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(54) IMPROVED SYSTEM FOR SETTING BLOCKS AND ARCHES FOR THE FORMATION OF SLABS

(57) Improved system for setting blocks and floor arches for the formation of slabs, comprising an assembly consisting of pincers which can turn the blocks and arches in order to form cross-linked asemblies of blocks or arches and place them on a palette, the assembly also comprising an electromechanical cart to lift each of the assemblies or layers of blocks or arches obtained with the pincers to build a slab.

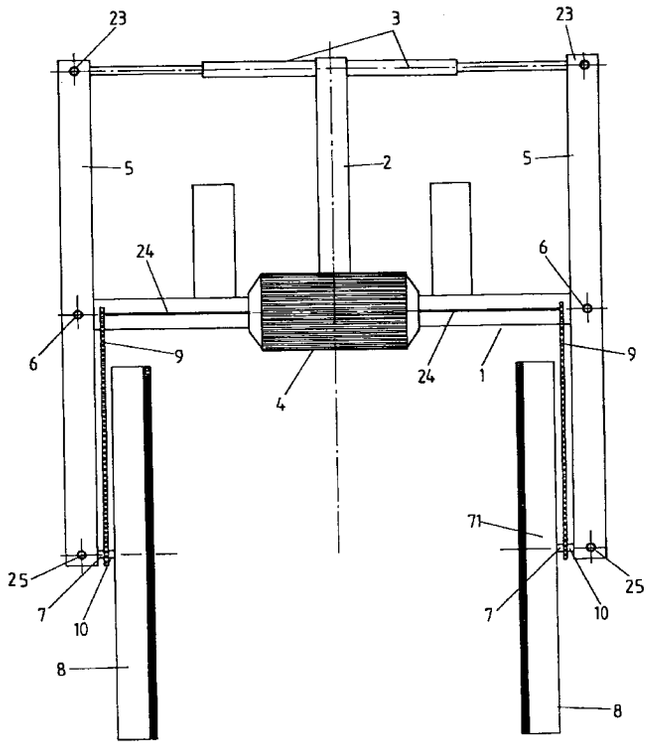

FIG. 1

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Description

[0001] The present invention refers to a system for setting blocks and arches with a grid or one direction configuration for the fomation of slabs in building work, said system representing an outstanding improvement for the formation of structural slabs in buildings.

[0002] The system of the invention mainly consists of a swinging clamp used for placing blocks and arches with a grid configuration, and of a trolley on which those block and arche assemblies are positioned for its further placement in order to provide grid or directional type slabs.

BACKGROUND OF THE INVENTION

[0003] At present there are swinging clamps capable of picking up objects such as blocks and arches from a pallet and revolving them, but with no capabilities to position them as to form a construction assembly.

[0004] On the other hand, and with respect to the use of an electrical fork lift truck used to position grid assemblies, preassembled by said clamp, no disclosures appear in the art.

[0005] As a consequence, the moving and placing of those elements with an average weight of about 25 kgs, is carried out now by manual means, what implies that the operator undergoes the severe stresses caused by picking and placing them up.

DESCRIPTION OF THE INVENTION

[0006] The system for setting blocks and arches forming grid assemblies for the formation of construction slabs, object of the present invention, avoids those inconveniences as it deals with the development of a swinging clamp for blocks and arches, capable of holding a block or arche and revolving it a quarter of a turn, i.e. 90 degrees, either in clockwise direction or in the opposite direction, each machine operation, alternatively, to create a block or arch assembly on a pallet. Further, a lift truck type machine provides said assemblies to form the structural slabs of buildings as compared with the work previously done by manual means.

[0007] In the above manner, one operator with said lift truck will be able to perform all operations, using an electrical control panel incorporated in said lift truck.

[0008] The system of the invention provides another important improvement as to enhance the production performance in the block and arch manufacturing process, since the handling of such elements will be made with the machine, it will be possible to produce larger and heavier elements, thus being capable to obtain twin component grid assemblies, hence improving the work quality and safety, for said assemblies may have only one connection as compared with the usual two connection system used in the art.

[0009] The swinging clamp for blocks and arches holdssaid elements from the position that they were placed by the block and arch manufacturing machine, by exerting pressure on them. First the said elements are placed in horizontal position, and they are turned 90 degrees, i.e. a quarter of turn, to the left, to be deposited vertically on the pallet.

[0010] In a second operation, the swinging clamp will turn 90 degrees to the right, depositing the elements vertically on the pallet, thus forming the grid assembly, opening facing opening and bottom facing towards outside.

[0011] It must be noted that, depending on the element size, the swinging clamp will perform either a quarter of a turn (90 degrees) or half a turn (180 degrees). For example, for 40 x 20 x 40 cms. elements, the swinging clamp will perform half a turn.

[0012] The lift truck object of the present invention consists of a electro-mechanical machine for the preparation of block or arch assemblies for the formation of grid or directional construction slabs, to be used in the handling and positioning of blocks and arches required to provide a construction slab.

[0013] The lift truck operation comprises following operations.

[0014] Once all elements, such as blocks and arches, are placed on the pallet, by means of the swinging clamp, in order to provide a block or arch grid assembly, the lift truck will raise the pallet to about 10 to 30 cms. from the floor, by emans of a motor driving system.

[0015] Further, said lift truck, provided with caterpillar type chains, will move, over the construction slab, to the area where said truck will deposit each block or arch assembly.

[0016] Subsequently, the lift truck will deposit the assembly lower elements on the desired place, lifting the remaining elements 10 to 30 cms.

[0017] It will move to leave the necessary space for the structural iron and the concrete casting, and after said displacement it will deposit next block or arch assembly. The space between the grid assemblies previously positioned will be measured by means of a detector incorporated in the lift truck back side.

[0018] These operation cycles will be repeated until the whole contents of the pallet has been deposited on the slab, then the same process will be followed with a new pallet, till the completion of the slab.

BRIEF DESCRIPTION OF DRAWINGS

[0019] For a better understanding of the description of the present invention, the following drawings are given as an example, showing a practical embodiment of the system for the setting of blocks and arches to form a grid assembly, and the positioning of said element to form a construction slab, object of the present invention.

Fig. 1 is a plan view of the block and arch swinging clamp used to form block or arch grid assemblies.

Fig. 2 is a front view of the block and arch swinging clamp used to form block or arch grid assemblies.

Fig. 3 is a side view of the block and arch swinging clamp used to form block or arch grid assemblies.

Fig. 4A is a plan view of a construction slab with blocks arranged in a grid configuration.

Fig. 4B is a plan view of a construction slab with blocks arranged in a directional configuration.

Fig. 5 is a front view of the lift truck used to handle the blocks or arches to form construction slabs.

Fig. 6 is a side view of the lift truck used to handle the blocks or arches to form construction slabs.

Fig. 7 is a back view of the lift truck used to handle the blocks or arches to form construction slabs.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0020] The system for setting blocks and arches in a grid assembly to form construction slabs, object of the invention, consists of a block and arch swinging clamp to provide block or arch grid assemblies and to deposit said assemblies on a pallet, and of an electro-mechanical fork lift truck used to move each assembly or group of blocks or arches for the formation of construction slabs.

[0021] Hence, the block and arch swinging clamp, used to provide an assembly and to deposit same on a pallet, comprises an iron beam (1) arranged across horizontally, a vertical strut (2) projecting from the beam central upper portion with its upper end fastened to two horizontal hydraulic pistons (3), one on the left and the other on the right, arranged to displace horizontally in opposite senses, and a motor reduction system (4) located on the across beam (1) for the driving of both side shafts (24).

[0022] Two beams (5) are placed on the cross beam (1) ends, at a substantially square angle to the beam (1) and forming a hinged joint (6) with said across beam (1).

[0023] Each one of said beams (5) forms a hinged joint with the respective hydraulic piston (3) end by mans of the connection (23) and having on its opposite end a horizontal shaft (7) housed in said beam connected to a hinged joint (25), said shaft (7) being prepared to support another beam (8), preferably made of rubber covered iron, so that said beam can operate by pressing the blocks or arches and turn them clockwise or anti clockwise a quarter of a turn (90 degrees), to provide the desired arrangement.

[0024] The pressure on the elements is made by means of the hydraulic pistons (3) associated to the hinged joints (6), (23), (25), which are housed in the beam (5).

[0025] The quarter of a turn, clockwise or anticlockwise, is performed by means of the reduction motor system (4) placed on the cross beam (1), from where the shafts (24) proyect such as it has been described above. From each one of the free ends of said shafts (24) one chain (9) projects to the left and another to the right towards the respective horizontal shafts (7) where respective gears (10) on each shaft (7) are engaged to each one of the said chains.

[0026] With this arrangement, the swinging clamp for blocks and arches, holds the elements with the help of the beams (8) in the position in which they have been positioned by the block and arch manufacturing machine, by exerting a pressure on said elements by means of the hydraulic pistons (3) associated to the hinged joints (6), (23) and (25). In this position, the elements held are in horizontal position, from where the beams (8) swing together a quarter of a turn, i.e. 90 degrees, to the left, depositing the element in a vertical position on the pallet.

[0027] In a second collection operation, the beams (8) will together perform a quarter of a turn to the right, depositing the elements in a vertical position on the palet, forming a grid assembly, opening facing openenings and bottoms towards outside.

[0028] Furthermore, in another operation, the electromechanical lift truck used to place block or arch grid assemblies on grid or directional construction slabs may consist of a metal structure (11) with two reduction motors (12) with chains (13) projecting from the truck sides and associated to corrsponding gear mechanisms (14) which transfer the movement to caterpillar type chains (15) that provide a wider support to said lift truck and an improved safety and performance.

[0029] The lift truck also consists of central reduction motor (16) and a drum (17) where two metal cables (18) are wound, each cable projecting in opposite direction with respect to the other, and being used to lift and lower the blocks and srches.

[0030] Cammsahfts (19) are provided on both sides of the lift truck, being driven by a central control (20) and an electrical panel.

[0031] The lift truck is provided with a detector (22) on its back side, to measure the distance between the grid assemblies previously positioned, in orde to leave the necessary space for the iron structure.

[0032] With this arrangement, once all elements such as blocks and arches have been positioned on the pallet by means of the swinging clamp to form grid assemblies, the operator will actuate on the motor starter (20) to start said motor (16), thus making the metal cables (18) wind around the drum (17) and with the aid of a pulley system (21) the motor movement is transmitted to the lifting of the pallet located on the camshafts (19) at approximately 10 t0 30 cms. above the floor.

[0033] After said process, the lift truck will move on the forms in the area where said lift truck must deposit each block or arch assembly or group with the aid of caterpillar type chains (15) driven by the reduction moto (12). The lift truck will then deposit said group of blocks or arches in the desired place and will lift the remaining elements to about 10 to 30 cms., above the floor.

[0034] Further the lift truck will move leaving the required space for the placement of the structural iron

and the concrete casting, to further deposit the following group. This space between the grid assemblies es measured precisely by means of a detector (22) mounted on the lift truck back side.

[0035] These cycles will repeat until the whole pallet contents is deposited on the slab, then said lift truck will proceed to start the same process with a new pallet till all blocks or arches assemblies are positioned in place.

[0036] Once the nature of the present invention as well as an embodiment of the same have been described sufficiently, it is only to be added that it will be possible to make changes in shape, materials and components in its whole or its components, as long as those modificatipons do not change substantially the characteristics of the invention as claimed below.

Claims

1. Improved system for setting blocks and arches for the formation of slabs, to be used in the construction works, characterized in that it consists of a block and arch swinging clamp capable of holding a block or arch to move it a quarter of a turn, i.e, 90 degrees, clockwise or anticlockwise in order to provide a grid assembly on a pallet; and a lift truck capable of positioning each one of said block or arch assemblies or groups to form the structural slabs of buildings.

2. System, according to first claim, characterized in that the block and arch swinging clamp is capable of holding the blocks and arches in horizontal position, by means of a pressure exerted on said elements such as they are delivered by the block and arch manufacturing machine, to move them a quarter of a turn, or 90 degrees, anticlockwise and deposit them in a vertical position on a pallet, and in a second operation moving a quarter of a turn clockwise to deposit the elements in vertical position on said pallet, to form a grid assembly, opening facing openning and bottoms toward outside.

3. System, according to precedent claims, characterized in that the swinging clamp consists of a iron beam (1) arranged across horizontally, a vertical strut (2) projecting from the beam central upper portion with its upper end fastened to two horizontal hydraulic pistons (3), one on the left and the other on the right, arranged to displace horizontally in opposite senses, and a motor reduction system (4) located on the across beam (1) for the driving of both side shafts (24).

4. System, according to precedent claims, characterized in that two beams (5) are mounted on the cross beam (1) ends and substantially perpendicular to said cross beam (1), with a hinged joint (6) for connection to said cross beam (1).

5. System, according to precedent claims, characterized in that each one of said beams (5) forms a hinged joint with the respective hydraulic piston (3) end by mans of the connection (23) and having on its opposite end a horizontal shalt (7) housed in said beam connected to a hinged joint (25), said shaft (7) being prepared to support another beam (8), preferably made of rubber covered iron, so that said beam can operate by pressing the blocks or arches and turn them clockwise or anti clockwise a quarter of a turn (90 degrees), to provide the desired arrangement.

6. System, according to precedent claims, characterized in that the pressure on the elements is exerted by means of hydraulic pistons (3) associated to the hinged joints (23, (6) and (25) housed in the beam (5).

7. System, according to precedent claims, characterized in that the quarter of a turn anticlockwise or clockwise of the elements is performed by the reduction motor (4) mounted on the cross beam (1), from where the said shafts (24) project, with corresponding chains (9) stretching, one on the left and the other to the right, towards the respective horizontal shafts (7) wherein associated gears (19) are engaged on ezch shaft (7) with each one of the said chains.

8. System, according to precedent claims, characterized in that the swinging clamp can turn the elements half a turn or 180 degrees, in the case that elements structure required it.

9. System, according to precedent claims, characterized in that said lift truck to be used for mounting grid assemblies is capable of holding the blocks and arches previously deposited as grid assemblies on the pallet and od lifting them about 10 to 30 cms above floor, of moving on the slab forms, to deposit the block and arches of the assembly in the desired place, lift the remaining elements of the pallet y move again towards next position, leaving the necessary space for the ribs of forms or beams

10. System, according to precedent claims, characterized in that the lift truck used for mounting blocks or arches consists of a metal structure (11) provided with two reduction motors (12) and chains (13) connected to both sides and engaged with corresponding gear mechanisms (14) which transfer the movement to caterpillar type chains (15) used for the lift truck displacement on the floor.

11. System, according to precedent claims, characterized in that the lift truck is also provided with a central reduction motor (16) and a drum (17) where two

metal cables (18) are wound, each one proyectin to opposite side with respect to the other, used to lift or lower the block and arch assemblies.

12. System, according to precedent claims, characterized in that camshafts (19), driven by a central control (20) and an electrical panel, are mounted on both sides of the block or arch assemblies handling lift truck.

13. System, according to precedent claims, characterized in that a detector (22) is mounted on back side of the lift truck used for handling blocks and arches, said detector designed to measure the distance between block and arch assemblies ribs previously positioned in order to leave the necessary space for said ribs.

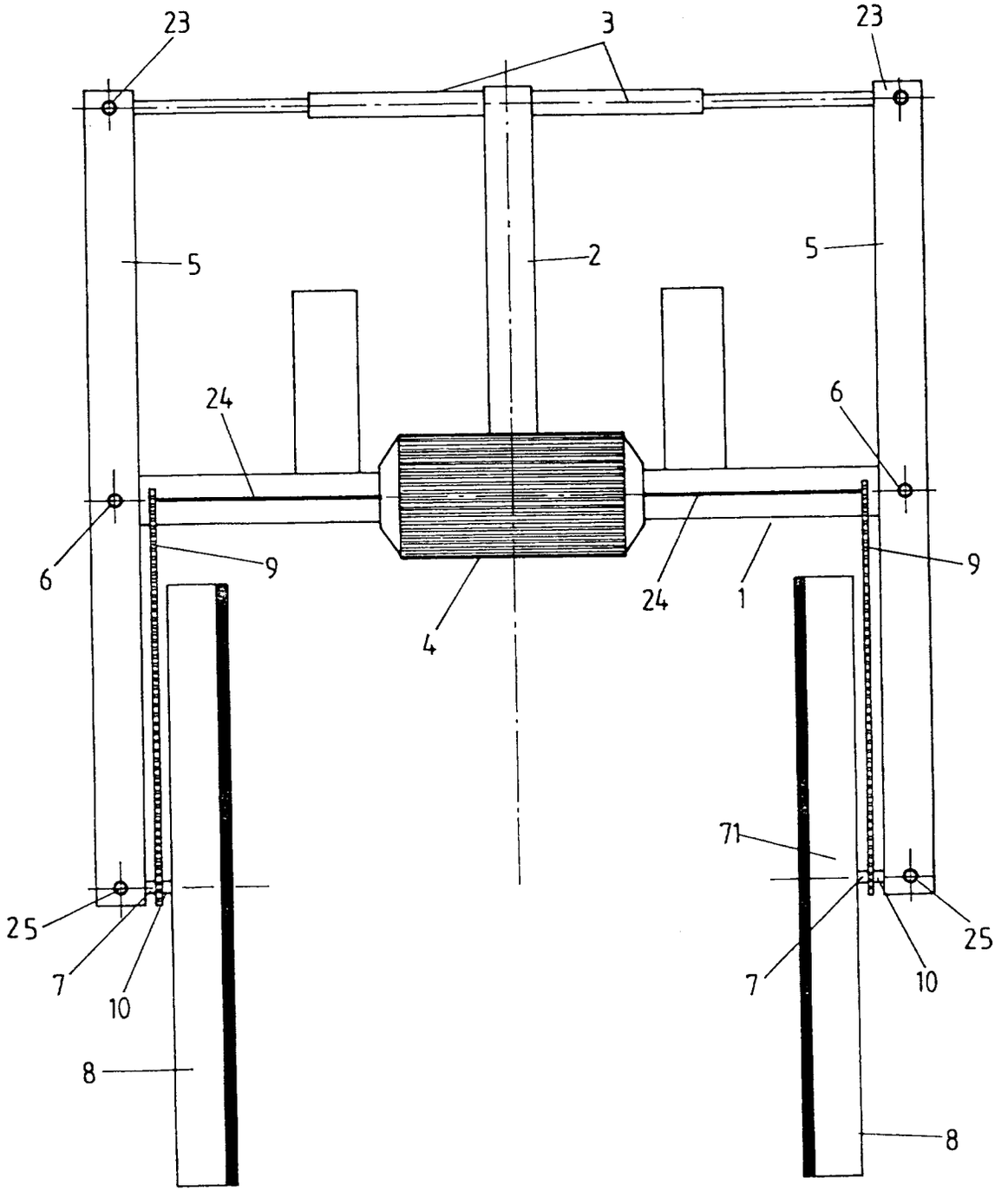

FIG. 1

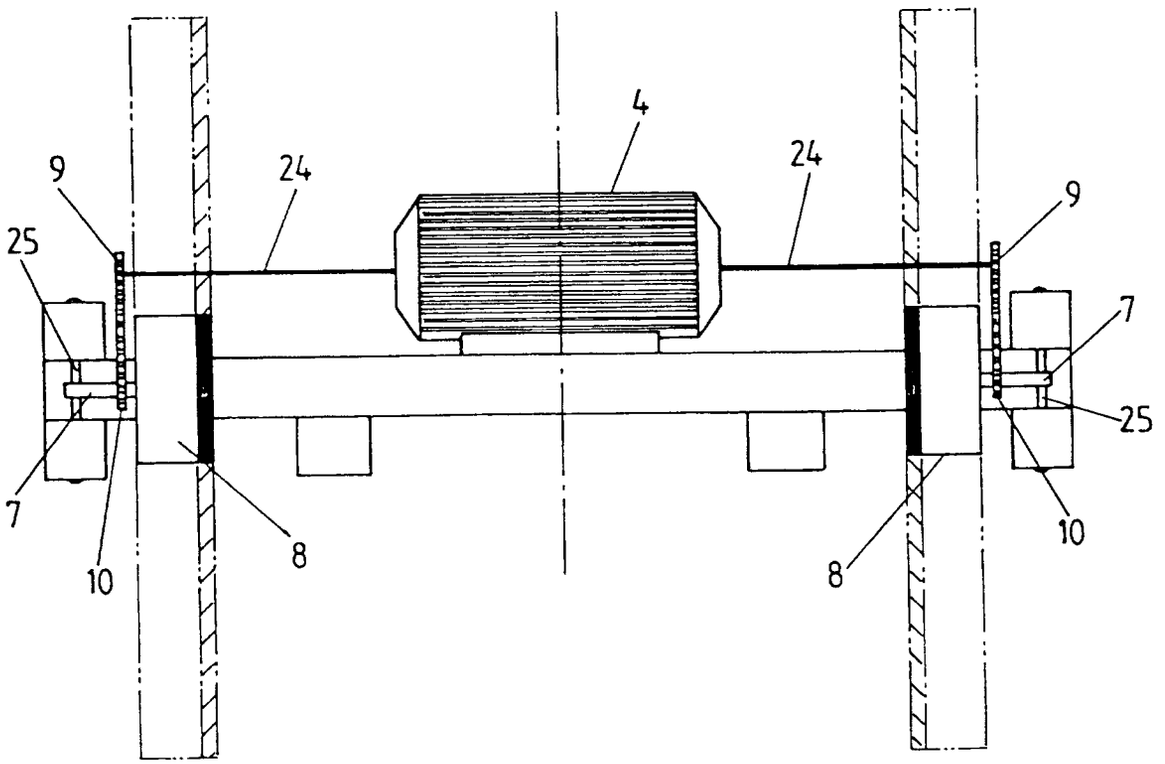

FIG. 2

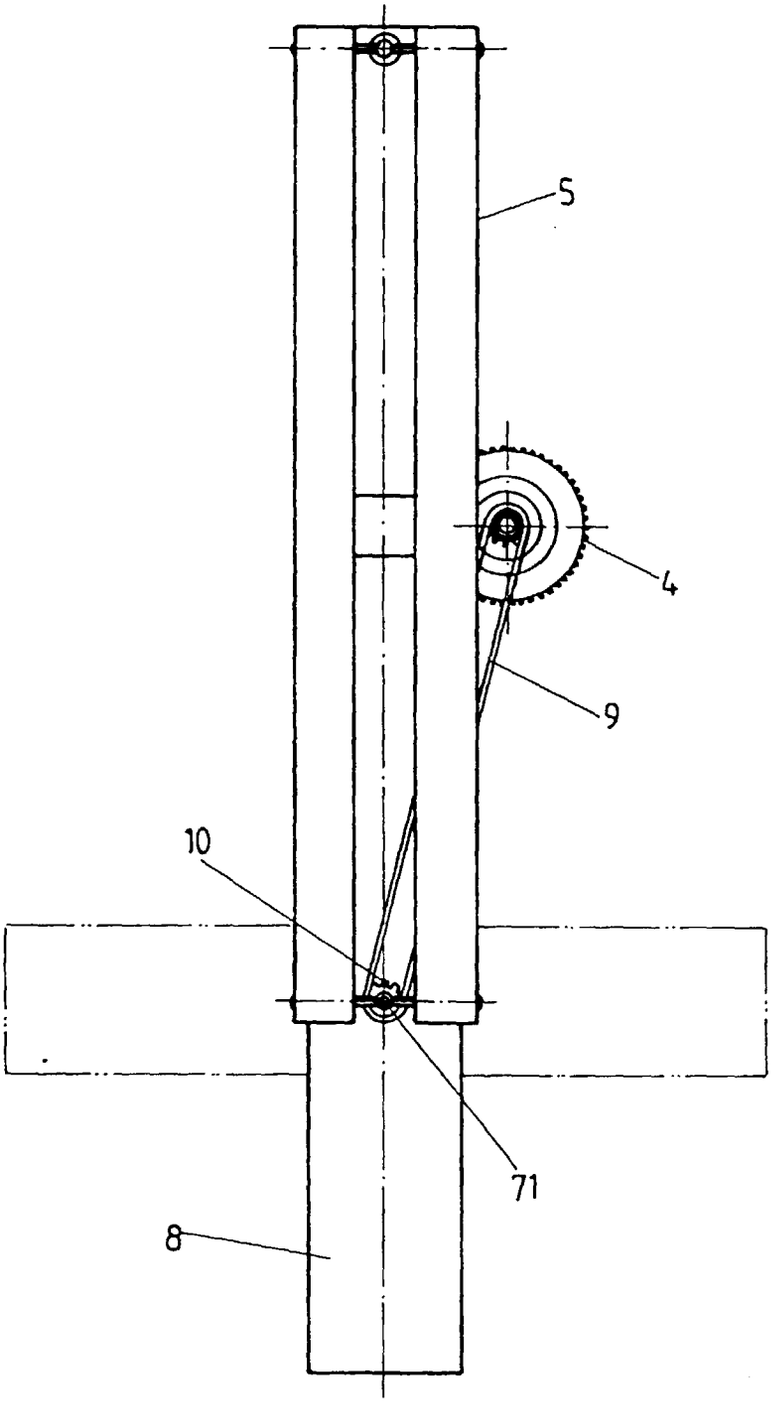

FIG. 3

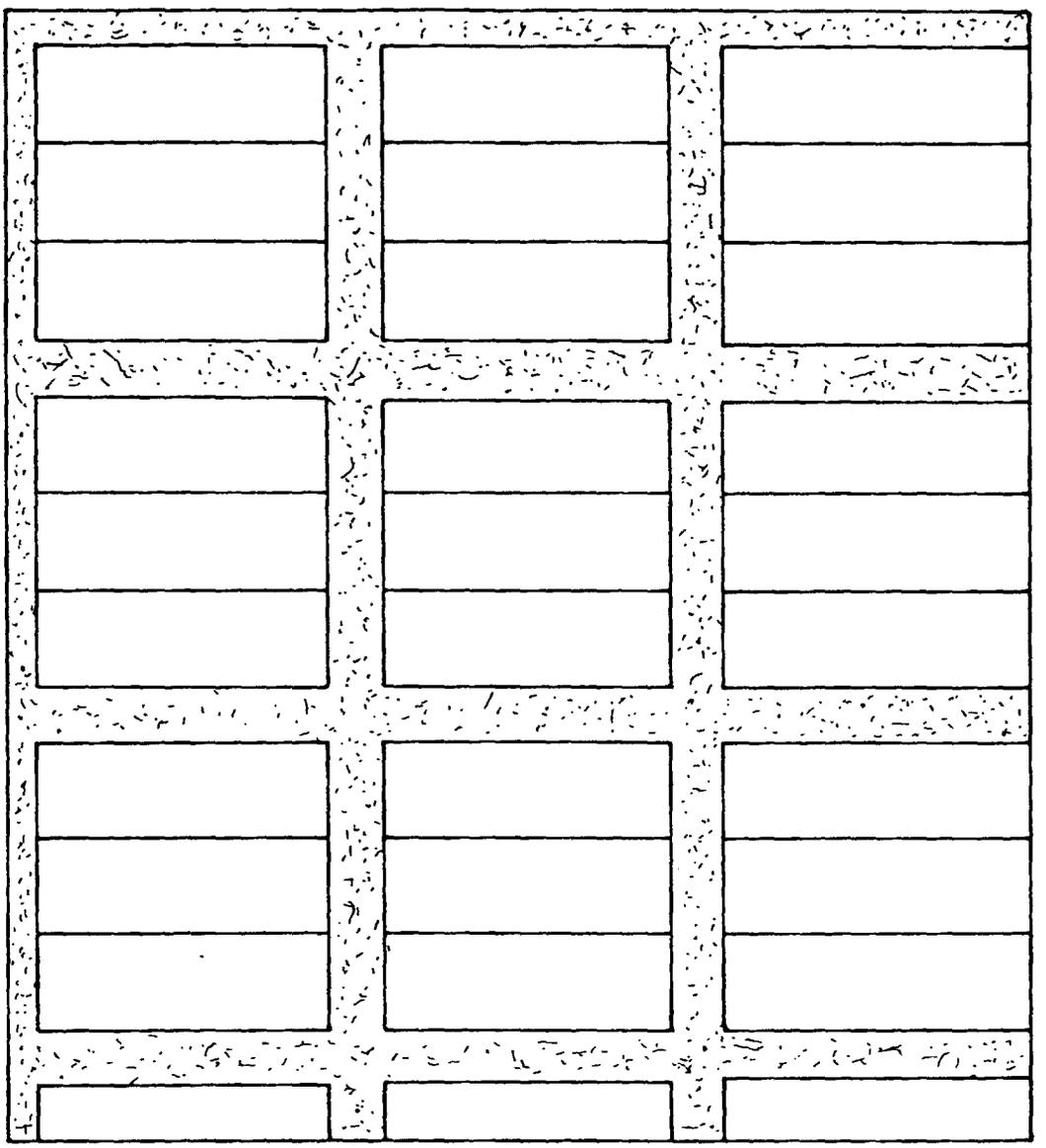

FIG. 4A

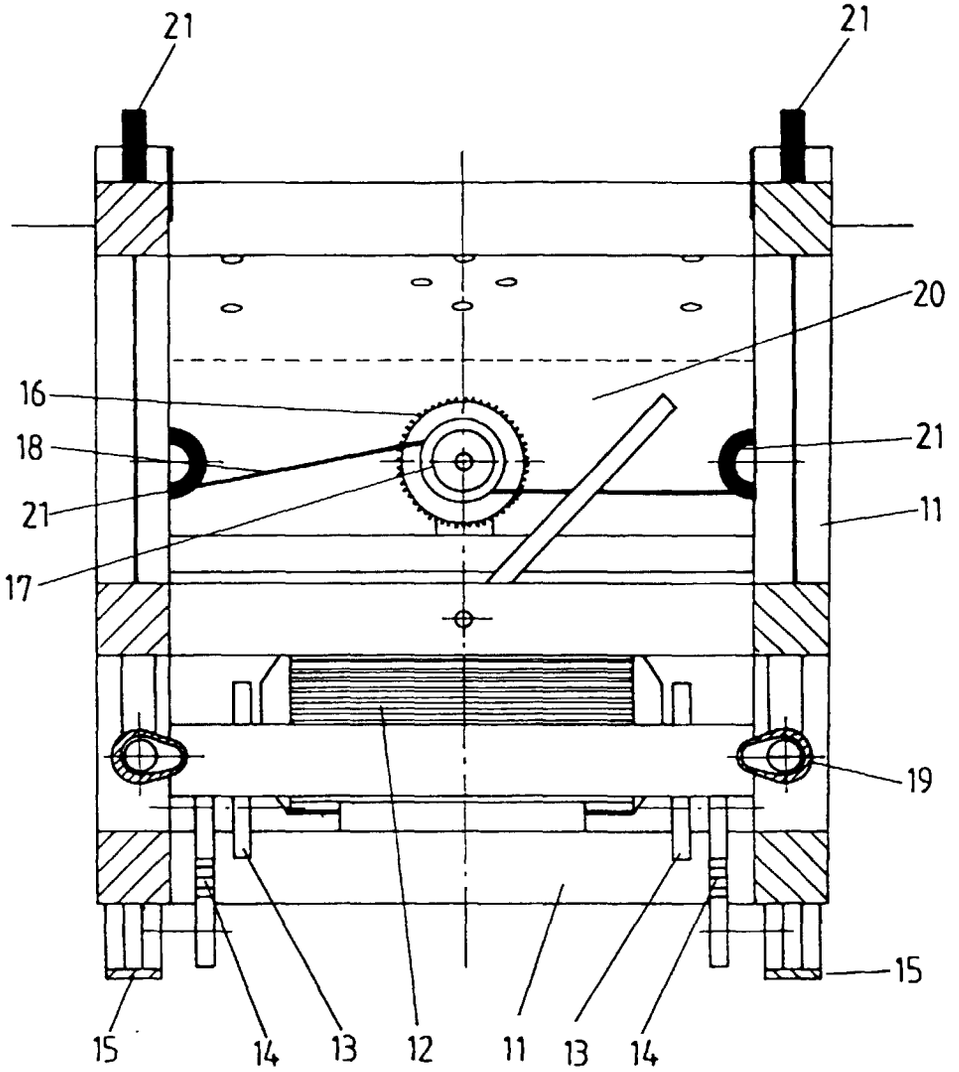

FIG. 5

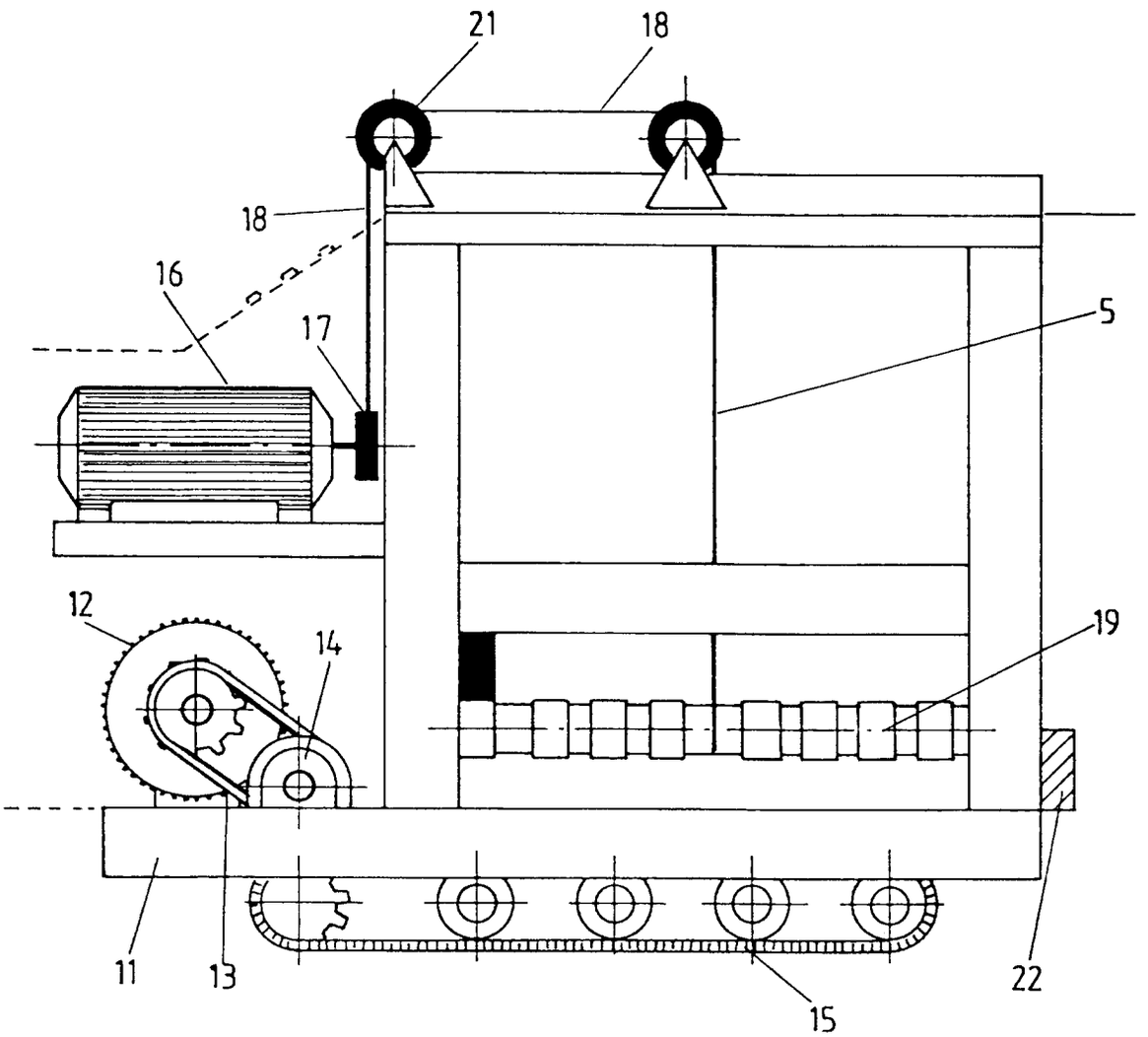

FIG. 6

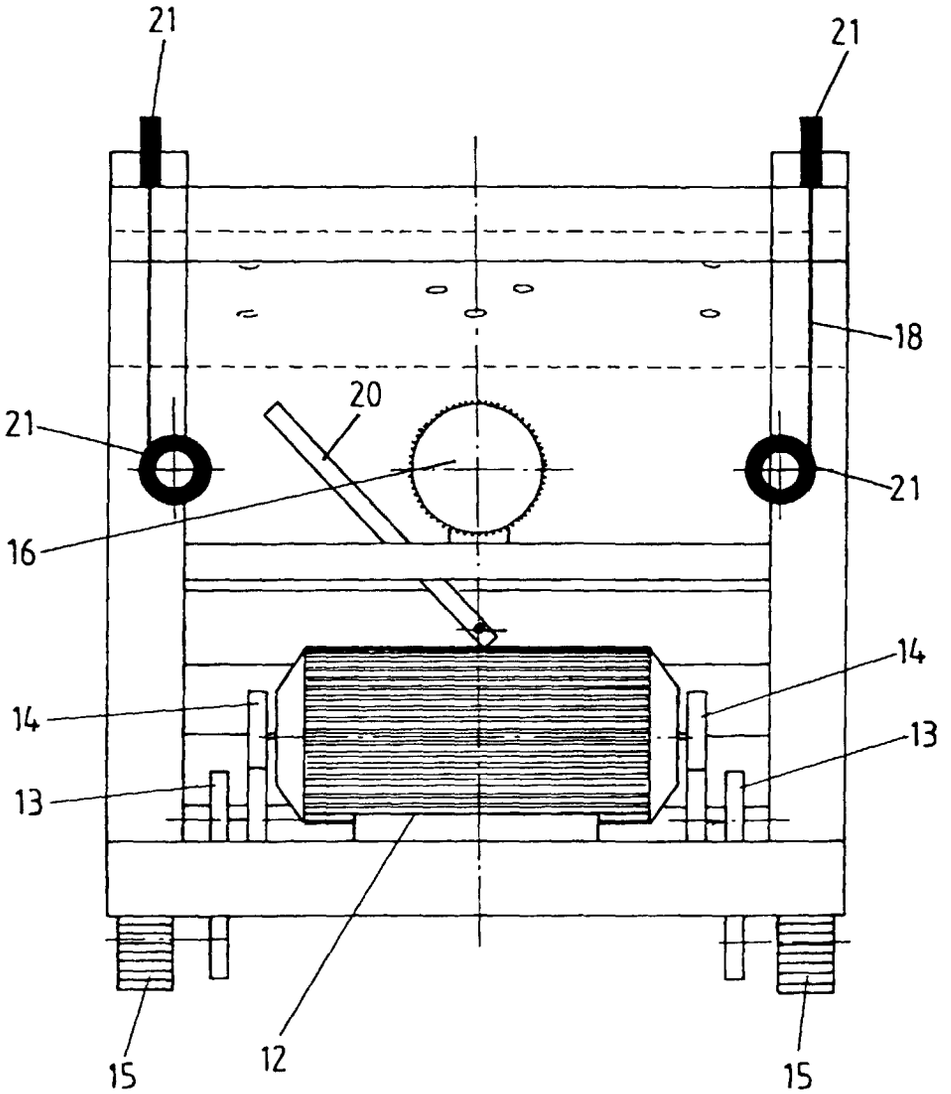

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 98/00134

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6: D04G 21/16, B66F 9/06

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 6: E04G 21/14, 21/16, B66F 9/18, B65G 47/+, E01C+

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)

WPI, EPODOC, ECLA, UCLA, CIBEPAT

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ES 1032540 U (M.A.I.C. TECNICOS, S.A.) 01 May 1996 (01.05.96), page 3, lines 13-16; page 4, line 19 - page 6, line 7; figures	1-6,9,11
A	US 4168130 A (BARTH et AL) 18 September 1979 (18.09.79); abstract; figures	1,9
A	ES 0337852 A (HENKEL MASCHINENFABRIK) 16 March 1968 (16.03.68), page 2, lines 21-28; figures	1
A	DE 3103748 A (TRANSPORT UND FÖRDERANLAGEN) 21 August 1982 (21.08.82), abstract; figures	1,2

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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 August 1998 (28.08.98)	10 September 1998 (10.09.98)
Name and mailing address of the ISA/ S.P.T.O.	Authorized officer
Facsimile No.	Telephone No.

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