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(54) **FORMWORK CONSTRUCTION METHOD FOR INNER WALL AND DEVICE THEREOF**

(57) The present invention relates to a formwork construction method for inner wall and device thereof. The construction method includes stripping, hoisting, supporting and spreading the formwork, in which, hoisting of the formwork is achieved with crane. Stripping and spreading of the formwork is achieved by a transverse motion machine making the driver rotary spreading and the driven liner spreading. The driver of machine leans against the wall, and the driven connect with the formwork. The formwork is supported on the bearing block of the inner wall by a bracket hinged under the formwork. The transverse motion machine makes use of a screw drive mechanism, which can enhance the bearing abilities and have a function of self-lock.

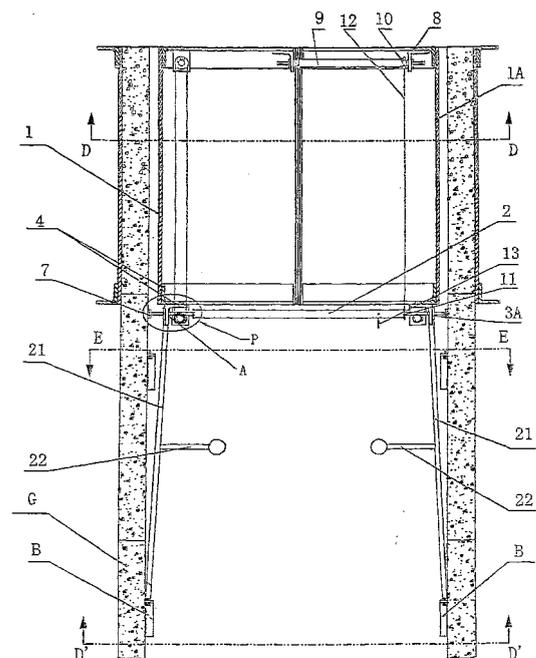


FIG. 1

Description

Field of the Invention

[0001] The present invention relates to an interior wall formwork, and more particularly to a formwork construction method for inner wall and device thereof.

Description of the Prior Art

[0002] During construction of a building, the interior and exterior wall formworks should be erected in advance and set apart at a specific distance, so as to allow the concrete to be poured in the space between the interior and exterior wall formworks. After the concrete hardens, the exterior wall formwork can be removed easily without the constraint of working space. However, the removal of the interior wall formwork is difficult due to the constraint of space and usually requires the worker to pry the formwork open, and thus it will likely generate side pressure against the wall that hasn't hardened completely, causing damage to the wall. The removal of the interior wall generally needs 24 hours after the concrete hardens, and it is really time consuming.

[0003] The present invention has arisen to mitigate and/or obviate the afore-described disadvantages.

SUMMARY OF THE INVENTION

[0004] The primary objective of the present invention is to provide an interior wall formwork construction method for enabling the interior wall formwork to be constructed more easily and quickly.

[0005] The secondary objective of the present invention is to provide an interior wall formwork construction device that is easily operated and simple structured.

[0006] An interior wall formwork construction method in accordance with the present invention comprises the steps of: stripping the formwork, hoisting the formwork, supporting and spreading the formwork. The interior wall formwork 1 is hoisted by a crane.

[0007] The stripping and spreading of the interior wall formwork are achieved by a transverse motion machine whose drive part doesn't move with the formwork, and the driven part is connected to the formwork and makes the formwork move transversely.

[0008] The interior wall formwork is supported by a bracket that stands on a bearing block of the interior wall and is hinged to the lower portion of the interior wall formwork.

[0009] The stripping of the interior wall formwork is achieved by the rotation of the driving part of the transverse motion machine and the linear movement of the driven part.

[0010] After stripping, the interior wall formwork can be hoisted, and during the hoisting of the interior wall formwork, the bracket will spread automatically and negotiate the obstacles on the interior wall, and will stand

at a higher bearing block on the interior wall after reaching the predetermined position.

[0011] After being well positioned, the interior wall formwork can be spreaded by an opposite rotation of the driving part of the transverse motion machine and an opposite linear movement of the driven part.

[0012] After spreading to a predetermined position, the interior wall formwork can be connected to the exterior wall formwork, so as to allow the pouring of concrete.

[0013] The bracket is hinged to a bottom of the interior formwork.

[0014] The transverse motion machine is a screw driven device comprising a screw shaft and a nut, and the nut is connected to the interior wall formwork via a connecting board, between the nut and the connecting board is disposed an adjusting mechanism that comprises a press board and a connecting member, the nut is formed at an end thereof with a flange, the connecting board is mounted on an outer periphery of the nut and a side of the connecting board is located at a side of the flange, the press board is mounted on the screw shaft, a side of the press board is located at another side of the flange, and the press board is connected to the connecting board via the connecting member.

[0015] The screw shaft is provided with an abutting assembly that is used to abut against an interior wall, and the abutting assembly includes a left block and a right block that are disposed at both sides of a flange formed at the end of the screw shaft.

[0016] An upper end of the interior wall formwork is connected to a transverse motion machine via another connecting member, and a drive part of transverse motion machine is connected to the screw shaft via a driven part, the transverse motion machine is a screw driven device comprising a screw shaft and a nut, the upper end of the interior wall formwork is mounted to the nut by the another connecting member.

[0017] The bracket is provided with an automatic spreading device for spreading the bracket outward, and the spreading device includes moment driven device, elastic-force driven device, manpower driven device, and electric driven device.

[0018] A lower end of the bracket is fixed to the bearing block of the inner wall by a positioning member that has a locking groove for engaging with a locking protrusion of the bearing block.

[0019] The present invention will become more obvious from the following description when taken in connection with the accompanying drawings, which show, for purpose of illustrations only, the preferred embodiments in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020]

Fig. 1 is an illustrative view of showing the stripping of the interior wall formwork in accordance with the

present invention;

Fig. 2 is an enlarged view of the part P of the Fig. 1;
Fig. 3 is an illustrative view of showing the hoisting of the interior wall formwork in accordance with the present invention;

Fig. 4 is a cross sectional view taken along the line D-D of Fig. 1;

Fig. 5 is a cross sectional view taken along the line D'-D' of Fig. 1;

Fig. 6 is an enlarged view of the part Q of the Fig. 1;

Fig. 7 is a cross sectional view taken along the line E-E of Fig. 1;

Fig. 8 is an illustrative view of showing the transverse spreading of the interior wall formwork in accordance with the present invention;

Fig. 9 is an enlarged view of the part M of the Fig. 8;

Fig. 10 is an illustrative view of showing the hoisting of the interior wall formwork of Fig. 9;

Fig. 11 is a cross sectional view taken along the line C-C of Fig. 8;

Fig. 12 is a cross sectional view taken along the line C'-C' of Fig. 8.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] Referring to the respective drawings, an interior wall formwork construction method in accordance with the present invention comprises the steps of: stripping the formwork, hoisting the formwork, supporting and spreading the formwork outward. The interior wall formwork 1 is hoisted by a crane.

[0022] The stripping and spreading of the interior wall formwork 1 are achieved by a transverse motion machine A whose drive part doesn't move with the formwork, and the driven part is connected to the formwork and makes the formwork move transversely.

[0023] The interior wall formwork 1 is supported by a bracket 21 that stands on a bearing block B of the interior wall and is hinged to the lower portion of the interior wall formwork 1.

[0024] The stripping of the interior wall formwork 1 is achieved by the rotation of the driving part of the transverse motion machine A and the linear movement of the driven part.

[0025] After stripping, the interior wall formwork 1 can be hoisted by a crane. During the hoisting of the interior wall formwork 1, the bracket 21 will spread automatically and negotiate the obstacles on the interior wall, and will stand at a higher bearing block B on the interior wall after reaching the predetermined position.

[0026] After being well positioned, the interior wall formwork 1 can be pushed outward by an opposite rotation of the driving part of the transverse motion machine A and an opposite linear movement of the driven part.

[0027] After spreading to a predetermined position, the interior wall formwork 1 can be connected to the exterior wall formwork, so as to allow the pouring of concrete.

[0028] For a better understanding of the present invention, its operation and construction, references should be made to the following descriptions:

5 1. transverse motion machine

[0029] The aforementioned transverse motion machine A is a screw driven device comprising a screw shaft 2 and a nut 3, and the nut 3 is connected to the interior wall formwork 1 via a connecting board 4. For enabling the interior wall formwork 1 to be moved to the predetermined position, between the nut 3 and the connecting board 4 is disposed an adjusting mechanism that comprises a press board 5 and a connecting member 6. The nut 3 is formed at an end thereof with a flange 31. The connecting board 4 is mounted on the outer periphery of the nut 3 and a side of the connecting board 4 is located at a side of the flange 31. The press board 5 is mounted on the screw shaft 2, a side of the press board 5 is located at another side of the flange 31, and the press board 5 is connected to the connecting board 4 via the connecting member.

[0030] The screw shaft 2 is provided with an abutting assembly 7 that is used to abut against the interior wall, and the abutting assembly 7 includes a left block 71 and a right block 72 that are disposed at both sides of the flange formed at the end of screw shaft 2.

[0031] In order to make the upper and lower ends of the interior wall formwork 1 move synchronously and stably, the upper end of the interior wall formwork 1 is connected to a transverse motion machine 9 via a connecting member 8, and the drive part of transverse motion machine 9 is connected to the screw shaft 2 via a driven part. The transverse motion machine 9 in this embodiment is a screw driven device comprising a screw shaft and a nut. The upper end of the interior wall formwork 1 is mounted to the nut by the connecting member 8.

[0032] In this embodiment, the rotary wheels 10 and 11 are chain wheels, the transmitting belt 12 between the rotary wheels 10 and 11 is a chain, and on the screw shaft 2 is arranged a manual spin handle 13.

[0033] The nuts 3 and 3A are disposed at both ends of the screw shaft 2, forming a screw driven mechanism, and the two nuts 3 and 3A rotate reversely and are connected the interior wall formworks 1 and 1a, respectively, so that two opposite interior walls can be constructed simultaneously. In addition, the transverse motion machine can be constructed both in longitudinal and transverse directions of a building, so that four walls can be constructed simultaneously.

2. bracket:

[0034] the number of the bracket 21 hinged to the bottom of the interior wall formwork 1 at least corresponds with that of the interior wall formworks 1, the bracket 21 stands on the bearing block B of the interior wall, and in this embodiment, the bracket 21 is a supporting rod.

[0035] If a building has three walls, there should be at least three brackets 21. In this embodiment, the building includes four walls, and there should be at least four brackets 21, the brackets 21 can be supporting rod or supporting board.

[0036] In this embodiment, the bracket 21 is provided with an automatic spreading device for spreading the bracket 21 outward, and the spreading device in this embodiment is a weight rod 22, so that the bracket 21 can spread and stand on the bearing block B of the interior wall 1 automatically after being hoisted up.

3. bearing block B:

[0037]

the bearing block B is a positioning member mounted to the interior wall and can be arranged at the interior wall of a lower floor.

[0038] For easy construction, the lower end of the bracket 21 can be fixed to the bearing block B by a positioning member 23 that has a locking groove 23A for engaging with the locking protrusion of the bearing block B. in this embodiment, the positioning member 23 is an independent structure mounted to the bracket 21.

[0039] Due to the self servo action, the drive part of the screw driven device only needs a very small torque, the driven part can produce a large axial force. Therefore, the interior wall formwork can be stripped and moved easily. Besides, the screw driven device has a self lock function, it ensures that the interior wall formwork can be locked at a predetermined position after stripping. The screw shaft is provided with an abutting assembly for abutting against the interior wall, so that the interior wall formwork can be moved stably.

[0040] In addition, the interior wall formwork is supported by the bracket, and there is no friction force when spreading the inner wall formwork, so that the drive force necessary for stripping and spreading the interior wall formwork is relatively small, and accordingly the operation is easy. Furthermore, the bracket for supporting the interior wall formwork stand on the bearing block B of a lower floor, therefore, the time for construction of interior wall formwork and the construction of the wall can be reduced effectively, and the interior wall formwork can be supported directly on the bearing block of the inner wall without any suspension device.

[0041] While we have shown and described various embodiments in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

Claims

1. An interior wall formwork construction method com-

prising:

stripping an interior wall formwork; hoisting the interior wall formwork; supporting the interior wall formwork; and spreading the interior wall formwork transversely; wherein the interior wall formwork is hoisted by a crane; the stripping of the interior wall formwork is achieved by rotation of a driving part and linear motion of a driven part of a transverse motion machine, and the driven part of the transverse motion machine is connected to the interior wall formwork.

2. An interior wall formwork construction method comprising:

stripping an interior wall formwork; hoisting the interior wall formwork; supporting the interior wall formwork; and spreading the interior wall formwork transversely; wherein the interior wall formwork is hoisted by a crane; the interior wall formwork is supported by a bracket that is hinged to a bottom of the interior wall formwork and stands on a bearing block of an interior wall.

3. An interior wall formwork construction method comprising:

stripping an interior wall formwork; hoisting the interior wall formwork; supporting the interior wall formwork; and spreading the interior wall formwork transversely; wherein the interior wall formwork is hoisted by a crane; the stripping of the interior wall formwork is achieved by rotation of a driving part and linear motion of a driven part of a transverse motion machine, and the driven part of the transverse motion machine is connected to the interior wall formwork, the interior wall formwork is supported by a bracket that is hinged to a bottom of the interior wall formwork and stands on a bearing block of an interior wall.

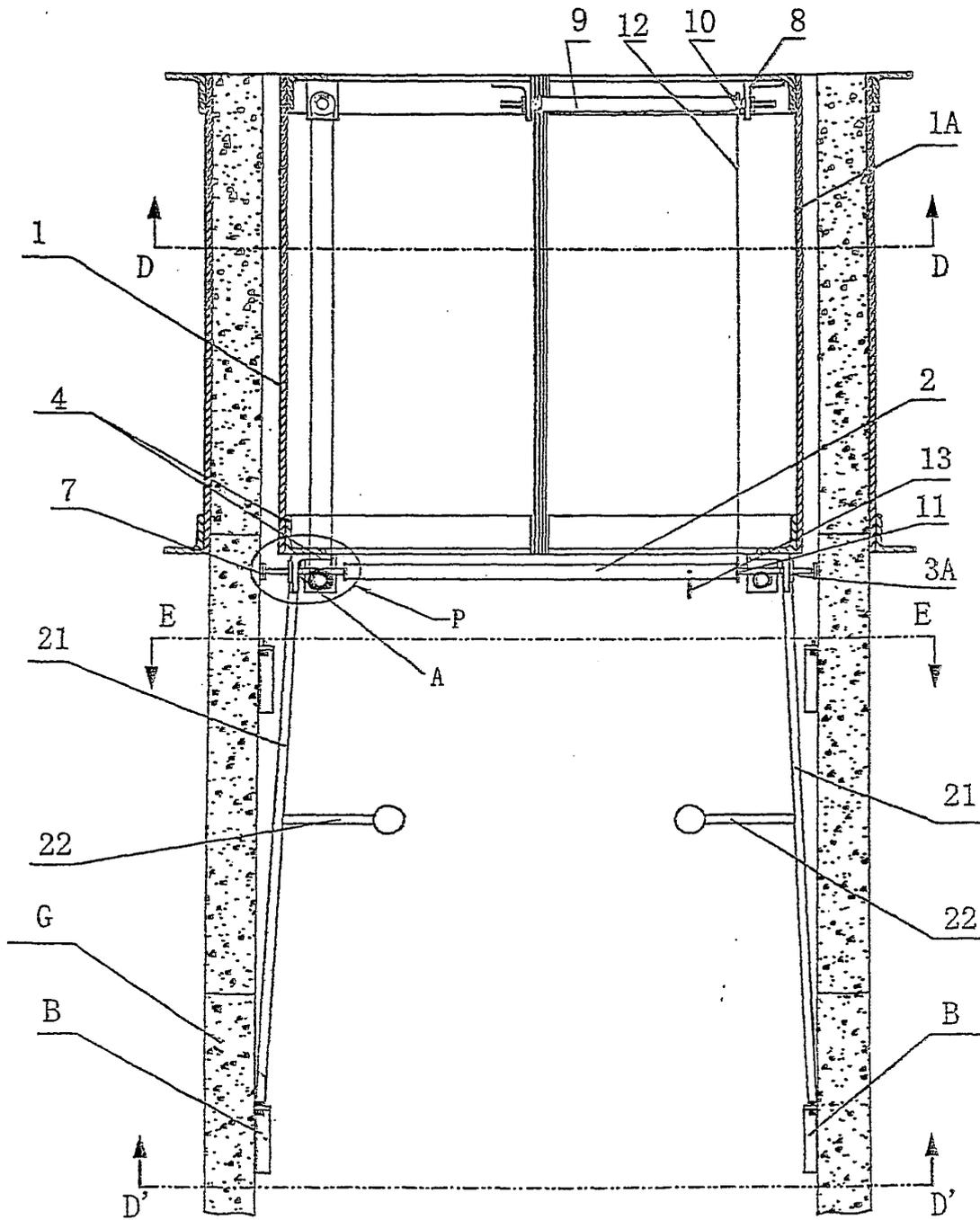
4. The interior wall formwork construction method as claimed in claim 3, wherein the stripping of the interior wall formwork is achieved by the rotation of the driving part of the transverse motion machine and the linear movement of the driven part; after stripping, the interior wall formwork is hoisted to a higher floor, during the hoisting of the interior wall formwork, the bracket will spread automatically and negotiate obstacles on the interior wall, and will stand at a higher bearing block on the interior wall after reaching a predetermined position; after being well positioned, the interior wall formwork will be pushed outward by an opposite rotation of the

driving part of the transverse motion machine and an opposite linear movement of the driven part;

after spreading to a predetermined position, the interior wall formwork will be connected to the exterior wall formwork, so as to allow pouring of concrete.

5. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 1, 2, 3 or 4, wherein the transverse motion machine is a screw driven device or a gear driven device or a cam mechanism or a slider-crank mechanism, the driving part of the transverse motion machine is connected to the interior wall formwork. 5
6. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 5, wherein the transverse motion machine is a screw driven device comprising a screw shaft and a nut, and the nut is connected to an interior wall formwork via a connecting board. 10
7. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 6, wherein the nut and the connecting board are integral with each other or are made separately and then connected by a connecting member. 15
8. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 5, wherein an adjusting mechanism is disposed between a nut and a connecting board and comprises a press board and a connecting member, the nut is formed at an end thereof with a flange, the connecting board is mounted on an outer periphery of the nut and a side of the connecting board is located at a side of the flange, the press board is mounted on a screw shaft, a side of the press board is located at another side of the flange, and the press board is connected to the connecting board via the connecting member. 20
9. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 6, wherein the screw shaft is provided with an abutting assembly that is used to abut against an interior wall. 25
10. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 9, wherein the abutting assembly includes a left block and a right block that are disposed at both sides of the flange formed at the end of screw shaft. 30
11. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 5, wherein the upper end of the interior wall formwork is connected to a transverse motion machine via a connecting member, and the drive part of transverse motion machine is connected to a screw shaft via a driven part. 35
12. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 11, wherein the transverse motion machine is a screw driven device comprising a screw shaft and a nut, the upper end of the interior wall formwork is mounted to the nut by another connecting member. 40
13. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 11, wherein the transverse motion machine is made of sliding cover or sliding shaft, wherein the upper end of the interior wall formwork is mounted on the sliding cover. 45
14. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 11, wherein the driven device comprises rotary wheels and transmitting member between the rotary wheels. 50
15. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 14, wherein the rotary wheels are chain wheels or drive wheels, the transmitting member between the rotary wheels is a chain. 55
16. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 6, wherein a manual spin handle is mounted on the screw shaft.
17. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 6, wherein the nuts are disposed at both ends of the screw shaft, forming a screw driven mechanism, and the two nuts rotate reversely and are connected the interior wall formwork.
18. The stripping and spreading device of the interior wall formwork construction method as claimed in claim 1, 2, 3 or 4, wherein the number of the bracket hinged to the bottom of the interior wall formwork at least corresponds with that of the interior wall formwork, the bracket stands on a bearing block of the interior wall.
19. The supporting device as claimed in claim 18, wherein the bracket is a supporting rod or a supporting board.
20. The supporting device as claimed in claim 18, wherein the bracket is provided with an automatic spreading device.

21. The supporting device as claimed in claim 20, wherein the automatic spreading device includes moment driven device and elastic-force driven device.
22. The supporting device as claimed in claim 21, wherein the automatic spreading device is a moment driven device, it is a weight rod positioned on the bracket, and one end of the weight rod is positioned on the bracket. 5
10
23. The supporting device as claimed in claim 18, wherein the bearing block of the interior wall is a predetermined groove or a predetermined flange or a predetermined positioning member. 15
24. The supporting device as claimed in claim 23, wherein the bearing block is mounted on the interior wall of a lower layer.
25. The supporting device as claimed in claim 18, wherein a lower end of the bracket is fixed to the bearing block by a positioning member. 20
26. The supporting device as claimed in claim 25, wherein the positioning member has a locking groove for engaging with a locking protrusion of the bearing block, or the positioning member has a locking protrusion to be engaged in a locking groove of the bearing block, . 25
30
27. The supporting device as claimed in claim 25, wherein the positioning member and the bracket are integral with each other or are made separately. 35
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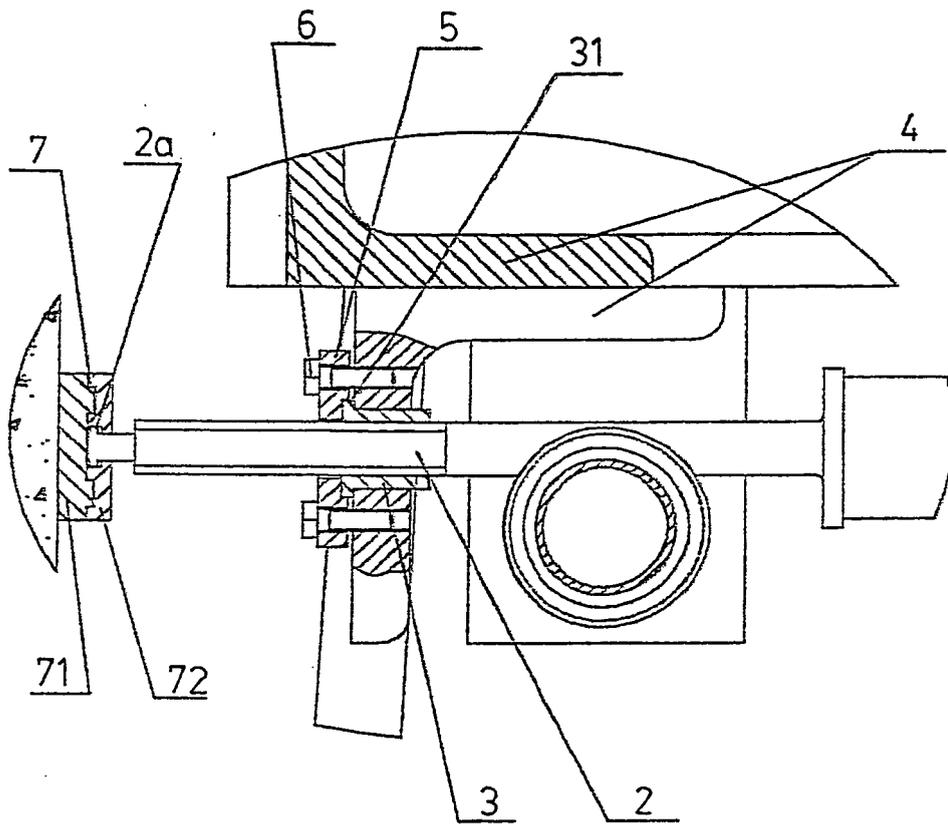


FIG. 2

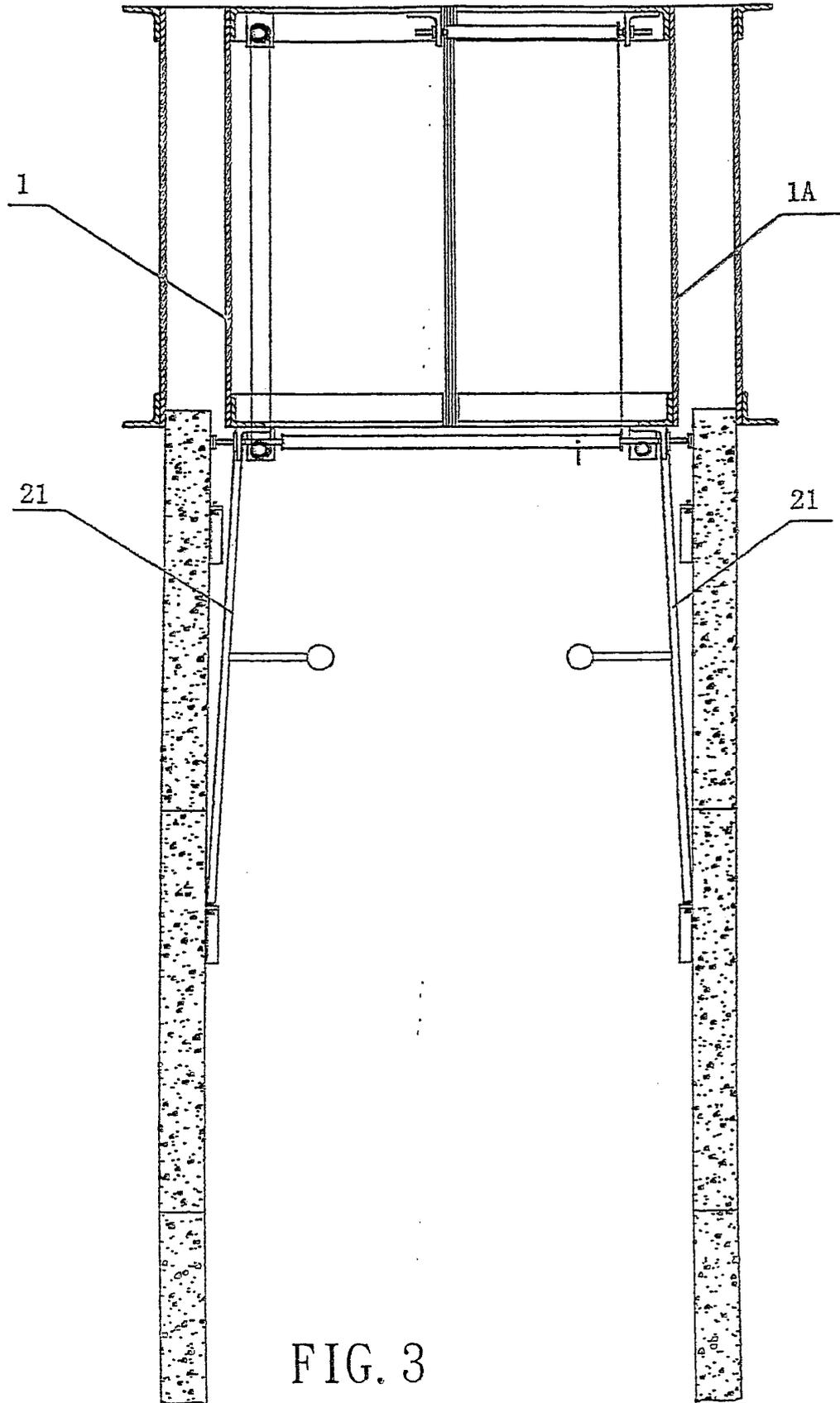


FIG. 3

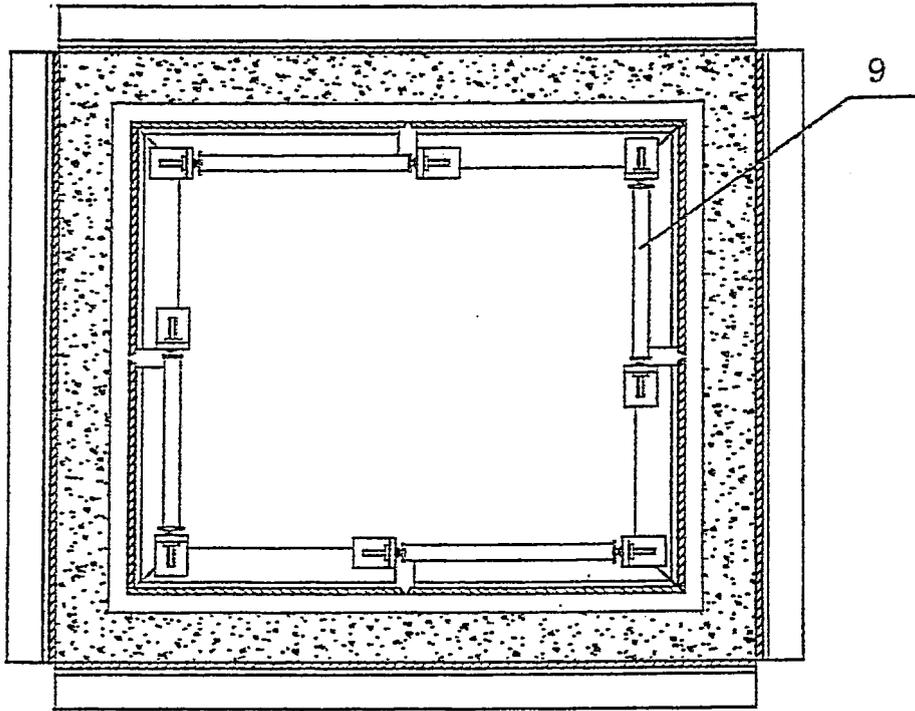


FIG. 4

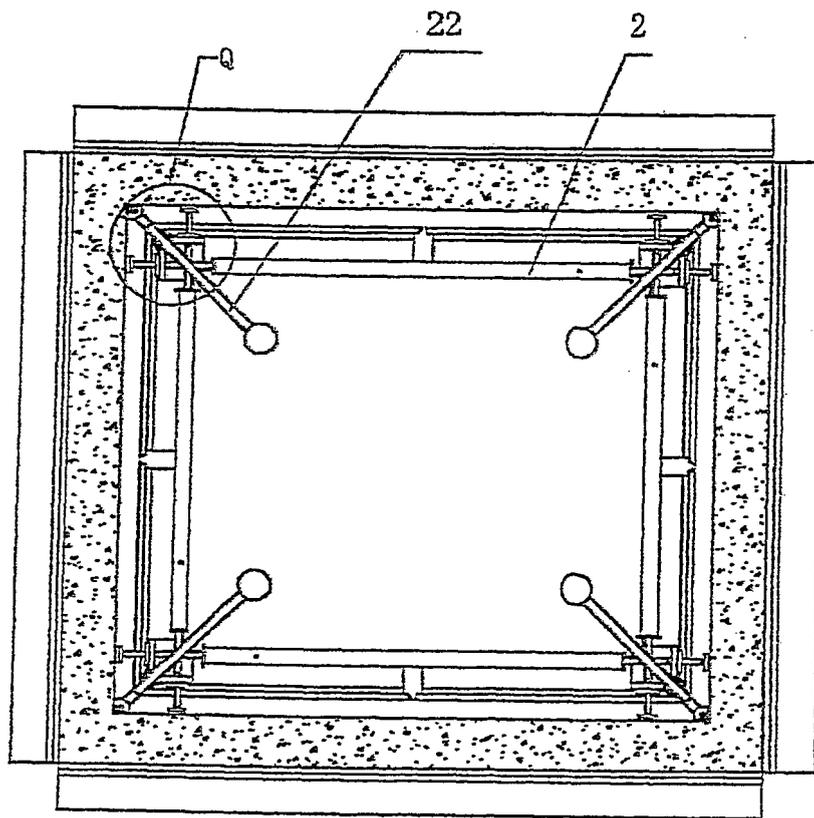


FIG. 5

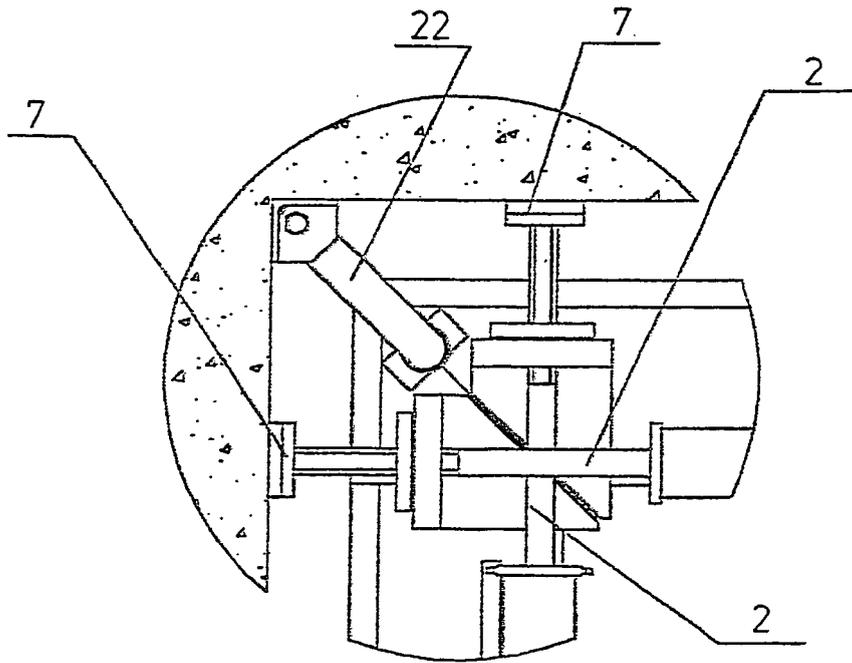


FIG. 6

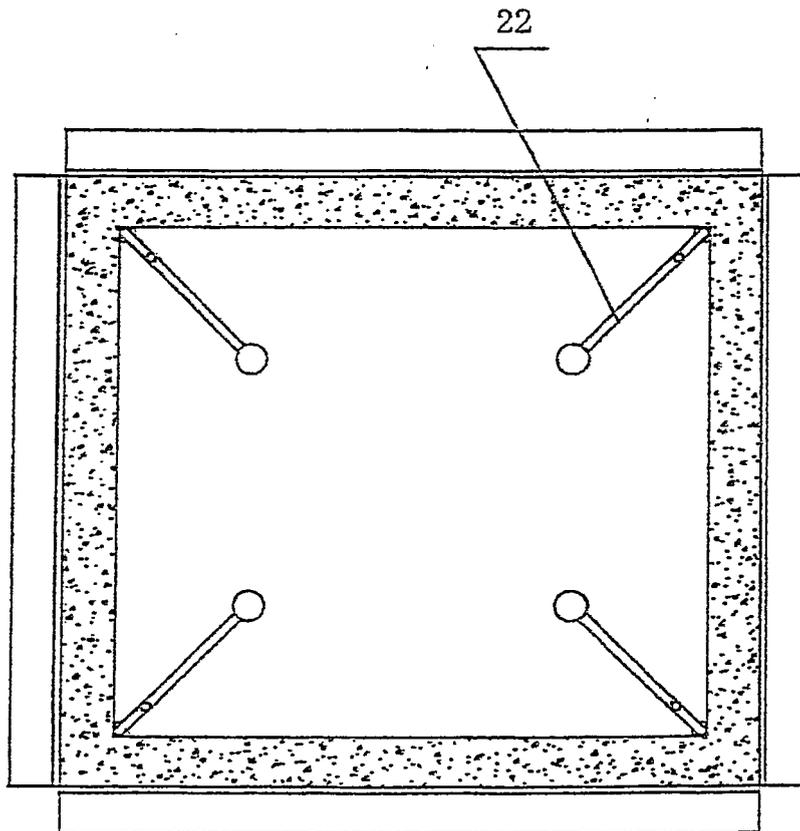


FIG. 7

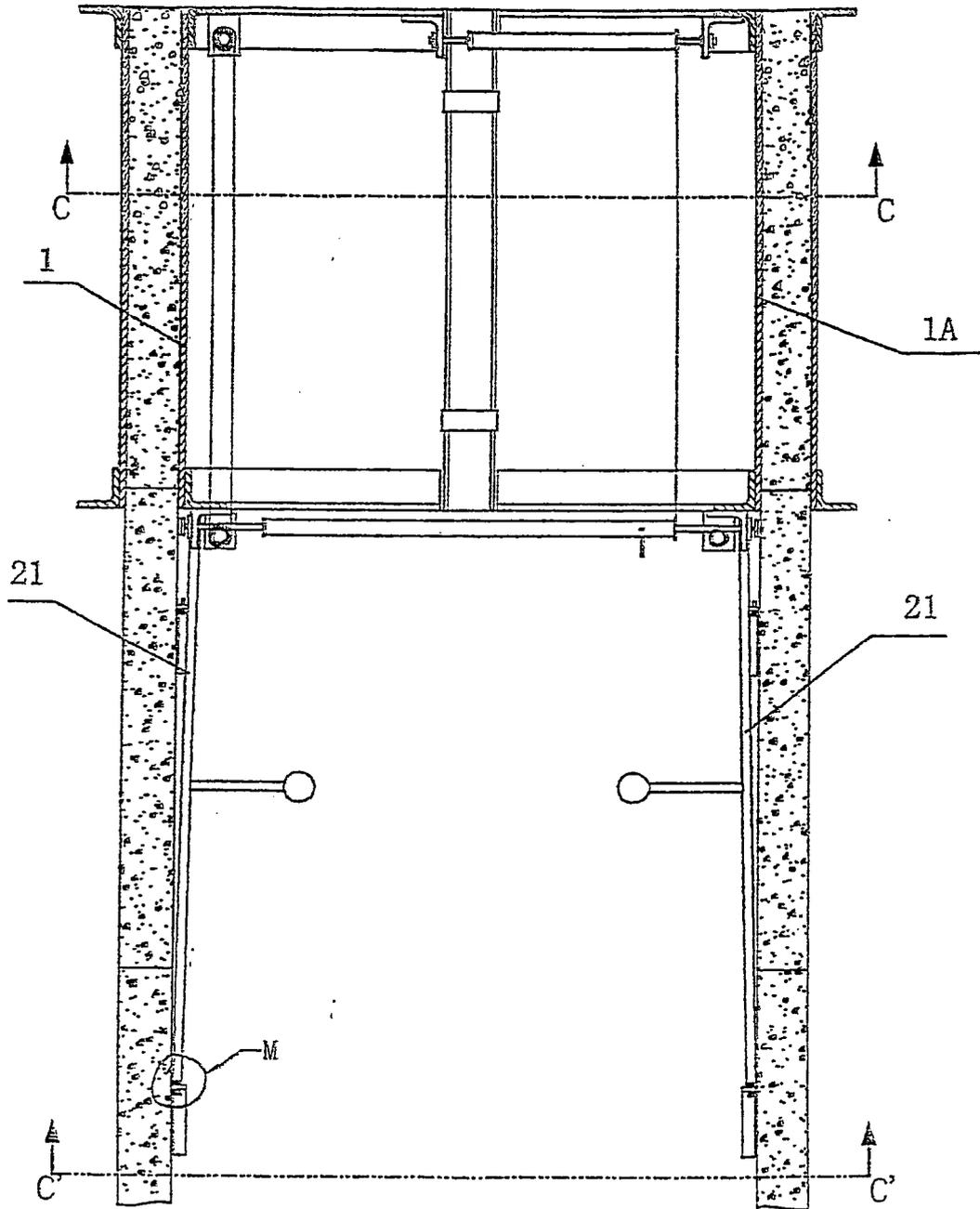


FIG. 8

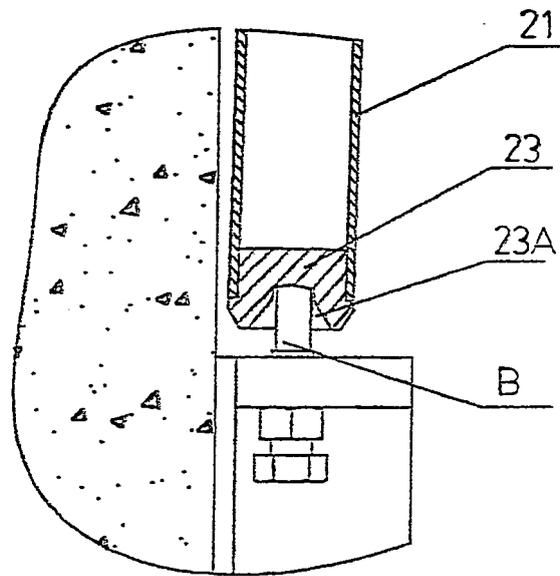


FIG. 9

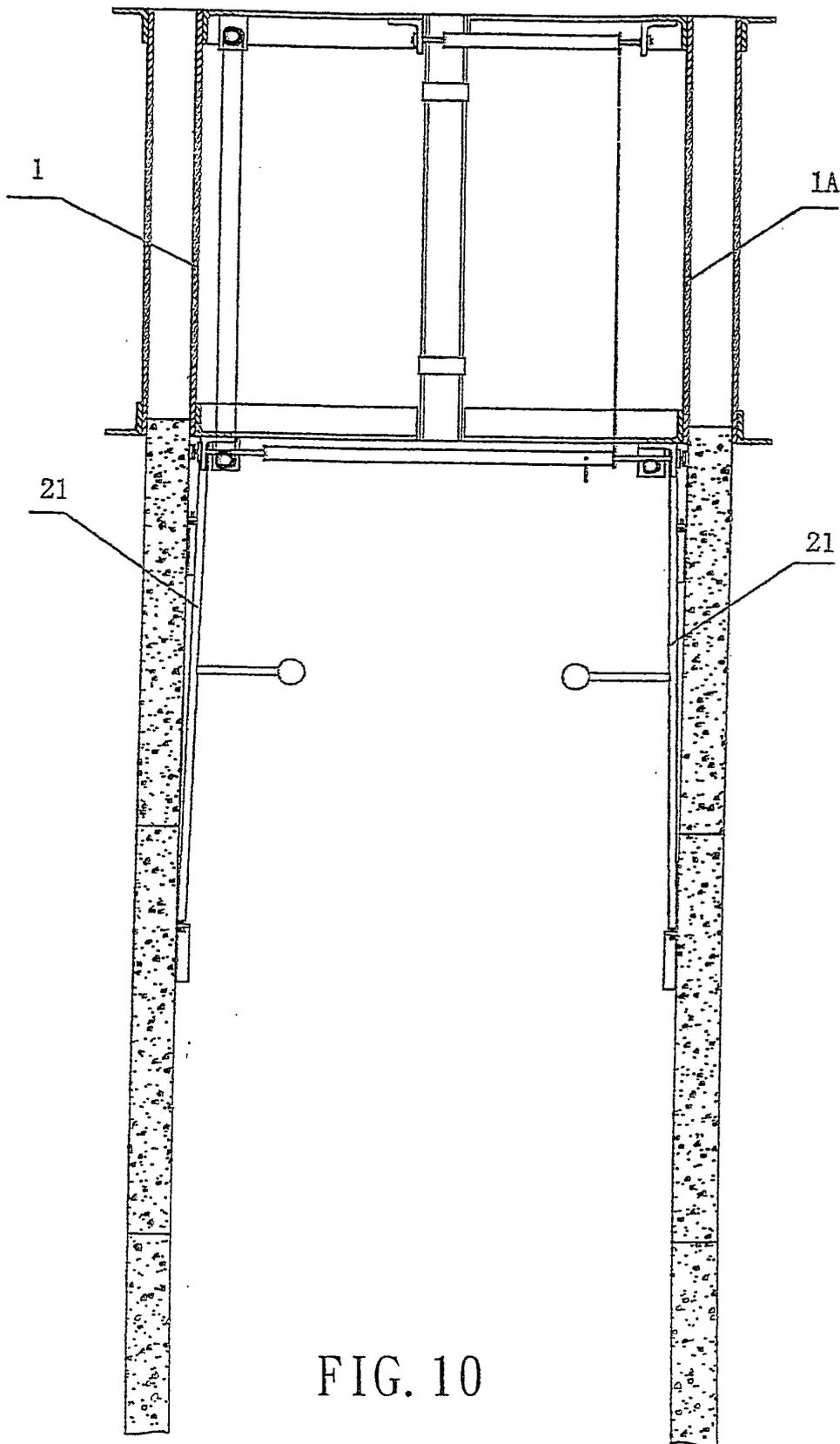


FIG. 10

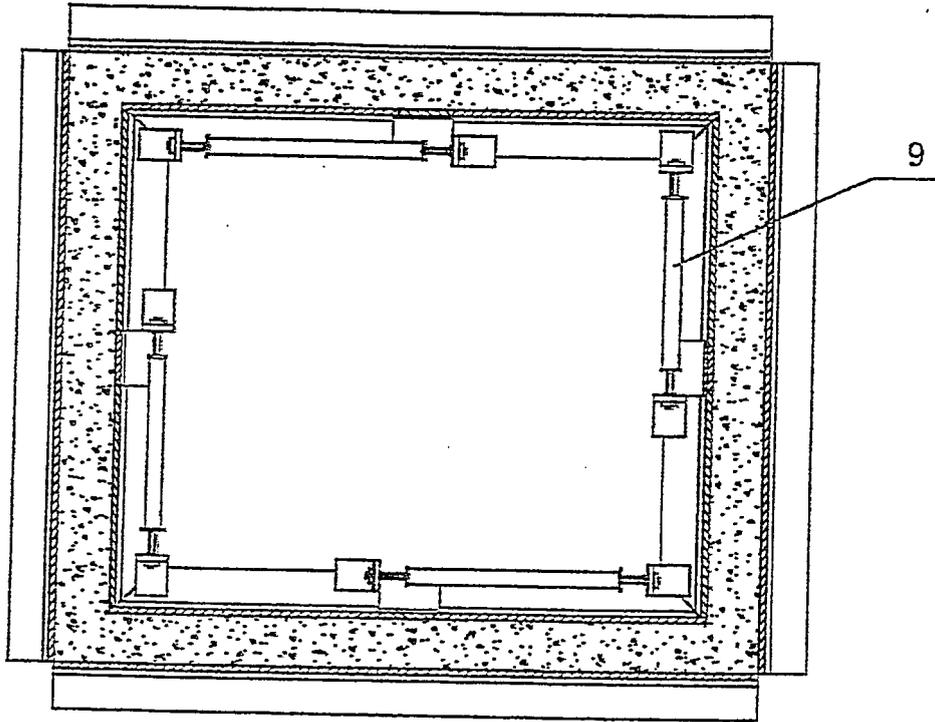


FIG. 11

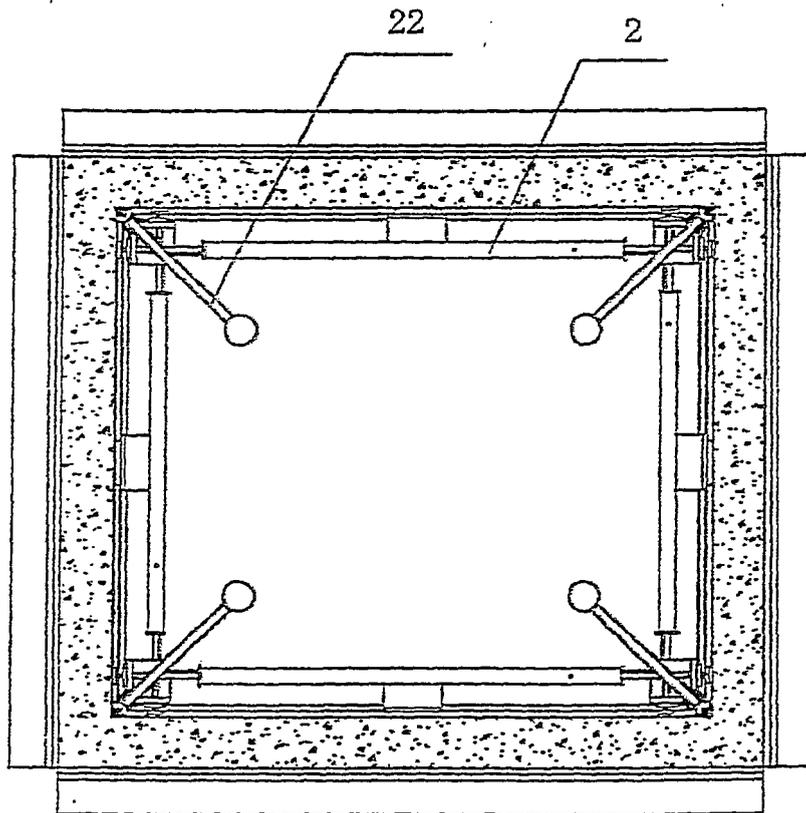


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2004/000072

A. CLASSIFICATION OF SUBJECT MATTER		
Int. Cl ⁷ E04G11/28 E04G11/48		
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)		
Int. Cl ⁷ E04G		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Chinese Patent Document (1985-)		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
EPODOC, WPI, PAJ transverse drive CNPAT, CNKI, 传动机构, 外张		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE3842092A (PERI WERK SCHWOERER KG ARTUR) 21. June 1990 (1990-06-21) the whole document figures 1-3	1-16
A	GB2189831A (EPITESTUDOMANYI INTEZET) 4 November 1987 (1987-11-04) the whole document figures 3-10	1-26
A	US4709899A (SHIMIZU CONSTRUCTION CO LTD) 1. December 1987 (1987-12-01) the whole document figures 10-19	1-16
A	US5630482A (PERI GMBH) 20. May 1997 (1997-05-20) the whole document figures 1-5	1-16
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents:	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>	
"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		
Date of the actual completion of the international search 2004-08-16	Date of mailing of the international search report 09 SEP 2004 (09.09.2004)	
Name and mailing address of the ISA/CN No.6 Xi Tu Cheng Road Haidian District Beijing, P.R.China	Authorized officer FengYun	
Facsimile No. (86-10)62019451	Telephone No. (86-01)62084826	



INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2004/000072

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US4148852 A (MESA IND INC) 10. April 1979 (1979-04-10) the whole document figure 5-6	17-26
A	JP2001140222A (MORIOKA HIDETOSHI) 22. May2001 (2001-05-22) the whole document figure 1-9	17-26
A	CN2457270Y (Wu Zonghe) 31. October 2001 (2001-10-31) the whole document figure	1-26

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2004/000072

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

There is no unity between Claim 5-16 and Claim 17-26

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2004/000072

Citation of document	Pub-date	Family Document	Pub-date
DE3842092A.	1990-6-21	none	
GB2189831A	1987-11-04	none	
US4709899A	1987-12-1	JP62101708A	1987-05-12
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		DE59400455D	1996-08-29
		ES2092397T	1996-11-16
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