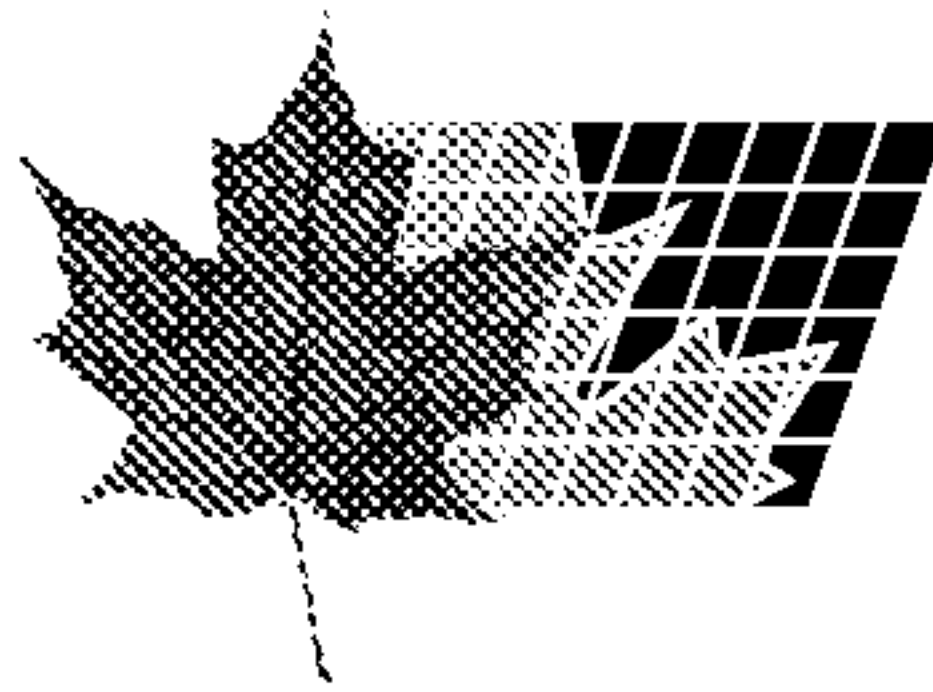




(11) (21) (C) **2,004,659**
(22) 1989/12/05
(43) 1991/06/05
(45) 2000/03/28

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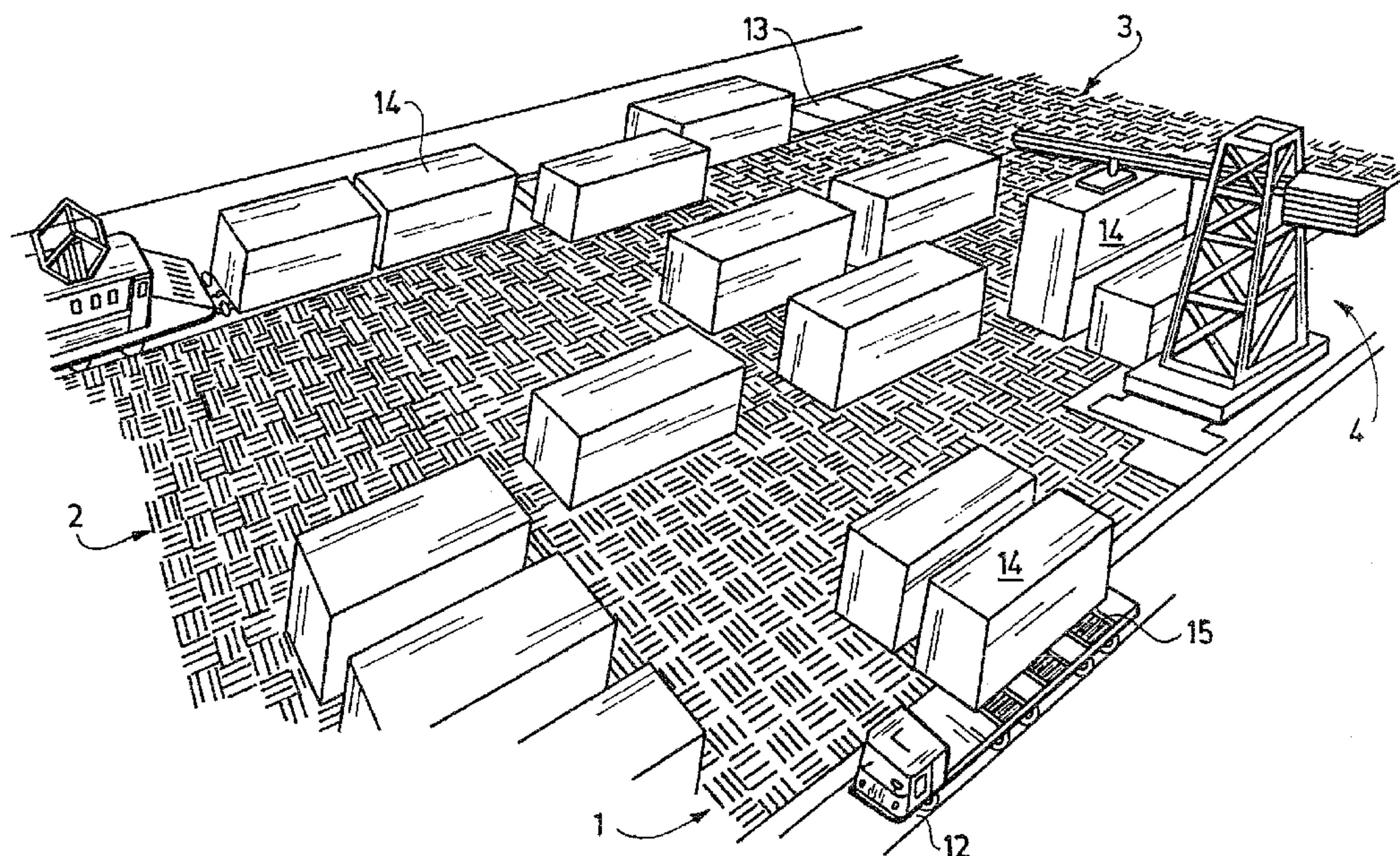
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(51) Int.Cl.⁶ B65G 13/02

(54) **SYSTEME POUR DEPLACER DES OBJETS DE GRANDES
DIMENSIONS**

(54) **DEVICE FOR MOVING LARGE OBJECTS**



(57) The invention relates to an device for moving and/or arranging large objects, e.g, containers, or vehicles by rollers or roller conveyers. According to the present invention rollers are arranged in rectangular blocks, so that the rollers in the individual blocks are parallel with each other, and are at an angle to those in the adjacent blocks, and each block is vertically movable. At least a certain part of the rollers in the blocks is driven. The driven rollers may be provided with independent or common drive, e.g. chain drive. Generally the blocks are arranged side by side, and the rollers in it are at right angle to each other. In given case, especially when small and light pieces e.g. cars have to be moved, it would be advisable to push the blocks into each other. The system may be realised as e.g. a shunting yard, or carpark.

A B S T R A C T

The invention relates to an device for moving and/or arranging large objects, e.g. containers, or vehicles by rollers or roller conveyors. According to the present invention rollers are arranged in rectangular blocks, so that the rollers in the individual blocks are parallel with each other, and are at an angle to those in the adjacent blocks, and each block is vertically movable. At least a certain part of the rollers in the blocks is driven. The driven rollers may be provided with independent or common drive, e.g. chain drive. Generally the blocks are arranged side by side, and the rollers in it are at right angle to each other. In given case, especially when small and light pieces e.g. cars have to be moved, it would be advisable to push the blocks into each other. The system may be realized as e.g. a shunting yard, or carpark. (Fig. 4)

DEVICE FOR MOVING LARGE OBJECTS

The invention relates to a device for moving and/or arranging large objects, e.g. containers, or vehicles by rollers or roller conveyors.

It is well-known that the loading of railway or public vehicles is not up to the modern technologies, or to the development pace of the vehicles.

The transport of goods shifted to public roads during the last 30 years, while the quantity and ton of goods/km transported by railway decline year by year. The proportion of transport of goods by camion including semi-trailer containers increases year by year. The advantages of public transport of goods represent short time of delivery, less damage during door to door delivery and transport without reloading.

On the other hand, drawbacks of the public transport of goods are the higher cost of energy and live labour, increased environment pollution, higher costs and greater administration, as well as the more difficult loading, adequate maintenance and development of public roads for reliable transportation.

Comparison of the advantages and drawbacks leads to the conclusion that the initial advantages have recently lost much of their attraction. The reason for this is that the constantly increasing traffic entails slowing down the transportation. This is especially true to the international camion and container transport, since the time of frontier crossings increases year by year. The costs and load of the public roads are also on the increase.

The advantages of shipping goods by rail could be improved again by solving the problem of loading and container maneuvering.

It is common knowledge that the category of transcontainers or big containers includes the containers without carriage according to the international standards.

Drawback of the presently known transcontainer transport system is that the technical requisites are of intermittent operation entailing high loss of capacity due to the idle return movement. I.e. the cranes are suitable mainly for lifting, their operation for long distance horizontal movement is expensive and difficult. The technical solution of lifting - conveying vehicles is complicated, consequently both the cost of investment and operation is high.

Further drawback of the currently known and used transcontainer transport systems is that the technical equipment provided for moving the containers does not conform flexibly to the volume of the containers to be moved, the technical equipment in places of light traffic has to be similar to the one used in places of heavy traffic approaching the capacity limit of the requisites employed. Further problem is that the presently used requisites do not allow automatization of handling the various container-loaders, reloaders and terminals.

For the time being, the simplified system of loading, maneuvering and reloading is as follows: "active" packed goods, or vehicles move on "passive" path (road, paved space, loading surface, etc). Their operation may be self-

powered (trolley, cars, wheel-mounted containers, etc), or externally powered (mobile cranes, frame cranes, etc). Lifting from "passive " path characteristic to the operation (generally with eccentric lifting) is conveyance by lifting.

However, even the most modern systems are incapable of eliminating the idle runs and recording the existing position of the moved units.

The matter of parking in big cities raises similar problems. The construction of garages, parking stations lags behind the increasing number of cars. Due to the high cost of construction, demand for large space and difficult operation, the number of parking stations is insufficient. As a result of the high costs, the parking fee is also high.

The parking stations built to date were constructed with traditional building units (steel structure, concrete, brick, etc). Ramps, communication roads requiring large space serve for driving in and out of cars, and for communication between the levels. Moving between and within the levels is done by the car itself. This is rather difficult, for the maneuvering requires large space and specially trained driver. Due to the exhaust gases, high capacity ventilation and strict fire protection regulation are imperative.

Further drawback of the traditional parking stations is that they can accomodate a small number of cars only, compared with the large dimensions, because of the space required for communication roads and turns. For these

reasons, they are not suited to solve the parking problems of big cities.

The object of the present invention is to provide an apparatus or system, whereby large objects, e.g. containers, vehicles can be moved or maneuvered with the aid of rollers or roller conveyors, and in addition, moving, maneuvering of the containers, vehicles, etc in a much smaller space is simpler and quicker than in the traditional solutions, but it enables at the same time the automatic tracking and recording of the objects moved in the system from the moment of entry to exit, with the aid of computer system.

According to the present invention rollers are arranged in rectangular blocks, so that the rollers in the individual blocks are parallel with each other, and are at an angle to those in the adjacent blocks, and each block is vertically movable.

At least a certain part of the rollers in the blocks is driven. The driven rollers may be provided with independent or common drive, e.g. chain drive.

Generally the blocks are arranged side by side, and the rollers in it are at right angle to each other. In given case, especially when small and light pieces e.g. cars have to be moved, it would be advisable to push the blocks - containing the rollers arranged in different directions - into each other, i.e. the rollers of different direction are arranged next to each other, but those of identical direction are provided with common drive and are jointly lifted or lowered. The blocks are generally provided with

guiding and/or buffer elements for the more accurate guiding of the objects to be moved.

If the apparatus is a shunting yard, it contains road side loading space, railway loading and storage space.

According to an advantageous embodiment exclusively roller conveyors parallel with the ramp are arranged on the periphery of public and/or railway loading spaces. At least a certain part can be pushed out at right angle to the ramp as to have the objects transferred to the vehicles not provided with roller conveyors. In given case, the roller conveyors are arranged below the blocks on the ramp pushed out and arranged to be adjustable in vertical position.

The system according to the invention is provided with supplementary, inlet and outlet roller conveyors arranged on the ramp or vehicle platform. Mobile independent roller conveyors can also be used to be placed on the ramp or vehicle for the time of loading. These loading roller conveyors are provided with flat, easily sliding lower pallet.

Flat loading pallets are also used when the lower surface of the objects, e.g. containers to be moved is not flat. In the case, the object to be moved is fixed on the loading pallets in order to move them with the roller conveyor.

Obviously the apparatus according to the invention has to be provided with computer control, or goodstracking and/or recording system, whereby the exact position of the ob-

jects moved in the system can always be established, and the objects are automatically moved to the intended position.

The invention is described more in detail by way of examples with the aid of drawing, in which:

- Figure 1: Top view of the equipment according to the invention assembled as shunting yard,
- Figure 2: Direction of progress on rollers in each block of the equipment,
- Figure 3: Section of a block of the equipment,
- Figure 4: Perspective view of the equipment shown in Figure 1,
- Figure 5: Top view of another embodiment of the equipment according to the invention,
- Figure 6: Side view of the vehicle adapted to the equipment according to the invention,
- Figure 7: Top view of the vehicle's platform shown in Figure 6,
- Figure 8: Side view of a railway car used with the equipment according to the invention,
- Figure 9: Top view of the railway car shown in Figure 8,
- Figure 10: Front view of the railway car shown in Figure 9,
- Figure 11: Side view of a supplementary loading pallet and container of the equipment according to the invention,
- Figure 12: Front view of the roller loading pallet used for the equipment,
- Figure 13: Side view of the roller pallet shown in Figure 12,

Figure 14: Schematic top view of two blocks pushed into each other.

Figure 1 shows an embodiment of the equipment according to the invention, formed as shunting yard, or container sorter. The area consists of public road loading space 1, railway loading space 2, shunting space 3 and storage space 4. Lifting mechanism is arranged in the shunting area 3 to put the containers on top of each other if necessary.

The whole area is composed of rollers 6 arranged in blocks 5. As shown in Figure 2, the rollers 6 in each block 5 are parallel with each other and the rollers in the adjacent blocks 5 have perpendicular centreline. Accordingly, the objects to be moved on rollers 6 in blocks 5 can be moved in the direction of arrows shown in Figure 2.

In order to make the moving possible, each block 5 can be vertically displaced and provided with drive. Thus, if an object in the blocks shown in Figure 2 is to be moved up, the upper block and those containing the rollers moving in the same direction are lifted out of the level of the system, and then the object above the blocks will rest only on the rollers of the given direction, and upon movement of the rollers it will move at right angle to the axis of the rollers.

If moving in the other direction, the former blocks are lowered to their original position, and the blocks containing the perpendicular rollers are lifted. In this case, the objects will rest on these rollers and move at right angle to the axis of the rollers.

Part of the section of block 5 is shown in Fig. 3. The rollers 6 are arranged in frame elements 7 so that the shafts 8 fit into the slots 9 between the frame elements 7. Thus, the rollers 6 can be lifted or lowered hydraulically or pneumatically at the same time. The rollers 6 are driven by chain drive 10. In lifted position of the rollers 6, the lower flat plate 11 of the object can be moved in the direction of arrows shown in the drawing.

The blocks are provided with guiding and/or buffer elements along their perimeter, which can be lifted out of the plane of blocks and ensure guiding and stopping of the objects.

Fig. 4 illustrates the perspective view of the container sorter similar to the one shown in Fig. 1. Here, each block 5 is shown in detail together with the rollers 6 arranged in the same direction. The motor vehicles 12 stand in to one side and the freight cars 13 to the other side of the loading space of the shunting area 3. As shown in the drawing, the containers 14 pass from the motor vehicles 12 to the public loading space 1 with the aid of roller conveyor 15. The roller conveyors 15 are mounted on the platform of motor vehicle 12.

The containers 14 pass from the public loading space 1 to the shunting area 3 travelling from there continuously rearranged according to the requirements towards the railway loading space 2, then in appropriate sequence to the freight cars 13. The freight cars 13 are provided suitably with the same roller conveyors as the motor vehicles 12.

Top view of another arrangement of the rollers is shown in Fig. 5. This illustrates a container reloader, where the lower roller conveyor 16 is the loading part of the inward containers, and the upper roller conveyor 17 is the loading part of the outward containers. A certain part of both roller conveyors 15 and 16 is formed as turning unit 18 and 19 from blocks of rollers 6 arranged at about 45° to each other. Further roller conveyor 20 is arranged between the turning units 18 and 19.

The containers arriving from the vehicle to the roller conveyor 16 on one side are loaded on the roller conveyor 16, then transferred with the aid of turning unit 18 and roller conveyor 20 to the turning unit 19, from where they get again to the second roller conveyor 17 and loaded on the arriving vehicle.

Figs. 6 to 10 show vehicles provided with roller conveyors fitting to the equipment according to the invention.

The container transport vehicle 21 shown in Figs. 6 and 7 has a platform 22 with roller conveyor 28 for taking up the container 14. The rollers 6 forming the roller conveyors 28 are lined up by pairs in two lines running next to each other. The rollers 6 are driven and they can be lifted out of the upper plane of platform 22 with spacing X. Corner fixing points are in the corners of platform 22, whereby the containers 14 can be fixed on platform 22.

Container 14 can be moved longitudinally on the rectangular platform 22 on rollers 6 lifted out of the former one's plane with the aid of roller conveyors 23.

Thus, for transportation, the container 14 is put on platform 22 with the driven roller conveyors 23, then following the return of rollers 6, the container 14 resting on platform 22 is fixed at the corner fixing points and forwarded to its place of destination. The container 14 arriving at its place of destination is released from the platform 22, the roller conveyors 23 are brought to operation, as a result of which the container 14 moves longitudinally outward from the vehicle.

The freight car 24 shown in Figs 8 to 10 is provided with similar roller conveyors 25. Here, however, the roller conveyors 25 are arranged crosswise instead of longitudinally. They function as the one presented in the former drawing.

In view of the fact, that the lower plate of the containers is not always flat, in certain cases it is advisable to support the containers with pallet provided with lower flat plate.

Figs 11 and 12 show the schematic drawing of a container 14 marked with dashed lines, situated on pallet 26. Similar corner elements 28 are fitted in the four corners of pallet 26 adjoining the corner elements 27 of container 14. Top view of the pallet 26 concurs with the horizontal projection of the standardized container 14. By the corner elements 28 on top of each other, each container 14 and pallet 26 can be releasably fixed to each other. The pallet 26 can be made of any material suited to the purpose, e.g. metal, wood, plastic or their combination, and it is a fundamental criterion that its lower surface is flat enabling its movement with the releasably fixed

container 14 on it along the roller path. In respect of the present invention not only the completely homogeneous flat surface, but for example the lower side of a framework constituting bars arranged in a common plane by their lower surface must also be regarded as flat surface movable on a roller path. Such framework can be formed even by parallel bars running only in one direction, but also by network consisting of perpendicular bars.

The container 14 and the adjoining pallet 26 represent a unit in the whole process of the container moving and transporting system of goods, which - if necessary - can be used as general purpose flat container. The size system of the pallets 26 is the same as that of the transcontainers. The corner elements are standard, whereby the pallets can be connected either to each other or to the containers and transport vehicle, and they are suitable for lifting as well.

The bottom of the containers can be formed - e.g. with reinforcing shell - as to have the lower surface to be flat, since movement of the containers on the roller path is ensured this way too.

The flat pallet may be assembled with module elements and parts separately fitted to the container's framework, thus filling in the gap between the flat surface and framework. In this case, the pallet is an accessory of the container, it becomes its monobuilt element.

Obviously, the apparatus according to the invention can be optimally utilized, if the freight cars, motor vehicles and railway stations are equipped with such uniform

solutions. Since this - especially at the initial time - is not realizable, or its mounting on vehicles is not recommended for reasons of safe operation, it is advisable to use supplementary units replacing the above described roller conveyors.

Figs 13 and 14 present such roller pallet. In essence, independent movable roller pallets are used instead of roller conveyors fixed and permanently mounted on the platform of vehicle or freight car. In this case, it is advisable to mount beams on the platforms of vehicles carrying the containers during transportation. The roller pallets are fitted between the beams performing the task of roller conveyors presented in Figs 6 to 10.

The roller pallets 29 shown in Figs 13 and 14 consist of base 30 and rollers 31. The lower plate of the bases 30 is flat, or flat covered surface, and the roller conveyors formed by rollers 31 can be lifted or lowered. Thus, by lifting the roller conveyors of the roller pallets pushed under the vehicle-carried container, the container can be rolled off the vehicle platform, then the whole pallet is lifted off the vehicle. The same roller pallets can be built into the perimeters of the loading spaces, which - as mentioned before - in given case are provided with roller conveyors at right angle to the ramp's edge. Part of these roller conveyors can be pushed out as such roller pallet at right angle to the ramp to the platform of the vehicles standing at the ramp. According to another feasible version, the roller pallet can be built into perimeter of the container maneuvering area or ramp, so that automatically extending from it, it rests on the vehicle platform and performs the above described tasks,

then it is automatically withdrawn below the ramp or loading area.

The examples shown above clearly demonstrate that the system according to the invention is more effective compared to the traditional solutions. The most important advantages are the following:

While in the present forms of the traditional loading, maneuvering and reloading, the goods move on passive path (road, paved space, loading surface, etc) with the aid of trolleys, cars, cranes, etc, now with the solution according to the invention active path is used eliminating partly the moving mechanisms used for rearrangement, and partly fundamentally reducing the space required for rearrangement, since it demands hardly any or no vacant space at all, at the same time it allows perfect automatization, as well as computer-aided tracking, recording, indication and control of the goods.

When railway is used, by building in roller bay between the underframe of the freight car and waggon body, it is possible to lift off the waggon body with the cargo from the carriage. This way, the off-time of the carriage and underframe is shortened, i.e. utilization of the expensive carriage is improved. The problem of loading and unloading of the freight car becomes simpler. In case of replaceable waggon body the problem of unloading on open track is simplified.

Maneuvering the cars is simplified by building shunting space consisting of roller bays, instead of the presently used hump yards. The area required by the roller shunting

space is much smaller than that of the presently used hump yard.

The new mechanism can be widely used - in the same system - and together with the currently used loading technologies. The high loading capacity is automated if required, its programmed embodiment is extremely quick, with further modern technology it saves live labour and area.

A special advantage of the apparatus according to the invention is that the containers to be loaded on the whole train can be collected on the periphery of the loading space and pushed at once to the train standing to the ramp. In given case, the loading space can be formed on both sides of the rail-track, when the loading takes place on both sides for example by pushing the already assembled container-line from one side into the train and with the same manipulation the containers on the train are pushed out to the other side.

The energy required for moving the goods is little, thus the loading is cheap. Naturally, it can be used not only for vehicles and machines, but for smaller unit-cargos as well.

The system according to the invention can be easily adapted to the container moving intensity and technology of the various handling places. The simple and quick container handling facility reduces the turning time of the containers and container transport vehicles and improves their utilization. Parallelism of the various container moving elements results in high transport

capacity.

The system offers excellent possibility for automatization of the various container moving processes. The container transport vehicles can also be used for transport tanks of general purpose, thus their degree of utilization might be maximal.

Further advantage of the system is that its technical requisites and equipment are simple, their operation is economic, energy- and live labour-saving, moreover flexibly connectible in various combinations to the existing container transport systems, and changing over gradually to the new system is free from problems. The system according to the invention may considerably facilitate the extensive use and propagation of the very rational container transport of goods and maneuvering the containers - conforming to the international standards - on the roller path. With proper combination of the vehicles and tracks or track elements according to the invention, systems flexibly complying with the existing technological demands can be developed, which enable the longitudinal and crosswise handling, lifting, turning around the vertical axis, collision-free stacking and assorting of the containers.

It stands to reason that the system can be combined also with conventional traditional container moving aids as well (crane, turntable, sliding platforms, etc). The roller paths and transport vehicles according to the invention can be used for moving - besides containers - other cargos, e.g. goods packed in boxes, tanks, etc. The invention is not restricted to the above detailed

solutions, but it can be realized in several other ways within the protective circle defined by the claim points.

For example, parking house can be built with the aid of the equipment according to the invention, where the motor vehicles are moved with elevators provided with roller pallets to the different floors to be arranged practically without vacant place, or optionally with the aid of a few number of vacant places, and they can be automatically moved to the elevator at any time.

Equipment based on the invention's principle can be similarly produced for arranging goods in department stores, post office, etc.

If the objects to be moved are relatively small and not too heavy, instead of reducing the size of the blocks, it is possible to arrange the blocks - containing rollers of different directions - within each other. This is shown in Fig. 14, where the rollers of different directions are arranged consecutively in chessboard pattern, so that the rollers of the same direction are moved, or lifted and lowered together. This way, practically two blocks are arranged in overlapping position.

The invention is not limited to the examples and can be produced in many ways within the scope claimed in the following claims.

What we claim is

1. Device for moving and/or arranging large objects. e.g. containers or vehicles by rollers or roller conveyors, characterized in that the rollers are arranged in rectangular blocks and the rollers in each block are parallel with each other, and at an angle to the rollers in the adjacent blocks, and the blocks are vertically displaceable.
2. Device according to claim 1, characterized in that the rollers in the adjacent blocks are at right angle to each other.
3. Device according to claim 1 or 2, characterized in that at least a certain part of the rollers in the blocks is driven.
4. Device according to claim 3, characterized in that each driven roller is provided with independent drive.
5. Device according to claim 3, characterized in that the rollers driven within each block are provided with a common drive.
6. Device according to claim 5, characterized in that the rollers are provided with chain drive.
7. Device according to claim 1 to 6, characterized in that the blocks containing rollers of different directions are arranged side by side.

8. Device according to claim 1 to 6, characterized in that blocks containing rollers of different directions are arranged within each other.

9. Device according to claim 1 to 8, characterized in that the the blocks are provided with guiding and/or buffer elements.

10. Device according to claim 1 to 8, characterized in that it is a shunting yard.

11. Device according to claim 10, characterized in that the shunting yard consists of road side loading space, railway side loading space as well as of arranging space and storage place.

12. Device according to claim 10, characterized in that rollers parallel with the ramp are on the perimeters of the loading spaces.

13. Device according to claim 12, characterized in that at least a certain part of the rollers parallel with the ramp are conveyors and can be pushed out at right angle to the ramp.

14. Device according to any of claims 1 to 13, characterized in that it is a carpark.

15. Device according to any of claims 1 to 14, characterized in that it is provided with supplementary, inlet and outlet roller conveyors.

16. Device according to claim 15, characterized in that the roller conveyors are arranged on the ramp.

17. Device according to claim 16, characterized in that the roller conveyors are arranged as to be pushed out and vertically adjustable below the blocks on the ramp.

18. Device according to claim 16, characterized in that the roller conveyors are arranged on a vehicle platform.

19. Device according to claim 18, characterized in that the roller conveyors are arranged on a pallet provided with flat lower plate.

20. Device according to any of claims 1 to 19, characterized in that it is computer controlled.

21. Device according to any of claims 1 to 20, characterized in that it is provided with computer recording system.

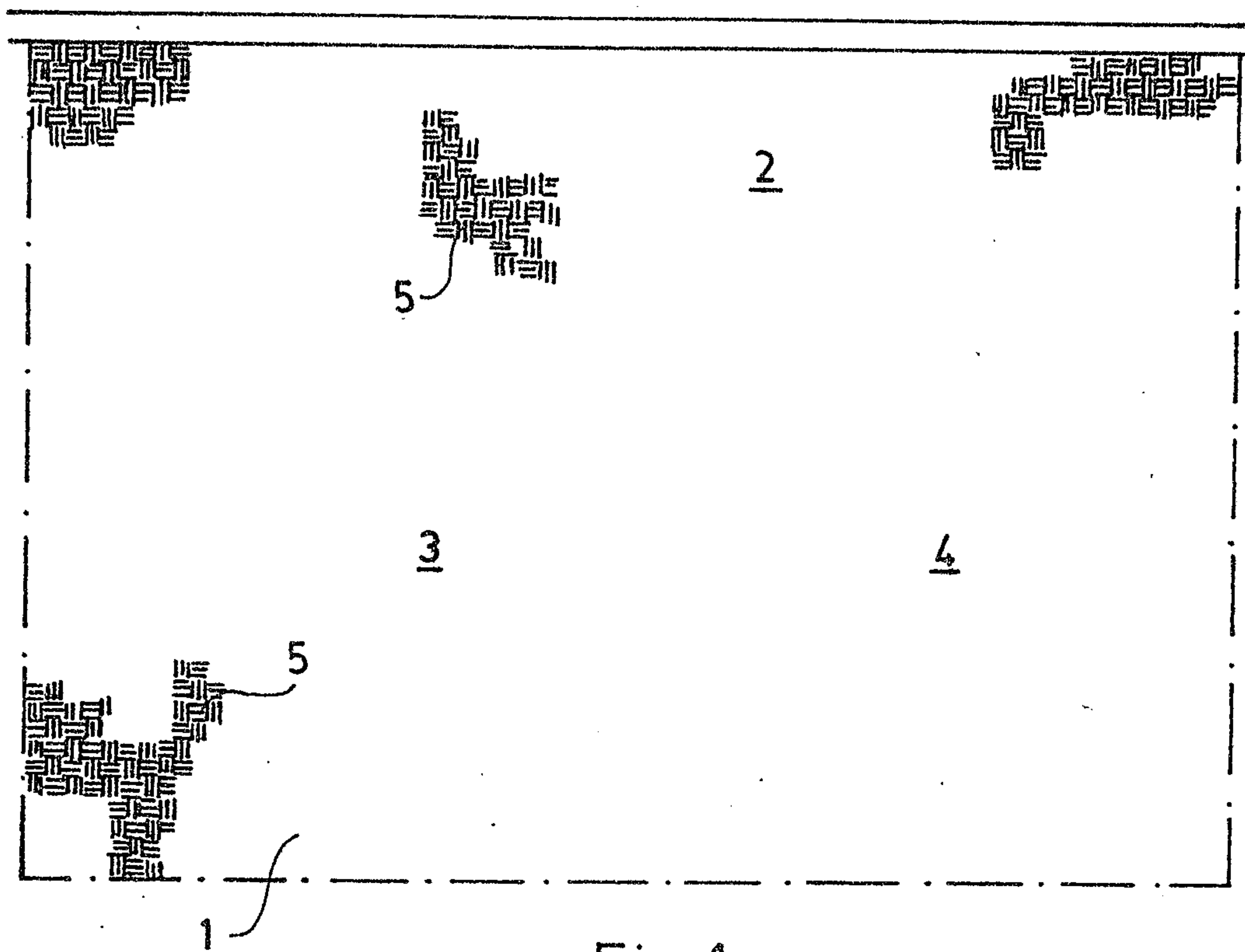


Fig. 1

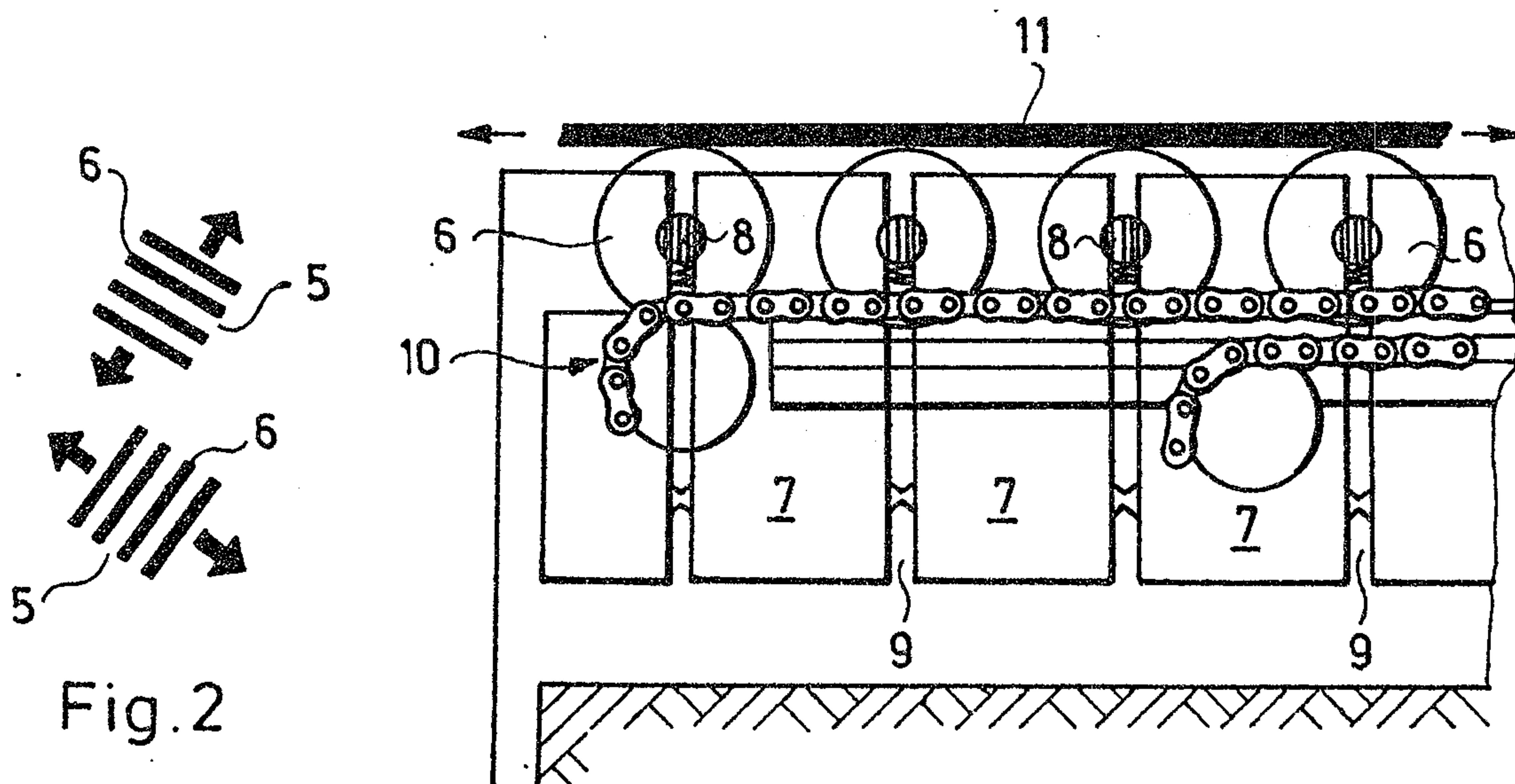


Fig. 2

Fig. 3

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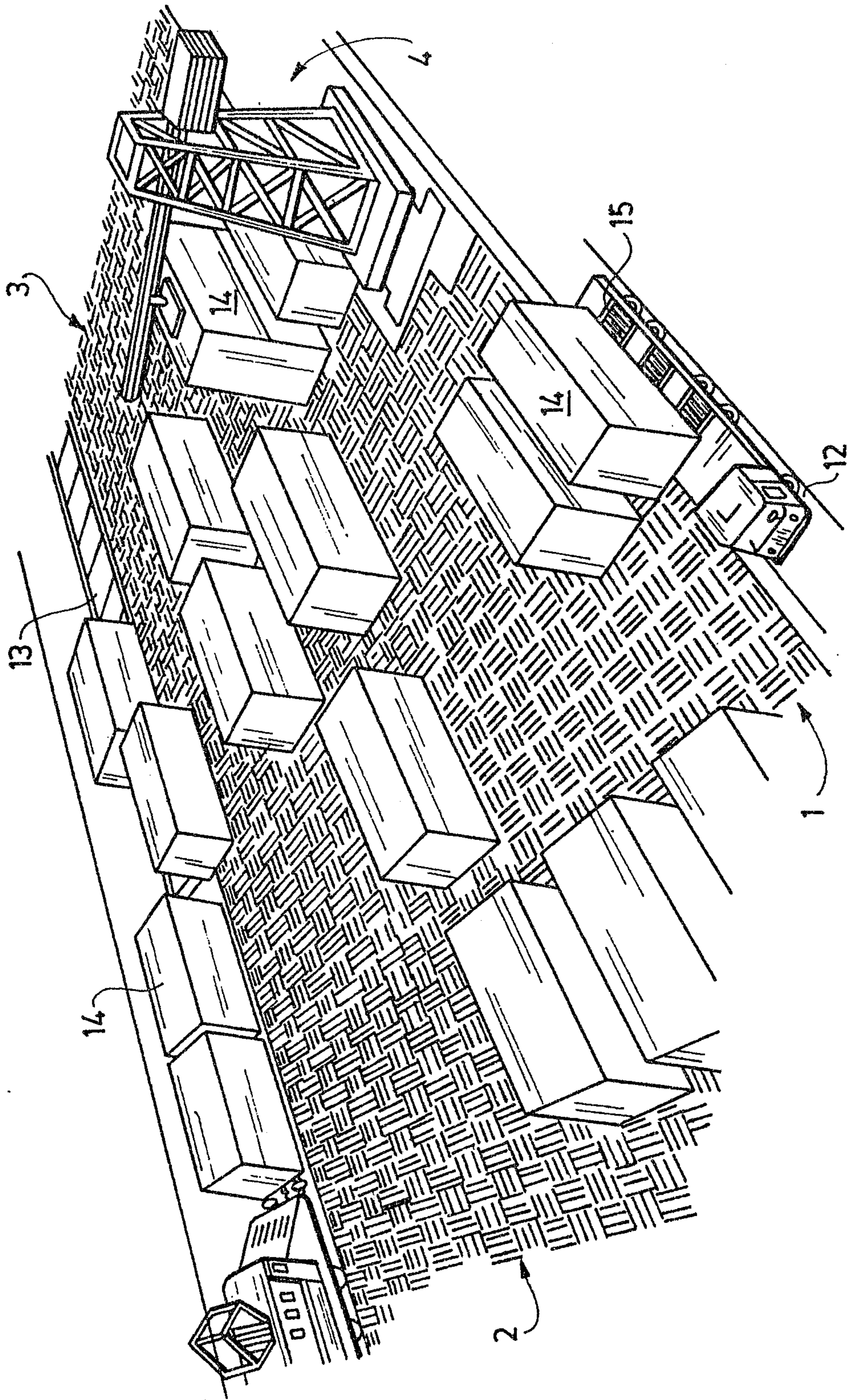
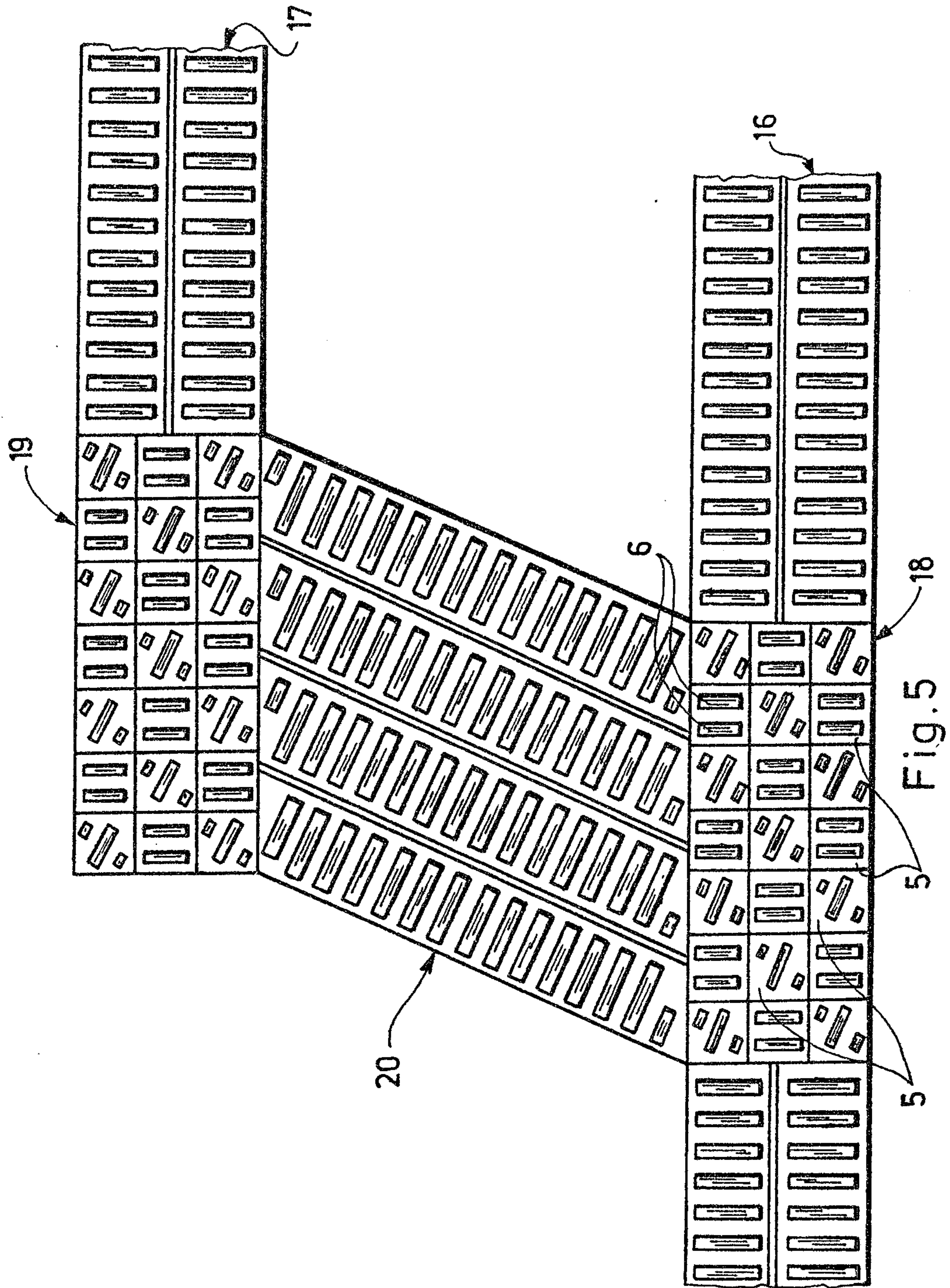


Fig. 4

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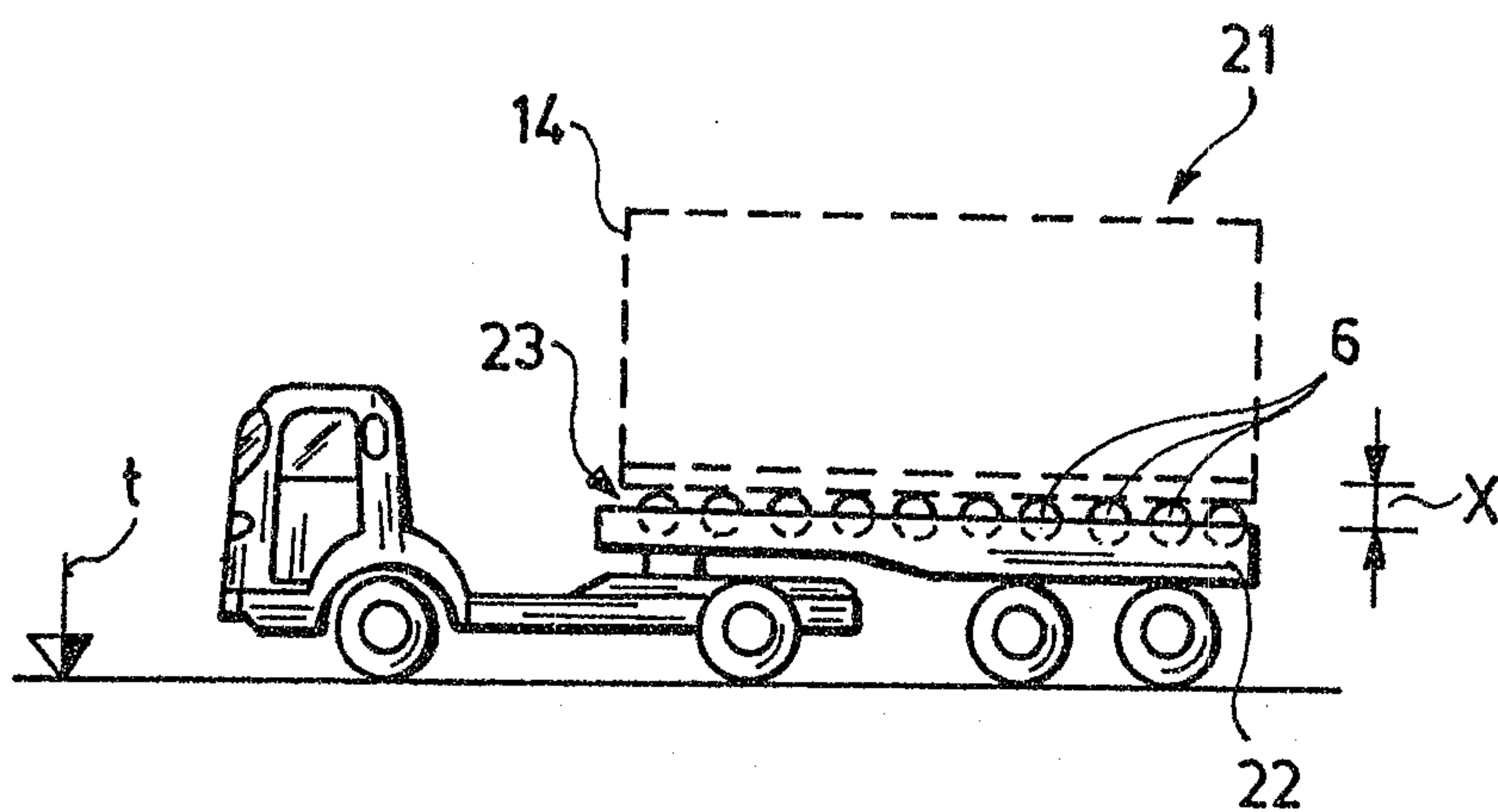


Fig. 6

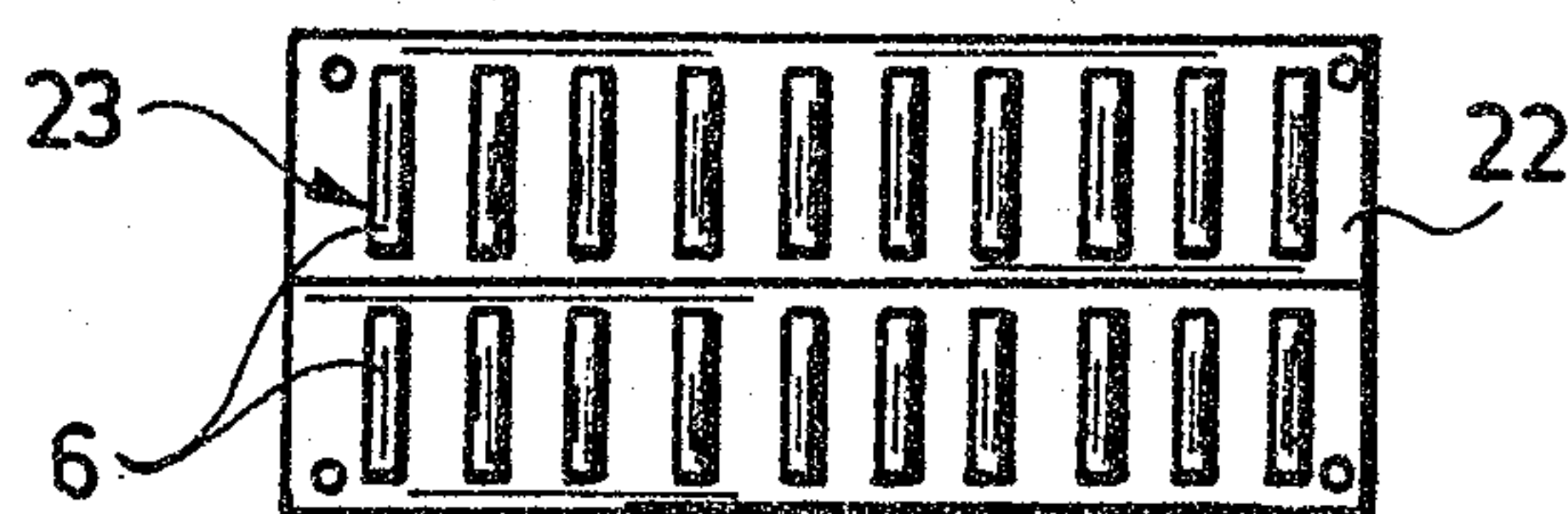


Fig. 7

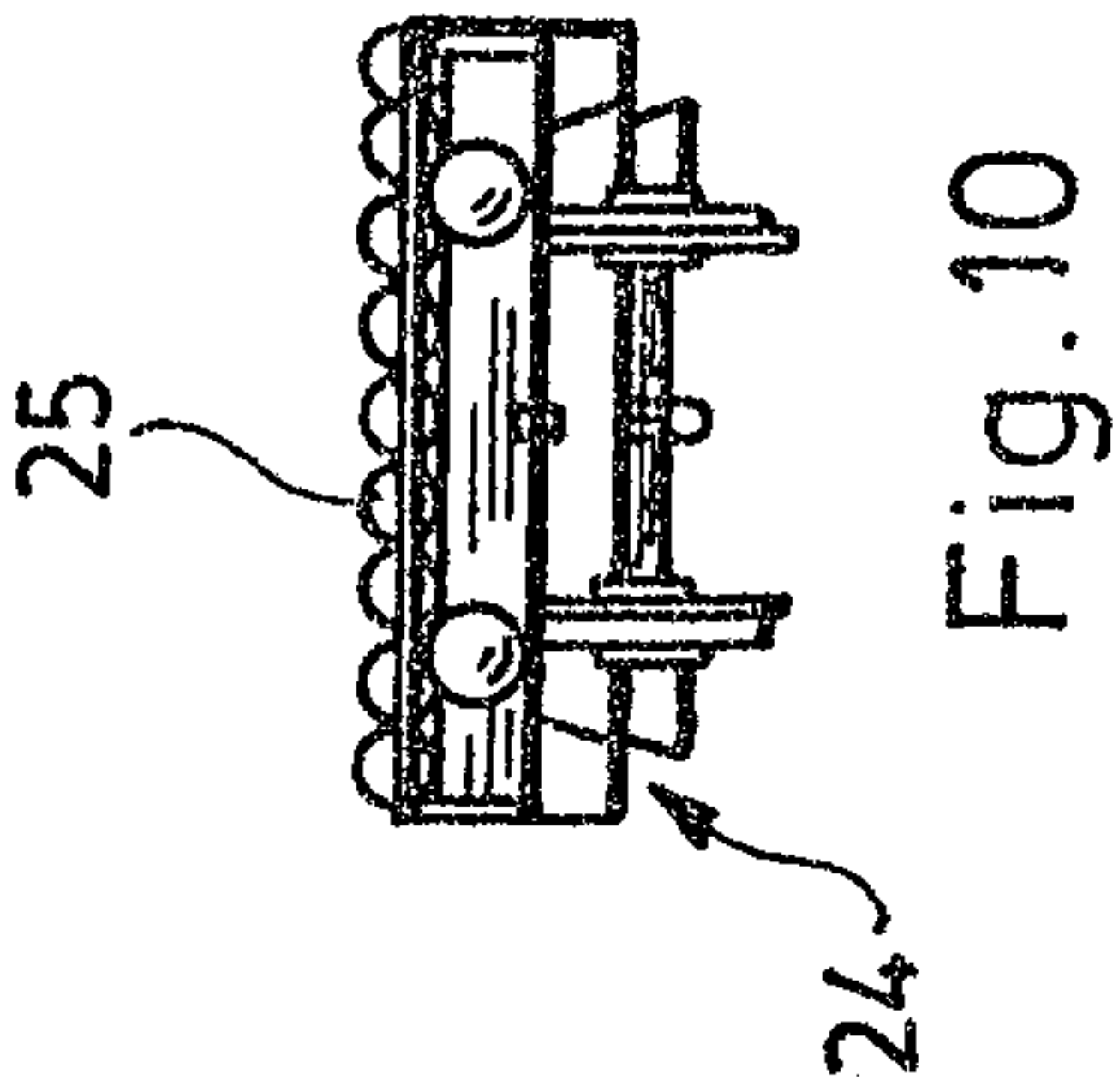


Fig. 10

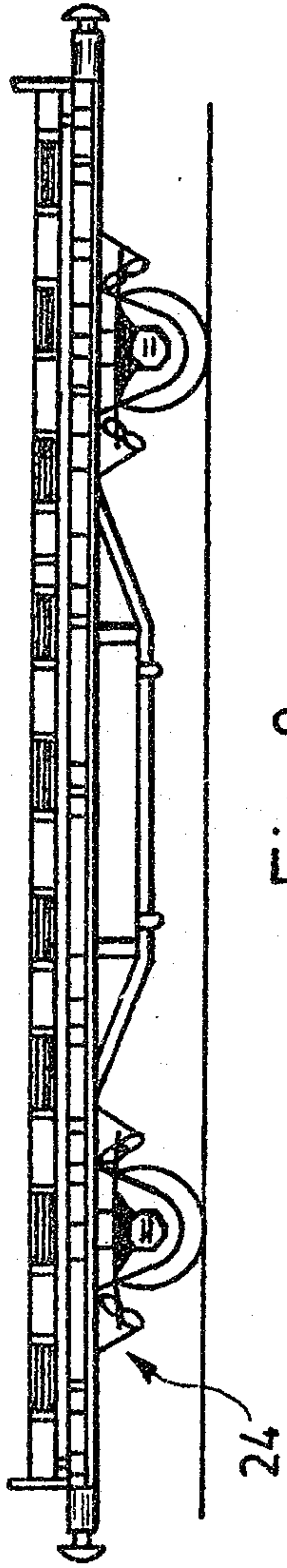


Fig. 8

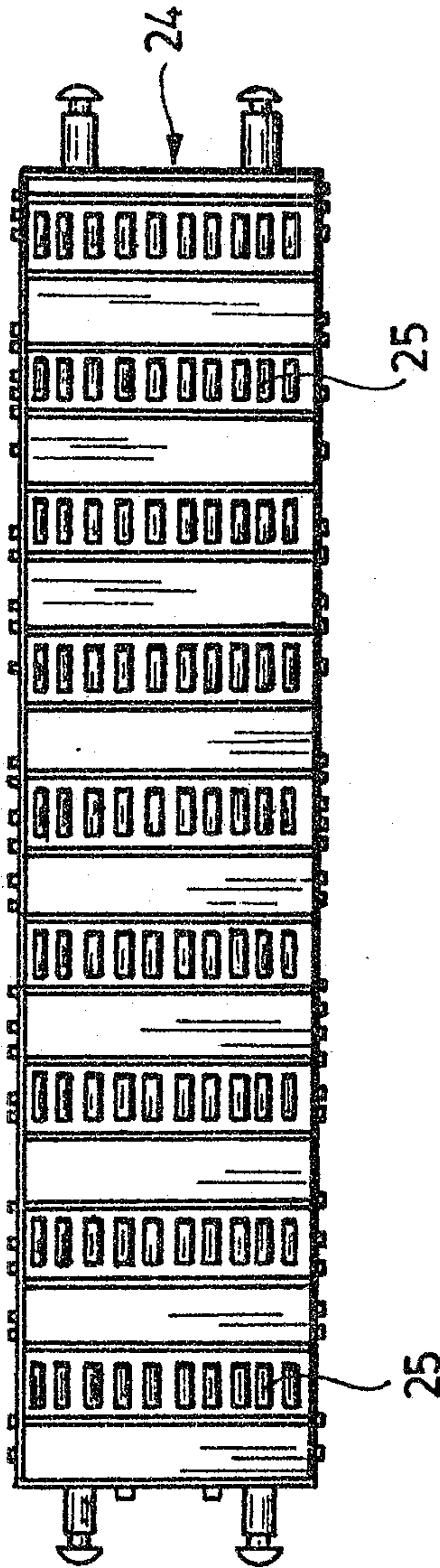


Fig. 9

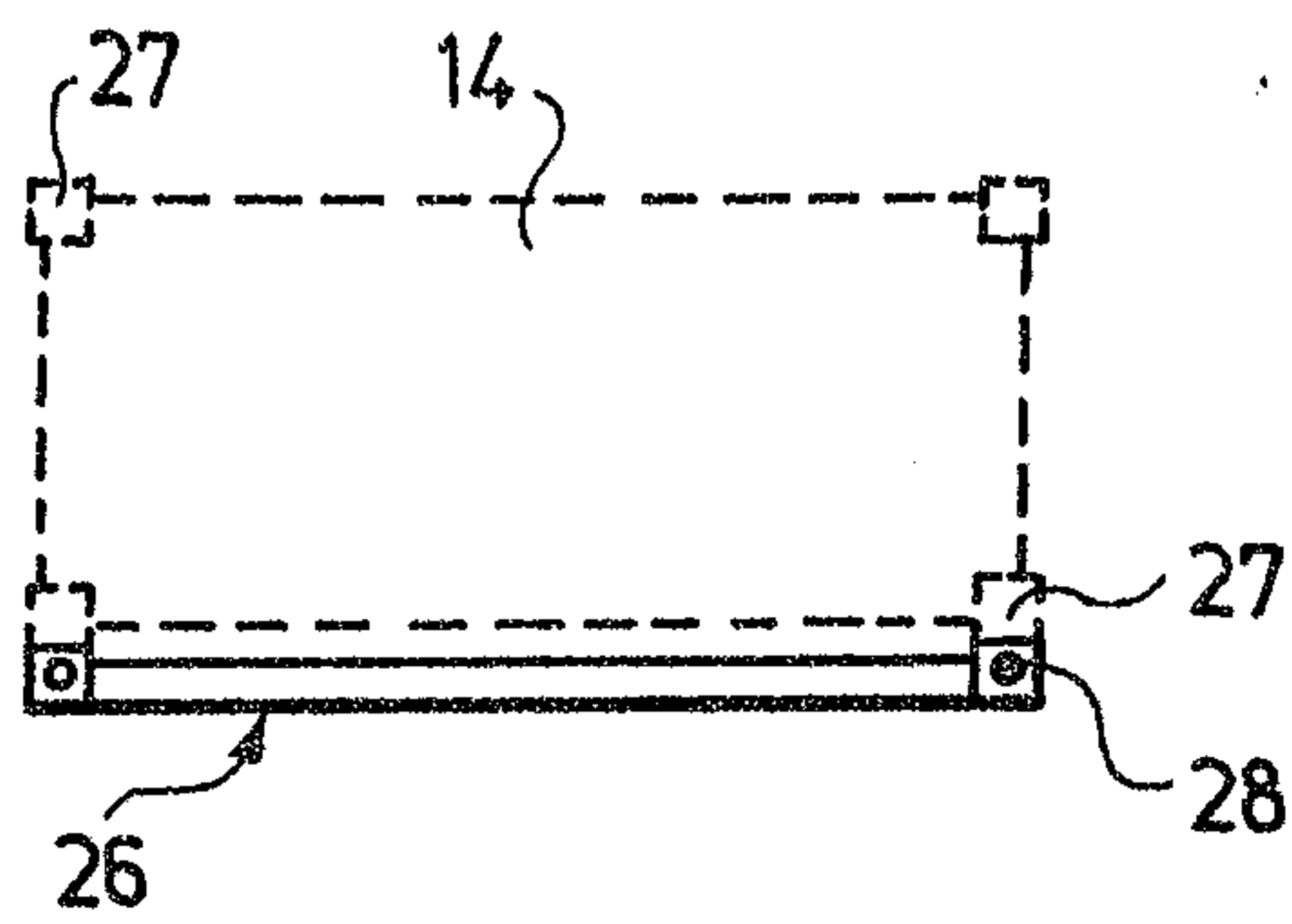


Fig. 11

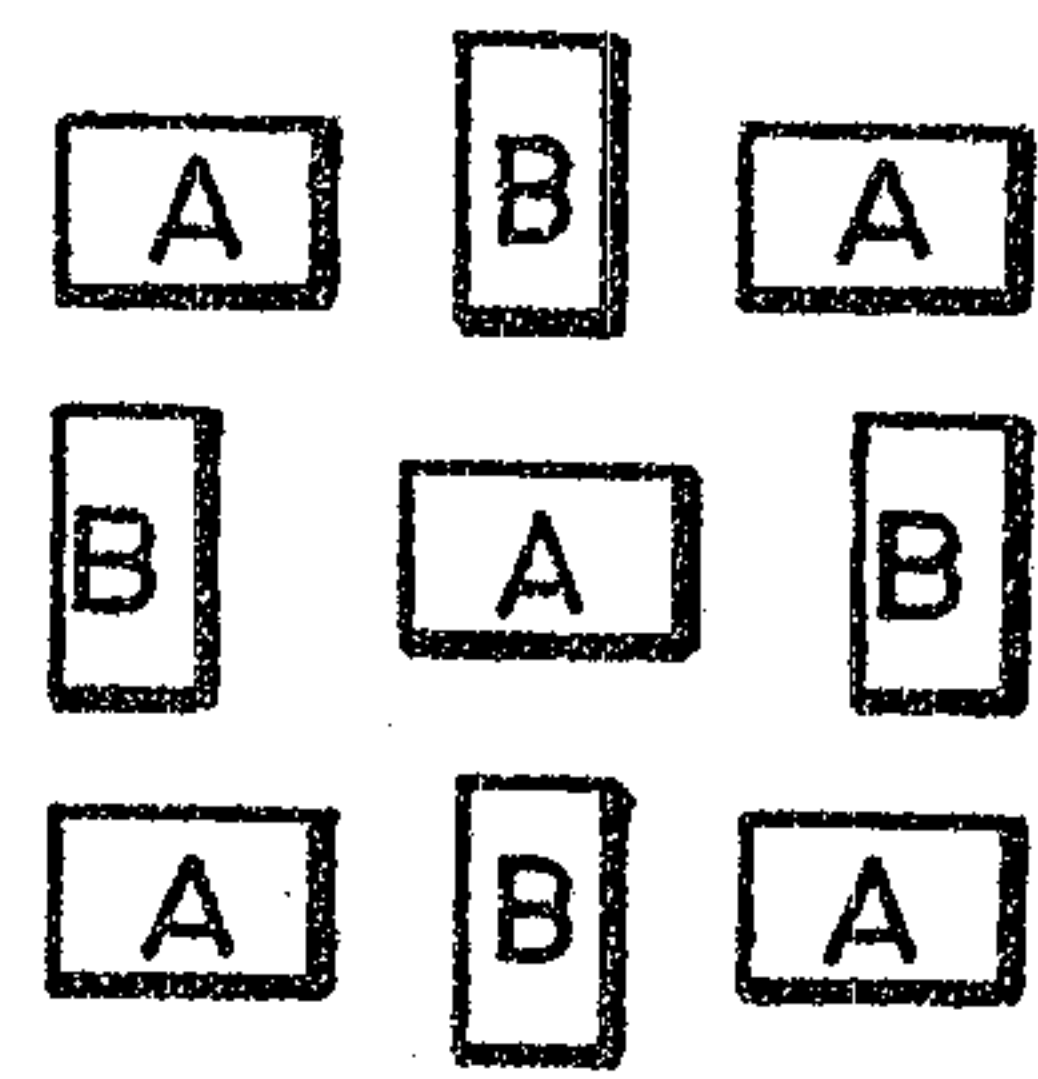


Fig. 14

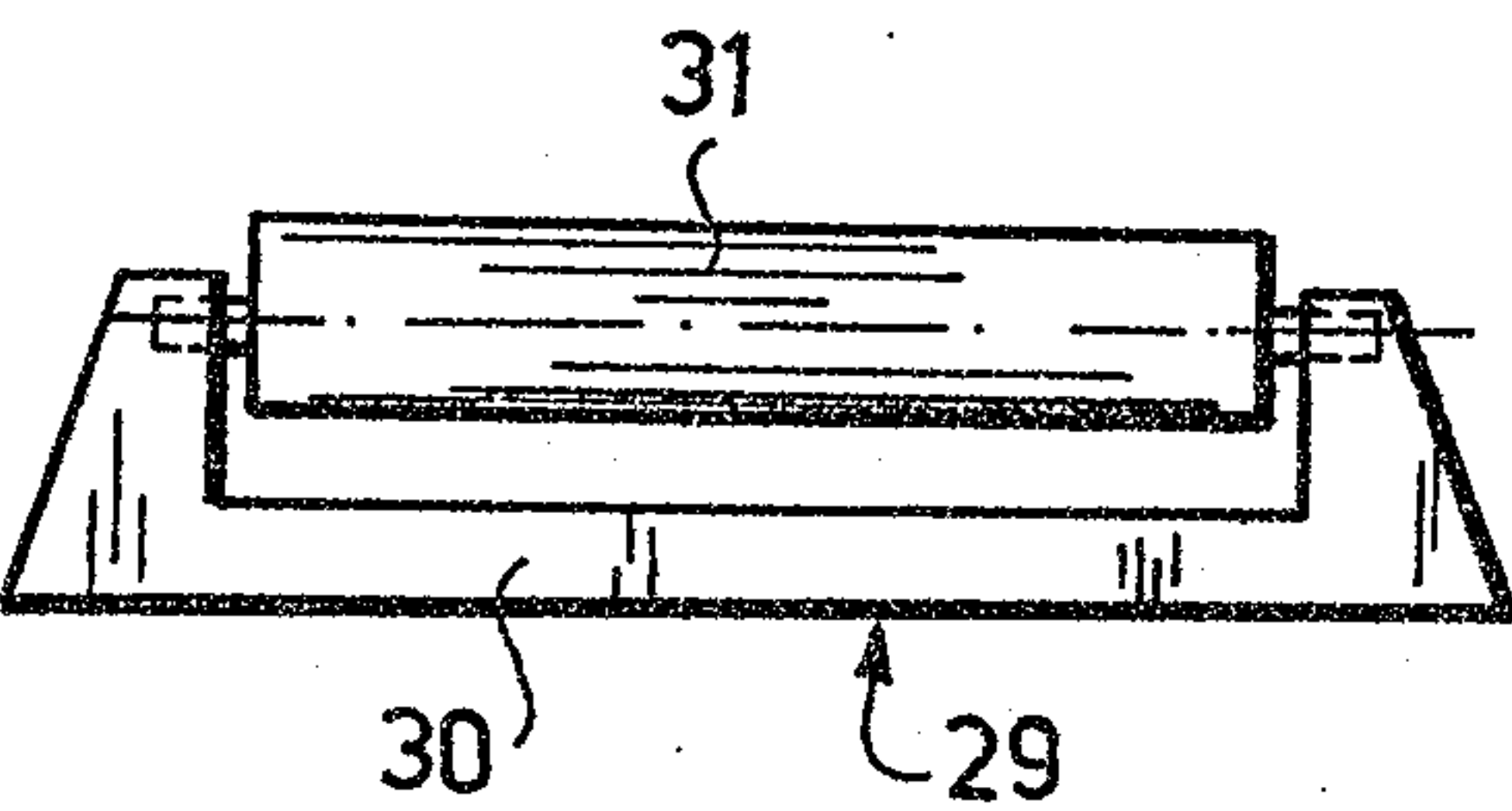


Fig. 12

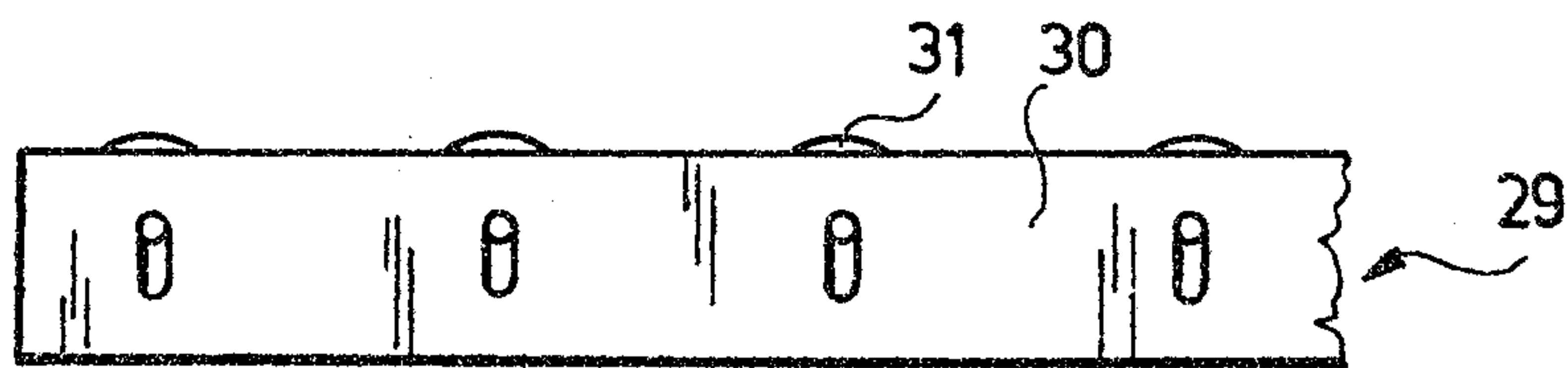


Fig. 13