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Stuttgart-Unterturkheim, Germany
Continuation-in-part of application Ser. No.
618,573, Feb. 27, 1967, now abandoned.

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[54] **AN INSTALLATION FOR THE FURTHER
TRANSFER OF ASSEMBLED MOTOR VEHICLES
READY FOR DRIVING AND INSTALLATION FOR
CARRYING OUT THE METHOD**
13 Claims, 6 Drawing Figs.

[52] U.S. Cl. **214/1 R,**
29/430, 108/53, 198/85, 214/16.1 CC

[51] Int. Cl. **B65g 47/00**

[50] Field of Search **214/1, 620,**
16.1 CC, 16.1 DC, 16.1 EB; 29/430; 198/131, 538;
108/53

[56] **References Cited**
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ABSTRACT: An installation for the further conveyance or transport of assembled motor vehicles, ready for driving in which the assembled vehicles, ready for driving, are transported while supported on a conveyor base support which, in its length, projects beyond the front as well as the rear end of the vehicle, corresponds in width essentially to that of the vehicle and is provided with a holding device for at least one vehicle wheel whereby the conveyor base support, during nonuse can be transported individually. In a preferred construction, the conveyor base support consists of two separate runner-type guide members, each provided with a troughlike recess for a rear wheel of the vehicle and interconnected along the forward and rearward ends. A system of conveyor belts for transporting the vehicles on their respective supports includes at least one belt constructed in the form of a buffer belt.

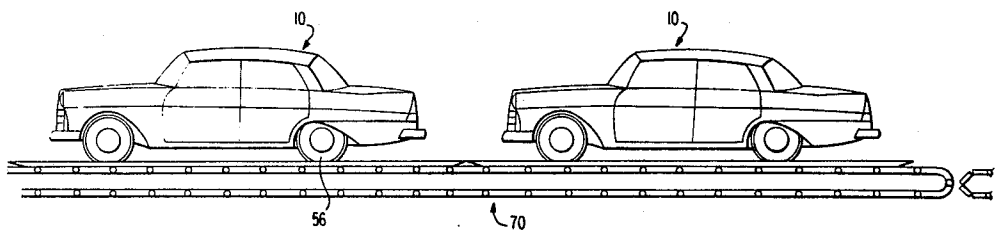
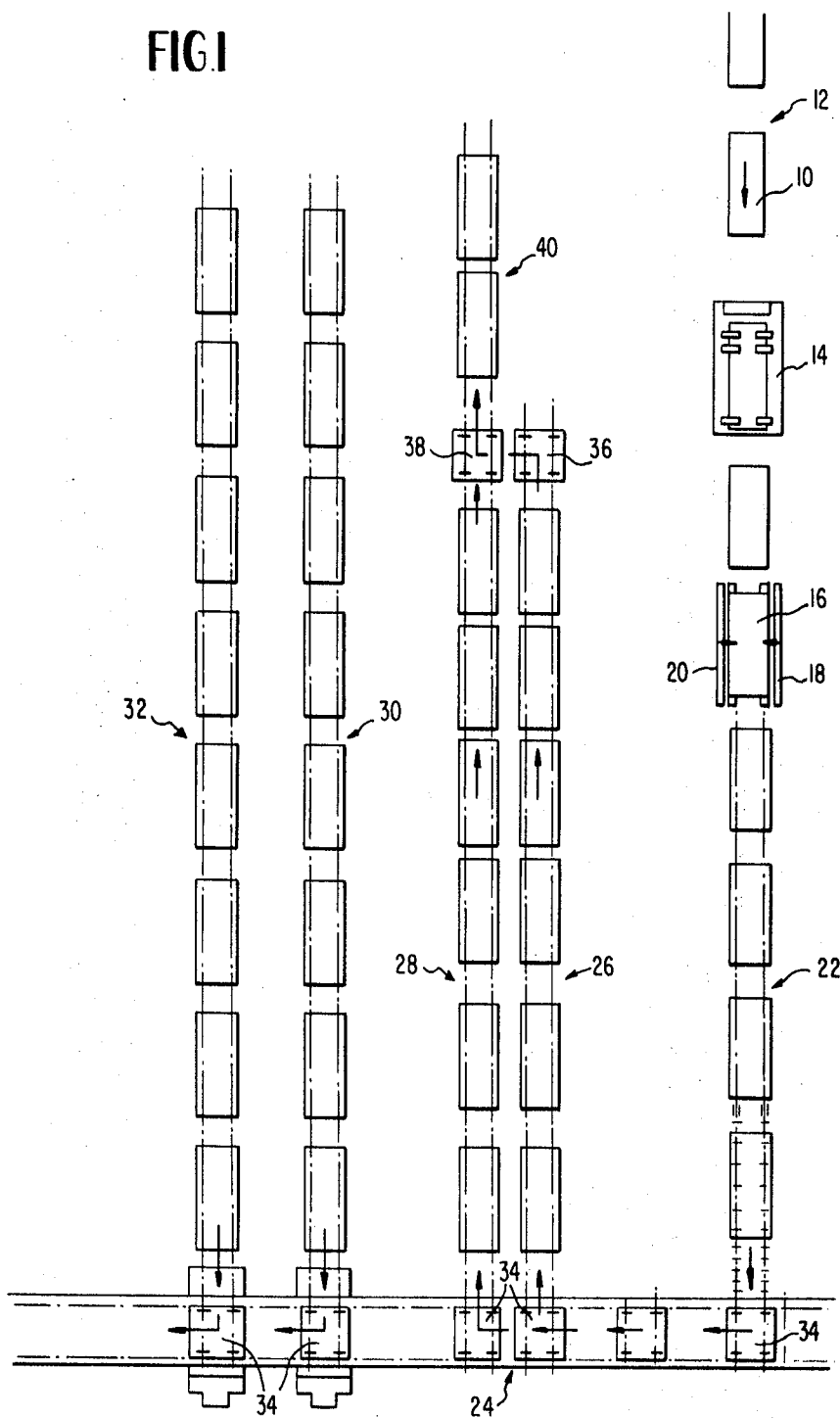


FIG. 1



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FIG. 2

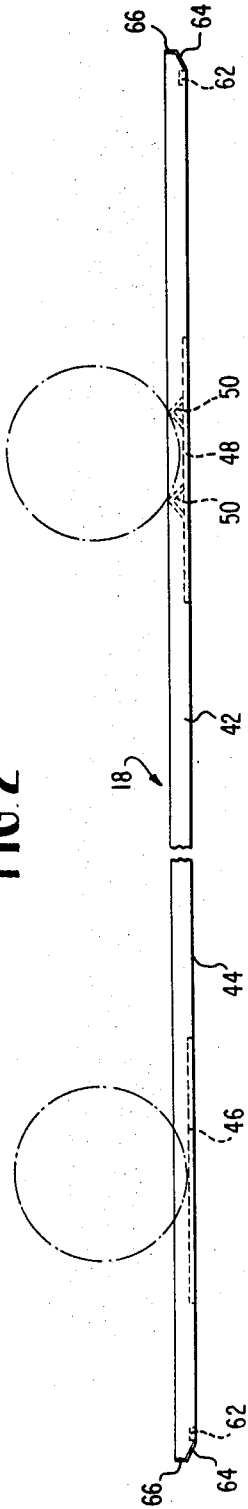


FIG. 3

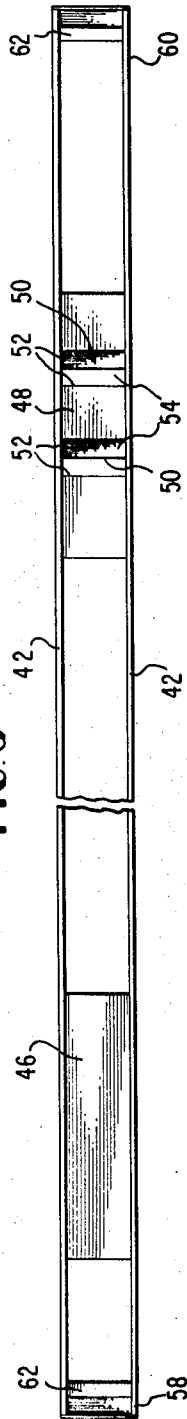
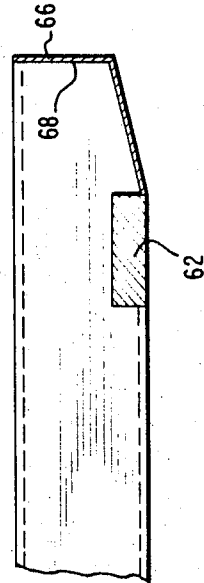


FIG. 4



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FIG. 5

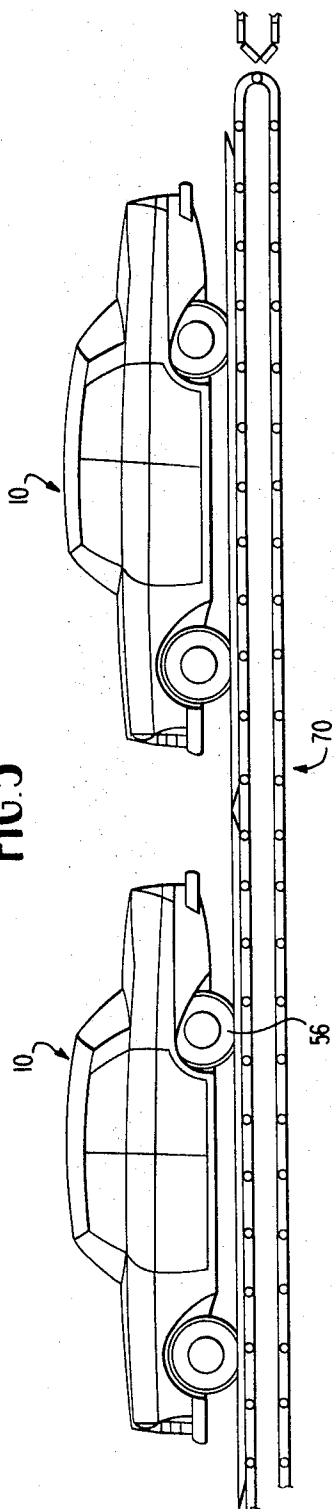
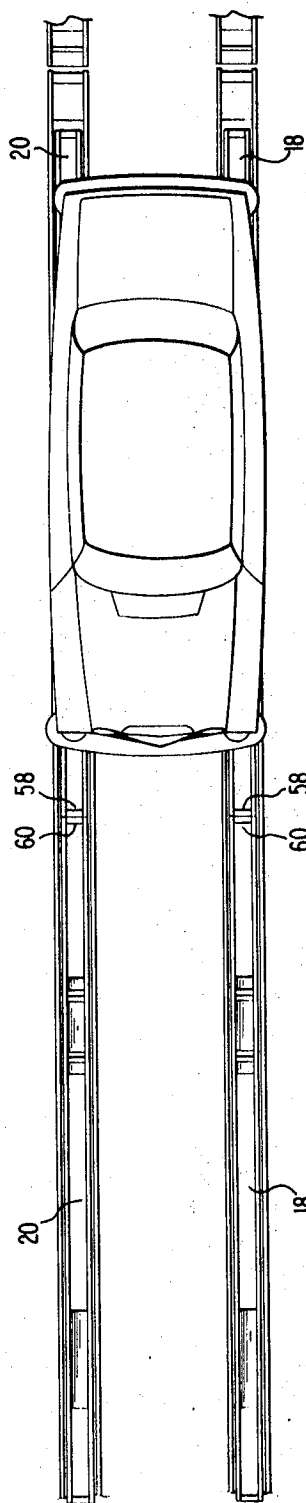


FIG. 6



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AN INSTALLATION FOR THE FURTHER TRANSFER OF ASSEMBLED MOTOR VEHICLES READY FOR DRIVING AND INSTALLATION FOR CARRYING OUT THE METHOD

This application is a continuation of our copending application, Ser. No. 618,573, filed Feb. 27, 1967, now abandoned.

The present invention relates to an installation for the further transfer or transport of assembled motor vehicles ready for driving from one end of an assembly line or conveyor band.

Heretofore, it was customary at the end of the manufacturing operation to drive motor vehicles by means of a driver and under the vehicle's own driving forces to the places through which the vehicles had to pass as the next station. For example, the motor vehicles after having passed through a roller test stand, were driven by a driver into a storage or parking space and were parked thereat among the other finished motor vehicles. In a similar manner, the motor vehicles were driven from the roller testing stand to the rework or refinish assembly lines or conveyor bands in case such reworking proved necessary. If vehicles are already present at the beginning of such a band or conveyor, then the vehicles have to be started anew each time the conveyor band has again a sufficient free capacity. Also at those places at which the bands reverse their direction, drivers have to stand ready to drive the motor vehicles from one band or conveyor to the next. Therebeyond, for example, in repair operations, there exists a larger number of occasions in which motor vehicles ready for driving have to be moved by a driver and under their own forces from one place to another.

These prior art methods have a number of disadvantages. A number of drivers always have to be ready in order that no stoppage occurs at the conveyor belts or bands. A true traffic circulation occurs in the halls and buildings of the manufacturing or repair shops, in the course of which the motor vehicles are exposed to similar dangers of damage as during normal operation on public streets. The combustion engines of the motor vehicles produce exhaust gases which can be sucked off only at high costs and with spacious installations. If the motor vehicles are stored in silos, dead end streets or parking buffer roads, then the surface available can be utilized only poorly because the motor vehicles have to maintain a minimum distance for parking. It is known to prevent damage of the bumpers by rubber cushions mounted thereon. These rubber cushions, however, are used only while on the production conveyor belts or bands and represent only an inadequate protection for the front end or rear end of a motor vehicle. Furthermore, if one conveys or transports the motor vehicles on bands in which either the right or left wheels stand on plate-type bands, then these motor vehicles tend to veer off course because of the asymmetrical drive. Furthermore, it is often time-consuming with stored motor vehicles to find again the sought-after motor vehicle among a number of similarly appearing motor vehicles.

SUMMARY OF THE INVENTION

It is the aim of the present invention to provide an installation by means of which the aforementioned difficulties can be eliminated. It is to be made possible by the method of the present invention to transport motor vehicles of the aforementioned type in a fully automatic manner and to guide the same fully automatically to the desired places.

The underlying problems are solved according to the present invention in that the motor vehicles, after they have been made ready for driving at least by the installation of the motor vehicle wheels, are placed on a vehicle base support, which projects in its length beyond the motor vehicle both at the front as well as rear end thereof, which has approximately the width of the motor vehicle, which includes a holding device for at least one motor vehicle wheel holding the motor vehicle on the vehicle base support and which in case of nonuse can be transported individually. It is possible to transport the motor vehicle on such a vehicle base support by

means of customary conventional conveyors or cross conveyors to the desired places without human assistance and with great operational safety. Only when the motor vehicle is in fact delivered, one can separate the same from the vehicle base support and transport back the latter to its storage or for renewed use. Since each motor vehicle, which rests on such a vehicle base support, has a standard spacing from the other vehicles when such a vehicle base support abuts against the others, storage and transport problems can be readily standardized. During transportation or conveyance it is thereby immaterial whether the motor vehicle is transported in its normal driving direction or opposite the same.

For realizing the method, the present invention provides that the vehicle base support includes two runner-type guide members which each carry a front and a rear wheel of the motor vehicle. It is possible by means of such runner-type guide members to transport the motor vehicle on the customary conveyor bands of all types and the road clearance frequently necessary is available nevertheless between the wheels. Additionally, the access to the vehicle bottom side is practically not impaired by such runner-type guide members. They may be manufactured readily, inexpensively and sturdily.

If the vehicle base support includes two separate runner-type guide members, then one saves the interconnection between the guide members and utilizes the motor vehicle itself as interconnection. In case of damage of a guide member, the entire pair of guide members no longer becomes useless or nonusable. Additionally, it is sometimes more favorable if one can push the guide members separately underneath the vehicle wheels. During the return transport, the two separate guide members occupy less space than two guide members rigidly connected with each other.

The runner-type guide members may also be so constructed that they are each provided with a troughlike recess as holding device. If one vehicle wheel rests in each of these recesses, then the motor vehicle and guide members are connected with each other in a manner which is completely adequate for most applications. Additionally, holding devices are not necessary in that case and it suffices if one pulls or drives a motor vehicle, for example, so far onto the guide member that two of its wheels reach corresponding recesses.

Advantageously, the troughlike recesses are arranged according to the present invention within the area of the rear wheels. For the most part, the hand brake acts on these wheels so that with a pullup or tightened hand brake, relatively flat recesses suffice for holding fast the rear wheels. A stable construction favorable from a manufacturing point of view is achieved if the recess is constituted by the mutually facing flanks of two projecting members which are arranged approximately perpendicularly to the longitudinal axis of the runner-type guide member and which surround form-lockingly the respective vehicle wheel over a part of its lower area.

Those runner-type guide members have high inherent rigidity combined with flat construction and slight weight which include two lateral members disposed upright in their position of use and having a boxlike cross section which lateral members are connected with each other at the bottom edge thereof by bottom sheet metal plates.

The side members need not be connected with each other over their entire lengths. Rather, it suffices if a forward bottom sheet metal plate is provided within the area of the front wheels and a rearward sheet metal plate is provided within the area of the recess or protruding members which are rigidly connected with the bases thereof. The forward sheet metal plate is then so arranged as to length and position that the front wheels of the shortest and longest motor vehicle still come to rest thereon.

A higher cross rigidity and the possibility to pull the runner-type guide members is achieved if the side members are connected at the forward and rearward end thereof by rungs or steps.

In order to prevent that a guide member, which slightly bends through or deflects at the ends under the load of the motor vehicle, abuts against the rollers of a band or the like, provision may be made that the side members are equipped at their ends in the lower areas thereof with a ramp-type bevelling. The deflected ends of the side members are then relatively slightly lifted in operation by the conveyor rollers.

In order to impart a larger impact and abutment surface to the guide members of succeeding motor vehicles and in order to further increase the rigidity of the guide members, the lateral members may be connected at their ends by a bumper or impact plate.

If the flanks of the protruding members have a spacing which prevents the contact with the sheet-metal bottom plate by the wheel of the smallest occurring diameter, the wheel is seized flush on both sides by the protruding members.

For purposes of initiating fully automatic transfer movement of motor vehicles from a cross conveyor to a longitudinal conveyor or vice versa, for purposes of marking or indicating the designation, for the call of stored motor vehicles and the like, marks may be secured at the bottom side of at least bottom sheet metal plate which characterizes and designates the motor vehicle. By means of such an arrangement and with the aid of conventional automatic guide systems, the motor vehicles may be switched fully automatically.

Accordingly, it is an object of the present invention to provide an installation for transporting assembled motor vehicles ready for driving which eliminates by extremely simple means the shortcomings and drawbacks encountered in the prior art constructions.

Another object of the present invention resides in an installation for transporting ready-to-drive motor vehicles which eliminates the need for drivers and permits the conveyance of such vehicles on conventional conveyor bands and the like.

A further object of the present invention resides in an installation of the type described above which greatly reduces the danger of damage to the motor vehicles while being transported within the plant, eliminates the need for sucking out exhaust gases and greatly facilitates the complete automation of the parking, storing and delivery of completed motor vehicles.

Still another object of the present invention resides in an installation for conveying ready-to-drive motor vehicles in which both storage and transportation problems can be standardized and permits the use of convention conveyor belts or bands as used in mass-production lines.

Still a further object of the present invention resides in a base support for ready-to-drive motor vehicles which is simple in construction, easy to convey, relatively inexpensive in cost and usable on any type conveyor belt or band as used in present-day mass production techniques.

These and further objects, features and advantages of the present invention will become more obvious from the following description when taken in connection with the accompanying drawing which shows, for purposes of illustration only, one embodiment in accordance with the present invention, and wherein:

FIG. 1 is a schematic partial plan view on assembly and conveyor bands as well as cross bands of motor vehicles as used with the method of the present invention;

FIG. 2 is a side elevational view of a guide member in accordance with the present invention;

FIG. 3 is a top plane view on the guide member of FIG. 2;

FIG. 4 is a partial cross-sectional view, on an enlarged scale, and taken along the line IV—IV of FIG. 3;

FIG. 5 is a side elevational view of motor vehicles resting on guide members in accordance with the present invention which are transported by a conveyor belt; and

FIG. 6 is a top plan view on the band of FIG. 5, but illustrating only one motor vehicle.

Referring now to the drawing wherein like reference numerals are used throughout the various views to designate like parts, and more particularly to FIG. 1, the motor vehicles are

indicated in this FIG. schematically in the form of rectangles 10. The motor vehicles 10 equipped with wheels and engine are transported on a first assembly band generally designated by reference numeral 12 in a conventional manner to a roller test stand 14 also of conventional construction. After the test, the driver drives the motor vehicle to a lifting platform 16 which raises the motor vehicle so that runner type guide members 18 and 20 can be placed under its wheels on the left- and right-hand side. The motor vehicle 10, resting on these guide members 18 and 20, is then transported by way of a further band or belt generally designated by reference numeral 22 to a cross conveyor generally designated by reference numeral 24 of any conventional construction. The band 22 can be used as a buffer band whereon vehicles are permitted to slip and idle, depending upon the service accommodations available at further advanced stations, or band 22 may be utilized for further installations, inspections or the like. Lifting plates 34 of conventional construction are provided at the places of the cross conveyor 24 at which branchoff further conveyor belts or bands 26, 28, 30 and 32, which lifting plates 34 are actuated by information affixed to the guide members 18 and/or 20. The conveyors 26 and 28 are reworking conveyor bands. The motor vehicles leaving the band 26 are transferred, resting on their guide members 18 and 20, by a conventional transfer plate 36 to a second conventional transfer plate 38, and are transported away from there by a further band generally designated by reference numeral 40. Sensing or interrogating heads of any conventional construction (not illustrated) are provided at the conveyor bands for informations affixed to the guide members 18 and 20, by means of which the stations and location of each motor vehicle can be determined.

Motor vehicle ready for delivery are supplied by way of the bands 30 and 32 while other motor vehicles are supplied by way of the cross conveyor 24 to a silo, a loading place, a delivery place, or the like.

Instead of lifting the motor vehicles by a lifting platform 16 so as to be able to place the guide members 18 and 20 underneath the wheels, it is also possible to drive directly onto the guide members 18 and 20. The guide members during this operation are advantageously aligned and fixed parallel to each other by a clamping device of conventional construction (not illustrated in the drawing).

FIGS. 2 and 3 illustrate such a guide member 18. The guide members 18 and 20 in the form of runners have identical appearances and may be used identically and interchangeably — if separate — on the left or right side of the motor vehicle 10. The guide member 18 includes two lateral members 42 which have a box-shaped cross section or profile. As can be seen in particular from FIGS. 5 and 6, the side members 42 are longer than the motor vehicle 10 to be transported thereon. The side members 42 are interconnected by welding within the area of the lower edge 44 by means of a forward and a rearward bottom sheet metal plate 46 and 48, respectively. Two protruding members 50 which have approximately a triangular prismatic form are welded to the rear bottom plate 48. The protruding members 50 are also welded for purposes of reinforcement of their construction at the end surface 52 to the inner sides of the lateral members 42. The mutually facing flanks 54 of the protruding members 50 have such a distance that a rear wheel 56 of the smallest occurring diameter cannot come into contact with its ground-engaging surface with the rear bottom sheet metal plate 48 if it rests between the protruding members 50. The distance between the protruding members 50 and the forward sheet metal plate 46 is thereby so selected that both with motor vehicles having shortest wheel base as also with motor vehicles having the longest wheel base, the front wheels still come to rest on the forward bottom plate 46.

A step or rung 62 is welded both to the forward end 58 as well as to the rearward end 60 of the guide member 18 which serve as reinforcement. Additionally, hooks, ropes, or the like can be secured at this rung if the guide member 18 is to be pulled, possibly with a motor vehicle 10 resting thereon. Both

the forward as well as the rearward end 58 and 60 are provided with a ramp-like bevelling 64. Depending on the rigidity of the guide member 8, the latter under the load of the motor vehicle 10 has the tendency to drop with the forward or rearward end 58 or 60 when the support of the guide member 18 takes place to a larger extent within the central area thereof. Notwithstanding this dropping or deflecting at the ends, the forward or rear end 58 or 60 can climb up on the next transport or conveyor roller by reason of the ramp-like bevelling 64 during transport in any direction.

The lateral members 42 are connected, by means of welding, within the area of the forward and rear ends 58 and 60 by means of impact or shock plates 66. However, it is also possible, especially if one desires to drive the motor vehicle onto the guide members 18 to omit the portion 68 of the impact plate 66 which is disposed upright in operation.

FIGS. 5 and 6 by reference the guide members 18 and 20 in operation. Two motor vehicles 10 which are placed on guide members 18 and 20, rest on a plate-type conveyor band generally designated by reference numeral 70. As can be seen in particular from FIG. 5, the guide members 18 and 20 abut at the forward and rearward ends 58 and 60. As a result thereof, the motor vehicles 10 have a defined but smaller distance from each other. This distance can be smaller than indicated in the drawing.

Motor vehicles 10 can be transported by means of such guide members 18 and 20 on any suitable types of conveyor bands such as plate-type bands, roller conveyors and also cross conveyors. Also, the transport by means of elevators or lifts can be considerably simplified thereby.

For purposes of designation-marking, of motor-vehicle identification, of control of the path to be taken by the motor vehicle and the like, marks of mechanical, magnetic or optical nature may be provided on the bottom side of the forward and/or rearward bottom plate 46 and 48 which can be read out by conventional sensing devices such as sensing heads of conventional construction.

While we have shown and described only one embodiment in accordance with the present invention, it is understood that the same is not limited thereto but is susceptible of numerous changes and modifications as known to a person skilled in the art, and we therefore do not wish to be limited to the details shown and described herein but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

We claim:

1. An installation for the further transport of assembled, ready-to-drive motor vehicles from the end of an assembly line, comprising one or more belt conveyors operatively interconnected according to a predetermined distribution pattern, at least one of said belt conveyors being constructed in the form of a buffer belt, and a plurality of conveyor base support structures each being adapted to support a vehicle thereon and to be transported on said belt conveyors, each of said structures projecting in length beyond the front and rear ends of a motor vehicle to be supported thereon and including holding means for at least one vehicle wheel on a respective support structure, each of said structures being transportable separately on said belt conveyors when not in use supporting vehicles, each of said structures including two separate guide means, each guide means including two lateral members having a boxlike cross section disposed approximately upright in normal use and bottom plate means interconnecting said lateral members at the bottom edges thereof, a forward bottom plate means being provided within the area of the forward vehicle wheels and a rearward bottom plate means being provided

within the area of the recess formed by protruding members and is rigidly secured with the bases of said protruding members, wherein the lateral members are connected at the forward and rearward ends thereof by rungs.

2. A combination according to claim 1, wherein the lateral members are provided at their ends within the lower areas thereof with a ramplike bevelling.

3. A combination according to claim 2, further comprising impact plate means connecting the lateral members at the ends thereof.

4. A combination according to claim 3, wherein the flanks of the protruding members are spaced apart by a distance which prevents contact between a vehicle wheel of the smallest diameter to be supported upon a support structure and the rear bottom plate means thereof.

5. A combination according to claim 4, further comprising marking means for identifying a motor vehicle supported upon a respective support structure, said marking means being affixed at a bottom side of at least one bottom plate means.

6. A combination according to claim 2, wherein the ramplike bevelling of the lateral members is provided in an upward direction to compensate for deflections of the lateral members at the ends thereof.

7. A combination according to claim 1, further comprising marking means for identifying a motor vehicle supported upon a respective support structure, said marking means being affixed at a bottom side of at least one bottom plate means.

8. An installation for the further transport of assembled, ready-to-drive motor vehicles from the end of an assembly line, comprising one or more belt conveyors operatively interconnected according to a predetermined distribution pattern, at least one of said belt conveyors being constructed in the form of a buffer belt, and plurality of conveyor base support structures each being adapted to support a vehicle thereon and to be transported on said belt conveyors, each of said structures projecting in length beyond the front and rear ends of a motor vehicle to be supported thereon and including holding means for at least one vehicle wheel for holding a vehicle on a respective support structure, each of said structures being transportable separately on said belt conveyors when not in use supporting vehicle, each of said structures including two separate guide means, each guide means including two lateral members having a boxlike cross section disposed approximately upright in normal use and bottom plate means interconnecting said lateral members at the bottom edges thereof, wherein the lateral members are interconnected, at the forward and rearward ends thereof, by rungs.

9. A combination according to claim 8, wherein each of said guide means includes a recess serving as holding means.

10. A combination according to claim 9, wherein said recesses are arranged within the area of the rear vehicle wheels.

11. A combination according to claim 8, wherein said holding means includes two protruding members, said protruding members being arranged such that mutually facing flanks thereof define a recess therebetween, said protruding members being arranged approximately perpendicularly to the longitudinal axis of a respective guide means, for-lockingly enclosing a respective vehicle wheel along a portion of its lower region.

12. A combination according to claim 8, wherein the lateral members are provided at their ends within the lower areas thereof with a ramp-like bevelling.

13. A combination according to claim 8, further comprising impact plate means interconnecting the lateral members at the ends thereof.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,608,745 Dated September 28, 1971

Inventor(s) Hubert Pohl and Kurt Leonhardt

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Title page, left column, line 11, which now reads:

"618,573, Feb. 27, 1967, now abandoned."

should read as follows:

-- 618,573, Feb. 27, 1967, now abandoned, which
claims priority, application Germany, March 2, 1966,
D 49 476 XI/81e. --

Signed and sealed this 2nd day of January 1973.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patent