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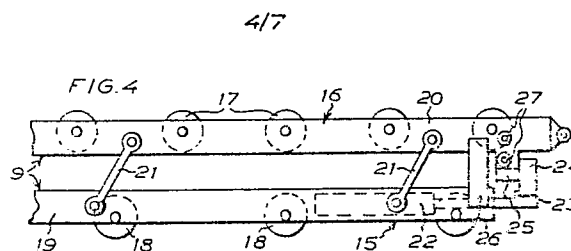
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(54) Goods-handling method and apparatus for loading and unloading of transport vehicles.

(57) This invention relates to a load handling apparatus for loading and particularly unloading of palletized goods on road and rail vehicles, ships, aircraft etc. and also for loading and unloading of goods in large goods containers. Characteristic of the load handling apparatus according to the invention is that it comprises at least two elongated, relatively narrow and long sections one of which forms a lower supporting section (15) while the other forms an upper lifter and conveyer section (16) raisably and lowerably mounted on the supporting section (15) and parallel therewith and forming together with the first-mentioned section an elongated narrow and low unit which is insertible through either of such open-ended passages of restricted width and height at the underside of the bottom of conventional pallets intended for the insertion of the lift forks of forklift trucks, the lifter and conveyer section (16) being raisable to a greater height and being lowerable to a smaller height than that of such a passage at the bottom of a pallet resting on a supporting surface for lifting goods, after the insertion of the unit through such a passage under the goods, transporting the goods along the lifter and conveyer section (16) and lowering the goods onto the supporting surface, whereupon the unit can be withdrawn from under the goods.



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GOODS-HANDLING METHOD AND APPARATUS FOR LOADING AND UNLOADING OF TRANSPORT VEHICLES

This invention relates to a goods-handling method and apparatus for loading and unloading of transport vehicles, particularly palletized goods but also other goods which like palletized goods permit the insertion of lift arms beneath the goods between said goods and a base.

It has been established by way of time studies that only about half the terminal time for loading and unloading of road vehicles is a tolerably effective work time while the other half of the terminal time is spent in waiting. The waste times and the effective work times are thus approximately equal, and it goes without saying that the waiting time costs which the consumer has to pay in the price of the merchandise, are considerable.

Another disadvantage resides in that the goods handling operation proper is not carried out as effectively as is desired, because of deficient methods and load handling equipment. The transported goods to a great extent are palletized or unitized goods, and the load handling technique at the terminal proper has made use of this fact for effectivization of the goods handling technique. A relatively small number of load carrying vehicles are also equipped with fixed conveying installations (roller conveyers, conveyer belts, etc.) which permit rapid transfer of goods between the vehicle, but this solution involves

disadvantages. It may be mentioned by way of example that it is expensive to equip every individual vehicle with a fixed load handling apparatus which besides would often impede using the vehicle for goods which cannot be handled by means of load handling apparatuses of this kind. It can therefore be established that the vehicles but very rarely are equipped with load handling apparatuses and therefore have to queue up waiting for assistance from the equipment of the goods terminal, which mostly is of such a type that loading and unloading will be both time-consuming and exacting.

The problem underlying the invention is that the loading and unloading systems utilized at present require an expensive and relatively heavy equipment which is fixedly mounted on the vehicle platform; besides they are relatively slow and require heavy manual work. By their fixed mounting on the vehicle they restrict the usefulness of the vehicle for transporting goods of varying kind, such as gravel in alternation with palletized goods.

The alternative is handling by industrial trucks which require much more personnel and a considerably longer loading time per vehicle. Other alternatives have also been suggested. For loading and unloading of containers from road vehicles there has been suggested a mobile conveyer comprising a frame and a longitudinally extendible, so-called "bellows type" structure, viz. a structure which can be extended to several times its collapsed length and is provided with a roller or wheel path which receives the goods from a conveyer on the frame and on which the goods can be conveyed onto the road vehicle where they are transferred manually from the end of the "accordion conveyer". This device can also be used for unloading and then requires that the goods are lifted onto the "bellows type" conveyer.

A variant of this loading apparatus includes instead of the "bellows type" conveyer a pivotally mounted belt conveyer, the loading apparatus being positioned laterally

of the vehicle with the conveyer pivoted so as to swing inwardly over the platform. This conveyer requires that the vehicle platform is accessible from the side and necessitates heavy manual work for lifting off and putting on goods, on loading and unloading.

It has also been suggested to use belt conveyers which can be moved in over a vehicle platform longitudinally thereof either with a cantilever arm or an arm supported on the vehicle platform. Also in this case heavy manual work is required for lifting the goods, at least when unloading is to be effected.

The object of the present invention is to provide a method and an apparatus which permit relatively rapid and easy loading and unloading of goods of the kind indicated in the foregoing. Said method and apparatus eliminate heavy manual work and do not bind the vehicle to the transport of unitized goods, such as palletized goods or goods equivalent from the view point of handling.

The method and apparatus according to the invention facilitate, by means of at least one lift arm, loading and particularly unloading of palletized or other goods which in relation to a base on which the goods are deposited, like the pallet of palletized goods, define at least one open-ended through channel of restricted width and height. An elongated conveyer of smaller width and considerable smaller height than the channel is mounted as a raisable and lowerable lift arm on a likewise elongated supporting base structure of smaller width than the channel and of so small a height that the supporting structure and the lift arm/conveyer constitutes an elongated lifter and conveyer unit of a height that in the lowermost position of the lift arm/conveyer relative to the supporting structure is smaller and in the uppermost position greater than the height of the channel. This elongated, narrow and low lifter and conveyer unit for loading or unloading the goods is relatively moved into said channel to a position beneath the goods with the support-

structure of the unit resting on the base. The lift arm/conveyer is then positively raised in relation to the supporting structure and the base so that the goods are lifted from the base. The goods are moved in their lifted position on the raised lift arm/conveyer longitudinally thereof and the goods are lowered at the selected position at a distance from the place of lifting, which is restricted by the reach of the lift arm/conveyer, by lowering of the lift arm/conveyer, after which, if desired, said unit is retracted or moved out of said channel to be used for lifting and conveying other goods.

The invention is described in greater detail hereinbelow with reference to the accompanying diagrammatic drawings in which:-

Fig. 1 shows an embodiment of a goods terminal with a warehouse and a number of loading docks; Fig. 2 shows one of the loading docks in Fig. 1 and fragmentarily a transport vehicle or trailer into which palletized goods are loaded in accordance with the invention; Fig. 3 shows a variant of a loading dock and in connection therewith a vertically adjustable transfer conveyer and a load handling apparatus according to the invention; Figs. 4 and 5 fragmentarily show two embodiments of an apparatus including a loading and unloading conveyer according to the invention, the cross-sectional height of which can be increased and reduced; Fig. 6 shows a modification of the apparatus in Fig. 5; Fig. 7 shows a load handling apparatus with a main conveyer and two conveyer arms projecting therefrom; Fig. 8 is a section on the line VIII-VIII in Fig. 7; Fig. 9 shows a load handling apparatus with sloping front end; Fig. 10 is a diagrammatic view of a transport system in which a load handling apparatus according to the invention is included.

Fig. 1 shows by way of example of the application of the invention a covered transport vehicle 1 in position at a loading dock 2 to be loaded with palletized goods which are discharged from a so-called automatic or roller

compartment store 3 to which the goods are moved on a roller belt conveyer 4 and lifted by means of a so-called coordinate crane 5 and sorted into the roller compartments 6 of the store. Loading and unloading of the store can be controlled by computer in conventional manner. The bottle neck in the unloading operation is the transfer of the goods from the conveyers (e.g. the roller conveyers or roller tracks) to the transport vehicle (cargo truck, trailer, semitrailer).

10 The idea underlying the invention is to make use of the platform of the truck (trailer, semitrailer) as an unloading point when the goods are moved onto the platform, which makes it possible to use load handling (lifting and transporting) apparatus of a lightweight construction. In other words, it is possible to use a relatively lightweight load handling construction for the majority of load handling cases. As will appear from the following this load handling construction or apparatus can be attended to by one operator, e.g. the driver, because of its simplicity and flexible adaptability to conventional conveyers on loading docks.

Fig. 2 illustrates an example of how goods carried on pallets 7 are transferred from the loading dock 2 to the vehicle platform (here shown as an open platform) by e.g. electrical control pulses to electrical drive motors for the conveyers from a control stand 8, and Fig. 3 shows a load handling apparatus 9 according to the invention placed on the vehicle platform. As will appear from the following description, this load handling apparatus may be embodied in different ways, all embodiments having in common that the apparatus can readily be placed on the vehicle platform and that after the loading of the goods it may easily be withdrawn from the underside of the goods without changing the position thereof. In Fig. 3 there is shown by way of example another type of loading dock 2' on which goods can be conveyed from two opposite directions to a reversible conveyer 10, turntable or the

like from which the goods are transferred to a vertically adjustable conveyer 11 and from there to a loading dock 2' which may be vertically adjustable and from which the goods are transferred to the load handling apparatus 9

5 according to the invention.

Fig. 4 shows an example of a load handling lifter and conveyer apparatus according to the invention. This apparatus comprises a subframe 15 and a conveyer 16 which is raisable and lowerable in relation to the subframe
10 and may be in the form of a roller conveyer. One or more or all rollers 17 may be driven, e.g. by electric motors, and should preferably be drivable in opposite directions to permit both loading and unloading. The subframe 15 may be in the form of a carriage having a number of supporting
15 rollers or wheels 18, which may advantageously be connected to drive means (not shown). The subframe 15 includes two laterally spaced beams 19 (only one shown in Fig. 4) which may be interconnected only at the rear ends and may be open at the front (right-hand) ends as shown in
20 Fig. 4. The conveyer 16 may fundamentally be of the same construction as the frame, and in the embodiment in Fig. 4 the load handling apparatus can therefore be in the form of a fork with two elongated horizontal arms. The subframe 15 and the conveyer 16 are interconnected movably in re-
25 lation to each other such as by means of a number of longitudinally spaced levers or links 21 which are pivotally connected to both the subframe and the conveyer. In the embodiment shown in Fig. 4 these links 21 constitute draw links by means of which the conveyer 16 may be raised
30 in relation to the subframe 15 by exerting a force on the conveyer 16 in the longitudinal direction with respect to the subframe 15. In the embodiment illustrated in Fig. 4 said force can be exerted by means of one or more hydraulic cylinders 22 which are supported in one or both
35 beams 19 which may be for example inverted L-beams. The piston rod 23 has a head 24 which extends upwardly for exerting pressure against an abutment 25 fixed to the

corresponding conveyer beam 20 when the piston rod 23 is retracted into the cylinder 22. With the aid of a suitable stop means shown in the form of a stop abutment 26 secured to the subframe 15, and stop means 27 on the conveyer 20, which are adapted to cooperate with said stop abutment 26, the links 21 can be prevented from being raised into fully vertical position. This is advantageous in that lowering of the conveyer 16 (collapse of the load handling apparatus) can be carried out by the weight of the conveyer 16 (or the weight of the conveyer 16 plus the weight of the load). In fully collapsed position of the load handling apparatus the longitudinal beams of the conveyer 16, which may be in the form of beams of U-section, can rest against the upper side of the subframe 15. When the conveyer 16 is lowered the head 24 of the piston rod is accommodated between the flanges of the opposite inverted U-section beam 20 of the conveyer 16, and the stop means 26 can be accommodated in a similar way or can lie at the outer side of the opposite beam 20. Of course, the means 24 and 26 shall not reach with their upper ends above the conveyer rollers 17 when the load handling apparatus 19 is collapsed, in order not to preclude using the load handling apparatus in the manner described in the following.

The load handling apparatus 9 should be so dimensioned that its width and height (the height between the undersides of the wheels 18 of the subframe 15 and the upper sides of the rollers 17 of the conveyer 16) allows the introduction of the load handling apparatus with its elongated conveyer and lifting arms into such channels 30 which are usually arranged in the subframes of pallets to facilitate handling of the pallets by forklift trucks, and it shall be possible to realize this introduction of the conveyer and lifting arms of the load handling apparatus when the pallets 7 are positioned on a base.

When the load handling apparatus is utilized for loading goods onto a vehicle platform as shown in Fig. 1

the conveyer 16 of the load handling apparatus should be raised relative to the subframe 15 to a height sufficient to allow the pallets 31 to go free from the vehicle platform when they are transferred to it. In the embodiment illustrated in Fig. 3 the loading dock 2' shall therefore be set to such a height position that the roller conveyor or roller track conveyor on the loading dock 2' has its loading plane on a level with that of the conveyer 16, i.e. on a level with the upper sides of the rollers 17 when the conveyer 16 is raised sufficiently relative to the subframe 15 of the loading apparatus to allow the pallets to go free from the vehicle platform. With the use of two load handling apparatuses 9 of an appropriate length for the vehicle platform the conveyers of the loading dock 2' can simultaneously transfer two double rows of pallets with goods thereon to the conveyers 16 of the two load handling apparatuses 9. The conveyers 16 are then lowered onto the respective subframes 15. In this position the dimensions of the load handling apparatuses shall be such that the pallets rest on the vehicle platform. As a result, the load handling apparatuses on the vehicle platform can without any difficulty be withdrawn from the undersides of the pallets, and it is even conceivable for the load handling apparatuses to be withdrawn from the vehicle platform on the support wheels 18 or by the conveyer rollers 17 if any one of these are driven. If the rollers 17 are to be used for this purpose the height positions of the conveyers 16 are first so adjusted that the rollers 17 only engage the undersides of the pallets with driving friction while the pallets with the majority of their weight rest on the vehicle platform.

The load handling apparatus fragmentarily and schematically shown in Fig. 5 is a modification of the embodiment of Fig. 4 and differs therefrom in that hydraulic cylinders 25 are used for lifting the conveyer portion 16 in relation to the subframe portion 15. It is

readily seen from Fig. 5 how the conveyer 16 can be raised and lowered in relation to the subframe 15.

The load handling apparatuses shown in Figs. 4 and 5 are intended for so-called "short side handling" of palletized goods, which means that use is made of conventional pallet channels for insertion of conventional lift forks of forklift trucks, and which channels are wholly open downwardly and at the short sides of the pallet.

According to the invention, the loading and unloading is carried out by means of the apparatus having a subframe and a raisable roller track or other conveyer track, which apparatus is moved in or placed on the vehicle platform and can be vertically adjusted so that the pallets when placed or transferred onto the apparatus according to the invention do not with their undersides touch the vehicle platform on which the apparatus is placed. Thus, the pallets with the goods thereon can be easily transported on the apparatus in the longitudinal direction thereof, and when the pallets have reached the intended position on the platform, the upper conveyer portion of the apparatus is lowered so that the pallets will stand on the platform and the apparatus which preferably is fork-shaped with elongated arms can then be withdrawn. For moving the load handling apparatus in over the vehicle platform and for returning the apparatus from the vehicle platform use may be made of for example a rack transmission, a hydraulic cylinder or other suitable means, instead of using driven wheels 18 or rollers 17 as described above.

To facilitate transfer of the fork-shaped load handling apparatus to and from the vehicle platform the fork arms may be articulated so as not to jam when introduced into the channels of the pallets. It may be suitable to use electronic guards, such as electric magnets, or photocells, for guiding the load handling apparatus onto the vehicle platform so that the pallets with goods or unitized loads thereon when transferred to the vehicle platform move in predetermined paths. To

prevent injuries to persons a supervising system (for example photoelectrical) may be required to prevent transfer of goods should obstacles (such as the operator's feet, legs etc.) appear in the conveyance path.

5 The load handling apparatuses described in the foregoing are very flexible as they can be adapted to most of the goods conveyance systems on the market for transport vehicles of various kinds, including trucks, trailers, railway waggon, aircraft and ships, for unitized load
10 handling; for example, handling of goods on pallets of the type "Europa-pall", container-loaded goods etc.

 The full effective loading height of the transport vehicles can be exploited because the pallets move only some centimetres over the surface of the vehicle platform
15 during the loading and unloading operations.

 The load handling apparatuses described in the foregoing can be adapted for handling of goods without making use of the channels of the pallets, in which case the pallets should be placed on longitudinal supports (for
20 example beams) on the base, for example the vehicle platform, whereby channel-like spaces are obtained between the base and undersides of the pallets and handling operations equivalent to that described above may be effected.

 However, it is also possible to modify the load
25 handling apparatus according to the present invention so that it can be used for loading and unloading and can be removed from the loaded goods without it being necessary to make use of the channels of the pallets or other artificially arranged channels.

30 Fig. 6 illustrates a load handling apparatus 9a according to the invention, which is intended for this purpose. In the embodiment illustrated the conveyor of the load handling apparatus comprises two relatively movable parts. One part 16a may be a roller conveyor and
35 has a fork-shaped front end portion 16b the arms 40a, b, c of which define intervening grooves 41 for a fork-shaped extension 16c of the conveyor. The extension 16c can be

projected and retracted with regard to the conveyor 16b. The extension conveyor 16c may comprise a fork conveyor of the type illustrated in Fig. 5. The arms 42 of which are movable in the spaces 41 between the arms 40 of the conveyor portion 16b. This portion has at its front end, for example at the outer side arms 40a, b, raisable and lowerable abutments 43 which can be projected to stop the conveyance of pallets and can be retracted for allowing the pallets to advance to the extensible conveyor 16c.

10 This conveyor is operable by means of a piston and cylinder unit 44 which may be of the hydraulic type and may have the form of a telescoping cylinder if a large stroke length is desired. The fork arms 42 are provided at their front ends with retractable abutments which may be the

15 front rollers 17c of the extension conveyor 16c. In the normal position of the conveyor 16c its conveying rollers 17c are on a level with the rollers 17a, 17b of the conveyor 16a, 17b. It should be observed, however, that the conveyor 16a, 16b can be of decreasing height towards

20 the front end thereof, which applies also to the extension conveyor 16c which, however, in an embodiment of the type shown in Fig. 5 can be lowered more at one end by its cylinders 35 (cf. Fig. 5) if an inclination is desired when the goods are discharged.

25 By raising the fork conveyor 16c so that its rollers 17c lift a pallet on the front portion 16b of the conveyor 16a said pallet can then be advanced away from the conveyor section 16b by means of the fork conveyor 16c by said last-mentioned conveyor being advanced under the

30 action of its cylinder unit 44. As already mentioned, the front abutments 43 on the conveyor section 16b can be lowerable for instance by means of a piston cylinder unit or the abutments may be sufficiently low to permit the fork conveyor 16c to lift the pallet over said abutments

35 43. When the fork conveyor 16c with the pallet supported thereby has been advanced to the contemplated delivery position on the vehicle platform the upper conveyor

tion of the fork conveyer 16c is lowered with respect to the subframe (15 in Fig. 5) for delivery of the goods. It should be observed that the pallet can in this case rest on the fork conveyer 16c transversely thereof, which means
5 that the pallet rests with its bottom boards 50 on the fork conveyer (cf. Fig. 3), but said fork conveyer can also be used in the same way as has been described for the fork conveyers in Figs. 4 and 5. In the latter case the fork conveyer 16c can be moved away from a pallet
10 deposited onto the vehicle platform in the manner earlier described, and in the former case (with the pallet placed transversely of the fork conveyer, i.e. so-called "long side handling") the fork conveyer 16c cannot be entirely unloaded before it has been retracted from the delivered
15 goods. However, the fork conveyer 16c can be lowered with its conveying section (conveying section 16 in Fig. 5), and as already mentioned this section can be inclined in a forward direction to permit retraction of the fork conveyer 16c without carrying the pallet along in its
20 retraction movement. The rollers of the fork conveyer 16c may during the retraction movement be driven "forwardly" at the same rate as the fork conveyer is retracted in order that the goods shall be retained sufficiently exactly at the point intended for the deposition. After
25 a pallet has been deposited the fork conveyer 16c is returned for receiving the next pallet from the conveyer 16a, 16b.

The load handling apparatus illustrated in Fig. 6 can without any difficulty be used for unloading palletized
30 goods if the pallets are positioned with their channels facing in the proper direction, that is, such that the fork conveyer 16c can be introduced into the channels, but if the pallets are transversely positioned (Fig. 3) it is necessary first to create a space for inserting
35 the fork arms of the fork conveyer 16c beneath the bottom boards 50 of the pallet, e.g. by placing the pallets on longitudinal rails or like members on the vehicle platform

wheels etc, and the conveyor mechanism ultimately need not necessarily be roller conveyor.

Fig. 9 shows schematically on said load handling apparatus in the form of a wedge-shaped sliding track 67 supported at the front end of a roller conveyor and adjoining a supporting conveyor surface which may be in the form of small rollers or, optionally, balls. The pallets supplied can slide on the sloping surface of the wedge, the outer end of which may optionally be pressed in beneath pallets placed on the vehicle platform by suitable means also in such cases in which the roller wedge cannot be inserted beneath the conveyor without the latter being lifted.

Finally, Fig. 10 shows a conveying system including a connecting track 2 with a switch 70 for reversing the direction of motion of the pallets, and in conjunction with the switch 70 there is arranged a transfer conveyor 71 for conveying pallets or like goods to a vertically adjustable table 72. Said table 72 is carried on a frame which is operable in conventional manner by means of a hydraulic cylinder for moving the table 72 in horizontal position upwards and downwards. From said table 72 the conveyor 16, 16a/16b, 16c or 16c' can be moved onto a vehicle platform or the like in correct level position. In this case the table 72 and its frame 73 constitute parts of the load handling apparatus according to the invention.

It should be observed that an arm 16 in Figs. 4 and 5 could be used as a load handling apparatus in certain simple cases without forming a part of a fork.

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45 in order to so create the possibility of inserting the arms 42 of the fork conveyer 16c beneath the bottom boards of the pallets.

As an alternative of the load handling apparatus illustrated in Fig. 6 use can be made of a load handling apparatus 9b of the type shown in Fig. 7, in which the fork conveyer 16c' comprises two cantilever arms which need not necessarily be equipped with driven rollers and which are guided in grooves in the conveyer 16a, 16b and can be optionally inserted in the longitudinal, downwardly open channels of the pallets or in the channels defined by the bottom boards 50 of the pallets (cf. Fig. 3). In this case the arms 42' of the fork conveyer 16c' can simply be of the same design as the arms of the conveyer section 16 in the load handling apparatuses in Figs. 4 and 5. However, these arms 42' are raisable and lowerable at their rear ends for instance by means of hydraulic cylinders 51 with pistons 52 shown in Fig. 8 which engage a bottom plate 53 of the conveyer 16a/16b. To keep the arms 42' of the fork conveyer 16c' with loads supported thereon in cantilever position the rear ends of the arms 42' are widened so as to form heads 54 which are guided in the grooves 41 and which in the embodiment illustrated in Figs. 7 and 8 can be fixed on two different levels between the fork arms 40a, b, c of the conveyer 16a/16b, such as the arms 40a and 40b in Fig. 8. For this fixation use can be made of hydraulically operated wedges or guide rollers 60 which by the action of a hydraulic cylinder can be moved in opposite directions into guide grooves 61, 62 in the side walls of arms 40a, 40b. The hydraulic cylinder 51 as well as the hydraulic cylinder 60' are housed in the arm head portion 54 which is of suitable hollow construction heretofore.

By means of the apparatus described, goods can be moved from the conveyer 16a/16b to an optional position on the vehicle platform ahead of said conveyer in the following manner.

CLAIMS

1. A method of facilitating, by means of at least one lift arm, loading and particularly unloading of palletized or other goods which in relation to a base on which the goods are deposited, similar to the pallet of palletized goods, define at least one open-ended through channel of restricted width and height, characterised by the steps of mounting an elongated conveyer (16) of smaller width and considerably smaller height than the channel as a raisable and lowerable lift arm on a likewise elongated supporting base structure (15) of smaller width than the channel (30) and of so small a height that the supporting structure and the lift arm/conveyer constitutes an elongated lifter and conveyer unit (15, 16) of a height that in the lowermost position of the lift arm/conveyer relative to the supporting structure is smaller and in the uppermost position greater than the height of the channel (30), relatively moving said elongated, narrow and low lifter and conveyer unit (15, 16) into said channel to a position beneath the goods (7) with the supporting structure of the unit resting on the base, positively raising the lift arm/conveyer (16) in relation to the supporting structure (15) and the base so that the goods are lifted from the base, moving the goods (7) in their lifted position on the raised lift arm/conveyer (16) longitudinally thereof and lowering the goods at the selected position at a distance from the place of lifting, which is restricted by the reach of the lift arm/conveyer, by lowering of the lift arm/conveyer, after which, if desired, said unit (15, 16) is retracted or moved out of said channel (30) to be used for lifting and conveying other goods.

2. Load handling system having at least one load handling apparatus which for lifting of palletized or other goods is insertable from a supporting surface in at least one through channel or equivalent opening of restricted width and height existing or arranged between

the goods and are supported by means of a lifting means beneath the goods (7) and the said system comprises two elongated, raisable and lowerable sections (15, 16) and a supporting section (15) adapted to be raised by and moved on said supporting surface while the other section forms an upper lifting section (16) which is pivoted with the firstmentioned section (15) and connected to be raised by and raisable and lowerable in relation to the supporting section and together with the latter forms an elongated unit (15, 16) which is narrow at said opening (30) and which in the maximally raised position of the lifting section has a greater height and in the lowest position of the lifting section has a smaller height than said opening, said lifting section, in order also to form a conveyer section, having means (17) for conveying goods along its upper surface and thus in the longitudinal direction of said elongated unit (15, 16), and a mechanism (21-24) connected between the two sections and by means of which the lifting and conveyer section (16) after insertion of said elongated unit (15, 16) beneath the goods (7) through said opening (30) between the supporting surface and the goods is raisable relative to the supporting surface resting on the supporting surface for lifting the goods up from this surface and for permitting the goods to be in its lifted position on the lifting and conveyer section, and which mechanism (21-24) permits depositing the goods (7) by lowering the lifting and conveyer section (16) such that the elongated unit (15, 16) may thereafter be retracted from the goods (7).

3. Load handling system as claimed in claim 1, characterised in that the load handling system comprises two substantially identical elongated units (15, 16) each of which consists of a supporting section (15) and a lifter and conveyer section (16) raisable and lowerably mounted on said supporting surface.

sections (15) of the two units (15, 16) being interconnected at their one end portions by a transverse connecting device so that the load handling apparatus forms a fork-like structure with the two units (15, 16) extending from the transverse connecting device in parallel with and laterally spaced from one another.

4. Load handling system as claimed in claim 3, characterised in that the lifter and conveyer sections (16) of the two units (15, 16) of the fork-like load handling apparatus are collectively raisable and lowerable.

5. Load handling system as claimed in claim 3, characterised in that the lifter and conveyer sections (16) of the two units (15, 16) of the fork-like load handling apparatus are collectively and relatively raisable and lowerable.

6. Load handling system as claimed in claim 3, characterised in that the fork-like load handling apparatus (16c) forms an extension section of a telescopically extensible conveyer (16a, 16b, 16c).

7. Load handling system as claimed in claim 2, characterised in that said unit (15, 16) is provided with support wheels or rollers (18) which are carried by the supporting section (15) of the unit (15, 16) and extend outwards from the bottom of the supporting section (15) only sufficiently to allow the bottom of the supporting section, when the unit (15, 16) is moved on the wheels or rollers (18), to go free from the supporting surface on which the unit rests.

8. Load handling system as claimed in claim 3, characterised in that the fork-like load handling apparatus comprises two lifter and conveyer units (15, 16) connected at their one end portions, is provided with support wheels or rollers (18) which extend outwards from the underside of the load handling apparatus a sufficient distance only to allow movement of the load handling apparatus on a substantially planar supporting surface without the underside of the load handling apparatus

touching the base.

9. Load handling system as claimed in claim 2 or 3,
characterised in that the lifter and conveyer section (16)
is pivotally connected to the supporting section (15)
5 and is inclinable in its longitudinal direction relative
to the supporting section.

10. Load handling system as claimed in claim 3,
characterised in that an auxiliary apparatus (67)
associable with the load handling apparatus comprises a
10 wedge-shaped structure with a sloping sliding or conveying
plane to facilitate transfer of goods onto or from the
load handling apparatus in cases where an opening or
openings (30) between the goods (7) and the supporting
surface for said goods are lacking, insufficient or
15 inaccessible.

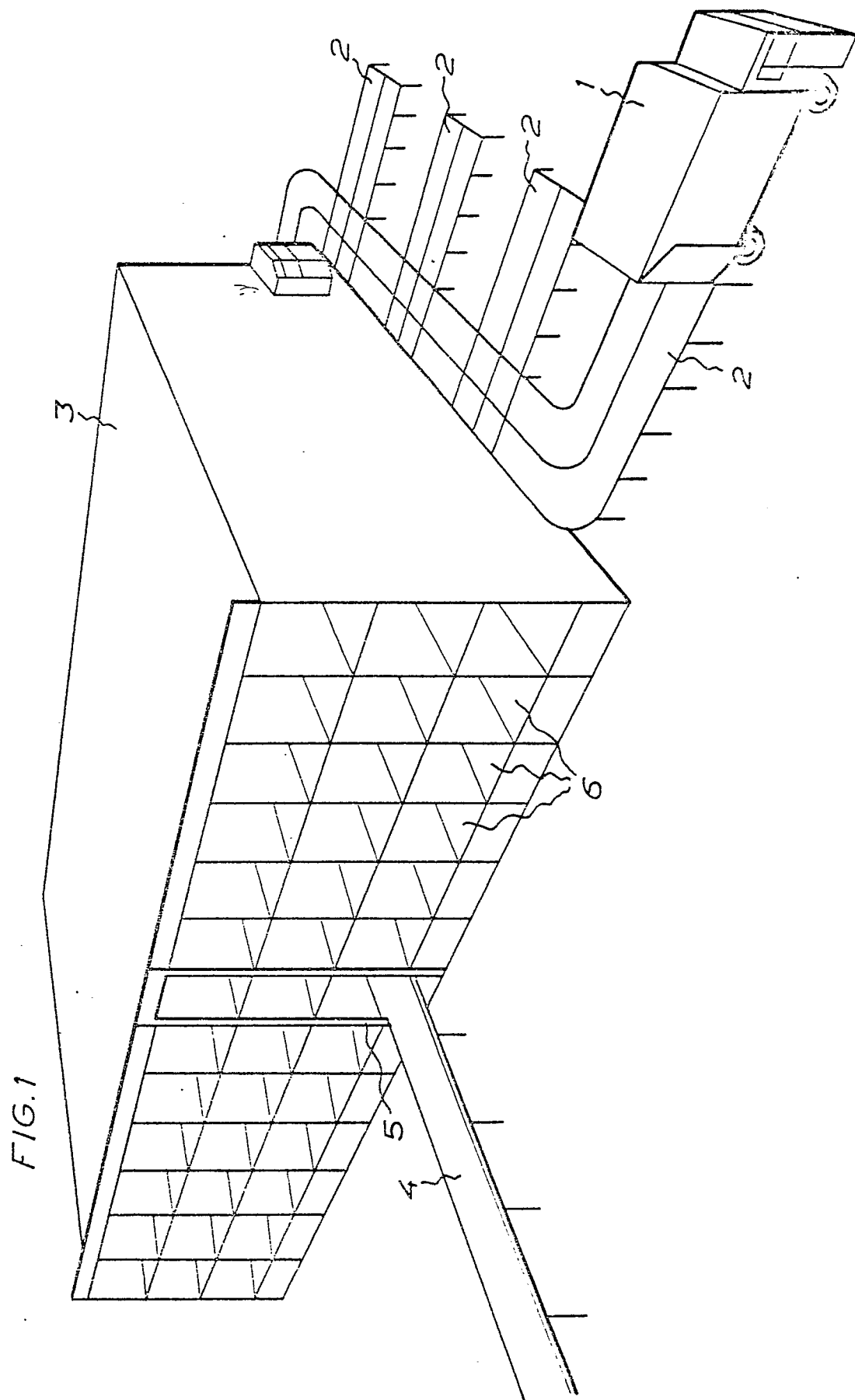
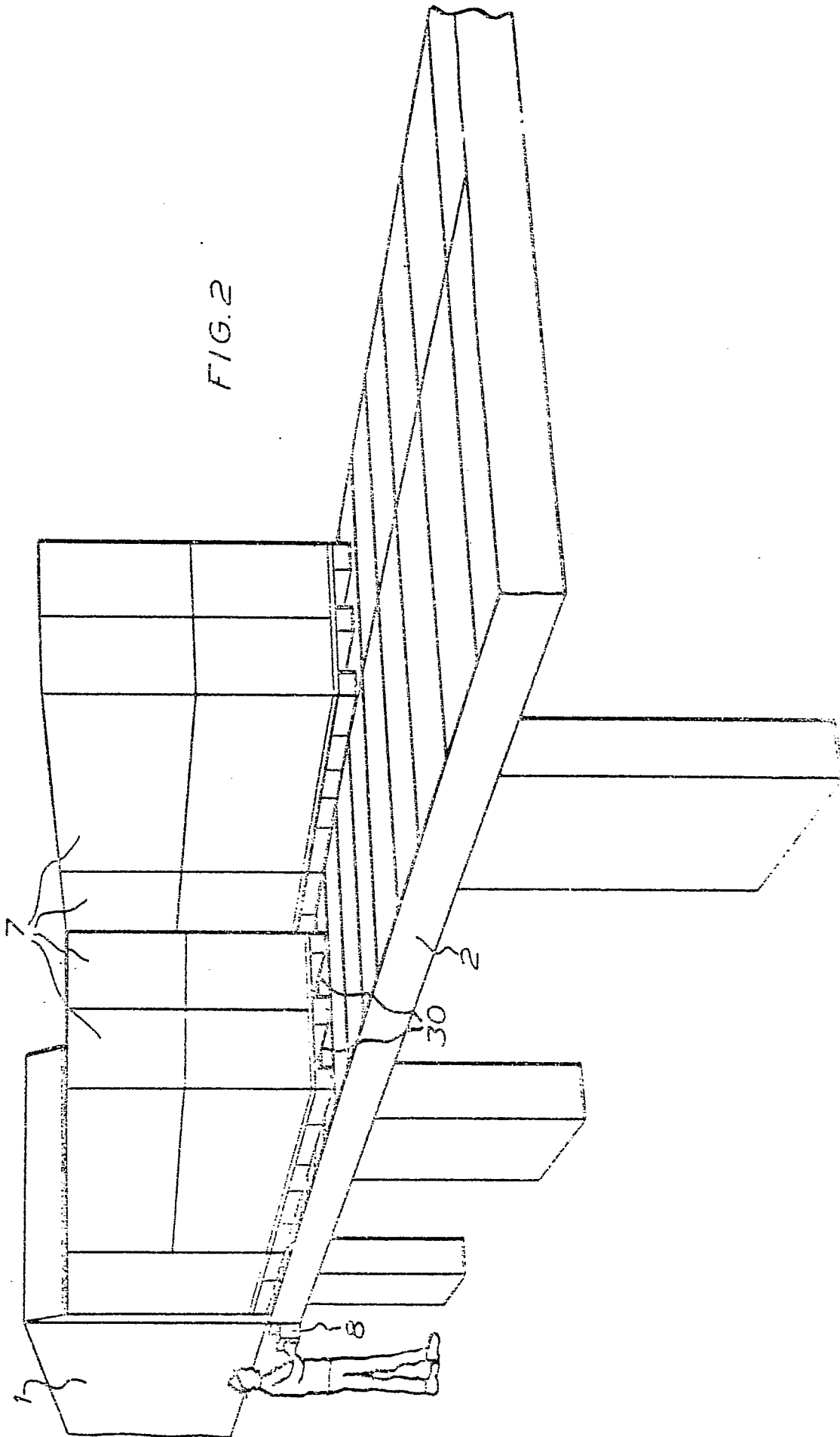
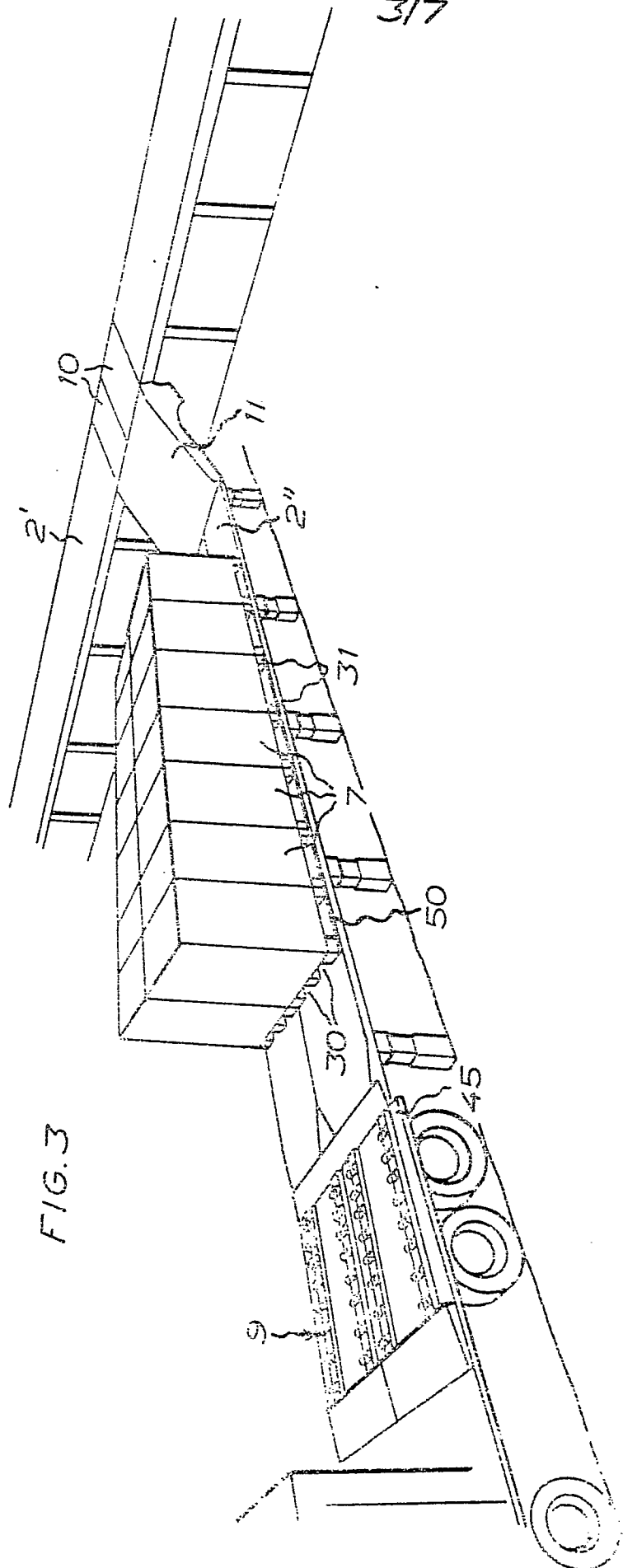


FIG. 2





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FIG. 4

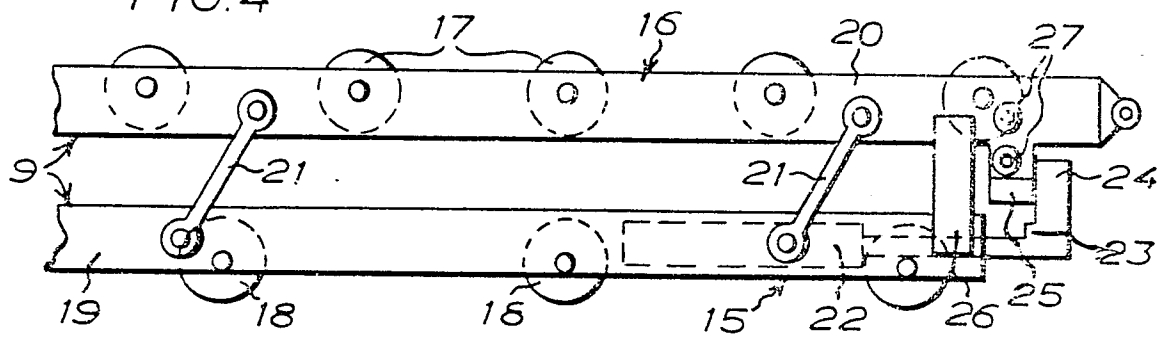


FIG. 5

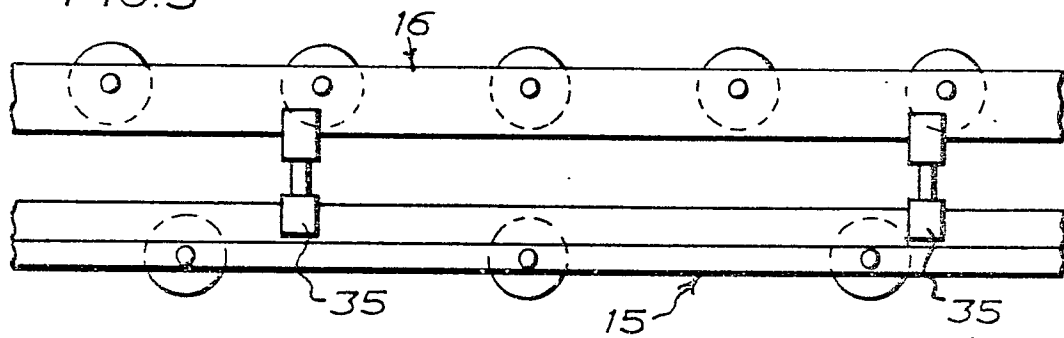
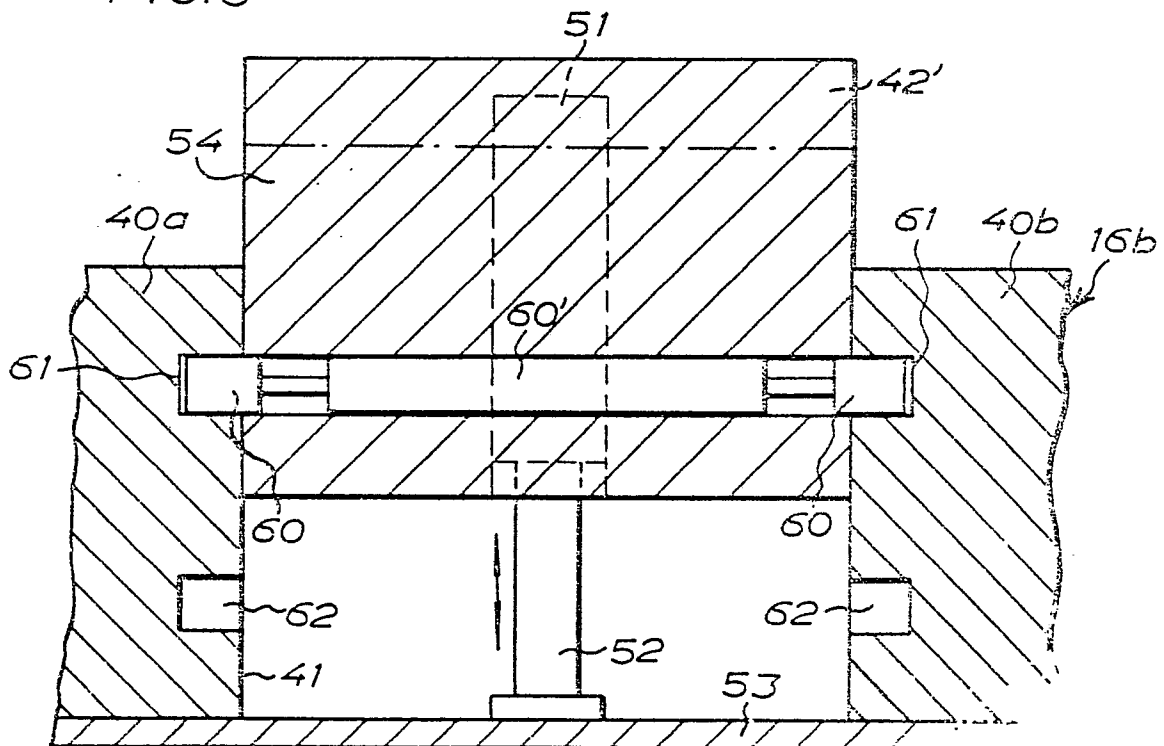


FIG. 8



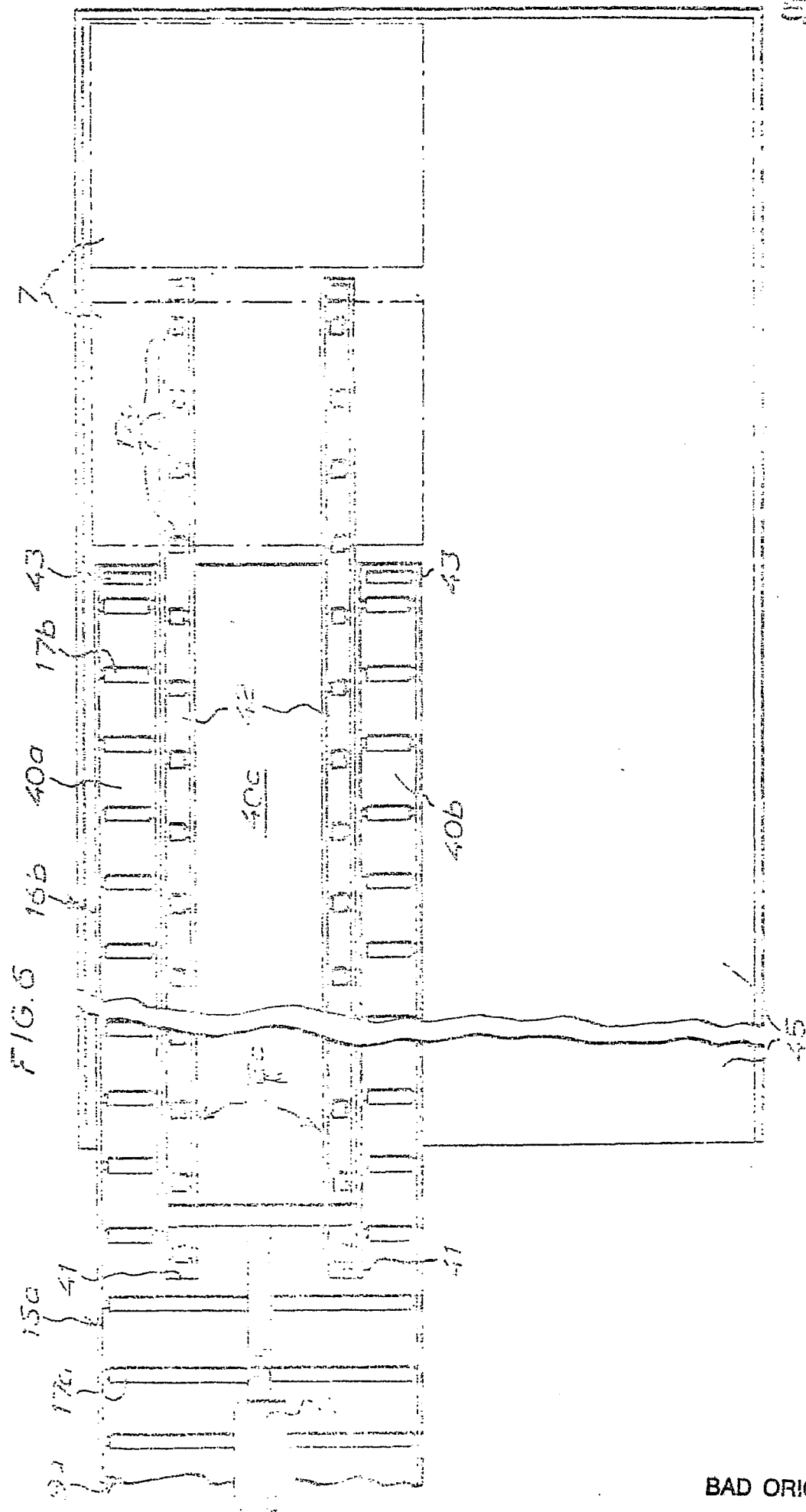
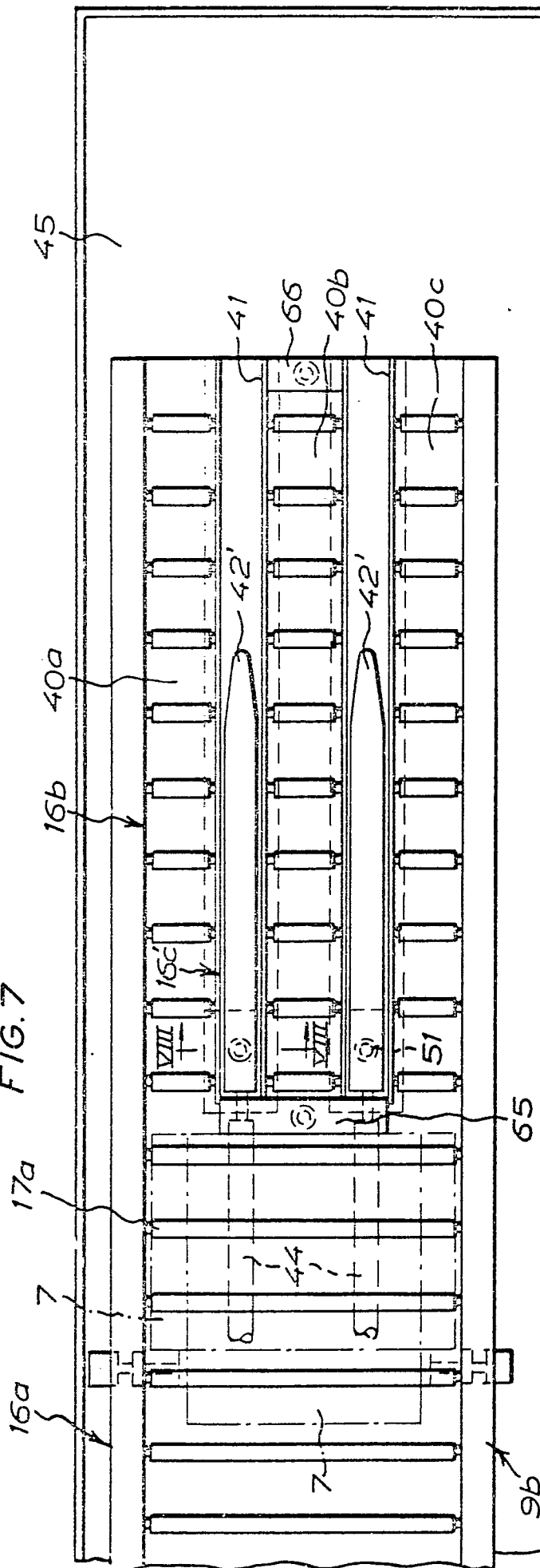


FIG. 7



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FIG. 9

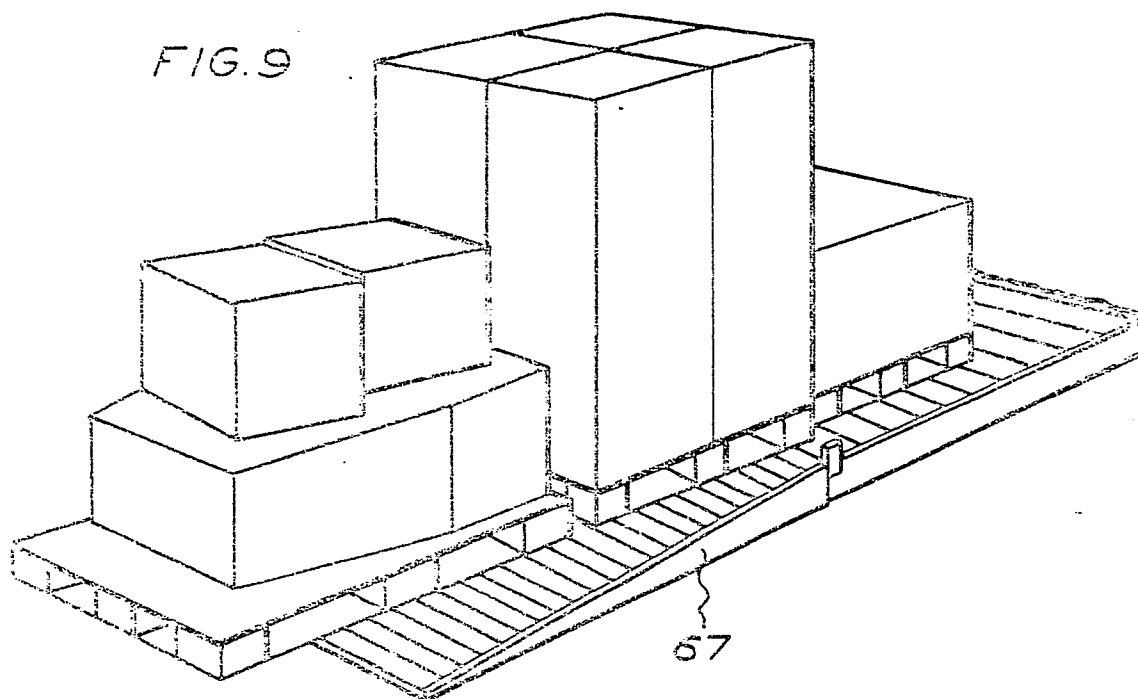
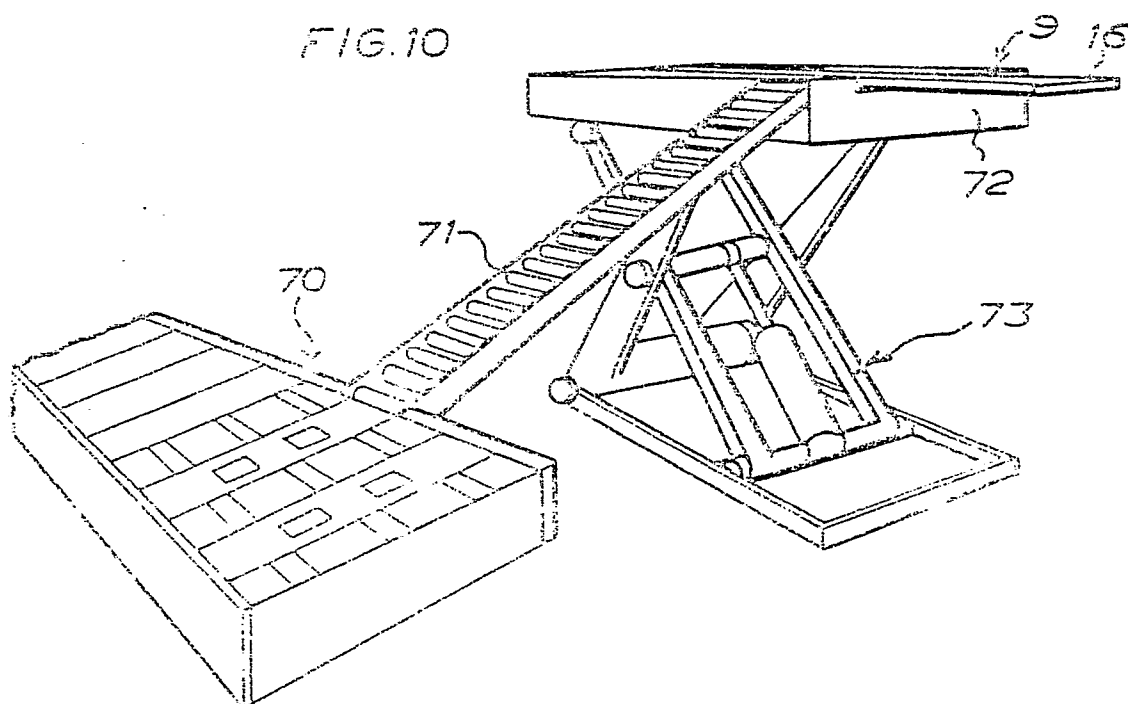


FIG. 10





DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>DE - A - 1 116 257</u> (SIEDER) * Entire document *	1, 2, 7, 8	B 65 G 1/00 B 65 G 7/00 B 65 G 67/02
X	<u>FR - A - 2 065 039</u> (WEZEP) * Entire document *	1, 2,	
X	<u>FR - A - 2 122 015</u> (CHAFUIS) * Entire document *	1, 2	
X	<u>FR - A - 2 219 094</u> (JAPANESE NATIONAL RAILWAYS) * Page 6, lines 22-38; page 7, page 8; page 9; page 10; page 11; lines 1-24; figures 6a, b, 7, 8 *	1, 2, 3, 4, 5, 6, 7, 8	TECHNICAL FIELDS SEARCHED (Int. Cl.) B 65 G 1/00 B 65 G 13/00 B 65 G 7/00 B 65 G 67/00
			CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosures P: intermediate disclosure T: theory or prior art relating to the invention E: contrasting approach D: document cited in application L: citation for other reasons
The present search report has been drawn up for all claims			at: member of the same claim family. corresponding document
Place of search	Date of completion of the search	Examiner	