

[SS 10] /ic E02D7/28 or E02D23/00

Results in EPODOC 3.933

[SS 11] method

Results in EPODOC 16.280.850

[SS 12] extensible or extending or extendible

Results in EPODOC 1.389.579

[SS 13] housing or formwork

Results in EPODOC 1.474.308

[SS 14] 10 and 11 and 12 and 13

Results in EPODOC 1

[SS 15] ..li



1/1 © EPODOC / EPO

PN - [CA1097330](#) A 19810310

PR - US19780888312 19780320

AP - CA19790323806 19790320

DT - I

CCI - [E21B1/02](#) ; [E21B6/00](#) ; [E21B7/20](#)

PA - SERVICE EQUIPMENT DESIGN CO

TI - **METHOD** AND APPARATUS FOR DRIVING PIPE

AB - A casing hammer for driving casing while drilling a water well comprises a **housing** having an annular pneumatic chamber with a relatively lightweight, short-stroke annular piston. The piston is reciprocally driven at a high rate to provide a large number of light blows of controllable energy upon an annular anvil that seals one end of the chamber. Percussive blows upon the anvil are transmitted through a drive head and adapter to the upper end of the pipe to be driven. The hammer is suspended from a rotary drive head that operates a hollow drill string **extending** downwardly through the hammer and through the casing driven thereby.

[SS 15] pillar and (opening 1w end)

Results in EPODOC 126

[SS 16] 15 and 10 and 13

Results in EPODOC 0

[SS 17] 15 and 10

Results in EPODOC 0

[SS 18] pillar and 10

Results in EPODOC 11

[SS 19] ..li



1/11 © EPODOC / EPO

PN - [KR101670683B](#) B1 20161031

PR - KR20160086615 20160708

AP - KR20160086615 20160708

DT - I

PA - HWA JEONG CO LTD [KR]; KIM DAE WOO [KR]; KIM KI BAEK [KR]; KIM SEONG YOON [KR]

TI - CONSTRUCTION METHOD FOR UNDERGROUND FOUNDATION STRUCTURE

AB - The present invention relates to a method for forming an underground foundation structure which forms a stable underground structure supported by a rock layer in an underground structure existing on a position where the rock layer is fairly deep. According to the present invention, the method for forming an underground foundation structure comprises: an upper **pillar** installation step of installing a hollow upper **pillar** wherein a hollow space of a prescribed diameter is installed in a first through hole formed in a first drilling step; a second drilling step of using a second drilling bit of a drilling machine moving downwards through the hollow space of the upper **pillar** to form a second through hole from a lower side of the upper **pillar** to a rock layer; and a hardener filling step of spraying high pressure water and a hardener while rotating and lifting the second drilling bit, supplying the hardener through the inside of the second drilling bit to spray the hardener from a hardener nozzle on an end of the second drilling bit, and supplying the high pressure water through the inside of the second drilling bit to spray the high pressure water from a high pressure nozzle laterally directed from an upper side of the hardener nozzle to continuously fill the hardener to the hollow space of the upper **pillar** from the rock layer.

2/11 © EPODOC / EPO

PN - [KR20160033380](#) A 20160328

PNFP - KR101635905B B1 20160704

PR - KR20140124054 20140918

AP - KR20140124054 20140918

DT - I

CT - || STSE (A)

[JP2000073328](#) A 20000307 [] (HITACHI SHIPBUILDING ENG CO);

[KR200352921Y](#) Y1 20040622 [];
[KR101126341B](#) B1 20120322 [] (LEE OH JIN [KR]);
[KR20130093878](#) A 20130823 [] (LEE SEUNG JUN [KR])

- PA - (A)
 LEEDO CO LTD [KR]; LEE YO SUB [KR]
- TI - (A)
 CAISSON HAVING HOLLOW **PILLAR**, AND PORT STRUCTURES USING IT
- (B1)
 Caisson having Hollow **Pillar** and Port Structures using it
- AB - (A)
 The present invention relates to a caisson having a hollow wave absorbing **pillar** and a breakwater and an inner wall including the same. The caisson for a coastal harbor includes: a lower plate installed on the seabed; and an outer wall unit including an inner space, wherein the front surface is open by a rear wall installed on the upper surface in the rear of the lower plate, a left wall installed on the left upper surface of the lower plate, and a right wall installed on the right upper surface of the lower plate. The caisson includes: a first hollow wave absorbing **pillar** coming into contact with a front inner wall of the left wall to dissipate wave energy by transforming the flow of waves coming to the outer wall unit wherein the front surface is open; a second hollow wave absorbing **pillar** coming into contact with a front inner wall of the right wall; and multiple third hollow wave absorbing pillars arranged at intervals between the first wave absorbing **pillar** and the second wave absorbing **pillar**. A first wave absorbing plate protrudes from the front side or the rear side of the first wave absorbing **pillar**, and a second wave absorbing plate protrudes from the front side or the rear side of the second wave absorbing **pillar**. A third wave absorbing plate protrudes from both sides of the third wave absorbing **pillar**. The third wave absorbing plate is separated from the adjacent third wave absorbing plate in order for the front side and the rear side to be repeatedly located. At least one large cross partition is installed to divide the inner space of the outer wall unit, on the upper surface of the lower plate to form at least four large partitioned spaces. A rear large partitioned space among the large partitioned spaces is filled with a filling material with self-load to be used as a gravity chamber, and a front large partitioned space is used as a wave chamber in order for the waves to flow inside.

3/11 © EPODOC / EPO

- PN - [KR101126341B](#) B1 20120322
- PR - KR20110037344 20110421
- AP - KR20110037344 20110421
- DT - I
- CNOI - [B66C1/62](#) ; [E02D23/00](#) ; [E02D27/52](#) ; [E02B3/06](#)
- CCA - [Y02A10/15](#)
- PA - LEE OH JIN [KR]
- TI - CAISSON STRUCTURE AND HARBOR STRUCTURE COMPRISING THE SAME
- AB - PURPOSE: A caisson and a harbor structure having the same are provided to move a caisson to an installation position in balance, construction a mold for forming concrete on the upper part of a top plate of a wave dissipation chamber, and prevent

damage of the concrete due to huge wave by connecting a lifting wire to the top plate of the wave dissipation chamber. CONSTITUTION: A caisson(10) comprises a wave dissipating chamber(100), a support unit(200), and a reinforcement support unit. The wave dissipation chamber opens toward sea direction in order to dissipate wave and comprises a wave dissipation **pillar**(120), a water flow chamber(140), a top plate of the wave dissipation chamber(160), and a bottom plate of the wave dissipation chamber. The wave dissipation **pillar** forms that a Y-shaped slit(122) and a V-shaped slit(124) are arranged in traverse direction by turns. The wave dissipation **pillar** dissipates the obtained wave for the first time. The water flow chamber dissipates the wave, passing through the wave dissipation **pillar**, for the second time. The top plate covers the upper part of the wave dissipation **pillar** and the water flow chamber. The support unit supports the caisson to prevent damage of the caisson due to shaking or falling down the caisson because of the wave. The support unit comprises multiple space units and top plates of the support unit(240). The spaces are formed in the rear side of the caisson, and filled with heavy weight materials such as sands and rubble mounds. The top plate of the support unit closes the upper part of the space units. The reinforcement support unit supports the caisson by the multiple spaces.

4/11 © EPODOC / EPO

- PN - [CN201695381U](#) U 20110105
- PR - CN20102214989U 20100604
- AP - CN20102214989U 20100604
- DT - I
- PA - CHINA NAT OFFSHORE OIL CORP; OFFSHORE OIL ENG CO LTD
- TI - Three-cylindrical foundation one-legged mooring platform
- AB - The utility model provides a three-cylindrical foundation one-legged mooring platform which comprises a platform and a support leg; the utility model is improved in that the support leg comprises three cylindrical foundations and an independent support leg structure; the three cylindrical foundations are arranged like an equilateral triangle, top plates of the three cylindrical foundations are respectively provided with fixed support **pillar** bodies by insertion, and a hoisting structure is arranged at the top ends of the support **pillar** bodies; and the independent support leg structure comprises a one-legged column and a truss body for supporting the one-legged column and the support **pillar** bodies, and the top end of the one-legged column is connected with the platform. The three-cylindrical foundation one-legged mooring platform has the advantages of simple and reasonable structure, easy building and mounting and low cost.

5/11 © EPODOC / EPO

- PN - [CN201433398Y](#) Y 20100331
- PR - CN2009259234U 20090625
- AP - CN2009259234U 20090625
- DT - I
- PA - CIXIN DING; SHUDONG DING
- TI - External support system for supporting open caisson structure
- AB - The utility model provides an external support system for supporting an open caisson

structure, which comprises support brackets fixed on the outer wall of the open caisson structure, upper support tube pillars arranged along the vertical direction, lower support tube piles which are arranged in a soil body and used for supporting the open caisson structure, and jacks arranged between the upper support tube pillars and the lower support tube piles, wherein the upper end of the upper support tube **pillar** is fixed on the bracket, the upper support tube **pillar** comprises a plurality of sections of tube **pillar** sections, the tube **pillar** sections are arranged in a removable way, the upper end of the jack is in contact with the lower end of the upper support tube **pillar**, and the lower end thereof is positioned on the lower support tube pile. Compared with the prior art that the movable cushion block is pulled out in high altitude and the movable cushion block guide limit structure is constantly cut, the support system with the structure not only can reduce the labor intensity of constructors and improve the construction progress, but also can recycle part of construction material and reduce the waste of resource.

6/11 © EPODOC / EPO

PN - [KR20090120997](#) A 20091125

PNFP - KR100975988B B1 20100817

PR - KR20080047074 20080521

AP - KR20080047074 20080521

DT - I

CT - || STSE (B1)
[KR100645319B](#) B1 20061106 [] (SUNAM [KR]);
[KR200341453Y](#) Y1 20040211 [];
[JP2001288753](#) A 20011019 [] (TAKENAKA DOBOKU, et al);
[JPH06341154](#) A 19941213 [] (TODA CONSTRUCTION)

CNOI - (A)
[E02D5/80](#) ; [E02D23/02](#) ; [E02D27/06](#) ; [E02D29/06](#)

PA - (A)
WI SUNG BAE [KR]

TI - (A)
THE METHOD FOR CONSTRUCTING UNDERWATER STRUCTURE
- (B1)
The Method for Constructing Underwater Structure

AB - (A)
PURPOSE: A construction method of an aquatic structure is provided to reduce the volume or weight of an aquatic structure block. CONSTITUTION: A plurality of support **pillar**(10) is formed and an anchor wire(20) is buried in a place where an aquatic structure is located. An aquatic structure block assembly is made of a plurality of blocks. The aquatic structure block is guided to the support **pillar** and pressed with a press mounted in the anchor wire. The aquatic structure block is fitted to the anchor wire and the support **pillar**. The press moving along the anchor wire is mounted on top of the aquatic structure block. The aquatic structure block is guided and inserted into the underwater bedrock with the press.

7/11 © EPODOC / EPO

PN - [KR20090108350](#) A 20091015

PNFP - KR100983072B B1 20100917

PR - KR20080033725 20080411

AP - KR20080033725 20080411

DT - I

CNOI - (A)
[E02D23/16](#)

CNOA - (A)
[E02D2200/1685](#) ; [E02D2250/0023](#) ; [E02D2300/0001](#)

PA - (A)
KOREA OCEAN RES DEV INST [KR]

TI - (A)
METHOD FOR CONSTRUCTING A LIGHT BEACON AND LIGHT BEACON STRUCTURE

AB - (A)
PURPOSE: A light beacon structure and a construction method thereof are provided to mount a light beacon structure without separate blasting by using form of underwater rock. CONSTITUTION: A light beacon is installed after measuring depth of sea and a pre-work is processed in a preparation step(ST100). A through hole is formed and an anchor **pillar** is mounted on an underwater rock without blasting or cutting in an anchor **pillar** mounting step(ST200). A caisson is installed on top of the anchor **pillar** in a caisson mounting step(ST300). Concrete is poured inside the caisson in a concrete pouring step(ST400). The concrete pouring step and the caisson mounting step are repeatedly performed.

8/11 © EPODOC / EPO

PN - [KR200000061642](#) A 20001025

PNFP - KR100336071B B1 20020509

PR - KR19990010826 19990329

AP - KR19990010826 19990329

DT - I

PA - (A)
HYUNDAI CONSTRUCTION CO LTD [KR]

TI - (A)
CAISSON MANUFACTURE SHIFTER AND ITS METHOD
- (B1)
Caisson manufacturing transfer unit and manufacturing method

AB - (A)
PURPOSE: A caisson manufacture shifter is provided to manufacture at a workshop by stages and to improve production efficiency by a one line-up system. CONSTITUTION: A caisson manufacture shifter comprises; a primary step (100A) of which forms a stepped section (120) and installs an elevator shaft (10) on the counter section to the seawater of a workshop (100); a secondary step (100B) of which moves a base slab (210) manufactured in a primary step (100A) and concretes a wall on the upper part of a base slab (210) to complete a caisson (200) and forms a **pillar** (20) on both sides of a workshop and a roof (21) on the upper part; a thirdly step (100C) of which moves the

location of a caisson (200) completed in a secondary step (100B) for curing the concrete surface, reforming or epoxy painting; an aero high system (30) to reduce frictional resistance to a minimum when a caisson or a base slab moves; a moving tool of a caisson (200) or a base slab (210) supported by an aero high system (30); a return tool of flotation panel (33) of an aero high system (30).

9/11 © EPODOC / EPO

PN - [JPH04128421](#) A 19920428
 PNFP - JPH0694665B B2 19941124
 PR - JP19900246060 19900918
 AP - JP19900246060 19900918
 DT - I
 FI - E02D15/06&101; E02D23/00; E02D23/00&Z
 FT - 2D042/AA00; 2D045/AA04; 2D045/BA01; 2D045/BA04; 2D045/CA00
 PA - (A)
 HONSHU SHIKOKU RENRAKUKIYOU KO; NIIGATA ENGINEERING CO LTD; KAJIMA CORP;
 TAISEI CORP
 TI - (A)
 TURNING SUPPORTING POINT OF UNDERWATER WORKING DEVICE
 AB - (A)
 PURPOSE:To smoothen the work of a turning supporting point by providing a turning supporting point, which consists of an inner cylinder and an outer cylinder, in the connection part of a cable member and a supporting **pillar** connected to a working vehicle, which turns around of the supporting **pillar**, and fitting a couple of force giving means to the outer cylinder. CONSTITUTION:A turning supporting point 25, which consists of an inner cylinder 101 to be moved in only the axial direction and an outer cylinder 106 to be rotated in only the circumferential direction, is provided in a supporting **pillar** 6 to which a working device for turning a working vehicle for performing cleaning of the water bottom or the like is fitted. A means 110 for giving the couple of force and a guide part 25a of a cable member 21 are provided in the outer cylinder 106. A self-travelling vehicle is connected to the cable member 21, and while the other end of the cable member 21 is connected to a cable member winding device. A turning supporting point for working smoothly and synchronously with the tuning of the working vehicle can be thereby obtained.

10/11 © EPODOC / EPO

PN - [JPS5944421](#) A 19840312
 PR - JP19820155020 19820906
 AP - JP19820155020 19820906
 DT - I
 CCI - [E02D7/28](#)
 FI - E02D7/28
 FT - 2D050/AA11; 2D050/AA12; 2D050/BB05; 2D050/BB07; 2D050/CA04; 2D050/CB08;
 2D050/CB42
 PA - KOI TERUO

- TI - METHOD AND APPARATUS FOR CONSTRUCTION OF FOUNDATION PILE
- AB - PURPOSE:To quickly and exactly construct a deformed pit by a method in which the ground is excavated by an excavating roller provided at the lower part of an auger casing, and an auger casing is operated while compacting the excavating soil with the wall of the pit. CONSTITUTION:When an excavator is operated, a tip excavating roller 7 and the excavating roller of an drill head 2 are turned in a fixed direction, and the ground is excavated by an excavating blade 4 and an auger casing 1 is penetrated. The excavated soil A is pressed on the wall of the excavated pit B by the large-diameter soil pressing face 9 of the auger casing 1 to form a deformed pit of a flat square or square type. The auger casing 1 is then pulled up, during which period cement mortar is jetted from a mortar jet nozzle 10 and packed into the excavated pit B to form a deformed cement mortar **pillar**, and a custom-made pile is penetrated into the cement mortar.

11/11 © EPODOC / EPO

- PN - [CN1097828](#) A 19950125
- PNFP - CN1054414C C 20000712
- PR - CN1994105791 19940530
- AP - CN1994105791 19940530
- DT - I
- PA - (A)
BEIJING NO 3 URBAN ENGINEERING [CN]
(C)
BEIJING NO 3 MUNICIPAL ENGINEER [CN]
- TI - (A)
Positioning connection technology and equipment for underground pre-fabricated steel pipe **pillar** and pouring pile
(C)
Positioning connection technology and equipment for underground prefabricated steel pipe **pillar** and pouring pile
- AB - (A)
To connect a prefabricated steel pipe **pillar** on a pouring pile foundation, insert a work tube in the reinforcing steel cage of the pouring pile, then pour concrete until marked height, chiselling the pile top, and install a positioning device on the pile top, hang the prefabricated steel pipe over the pile, fix a positioning frame on the top of the steel pipe, then pour concrete into the steel pipe, pull up the work tube, thus forming a composite pile. The present method is simple and convenient, it can guarantee the verticality within the range of 1/600 **pillar** height.

[SS 19] ..v

[EPODOC: SS 19] 10 and 12

Results in EPODOC 127

[SS 20] 13 and 19

[SS 21] ..li



1/5 © EPODOC / EPO

PN - [CA2887512](#) A1 20140424

PNFP - CA2887512 C 20160209

PR - US201213654430
20121018; US201313939940
20130711; WO2013CA50758
20131009

AP - CA20132887512 20131009

DT - I

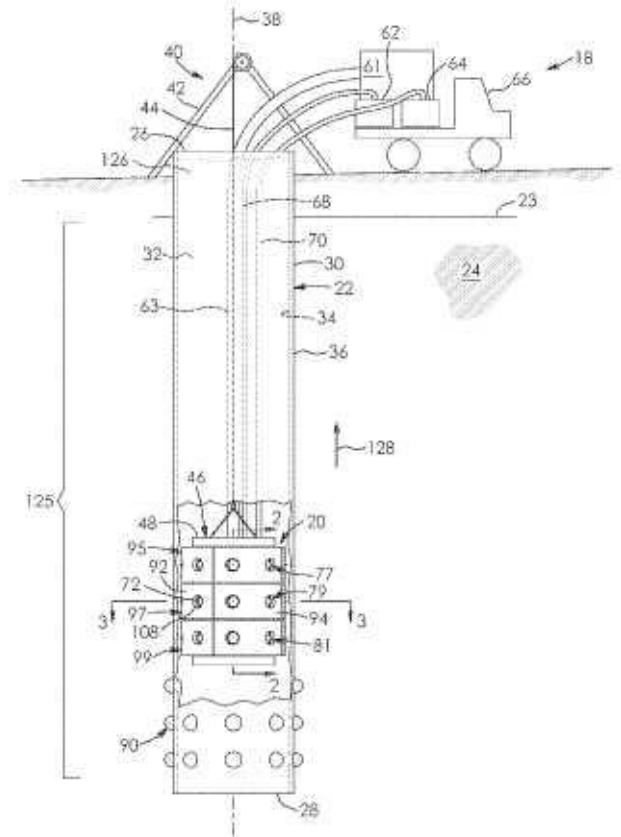
CCI - [E02D5/54](#) ; [E02D7/28](#)

CQI - [E02D7/02](#)

PA - (A1 C)
P3 INFRASTRUCTURE CONSULTING
INC [CA]

TI - (A1 C)
APPARATUS AND SYSTEM FOR
SECURING A HOLLOW PILE IN THE
GROUND

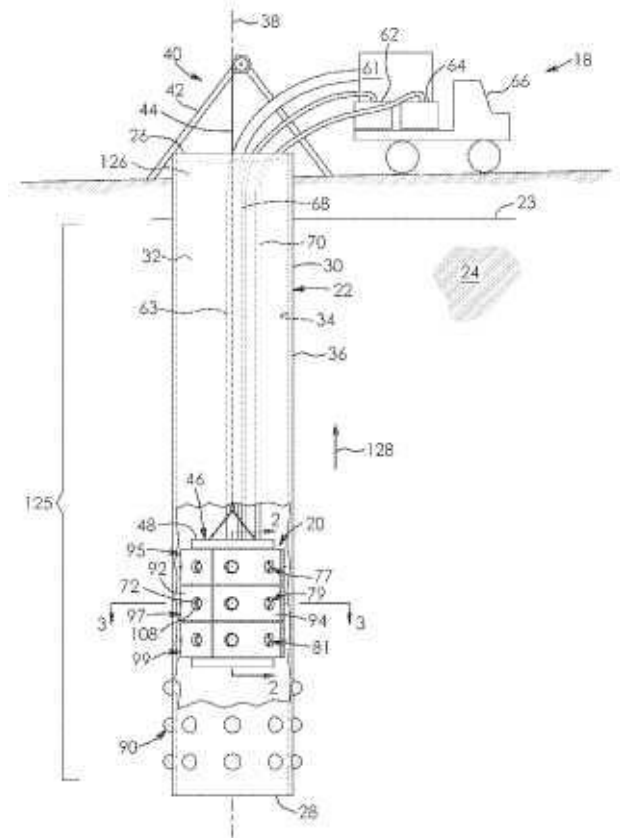
AB - (A1 C)
There is provided an apparatus
for securing a hollow pile in the
ground. The pile has a wall with
an inner surface. The apparatus
is positionable within the pile.
The apparatus includes
a **housing** having an interior and
a plurality of apertures. The
apparatus includes a plurality of
spaced-apart protrusions
slidably **extending** through the
apertures of the **housing**. The
protrusions are moveable
outwards from the **housing** for
selectively deforming portions of
the wall of the pile and creating
anchor knobs in the pile upon
pressurized hydraulic fluid being
applied to the interior of
the **housing**. The apparatus
includes a plurality of support
members **extending** outwardly



from the **housing**. The support members are shaped to selectively abut and support the inner surface of the wall of the pile when the anchor knobs are being formed.

2/5 © EPODOC / EPO

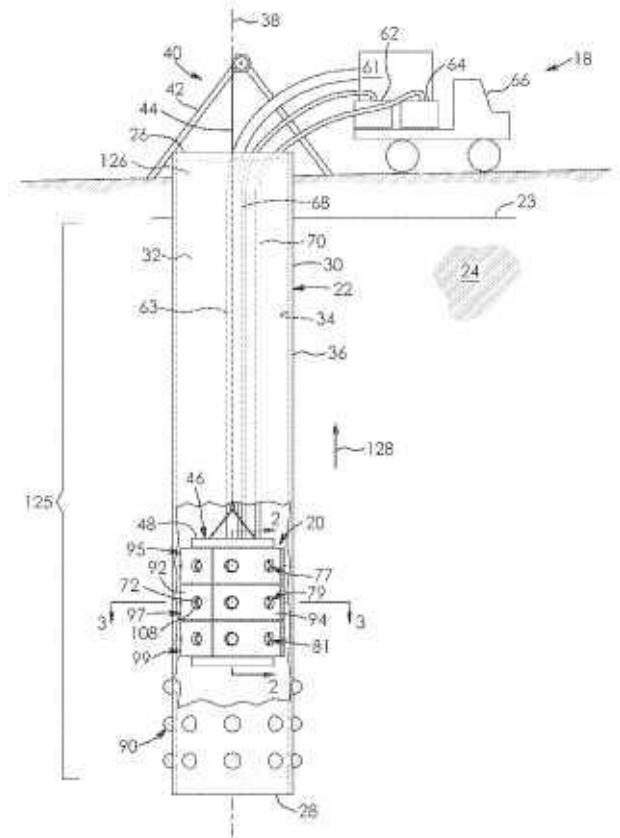
- PN - [WO2014059537](#) A1 20140424
- PR - US201213654430
20121018; US201313939940
20130711
- AP - WO2013CA50758 20131009
- DT - **
- CT - [CA] ISR (A1)
[JP2008169564](#) A 20080724
[X] (NAKANO DENKI KK);
[JP2004218215](#) A 20040805
[A] (MORIYA NORIO);
[JP2009078604](#) A 20090416
[A] (SAKAE RIKEN KOGYO CO LTD,
et al);
[GB1034128](#) A 19660629
[A] (STANLEY SEROTA);
[US3995438](#) A 19761207
[A] (POGONOWSKI IVO C);
[US4064703](#) A 19771227
[A] (POGONOWSKI IVO C)
- CCI - [E02D5/54](#) ; [E02D7/28](#)
- CQI - [E02D7/02](#)
- PA - P3 INFRASTRUCTURE CONSULTING
INC [CA]
- TI - APPARATUS AND SYSTEM FOR
SECURING A HOLLOW PILE IN THE
GROUND
- AB - There is provided an apparatus
for securing a hollow pile in the
ground. The pile has a wall with
an inner surface. The apparatus
is positionable within the pile.
The apparatus includes
a **housing** having an interior and
a plurality of apertures. The
apparatus includes a plurality of
spaced-apart protrusions
slidably **extending** through the
apertures of the **housing**. The



protrusions are moveable outwards from the **housing** for selectively deforming portions of the wall of the pile and creating anchor knobs in the pile upon pressurized hydraulic fluid being applied to the interior of the **housing**. The apparatus includes a plurality of support members **extending** outwardly from the **housing**. The support members are shaped to selectively abut and support the inner surface of the wall of the pile when the anchor knobs are being formed.

3/5 © EPODOC / EPO

- PN - [US2014112722](#) A1 20140424
- PNFP - US9022695 B2 20150505
- PR - US201313939940
20130711; US201213654430
20121018
- AP - US201313939940 20130711
- DT - *; Rep
- CT - || STSE (B2)
[US2743781](#) A 19560501 [] (LANE JOHN J)
[US2884066](#) A 19590428 [] (TEPLITZ ABRAHAM J, et al)
[US3471174](#) A 19691007 [] (MANNING WILLIAM F)
[US3555831](#) A 19710119 [] (POGONOWSKI IVO C)
[US3874181](#) A 19750401 [] (POGONOWSKI IVO C)
[US4123913](#) A 19781107 [] (POGONOWSKI IVO C)
[US4768899](#) A 19880906 [] (DYSARZ EDWARD D [US])
[US4799829](#) A 19890124 [] (KENNY PATRICK M [US])
[US2011247815](#) A1 20111013 [] (JELSMA HENK H [US])
- || R141 (A1)
[US3874181](#) A [];
[US4123913](#) A [];



[US3471174](#) A [];
[US3555831](#) A [];
[US2884066](#) A [];
[US2011247815](#) A1 [];
[US2743781](#) A [];
[US4799829](#) A [];
[US4768899](#) A []

- CCI - [E02D5/54](#) ; [E02D7/28](#)
- CQI - [E02D7/02](#)
- PA - (A1 B2)
P3 INFRASTRUCTURE CONSULTING
INC [CA]
- TI - (A1 B2)
APPARATUS AND SYSTEM FOR
SECURING A HOLLOW PILE IN THE
GROUND
- AB - (A1 B2)
There is provided an apparatus
for securing a hollow pile in the
ground. The pile has a wall with
an inner surface. The apparatus
is positionable within the pile.
The apparatus includes
a **housing** having an interior and
a plurality of apertures. The
apparatus includes a plurality of
spaced-apart protrusions
slidably **extending** through the
apertures of the **housing**. The
protrusions are moveable
outwards from the **housing** for
selectively deforming portions of
the wall of the pile and creating
anchor knobs in the pile upon
pressurized hydraulic fluid being
applied to the interior of
the **housing**. The apparatus
includes a plurality of support
members **extending** outwardly
from the **housing**. The support
members are shaped to
selectively abut and support the
inner surface of the wall of the
pile when the anchor knobs are
being formed.

PN - [US4037423](#) A 19770726

PR - NO19740003469 19740926

AP - US19750610431 19750904

DT - **

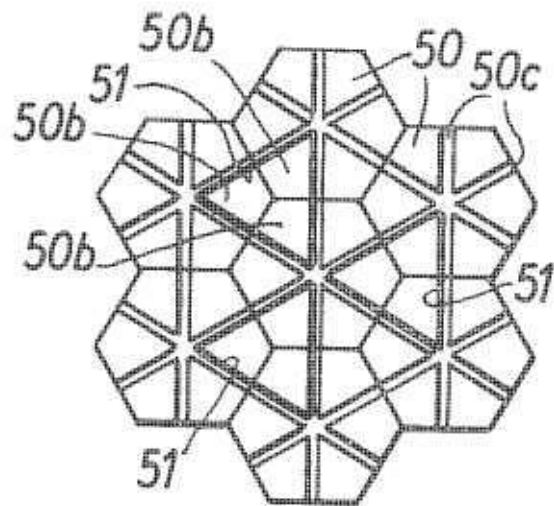
CT - [US670321](#) A []; [US2233089](#) A [];
[US3680275](#) A []; [US3717967](#) A [];
[US3855809](#) A []; [US3894397](#) A [];
[US3913336](#) A []

CCI - [E02D25/00](#) ; [E02D29/06](#)

PA - KNUTSEN EINAR

TI - Process for producing a connecting construction unit, such as a quay, container or platform

AB - Process for producing a connecting construction unit, such as a quay, container or platform, without the use of docks. The first step involves erecting when floating on the sea a rigid raft comprised of floating elements. A construction section is formed on the raft while the latter serves as a permanent under side in the bottom part of the construction section. The construction section has downwardly **extending** portions comprising connecting portions between the floating elements which are produced using the elements as **formwork**. The elements have at least two vertical slots which intersect to form a cross or star as a result of the elements being tightened together, the slots being brought into alignment with similar slots of neighboring elements. The elements are subsequently provided or formed with the connecting portions in an upper portion of the slots.



PN - [CA1097330](#) A 19810310
 PR - US19780888312 19780320
 AP - CA19790323806 19790320
 DT - I
 CCI - [E21B1/02](#) ; [E21B6/00](#) ; [E21B7/20](#)
 PA - SERVICE EQUIPMENT DESIGN CO
 TI - METHOD AND APPARATUS FOR DRIVING PIPE
 AB - A casing hammer for driving casing while drilling a water well comprises a **housing** having an annular pneumatic chamber with a relatively lightweight, short-stroke annular piston. The piston is reciprocally driven at a high rate to provide a large number of light blows of controllable energy upon an annular anvil that seals one end of the chamber. Percussive blows upon the anvil are transmitted through a drive head and adapter to the upper end of the pipe to be driven. The hammer is suspended from a rotary drive head that operates a hollow drill string **extending** downwardly through the hammer and through the casing driven thereby.

[SS 21] ..v

[EPODOC: SS 21] 11 and 12 and 13

Results in EPODOC 9.596

[SS 22] pillar and 21

Results in EPODOC 13

[SS 23] ..li



1/13 © EPODOC / EPO

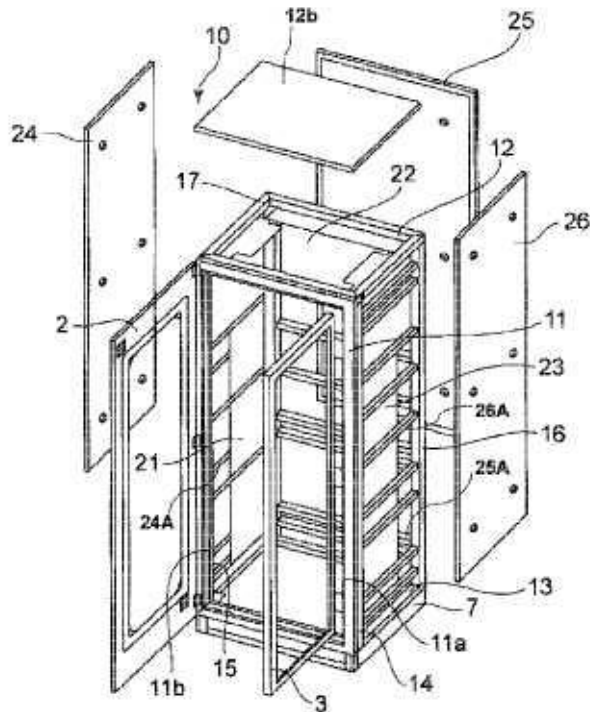
PN - [KR20120120678](#) A 20121102
 PNFP - KR101252708B B1 20130410
 PR - KR20110038406 20110425
 AP - KR20110038406 20110425
 DT - I
 CT - || STSE (B1)
[KR100903986B](#) B1 20090625 []
 TI - (A)
 Offshore floating-type structure having underwater space, and offshore direct constructing **method**
 - (B1)
 Offshore floating-type structure constructing **method** having underwater space
 AB - (A)
 PURPOSE: A floating offshore structure with an underwater space and a direct

construction **method** thereof are provided to actively utilize not only an offshore space but also an underwater space by forming the conical underwater space. CONSTITUTION: A floating offshore structure with an underwater space comprises upper plate structures or pontoons(160), an underwater structure, and upper facilities(170). The upper plate structures are floated on the sea by using buoyancy. The underwater structure is formed under the upper structures or the pontoons at one or more floors. The upper facilities are formed on the top of the upper plate structures or the pontoons. The underwater structure is connected by **extending a housing** and a **pillar** from the lowermost floor to the uppermost floor. Cables are connected to the **pillar**.

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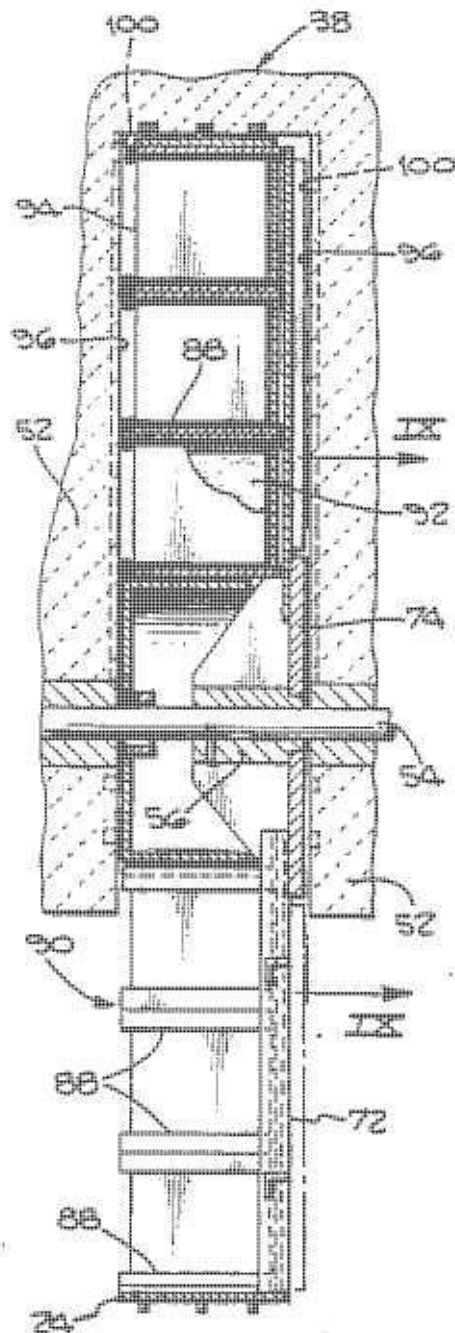
- PN - [JP2012191797](#) A 20121004
- PNFP - JP5695942B B2 20150408
- PR - JP20110054392 20110311
- AP - JP20110054392 20110311
- DT - I
- CT - || STSE (A)
[JPS62259676](#) A 19871112 [
] (DAIHATSU MOTOR CO LTD, et
 al)
- CCI - [H02B1/301](#) ; [H02B1/38](#)
- FI - H02B1/08&A; H02B1/08&C;
 H02B1/30&A; H02B1/38&A
- FT - 5G016/AA04; 5G016/CA01;
 5G016/CA05; 5G016/CC01
- PA - (A)
 TOSHIBA CORP
- TI - (A)
 ASSEMBLY TYPE **HOUSING** FOR
 CONTROL BOARD AND
 ASSEMBLY **METHOD** OF THE SAME
- AB - (A)
 PROBLEM TO BE SOLVED: To
 provide an assembly
 type **housing** for a control board
 which allows a heavy object to
 be attached thereto and reduces
 the wiring/assembling work
 time, the operation time at the
 work site, and the like, which
 easily forms control boards
 having different sizes and has
 good workability, and to provide
 an assembly **method** of the
 assembly type **housing** for the
 control board.SOLUTION: Control

[図4]



components are mounted on an inner door 3, and a reinforcement frame 11, which the inner door 3 is attached so as to be opened and closed, is placed on a front surface of a rectangular parallelepiped. Vertically **extending** four pillars, a front surface A **pillar** 14, a front surface B **pillar** 15, a rear surface A **pillar** 16, a rear surface B **pillar** 17, are respectively placed on vertical four sides of the rectangular parallelepiped. Further, an A panel 21, a B panel 22, and a C panel 23, to which wiring and assembly work have been performed, are attached. Then, a bottom surface frame 13 and a roof frame 12 are respectively placed on a bottom surface and a top surface of the rectangular parallelepiped to form a **housing** structure.

PN - [US4960166](#) A 19901002
 PR - US19890387539 19890731
 AP - US19890387539 19890731
 DT - *
 CT - [US2946573](#) A []; [US3545532](#) A [];
[GB676573](#) A []; [GB2129533](#) A []
 CCI - [F28D19/044](#)
 CCA - [Y10S165/02](#)
 PA - HIRT COMBUSTION ENG [US]
 TI - Rotary heat wheel structure
 and **method**
 AB - A rotary heat wheel structure for
 a rotary heat exchanger in which
 a rotating wheel is provided with
 heat exchange material and
 rotates within a wheel **housing** to
 continuously cross an inlet path
 of low pressure cooler gas and
 an outlet path of high pressure
 hotter gasses for pre-heating the
 gas in the inlet path for utilizing
 the heat in the burned gasses
 before discharge to atmosphere.
 The wheel **housing** encloses the
 periphery of the wheel and is
 also provided with **housing**
 pillars defining an inlet path
 opening and an outlet path
 opening through which the
 rotary wheel rotates. Interior
 surfaces of the **housing** pillars
 are provided with
 radially **extending** grooves
 which co-act with opposite side
 faces of the rotary wheel to
 provide turbulence between the
 wheel side faces and the **pillar**
 surfaces so that leakage of
 gasses from the outlet path to
 the inlet path in the
 wheel **housing** is reduced.



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PN - [JPH04179752](#) A 19920626
 PNFP - JP2510354B B2 19960626
 PR - JP19900306830 19901113

AP - JP19900306830 19901113

DT - I

FI - E04B7/02&521A

PA - (A)
MISAWA HOMES CO

TI - (A)
ROOF FOR UNIT **HOUSING**

AB - (A)
PURPOSE:To prevent the occurrence of an overlap between pillars by a **method** wherein the **pillar** of a first roof unit has length ranging from the upper part of the first roof unit to the lower part thereof, the **pillar**, adjoined to the **pillar** of the first roof unit, of a second roof unit has a short length **extending** from the upper part of the second roof unit to the middle of the first roof unit, and the **pillar** of the first roof unit is joined with the **pillar** of the second roof unit. CONSTITUTION:A **pillar** 34 of an outside roof unit 3 is formed of a square pipe and has length ranging from the upper part of the roof unit 3 to the lower part thereof. A **pillar** 10 of a central roof unit 2 is formed of a square pipe and has a short length **extending** from the upper part of the central roof unit 1 to the middle of the **pillar** 34 of the outer roof unit 3. After the outer roof unit 3 is fixed, the **pillar** 10 of the central roof unit 2 is joined with the **pillar** 34 of the outer roof unit 3 through a bracket 15 and a mounting plate 17 for integral formation.

5/13 © EPODOC / EPO

PN - [JPH0782883](#) A 19950328

PR - JP19930249827 19930910

AP - JP19930249827 19930910

DT - I

FI - E01D19/02; E04G11/28

FT - 2D059/AA03; 2D059/BB37; 2D059/DD12; 2D059/DD17; 2D059/DD20; 2E150/BA22; 2E150/HG00; 2E150/KA01; 2E150/KA06; 2E150/KB02; 2E150/KB05; 2E150/KB11; 2E150/KD04; 2E150/KE05; 2E150/MA02X; 2E169/CA05; 2E169/CB01; 2E177/FA05; 2E177/FB01

PA - TAISEI CORP

TI - CONSTRUCTION **METHOD** OF TOWERING CONCRETE STRUCTURE

AB - PURPOSE:To dispense with a scaffold of full height and facilitate execution even on the foundation of inclined ground by loading a main **pillar** on the concrete after placing, contracting jacks so as to pull up a **formwork** applying the reaction on the main **pillar**, and **extending** the jacks so as to push up the main **pillar** applying the reaction on the **formwork**. CONSTITUTION:A main **pillar** 1 is loaded on the upper face of hardened concrete 4. Next jacks 3 are contracted so as to pull up a **formwork** 2 through a suspended girder 21 applying the reaction on the main **pillar** 1. The lower end part of a **formwork** 2 is fixed to the concrete 4. This work of pulling up and fixing is executed from a scaffold 5 connected to the suspended girder 21. Next the jacks 3 are extended so as to push up the lower end of the main **pillar** 1 up to a little higher position than the surface of concrete succeedingly being placed applying the reaction on the **formwork** 2. Next, concrete is placed in the **formwork** 2. By repeating the above-mentioned operations, a scaffold from the foundation to the upper end is unnecessary, and the

execution is facilitated even if the foundation ground is uneven or inclined.

6/13 © EPODOC / EPO

PN - [JPS6245049](#) A 19870227
PR - JP19850184915 19850822
AP - JP19850184915 19850822
DT - I
CCI - [H01L21/50](#)
FI - H01L23/08&B
PA - ROHM CO LTD
TI - SEALING DEVICE FOR GLASS SEALING ELECTRONIC PART
AB - PURPOSE:To enable a glass sealing with a high efficiency and of high quality by a **method** wherein a work in a heated condition is tightly bonded on a supporting bed so as to be covered in an airtight condition at the upper portion of the cooling part, and a lower open type pressing chamber is arranged so as to be movable vertically and inert gas is compressed and fed into the pressure chamber. CONSTITUTION:A cylindrical support **pillar** 21 is erected on the upper surface of a pressurized chamber 20 and the support **pillar** 21 is made to protrude upward penetrating a **housing** 19. The chamber 20 is vertically driven **extending** from its descending position to enter into a furnace cylinder 11 with the expansion and constriction operation of air cylinders 22 and 22 coupled with its protruded ends to its ascending position where it is shifted upward of the furnace cylinder 11 and is accommodated in the **housing** 19. The pressurized chamber 20 entirely covers a work W just under the **housing** 19 in its descended state, and at the same time, the whole periphery of the lower end of the chamber 20 is adhered on the upper surface of a supporting bed 10 to form an airtight chamber between the supporting bed 10. The upper end of the cylindrical support **pillar** 21 is connected to a gas compressor for nitrogen gas which is inert gas to be connected.

7/13 © EPODOC / EPO

PN - [JPH051473](#) A 19930108
PNFP - JPH0711191B B2 19950208
PR - JP19910178778 19910624
AP - JP19910178778 19910624
DT - I
FI - E04G21/14
FT - 2E174/AA03; 2E174/BA03; 2E174/CA03; 2E174/CA16; 2E174/CA28; 2E174/CA38; 2E174/DA01; 2E174/DA13; 2E174/DA32; 2E174/DA58; 2E174/DA64
PA - (A)
HAGIWARA KATSUJI
TI - (A)
BEAM CONSTRUCTING **METHOD** IN REINFORCED CONCRETE BUILDING AND RECEIVING FRAME THEREOF
AB - (A)
PURPOSE:To correctly equip a preassembled beam reinforcement structure previously

formed in a **formwork** for beam construction, reduce a working quantity of skilled operators at a jobsite, and improve workability. CONSTITUTION:After constructing **pillar** main reinforcements 42 and a **formwork** 43 (a), a preassembled beam reinforcement structure D is arranged over a prearranged position for beam construction of the **formwork** 43 (b). Winches 30 are temporarily provided respectively on the upper end parts of the **pillar** main reinforcements 42 positioned on the circumference of both end parts of the prearranged position for beam construction, and winches 31 are provided **extending** over the **formwork** 43. Further, both end parts of the preassembled beam reinforcement structure D are respectively hung with both the winches 30, the preassembled beam reinforcement structure D is gradually brought down (c) after the center part is hung with the winch 31, arranged on the prearranged position for beam construction, hereafter the winches 30,31 are removed from the **pillar** main reinforcements 42 and the preassembled beam reinforcement structure D, and the beam construction is completed.

8/13 © EPODOC / EPO

PN - [JPH0718681](#) A 19950120
 PR - JP19930158884 19930629
 AP - JP19930158884 19930629
 DT - I
 FI - E02D27/00&D; E04B1/21&A; E04C3/34
 FT - 2D046/AA00; 2D046/AA15; 2E163/FA02; 2E163/FD03; 2E163/FD04; 2E163/FD32; 2E163/FD44; 2E163/FD46; 2E163/FD54; 2E163/FF11; 2E163/FF51
 PA - FUJITA CORP
 TI - CONNECTING **METHOD** FOR PRECAST CONCRETE **PILLAR** AND FOUNDATION SECTION
 AB - PURPOSE:To provide a connection section reducing the execution cost and labor and having no structural weak point by **extending** a **pillar** leg section connected to a foundation section to a foundation bottom section, and chipping the concrete at the connection section to an underground beam. CONSTITUTION:After a pile B and the foundation work are completed, a precast concrete **pillar** A is erected at a prescribed position and temporarily fixed. A **pillar** leg section is extended to a foundation bottom section, thereby the fixing length of a **pillar** main reinforcement 1 to the foundation section is assured. The concrete of the **pillar** leg section connected to the foundation section on the precast concrete **pillar** A is chipped. The main reinforcement 5 of an underground beam is arranged in the **pillar** A via the chipping section 3. The auxiliary reinforcement 6 of the underground beam and a footing section are arranged, a **formwork** is assembled, then concrete is placed on the foundation section. The precast concrete **pillar** A and the foundation section are integrated at the same time.

9/13 © EPODOC / EPO

PN - [JPH09310448](#) A 19971202
 PNFP - JP3759995B B2 20060329
 PR - JP19960127529 19960522
 AP - JP19960127529 19960522
 DT - I

FI - E04B1/16&F; E04C3/34; E04C5/01
 FT - 2E163/FA02; 2E163/FA05; 2E163/FA12; 2E163/FD46; 2E163/FD50; 2E164/AA02
 PA - (A)
 TEKKEN CONSTR CO
 TI - (A)
 CONCRETE STRUCTURE AND WORK EXECUTION **METHOD** THEREOF
 AB - (A)
 PROBLEM TO BE SOLVED: To increase tensile strength, bending strength, and shearing strength of a concrete structure by burying main reinforcements without restriction, and arranging steel fiber in the structure uniformly and dispersedly. SOLUTION: A plurality of main reinforcements are standingly provided on fixed positions of a base made of concrete without restriction. A **formwork** is assembled outside the main reinforcements 2, and concrete 6 mixed with a fixed quantity of steel fiber 5 of carbon steel, stainless steel, or the like is placed inside the **formwork**. After hardening of the concrete 6, the steel fiber 5 is arranged **extending** over the whole sectional territory of the **pillar** 7 of a concrete structure, uniformly and at random. Consequently, customary belt reinforcement restricting the main reinforcements is eliminated, customary steel fiber reinforced concrete is improved, and hence the tensile strength, the bending strength, and the shearing strength of the concrete structure can be increased.

10/13 © EPODOC / EPO

PN - [JPH06330642](#) A 19941129
 PR - JP19930120096 19930521
 AP - JP19930120096 19930521
 DT - I
 FI - E04G23/02&F
 FT - 2E176/AA01; 2E176/AA04; 2E176/AA13; 2E176/BB29
 PA - MITSUI CONSTR; TOYO BOSEKI
 TI - REINFORCEMENT FOR CONCRETE **PILLAR** BODY
 AB - PURPOSE: To obtain a reinforcing **method** in a simple manner for a concrete **pillar** body in which the deterioration in the reinforcing effect is less, the reinforcing work can be carried out in a simple manner, and the increase of weight due to repair is less. CONSTITUTION: On the periphery of a concrete **pillar** body 1, a plurality of receiving plates 2 **extending** in the lengthwise direction of the **pillar** body 1 are attached, keeping a proper interval, and a reinforcing rope 4 having the larger pulling strength than that of the concrete is wound from over the receiving plate 2, and the elastic material such as the expansion mortar and spring is interposed in the gap between the receiving plate 2 and the **pillar** body 1. The part over the reinforcing rope 4 is vered by a **formwork** 13, and each gap between the receiving plate 2, **formwork**, and the **pillar** body 1 is charged with the expansion mortar 15, or the reinforcing rope 4 is formed to a reinforcing rope consisting of the chemical fibers containing thermoplastic resin, and the thermoplastic resin of the reinforcing rope 4 is dissolved and then hardened, and the reinforcing rope 4 is covered by the **formwork**, and the part between the **formwork** 13 and the **pillar** body 1 is charged with charging material.

11/13 © EPODOC / EPO

PN - [JPH08260797](#) A 19961008
 PR - JP19950063754 19950323
 AP - JP19950063754 19950323
 DT - I
 FI - B60J5/04&K; E05C17/22&A
 PA - NISSAN MOTOR
 TI - DOOR CHECK LINK DEVICE AND ITS INSTALLING **METHOD**
 AB - PURPOSE: To eliminate the deterioration in the operation feeling of a door and the danger generating an abnormal noise, as well as to reduce the number of part items. CONSTITUTION: In a door check link device in which a door check 1 made by superposing and **housing** a pair of guides 3 and 3 to a casing 2 is provided, and one end of an arm 18 pushed in between the pair of guides 3 and 3 is interlocked to the rear surface of a front **pillar**, projections 12 are provided on the side surface of the guides 3. On the side wall of the casing 2, projection engaging grooves 7 **extending** from the opening edge in the guide inserting direction are formed, and extensions 8 the projections 12 are engaged when the arm 18 is pushed in are formed to the projection engaging grooves 7.

12/13 © EPODOC / EPO

PN - [JPH08199677](#) A 19960806
 PR - JP19950013671 19950131
 AP - JP19950013671 19950131
 DT - I
 FI - E04B1/16&Q
 PA - MAEDA CONSTRUCTION
 TI - CONNECTING **METHOD** FOR REINFORCED CONCRETE **PILLAR** AND STEELWORK BEAM
 AB - PURPOSE: To remarkably simplify a concrete **formwork** and a support and, position a beam easily and accurately. CONSTITUTION: Reinforcements are arranged on the part position to be a **pillar** 1. A concrete **formwork** is provided around the reinforcements. Concrete is placed in the concrete **formwork**, and a recessed part 4 is formed on the upper face of the concrete. A joint member 5 is fitted in the recessed part 4. A beam is fixed to the joint member 5. Concrete is placed on the joint member 5 and the beam. The joint member 5 is constituted of an annular metallic material 9 to be fitted into the recessed part 4 and a beam receiving member 7 **extending** from the annular metallic material 9.

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PN - [GB783667](#) A 19570925

PR - GB19550034259 19551130

AP - GB19550034259 19551130

DT - *; Rep

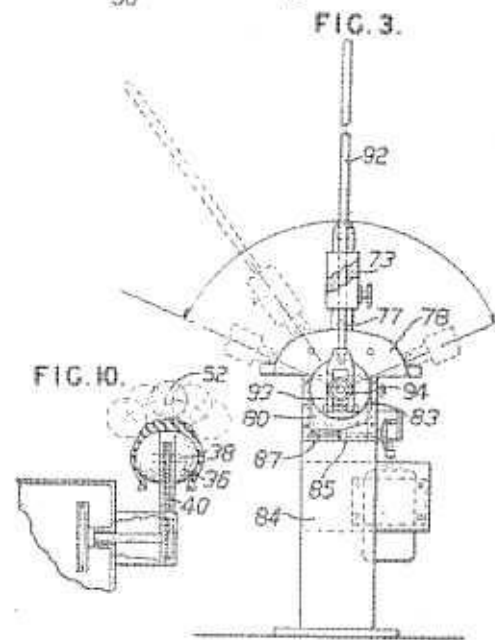
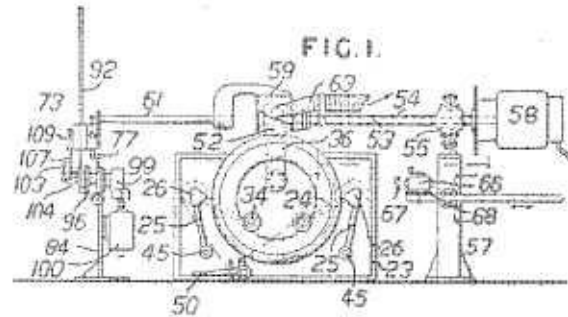
CCI - [B29B17/0206](#)

CCA - [B29D2030/541](#) ; [Y02W30/622](#)

PA - VAUGHN RAWLS

TI - Improvements in or relating to **method** and apparatus for buffing pneumatic tyre casings

AB - 783,667. Buffing tyres. RAWLS, V. Nov. 30, 1955 [Dec. 15, 1954; May 16, 1955], No. 34259/55. Class 31 (1). A pneumatic tyre is prepared for re-treading or re-lugging by buffing a stretched area of its surface. The tyre is stretched by placing it over a two-part sphere 36, Figs. 1 and 10, mounted on a horizontal shaft 38, causing one or more rollers 34 carried by arms 24 to engage the inner bead of the tyre so as to pull it downwardly over the sphere, and rotating the sphere. The arms 24 are mounted on shafts 26 which extend rearwardly into a casing 23 and there carry interconnected bell-cranks which are operated by a pneumatic or other motor to apply the rollers to the tyre for the buffing operation and thereafter returned to inoperative position by a spring ; the return action of the spring also causes rollers 45 carried by further arms 25 on the shafts 26 to engage under the tyre and lift it from the sphere. The sphere is rotated from a motor through first a belt-and-pulley drive including a reduction gear and then a chain 40. Brakes associated with the shafts 26 for application by a pedal 50 ensure that the tyre is held in its



stretched condition during the buffing operation. The buffing wheel 52, which consists of a cylindrical member studded with a large number of protruding points for ripping away the tyre, is mounted in a **housing** 59 carried by a transversely-**extending** tube 54 supported at its outer end in a ball joint 55 on a **pillar** 57 ; a tube 61 extends in the opposite direction from the **housing** 59 to means on a **pillar** 84 for swinging the wheel arcuately over the surface of the tyre. The drive shaft 53 of the wheel is journalled in the tube 54 and driven by a motor 58 at the outer end of the tube. The outer end of the tube 61 is connected to a hollow box 73, Figs. 1 and 3, slidable on a swinging arm 92 and carrying a vertically-adjustable slide supporting a roller 77 for engagement with a template 78 which is shaped to the desired form of the finished tyre and is detachably mounted on a frame 80 arranged to be vertically adjusted between gibs 83 on the **pillar** 84 by means of a horizontally-slidable wedge 85 actuated by a hand-operated screw 87. A yoke 93 on the lower end of the arm 92 straddles a driving lug 94 on the driven disc of a friction clutch 96 of which the driving disc is rotated through reduction gearing 99 by a motor 100. The clutch discs are engaged in order to swing the arm 92 from one side to the other by rocking a handle 103 so as to compress a spring 104, and the template roller 77 is maintained in contact with the template 78 by a spring 107 which is connected between the

casing 73 and driving lug 94 and controlled by a handle 109. The motor 100 is automatically stopped after the arm 92 has been swung through a buffing arc by means of a suitably-positioned limit switch. The margins of the tyre beyond the area treated by the buffing wheel 52 are touched by a buffing wheel 67, Fig. 1, on the shaft of a motor 66 pivoted on a vertical axis on a carriage 68 slidable horizontally on the **pillar** 57. The **housing** 59, which almost entirely encloses the buffing wheel 52, is connected by a pipe 63 with a suction dust collector. It is stated that the wheel 52 produces a multiplicity of spaced disconnected slits or grooves in the surface of the tyre.

[SS 23] ..v

[EPODOC: SS 23] 10 and 12

Results in EPODOC 127

[SS 24] method and 23

Results in EPODOC 71

[SS 25] opening and 24

Results in EPODOC 6

[SS 26] ..li



PN - [AU2016298233](#) A1 20180215

PR - US201514809579
20150727; WO2016US44038
20160726

AP - AU20160298233 20160726

DT - I

CCI - [E02D7/28](#)

PA - GEOPIER FOUNDATION CO INC

TI - Open-bottom **extensible** shells
and related methods for
constructing a support pier

AB - **Extensible** shells and related
methods for constructing a
support pier are disclosed.
An **extensible** shell can define an
interior for holding granular
construction material and define
a first **opening** at a first end for
receiving the granular
construction material into the
interior and a second **opening** at
a second end. The **extensible**
shell can be flexible such that
the shell expands when granular
construction material is
compacted in the interior of the
shell. A **method** may include
positioning the **extensible** shell
in the ground and filling at least
a portion of the interior of the
shell with the granular
construction material. The
granular construction material
may be compacted in the interior
of the **extensible** shell to form a
support pier.

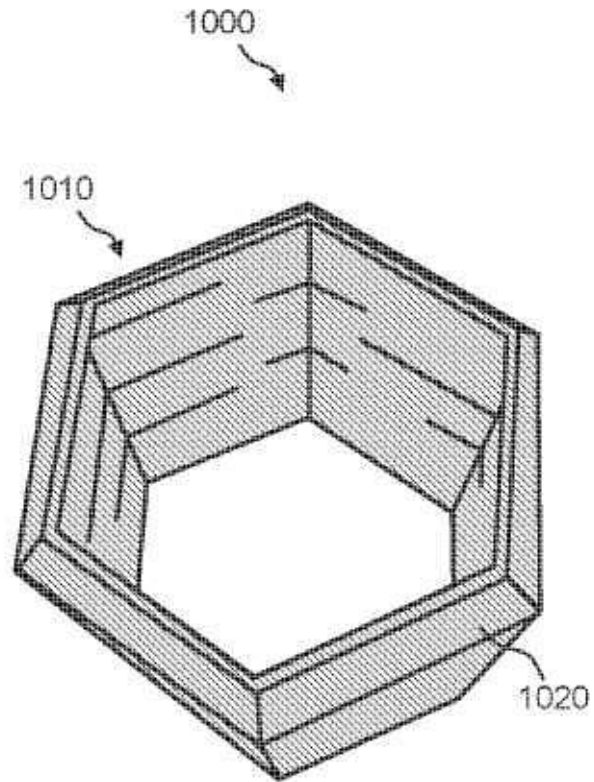


FIG. 11A

PN - [CA2993469](#) A1 20170202

PR - US201514809579
20150727; WO2016US44038
20160726

AP - CA20162993469 20160726

DT - I

CCI - [E02D7/28](#)

PA - GEOPIER FOUND COMPANY INC
[US]

TI - OPEN-BOTTOM **EXTENSIBLE**
SHELLS AND RELATED METHODS
FOR CONSTRUCTING A SUPPORT
PIER

AB - **Extensible** shells and related
methods for constructing a
support pier are disclosed.
An **extensible** shell can define an
interior for holding granular
construction material and define
a first **opening** at a first end for
receiving the granular
construction material into the
interior and a second **opening** at
a second end. The **extensible**
shell can be flexible such that
the shell expands when granular
construction material is
compacted in the interior of the
shell. A **method** may include
positioning the **extensible** shell
in the ground and filling at least
a portion of the interior of the
shell with the granular
construction material. The
granular construction material
may be compacted in the interior
of the **extensible** shell to form a
support pier.

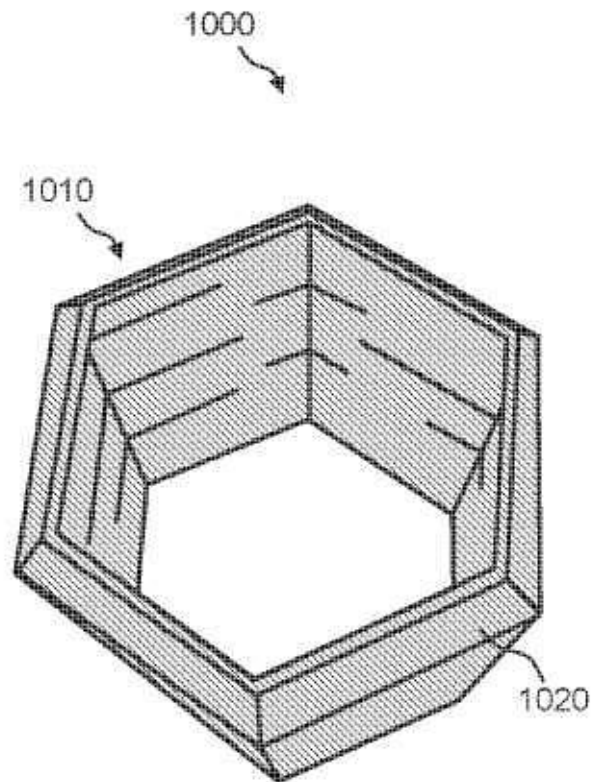


FIG. 11A

PN - [WO2017019682](#) A1 20170202
 PR - US201514809579 20150727
 AP - WO2016US44038 20160726
 DT - *; Rep
 CT - |US| ISR (A1)
[US2005081459](#) A1 20050421
 [A] (MOROSCHAN CASEY [CA])
 [A] 1-32
 *, see entire document. *;
[US4397588](#) A 19830809
 [A] (GOUGHNOUR R ROBERT)
 [A] 1-32
 *, see entire document *;
[US6354766](#) B1 20020312
 [A] (FOX NATHANIEL S [US])
 [A] 1-32
 *, see entire document.; *;
[US2007077128](#) A1 20070405
 [A] (WISSMANN KORD J [US])
 [A] 1-32
 *, see entire document. *;
[US2008031694](#) A1 20080207
 [A] (WISSMANN KORD J [US], et al)
 [A] 1-32
 *, see entire document. *

CCI - [E02D7/28](#)
 PA - GEOPIER FOUND COMPANY INC
 [US]
 TI - OPEN-BOTTOM **EXTENSIBLE**
 SHELLS AND RELATED METHODS
 FOR CONSTRUCTING A SUPPORT
 PIER

AB - **Extensible** shells and related methods for constructing a support pier are disclosed. An **extensible** shell can define an interior for holding granular construction material and define a first **opening** at a first end for receiving the granular construction material into the interior and a second **opening** at a second end. The **extensible** shell can be flexible such that the shell expands when granular construction material is

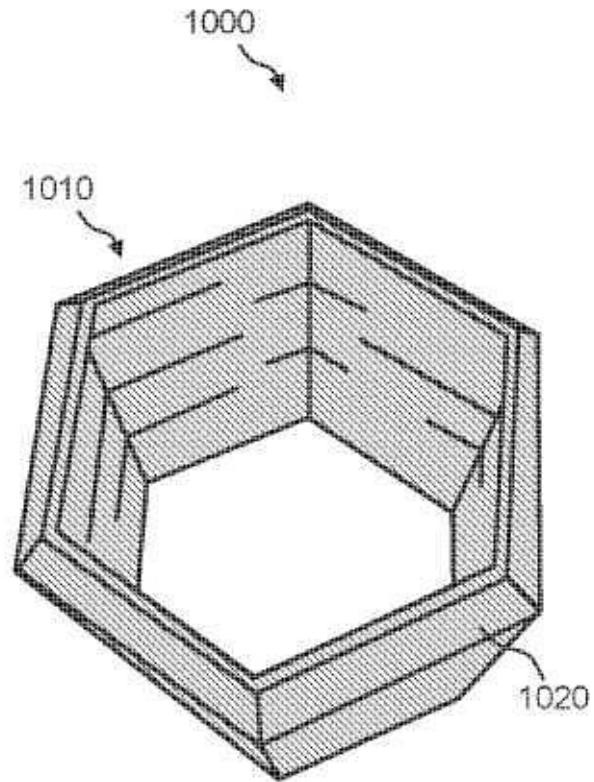
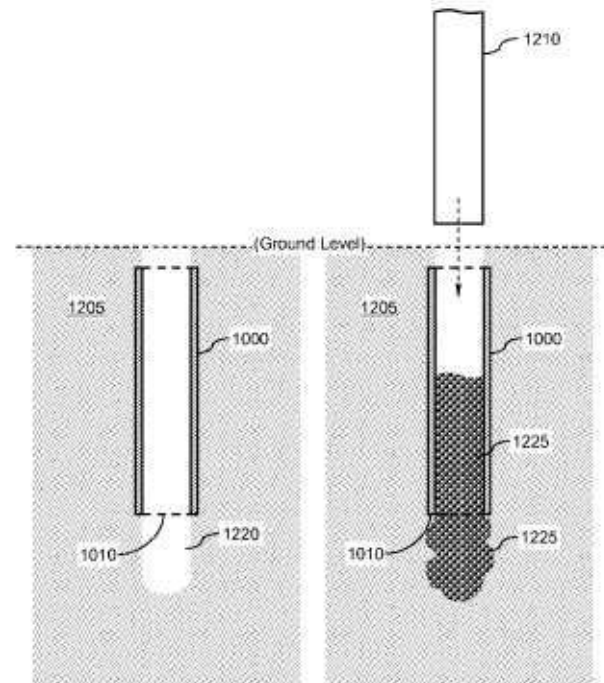


FIG. 11A

compacted in the interior of the shell. A **method** may include positioning the **extensible** shell in the ground and filling at least a portion of the interior of the shell with the granular construction material. The granular construction material may be compacted in the interior of the **extensible** shell to form a support pier.

4/6 © EPODOC / EPO

- PN - [US2015330051](#) A1 20151119
- PNFP - US9567723 B2 20170214
- PR - US201514809579
20150727; US201313822011
20130620; WO2011US51349
20110913; US20100880804
20100913
- AP - US201514809579 20150727
- DT - *; Rep
- CT - || R141 (A1)
[US4397588](#) A 19830809 [
] (GOUGHNOUR R ROBERT);
[US6354766](#) B1 20020312 [
] (FOX NATHANIEL S [US]);
[US2005081459](#) A1 20050421 [
] (MOROSCHAN CASEY [CA]);
[US2007077128](#) A1 20070405 [
] (WISSMANN KORD J [US]);
[US2008031694](#) A1 20080207 [
] (WISSMANN KORD J [US], et al);
[US9091036](#) B2 20150728 [
] (WHITE DAVID J [US])
- CCI - [E02D3/08](#) ; [E02D5/60](#) ;
[E02D7/28](#) ; [E02D23/00](#) ;
[E02D27/16](#) ; [E02D27/18](#) ;
[E02D27/20](#)
- CCA - [E02D7/02](#) ; [E02D7/30](#) ;
[E02D2200/165](#) ;
[E02D2200/1685](#) ;
[E02D2200/1692](#) ;
[E02D2250/0007](#) ;
[E02D2300/0006](#) ;
[E02D2300/0079](#)
- PA - (A1)



	GEOPIER FOUNDATION CO INC [US]
	- (B2) GEOPIER FOUND COMPANY INC [US]
TI	- (A1) OPEN-END EXTENSIBLE SHELLS AND RELATED METHODS FOR CONSTRUCTING A SUPPORT PIER
	- (B2) Open-end extensible shells and related methods for constructing a support pier
AB	- (A1 B2) Extensible shells and related methods for constructing a support pier are disclosed. An extensible shell can define an interior for holding granular construction material and define a first opening at a first end for receiving the granular construction material into the interior and a second opening at a second end. The extensible shell can be flexible such that the shell expands when granular construction material is compacted in the interior of the shell. A method may include positioning the extensible shell in the ground and filling at least a portion of the interior of the shell with the granular construction material. The granular construction material may be compacted in the interior of the extensible shell to form a support pier.

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PN	- CN101775799 A 20100714
PNFP	- CN101775799B B 20120125
PR	- CN2010140028 20100114
AP	- CN2010140028 20100114
DT	- I
PA	- (A B)

CHAO KONG

TI

- (A B)

Piling device and piling **method** for rectangular filling pile with soil drawn out drily

AB

- (A)

The invention provides a piling device for a rectangular filling pile with soil drawn out drily. The device comprises an open rectangular steel form tube, wherein a movable inserted rectangular soil lifting device is arranged in the rectangular steel form tube; a bulldozing device with a slider push plate is arranged at one side of the rectangular soil lifting device; the slider push plate is driven by hydraulic or compressed air; and the moving direction of the slider push plate is vertical to the moving direction of the soil lifting device, and the working surface of the slider push plate corresponds to the surface of grid soil of the soil lifting device. The piling **method** comprises the following steps: plunging the open rectangular steel form tube in the soil layer of a pile station after miscellanea is removed from the pile position and soil is filled into the pile station, thus weak soil of the soil layer is fully extruded into the rectangular steel form tube; the lifting the weak soil to the upper end of the **opening** of the steel form tube by the soil lifting device; starting the slider push plate of the soil moving device to extrude the rectangular weak soil at the upper end of the **opening** of the steel form tube out of the tube; removing soil by connecting an extension bar and the soil lifting device for **extending**, until the soil is completely extruded and removed; arranging a reinforcement cage in the steel form tube from the **opening**, and filling concretes in the steel form tube from the **opening**; and pulling out the steel form tube by shaking to form a pile. The device has the advantages of saving concretes and reinforced bars, improving carrying capacity and lateral pressure resistance of deep foundation pits, having high construction efficiency, and obviously reducing the labor strength of operators.

- (B)

The invention provides a piling device for a rectangular filling pile with soil drawn out drily. The device comprises an open rectangular steel form tube, wherein a movable inserted rectangular soil lifting device is arranged in the rectangular steel form tube; a bulldozing device with a slider push plate is arranged at one side of the rectangular soil lifting device; the slider push plate is driven by hydraulic or compressed air; and the moving direction of the slider push plate is vertical to the moving direction of the soil lifting device, and the working surface of the slider push plate corresponds to the surface of grid soil of the soil lifting device. The piling **method** comprises the following steps: plunging the open rectangular steel form tube in the soil layer of a pile station after miscellanea is removed from the pile position and soil is filled into the pile station, thus weak soil of the soil layer is fully extruded into the rectangular steel form tube; the lifting the weak soil to the upper end of the **opening** of the steel form tube by the soil lifting device; starting the slider push plate of the soil moving device to extrude the rectangular weak soil at the upper end of the **opening** of the steel form tube out of the tube; removing soil by connecting an extension bar and the soil lifting device for **extending**, until the soil is completely extruded and removed; arranging a reinforcement cage in the steel form tube from the **opening**, and filling concretes in the steel form tube from the **opening**; and pulling out the steel form tube by shaking to form a pile. The device has the advantages of saving concretes and reinforced bars, improving carrying capacity and lateral pressure resistance of deep foundation pits, having high construction efficiency, and obviously reducing the labor strength of

operators.

PN - [GB1397137](#) A 19750611

PR - US19710163422
19710716; US19720267753
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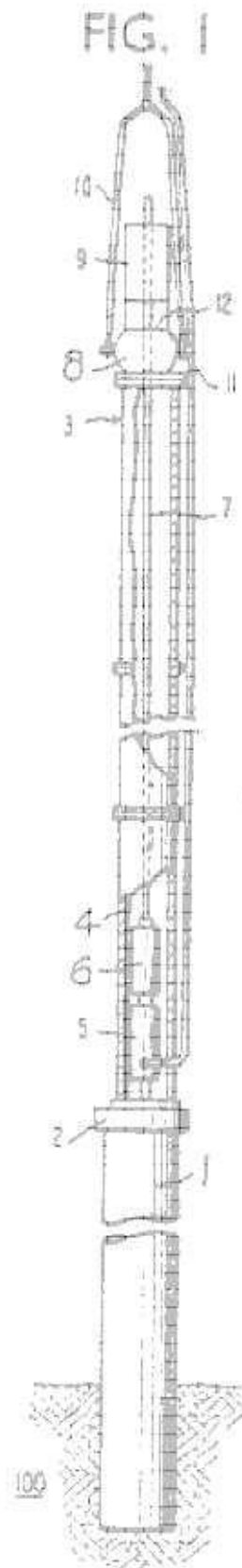
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CCI - [E02D7/28](#) ; [E02D7/00](#) ;
[E02D7/02](#) ; [E02D7/26](#)

PA - ORB INC

TI - EVACUATED TUBE WATER
HAMMER PILE DRIVING

AB - 1397137 Pile drivers ORB Inc 14
July 1972 [16 July 1971 30 June
1972] 33175/72 Heading B3H
[Also in Division E1] In a **method**
for sinking a pile under a body of
water the apparatus comprises a
hollow tube 4 connected to the
pile 1, the tube 4 being
sequentially evacuated by pump
6 and filled with ambient water
by **opening** a valve 8 at the end
of the tube 4, the incoming water,
when it strikes the lower end of
the tube 4 or any residual water
therein producing a driving
pulse. The tube 4 may be located
within a hollow pile with
retractable means at the lower
end of the tube for engaging the
pile, Figs. 2, 3 (not shown). In
another arrangement, Fig. 4 (not
shown), the hollow pile itself
constitutes the tube 4. In such
cases the water may be removed
from within the pile by releasing
a quantity of steam from a
tube **extending** from a steam
generator at the water surface
into the pile, the pressure pulse
acting on a pile tip (122), Fig. 5
(not shown), or piston-like
means (140) attached to the end
of the tube and engageable with
the pile, Fig. 6 (not shown). The
hollow tube may also be
evacuated by combusting or



reacting suitable fuels within the tube. Baffles located within the tube may prolong the duration of each drive pulse and may also effect a screwing action. In another embodiment the water is removed by raising a piston located within a hollow pile, the piston then being released to allow the water to refill the pile, Fig. 13 (not shown). The tube 4 may be provided with reservoir of, possibly pressurized, liquid at its upper end, the tube 4 being evacuated by steam or other condensable vapour acting on the underside of a free piston slidably located in the tube, Fig. 14 (not shown).

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