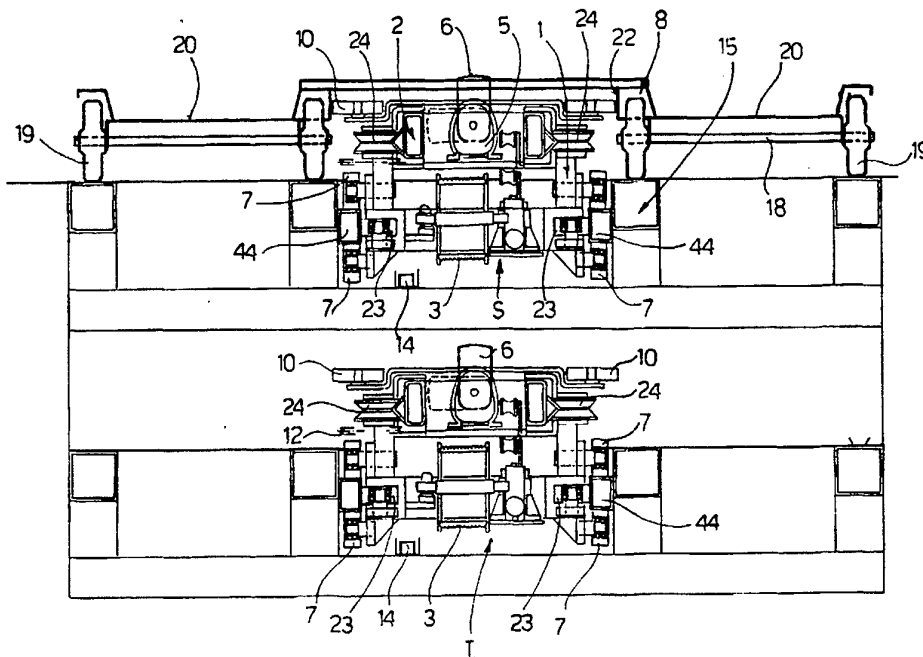




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(54) Title: SYSTEM FOR HANDLING CARS IN TOWER GARAGES



(57) Abstract

A system for handling cars in tower garages, comprising a platform (15) that can be moved horizontally and vertically, provided with at least one group of telescopic trolleys (I, S), each consisting of a main trolley (1) guided in the platform (15) and a secondary trolley (2), positioned above the main trolley (1) and guided in it, movement of the trolleys (1) and (2) taking place by means of cable coils (16, 13, 28), the secondary trolley (2) having a lever (6) that can be moved transversally to the direction of movement, to couple with a flatbed (8) designed to support a car, by entering a seating (46) provided in said flatbed.

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DESCRIPTION**SYSTEM FOR HANDLING CARS IN TOWER GARAGES**

The present invention relates to a system for handling cars in tower garages, and more particularly to a system for picking up and setting down the flatbeds bearing the cars in the parking areas or in the entry and exit rooms.

- 5 As is known, a tower garage with an automatic parking system comprises a plurality of parking areas, hereafter called stalls, disposed on several levels.

Special platforms with wheels are provided for moving and supporting the cars, said platforms being maneuvered by the garage handling mechanism, which can be moved
10 horizontally along the corridors between the various rows of stalls and raised to the height of the various levels.

The handling mechanism comprises a platform that contains two trolleys placed one on top of the other, to allow the flatbeds to be exchanged.

15

In each stall and each garage entry and exit room there is always a flatbed which may be empty or have a car on it. The platform of the handling mechanism too always has either with an empty flatbed in the lower trolley or a full flatbed in the upper trolley.

- 20 When a flatbed with a car has to be removed from the entry room or from a stall, the mechanism positions itself in front of the room or in front of the stall and picks up the flatbed with the upper trolley. Subsequently, it rises to a suitable height and, by means of the lower trolley sets down an empty flatbed in place of the one picked up.

- 25 Setting down of a flatbed with car in the exit room or in a stall takes place in the same way, inverting the operations described: first the system picks up the empty flatbed with the lower trolley and then sets down the full flatbed with the upper trolley.

- The devices currently used for shifting flatbeds from the parking area to the platform of the
30 handling mechanism and vice versa are rather complicated and costly. Normally, they require different motorizations for moving the trolley and picking up the flatbed, and therefore they are more subject to the risk of breakage or failure.

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Furthermore, the known devices do not guarantee that the flatbed is centered, hence complicated auxiliary centering devices must be used.

The aim of the invention is to eliminate the above drawbacks, providing a car handling
5 system for tower garages that is simple and reliable and permits automatic centering of the platforms.

This aim is achieved according to the invention by providing for each flatbed handling
trolley to be of a telescopic type and made up of a main trolley and a secondary trolley,
10 guided one inside the other and inside the garage handling mechanism platform, both transversely or horizontally and vertically.

The platform is coupled for handling by means of a simple lever situated on the secondary
trolley, which is rotated until it engages with a slot underneath the flatbed.

15

Telescopic sliding of the two trolleys, the main one and the secondary one, is achieved by means of cable arrangement and a motorized winch mounted on the main trolley.

Further characteristics of the invention will emerge more clearly from the detailed
20 description that follows, referring to a purely exemplary, and therefore non-limiting, embodiment, illustrated in the appended drawings, in which:

Figure 1 is a top plan view of a car-bearing flatbed;

25 Figure 2 is a side view of the flatbed in Figure 1;

Figure 2a is an enlargement of a detail of figure 2;

Figure 3 is a cross section of the flatbed;

30

Figure 4 is a schematic plan view of a group of telescopic trolleys of the handling system according to the invention;

Figure 4a is a side view of the group of trolleys in figure 4;

35

Figure 5 is a cross section of the platform of the handling system, provided with two groups of telescopic trolleys, the upper one having a flatbed;

- 3 -

Figure 6 is a plan view showing the upper telescopic trolley group of the handling platform completely extended and in the flatbed coupling stage;

Figure 6a is a side elevation of the device in Figure 6;

5

Figure 6b is an enlargement of the detail in Figure 6a relating to the flatbed coupling system;

Figure 6c is an enlargement of the upper central part of figure 6a;

10 Figure 7 schematically illustrates the cable arrangement of the main trolley;

Figure 8 schematically illustrates the cable arrangement of the secondary trolley.

Figure 9 is an axonometric schematic view of a group of telescopic trolleys mounted on the
15 platform of the handling mechanism;

Figure 10 is a schematic view of the handling platform assembly shown in longitudinal section (top) and in a plan view (bottom) and a plurality of stalls disposed on several levels, each with an empty flatbed.

20

With reference first to figure 10, a part of the tower garage is illustrated therein, comprising a plurality of parking areas or stalls 40, disposed on several levels, each provided with a flatbed 8 to support a car (not shown). Inside the tower garage a mobile platform, indicated as a whole by reference number 15, can be translated horizontally and raised vertically. This
25 platform 15 has a lower group of telescopic trolleys I and an upper group of telescopic trolleys S, perfectly identical to each other, for picking up and setting down the flatbeds 8, as will be better described below.

As can be seen more clearly in Figures 1 to 3, each flatbed 8 comprises a metal frame that
30 supports two longitudinal tracks 20, designed to receive the wheels 42 of a car, only one of which is shown schematically in figures 2 and 2a. The two tracks 20 have at one end a housing saddle 17 for the front wheels of the car, so as to form a reference point for positioning of the car.

35 The flatbed 8 has a plurality of wheels 19, mounted in pairs on axles 18, that allow the flatbed to be translated longitudinally.

- 4 -

In each stall 40 a pair of saddles 9 is provided (see particularly Figure 6a) designed to block the outermost wheels of the flatbed 8 to prevent spontaneous movements of the flatbed itself.

- 5 In the lower middle part of the flatbed 20 two vertical guiding surfaces 22 are provided to allow alignment with the telescopic trolley I or S, which will now be described in detail.

Each telescopic trolley assembly I or S comprises a main trolley 1 and a secondary trolley 2, sliding in each other.

10

The main trolley 1 translates inside the fixed structure of the platform 15, by means of four pairs of idle rollers 7, with a horizontal axis and two pairs of idle rollers 23, with a vertical axis, which guarantee its horizontal and vertical alignment, sliding along the walls of the respective rectangular section bars 44, integral with the mobile platform 15 (see particularly

15 Figure 5).

The secondary trolley 2, mounted on the main trolley 1, and positioned above it, comes out telescopically guided by a series of idle wheels 24 with V-shaped grooves on vertical axes supported by the main trolley 1.

20

The upper part of the secondary trolley 2 slips into the central seating, provided with lateral guides 22, of the platform 8 and, during transfer of the platform, it guarantees horizontal centering, by means of idle rollers 10, with a vertical axis, integral with the trolley and engaging with said vertical guides 22 of the flatbed.

25

The movement of the main trolley 1 is obtained by means of a winch assembly 3, mounted on the trolley itself, as shown schematically in figure 7, on which a cable 16 winds, the two ends of which are secured at two corresponding points of the platform 15. Thus rotation in one direction of the winch 3 results in translation in a certain direction of the main trolley 1, and rotation in the opposite direction of the winch results in translation of the trolley in the other direction.

30

The secondary trolley 2 is moved in one direction and the other by means of two respective cable arrangements 13 and 28, which are perfectly symmetrical (see particularly figures 8 and 9) and have a respective fixed end 26 on the main trolley 1 and the other fixed end 27 on the secondary trolley 2. Two idle pulleys are provided for each cable arrangement 13; 28: one 12 on the platform 15 and the other 11 integral with a respective end of the main trolley 1.

35

- 5 -

The cable arrangement 13 causes the secondary trolley 2 to come out telescopically, whilst the cable coil 28 causes it to return, following a movement in the corresponding direction of the main trolley 1 obtained by means of the winch 3.

5 With the cable arrangements 13 and 28 thus set up, that is with the pulley 11 integral with the main trolley 1 and the pulley 12 integral with the platform 15, if the main trolley 1 moves a distance X, the secondary trolley 2 will move twice as far; this movement is added to that of the main trolley, thus providing a total movement of the secondary trolley 2 equal to 3 X, as shown schematically in Figure 6a.

10

Coupling of the secondary trolley 2 to the flatbed 8 in order to pull the latter takes place by means of a lever 6 that can rotate through 90° transversally to the direction of movement, driven by a geared motor 5 mounted on the secondary trolley 2 (see detail in figure 6b). The lever 6, which is coated with hard rubber 30, enters a transversal seating 46 provided in the
15 flatbed 8, and created by cross pieces 29 equipped with a suitable draft 21 (Fig. 1)

Power is supplied to the system by means of a supply chain 14 supporting electrical cables, which supply the winch 3 and a cable winder 4 which supplies the geared motor assembly 5 (see particularly Figure 6c).

20

From what is described the advantages of the handling system according to the invention are obvious, in that it allows automatic centering of the flatbed 8, thanks to engagement of the rollers 10 and the secondary trolley 2 with the inside guides 22 of the flatbed, and it allows rapid and simple movement of each group of telescopic trolleys, through operation
25 of the winch 3. The flatbed 8 is coupled in an extremely simple manner, through rotation of the hooking lever 6 by means of the geared motor 5.

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CLAIMS

1. A system for handling cars in tower garages, comprising a horizontally and vertically mobile platform (15) and having at least one group of trolleys (I, S) for translation of a respective flatbed (8) designed to support a car, characterized in that each group of trolleys (I, S) comprises a main trolley (1) and a secondary trolley (2), that slide telescopically one
5 inside the other and are operated by a single motorization, said secondary trolley (2) bearing a coupling means (6) suitable for engaging the flatbed (8) when it is to be pulled.
2. A system according to claim 1, characterized in that the telescopic movement of said trolleys (1, 2) takes place by means of cable arrangements (16, 13, 28).
- 10 3. A system according to claim 2, characterized in that said main trolley (1) can be moved in one direction or another by means of a winch (3), integral with it, onto which said cable arrangement (16) winds, its ends (25) being secured to two opposite points of said platform (15).
- 15 4. A system according to claim 2 or 3, characterized in that said cable coils (13, 28) are perfectly symmetrical to each other and have a respective fixed end (26) on said main trolley (1) and the other fixed end (27) on said secondary trolley (2), passing on two idle pulleys, one (12) integral with the platform (15) and the other (11) integral with a corresponding
20 end of the main trolley (1) so that one of said cable arrangements (13, 28) causes the secondary trolley (2) to come out telescopically through translation in this direction of the main trolley (1) and the other cable arrangements cause it to return through translation in the opposite direction of the main trolley (1).
- 25 5. A system according to claim 4, characterized in that movement of said secondary trolley (2) is multiplied with respect to the movement of said main trolley (1).
6. A system according to claim 1, characterized in that said means for coupling the secondary trolley (2) to the flatbed (8) consists of a lever (6) that can be moved
30 transversally to the direction of movement of the trolley, from a resting position in which it allows the trolley to be inserted beneath the flatbed, to an operating position in which it engages in a seating (46) created in the flatbed (8).
7. A system according to claim 6, in which said lever (6) is coated with hard rubber (30) and
35 said seating (46) is created by two cross pieces (29) of the flatbed (8), provided with respective drafts (21).

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8. A system according to claim 6 or 7, characterized in that said lever (6) is operated by a geared motor (5) integral with the secondary trolley (2), power being supplied to said geared motor (5) and said winch (3) through a supply chain (14) supporting electrical cables and a cable winder (4).

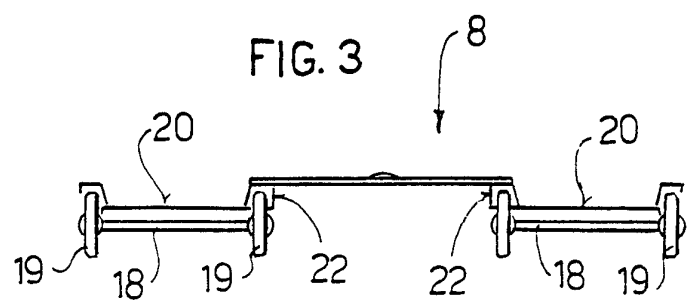
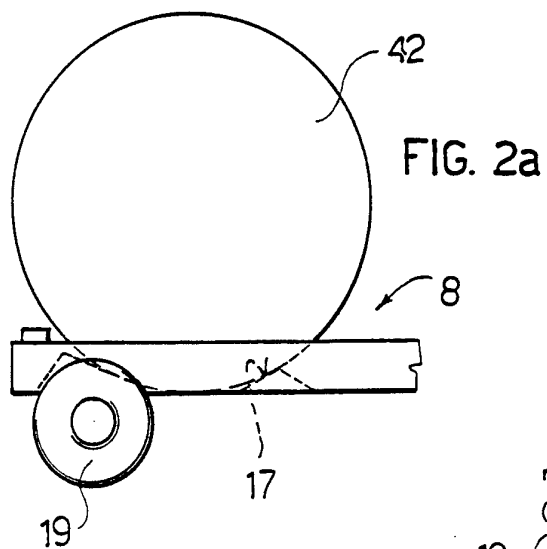
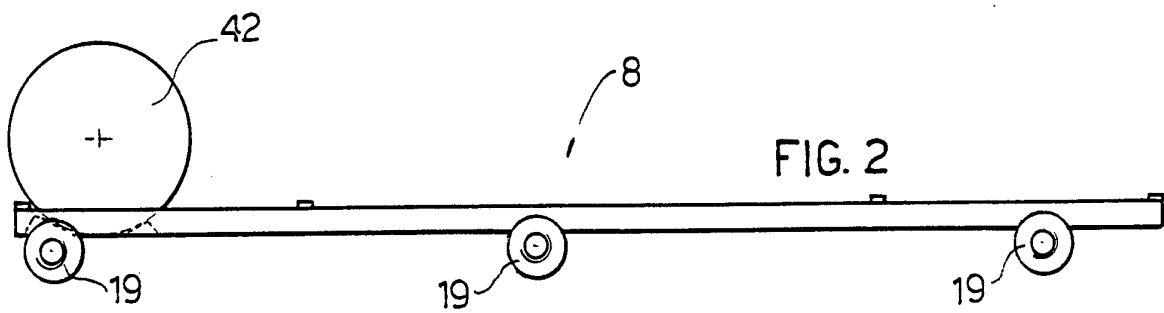
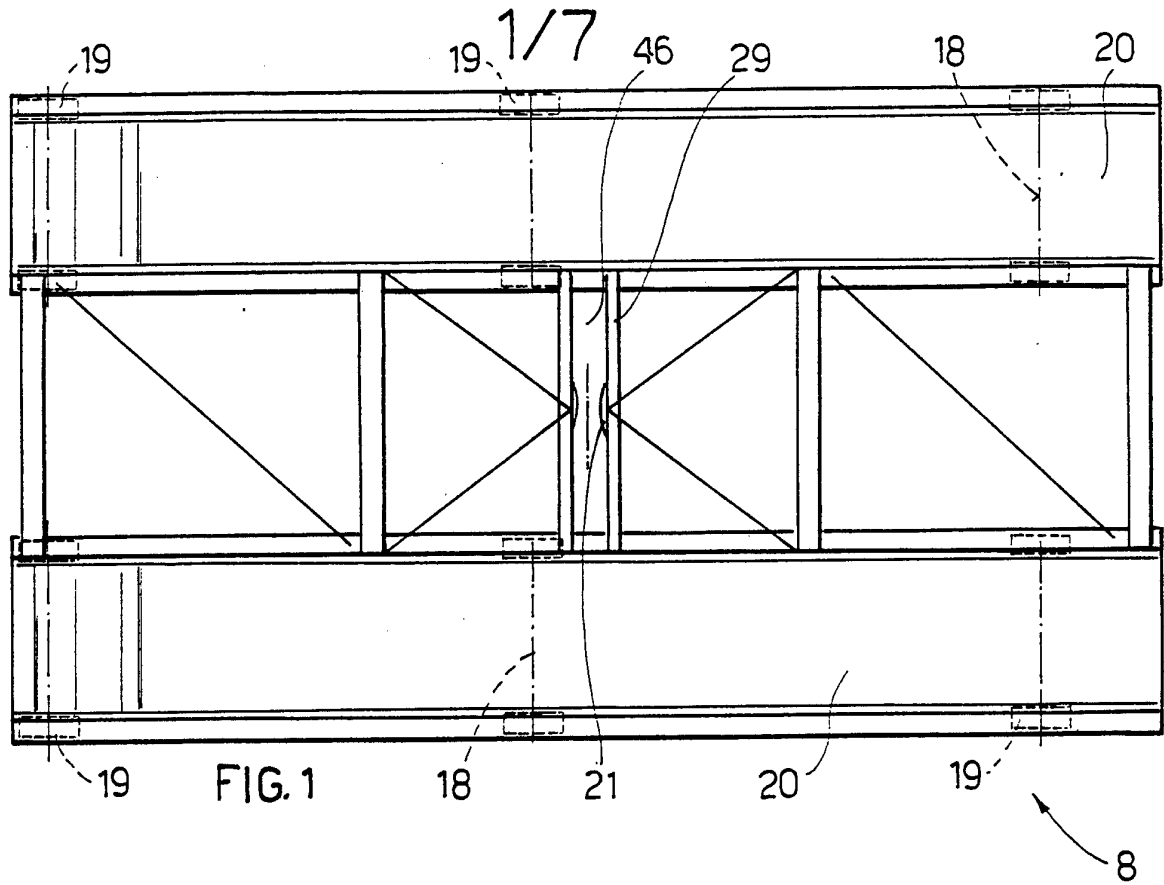
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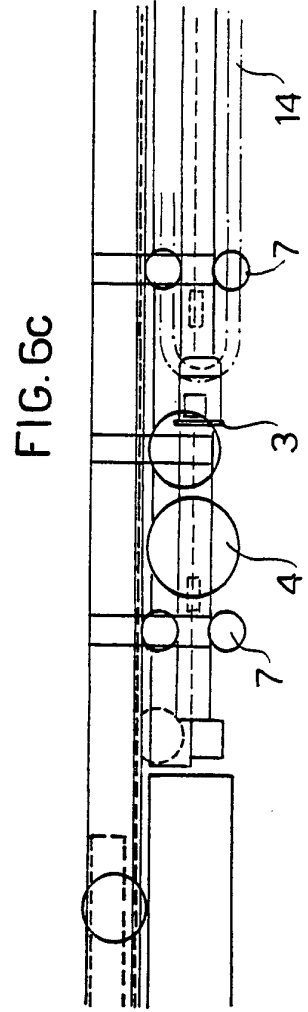
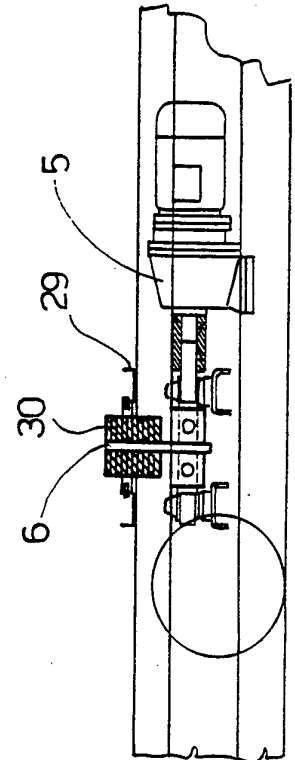
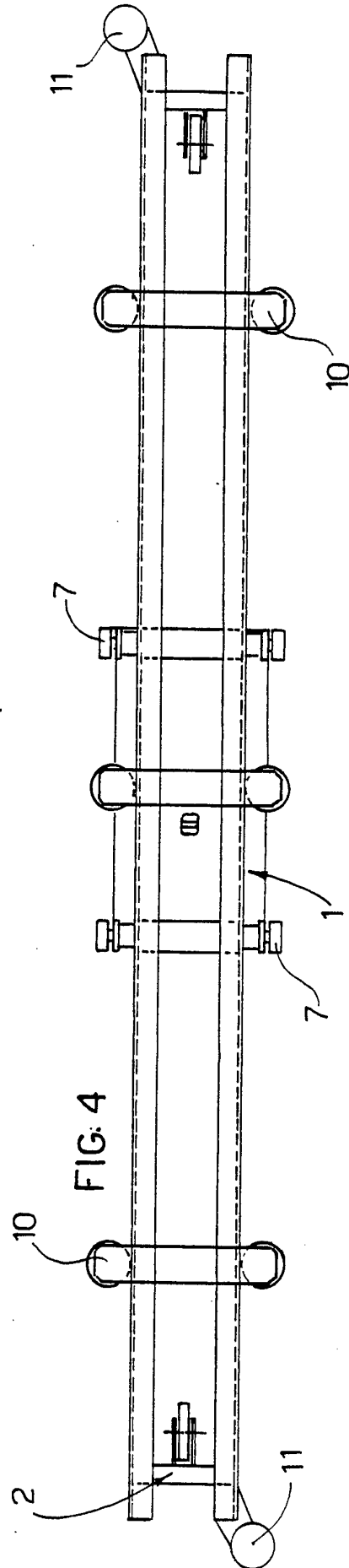
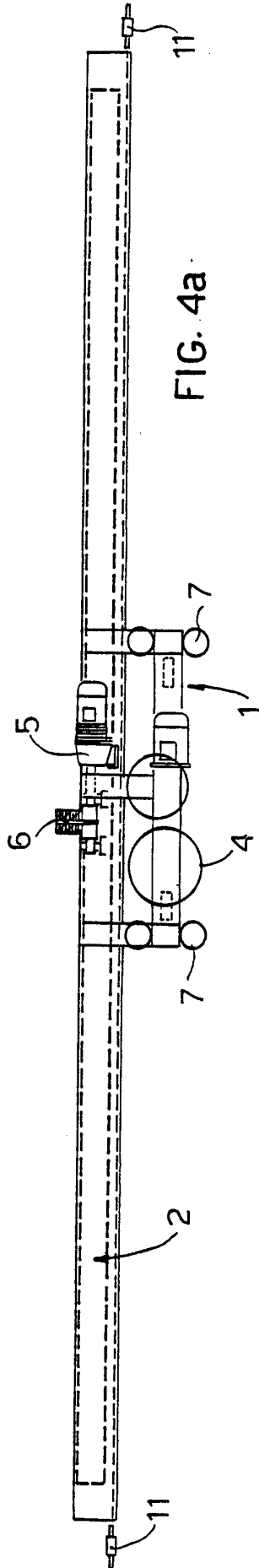
9. A system according to claim 1, characterized in that said main trolley (1) is guided horizontally and vertically on said platform (15), by means of rollers with a vertical axis (23) and rollers with a horizontal axis (7), whilst said secondary trolley (2) is guided by a series of idle rollers (24) with V-shaped grooves, integral with the main trolley (1).

10

10. A system according to any one of the preceding claims, characterized in that said secondary trolley (2) is provided with a plurality of idle rollers (10) with a vertical axis, designed to engage with corresponding lateral guides (22) created in a central position beneath each flatbed (8), for horizontal centering of the latter during transfer.

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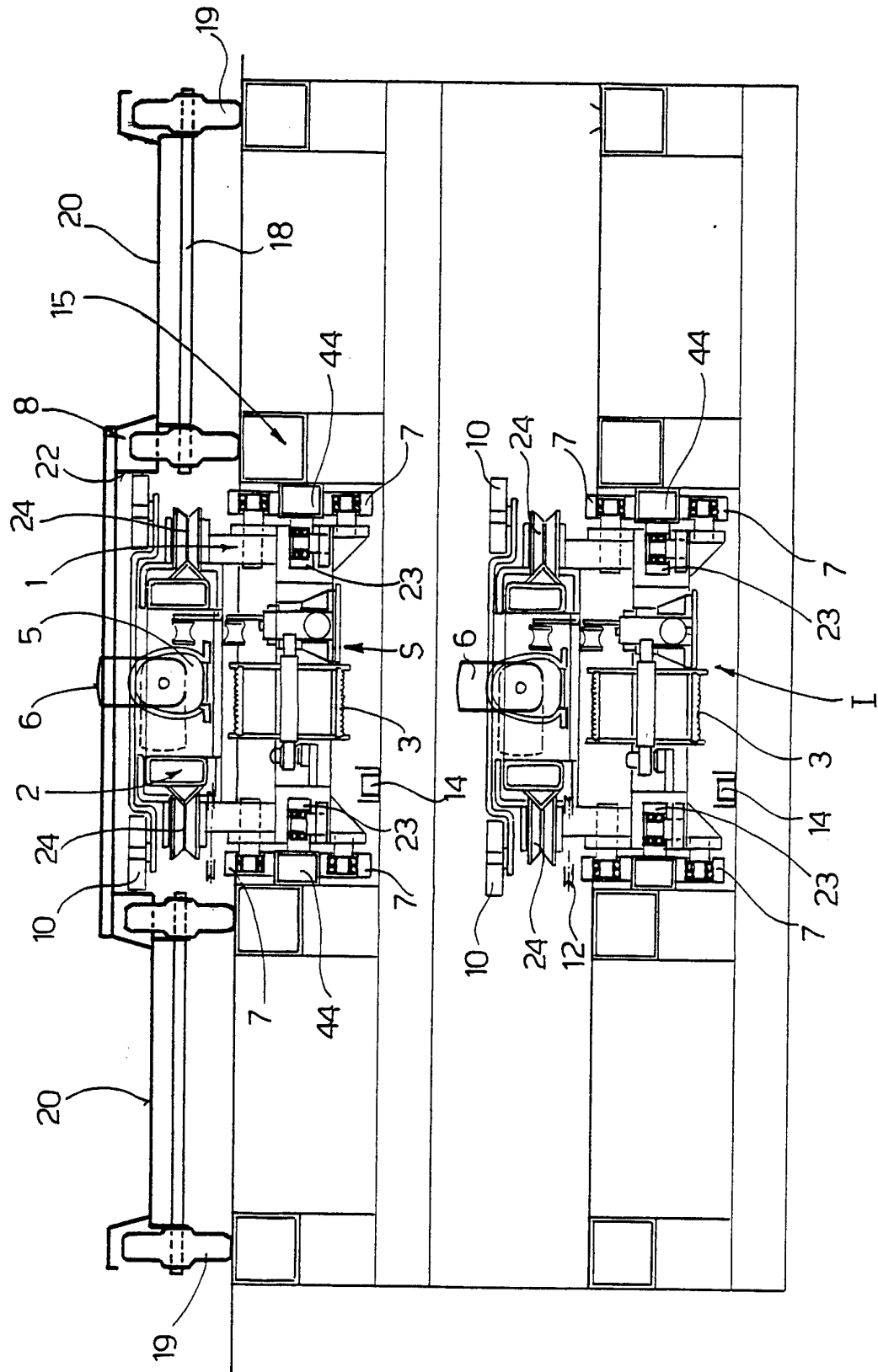
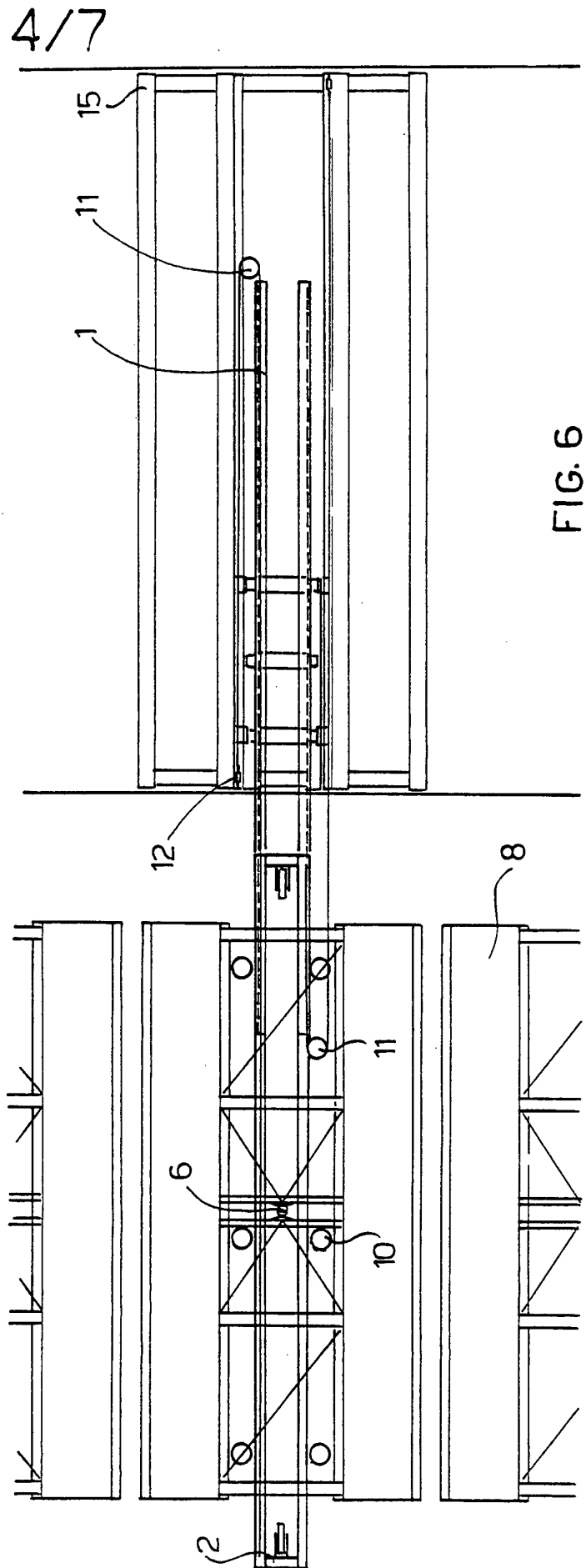
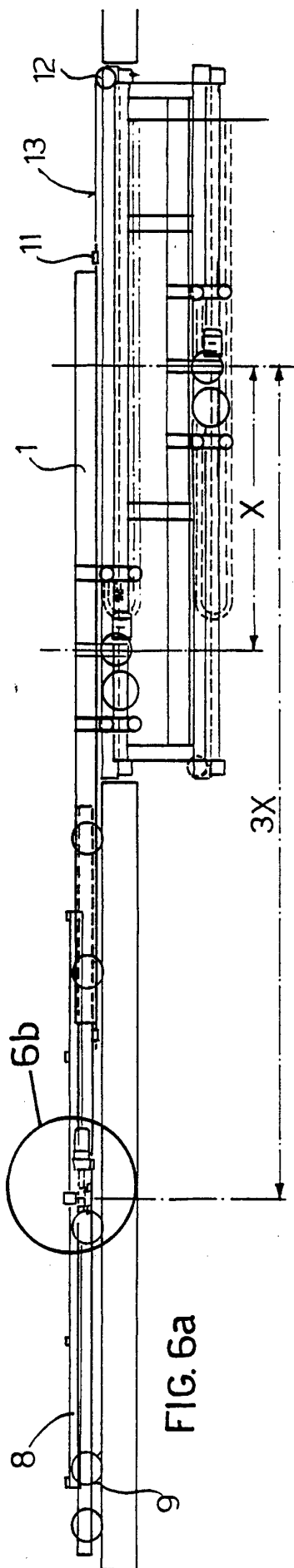


FIG. 5



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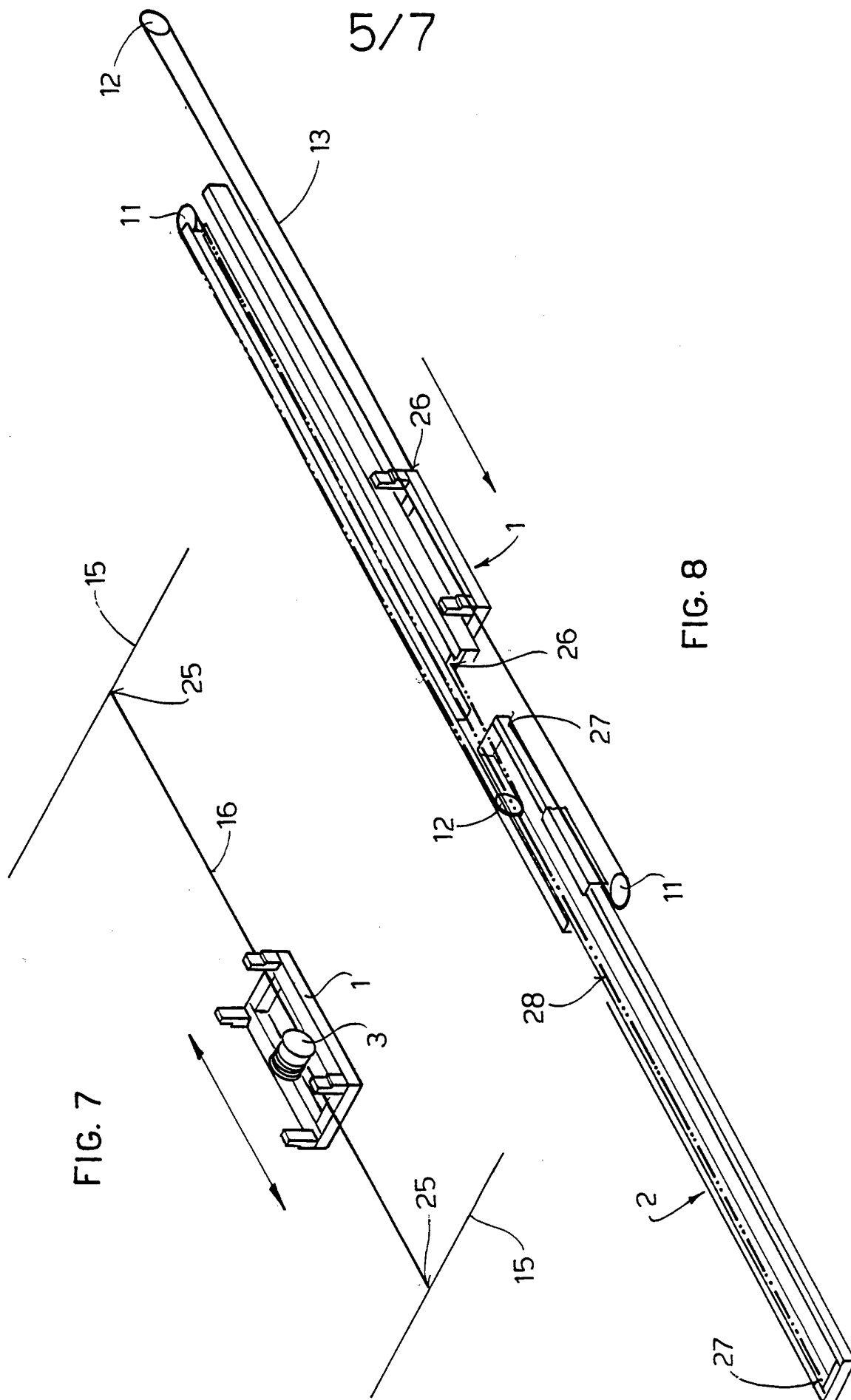


FIG. 7

FIG. 8

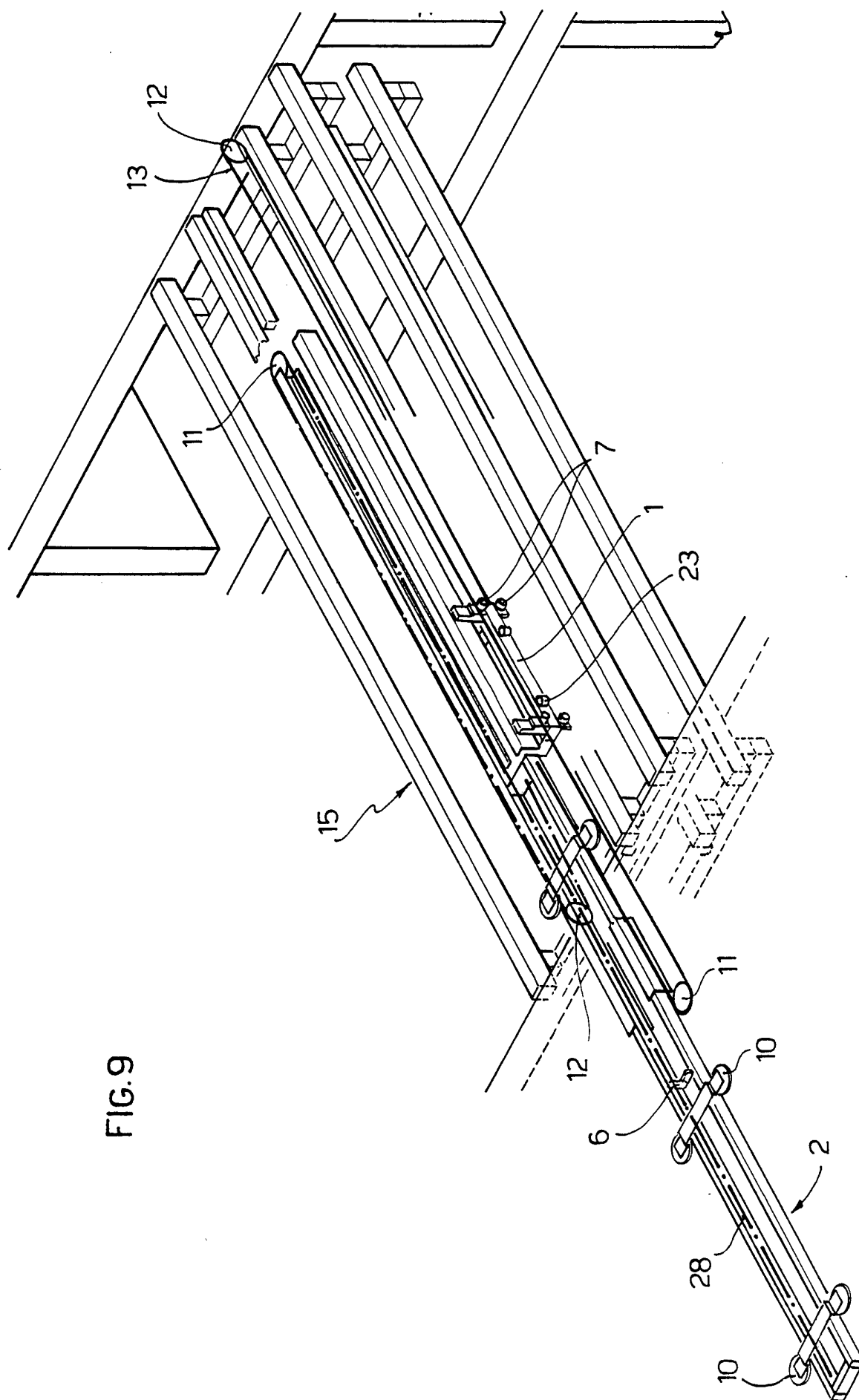


FIG. 9

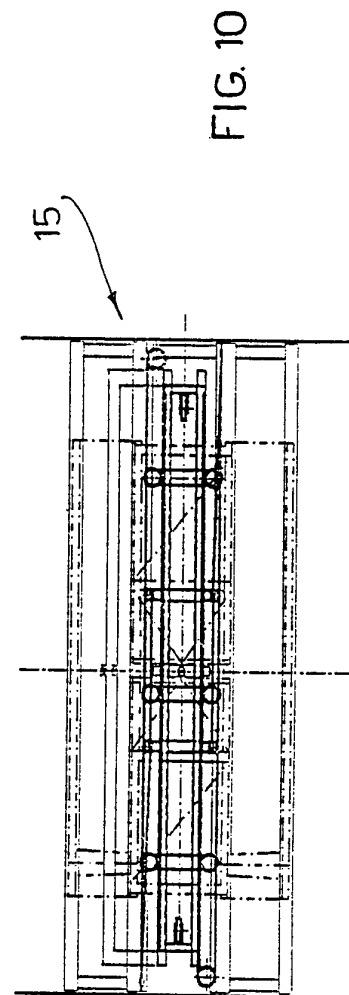
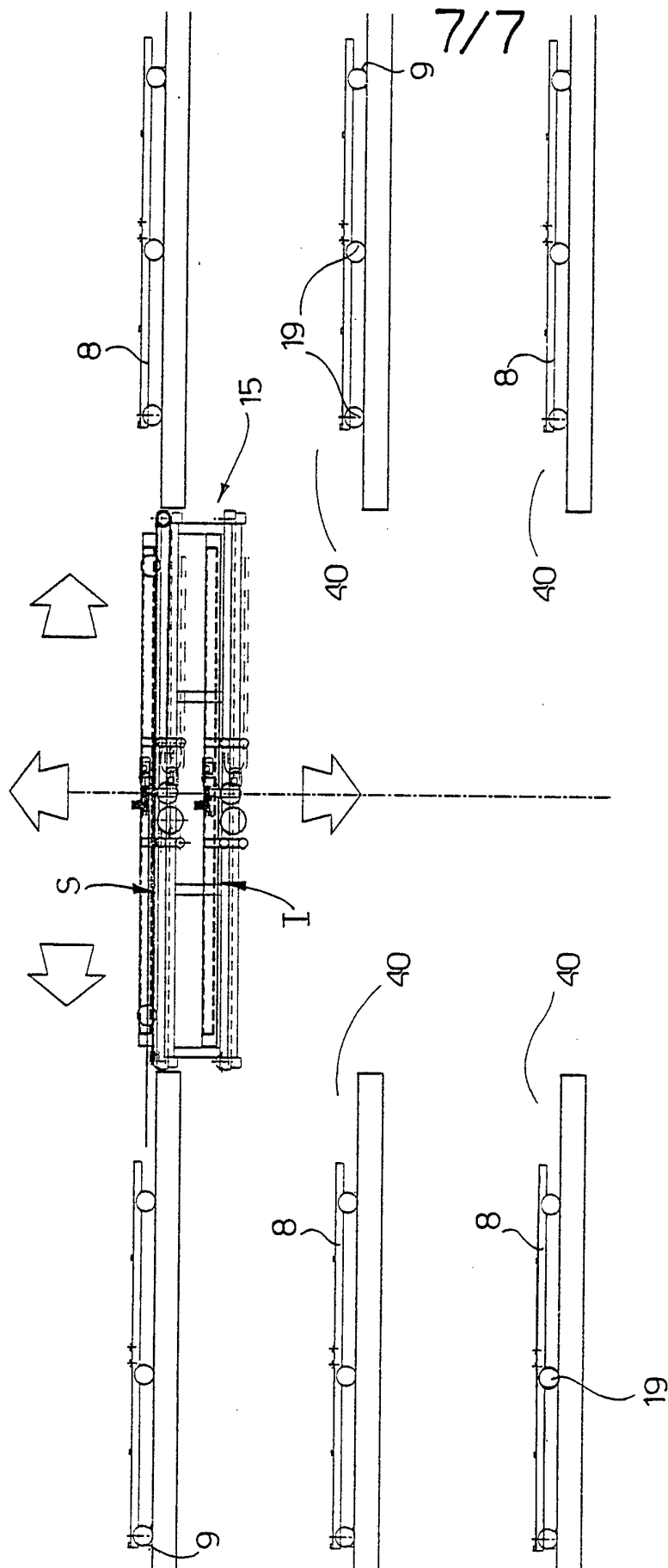


FIG. 10

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP 94/02231A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 E04H6/24

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 E04H

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 practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US,A,3 337 070 (GUILBERT) 22 August 1967 see column 2, line 46 - column 4, line 65; figures 1-7 ---	1,6
Y	FR,A,1 493 770 (MENARD) 26 July 1966 see page 1, left column, line 23 - right column, line 28; figures 1-3 ---	1,6
A	EP,A,0 374 104 (ELECON) 20 June 1990 see column 3, line 33 - column 5, line 19; figures 1-10 ---	1
A	GB,A,1 064 541 (GLOVER) 5 April 1967 see page 2, line 23 - line 107; figures 1,2 -----	2-5

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Date of the actual completion of the international search

4 November 1994

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European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
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Fax (+31-70) 340-3016

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Kergueno, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/EP 94/02231

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-3337070		NONE	
FR-A-1493770		NONE	
EP-A-0374104	20-06-90	NONE	
GB-A-1064541		NONE	