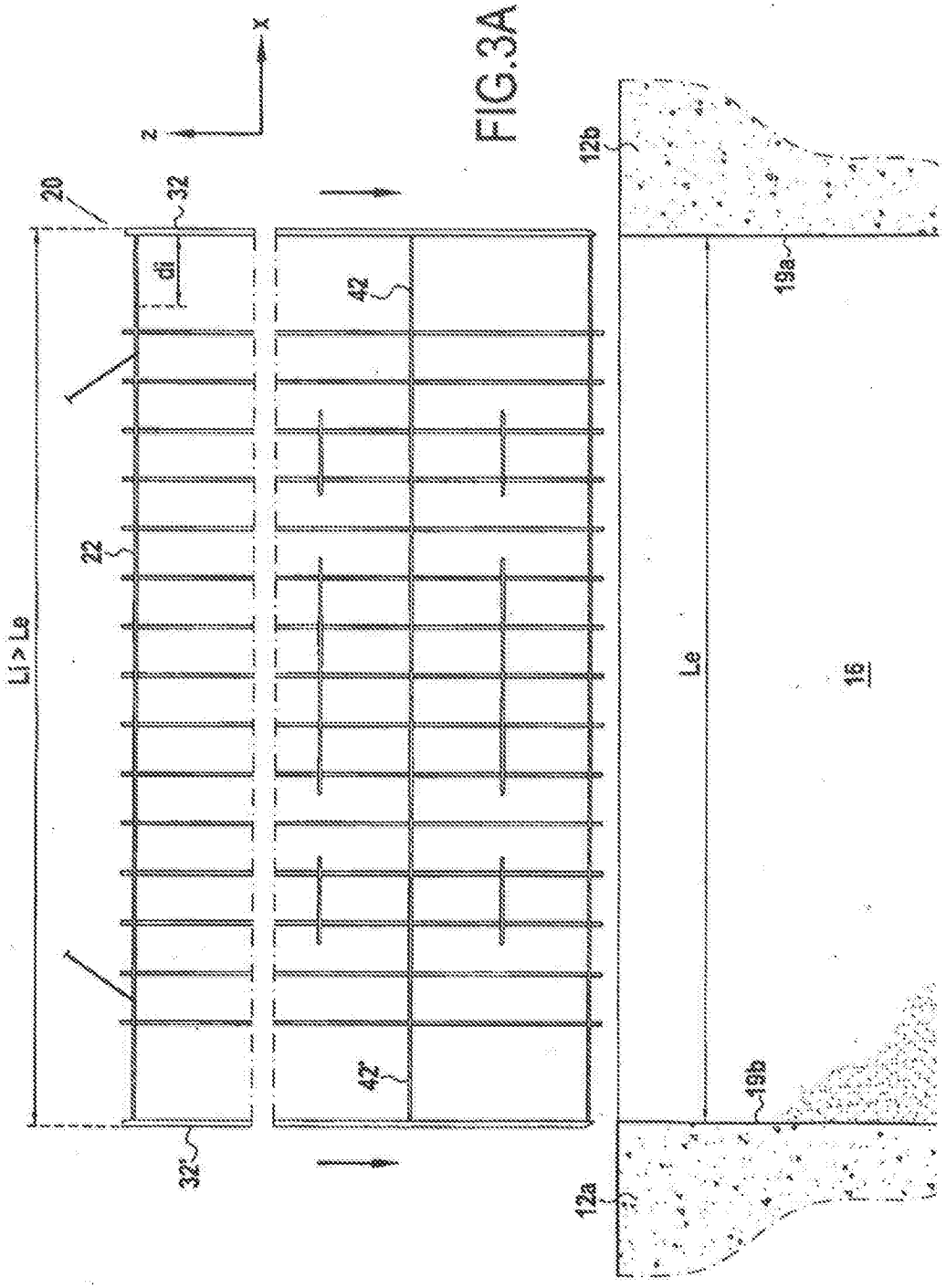
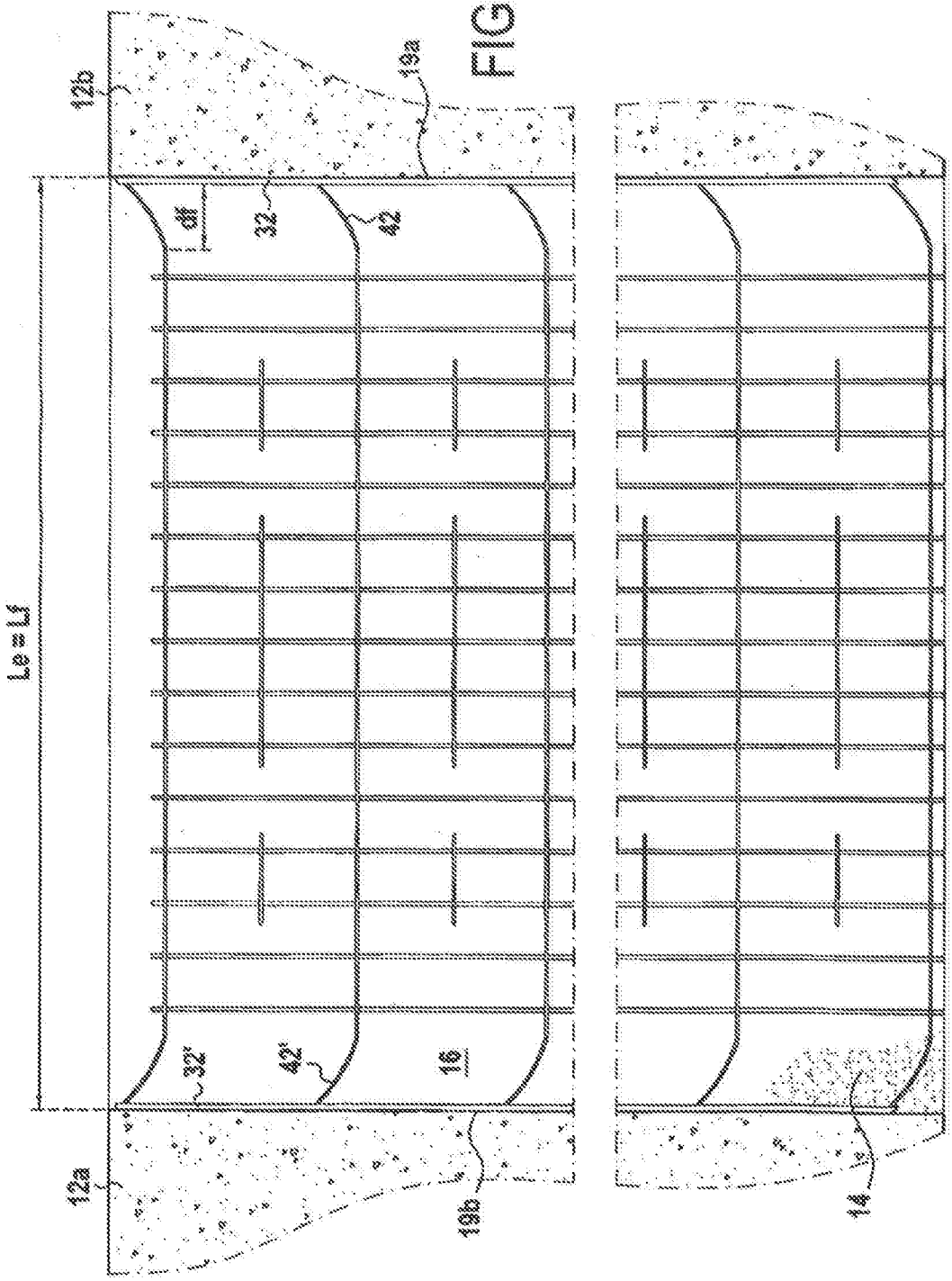


FIG.3B



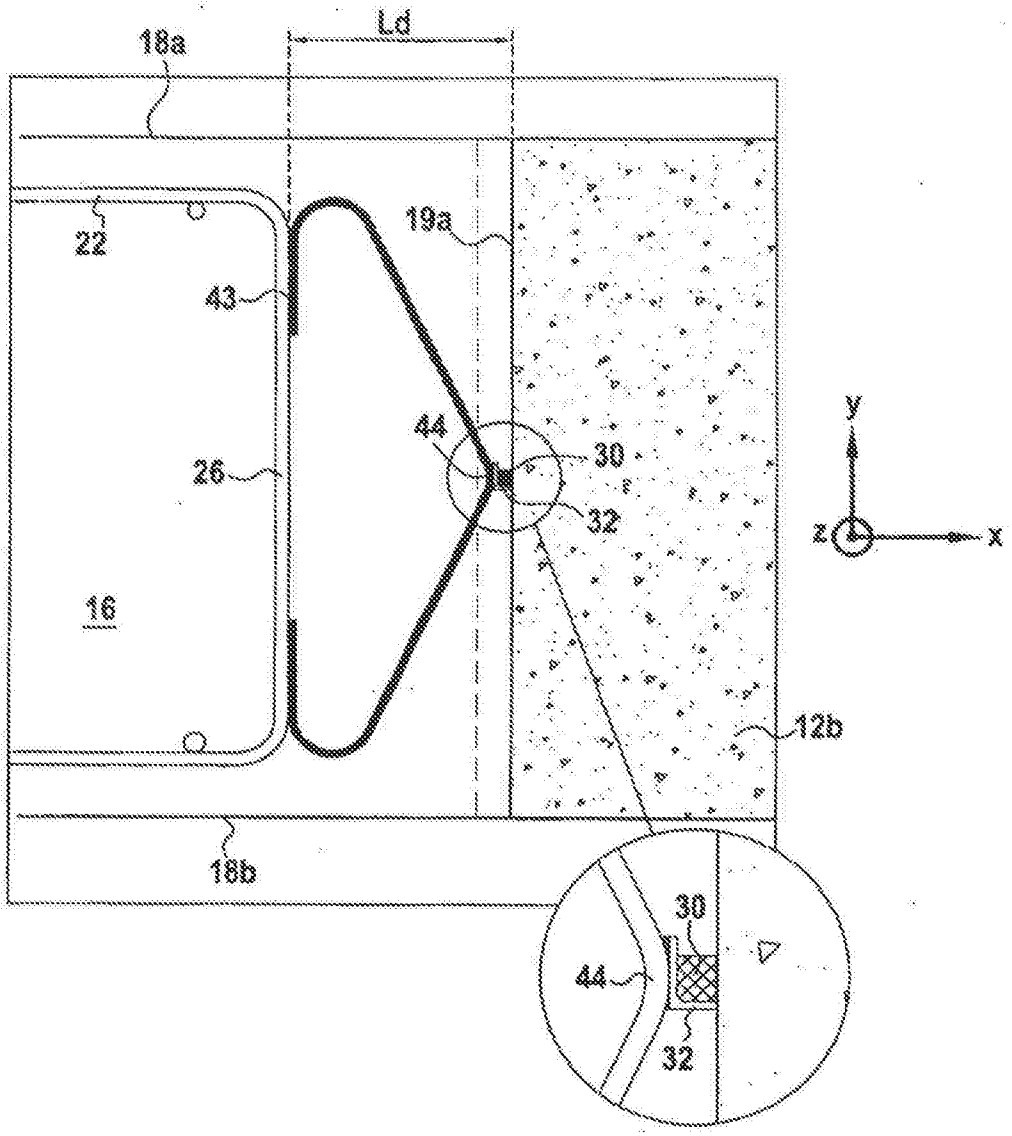


FIG.4

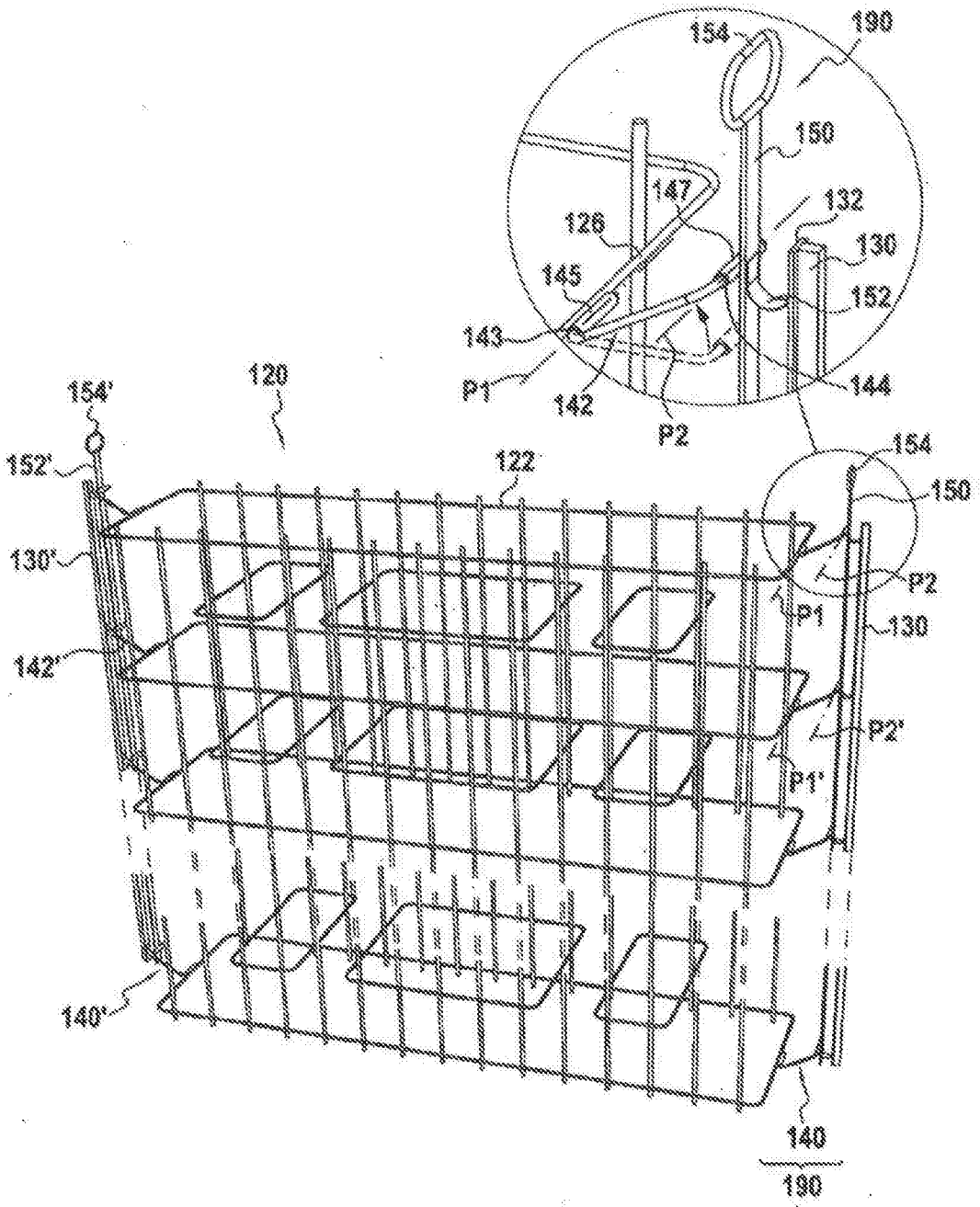
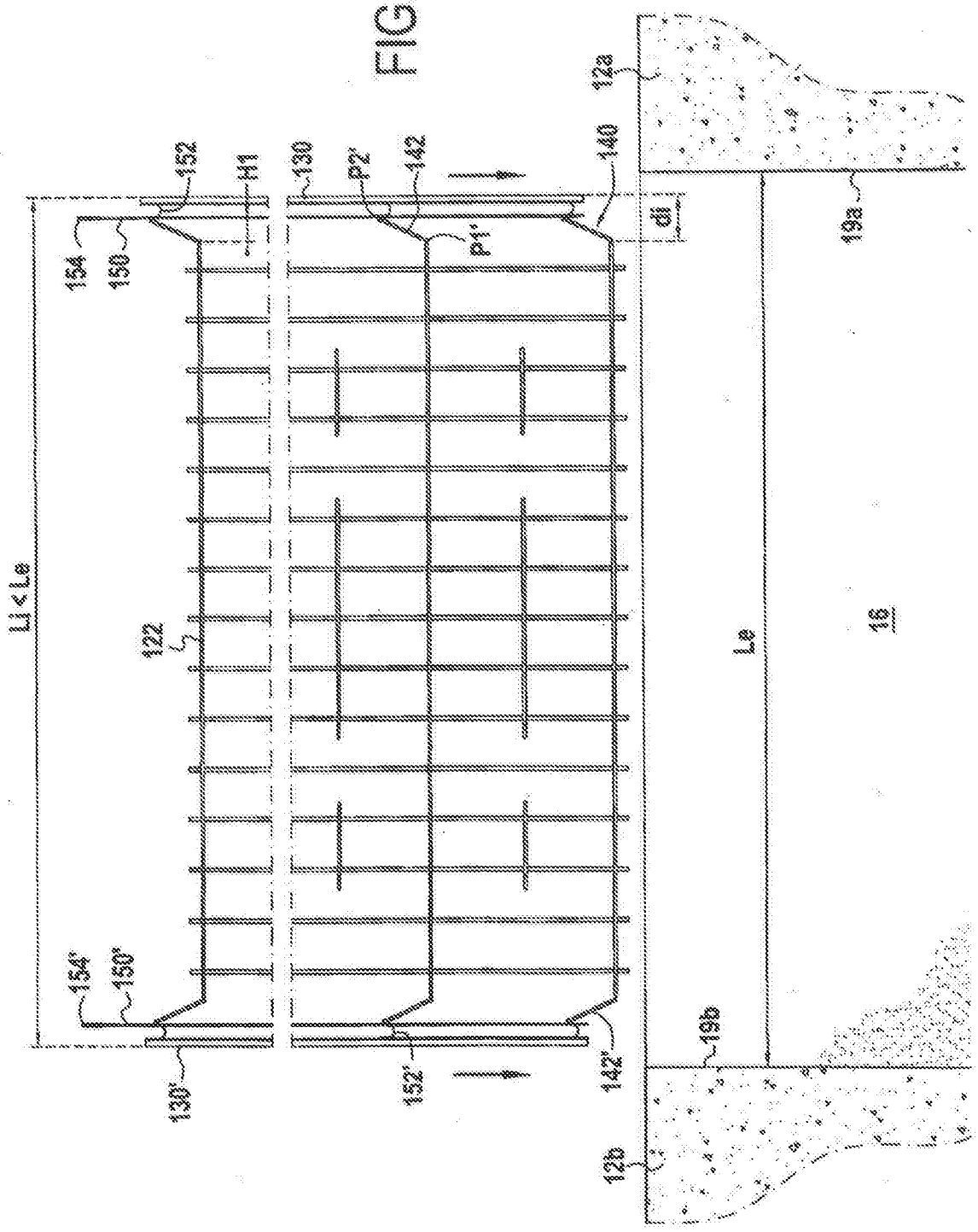

154
190
150
147
132
126
130
145
152
143
144
P1
142
P2
154'
120
152'
122
154
150
130'
P2
P1
130
142'
P2'
P1'
140'
140
190

FIG.5

FIG.6A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162
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P2'
142
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19a
di
P1''
154'
150'
130'
152'
142'
19b
12b
Le
16

FIG.6B

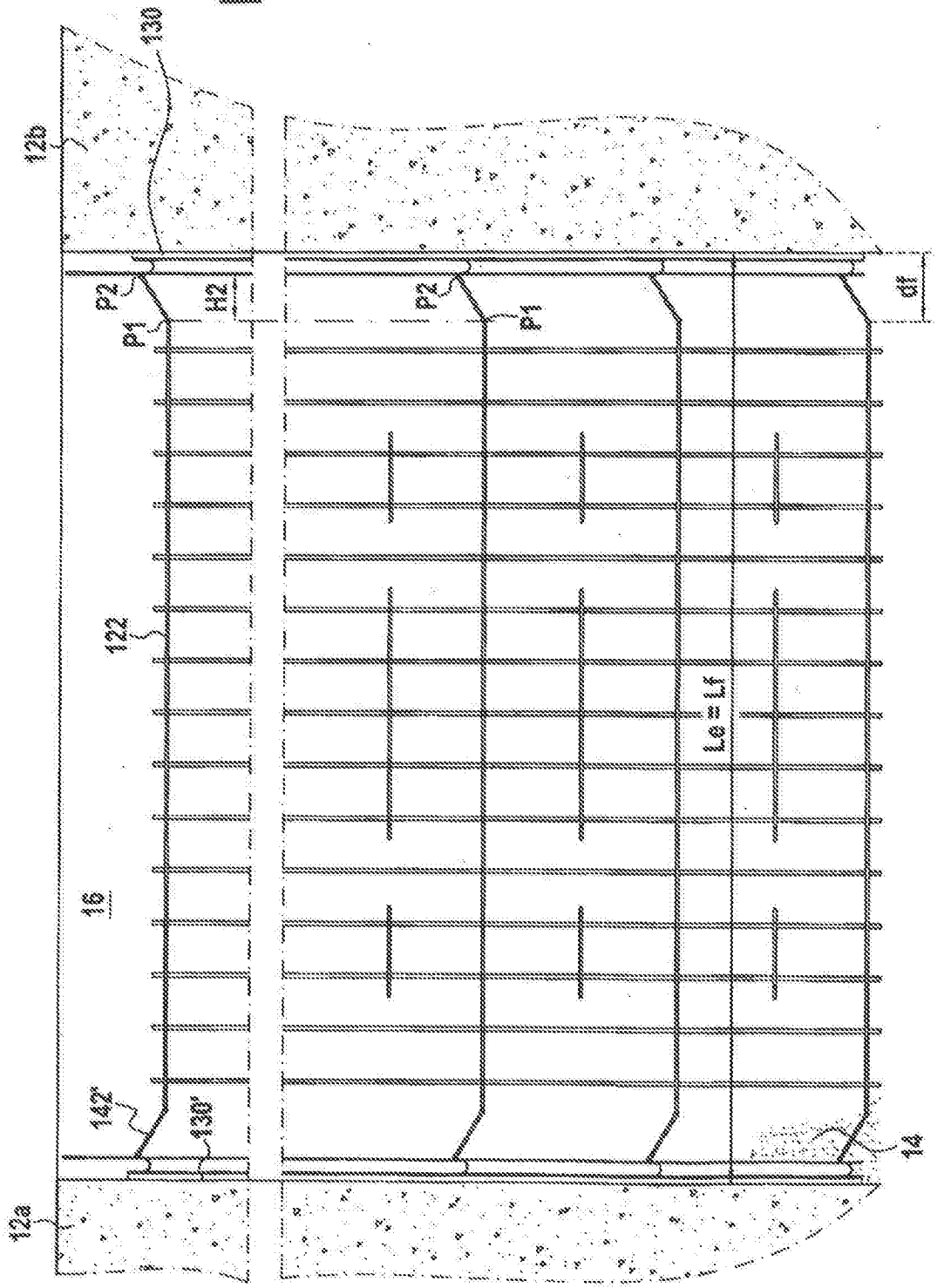
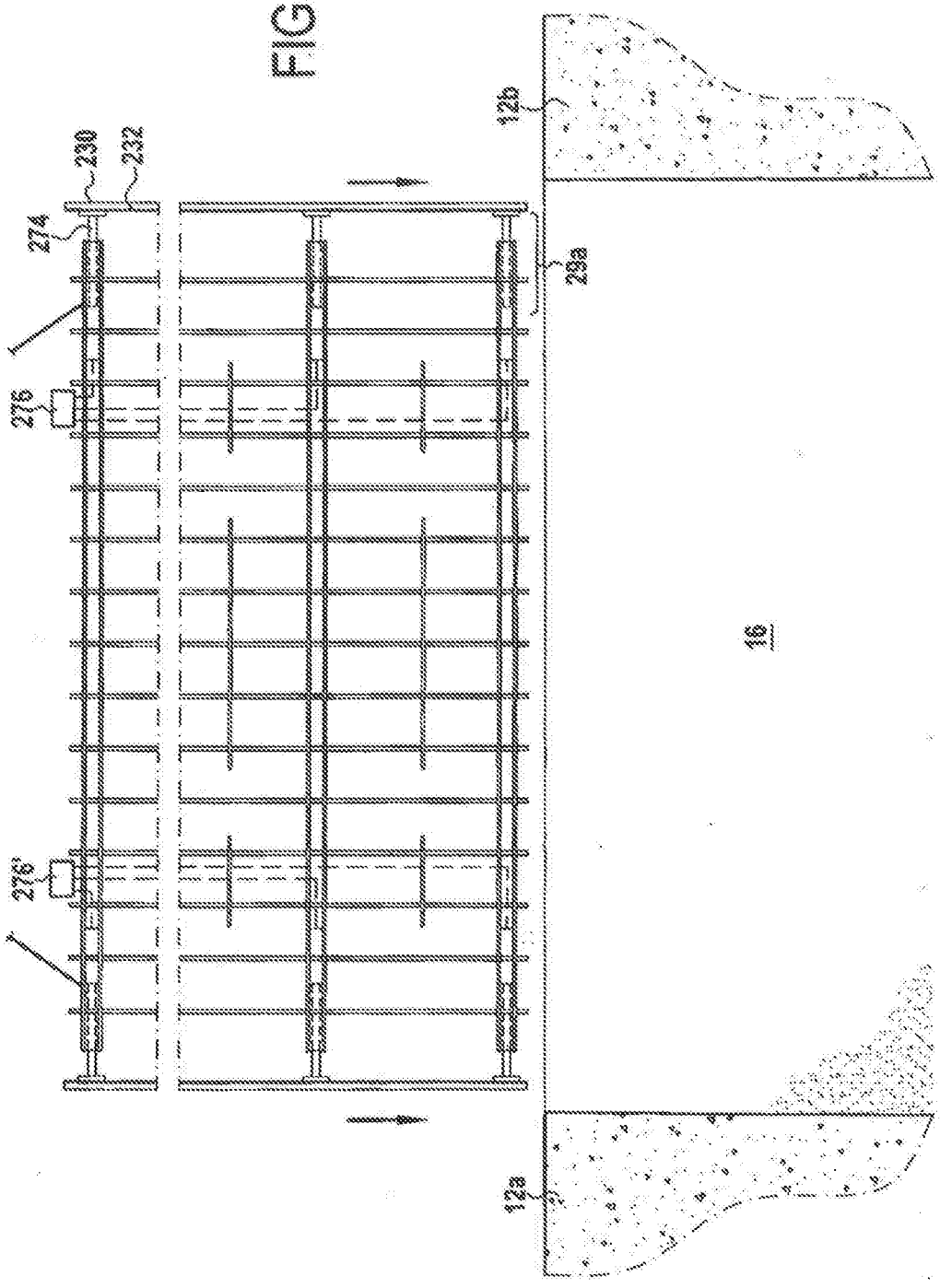


FIG.8A



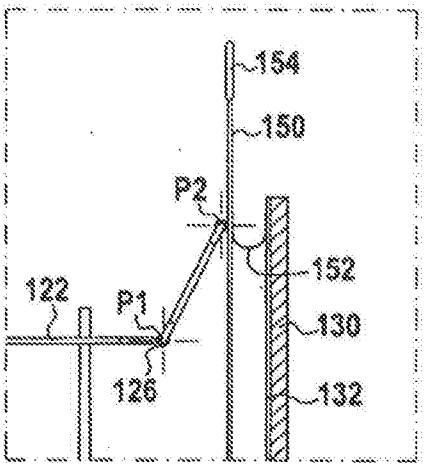


FIG.7A

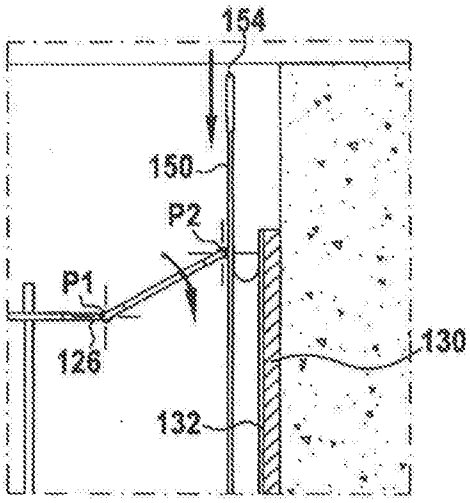


FIG.7B

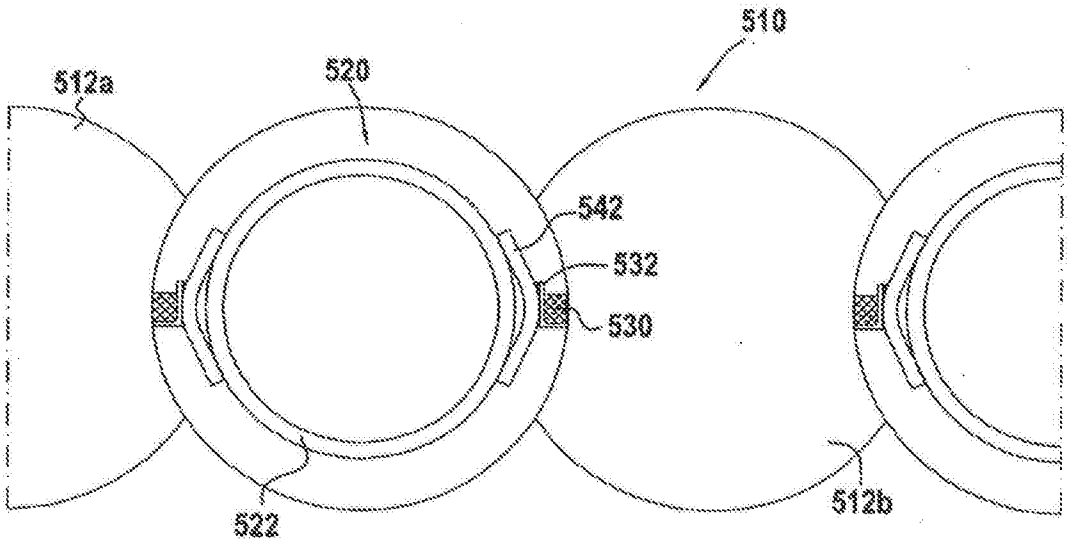


FIG.11

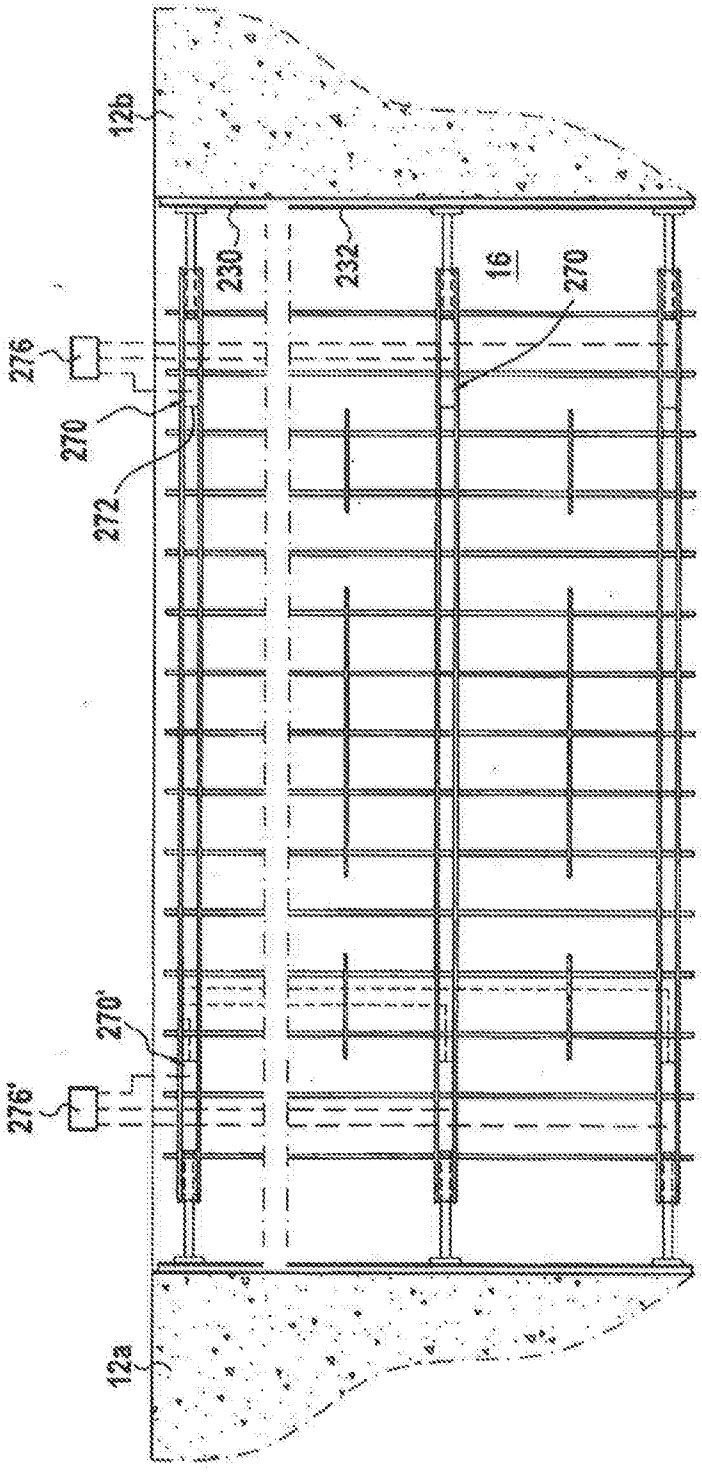
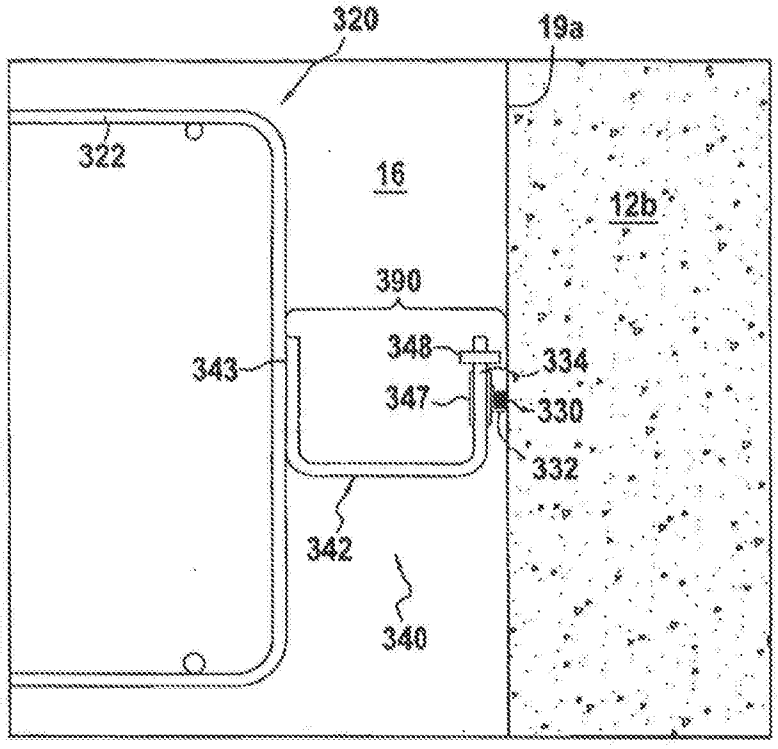


FIG.8B


320
19a
322
16
12b
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343
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334
347
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332
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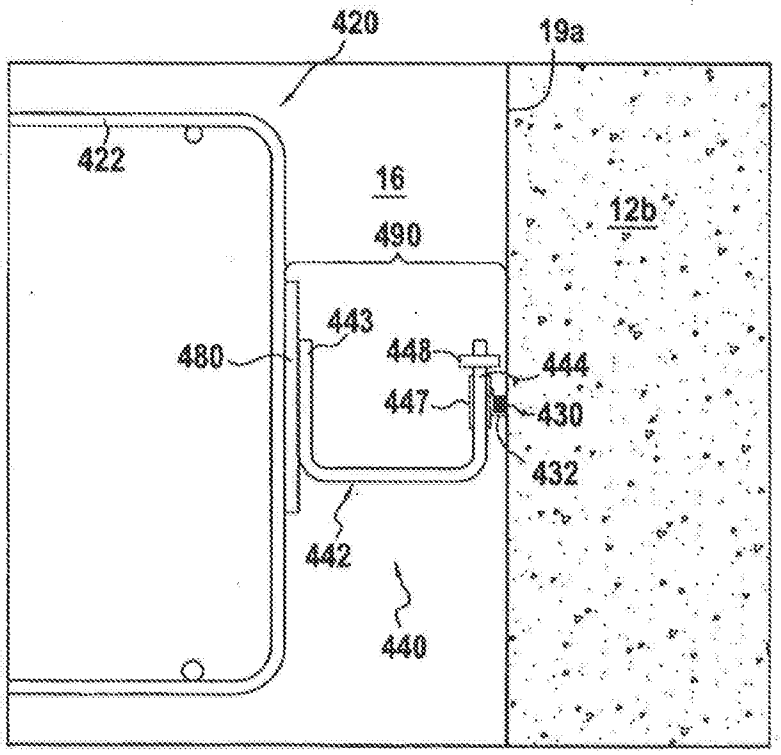
340

FIG.9


420
19a
422
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12b
490
443
480
448
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447
430
432
442
440

FIG.10

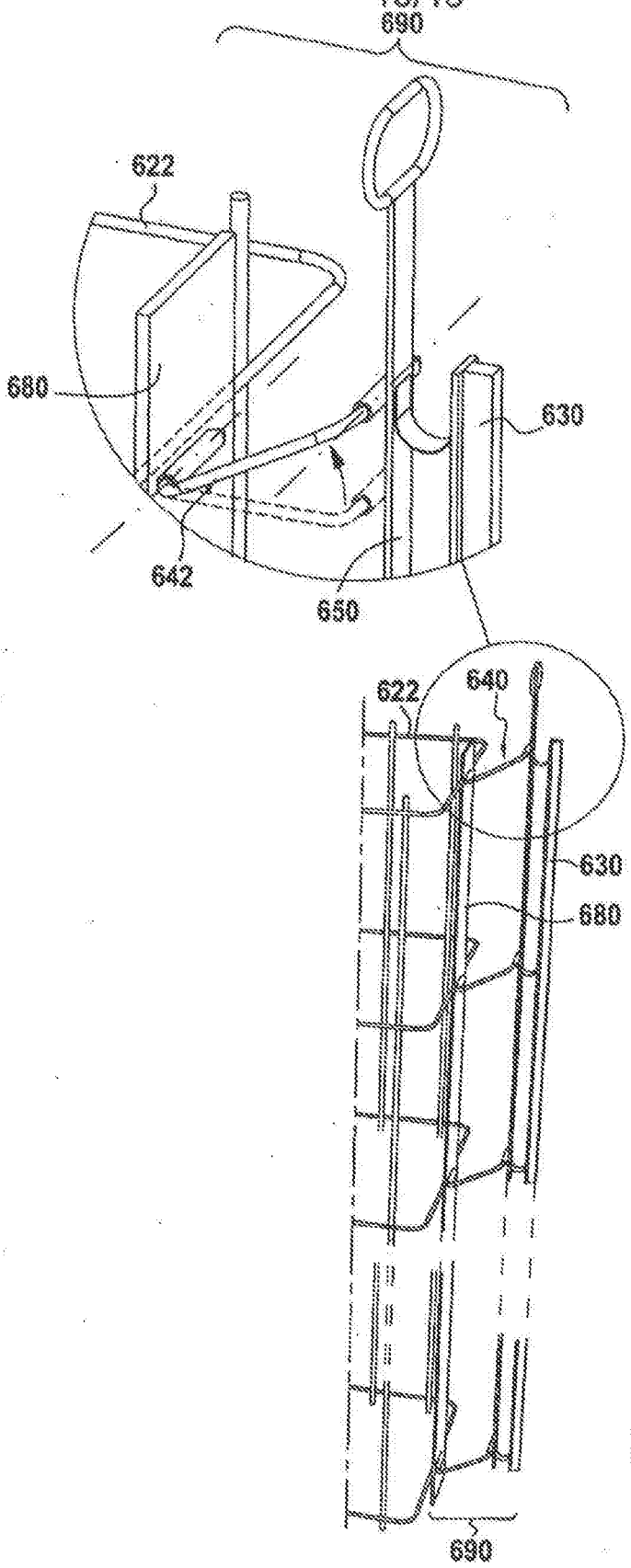

FIG.12