(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 430 892 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **90830222.7**

(51) Int. Cl.[5]: **E04H 6/18**

(22) Date of filing: **18.05.90**

(30) Priority: **01.12.89 IT 2256289**

(43) Date of publication of application:
05.06.91 Bulletin 91/23

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR LI LU NL SE
Bulletin

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(54) Truck for removing and locating motor vehicles in an automatic parking system.

(57) The present invention relates to a truck for removing and locating motor vehicles in an automatic parking system, characterized in that the truck comprises a base frame (2) provided with wheels (5), and a raising frame (11), associated with the base frame (2) through the interposition of means for vertically displacing the raising frame 11 with respect to the base frame 2.

The raising frame is provided with seats (20) for receiving the front wheels of a motor vehicle and with racks (25) for supporting the rear wheels of the motor vehicles.

There are moreover provided centering means (30) for properly locating the motor vehicle with respect to the longitudinal axis of the truck.

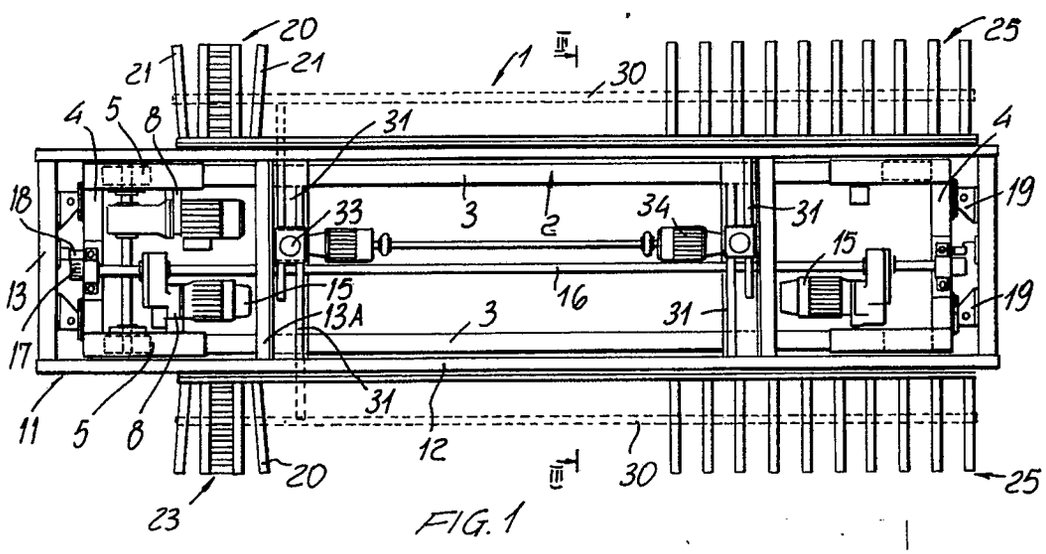

FIG. 1

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TRUCK FOR REMOVING AND LOCATING MOTOR VEHICLES IN AN AUTOMATIC PARKING SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to a truck for removing and locating motor vehicles in an automatic parking system.

As is known, for handling motor vehicles in automatic parking systems there are conventionally used devices or apparatus for taking up the motor vehicle and locating it at a desired zone in a fully automatic way.

Known motor vehicle handling apparatus have been found as unsatisfactory; moreover it is generally necessary that the motor vehicle be precisely arranged with respect to the handling apparatus which requires long time operating steps negatively affecting the operating cost.

Another drawback of known motor vehicle handling apparatus is that these apparatus are rather complex from the construction standpoint and, accordingly, have a comparatively high construction cost.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned drawbacks by providing a truck for removing and locating motor vehicles in an automatic parking system which affords the possibility of easily handling the motor vehicle in a very reduced space, with the additional possibility of easily remotely controlling the truck.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such a motor vehicle handling truck which is adapted to precisely locate the motor vehicle, by automatic means which are directly applied to the truck, thereby greatly simplifying all of the motor vehicle handling operations.

Another object of the present invention is to provide such a motor vehicle handling truck which has a very simple construction while providing a very reliable operation and which, moreover, can be easily made starting from easily available elements and material and which, moreover, is very competitive from a mere economic standpoint.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a truck for removing and locating motor vehicles in an automatic parking system, characterized in that said truck comprises a wheeled base frame and a raising frame, associated with said base frame through the interposition of means for vertically displacing said raising frame with respect to said base frame, said raising frame being provided with seats for housing the front wheels of a motor vehicle and with racks for supporting the rear wheels of said motor vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the invention will become more apparent hereinafter from the following detailed description of a preferred, though not exclusive, embodiment of a truck for removing and locating motor vehicles in automatic parking systems, which is illustrated, by way of an indicative but not limitative example, in the accompanying drawings, where:

Figure 1 is a top plan view of the truck for removing and locating motor vehicles in automatic parking systems according to the present invention;

Figure 2 is an elevation view of the truck;

Figure 3 is a schematical cross-sectional view of the truck taken along the line III-III of Figure 1;

Figure 4 is an end view of the subject truck;

Figure 5 is a top plan view of means for centering the motor vehicle;

Figure 6 is an elevation view of the means for centering the motor vehicle; and

Figures 7 and 8 are respectively a cross-sectional front view and a top plan view of the truck according to the invention, which is associated with an auxiliary outer rack, provided with teeth, adapted to support longitudinal axis rollers for transversely displacing, with respect to the truck, whe wheels of the motor vehicle.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the figures of the accompanying drawings, the truck for removing and locating motor vehicles in automatic parking systems, according to the present invention, which is overally indicated at the reference number 1, comprises a base frame 2 which, preferably though not necessarily, consists of two base longitudinal members 3 which are coupled, at the ends thereof, by bottom or base head members indicated at 4.

The base frame 2 is provided with displacement wheels 5, at least a part of which are driving wheels: in the embodiment being shown, the front wheels 5 are driving wheels and are coupled, by means of a driving shaft 6, to a driving motor 7 which is supported by the base frame.

Guide rollers 8 can be moreover provided engaging laterally of the guide rails generically indicated at 9.

To the base frame 2 there is coupled a raising frame 11 which comprises longitudinal members 12 coupled by head members 13 and connecting cross-members 13A.

Between the raising frame 11 and base frame 2 there are arranged driving means,for vertically displacing the raising frame, which driving means advantageously comprise raising motors 15 supported by the base frame,and which are associated with the same driving shaft 16 so as to provide the desired raising power with a less height requirement for the motors, thereby the truck will have a comparatively small height.

On the driving shaft 16 there are keyed driving pignons 17 meshing with vertical racks 18 rigidly associated with the head members 13 so as to vertically displace the raising frame 11 with respect to the base frame 2.

There are moreover provided guide means overally indicated at the reference number 19 which are interconnected between the head members of the base frame and the head members of the raising frame, which guide means advantageously comprise ball circulating bushes, bearings,bushings and the like, adapted to provide a precise vertical displacement of the raising frame.

The raising frame 11 is moreover provided with seats for housing the front wheels 20 of the motor vehicle, which seats comprise bar pairs 21 which slightly diverge from one another starting from the raising frame toward the outside, so as to provide a front wheel receiving and precentering zone.

Between the bars 21 there is provided a roller assembly 23 arranged transversely of the longitudinal axis of the truck, which allowsthe motor vehicle to be easily displaced in the cross direction of the truck, in order to perfectly center the motor vehicle, as it will become more apparent hereinafter.

To the raising frame 11 there are moreover affixed racks, indicated overally at the reference number 25, which provide the supporting zone for the rear wheels of the motor vehicle.

The truck is moreover provided with means for centering the motor vehicle, in order to properly arrange said motor vehicle along the longitudinal axis, which centering means comprise centering bars or rods, indicated at 3O, extending parallel to the longitudinal members 12 and arranged outside of the latter.

The centering bars 3O, which are provided with bearing rollers 30a, are coupled to centering rods 31 in turn coupled, through a double-rack system 32, to a central pignon 33 driven by centering motors indicated at 34.

With the disclosed coupling arrangement, as the central pignon 33 is driven, there is provided a symmetrical translation of the centering bars 30 with respect to the longitudinal members 30 so that said bars engage with the inside surfaces of the motor vehicle wheels arranged on the racks thereby providing, if it is necessary, a translation in the cross direction with respect to the longitudinal extension of the truck, to accurately and precisely locate the motor vehicle on the truck.

The double-rack system provides a symmetrical displacement of the guide bars adjoining the longitudinal members 12 thereby a reliable centering position is obtained.

The front wheels, as stated, bear on the roller assembly 23 so that said wheels can be easily displaced in the cross direction without any appreciable friction, whereas the racks allow for an easy translationof the rear wheels, since the friction is very small.

In operation, the motor vehicle to be taken up is arranged on a fixed rack 40, whereas the truck is arranged under the fixed rack 40, and then there are driven the translation means; as the translation means are driven, the rack 25 and wheel receiving seats 20 will be displaced beyond the fixed rack 40 so as to engage the motor vehicle wheels.

With the vehicle properly supported by the raising frame, there are driven the motor vehicle centering means which properly arrange the motor vehicle on the truck.

Then there are actuated the truck driving means, for displacing the motor vehicle to the desired position, where it is released, by carrying out a reverse movement.

From the above disclosure it should be apparent that the invention fully achieves the intended aim and objects.

In particular, the fact is to the pointed out that a motor vehicle handling truck has been provided which is adapted to properly locate the motor vehicle in a comparatively reduced space and with comparatively simple handling operations.

Another main aspect of the present invention is that the truck has a comparatively reduced size thereby greatly simplifying all of the automatic parking systems as well as the motor vehicle handling operations.

Figures 7 and 8 show the truck 1 associated with an outer device 51, of rack shape, and so arranged as to allow the rack 52 of the truck 51 to cooperate with the rack of this outer device 51.

More specifically, the rack of the outer device 51 bears on tooth members 53 which form said rack, longitudinal axis rollers 54 adapted to allow the motor vehicle wheels to be cross-displaced with respect to the truck 1, independently from the motor vehicle wheel base.

While the invention has been disclosed and illustrated with reference to a preferred embodiment thereof, it should be apparent that the disclosed embodiment is susceptible to several modi-

fications and variations all of which will come within the spirit and scope of the appended claims.

Claims

1. A truck for removing and locating motor vehicles in an automatic parking system, characterized in that said truck comprises a wheeled base frame and a raising frame, associated with said base frame through the interposition of means for vertically displacing said raising frame with respect to said base frame, said raising frame being provided with seats for housing the front wheels of a motor vehicle and with racks for supporting the rear wheels of said motor vehicle.

2. A truck, according to Claim 1, characterized in that said base frame comprises a pair of base longitudinal members coupled, at the end portions thereof, by a pair of base head members, said base frame including at least a driving motor associated with a driving shaft coupled to said motor vehicle wheels there being moreover provided vertical axis guide wheels adapted to engage with the guide rails so as to displace said truck, said raising frame including one or more coupling cross members overlaying said base frame.

3. A truck, according to the preceding Claims, characterized in that said means for vertically driving said raising frame comprise at least a driving motor operating one or more pignons meshing with one or more vertical racks rigidly associated with said raising frame.

4. A truck, according to one or more of the preceding claims, characterized in that said truck comprises one or more driving motors for vertically driving said raising frame, said motors being keyed on the same vertical driving shaft, provided with pignons meshing with respective racks associated with said raising frame, said vertical driving shaft being arranged in the region of the symmetry longitudinal axis of said truck.

5. A truck, according to one or more of the preceding claims, characterized in that said truck further comprises motor vehicle centering means adapted to center said motor vehicle with respect to the longitudinal axis.

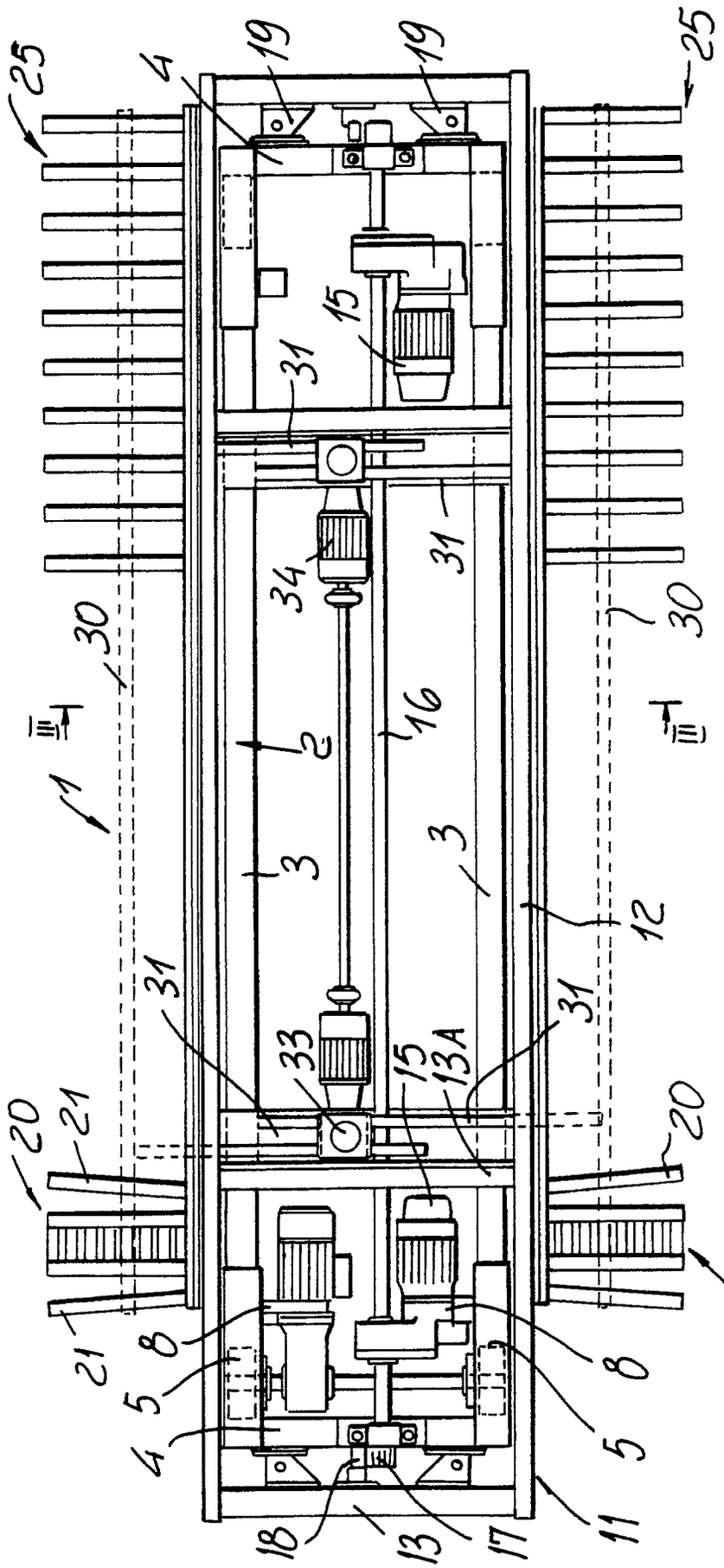
6. A truck, according to one or more of the preceding claims, characterized in that said centering means comprise centering bars arranged laterally of the longitudinal members of said raising frame and coupled, by coupling rods, to a double rack system driven by at least a centering motor and supported by said raising frame.

7. A truck, according to one or more of the preceding claims, characterized in that said centering bars are driven in a mutually symmetrical way with respect to the longitudinal axis of said truck.

8. A truck, according to one or more of the preceding claims, characterized in that said front wheel receiving seats are provided with bars slightly diverging to the outside of the raising frame, on the intermediate portion of said housing seats there being provided roller assemblies for providing a cross displacement with respect to said truck.

9. A truck, according to one or more of the preceding claims, characterized in that it is associated with an outer device of rack configuration and so arranged as to allow the rack of said truck to be arranged in an intermediate position with respect to said rack

10. A truck, according to one or more of the preceding claims, characterized in that said outer rack is provided with rack teeth bearing longitudinal axis rollers adapted to allow said motor vehicle wheel to be transversely displaced with respect to the truck independently from the base of said wheels.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III
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31
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FIG. 1

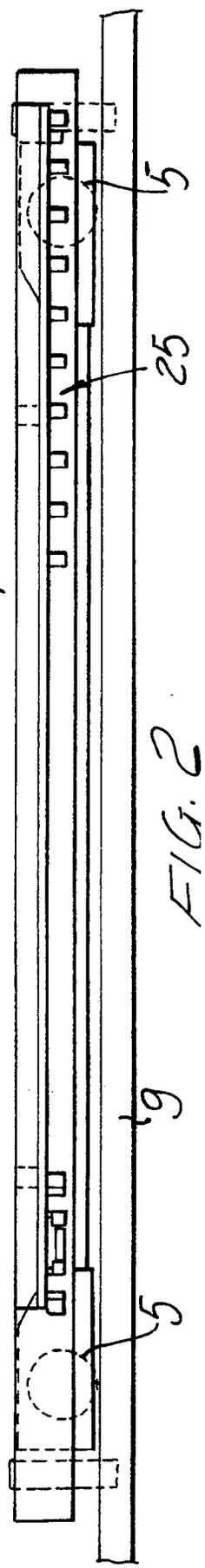
1
5
25
9
5

FIG. 2

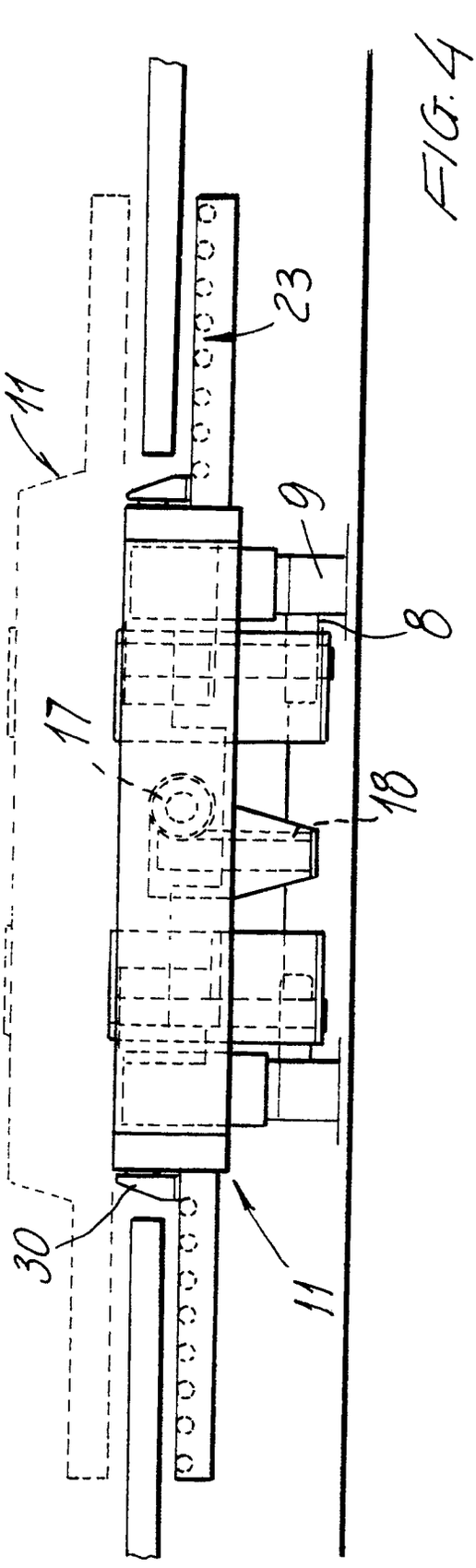

FIG. 4

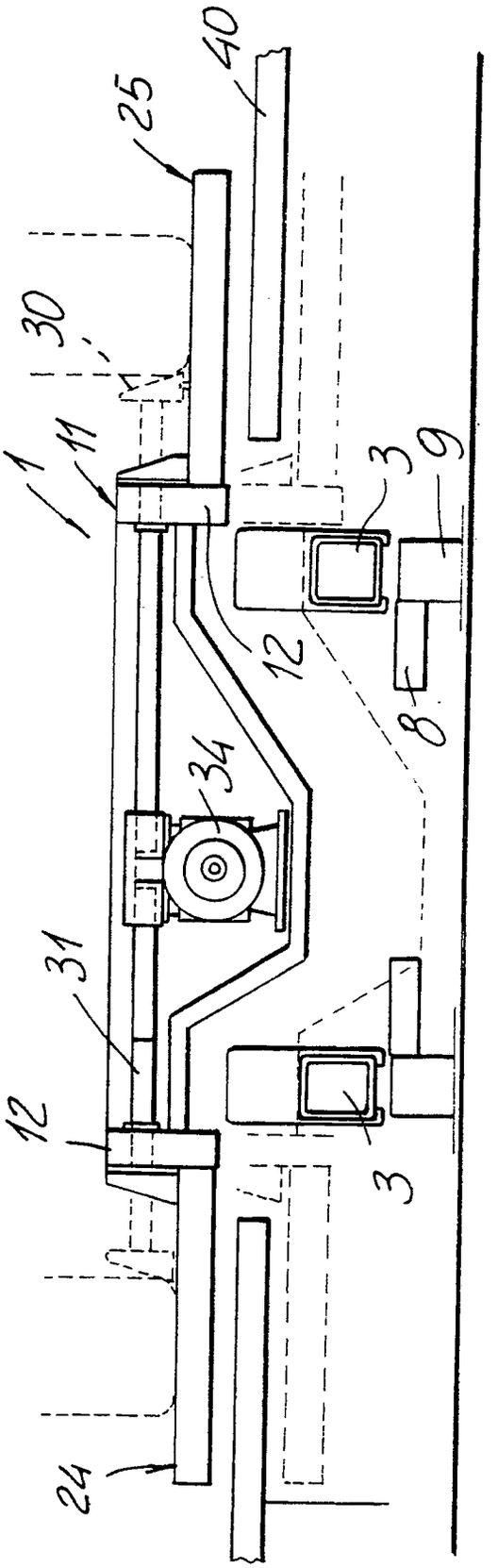

FIG. 3

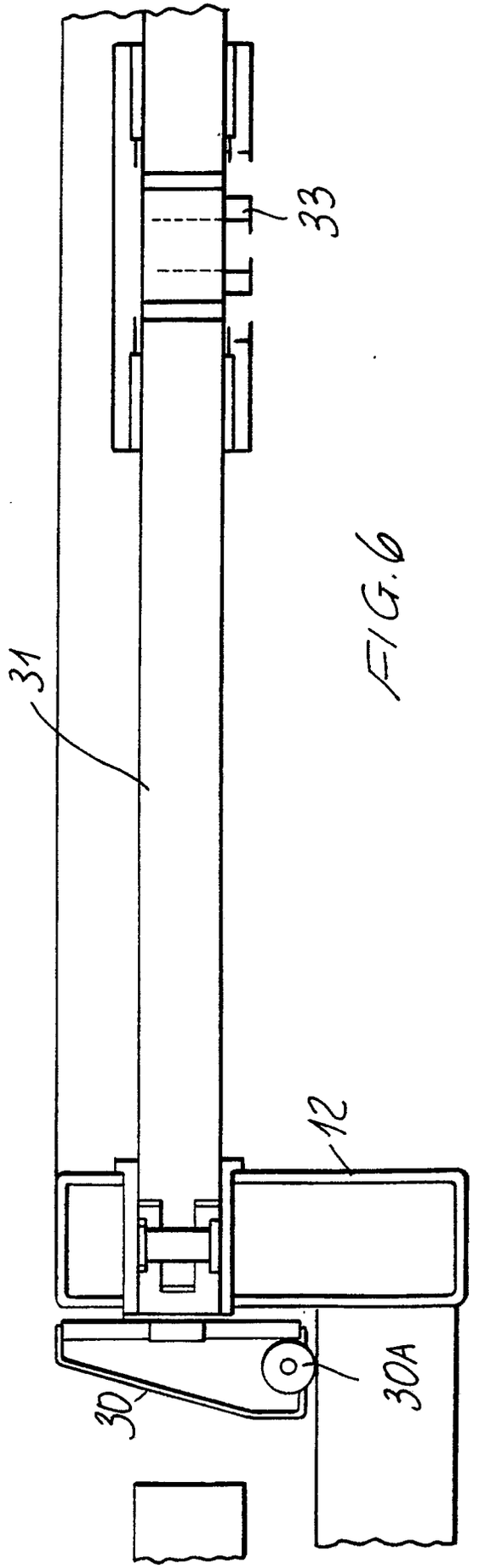

FIG. 6

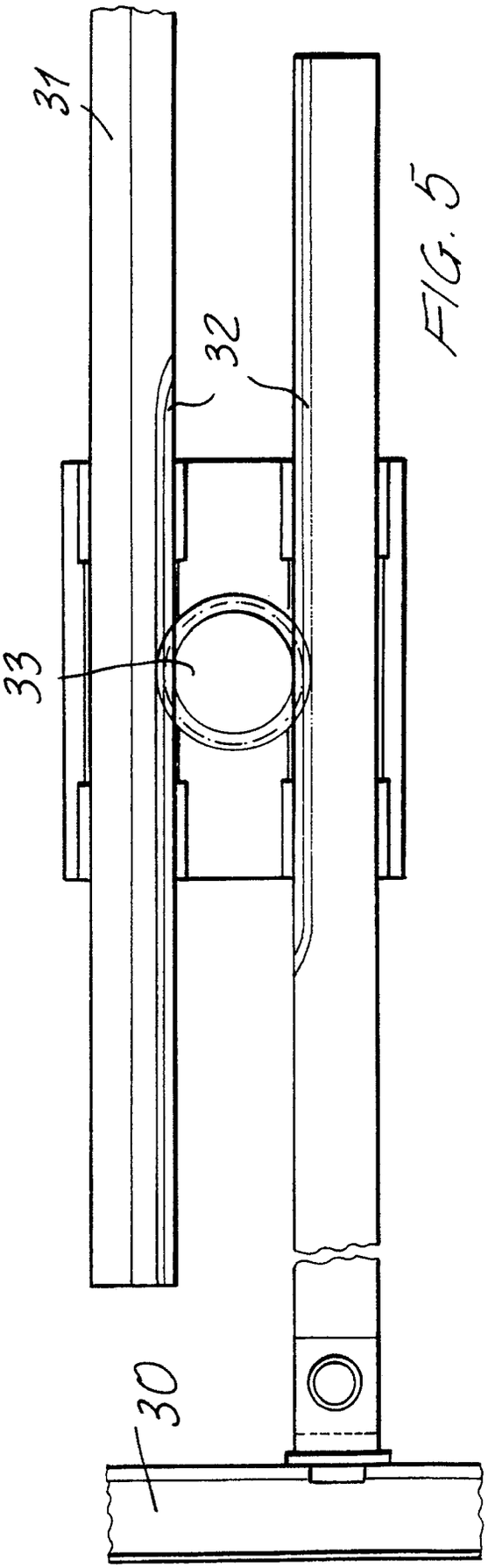

FIG. 5

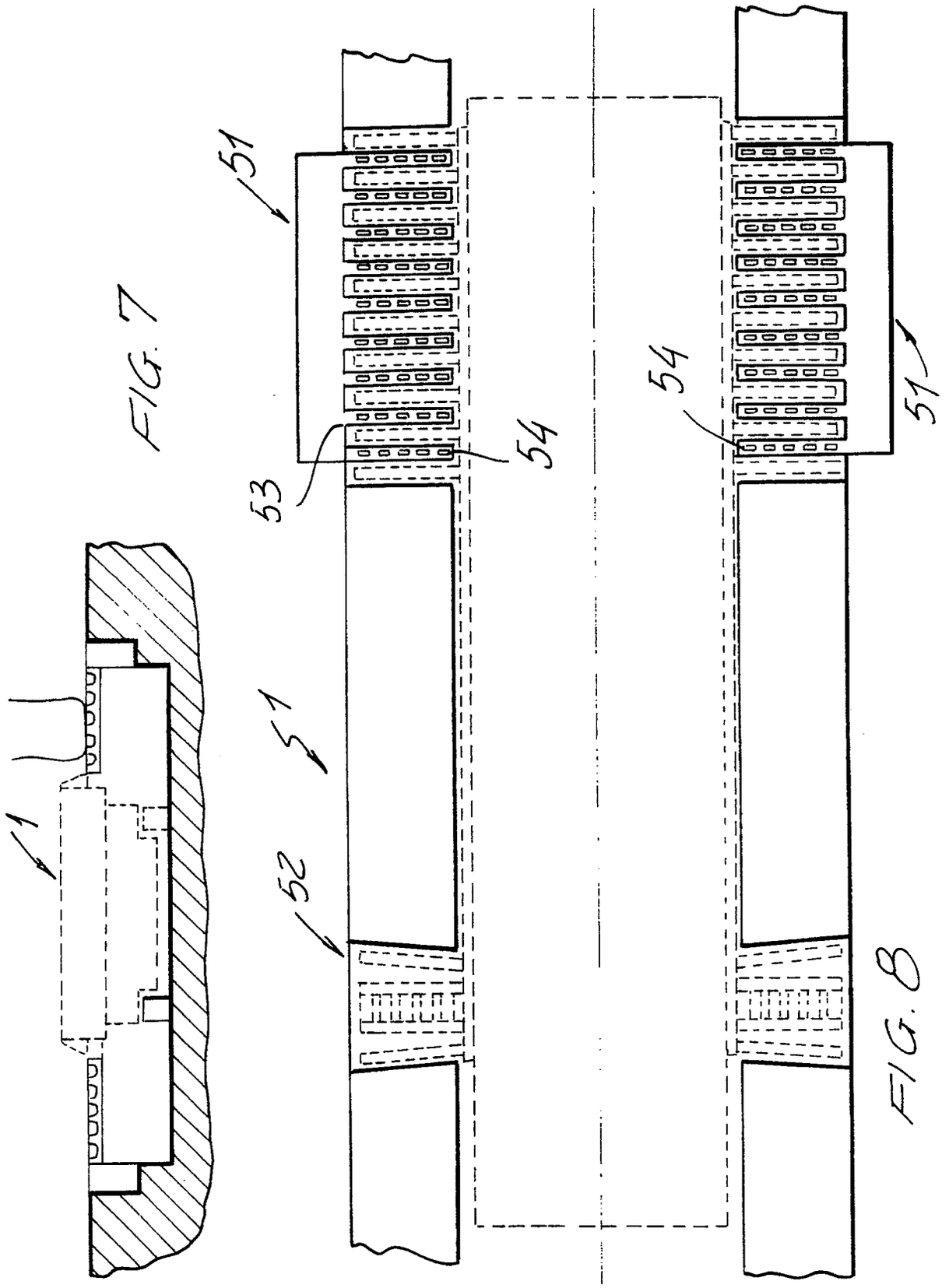

FIG. 7

FIG. 8

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EUROPEAN SEARCH REPORT

Application Number

EP 90 83 0222

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X,Y	EP-A-0 236 278 (SOSTEC) * page 6, line 16 - page 10, line 15; figures 1-6, 9, 10-14 *	1-3,5,9,6, 7	E 04 H 6/18
Y,A	FR-A-1 167 565 (SICOMATIC) * page 3, column 1, line 23 - column 2, line 4; figure 1 *	6,7,8	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

E 04 H

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	21 February 91	BARBAS A.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same catagory
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention

E: earlier patent document, but published on, or after the filing date
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