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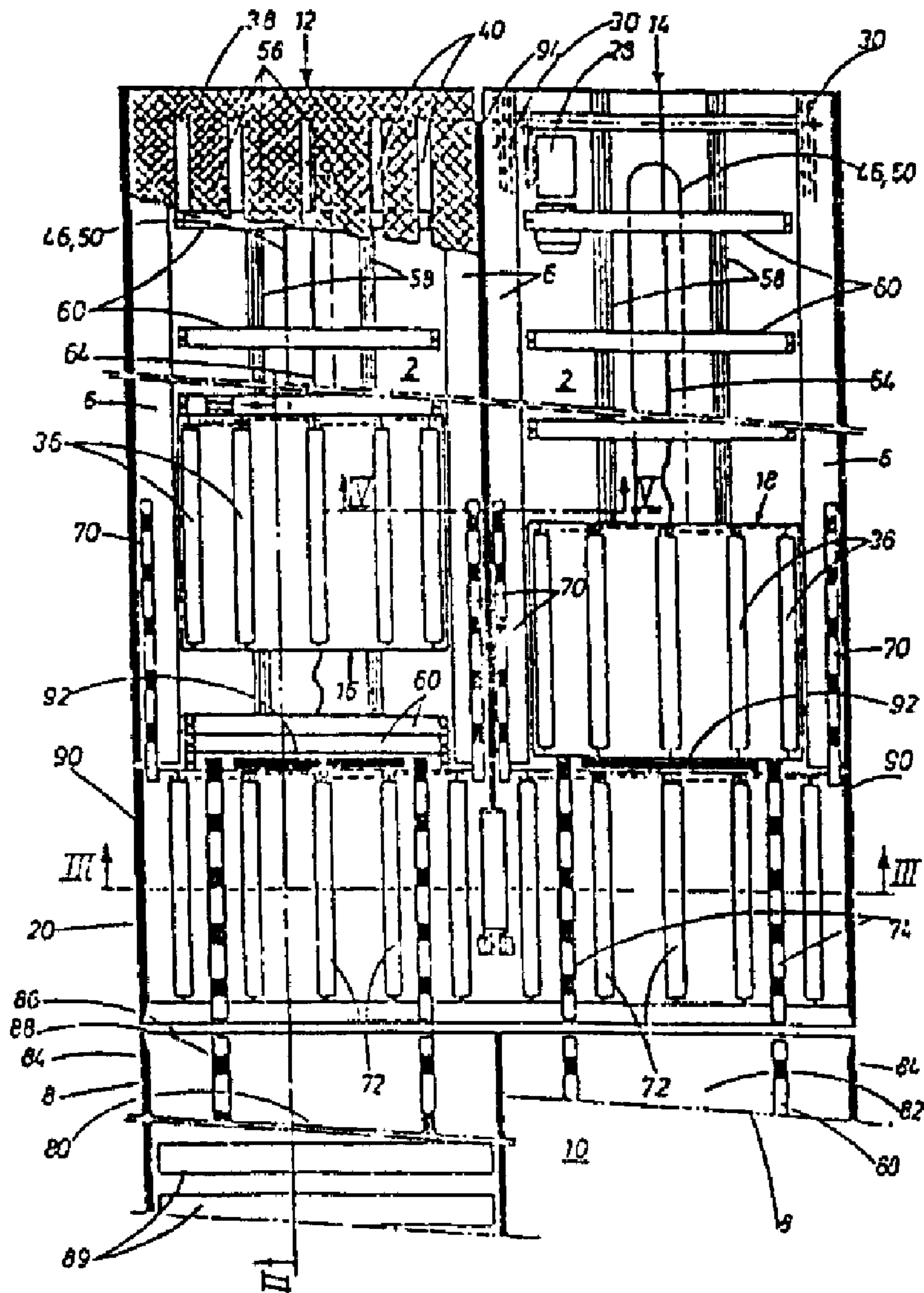
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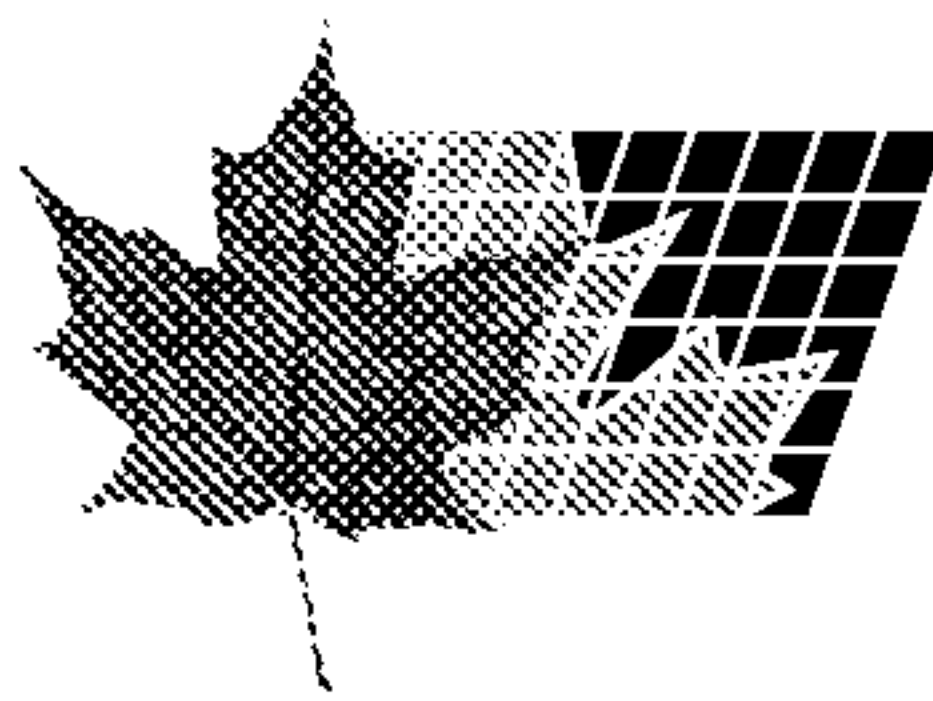
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(54) **SYSTEME DE CHARGEMENT ET DE DECHARGEMENT POUR
CAMIONS, LEURS REMORQUES, CONTENEURS DE
TRANSPORTS ET SIMILAIRES**

(54) **LOADING AND UNLOADING SYSTEM FOR CARGO TRUCKS,
THEIR TRAILERS, TRANSPORT CONTAINERS AND THE
LIKE**





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(57) L'invention concerne un système de chargement et de déchargement, situé ou à monter sur des camions, leurs remorques, des conteneurs de transport et similaires, qui comprend deux voies de chargement (12, 14) s'étendant dans le sens longitudinal l'une à côté de l'autre. Ce système se caractérise en ce qu'il est prévu au moins un élément de transport transversal (16, 18) déplaçable le long des voies de chargement. Ledit élément est en mesure de déplacer des fûts de charge (22) individuels le long des voies de chargement et de passer en n'importe quel point d'une voie de chargement à l'autre. Ce système permet de trier les fûts (22) chargés même pendant le trajet, de manière qu'ils puissent être déchargés avec une économie de temps, selon l'ordre des clients à livrer, même s'ils ont été mal placés au départ.

(57) The invention relates to a loading and unloading system in or for installing in cargo trucks, their trailers, transport containers and the like. The system comprises two adjacent longitudinally running loading tracks (12, 14) and is characterized in that at least one transversal transporting means (16, 18) is provided which can travel along the loading tracks. Said means are capable of moving individual freight drums (22) along and on the loading tracks and can be shifted to any position of choice from one loading track to the others. This permits a sorting of the loaded drums (22) also during the drive so that the drums can be unloaded in a timesaving manner after being rearranged into the sequence pertaining to the customers. A cross transporting device (20) is preferably mounted in front of both loading tracks (12, 14). Said device enables a transversal movement also similar to a longitudinal movement of the drums (22) which are to be loaded or unloaded. In addition, the inventive loading and unloading system is computer controlled.



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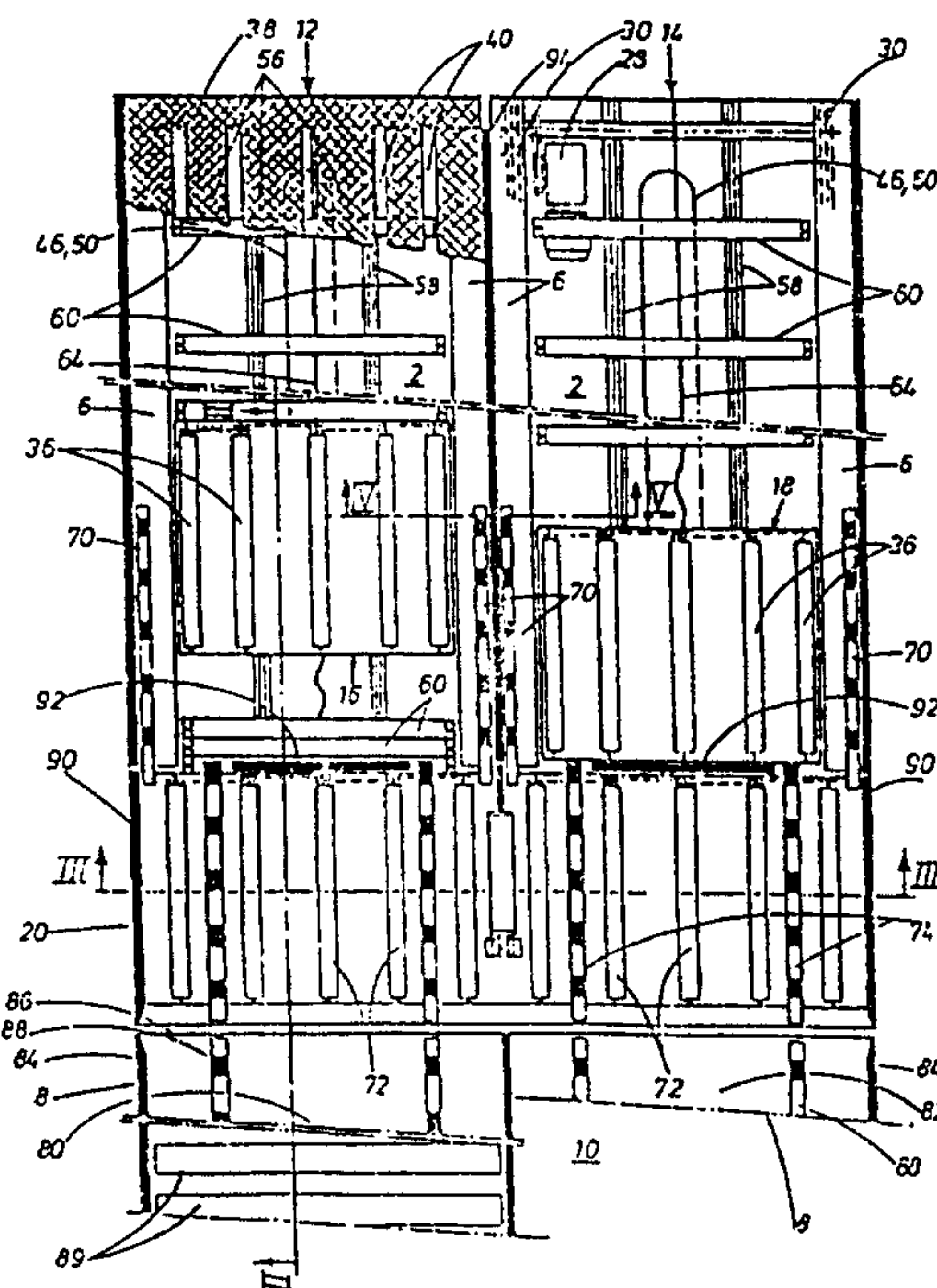
Vor Ablauf der für Änderungen der Ansprüche zugelassenen
Frist; Veröffentlichung wird wiederholt falls Änderungen
eintreffen.(54) Title: LOADING AND UNLOADING SYSTEM FOR CARGO TRUCKS, THEIR TRAILERS, TRANSPORT CONTAINERS AND
THE LIKE(54) Bezeichnung: BE- UND ENTLADESYSTEM FÜR LASTKRAFTWAGEN, DEREN ANHÄNGER, TRANSPORTCONTAINER
UND DERGL.

(57) Abstract

The invention relates to a loading and unloading system in or for installing in cargo trucks, their trailers, transport containers and the like. The system comprises two adjacent longitudinally running loading tracks (12, 14) and is characterized in that at least one transversal transporting means (16, 18) is provided which can travel along the loading tracks. Said means are capable of moving individual freight drums (22) along and on the loading tracks and can be shifted to any position of choice from one loading track to the others. This permits a sorting of the loaded drums (22) also during the drive so that the drums can be unloaded in a timesaving manner after being rearranged into the sequence pertaining to the customers. A cross transporting device (20) is preferably mounted in front of both loading tracks (12, 14). Said device enables a transversal movement also similar to a longitudinal movement of the drums (22) which are to be loaded or unloaded. In addition, the inventive loading and unloading system is computer controlled.

(57) Zusammenfassung

Ein Be- und Entladesystem in bzw. für den Einbau in Lastkraftwagen, deren Anhänger, Transportcontainer und dergl. und mit zwei nebeneinander längsverlaufenden Ladebahnen (12, 14) kennzeichnet sich dadurch, daß mindestens ein entlang den Ladebahnen verfahrbares Querfördermittel (16, 18) vorgesehen ist, das in der Lage ist, einzelne Ladungsgebilde (22) auf den Ladebahnen entlangzubewegen und an jeder beliebigen Stelle von einer Ladebahn zu der anderen umzusetzen. Dies erlaubt ein Sortieren der geladenen Gebilde (22) auch noch während der Fahrt, so daß diese selbst nach Um disposition in der Reihenfolge der Kunden zeitsparend entladen werden können. Vorzugsweise ist den beiden Ladebahnen (12, 14) stimseitig eine Kreuzfördevorrichtung (20) vorgelagert, die eine Quer- wie auch Längsbewegung der zu ladenden bzw. entladenden Gebilde (22) ermöglicht, und ist das betreffende Be- und Entladesystem computergesteuert.



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K-9675

Loading and unloading system for cargo motor vehicles, their trailers, transport containers and the like

The present invention relates to a loading and unloading system in or for installing in cargo motor vehicles, their trailers, transport containers and the like and having two loading tracks running longitudinally and adjacent.

Such a system is known for example from the US patent publications ~~3,250,408~~ and 3,937,338 as well as the PCT publication WO 92/04263. With the system, substantially similar bundles such as loaded standard pallets can be displaced in the longitudinal direction of the vehicle or shipping room, so as to facilitate loading and unloading thereof. The loading tracks are formed by sunk chain or belt conveyors, ~~possibly in combination with an abutment bar (US patent publication 3,250,408)~~. However, with the system generally only entire lines of the respective bundles can be displaced inwardly and outwardly.

Further, shelf operating devices are known from for example the German laid open publication DE 44 00 829 and the German utility model DE-UM G 91 03 198.2 and have a rack with transverse conveying means, which rack can travel along a transport aisle, so as to laterally transport bundles received from the rack into storage channels, or to take them out therefrom. The transverse conveying means comprise an elevating platform in order to transpose or drop off the respective bundles from one roller conveyor to another.

Starting out therefrom, the present invention is based on the object to further refine a loading and unloading system of the type mentioned in the introduction

insofar similar to a shelf operating device, to facilitate the ready loading and unloading of individual bundles.

This object is primarily achieved by the characterizing feature of claim 1. Moreover, the dependent claims state advantageous possibilities for further embodiments.

The respective transverse conveying means that can travel along the loading tracks enables taking over individual bundles at any location from one loading track to the other and herewith, possibly in a plurality of steps, storing each individual bundle at a desired loading platform location or to take it from there to the loading/unloading location. In connection herewith, a corresponding sorting of the bundles can take place also during transport, if desired computer controlled, which is not least of interest when for example during a transport the route of transport is modified and the consecutive delivery to individual customers has to be rearranged.

In the following a preferred embodiment will be described with the figures in more detail. Of the figures:

Fig. 1 shows a (somewhat schematized) plane view onto the respective loading and unloading system on a truck loading platform, including the associated stationary loading and unloading device,

Fig. 2 shows a vertical longitudinal section along line II-II of Fig. 1,

Fig. 3 shows a vertical transverse section along line III-III of Fig. 1,

Fig. 4 shows a vertical transverse section along line IV-IV of Fig. 1.

Fig. 5 shows a schematic side view of a storage device being adjacent the rear of the loading and unloading system, which device can be folded downwardly and in the down-folded condition enlarges the loading platform, for temporary storage of individual bundles of freight and

Fig. 6 shows a schematic perspective front view of a truck or container shipping room equipped with the respective loading and unloading system including the storage device.

As is apparent in particular from Figs. 1 and 6, a frame 6 preferably made from aluminum is stored on the floor 2 of a shipping room 4 - such as that of a truck or container freight space, and accommodates all the substantial parts of the inventive loading and unloading system, with the exception of the stationary loading and unloading device 8 resting upon a stationary loading ramp 10 or the like.

Apart from the stationary loading and unloading device 8, the inventive loading and unloading system essentially consists of two loading tracks 12 and 14 that are arranged next to one another, run longitudinally relative to the shipping room 4, and on which transverse conveying means in the form of one carriage 16 or 18 each can separately be displaced, as well as of a cross-type conveying means 20 disposed in front of the end face of the two loading tracks 12 and 14. While the carriages 16 and 18 are capable [to displace] individual

carriage 16 or 18 each can be displaced, as well as a cross-type conveying means 20 disposed in front of the end face of the two loading tracks 12 and 14. While the carriages 16 and 18 are capable to displace individual bundles 22 of freight (Figs. 2 and 3) such as so-called Euro-pallets along the respective loading track 12 or 14 and, combined with one another, to transfer them from one loading track to the other, the cross-type conveying means 20 can take over bundles 22 delivered from the stationary loading and unloading device 8, transversely bring them into a suitable position flush with a desired one of the two loading tracks 12 and 14, simultaneously align them and then transfer them onto the carriage 16 or 18 of the respective loading track.

As is apparent from Figs. 1 and 2, the two carriages 16 and 18 are driven via pinions 24 running along a rack 26 fixedly disposed in the frame 6, by means of a hydraulic or electric motor 28 via a chain 30, the pinions 24 opposite the rack 26 rolling off said chain 30. In this way, the respective carriage 16 or 18 is given half of the velocity of the chain 30, whereas the driving force acting on the carriage is double the tensile force effective in the chain. As is particular evident from Fig. 4, the rack 26 can also consist of a chain, in this case fixedly mounted to the frame 6.

The carriages 16 and 18 each comprise a support surface 32 (Fig. 2) corresponding in its dimension approximately to the base area of an individual bundle 22 and being formed from an elevating platform 34 carrying a rolling conveyor 36 having rolls 37 extending longitudinally relative to the loading tracks 12 and 14. The elevating platform 34 is capable of lifting the rolls 37 beyond the level of a cover 38 of the frame 6; to this end the cover has continuously longitudinally extending slots 40. Thereby the rolls 37 can longitudinally as well as sideways relative to the axis of the respective loading track 12 and 14 displace a bundle 22 received from the respective carriage 16 or 18.

Driving of the rolls 37 takes place by means of chains 42 and 44, by means of a motor 48, for instance an electric gear motor or a hydraulic motor, fed from a trailing cable or trailing hose 46, of the elevated platform 34 by means of pneumatic or hydraulic lifting cylinders 52 (Fig. 4) fed from a trailing hose 50.

As is apparent from Fig. 4, the two carriages 16 and 18 run on guide rails 54 as components of the frame 6, which are just like the racks 26 and chains 30 counter-sunk relative to the cover 38 to an extent that they can also be used in a conventional manner as a loading platform. To this end, so as to support the elongated parts 56 of cover 38 from below,

the parts being separated from one another by slots 40, rails 58 passing loosely through the respective carriage 16 or 18 are arranged lying on the floor 2 of the shipping room 4; on the rails several towed supports 16 each are guided so that they can be longitudinally displaced. The towed supports 60 comprise on their upper side one support roll 62 each on which the cover 38 can rest. They are connected with one another, with one end of the frame 6 each, and with the respective carriage 16 or 18, by means of a chain or rope 64 so that, in accordance with the position of the carriage, assume equal intervals or can be disposed closely to one another; to this end, they are pulled apart from or pushed against one another by the carriage.

As is apparent from Figs. 1, 4 and 6, drivable chain conveyers 70 are arranged on both sides of the carriages 16 and 18 as well as in between them, so as to transfer bundles 22 from the cross-type conveying means 20 onto the adjacent end of the respective loading track 12 or 14, or to fetch them from there onto the cross-type conveying means 20.

The cross-type conveying means 20 has two transversely extending roller conveyors 72 which are adjacent one another, in symmetry to the longitudinal center plane of the shipping room 4, and independent of one another, as well as altogether four chain conveyors 74 arranged longitudinally extending between individual rolls of the roller conveyor 72 and liftable beyond the loading level of the roller conveyor 72.

The stationary loading and unloading device 8 consists of two units 80 and 82 in a common frame 84, being disposed next to one another and each of approximately half the width of the shipping room 4. Two chain conveyors 88 being disposed spaced from one another and directed towards the ramp edge 86, and, preceding the chain conveyors, parking means in the form of a roller conveyor 89 are supported on each side in the frame 84. The chain conveyors 88 of the two units 80 and

82 are just like their roller conveyor 89 independent of one another and can be driven in either direction.

Now, if a bundle 22 is delivered from one of the units 80 and 82, in particular, from its chain conveyors 88, this bundle 22 will be taken over onto the cross-type conveying means 20 by means of two chain conveyors 74 thereof. With the chain conveyors 74 lowered, the roller conveyor of the cross-type conveyor means 20 then effects a possibly required lateral displacement of the respective bundle 22 in front of the desired one of the two loading tracks 12 and 14. This lateral displacement takes place up to abutting one of two slightly resilient stop surfaces 90 on the oppositely facing end faces of the roller conveyors 72. Still further, a stop plate 92 on each end face at the beginning of each of the loading tracks 12 and 14 and following the cross-type conveying means 20 can be extended upwardly. By means of the stop surfaces 90 in cooperation with the stop plate 92, every single one of the bundles 22 being on the cross-type conveying means 20 can reliably be aligned relative to the adjacent loading track 12 or 14, regarding angle and position. After the alignment having been carried out, the chain conveyors 74 can come into action, so as to transfer together with two of the chain conveyors 70 the bundle onto the adjacent end of the respective loading track 12 or 14.

Once this has taken place, the respective carriage 16 or 18 accommodates the bundle and transports same along the loading track until it impinges on the bundles previously already stored on the same loading track, whereupon the carriage with the lowered rolls 37 can return. The respective movements are controlled with the assistance of sensors. A retractable stopper plate 94 extending in between the two loading tracks substantially over the entire length thereof prevents that bundles stored on the loading tracks can slide sideways during transport.

If desired, the same or a different bundle 22 can also additionally be transferred outside the cross-type conveying means 20 from one of the loading tracks 12 or 14 onto the other. To this end, both carriages 16 and 18 travel into the respective position while being disposed next to one another, whereupon their rolls 34 are lifted and

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driven [in the required sense]. Naturally, this requires the respective position over the second loading track to be free. Should this not be the case, the respective position can be freed by transposing and displacing the remaining bundles 22, possibly several times. Under automatic control this can also take place while driving, for which it is merely required to keep one single position on the cover 38 free. Incidentally, next to the two loading tracks 12 and 14, the cross-type conveying means 20 can be loaded as well, as long as the latter is not arranged on a shipping room sideboard, which is also possible, but then of course separate from the frame 6.

So as to also utilize even the last place in the shipping room 4 for loading without sacrificing the capability to transpose the loaded bundles 22 without external auxiliary means, a storage device 96 for the temporary accommodation of one or also two of the loaded bundles 22 may be provided at the cross-type conveyor means 20; the storage device can be extended, i.e. folded outwardly, and in its extended state enlarges the loading platform, as shown in Figs. 5 and 6. In the illustrated example, the storage device 96 can like a shipping room sideboard be folded downwardly by means of a cylinder 98, and be fixed in a horizontal as well as in certain inclined dispositions. Moreover, it can completely be folded downwardly, so as to not interfere during non-use. Alternatively, it could also be integrated into a normal shipping room side ward. Relative to its horizontal disposition it comprises on its upper side at least one set of rolls, a conveyor belt, or as illustrated chain conveyors 100 permitting to easily maneuver ~~an~~ individual bundles 22 onto or off the storage device and onto the loading platform.

As shown in Fig. 6, the storage device 96 can extend over the entire width of the loading platform and in this case be divided in the center so that there are two separately operable halves 102 and 104, each for accommodating a single bundle 22 and flush with each of the loading tracks 12 and 14. In an inclined disposition the storage device 96 can be utilized for adapting to different levels of loading ramps. However, the storage device 96 could alternatively also be constructed like a drawer or a platform that can be pivoted horizontally outwards.

Control of the elements described in the foregoing including those of the storage device 94 and a stationary loading and unloading device 8 may conveniently be computer aided, preferably by means of an onboard computer, namely such that the operator, i.e. generally the driver, merely has to enter certain addressees by sequence and at the most by amount. In support, an identification of the individual bundles 22 by means of an automatically readable code, such as a bar code, can be used in combination therewith.

A person skilled in the field of computers is familiar with such measures for control so that any further elaboration thereon can be dispensed with.

In comparison to previous practice, the loading and unloading system described so far permits considerably accelerated loading and unloading of the trucks, their trailers, transport containers and the like, even if a re-disposition has to take place between loading and unloading. For this, merely one single operator is required.

If desired, the subject system can be retrofitted as well as removed again as an independent unit or module, for which it is sufficient to put it onto a conventional loading platform. On the other hand, it can be integrated in the floor 2 of the

shipping room during the manufacture of new vehicles, whereby loading height, material and weight can be saved. In this case, the cover 38 with its slots 40 forms the floor 2 of the shipping room 4, whereas the frame 6 beneath can also be a supporting element.

Due to the presence of the cross-type conveying means 20 or even due to the possibility to transpose from one of the two carriages 16 and 18 onto the other, already a single one of the two units 80 and 82 of the stationary loading and unloading device is possibly sufficient. On the other hand the two adjacent and independent units enable a rapid and independent loading and unloading of both loading tracks 12 and 14. For example, one of them can already be loaded while the other is still being unloaded.

However, should the mentioned stationary loading and unloading device be altogether missing at one or the other loading location, loading and unloading may also take place by means of a forklift or a shipping room sideboard. In the same way, a forklift, possibly in cooperation with one or both of the carriages 16 and 18, can be used with a tarpaulin-type truck or trailer, also for lateral loading and unloading. Further, in between two vehicles or containers similarly equipped and correspondingly parked next to one another, a direct transposition at the end or the side can take place.

Patent claims:

1. Loading and unloading system in or for installing in cargo motor vehicles, their trailers, transport containers and the like, ~~and~~ having two loading tracks (12, 14) extending longitudinally adjacent, and longitudinal conveying means arranged thereon for transporting along the loading tracks bundles (22) of freight to be loaded, characterized in that at least one transverse conveying means (16, 18) is provided which can longitudinally travel along the loading tracks (12, 14) and is capable to displace ~~move~~ individual bundles of freight (22) ~~along and on the loading tracks and to displace them~~ at any desired location from one loading track to the other.

2. Loading and unloading system of claim 1, **characterized** by the loading tracks (12, 14) having guide rails (54) that are sunk relative to a leveled loading platform (38), and by one carriage (16, 18) each running on the guide rails of each loading track forming an individual transverse conveying means.

3. Loading and unloading system of claim 2, **characterized** in that each carriage (16, 18) comprises one roller conveyor (36) that can be lowered below the loading platform (38).

4. Loading and unloading system of claim 3, **characterized** in that the loading platform (38) is formed by a cover having longitudinally extending slots (40) for passing of the rollers (37) of the respective roller conveyor (36), ~~which~~

5. Loading and unloading system of claim 4, characterized in that the respective cover rests on a series of towed supports (60) in front or behind the carriage, which towed supports can travel longitudinally and are coupled with one another and with the respective carriage (16, 18).

65. Loading and unloading system of one of the preceding claims, characterized in that a cross-type conveying means (20) is disposed at the end face before the two loading tracks (12, 14), which cross-type conveying means is capable to displace the accommodated bundles (22) of freight from the axis of one of the loading tracks (12, 15) to that of the other, as well as to transfer said bundles of freight between each loading track and an external loading location such as a loading ramp (10).

76. Loading and unloading system of claim 65, characterized in that the cross-type conveying means (20) consists of at least one roller conveyor (72) oriented transversely and having chain conveyors (74) arranged longitudinally extending in between individual rolls thereof.

87. Loading and unloading system of claim 65 or 76, characterized in that preferably resilient stop surfaces (90) are arranged at both sides of the cross-type conveying means (20), for the orientation of bundles (22) of freight thereon.

98. Loading and unloading system of one of claims 65 to 87, characterized in that one upwardly extendable stop plate (92) each is arranged at the end face in front of the two loading tracks (12, 14) and following the cross-type conveying means (20), for bundles (22) of freight being on the cross-type conveying means.

109. Loading and unloading system of one of claims 65 to 98, characterized in that a cross-type conveying means (20) is mounted or mountable on a shipping room sideboard.

110. Loading and unloading system one of the preceding claims, characterized in that a stop plate (94) against lateral sliding of the stored bundles (22) of freight is arranged between the two loading tracks (12, 14) and

extending substantially over their entire length, which stop plate can be lowered.

124. Loading and unloading system of one of the preceding claims, characterized in that the transverse conveying means ~~(16, 18)~~ are capable to take over bundles (22) of freight also directly from the sides of the vehicle or the like, or to deliver them from there.

132. Loading and unloading system of one of the preceding claims, characterized by an extendable storage device (96) for temporary storage of individual of the loaded bundles (22) of freight, which enlarges in its extended state the available overall loading platform.

143. Loading and unloading system of claim 132, characterized in that the storage device (96) is integrated in a shipping room sideboard.

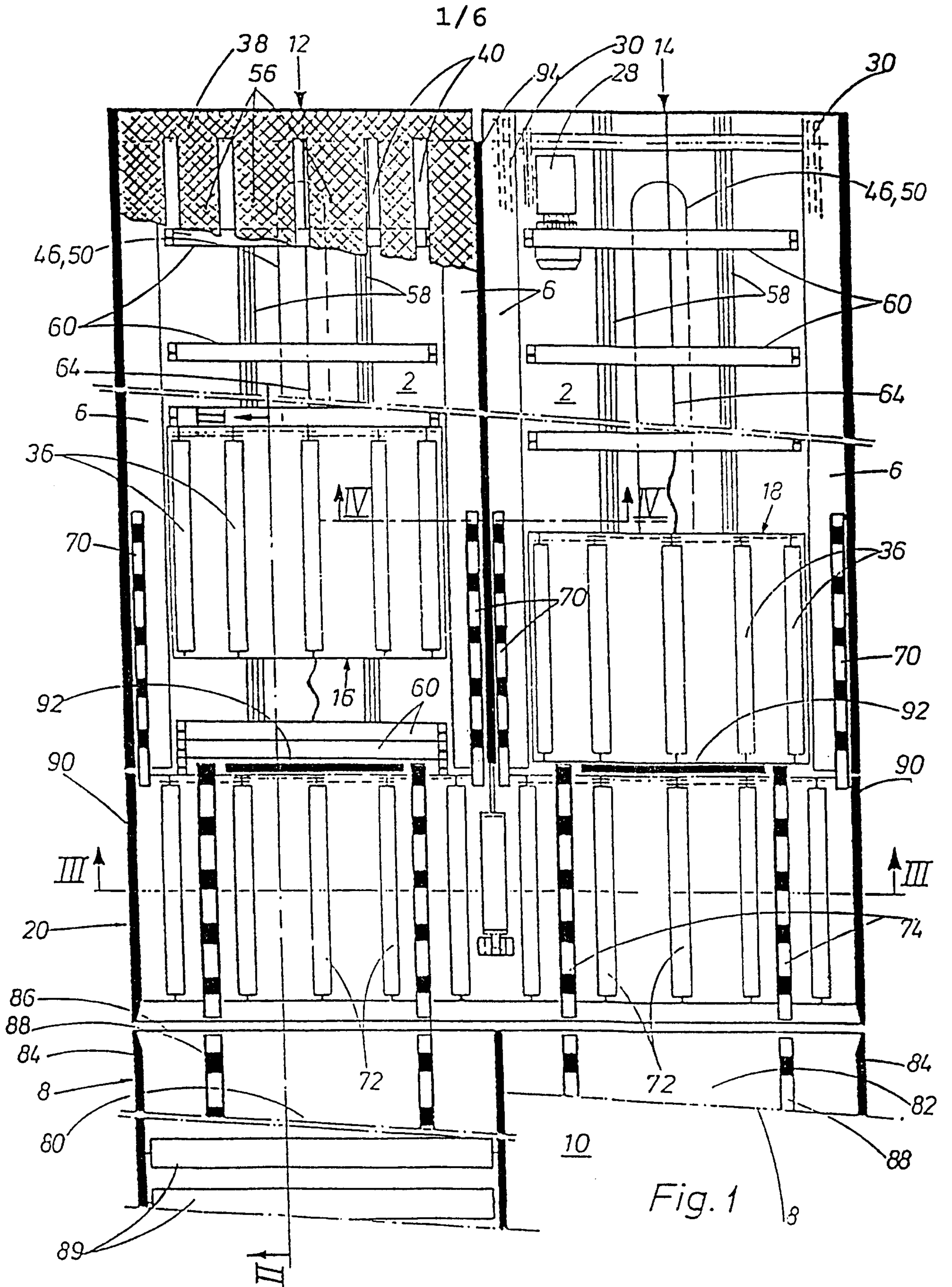
154. Loading and unloading system of one of the preceding claims, characterized by having an associated stationary loading and unloading device (8) for arranging on a loading ramp (10) or the like, the device (8) having roller, belt, and/or chain conveying means (88).

165. Loading and unloading system of one of the preceding claims, characterized in that it can be retrofitted as an independent unit or module into existing vehicles or transport containers and the like, and can preferably be removed again.

176. Loading and unloading system of one of the preceding claims, characterized in that it is computer aided or computer controlled with the aid of sensors and possibly machine readable codes on the respective bundles (22) of freight.

187. Loading and unloading system of claim 176, characterized in that the respective computer is a programmable onboard computer that is preferably also still usable during transport.

198. Loading and unloading system of claim 187 in combination with claim 132 and/or 154, characterized in that also the storage device (96) and/or the stationary loading and unloading device (8) can be controlled by means of the same computer.



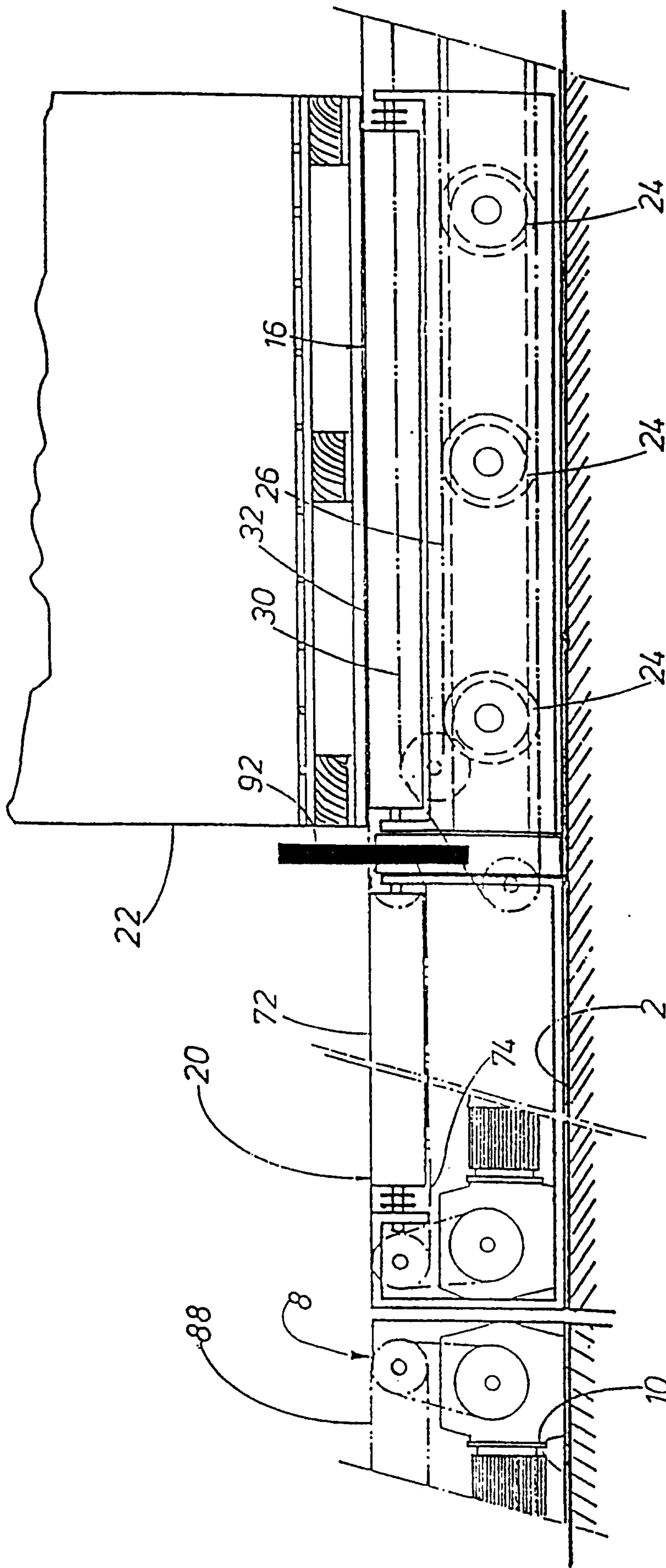


Fig. 2

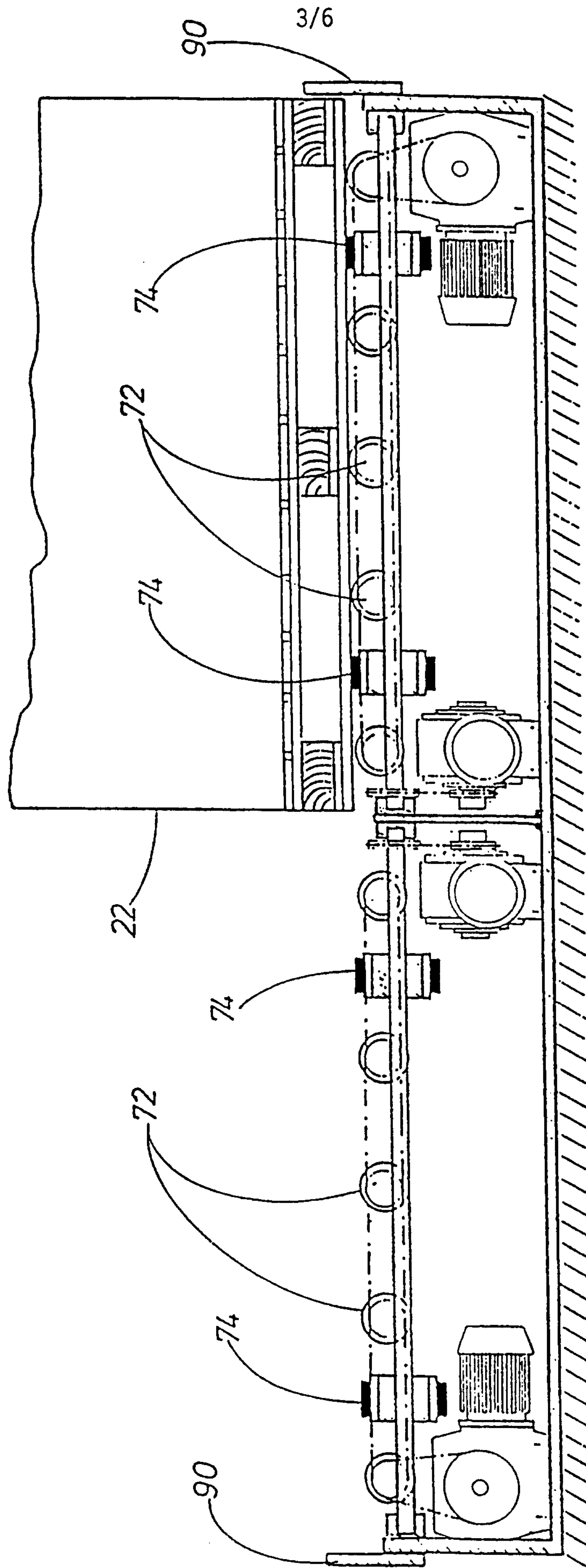


Fig. 3

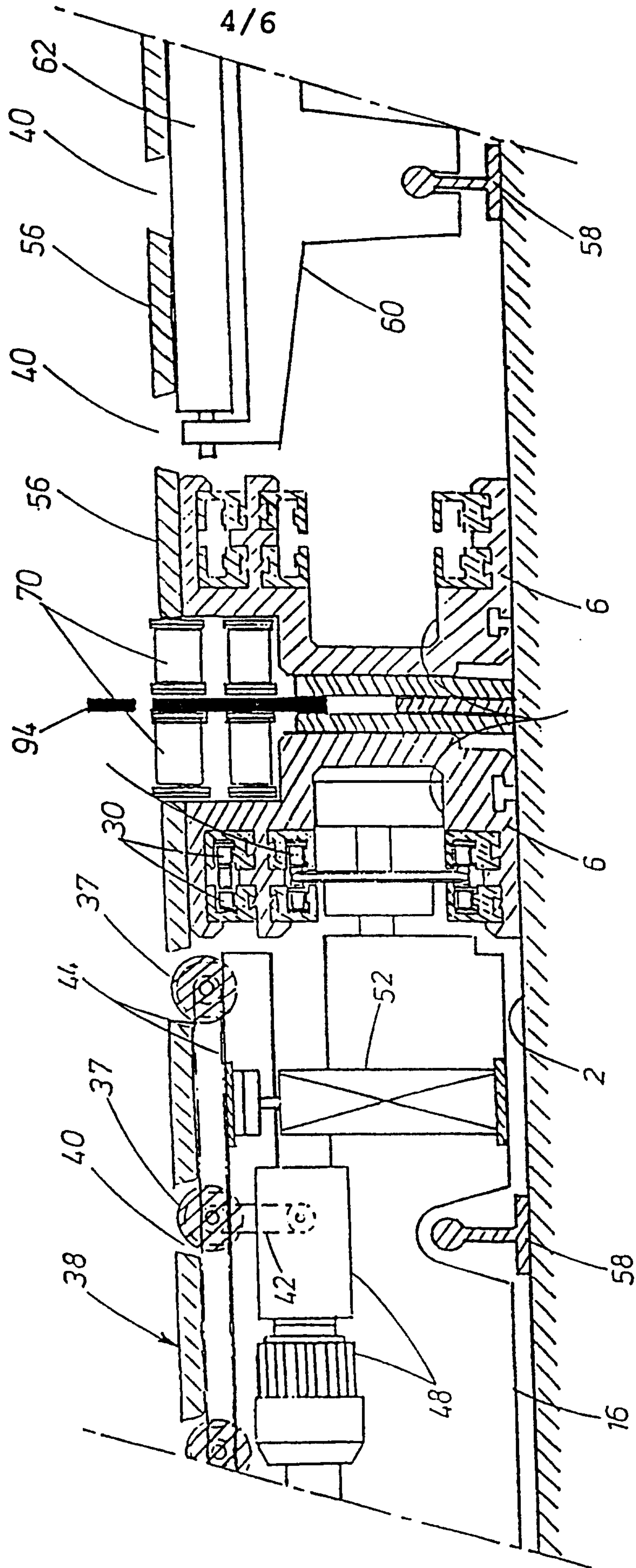


Fig. 4

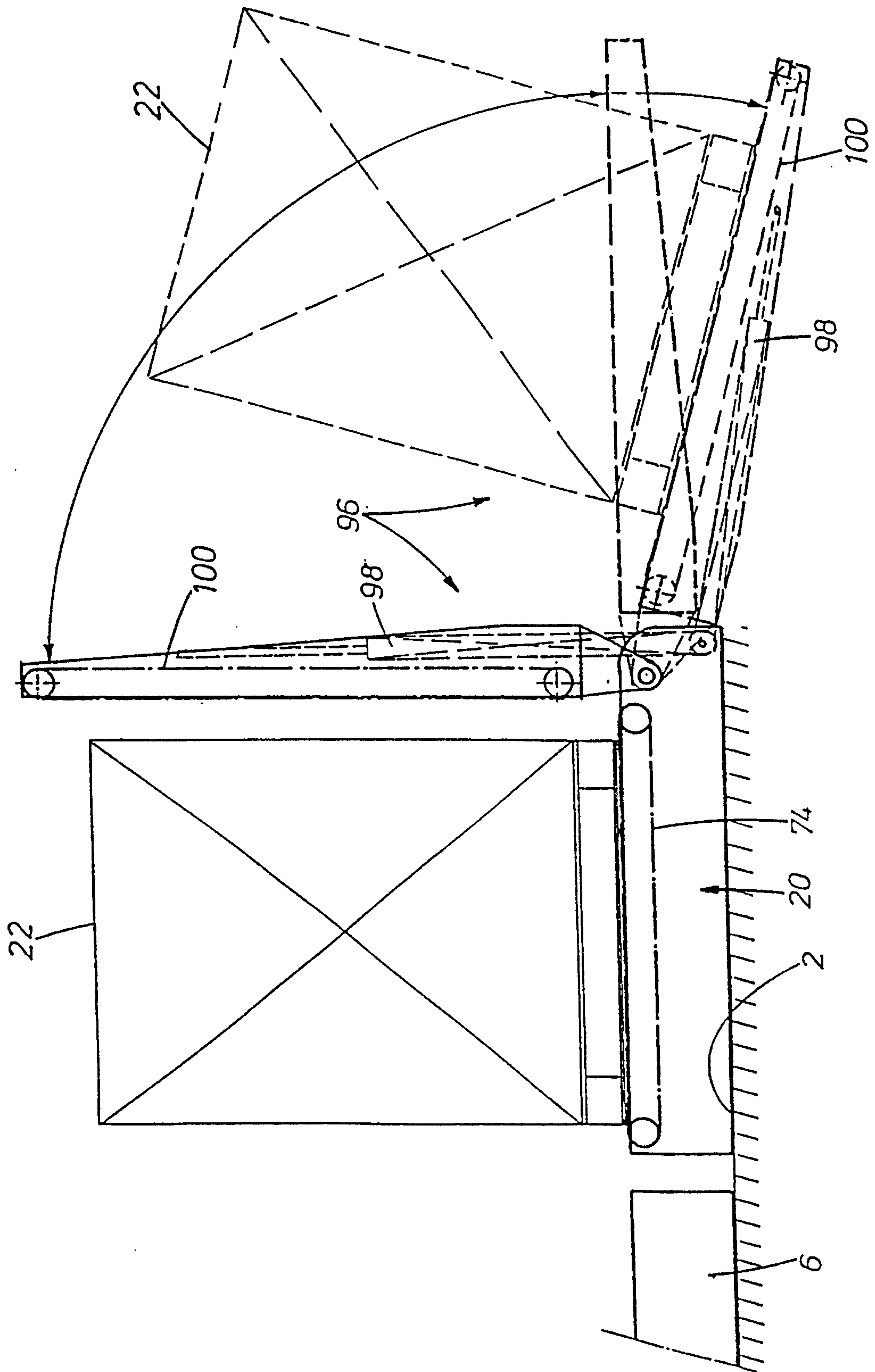


Fig.5

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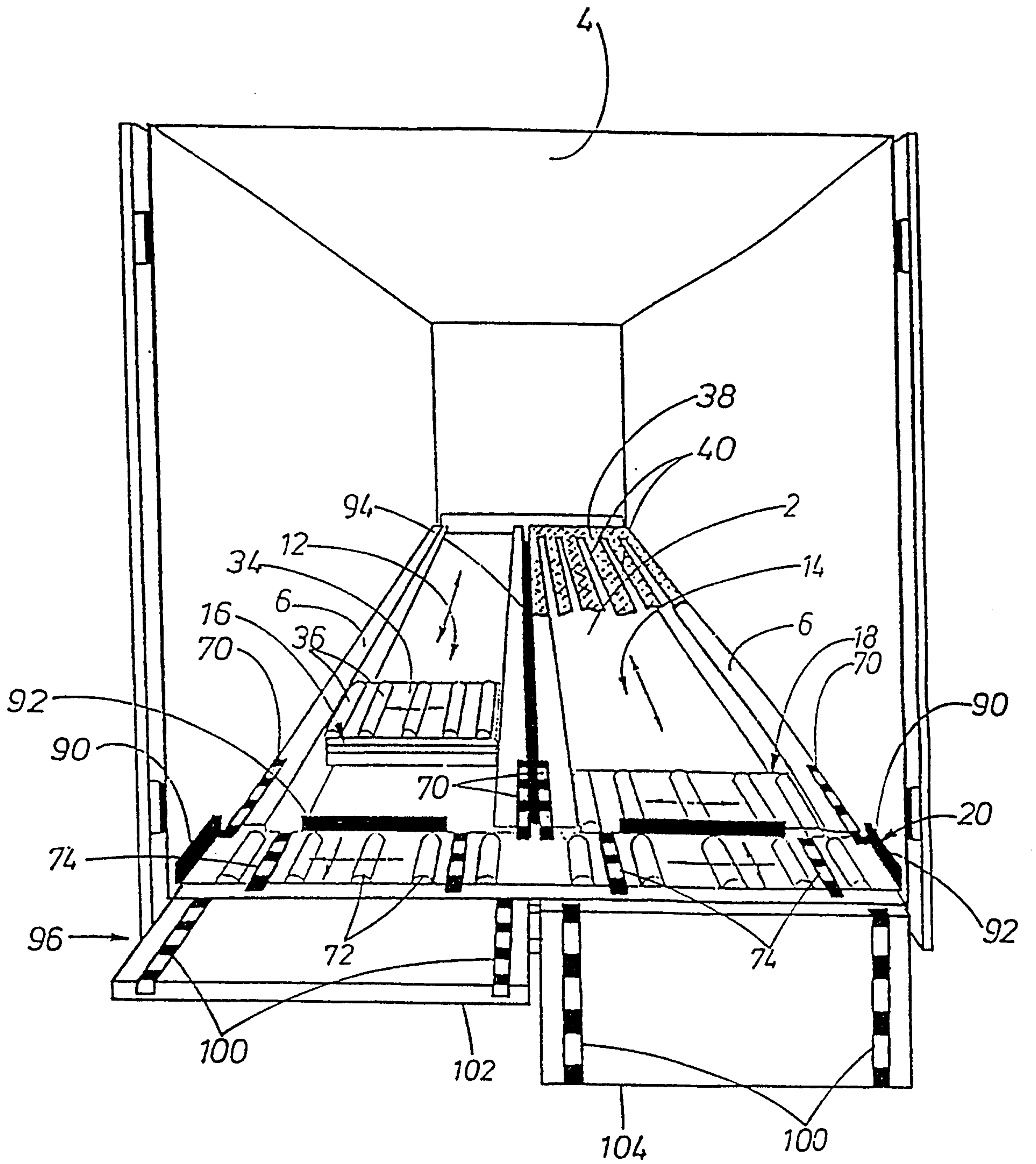


Fig. 6

