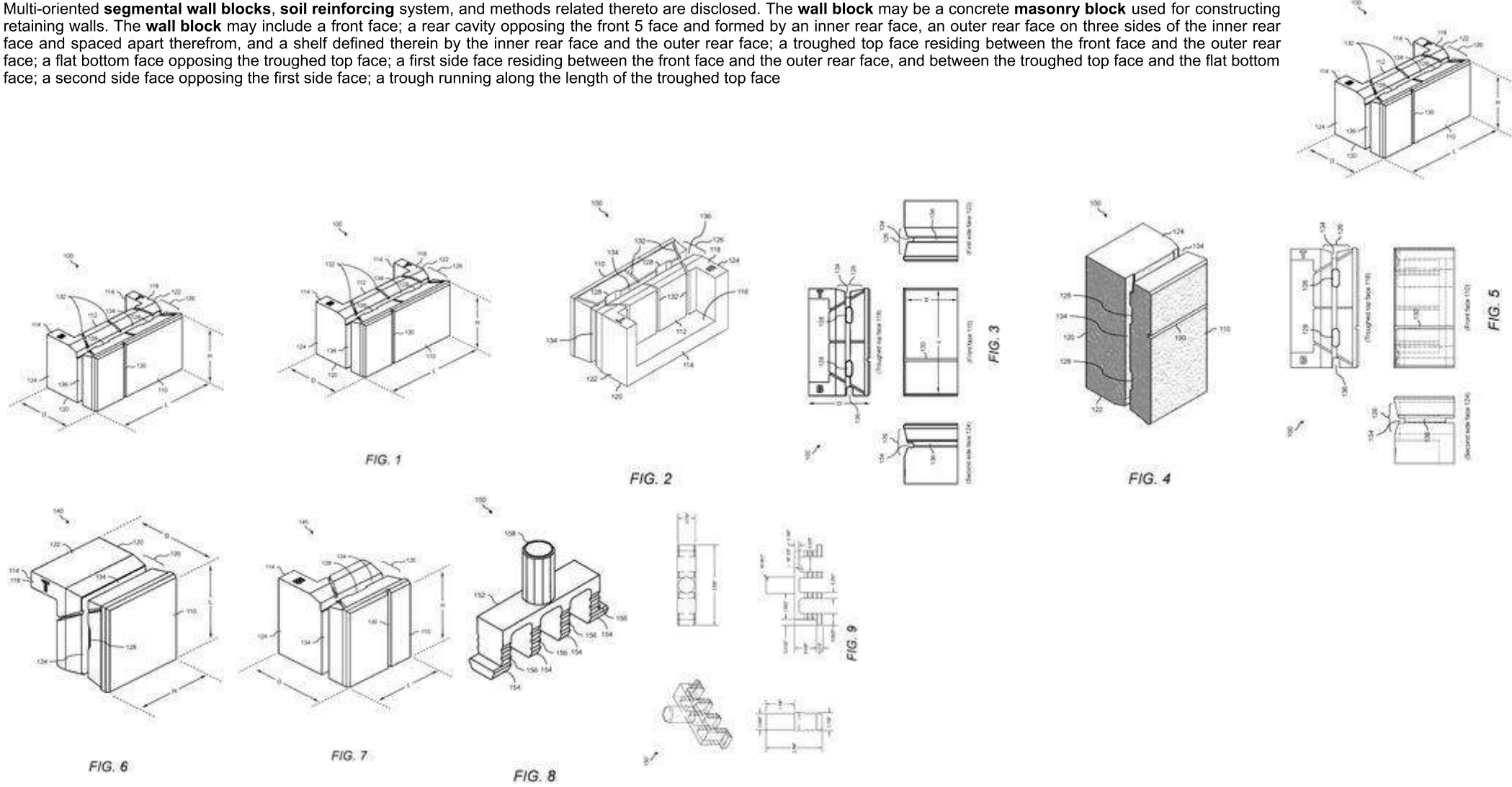


Patent families - 40 results

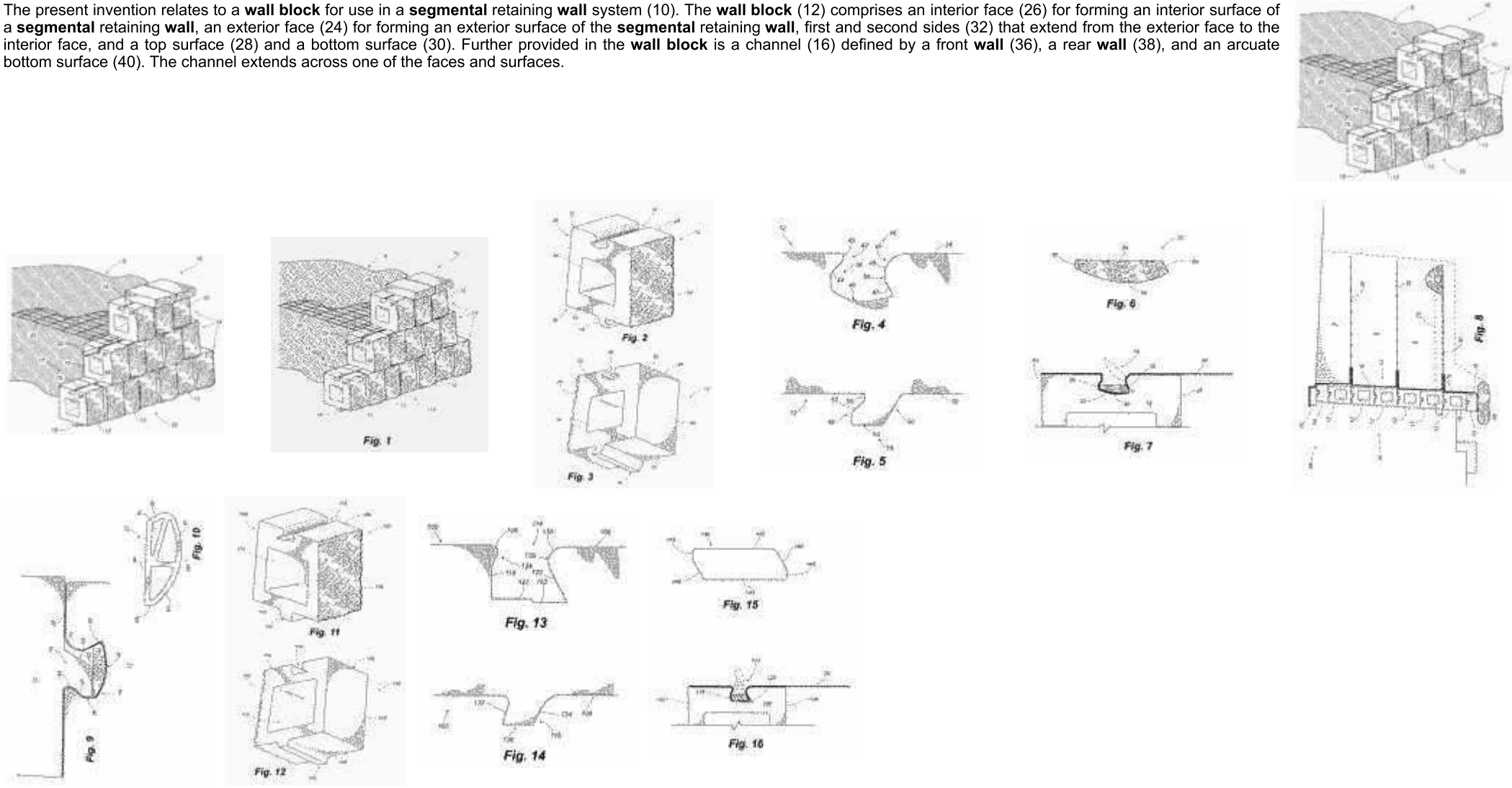
#	  Title	Publication number	Publ. date	Applicant/Assignee			
1.	Multi-oriented segmental wall blocks, soil reinforcing system, and methods	EP3414400	2018-12-19	TENSAR INTERNATIONAL TENSAR INT	100 %		

Multi-oriented **segmental wall blocks**, **soil reinforcing** system, and methods related thereto are disclosed. The **wall block** may be a concrete **masonry block** used for constructing retaining walls. The **wall block** may include a front face; a rear cavity opposing the front 5 face and formed by an inner rear face, an outer rear face on three sides of the inner rear face and spaced apart therefrom, and a shelf defined therein by the inner rear face and the outer rear face; a troughed top face residing between the front face and the outer rear face; a flat bottom face opposing the troughed top face; a first side face residing between the front face and the outer rear face, and between the troughed top face and the flat bottom face; a second side face opposing the first side face; a trough running along the length of the troughed top face



2.	Segmental retaining wall system	EP1196662	2002-04-17	ANCHOR WALL SYSTEMS ANCE WALL SYSTEM	86 %		
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The present invention relates to a **wall block** for use in a **segmental retaining wall** system (10). The **wall block** (12) comprises an interior face (26) for forming an interior surface of a **segmental retaining wall**, an exterior face (24) for forming an exterior surface of the **segmental retaining wall**, first and second sides (32) that extend from the exterior face to the interior face, and a top surface (28) and a bottom surface (30). Further provided in the **wall block** is a channel (16) defined by a front wall (36), a rear wall (38), and an arcuate bottom surface (40). The channel extends across one of the faces and surfaces.



3.

Fill side slope gravity type retaining wall reinforcing structure and construction method thereof

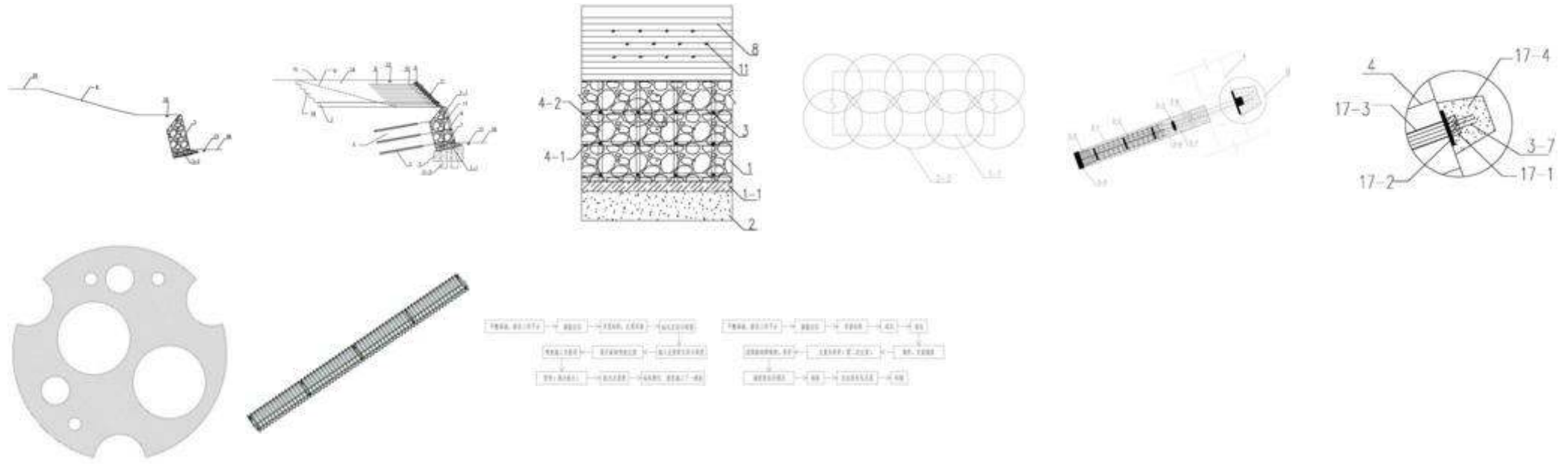
CN110847224

2020-02-28

WUHAN SURVEYING GEOTECHNICAL RESEARCH INSTITUTE

75 %

The invention provides a fill side slope gravity type retaining **wall reinforcing** structure and a construction method thereof. The **reinforcing** structure comprises an original gravity type retaining **wall**, a fill side slope above the retaining **wall**, a high-pressure rotary spraying **reinforcement** body constructed in the retaining **wall** foundation, a lattice anchor cable supporting structure constructed on the retaining **wall** and a slope **reinforcing** structure constructed on the **soil** filling side slope. According to the **reinforcing** structure, the original retaining **wall** foundation is subjected to high-pressure rotary jet **reinforcement** treatment, the bearing capacity of the retaining **wall** foundation is directly improved, the passive protection of the original retaining **wall** is changed into active protection of the lattice pressure type anchor cable, the anti-overturning, anti-slip and other stability of the original retaining **wall** is greatly improved, and the displacement of the retaining **wall** can be effectively controlled; and according to the upper fill side slope, a geogrid is laid in the filling **soil**, and the deformation condition of the **soil** body is improved and the engineering performance of the **soil** body is improved by utilizing the interaction between the geogrid and the filling **soil** of each layer, so that the stability of the upper fill side slope is guaranteed, and the adverse effect of the upper filling **soil** on the original retaining **wall** can be effectively reduced.



4.

Geogrid reinforcement lime soil retaining wall and construction method thereof

CN102535512

2012-07-04

SHIJIAZHUANG TIEDAO UNIVERSITY

74 %

The patent refers to the field of 'underground or underwater structures, retaining walls'. The invention discloses a geogrid **reinforcement** lime **soil** retaining **wall** and a construction method of the geogrid **reinforcement** lime **soil** retaining **wall** and belongs to the field of fixed buildings. The retaining **wall** comprises a concrete building **block** type **wall** panel, filling materials and a one-way plastic stretching geogrid, wherein the weight percentage of lime in the filling materials is 2 percent to 10 percent, the rest materials are **soil**, and the concrete building **block** type **wall** panel is an air bubble light concrete building **block** type **wall** panel. The construction method comprises the following steps that: (1) the substrate treatment is carried out, and in addition, stripped base casting groove positions are dug in advance; (2) concrete stripped bases are cast in situ; and (3) retaining **wall** construction is carried out. The dead weight of the filling materials can be reduced, the self stability is improved, and the requirement on the foundation carrying capability is reduced; the integral performance of the filling materials is enhanced, and the intensity is improved; the geogrid intensity damage can be reduced; and the material resources are wide, the materials can be obtained from local sources, and the manufacture cost is low.

5.

Segmented precast open-web retaining wall building block and retaining wall structure

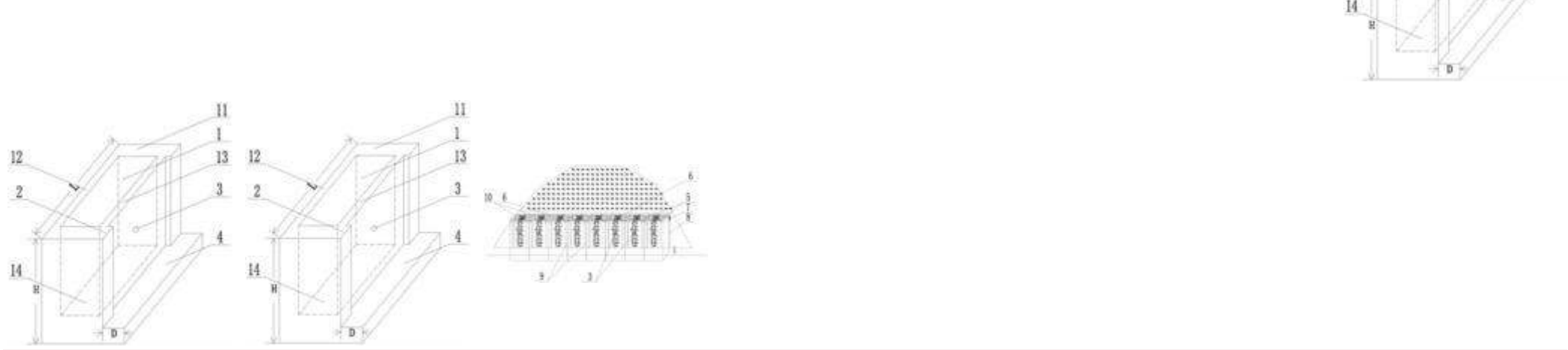
CN105544600

2016-05-04

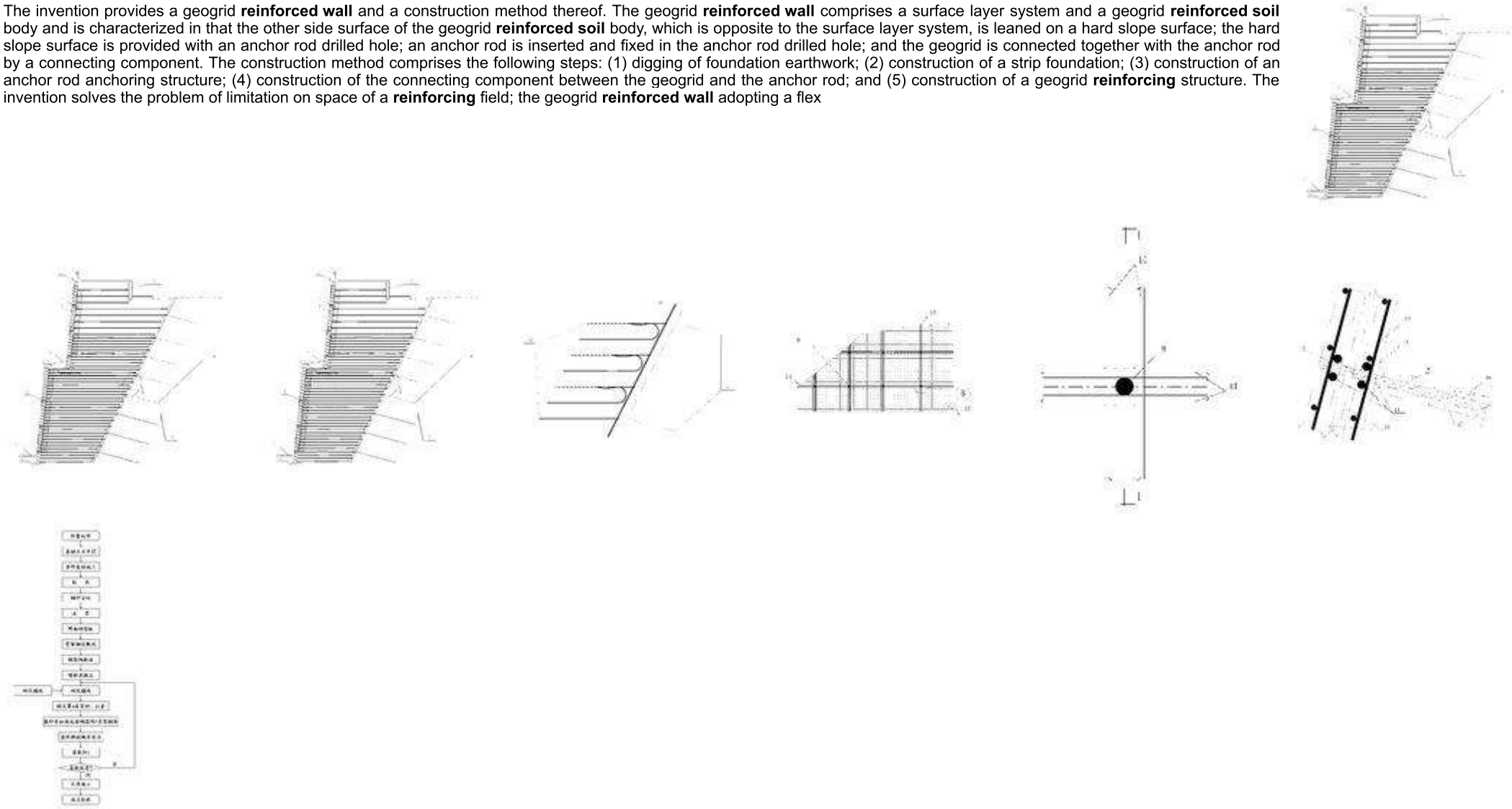
CHINA RAILWAY SIYUAN SURVEY & DESIGN

74 %

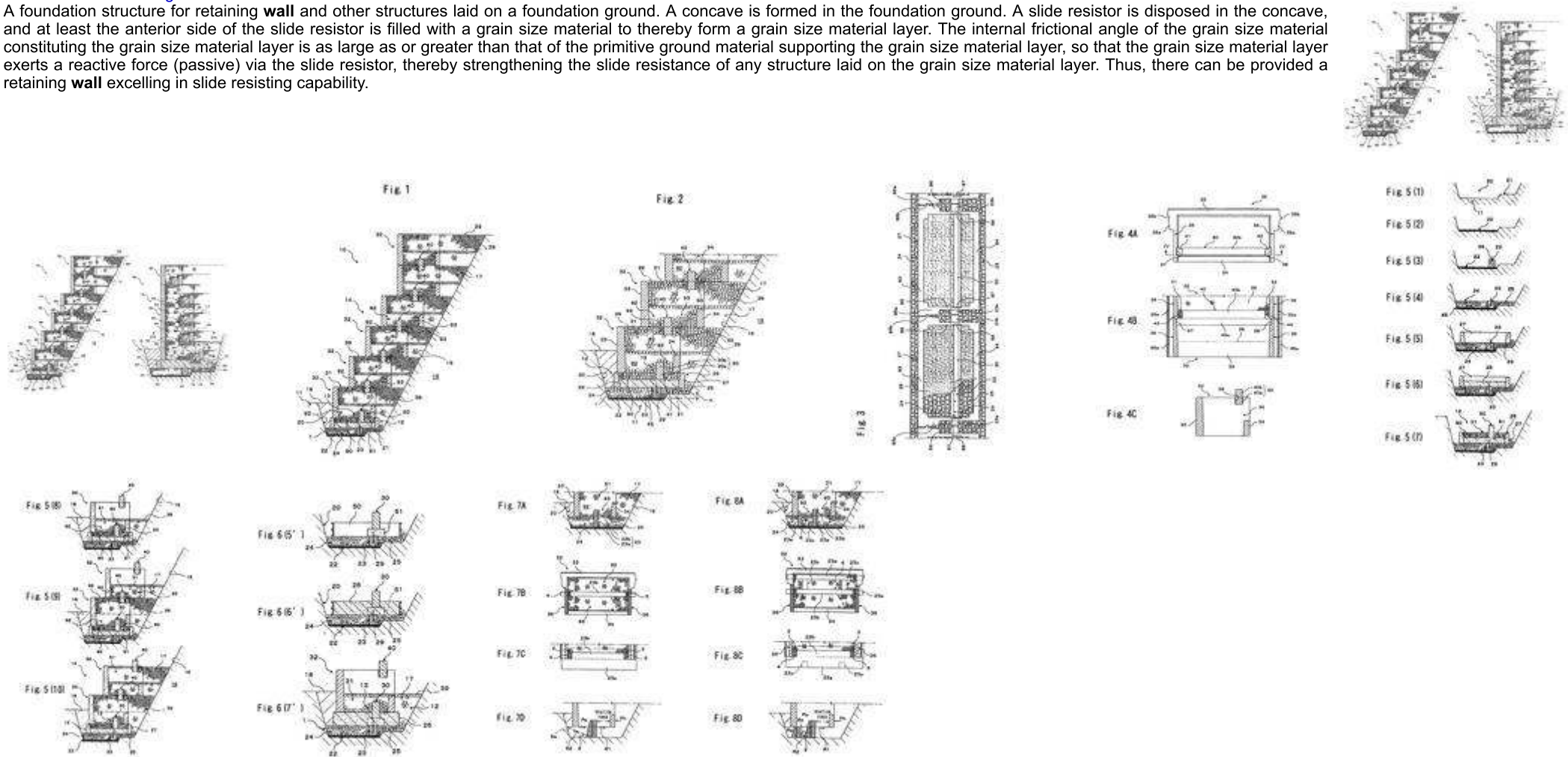
The invention discloses a **segmented** precast open-web retaining **wall** building **block**. The building **block** is of a box structure with the upper end open. An outer retaining **wall** thin-**wall** and a lower bottom board of the building **block** are provided with a drain hole and a step-like **wall** toe respectively. The building **block** is of an integral structure formed by pouring **reinforced** concrete at a time. The invention further discloses a retaining **wall** structure built by using the retaining **wall** building **blocks**. The buried depth of the retaining **wall** structure is 0.5-1.5 m. The building **blocks** are backfilled with planting **soil**. Green plants are planted in the building **blocks**. Expansion joints are formed between the building **blocks**. Each building **block** is provided with a top cover provided with a square planting opening. According to the **segmented** precast open-web retaining **wall** building **block** and the retaining **wall** structure, the strength characteristic of **reinforced** concrete is given full play, components are precast in a factory or a centralized site, and control is easy; the building **block** is low in price, the engineering quantity of chip stone and concrete is greatly reduced, and the construction cost is lowered; the building **block** is backfilled with the planting **soil** and has the functions of a greening tank, and the greening effect is remarkable; the retaining **wall** structure is built by using the building **blocks**, so that the on-site hoisting time is short, and the stability of an excavated slope is facilitated.



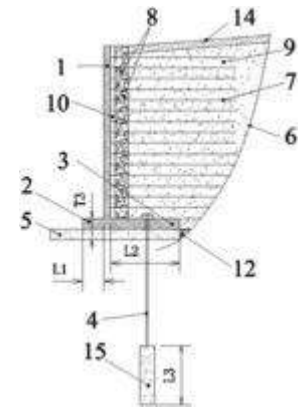
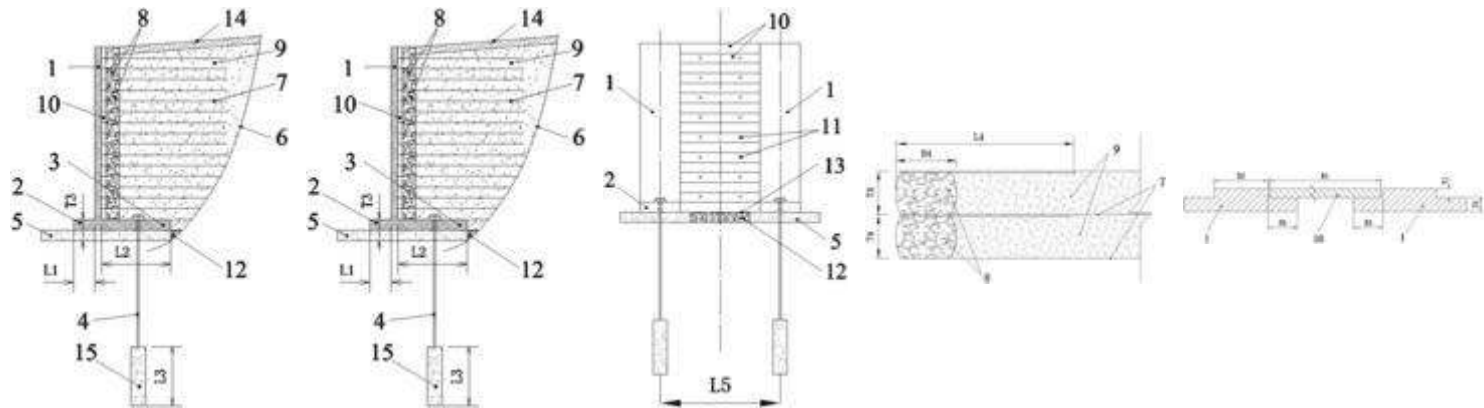
The invention provides a geogrid **reinforced wall** and a construction method thereof. The geogrid **reinforced wall** comprises a surface layer system and a geogrid **reinforced soil** body and is characterized in that the other side surface of the geogrid **reinforced soil** body, which is opposite to the surface layer system, is leaned on a hard slope surface; the hard slope surface is provided with an anchor rod drilled hole; an anchor rod is inserted and fixed in the anchor rod drilled hole; and the geogrid is connected together with the anchor rod by a connecting component. The construction method comprises the following steps: (1) digging of foundation earthwork; (2) construction of a strip foundation; (3) construction of an anchor rod anchoring structure; (4) construction of the connecting component between the geogrid and the anchor rod; and (5) construction of a geogrid **reinforcing** structure. The invention solves the problem of limitation on space of a **reinforcing** field; the geogrid **reinforced wall** adopting a flex



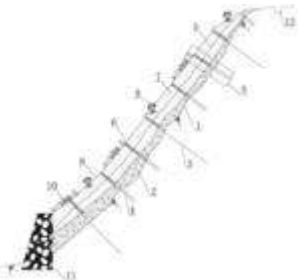
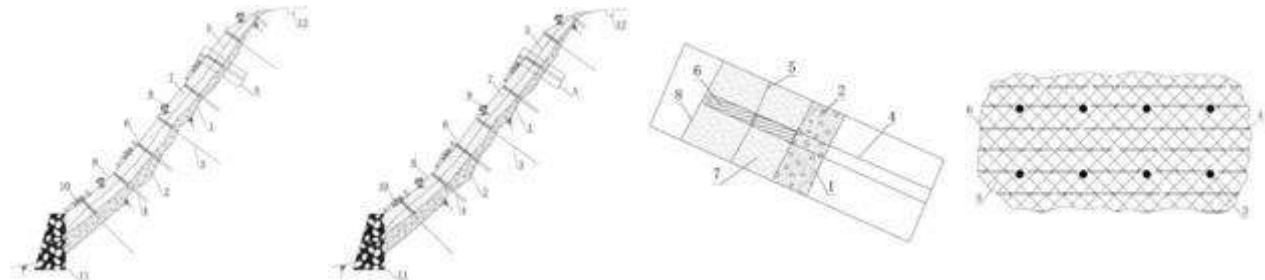
A foundation structure for retaining **wall** and other structures laid on a foundation ground. A concave is formed in the foundation ground. A slide resistor is disposed in the concave, and at least the anterior side of the slide resistor is filled with a grain size material to thereby form a grain size material layer. The internal frictional angle of the grain size material constituting the grain size material layer is as large as or greater than that of the primitive ground material supporting the grain size material layer, so that the grain size material layer exerts a reactive force (passive) via the slide resistor, thereby strengthening the slide resistance of any structure laid on the grain size material layer. Thus, there can be provided a retaining **wall** excelling in slide resisting capability.



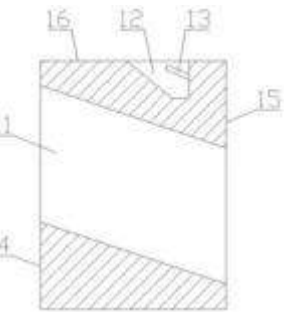
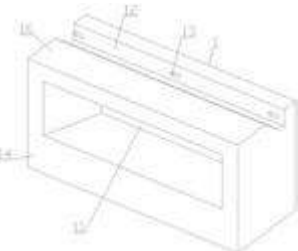
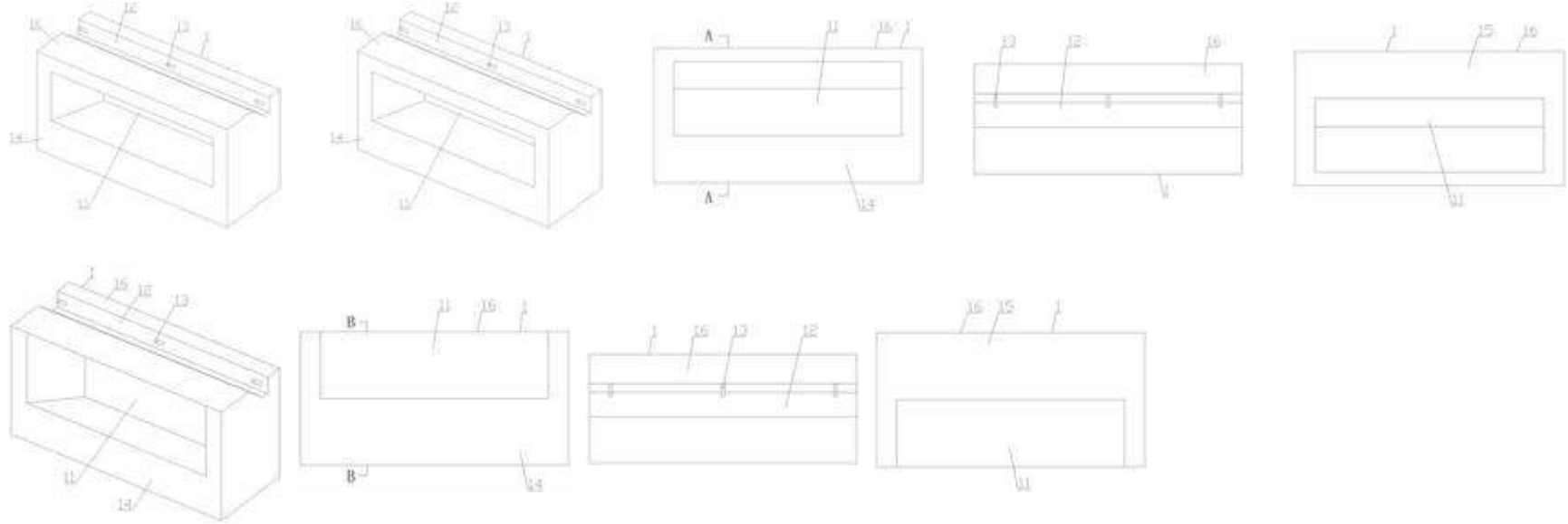
The invention discloses a construction method of a combined supporting and retaining structure, and relates to the technical field of civil construction. The method includes the steps of surveying and setting-out, mountain slope treatment, manufacturing of prefabricated **reinforced** concrete breast boards, foundation surface cleaning and replacement filling, construction of a cast-in-place concrete foundation, construction of a cantilever type structure, construction of pre-stressed anchor cables, **masonry** installation of the prefabricated **reinforced** concrete breast boards, and construction of a wrapped face **reinforced soil** structure and a covering layer. By using the vertical pre-stressed anchor cables, the workload can be reduced, the construction period can be shortened, the anti-overturning capacity and anti-slippage capacity of the combined supporting and retaining structure can be improved, and the overall stability and anti-lateral-deformation capacity of the whole combined supporting and retaining structure can be improved; by adopting the prefabricated **reinforced** concrete breast boards, the construction progress can be accelerated, and the project quality can be ensured; by using the wrapped face **reinforced soil** structure, the strength and integrity of a filling part can be improved, and the lateral **soil** pressure on the panel of the supporting and retaining structure can be reduced. By means of the method, the overall stability is improved, occupation of land is reduced, construction is simplified, and the construction cost is reduced; the method is especially suitable for roadbed construction in mountainous and hilly regions.



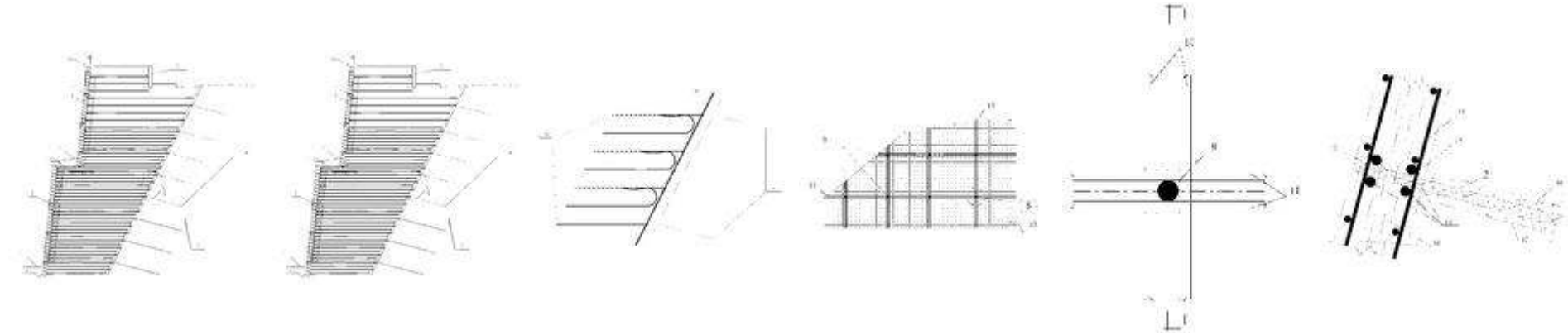
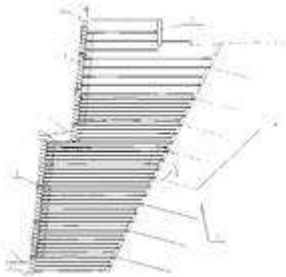
The invention discloses a **reinforcing** and anchoring ecological restoration system for a high and steep waste slag side slope of a wind power plant in a mountainous area. The system comprises a slope surface **reinforcing soil** fixation structure arranged on a waste slag slope surface, a side slope drainage structure, a bottom **blocking** structure and a slope surface vegetation recovery structure. The slope surface **reinforcing soil** fixation structure comprises a **reinforcing** net and a plurality of baffles, and the **reinforcing** net and the baffles are fixed to the waste slag slope surface through main anchor rods and U-shaped nails. The side slope drainage structure comprises an intercepting ditch and a drainage ditch, the intercepting ditch is arranged at the top of the waste slag side slope, and the drainage ditch is connected with the intercepting ditch. The bottom **blocking** structure comprises a retaining **wall** arranged at the bottom of the waste slag side slope. The high and steep waste slag side slope of the wind power plant in the mountainous area has the growth conditions of general tree-grass and shrub-grass, it is ensured that a certain ecological restoration effect can be achieved in a short period, meanwhile, the requirements for long-term stability and water and **soil** loss prevention of the high and steep waste slag side slope of the wind power plant in the mountainous area can be met, and therefore the technical level limitation of traditional water and **soil** conservation governing of the high and steep waste slag side slope of the wind power plant in the mountainous area is broken through.



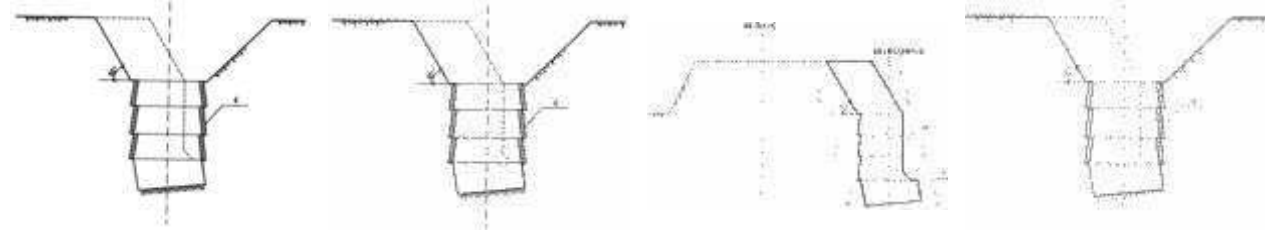
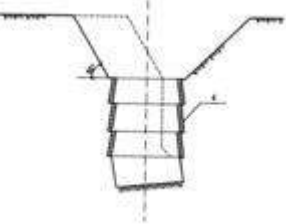
The invention discloses an ecological inclined-hole building **block**, an ecological protective **wall** built by the ecological inclined-hole building **block** and a construction method thereof. The ecological inclined-hole building **block** comprises a rectangular building **block** body, wherein inclined grass planting holes are formed in the building **block** body. The ecological protective **wall** built by the ecological inclined-hole building **block** aims to improve slope gradient and prevent water and **soil** loss, so that turf can be planted on a slope with relatively great gradient. The ecological inclined-hole building **block** is provided with a horn-shaped inclined hole with a relatively great opening, so that the turf planting area is increased on the premise of guaranteeing **soil** storage efficiency and increasing a turf survival rate. The ecological inclined-hole building **block** can be used as the ecological protective **wall**, and can be used for planting turf after grass planting holes of the ecological inclined-hole building **block** are filled with **soil**, so that greening of slopes at the two sides of a road is realized; and compared with an existing turf-planting and slope-protecting technology, the building **block** construction process disclosed by the invention has the advantages of being relatively simple and greatly reducing construction difficulty.



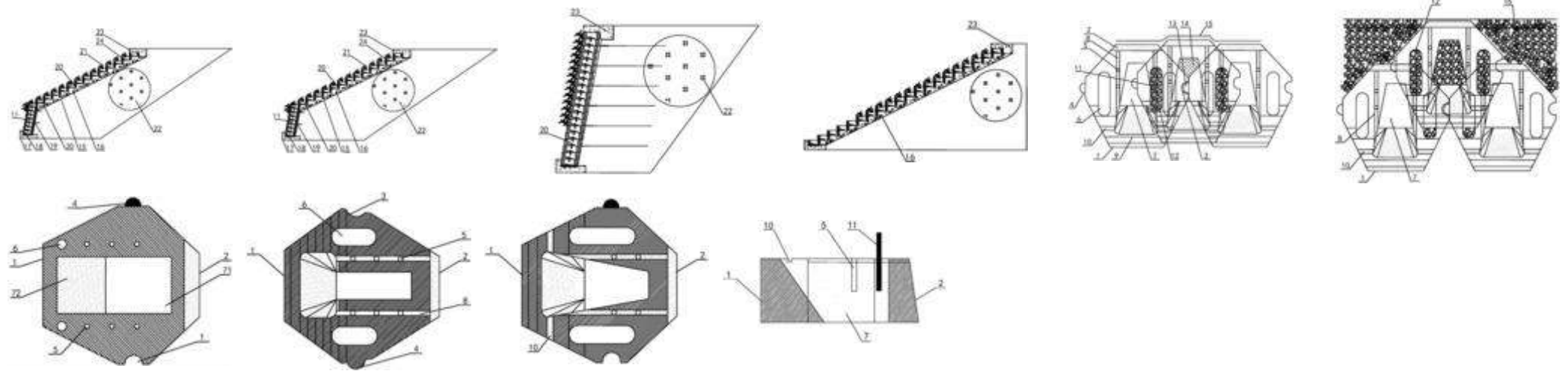
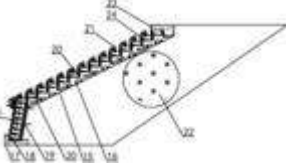
The utility model provides a geogrid **reinforced wall** which comprises a surface layer system and a geogrid **reinforced soil** body. The geogrid **reinforced wall** is characterized in that the other side face, opposite to the surface layer system, of the geogrid **reinforced soil** body leans against a hard slope surface, the hard slope surface is provided with anchor rod drill holes, anchor rods are inserted in the anchor rod drill holes and fixed, and geogrids are connected together with the anchor rods through connecting components; the bore diameter of each anchor rod drill hole is 50-100mm, and the distance between two adjacent anchor rods is 60-250cm. According to the geogrid **reinforced wall**, the problem that space of a **reinforced** field is limited is resolved, the geogrids of flexible retaining structures and the **reinforced wall** can still be constructed in an area with a small and narrow field, limited space, rocks and hard **soil** in an original state, construction efficiency is high, manufacturing cost is low, and the **wall** is firm and stable in structure.



The invention discloses a construction method for a concrete gravity buttress retaining **wall**. The concrete gravity buttress retaining **wall** comprises three parts from top to bottom, that is, an upper part, a middle part and a lower part. The upper part is an upward parallelogram, the middle part is a tangential circular concrete pier with a vertical **wall** breast, the angle of osculation of the middle part ranges from 90 to 170 degrees, the lower part is also a tangential circular concrete pier, and the tangential direction of the lower part is opposite to that of the middle part. The construction method for the concrete gravity buttress retaining **wall** is characterized by comprising the steps of measurement and line laying, **masonry** of walling cribs, artificial boring, protection of the walling cribs, ramming with gravel, sectional framework layout, sectional concrete filling, maintenance and molding and the like. The construction method for the concrete gravity buttress retaining **wall** solves the problem that the original **soil** of common gravity retaining walls is unstable. The construction method has the advantages of free vibration and **soil** squeezing, low noise and small operational plane during construction, is adopted when construction conditions of the common gravity retaining walls are limited, used for cubage of excavation in mass building areas, and fills up the blank of the common gravity retaining walls.

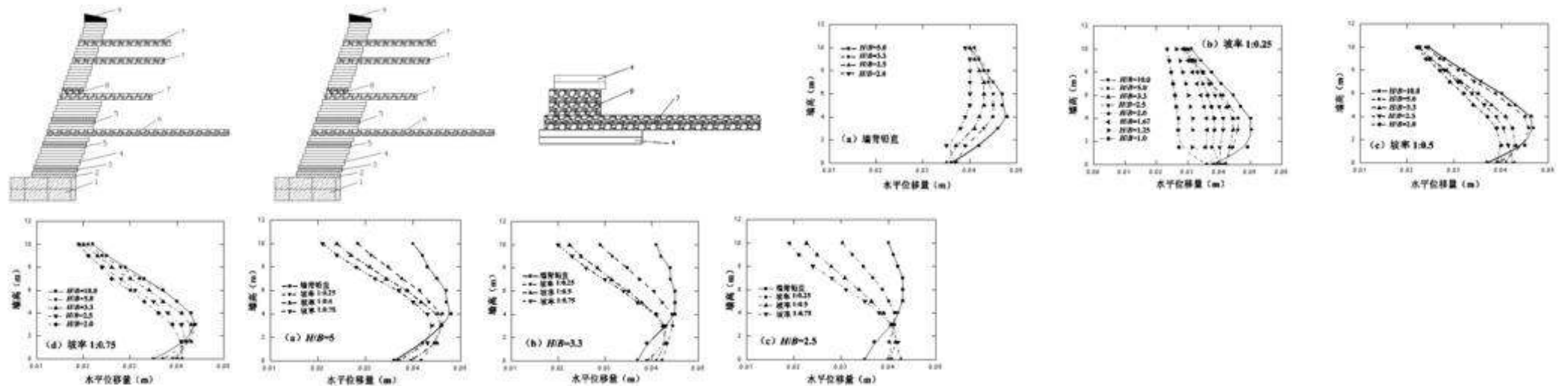


The utility model relates to a building **block** laid dry formula ecological retaining **wall** system, including **wall** body, building **block**, the building **block** is built and is built in **wall** body lower part formation fish nest, and the building **block** is built to build to plant in **wall** body upper portion formation and is planted, and the **wall** body top sets up the concrete and bears down on one, the building **block** by preceding terminal surface, rear end face, side notch, the protruding tooth in side, insert the pin fixed orifices, insert the pin connecting hole and form, upper and lower two -layer two adjacent building **blocks** are inserted pin with polymer glass fiber and are connected, polymer glass fiber insert the pin hypomere be fixed in lower floor's building **block** insert the pin fixed orificesinside, what polymer glass fiber inserted that the pin upper **segment** connects upper building **block** inserts the pin connecting hole, should insert the pin connecting hole and place the location rubble.The utility model discloses have good self -draining with keep off **soil** nature, antidumping nature, safe firm, construction more convenient, save the cost greatly, the practicality is wider, ecological hole in the building **block** makes the **wall** body control the inside and outside hole that forms the intercommunication from top to bottom, effectively realizes ecology and function diversity.



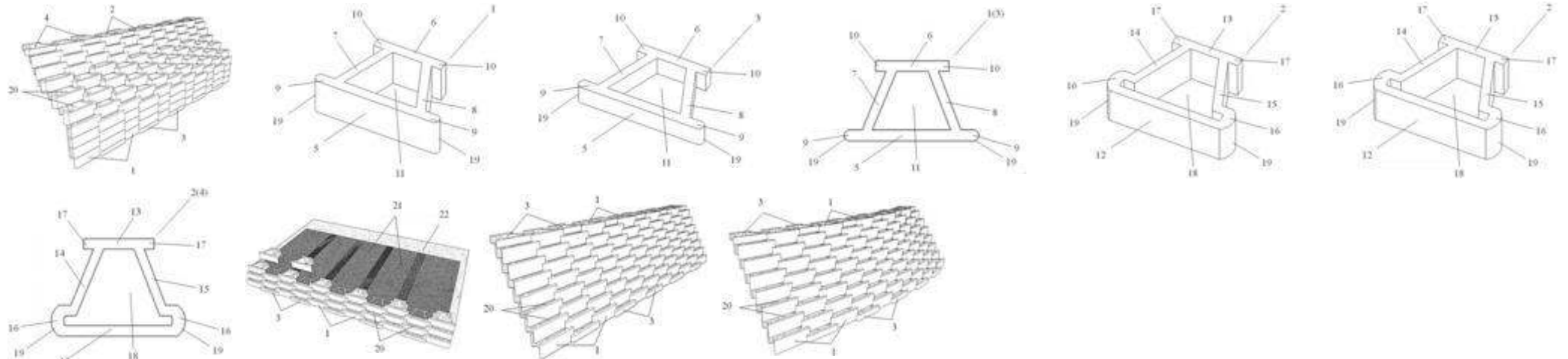
14.	Earthwork standard room retaining wall and construction method thereof	CN103572777	2014-02-12	CHANG'AN UNIVERSITY NINTH ENGINEERING GENERAL TROOPS OF CHINA AIRFIELD BUILDING	71 %
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The invention discloses an earthwork standard room retaining **wall**. A rigid layer, a bottom gravel drainage layer and an earth filled layer are sequentially laid on a foundation layer; at least one gravel drainage layer is laid in the earth filled layer; every one layer increase from the rigid layer ensures that an earthwork standard room is rearward shrunk, so as to form certain gradient; the retaining **wall** adopts a variable section structure; the higher the retaining **wall** is, the smaller the section and the thickness are. The invention also discloses a construction method of the retaining **wall**. Compared with the traditional retaining structures, such as a mortar rubble retaining **wall**, a **reinforced** retaining **wall**, a prestressed anchor sheet-pile **wall**, an anchor plate retaining **wall** and the like, the earthwork standard room retaining **wall** has the advantages that the structure is light and low in requirement on the bearing capacity of a foundation, **masonry** is cancelled, a **wall** surface is afforested, the retaining **wall** is ecological and environmentally friendly, and the landscape is beautified. Compared with the similar earthwork standard room retaining walls, the earthwork standard room retaining **wall** has the advantages that the horizontal displacement of the retaining **wall** is reduced, the safety factor is increased, earthwork standard rooms and **reinforcing** steel bars are saved, the labor force is saved, the construction period is shortened, and the economic benefit is obvious. The earthwork standard room retaining **wall** can be applied to slope protection of projects of expressways, airports and the like.



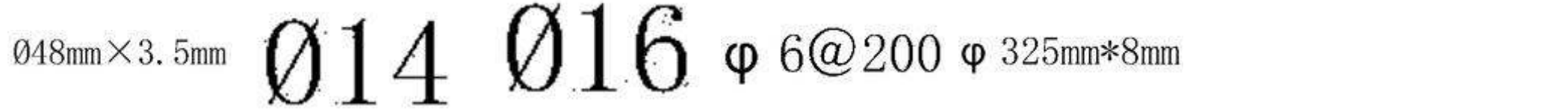
15.	Slope-variable spatial crossing mutually-embedded ecological building block retaining wall system and construction method thereof	CN104514227	2015-04-15	GUAN DAWEI HUANG JING	71 %
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The invention relates to a slope-variable spatial crossing mutually-embedded ecological building **block** retaining **wall** system and a construction method thereof. The retaining **wall** system comprises two main mutually-embedded ecological building **blocks** and two corresponding assistant ecological building **blocks**; each building **block** is consist of front and rear face plates which are provided with suspended arms and are parallel mutually and left and right rib plates which are connected with the face plates; and a central through hole is formed by the face plates and the rib plates. Through the combination of different building **blocks**, the retaining **wall** can be installed as the types of the straight surface, curved surface and different slope combinations in the construction, and the through holes formed in the **wall** after the construction can be used for planting the plants with different root system developed degrees. The slope-variable spatial crossing mutually-embedded ecological building **block** retaining **wall** system is capable of mutually locking by using own structure characteristics, avoiding using mediums, such as a rubber rod and a pin, improving the safety and durability of the retaining **wall**, and satisfying the retaining **wall** designs of different slopes and curved surfaces because of the combination of different building **blocks** in the construction. The slope-variable spatial crossing mutually-embedded ecological building **block** retaining **wall** system can be applied to the constructions of the road and river slope protection, the production is simple, and the construction is convenient.



16.	High-permeability zone under-water-level elevator foundation pit open caisson moulding bed construction method	CN103205978	2013-07-17	NANTONG YINGXIONG CONSTRUCTION	71 %
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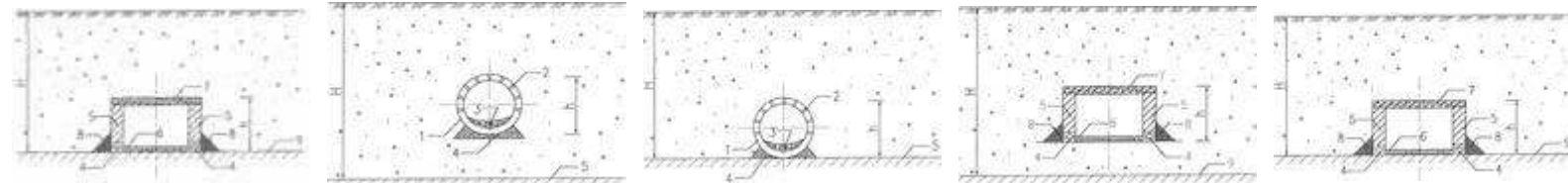
The invention discloses a high-permeability zone under-water-level elevator foundation pit open caisson moulding bed construction method. The method includes the steps of foundation trench positioning and setting out, foundation pit bottom plate leveling, open caisson production and formation, open caisson sinking, open caisson bottom sealing, plain concrete backfilling of the periphery of the outer side of an open caisson, elevator shaft slope angle backfilling in the open caisson, and the like. By the method, slope setting amount of elevator shaft pit and catchpit **soil** excavation of construction is decreased, foundation **soil** disturbance is reduced, and foundation pit side **wall** brick moulding bed **masonry** and formwork pouring of a concrete cushion is replaced. Construction period is longer than that of normal construction, sand gushing and **soil** layer collapse are avoided in a foundation pit **soil** excavation process for special **soil** layer elevator shaft and catchpit construction, the problem that quicksand and collapse of the foundation pit **wall** are difficult to avoid under the circumstance of the underground water level with high-permeability coefficient is solved, and cost for quicksand and collapse management is saved by a large amount.



17.	Underground diaphragm wall and deserted underground civil air defense engineering intersection processing method	CN104099943	2014-10-15	FOURTH ENGINEERING	70 %
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The invention discloses an underground diaphragm **wall** and deserted underground civil air defense engineering intersection processing method. The method comprises the steps that when the vault structure of an air-raid shelter with a shallow burial depth is removed by adopting small-area excavation, two **blocking** walls are respectively built on two sides of an underground diaphragm **wall**, and then clay is layered and backfilled to the original ground; the **blocking** walls are two brick walls; C30 impervious concrete is poured in a middle reserved cavity to reach P8 impervious level; daubing is carried out around a channel structure in the cavity and water-swelling rubber water stop bars are pasted, chemical steel bar planting is carried out around the channel structure, steel bars are connected with double-layer two-way **reinforcement** meshes which are arranged in the cavity in a welding way, and finally, waterproof layer construction is carried out by adopting double-sided self-adhesion rubber bituminous waterproof sheet materials on the sides, facing the underground diaphragm **wall**, of the **blocking** walls. The method has the advantages that the structural design is reasonable, the underground diaphragm **wall** and underground civil air defense engineering intersection problem and the slurry leakage problem in the underground diaphragm **wall** construction are solved by the adopted construction method, and meanwhile, the water leakage problem of underground diaphragm **wall** joints when a station main body is excavated in the later period is effectively prevented.

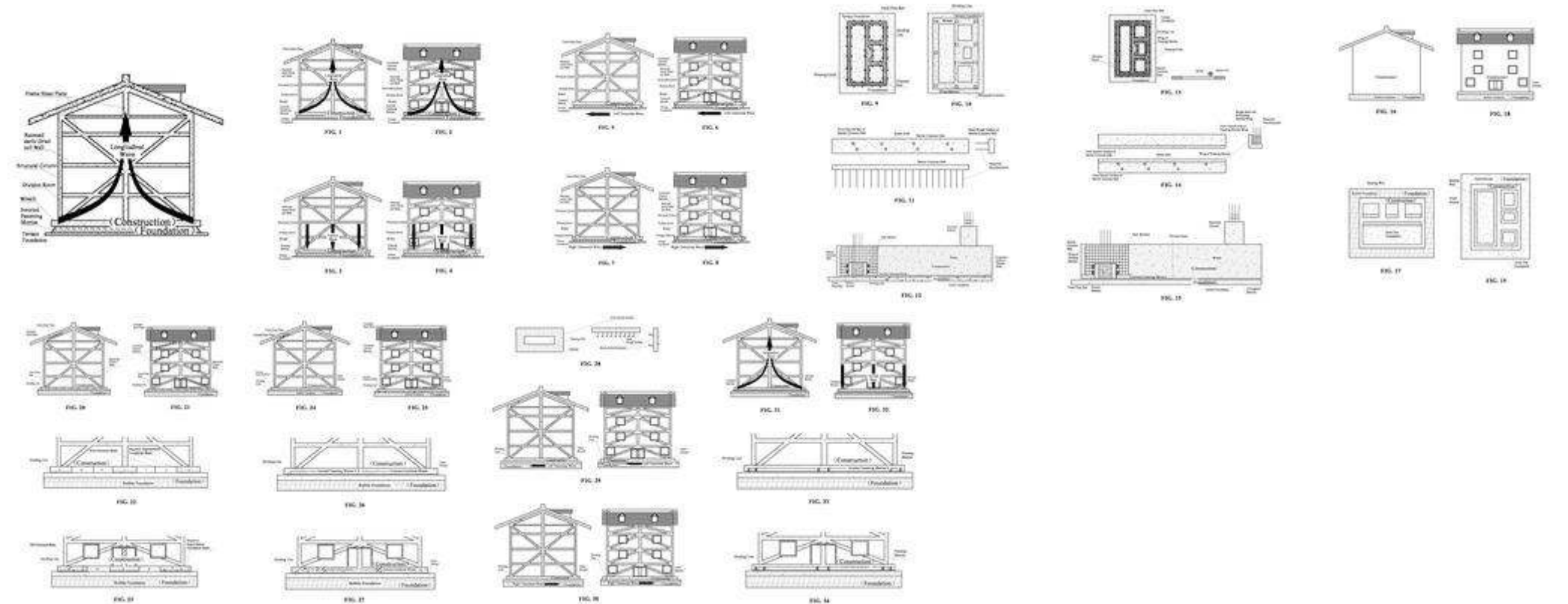
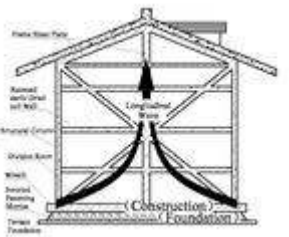


18.	Design construction method of rectangular infiltration gallery for stabiling water volume	CN101225666	2008-07-23	ZHEJIANG WATER PURIFICATION BUILDING WATER SUPPLY & DRAINAGE CONSTRUCTION	70 %
The invention relates to a design and construction method of a rectangular infiltration gallery used for stabilizing water volume, comprising the steps that: soil excavating, dry masonry, wet masonry, stones ranging, sealing cover, backfilling grading gravel filter layer and backfilling mixed sand and gravel filter layer. The dry masonry is that an influent slit array is arranged on the bottom of the two lateral walls of the rectangular infiltration gallery. The wet masonry is that the two lateral walls of the rectangular infiltration gallery are built to the designed total height by adopting at least one of the rubbles, cement blocks, bricks, precast concrete blocks or present stirring concrete. The height of the stones ranging foundation, the bottom height of the two lateral walls of the dry masonry rectangular infiltration gallery and the sizes of gravels, bricks and rubbles are determined according to the design requirements. The design and construction method of a rectangular infiltration gallery used for stabilizing water volume has the advantages of excavating and simultaneously masoning, relatively low effect of collapse, good influent effect, stable water volume, effectively solving the problem that the water inlets of the present round infiltration gallery are blocked after the sand gets in firstly, and the water inflow is sudden drawdown, greatly improving the water yield of the collecting-getting water structure, making the water between the open wells and infiltration galleries continuously flows into the water collecting structure by gravity. 					
19.	Construction method of fill subgrade retaining wall	CN110258625	2019-09-20	SHENZHEN JZRB ENGINEERING	70 %
The invention discloses a construction method of a fill subgrade retaining wall, and relates to a construction technology. The construction method of the fill subgrade retaining wall is used for solving the problems of long engineering cycle and low efficiency of a general construction method. The construction method of the fill subgrade retaining wall approximately comprises the steps that a foundation pit is excavated, specifically, the foundation pit is excavated in a segmented mode according to the design depth; a foundation is constructed, specifically, prefabricated building blocks are sequentially constructed at the outer edge of the foundation pit, the prefabricated building blocks are bundled by tiepiece belts for reinforcement, and the retaining wall is formed by constructing layer by layer; drainage construction is carried out, specifically, drainage pipes are inserted into the foundation pit; the foundation pit is backfilled, specifically, the foundation pit is synchronously backfilled in the process of constructing the prefabricated building blocks; and cap rocks are poured, specifically, the cap rocks are poured on the prefabricated building blocks, and the retaining wall construction is completed. The construction method of the fill subgrade retaining wall has the following advantages and effects that compared with a traditional method, the pouring amount of concrete in the construction method for forming the retaining wall by constructing the prefabricated building blocks is less, so that the waiting time required for concrete setting is short, the construction period of a subgrade can be shortened, and the construction efficiency of the subgrade is improved. 					
20.	Construction method of underground continuous wall	CN102691294	2012-09-26	ANYI CONSTRUCTION JIANGSU PROVINCIAL HOUSING CONSTRUCTION NANTONG TEXTILE VOCATIONAL TECHNOLOGY COLLEGE	70 %
The invention discloses a construction method of an underground continuous wall. The method includes steps of firstly, preparing a guide wall; secondly, preparing slurry; thirdly, dividing groove segments; fourthly, preparing equipment; fifthly, performing grooving construction; sixthly, trimming the grooves, cleaning bottoms and replacing the slurry; seventhly, preparing reinforcement cages, cleaning the grooves, and checking the grooves; eighthly, applying lock tubes; ninthly, placing the reinforcement cages; tenthly, concreting under water; eleventhly, pulling out the lock tubes; and twelfthly, maintaining the concrete for 10-15 days. By using a heavy grooving machine as grooving equipment of soil layers and a slot milling machine to perform grooving to rock stratum, technical problems of grooving in penetrating the soil layers and the rock stratum are solved. The reinforcement cages are used as preparing platforms, so that mounting quality and precision of the reinforcement cages and embedded parts are guaranteed through precise construction, and wall quality is improved. The construction method is a breakthrough in the underground continuous wall construction. By the method, the continuous wall can be used as foundation of a building and as an external wall of a multi-storey basement, and a foundation is laid for further development of construction techniques. 					
21.	High sediment side slope of abandoning suddenly in mountain area wind -powered electricity generation field adds muscle anchor ecological remediation structure	CN205475264	2016-08-17	CHINA POWER CONSTRUCTION GUIYANG SURVEY & DESIGN INSTITUTE	69 %
The utility model discloses a high sediment side slope of abandoning suddenly in mountain area wind -powered electricity generation field adds muscle anchor ecological remediation structure, domatic on abandoning the slag bank face adds the solid soil structure of muscle, side slope drainage structure, bottom block structure and domatic revegetation structure including arranging, the domatic solid soil structure of muscle that adds includes that it nets and a plurality of baffle to add the muscle, just adds muscle net and baffle and fixes on abandoning the slag bank face with staple through the bower anchor pole, the side slope drainage knot includes catch water drain and escape canal, and sediment side slope top is being abandoned in the catch water drain setting, and the escape canal links to each other with the catch water drain, block the structure and include the barricade in the bottom, sediment side slope bottom is being abandoned in the barricade setting. The utility model discloses the high sediment side slope of abandoning suddenly in messenger mountain area wind -powered electricity generation field possesses general qiao (irritating) grass growth conditions, ensures to reach certain ecological effect of resumeing in a short time, can satisfy the high long -term stability and soil erosion and water loss prevention and cure requirement of abandoning the sediment side slope suddenly in mountain area wind -powered electricity generation field simultaneously again to break through the high technical merit restriction of abandoning the improvement of sediment side slope tradition soil and water conservation suddenly in mountain area wind -powered electricity generation field.					
22.	Construction method for making ultra-long artificial excavating pile penetrate cave and ultra-long pile penetrating cave	CN101691751	2010-04-07	THIRD CONSTRUCTION	69 %
The invention relates to a construction method for making an ultra-long artificial excavating pile penetrate a cave and an ultra-long pile penetrating the cave. The construction method comprises two steps of excavating a pile hole at the top of the cave and constructing a concrete protective wall on the part of the pile penetrating the cave, wherein the step of excavating the pile hole at the top of the cave is performed in sections layer by layer from top to bottom; the radius of a pile hole on the part of the pile penetrating the cave is enlarged compared with the prior design; an outer mold of the cave protective wall is a brick mold; and the protective wall is constructed in sections from bottom to top. Finally, steel reinforcement cages are hoisted and put, and concrete is poured. The construction method for making the artificial excavating pile penetrate the cave can effectively eliminate the influence of geological conditions on a construction site, and can effectively improve the strength of a pile body, reduce the construction difficulty, accelerate the construction, reduce the construction cost and ensure the construction safety.					
23.	Loess landslide control system based on ecological remediation	CN106168030	2016-11-30	NORTHWEST UNIVERSITY	69 %
The invention discloses a loess landslide control system based on ecological remediation. After substep square cutting of a loess landslide mass, the side slope of the loess landslide mass is of a multistep structure, a square-cut side slope is formed, single-row slide-resistant piles are arranged on a slide-resistant section on the front portion of the landslide mass, a retaining wall is constructed at the front edge of the landslide mass, a drainage project is constructed on the slope face and periphery of the landslide mass, and a three-dimensional soil engineering grid grass planting protection slope is laid on the slope face of the square-cut side slope. Cutting, retaining, protection and drainage in landslide treatment are combined, the landslide slide force is reduced to the maximum extent, the landslide skid resisting force is increased to the maximum extent, the influence of rainfall on the slope is eliminated, a slope protection system with an ecological function is constructed through a three-dimensional soil engineering grid, the functions of self washout resistance, slide force resisting reinforcement, ecological restoration and the like of the landslide mass are improved, the overall stability of landslide is effectively improved, and therefore the aim of permanently controlling loess landslide is achieved.					
24.	High-side-slope large-curve retaining wall building construction method	CN104328797	2015-02-04	SHAANXI HUASHAN ROAD & BRIDGE ENGINEERING	68 %
The invention discloses a high-side-slope large-curve retaining wall building construction method. According to the method, through controlling the slope ratio of a high-side-slope retaining wall, large-curve measurement and settlement observation, reasonably arranging drainage holes and increasing the thickness and area of a sand-gravel reversed filtering layer, the construction difficulty and the measurement control precision requirement are reduced, the construction work procedure is simplified, the construction quality is ensured, the construction period is also shortened, the breakthrough achievement is obtained in the aspect of synthetically governing the landslide mass, and precious experience is provided for construction of similar ultra-high-side-slope and oversized curve retaining wall building engineering.					

25.	Method for ecological restoration of mountain	CN102677651	2012-09-19	BEIJING ZHENGHE HENGJI BINSHUI ECOLOGY ENVIRONMENTAL MANAGEMENT	67 %
The patent refers to the field of 'investigating, improving or preserving foundation soil or rock'. The invention relates to a method for ecological restoration of a mountain, which comprises the following steps: (1) forming holes on a rocky mountain; (2) filling cement mortar (1 : 3) in the holes; (3) inserting foundation steel bars into the cement in the holes and allowing the foundation steel bars to protruding out of the rocky mountain at a certain length, and pouring a cement frame or not with the foundation steel bars as center; (4) laying a vertically consecutive planting soil layer along the rock slope of the rocky mountain, wherein the planting soil layer comprises plant growth bags stacked along the rock slope and filling soil for filling gaps; (5) coating a steel mesh on the outer surface of the planting soil layer, wherein the steel mesh is fixedly connected with the foundation steel bars to fix the plant growth bags and is formed of a plurality of steel wires by crossing each other; and (6) watering and curing the plant growth bags. The method provided by the invention perfectly combines plants, soil and the mountain; and not only has rapid and good greening effect and effectively solves the problems of mountain landslide, collapse and the like, but also forms a stable long-life plant community, achieving an original ecological effect.					
26.	Rectangular enclosure pile, and construction method using rectangular enclosure pile as main structure	CN104563131	2015-04-29	JINAN RAIL TRANSIT	67 %
The invention discloses a rectangular enclosure pile, and a construction method using the rectangular enclosure pile as a main structure. The rectangular enclosure pile comprises a plurality of prefabricated rectangular piles which are arranged according to the set positions and equipped with grouting holes; a top pressing crown beam, a waist beam, and a partition wall which is built through coal has hollow bricks are fixed between adjacent piles; the horizontal supporting and reverse building combined method is utilized for constructing; the top pressing crown beam is horizontally fixed on the top part of the adjacent rectangular pile; the waist beam is horizontally fixed at a bracket of the adjacent rectangular frame; the partition wall is built in a space formed by the adjacent rectangular pile and the waist beam; when a foundation pit is excavated, a vertical support and a horizontal support of the enclosure structure are respectively used as a vertical part and a horizontal part of the main structure of a building, and therefore, the waste of temporary supporting structure can be avoided; meanwhile, the construction period is saved, and the sustainable development of the foundation pit work can be achieved.					
27.	Construction method of mountain foundation pit	CN110284505	2019-09-27	SECOND CONSTRUCTION ENGINEERING	67 %
The invention provides a construction method of a mountain foundation pit, and relates to thetechnical field of building construction.The construction method of the mountain foundation pit includes the steps that an earthwork is excavated; excavation is carried out according to the forms of section, layering and blocking; by forming drainage ditches in the top of the foundation pit and combining the method of reducing groundwater level,it is ensured that the construction is in a water-free state; support construction is carried out, and includes natural step-slope and anchor rod support; the step-slope form is monitored in realtime; retaining walls are constructed; a plurality of diamond-shaped lattice retaining wallsare adopted, concrete is poured between the adjacent lattice retaining walls, and each beam lattice is filled withseeds for soil and grass planting; expansion joints are arranged between the adjacent lattice retaining walls, andthe expansion joints are filled with asphalt mastic; and a drainage system is constructed, and earthwork backfilling is carried out.					
28.	Method for constructing inverted type foundation beam	CN102535493	2012-07-04	JIANGSU HUAIHAI CONSTRUCTION NANTONG TEXTILE VOCATIONAL TECHNOLOGY COLLEGE	67 %
The patent refers to the field of 'foundations as substructures'. The invention discloses a method for constructing an inverted type foundation beam. The method comprises the following steps of: (1) carrying out earthwork excavation and construction: (11) excavating to the position of a marked elevation on the bottom of a raft plate by using a machine, and leaving soil with the thickness of 200 mm for manual shoveling, (12) releasing an axis in time after the axial excavated soil of foundation ditches 1-7 reaches the marked elevation, and manually excavating a beam groove; (2) carrying out waterproofing work; (3) binding reinforced steel bars and putting the reinforced steel bars in the groove; and (4) carrying out concrete pouring and curing. With the adoption of the method disclosed by the invention, the bearing capacity of foundation can be ensured, the occurrence of uneven settlement of a building, caused by construction quality is prevented, and meanwhile, the method is easy in on-site construction.					
29.	Composite foundation for arid region earthen site collapse area and sapping area and construction method	CN107100184	2017-08-29	LANZHOU UNIVERSITY OF TECHNOLOGY	66 %
The invention discloses a composite foundation for an arid region earthen site collapse area and a sapping area and a construction method. The composite foundation comprises an upper modified glutinous rice pulp dust layer (1) and a lower rubble building cushion layer (2) from top to bottom, wherein the lower rubble building cushion layer (2) comprises rubbles (21), and modified glutinous rice pulp (22) filled in gaps among the rubbles. The construction method comprises the following steps: (1) glutinous rice pulp is prepared; (2) modified glutinous rice pulp dust (11) is prepared; (3) the modified glutinous rice pulp (22) is prepared; (4) temporary support: a rigidity and flexibility combination method is adopted to effectively support site body collapse area (10) or rapping area (11) soil; (5) a base slot is excavated; (6) mold support: a free face (8) of a site body pre-reinforced area serves as a template, and the other three surfaces support a mold; (7) the rubbles are built; (8) the modified glutinous rice pulp dust is compacted; (9) the template is disassembled; (10) the maintenance is performed; and (11) the steps are repeated to construct the next adjacent section of the composite foundation.					
30.	Method for constructing wind tower foundation	CN105332385	2016-02-17	QINGDAO BAIJIANCHENG ENVIRONMENTAL PROTECTION TECHNOLOGY	65 %
The invention discloses a method for constructing a wind tower foundation. According to the technical scheme, the wind tower foundation is constructed through a structure raft foundation, and the method comprises the steps that the position of the wind tower foundation is set; an earthwork is dug; a foundation pad is constructed; a brick forming die is built, and plastering is carried out; foundation waterproofness construction is carried out; a foundation waterproof protection layer is constructed; foundation paying off is carried out; lower foundation bottom plate steel bars are bound and pre-buried; tower crane accessories are mounted; upper foundation steel bars are bound, and a steel plate waterstop and a formwork are mounted; wind tower foundation concrete construction is carried out; and the connecting and twisting faces of the wind tower foundation and a structure raft are subjected to texturing treatment and waterproof connecting and twisting treatment. According to the method, the construction procedures are simplified, the construction cost is reduced, the wind tower foundation and the structure raft are of an integral structure, and stressing is more even and safer.					
31.	Wall surface dust block	CN101230580	2008-07-30	Cheng Weiguo	64 %
The invention discloses a wall surface earth retaining block which is a masonry block suitable for growing plants; the body of the earth retaining block is provided with a bottom plate and a side plate; the lateral surface of the block body is in a boat shape, the top surface thereof is T-shaped, the block body can be divided into a front part and a back part. The back part is of a backfilling zone which can be backfilled with the soil suitable for the growing of plants, thereby a plant growing channel is formed in an inverted filter behind a wall so as to provide a relative good environment for the development and the growth of plant roots; therefore, when a reinforced segmental earth retaining wall is applied to the projects of municipal work, water conservancy, road, and so on, the survival rate of the plants on a surface structure can be greatly raised, thereby the effect of virescence of the wall surface is more prominent.					
32.	Earthquake-resistant packaged reinforced soil structure	CN201485764	2010-05-26	CHINA RAILWAY ERYUAN ENGINEERING	64 %
The utility model discloses an earthquake-resistant packaged reinforced soil structure and aims at improving the integral stability of a retaining structure, effectively controlling the panel deformation and enhancing the earthquake-resistant capability of a retaining wall. The earthquake-resistant packaged reinforced soil structure comprises a panel (30), filling materials and a gravel inverted filter layer (20), wherein the filling materials are filled and compacted at the internal side of the panel in a layered mode; the gravel inverted filter layer (20) is arranged longitudinally; and main lacing wires (10) are horizontally and alternately arranged in the filling materials in a layered mode; the panel (30) comprises split blocks (31) and integral blocks (32), which are vertically built at row intervals; each split block (31) comprises an external block (31a) and an internal block (31b) which are spliced along the thickness direction of the panel (30); the main lacing wires (10) inflect and package the gravel inverted filter layer (20) and the internal block (31b); a vertical riveted connecting structure and/or a vertical plug joint structure are/is also arranged between the external block (31a) and the integral block (32); and a vertical plug joint structure is arranged between the internal block (31b) and the integral block (32).					

33.	Ground surface construction; complete disaster relief and preservation technology for liquid tank trailers during earthquakes, tsunami, and super storms, and structure and equipment thereof	WO2017/024751	2017-02-16	E**** PROCESS JIANG, LIZHONG ZHANG, YE	64 %
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The invention discloses a technology of passage between supporting tripod structural partition ground building and an underground facility in building shockproof disaster alleviation technology. The technology uses a partition between an upper buiding structure and a lower building structure to allow the buikding to avoid earthquake, seaquake, and superstrong wind disasters through a passage between supporting tripod structures and will not break off communication of a main structure due to a fireproof structure. The technonlogy can ensure the safety of the building, can retain facility capacity, and ensure convenient life, will not reduce benefits and increase the cost with the fireproof performance. (From CN107614795 A)

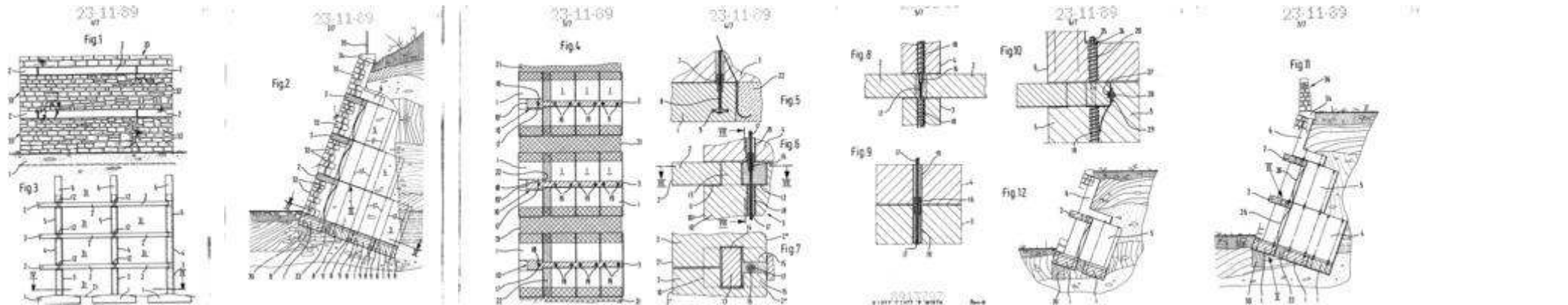
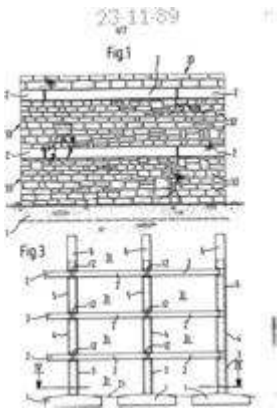


34.	Crossroad underground walkway and comprehensive pipe rack co-construction structure and construction method thereof	CN110295624	2019-10-01	CHINA MCC20 SHANGHAI ERSHIYE CONSTRUCTION	63 %
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The invention relates to a crossroad underground walkway and comprehensive pipe rack co-construction structure and a construction method thereof. The co-construction structure comprises three layers of main body section structures; the upper layer of main body section structure is of an underground walkway single-cabin structure, and communicates with four access ports through four sections of upper-layer gradient change connecting sections; the middle layer of main body section structure is of a double-cabin structure of a comprehensive cabin and a gas cabin; the bottom layer of main body section structure is of a double-cabin structure of a comprehensive cabin and an electric cabin; the upper layer of main body section structure and the middle layer of main body section structure, and the middle-layer main body section structure and the bottom layer of main body section structure communicate through ladder channels; the two ends of the bottom layer of main body section structure communicate with bottom-layer gradient change connecting sections; and after the bottom-layer gradient change connecting sections are gradually changed, the elevation is consistent with the elevation of the middle layer of main body section structure. Under the precondition of guaranteeing relative independent arrangement of all municipal pipelines in a comprehensive pipe rack, the co-construction structure meets the pedestrian passing and comprehensive pipe rack maintenance demands, and fully uses the underground space structure to reduce the construction cost.

35.	No title available	DE8913797	1990-01-04	LUZ CHRISTOF LUZ HANS WIRTH PETER 7000 STUTTGART	63 %
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No abstract available



36.	Tunneling construction method with first wall construction and second tunneling construction	CN105863650	2016-08-17	ZHEJIANG TRANSPORTATION PLANNING & DESIGN RESEARCH INSTITUTE	62 %
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The invention discloses a tunneling construction method with first wall construction and second tunneling construction. The tunneling construction method comprises the following steps of firstly excavating a trough at the position of a hole entrance of a mountain body, excavating soil masses, then adopting masonry materials to build a gravity-type soil retaining wall for balancing the original mountain body and ensuring the stability of side upward slopes; after the soil retaining wall is completed and maintained, firstly building a pipe shed and pre-grouting for reinforcing a stratum, then excavating off the soil masses at the outer side of the soil retaining wall, and next, excavating according to a traditional method. The tunneling construction method disclosed by the invention has the advantages that the balance and the stability of the mountain body at the hole entrance can be realized by arranging the soil retaining wall and protective arches of pipe-shed advance supports at a tunneling position; finally, the tunneling construction is conducted at the balanced and stable mountain-body slope, so that safe and feasible tunnel construction is guaranteed, the amount of excavation is less and the vegetation destruction is less; the soil retaining wall also can be used as a tunnel-door end wall during operation, so that the construction method can realize micro-excavation and safe tunneling in any stable mountain-body stratum.

37.	Construction method of soil covering tank	CN101852031	2010-10-06	FOURTH CONSTRUSTION	59 %
The invention relates to a construction method of a soil covering tank for storing product oil and the like, which comprises the following steps of: (A) building a tank chamber of a soil covering tank: firstly, carrying out earth excavation with a method combining a back-acting shovel and manual excavation; then, manufacturing a ring beam, precasting concrete blocks on the spot according to the radian of the ring beam, and building the concrete blocks; carrying out the engineering of steel bars: welding steel bars by machining, and manually binding the steel bars on the spot; carrying out the engineering of templates and scaffolds: taking a bamboo plywood as a top plate template of a concrete thin shell of the tank chamber, designing a camber at the middle part, and taking scaffold tubes as bottom template brackets of the thin shell of the tank; then, carrying out concrete engineering and asphalt sand construction; and finally, carrying out waterproof engineering, thereby completing the construction of the tank chamber of the soil covering tank; and (B) installing a storage tank body of the soil covering tank: firstly, precasting the storage tank body; then, installing a tank bottom plate; installing the tank body, and welding the storage tank; and finally, testing and inspecting to complete the whole construction process of the soil covering tank after the construction is qualified. The invention reduces the occurrence of accidents, increases the benefit and reduces the dust emission.					
38.	Construction method applied to reinforcement of floor handling project flood control lift	CN106930231	2017-07-07	ZHEJIANG UNIVERSITY OF WATER RESOURCES & ELECTRIC POWER	59 %
The invention discloses a construction method applied to reinforcement of a floor handling project flood control lift. The construction method comprises the following steps of (a) construction planning, (b) earthwork filling, (c) original lift maintenance, (d) banket construction, (e) retention wall bricklaying, (f) sod revetment and (g) construction of a road at the top of the lift. The construction method has the advantages that construction time is reasonably arranged, the construction period is short, construction cost is low, operability is high, construction efficiency is high, the flood control capacity of the flood control lift is improved, and maintenance is easy.					
39.	Quake-proof coverage-type reinforced fill structure	CN101671985	2010-03-17	CHINA RAILWAY ERYUAN ENGINEERING	58 %
The invention discloses a quake-proof coverage-type reinforced fill structure, aiming at improving the integral stability of a retaining and supporting structure, effectively controlling the deformation of a panel and enhancing the quake-proof capability of a retaining wall. The quake-proof coverage-type reinforced fill structure comprises a panel (30), fillers filled and pressed at the inner sideof the panel (30) in a layering way and an aggregate inverted filter (20) arranged longitudinally. Main lacing wires (10) are arranged in a horizontal, interlacing and layering way; the panel (30) isformed by a split type building block (31) and an integral building block (32) built vertically at intervals; the split type building block (31) is formed by an outer building block (31a) and an inner building block (31b) spliced in a thickness direction of the panel (30); the main lacing wire (10) is rebated to cover the aggregate inverted filter (20) and the inner building block (31b); a vertical tenon connection structure and/or a vertical splicing structure are arranged between the outer building block (31a) and the integral building block (32); and a vertical splicing structure is arranged between the inner building block (31b) and the integral building block (32).					
40.	Protection method and protection device for blocking deep cutting falling rocks	CN103243665	2013-08-14	CHINA RAILWAY ENGINEERING	57 %
The invention discloses a protection method and a protection device for blocking deep cutting falling rocks. The protection method for blocking the deep cutting falling rocks includes the steps: excavating earth rocks for a plurality of longitudinally and uniformly arranged anchored pile bodies constructed on a falling rock bearing side of a cutting and supporting excavated hole walls; pouring anchored piles; excavating the cutting after the anchored piles achieve design strength; and mounting a breast board between each two adjacent anchored piles after the cutting is excavated and forming pile-sheet retaining walls by the breast boards and the anchored piles. In the protection method, the reinforced concrete anchored piles are firstly constructed on the falling rock bearing side of the deep cutting, a slope is closed by the aid of the reinforced concrete pile-sheet retaining walls formed by the anchored piles and the breast boards, accordingly, earth rock excavation engineering is decreased, slope stability is enhanced, and the capacity of bearing the impact force of perilous falling rocks is also enhanced. Therefore, by the protection method, the cutting can be supported and retained in deep excavation, the perilous falling rocks can be blocked, and the protection method has the advantages of high safety, economy, practicability and convenience in construction.					