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(54) A HANGING CONCRETE DISTRIBUTION MAST

(57) Disclosed herein is a wall-mounted placer which can be installed in a convenient way, may be lifted along walls, and have a larger operation area. The wall-mounted placer according to the present invention comprises a pillar, supporting frames and a placing boom, with the pillar fitted though the supporting frames and the placing boom arranged at the top end of the pillar, wherein the supporting frames and a base provided at the bottom of the pillar are fixed to a wall by means of fixing devices.

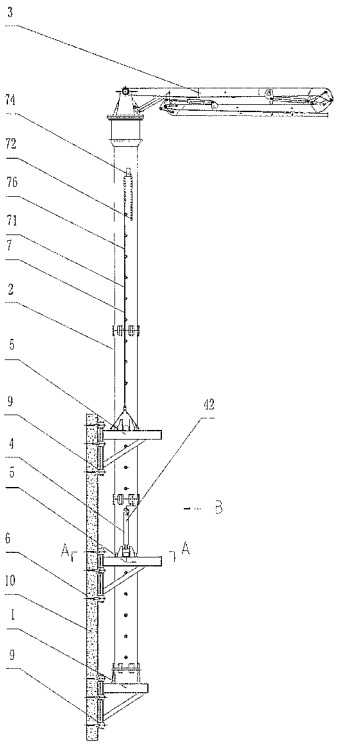

Fig.4

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Description

[0001] WALL-MOUNTED PLACER

FIELD OF THE INVENTION

[0002] The present invention relates to the field of construction machinery, in particular to a placer adapted for placing concrete.

BACKGROUND OF THE INVENTION

[0003] Currently, during construction operations, placers are conventionally used for placing concrete to construct walls and floors. Prior art placers may be generally classified into three types:

[0004] 1. Floor-mounted placer. As shown in Fig. 1, at first, mounting holes with predetermined sizes are pre-defined in floors such that at least three supporting frames may be fitted into these predefined mounting holes in respective building floors 12 via expansion bolts; afterwards, wedges are used to fix the placer to the supporting frames. Such a placer is mainly disadvantageous in that: firstly, it is required to provide holes in floors 12 in advance and to block these holes after the placer has climbed up; secondly, the floor-mounted placer can only be mounted on a floor lower than the topmost floor since the fresh topmost floor may not be strong enough to hold the placer, thus imposing a limit on the operation height of the placer; thirdly, for some high buildings, it is the walls that need to be developed prior to floors, and these walls are often much higher than floors, therefore a relative high wall may not be constructed with a floor-mounted placer.

[0005] 2. Floor-standing placer. As shown in Fig. 2, legs 17 of the floor-standing placer rest on the floor. Such a placer is mainly disadvantageous in that the operating radius of placing boom of the floor-standing placer 14 is less than 19 m. Restricted by the small radius, it is necessary to relocate the placer and to reinstall concrete delivery pipes when another placing area is desired.

[0006] 3. Hoistway-placer. As shown in Fig. 3, hoistways 18 are usually provided in core regions of buildings. Such a hoistway-placer 15 is mainly disadvantageous in that: the placer is located in a core region of the building and can only cover said building. If it is desired to carry out operation on a neighboring building, the hoistway-placer has to be moved and reinstalled, while a wall-mounted placer 16 may carry out operation on a neighboring building without any movement.

SUMMARY OF THE INVENTION

[0007] The present invention is intended to solve the problems in the prior art, and provides a wall-mounted placer which can be installed in a convenient way, may be lifted along walls, and have a larger operation area.

[0008] The wall-mounted placer according to the present invention comprises a pillar, supporting frames and a placing boom, with the pillar fitted through the supporting frames and the placing boom arranged at the top end of the pillar, wherein the supporting frames and a base provided at the bottom of the pillar are fixed to a wall by means of fixing devices.

[0009] The pillar is further provided with a jacking assembly comprising a blocker, jacking cylinders, a supporting device, pluralities of supporting members arranged on the pillar and abutments, such that the abutments are arranged on the supporting frame and are symmetrically mounted on both sides of the pillar, the jacking cylinders are arranged on the abutments, the supporting device is arranged on a piston rod of the jacking cylinder and cooperates with the supporting member, and the blocker is arranged on the abutments, with one end thereof engaged to the abutment and the other end arranged between two supporting members.

[0010] The supporting members are designed as pluralities of rigid tubes arranged on the pillar, with a supporting stub provided in the rigid tube above the piston rods, and wherein the supporting devices are designed as fixed supporting blocks which are arranged on the piston rods and cooperate with the supporting stubs.

[0011] The supporting members are designed as pluralities of fixed stoppers arranged on the pillar, and the supporting device comprises a supporting bracket and a rotating stopper arranged thereon and cooperating with the fixed stopper, such that one end of the rotating stopper is hinged to the supporting bracket, and the other end thereof is arranged between two fixed stoppers.

[0012] One end of the blockers is hinged to the abutment, and the other end thereof is arranged between two supporting member, with the end hinged to the abutment provided with a return spring connected to the abutments.

[0013] A guide groove with an internal compression spring therein is defined in the abutment, such that one end of the blocker is arranged in the guide groove and engaged with the compression spring, and the other end thereof is arranged between two supporting members.

[0014] A lifting assembly comprising lifting cables, a drive unit, and rollers is attached to the pillar, such that the drive unit is arranged at the upper end of the pillar of the placer and comprises an output shaft coupled to the rollers, and the

lifting cables are connected with the rollers and the supporting frame at the respective ends thereof

[0015] The rollers are designed as sprockets, and the lifting cables comprise at the respective ends thereof a wire connected with the supporting frame and a chain wounded on the sprocket.

[0016] The fixing device is provided with longitudinal elongated holes and transversal elongated holes.

[0017] The present invention is advantageous in that:

[0018] 1. The placer is installed on walls with a base and supporting frames, such that during construction process, compared with a placer of other kinds with a similar boom length, the placer according to the present invention may be lifted to a higher construction height and may cover a larger operation area. 2. With an automatic jacking device and an automatic lifting mechanism, the placer according to the present invention may rise together with the wall height increasing. Therefore, it is possible to reduce intensity involved in labor, improve the work efficiency, and save time and cost. 3. The fixing device is provided with two sets of elongated holes. Thus, it is possible to effectively reduce installation errors and accurately locate the base and the supporting frames.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

Fig. 1 illustrates installation of a wall-mounted placer and a floor-mounted placer;
Fig. 2 illustrates installation of a floor-standing placer;
Fig. 3 is a schematic view showing the operation areas of the wall-mounted placer and a hoistway-placer;
Fig. 4 is a structural schematic view of a first embodiment according to the present invention;
Fig. 5 is a partially enlarged schematic view along arrow B in Fig. 4;
Fig. 6 is a schematic view showing the operating mechanism of a blocker in the first embodiment according to the present invention;
Fig. 7 is a partially enlarged schematic view of a lifting assembly;
Fig. 8 is a partially enlarged schematic view of a sprocket;
Fig. 9 is a top view of a fixing device;
Fig. 10 is a sectional view of the fixing device taken along A-A;
Fig. 11 is a structural schematic view of a second embodiment according to the present invention;
Fig. 12 is a partially enlarged schematic view along arrow C in Fig. 11;
Fig. 13 is a schematic view showing the operating mechanism of a blocker in the second embodiment according to the present invention;
Fig. 14 is a schematic view showing the operating mechanism of a rotating stopper.

Reference numerals:

1. base	2. pillar	3. placing boom
4. jacking assembly	41. blocker	42. jacking cylinder
43. abutment	44. return spring	45. supporting device
46, supporting member	47. piston rod	48. compression spring
431. guide groove	451. fixed supporting block	452. rotating stopper
453. supporting bracket	461. rigid tube	462. supporting stub
463. fixed stopper	5. supporting frame	6. pre-embedded part
7. lifting assembly	8. fastener	9. fixing device
10 wall	12. floor	13. floor-mounted placer
14. floor-standing placer	15. hoistway placer	16. wall-mounted placer
17. leg	18. elevator hoistway	464. locking pin
465. locking recess	71. lifting cable	72. chain
73. drive unit	74. rollers	75. sprocket
76. wire	51. lifting ring	52. guide pulley
91. elongated hole		

DETAILED DESCRIPTION OF THE INVENTION

First embodiment of the present invention

[0020] As shown in Fig. 4, 5, 6, 7, 8 and 10, a wall-mounted placer according to the first embodiment of the present invention comprises a pillar 2, supporting frames 5, fasteners 8 and a placing boom 3, wherein the pillar 2 is fitted through the supporting frames 5, the fasteners 8 as securing members are fitted between the pillar 2 and the supporting frames 5, and the placing boom 3 is arranged at the top end of the pillar 2. At the bottom of the pillar 2 is provided a base 1, which as well as the supporting frames 5 are fixed to a wall 10 by means of fixing devices 9. As shown in Fig. 9, the fixing device 9 is provided with longitudinal elongated holes and transverse elongated holes 91. The pillar 2 is further provided with a jacking assembly 4, which comprises a blocker 41, jacking cylinders 42, a supporting device 45, pluralities of supporting members 46 arranged on the pillar 2 and abutments 43 symmetrically arranged on both sides of the pillar 2, wherein the jacking cylinders 42 are arranged on the abutments 43, and the supporting device 45 is provided on a piston rod 47 of the jacking cylinder 42 and cooperates with the supporting member 46. On each of the abutments 43 is provided a respective blocker 41, with one end thereof being hinged to the respective abutment 43 and the other end being arranged between two supporting members 46. The supporting members 46 are designed as pluralities of rigid tubes 461 arranged on the pillar 2. A supporting stub 462 is provided in the rigid tube 461 above the piston rods 47. The supporting devices 45 are designed as fixed supporting blocks 451 arranged on the piston rods 47. These fixed supporting blocks 451 cooperate with the supporting stubs 462. At the hinged end of the blocker 41 to the abutment 43 is provided a return spring 44. The other end of the return spring 44 is connected with the abutments 43. When the placer is at rest, the rigid tubes 461 seat on the blockers 41, and the blockers 41 support the rigid tubes 461 and the placer. During the jacking process, the rigid tube 461 below the blocker 41 pushes the blocker 41 to rotate in the arrow direction as shown in Fig. 9, causing a stretch of the return spring 44; after the rigid tube 461 passes across the blocker 41, the latter will restore its original occupation automatically by the return spring 44. The supporting stub 462 in the present embodiment is divided into two segments. Each segment is respectively inserted into the end of the rigid tube 461. A locking pin 464 is provided in the rigid tubes 461, and the supporting stubs 462 is provided with a locking recess 465 matching with the locking pin 464. During installation, the supporting stub 462 is inserted into the rigid tubes 461 in such a way that the locking recess 465 is aligned with the locking pin 464, and then the supporting stub 462 is rotated by a certain angle in the rigid tube 461 until the supporting stub 462 is appropriately positioned in the rigid tube 461. A lifting assembly 7 is attached to the pillar 2. The lifting assembly 7 comprises lifting cables 71, a drive unit 73, and rollers 74 designed as sprockets 75 in the present embodiment for purpose of higher transmission efficiency and slip-resistance of the lifting cables 71. The lifting cable 71 comprises at the respective ends thereof a wire 76 connected with the supporting frame 5 and a chain 72 wounded on the sprocket 75. The drive unit 73 is arranged at the upper end of the pillar 2 of the placer, and comprises an output shaft coupled to the sprockets 75. The chain 72 has a sufficient length such that the supporting frame 5 may to be lifted into a desired position. The supporting frame 5 is provided with guide pulleys 52 and a lifting ring 51 cooperating with the lifting cables 71.

Operation principle of the first embodiment of the present invention

[0021] At first, pre-embedded parts 6 are provided in walls 10 during placing. Afterwards, both the base 1 and the supporting frames 5 are fixed onto the wall 10 by means of the fixing devices 9 and the pre-embedded parts 6, so that the placer may be fixed to the wall 10 to form a wall-mounted placer. The fixing devices 9 are provided with elongated holes 91 to eliminate embedding errors of the pre-embedded parts 6 and to ensure a precise installation of the placer. With the wall height increasing, the placer becomes not high enough to meet operational requirements. At this point, the jacking assembly 4 may be utilized to jack up the placer. During the operation of the jacking assembly 4, at first, both supporting stubs 462 are respectively inserted into ends of the rigid tubes 461 of the pillar 2, and the moving ends of the jacking cylinders 42 are respectively connected with the supporting stubs 462; then the fasteners 8 between the pillar 2 and the supporting frames 5 are removed, and the fixing devices 9 connecting the base 1 with the wall 10 are also removed; thereafter, the jacking cylinders 42 jack up the supporting stubs 462, which causes the placer to rise. During the jacking process, the rigid tube 461 below the blocker 41 pushes the blocker 41 to rotate in the arrow direction shown in Fig. 6 and causes the return spring 44 to get stretched; after the rigid tube 461 passes across the blocker 41, the latter will restore its original occupation automatically by the return spring 44. If the piston rods 47 of the jacking cylinders 42 starts to retract, the rigid tube 461 drops back onto the blocker 41. The blocker 41 blocks the rigid tube 461 from further movement and thus holds the placer. Next, the supporting stubs 462 are pulled out, re-inserted into a rigid tube 461 closer to the piston rods 47, and re-connected to the piston rods 47. Thus the next jacking process can be repeated in a similar way as described above. The jacking process is repeated until the placer is jacked up to a desired operation height. At this point, the fasteners 8 are refitted into position, and the base 1 is fixed to the wall 10 by fixing devices 9. Thus, the jacking process of the placer is completed. After the jacking process, the jacking assemblies 4 are

situated in a lower position with respect to the pillar 2. To facilitate a future jacking, it is necessary to lift the supporting frames 5 by a certain height with the lifting device 7. During the lifting process, the wires 76 are connected with the lifting ring 51 of the highest supporting frame 5, and the fasteners 8 between the highest supporting frame 5 and the pillar 2 as well as the fixing device 9 connecting the highest supporting frame 5 to the wall 10 are removed, so that the highest supporting frame 5 can be suspended by wires 76. Afterwards, the drive unit 73 is activated such that chains 72 and wires 76 may be driven by the sprocket 75 to lift the highest supporting frame 5. After the highest supporting frame 5 gets into position, the drive unit 73 will be turned off, the fasteners 8 between the supporting frame 5 and the pillar 2 will be fitted, and the highest supporting frame 5 will be disconnected from the wires 76. In this way, the lifting process for the highest supporting frame 5 is completed. To lift the next supporting frame 5, wires 76 are connected with the next supporting frame 5 via the guide pulley 52, the fasteners 8 between the supporting frame 5 and the pillar 2 as well as the fixing device 9 connecting the supporting frame 5 to the wall 10 are removed, the drive unit 73 is activated, and the supporting frame 5 is lifted. After the supporting frame 5 gets into position, the drive unit 73 is turned off, and the fasteners 8 between the supporting frame 5 and the pillar 2 are refitted, such that the lifting process is completed. The fixing devices 9, the jacking assemblies 4 and the lifting device 7 cooperate with each other, such that the placer may be fixed on the wall 10 and may be raised with a rising wall 10 to meet requirements for an engineering construction.

Second embodiment of the present invention

[0022] As shown in Fig. 7, 8, 10, 11, 12, 13 and 14, a wall-mounted placer according to the second embodiment of the present invention comprises a pillar 2, supporting frames 5, fasteners 8 and a placing boom 3, wherein the pillar 2 is fitted through the supporting frames 5, the fasteners 8 as securing members are fitted between the pillar 2 and the supporting frames 5, and the placing boom 3 is arranged at the top end of the pillar 2. At the bottom of the pillar 2 is provided a base 1, which as well as the supporting frames 5 are fixed to a wall 10 by means of fixing devices 9. The fixing device 9 is provided with longitudinal elongated holes and transverse elongated holes 91, as shown in Fig. 9. The pillar 2 is further provided with a jacking assembly 4, which comprises a blocker 41, jacking cylinders 42, supporting devices 45, pluralities of supporting members 46 arranged on the pillar 2 and abutments 43 symmetrically arranged on both sides of the pillar 2, wherein the jacking cylinders 42 are arranged on the abutments 43, and the supporting device 45 is provided on a piston rod 47 of the jacking cylinder 42 and cooperates with the supporting member 46. A guide groove 431, in which a compression spring 48 is provided, is defined in the abutment 43, One end of the blocker 41 is arranged in the guide groove 431 and is engaged with the compression spring 48, and the other end the blocker 41 is arranged between two supporting members 46 The supporting members 46 are designed as pluralities of fixed stoppers 463 arranged on the pillar 2. The supporting device 45 comprises a supporting bracket 453 and a rotating stopper 452 arranged thereon and cooperating with the fixed stopper 463. One end of the rotating stopper 452 is hinged to the supporting bracket 453, and the other end thereof is arranged between two fixed stoppers 463. When the pillar 2 of the placer is jacked up, both the blocker 41 and the fixed stoppers 463 are in the way of the rigid tubes 461. When the placer is at rest, the pillar 2 of the placer is held in position by the fixed stopper 23 on the blocker 41. During the jacking process, a fixed stopper 463 below the blocker 41 pushes the blocker 41 to rotate in the arrow direction as shown in Fig. 13, and after the fixed stopper 463 passes across the blocker 41, the latter will restore its original occupation automatically by the compression spring 48. A lifting assembly 7 is attached to the pillar 2. The lifting assembly 7 comprises lifting cables 71, a drive unit 73, and rollers 74 designed as sprockets 75 in the present embodiment for purpose of higher transmission efficiency and slip-resistance of the lifting cables 71. The lifting cable 71 comprises at the respective ends thereof a wire 76 connected with the supporting frame 5 and a chain 72 wounded on the sprocket 75. The drive unit 73 is arranged at the upper end of the pillar 2 of the placer, and comprises an output shaft coupled to the sprockets 75. The chain 72 has a sufficient length such that the supporting frame 5 may to be lifted into a desired position. The supporting frame 5 is provided with guide pulleys 52 and a lifting ring 51 cooperating with the lifting cables 71.

Operation principle of the second embodiment of the present invention

[0023] At first, pre-embedded parts 6 are provided in walls 10 during placing. Afterwards, both the base 1 and the supporting frames 5 are fixed onto the wall 10 by means of the fixing devices 9 and the pre-embedded parts 6, so that the placer may be fixed to the wall 10 to form a wall-mounted placer. The fixing devices 9 are provided with elongated holes 91 to eliminate embedding errors of the pre-embedded parts 6 and to ensure a precise installation of the placer. With the wall height increasing, the placer becomes not high enough to meet operational requirements. At this point, the jacking assembly 4 may be utilized to jack up the placer. Before the jacking operation, the fasteners 8 between the pillar 2 and the supporting frames 5 are removed, and the fixing devices 9 connecting the base 1 with the wall 10 are also removed; thereafter, the jacking cylinders 42 jack up the supporting stubs 462, causing the placer to rise. During the jacking process, the fixed stopper 463 below the blocker 41 pushes the blocker 41 to rotate in the arrow direction shown in Fig. 13; after the fixed stopper 463 passes across the blocker 41, the latter will restore its original occupation

automatically by the compression spring 48. If the placer needs to be jacked up further when the piston rod 47 of the jacking cylinder 4 has reached its maximum stroke, the piston rod 47 will start to retract. At this time, the fixed stopper is disengaged from the rotating stopper 452, and the placer is held in position by the blocker 41. The piston rod 47 moves downwardly continuously with the supporting bracket 453 and the rotating stopper 452 thereon. If the rotating stopper 452 comes across a lower fixed stopper 463, it may be pushed by the fixed stopper 463 to rotate in the arrow direction shown in Fig. 14. After the rotating stopper 452 passes across the fixed stopper 463, the former will restore its original occupation automatically by gravity. After the piston rod 47 completes its retraction, the jacking assembly may start a new jacking cycle. The jacking cycle is repeated until the placer is lifted to a desired operation height. At this point, the fasteners 8 are refitted into position, and the base I is fixed to the wall 10 by fixing devices 9. Thus, the jacking process of the placer is completed. When the placer is at rest, the pillar 2 is held in position by the fixed stopper 463 on the blocker 41. And if no more jacking is required, fasteners 8 may be re-fitted between the supporting frame 5 and the pillar 2. After the jacking process, the jacking assemblies 4 are situated in a lower position with respect to the pillar 2. To facilitate a future jacking, it is necessary to lift the supporting frames 5 by a certain height with the lifting device 7. During the lifting process, the wires 76 are connected with the lifting ring 51 of the highest supporting frame 5, and the fasteners 8 between the highest supporting frame 5 and the pillar 2 as well as the fixing device 9 connecting the highest supporting frame 5 to the wall 10 are removed, so that the highest supporting frame 5 can be suspended by wires 76. Afterwards, the drive unit 73 is activated such that chains 72 and wires 76 may be driven by the sprocket 75 to lift the highest supporting frame 5. After the highest supporting frame 5 gets into position, the drive unit 73 will be turned off, the fasteners 8 between the supporting frame 5 and the pillar 2 will be fitted, and the highest supporting frame 5 will be disconnected from the wires 76. In this way, the lifting process for the highest supporting frame 5 is completed. To lift the next supporting frame 5, wires 76 are connected with the next supporting frame 5 via the guide pulley 52, the fasteners 8 between the supporting frame 5 and the pillar 2 as well as the fixing device 9 connecting the supporting frame 5 to the wall 10 are removed, the drive unit 73 is activated, and the supporting frame 5 is lifted. After the supporting frame 5 gets into position, the drive unit 73 is turned off, and the fasteners 8 between the supporting frame 5 and the pillar 2 are refitted, such that the lifting process is completed. The fixing devices 9, the jacking assemblies 4 and the lifting device 7 cooperate with each other, such that the placer may be fixed on the wall 10 and may be raised with a rising wall 10 to meet requirements for an engineering construction.

Claims

1. A wall-mounted placer comprising a pillar (2), supporting frames (5) and a placing boom (3), with the pillar (2) fitted through the supporting frames (5) and the placing boom (3) arranged at the top end of the pillar (2), wherein the supporting frames (5) and a base (1) provided at the bottom of the pillar (2) are fixed to a wall (10) by means of fixing devices (9).

2. The wall-mounted placer according to Claim 1, wherein the pillar (2) is further provided with a jacking assembly (4) comprising a blocker (41), jacking cylinders (42), a supporting device (45), pluralities of supporting members (46) arranged on the pillar (2) and abutments (43), and wherein
the abutments (43) are arranged on the supporting frame (5) and are mounted on both sides of the pillar (2),
the jacking cylinders (42) are arranged on the abutments (43),
the supporting device (45) is arranged on a piston rod (47) of the jacking cylinder (42) and cooperates with the supporting member (46), and
the blocker (41) is arranged on the abutments (43), with one end thereof engaged to the abutment (43) and the other end arranged between two supporting members (46).

3. The wall-mounted placer according to Claim 2, wherein the supporting members (46) are designed as pluralities of rigid tubes (461) arranged on the pillar (2), with a supporting stub (462) provided in the rigid tube (461) above the piston rods (47), and wherein the supporting devices (45) are designed as fixed supporting blocks (451) which are arranged on the piston rods (47) and cooperate with the supporting stubs (462).

4. The wall-mounted placer according to Claim 2, wherein the supporting members (46) are designed as pluralities of fixed stoppers (463) arranged on the pillar (2), and the supporting device (45) comprises a supporting bracket (453) and a rotating stopper (452) arranged thereon and cooperating with the fixed stopper (463), such that one end of the rotating stopper (452) is hinged to the supporting bracket (453), and the other end thereof is arranged between two fixed stoppers (463).

5. The wall-mounted placer according to any one of Claims 2 to 4, wherein one end of the blockers (41) is hinged to

the abutment (43), and the other end thereof is arranged between two supporting member (46), with the end hinged to the abutment (43) provided with a return spring (44) connected to the abutments (4.3).

6. The wall-mounted placer according to any one of Claims 2 to 4, wherein a guide groove (431) with an internal compression spring (48) therein is defined in the abutment (43), such that one end of the blocker (41) is arranged in the guide groove (431) and engaged to the compression spring (48), and the other end thereof is arranged between two supporting members (46).

7. The wall-mounted placer according to any one of Claims 1 to 4, wherein a lifting assembly (7) comprising lifting cables (71), a drive unit (73), and rollers (74) is attached to the pillar (2), such that the drive unit (73) is arranged at the upper end of the pillar (2) of the placer and comprises an output shaft coupled to the rollers (74), and the lifting cables (71) are connected with the rollers (74) and the supporting frame (5) at the respective ends thereof.

8. The wall-mounted placer according to Claim 5, wherein a lifting assembly (7) comprising lifting cables (71), a drive unit (73), and rollers (74) is attached to the pillar (2), such that the drive unit (73) is arranged at the upper end of the pillar (2) of the placer and comprises an output shaft coupled to the rollers (74), and the lifting cables (71) are connected with the rollers (74) and the supporting frame (5) at the respective ends thereof.

9. The wall-mounted placer according to Claim 6, wherein a lifting assembly (7) comprising lifting cables (71), a drive unit (73), and rollers (74) is attached to the pillar (2), such that the drive unit (73) is arranged at the upper end of the pillar (2) of the placer and comprises an output shaft coupled to the rollers (74), and the lifting cables (71) are connected with the rollers (74) and the supporting frame (5) at the respective ends thereof.

10. The wall-mounted placer according to Claim 8, wherein the rollers (74) are designed as sprockets (75), and the lifting cables (71) comprise at the respective ends thereof a wire (76) connected with the supporting frame (5) and a chain (72) wounded on the sprocket (75).

11. The wall-mounted placer according to Claim 9, wherein the rollers (74) are designed as sprockets (75), and the lifting cables (71) comprise at the respective ends thereof a wire (76) connected with the supporting frame (5) and a chain (72) wounded on the sprocket (75).

12. The wall-mounted placer according to any one of Claims 1 to 4, wherein the fixing device (9) is provided with longitudinal elongated holes and transversal elongated holes (91).

13. The wall-mounted placer according to Claim 10, wherein the fixing device (9) is provided with longitudinal elongated holes and transversal elongated holes (91).

14. The wall-mounted placer according to Claim 11, wherein the fixing device (9) is provided with longitudinal elongated holes and transversal elongated holes (91).

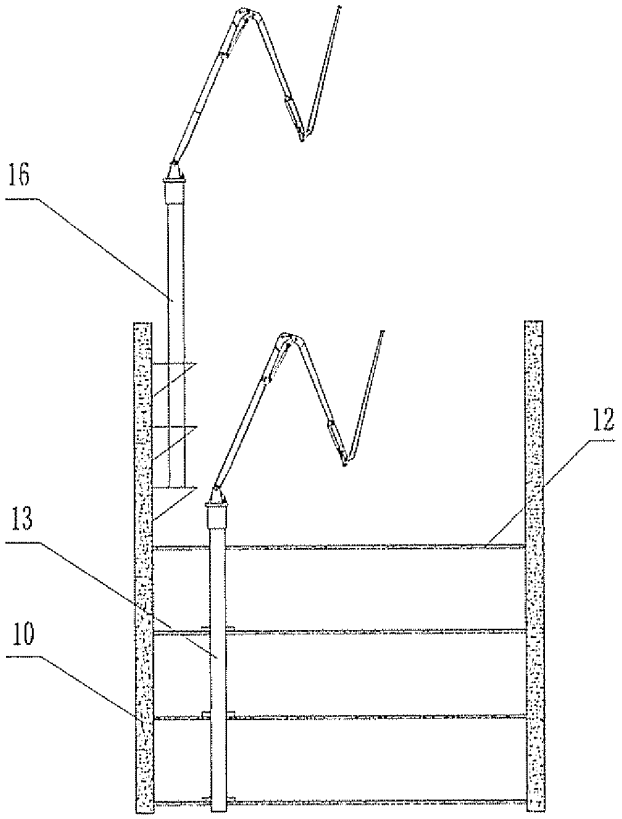

Fig.1

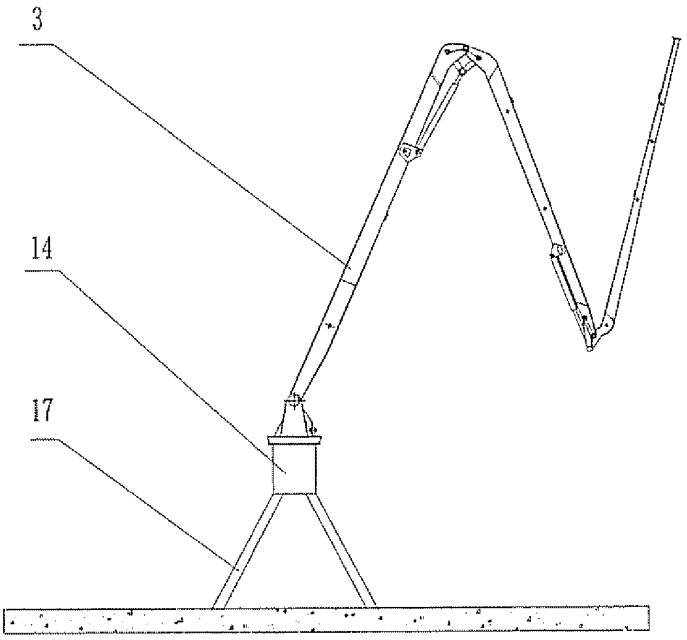

Fig.2

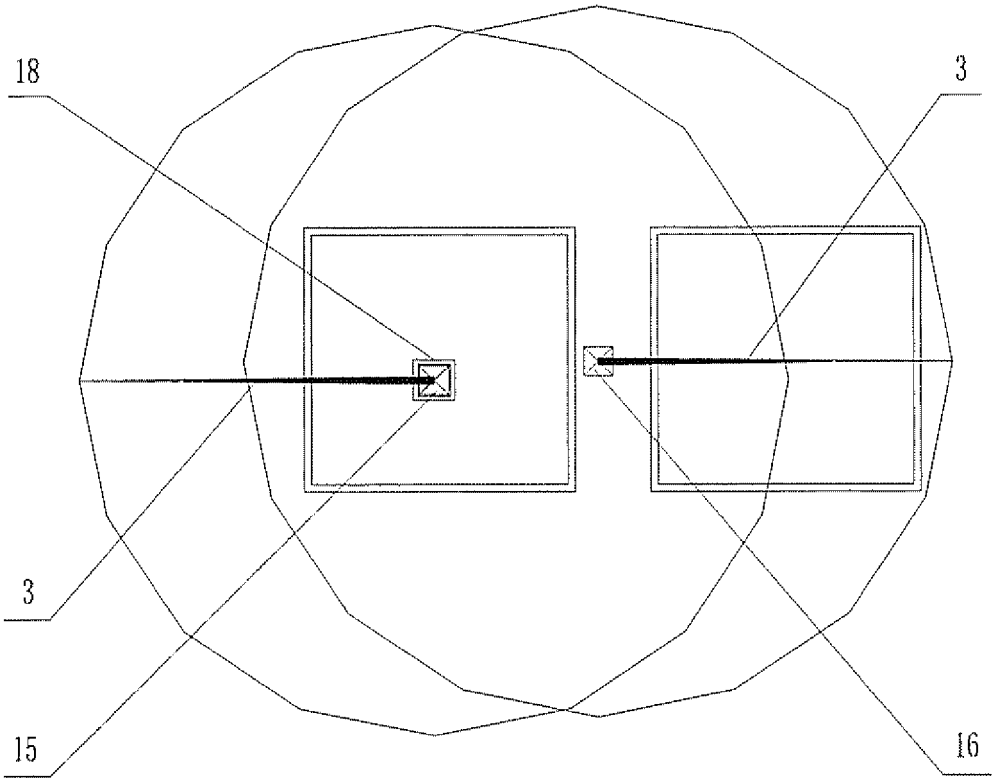

Fig.3

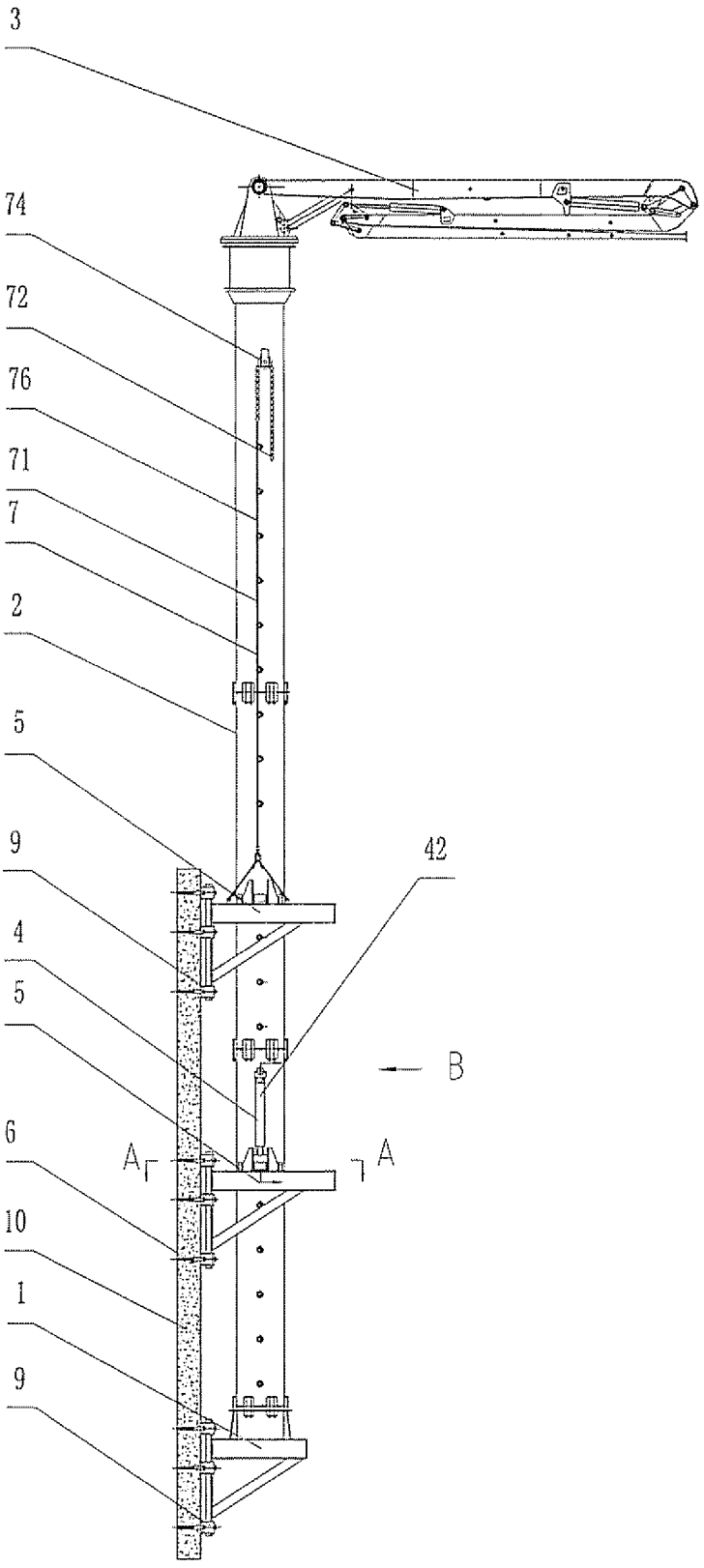

Fig.4

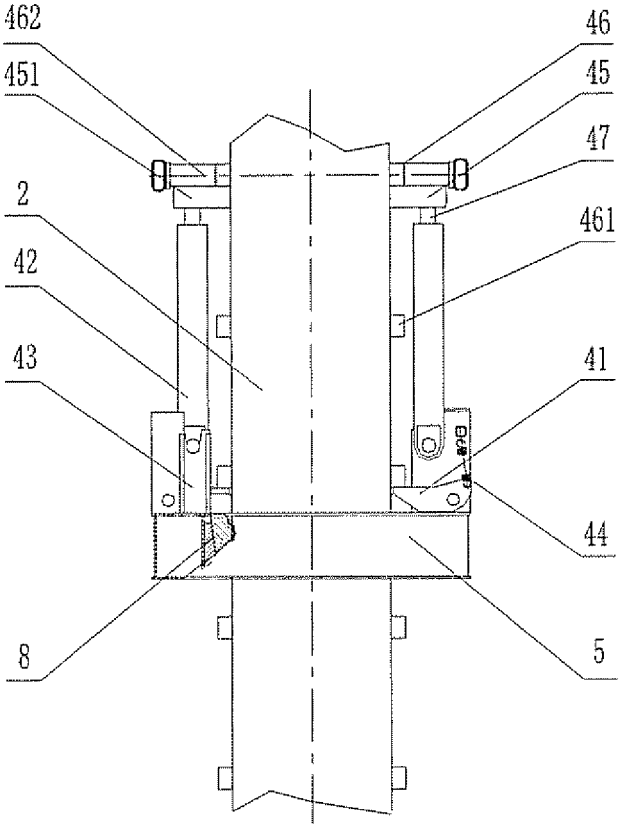

Fig.5

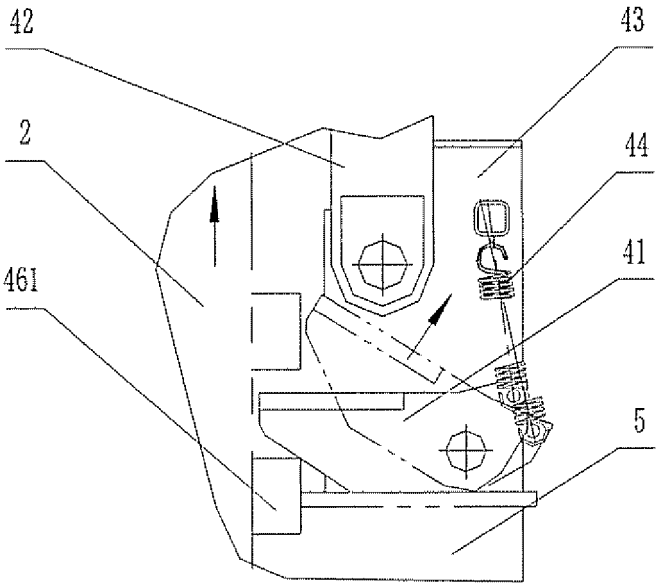

Fig.6

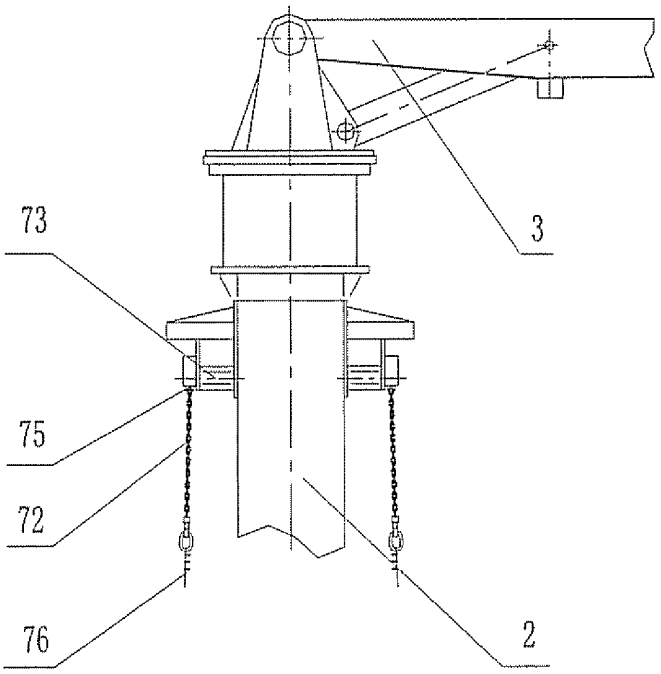

Fig.7

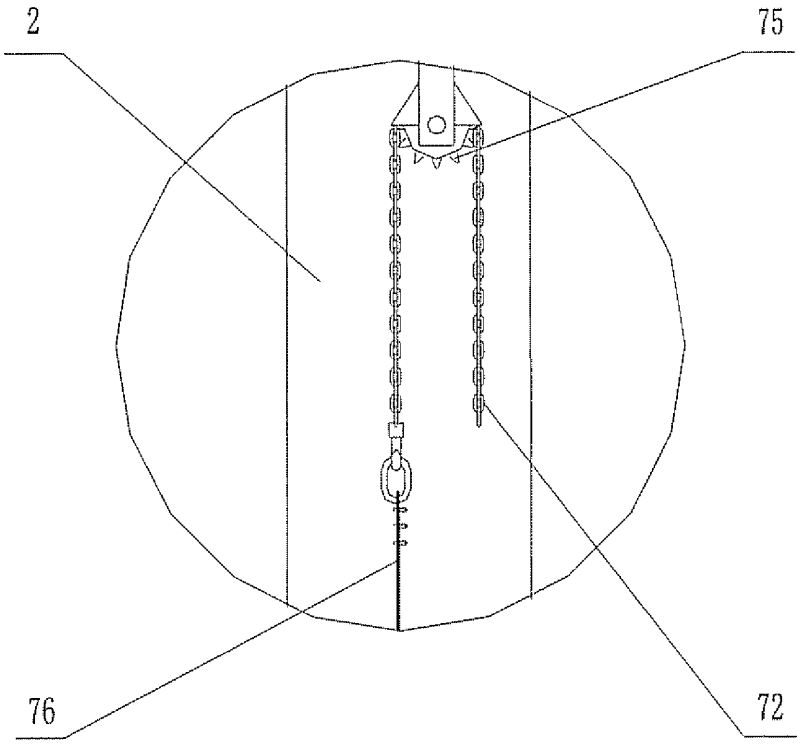

Fig.8

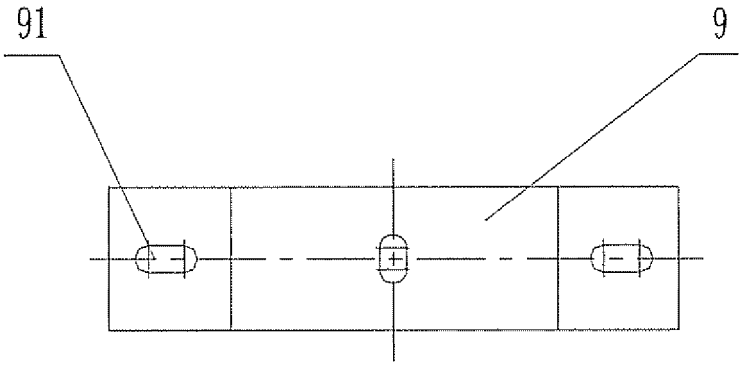

Fig.9

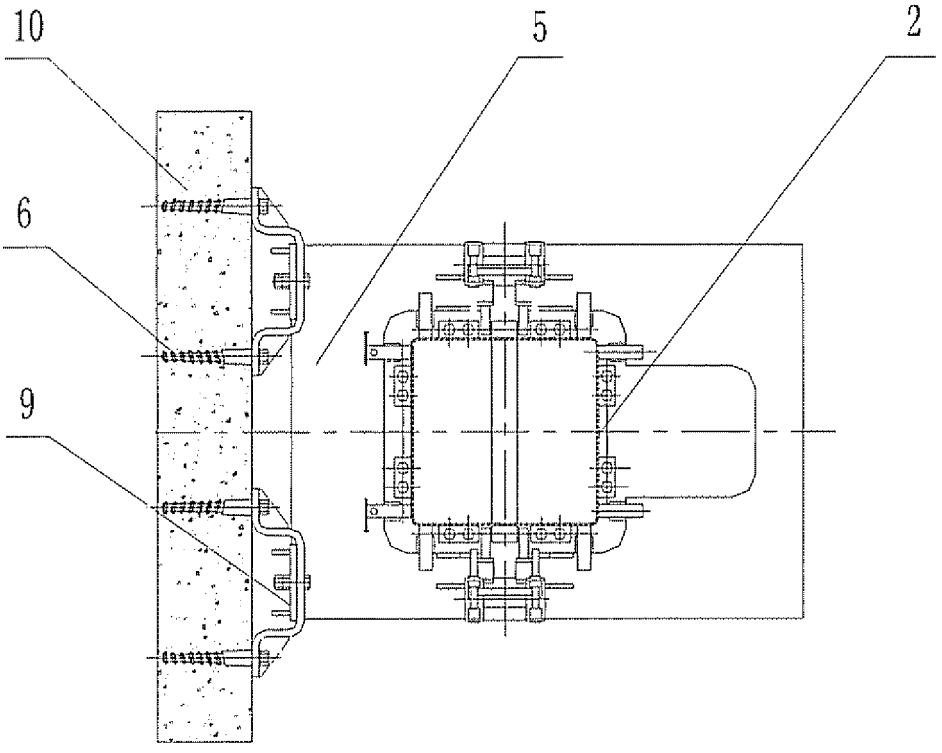

Fig.10

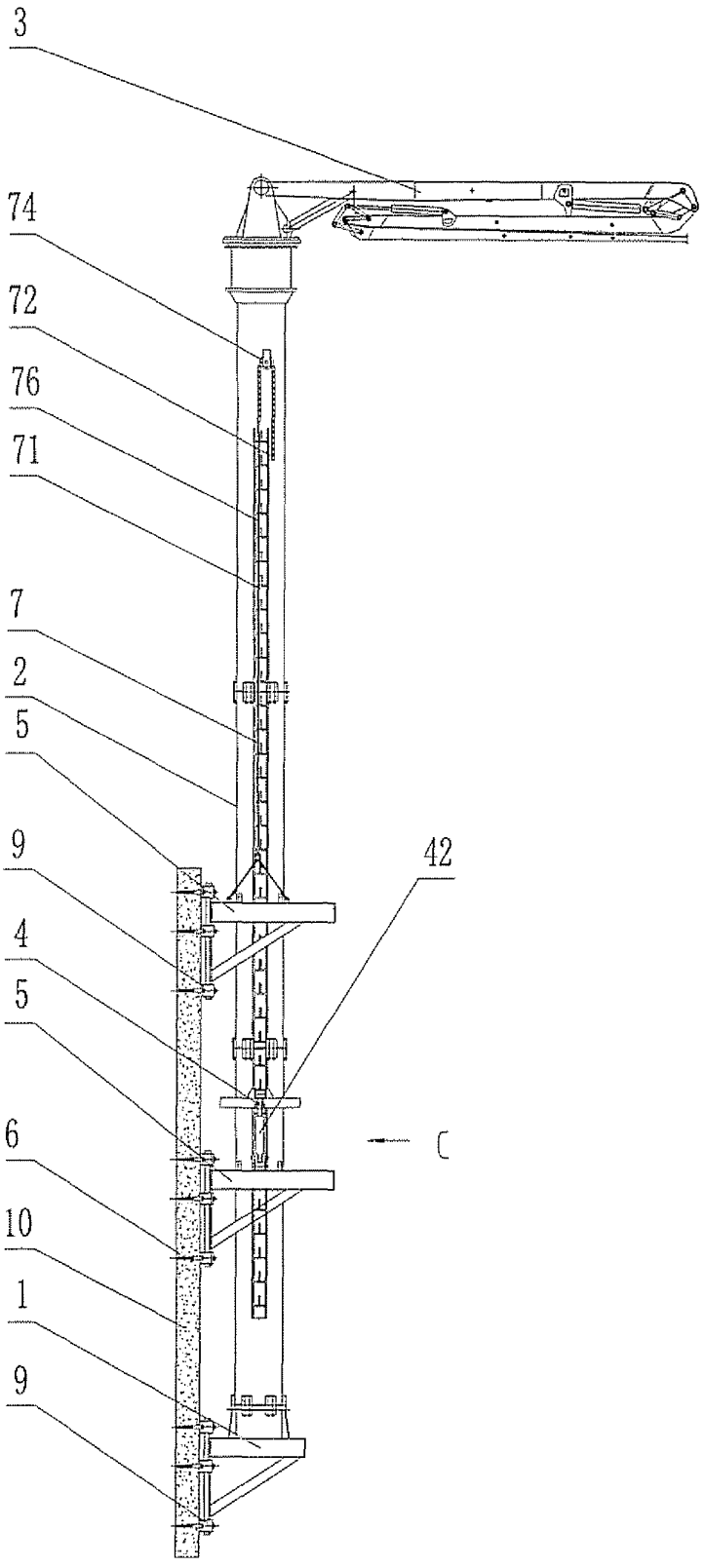

Fig.11

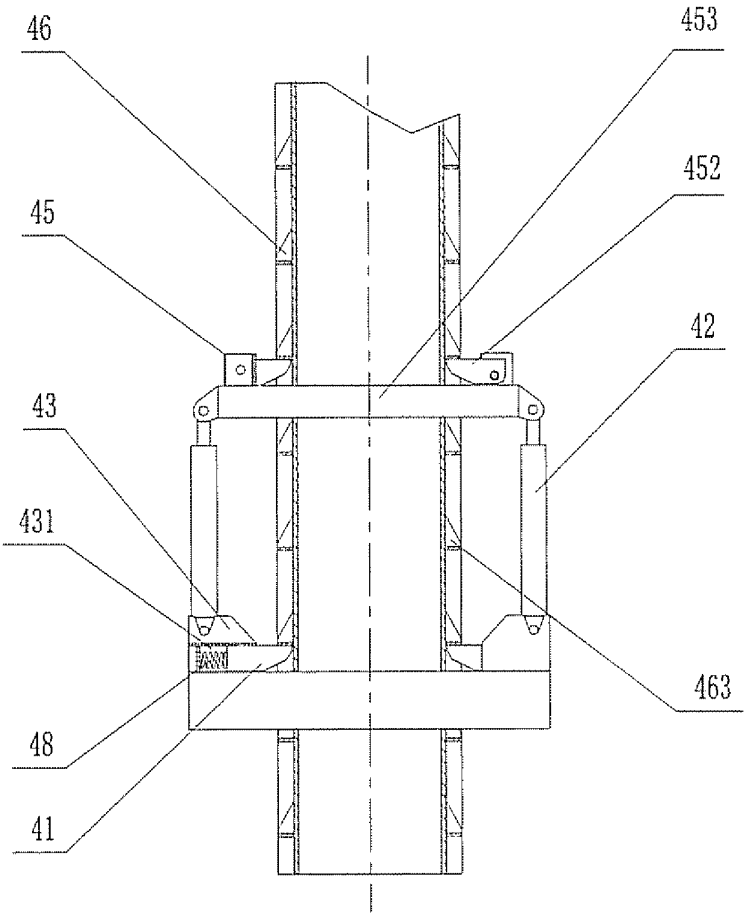

Fig.12

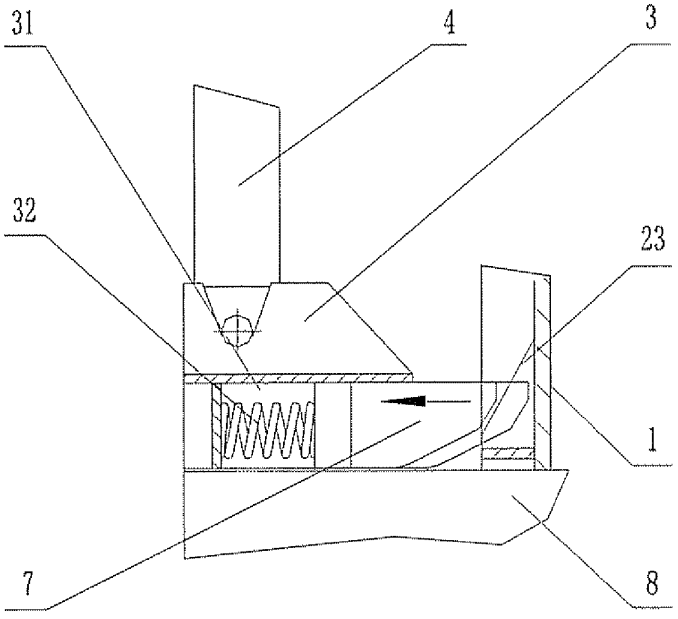

Fig.13

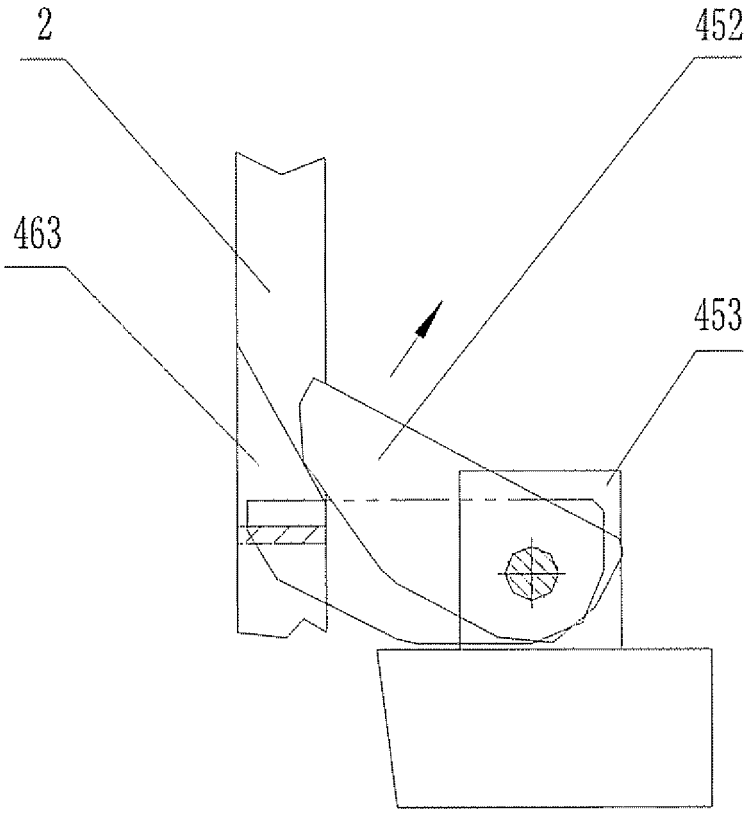

Fig.14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2007/000328

A. CLASSIFICATION OF SUBJECT MATTER

E04G21/04(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC E04G21

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, WPI, PAJ, EPODOC hang, arm

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO9314288A(Aktenzeichen) 22 Jul. 1993 (22.07.1993); abstract; fig.1	1—14
A	JP10292627A(SHIMIZU CONSTR CO LTD), 04 Nov. 1998(04.11.1998) description; fig. 1	1—14

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 MAY 2007(25.05.2007)	**12 Jul. 2007 (12.07.2007)**
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer Xiadong Telephone No. (86-10)62084843

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2007/000328

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
WO9314288A	22.07.1993	DE4200669A	15.07.1993
JP10292627A	04.11.1998	none	

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