Nov. 9, 1954 H. HUBSCHER 2,693,770

DEVICE FOR THE TRANSPORT OF GOODS

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Fig. 1.

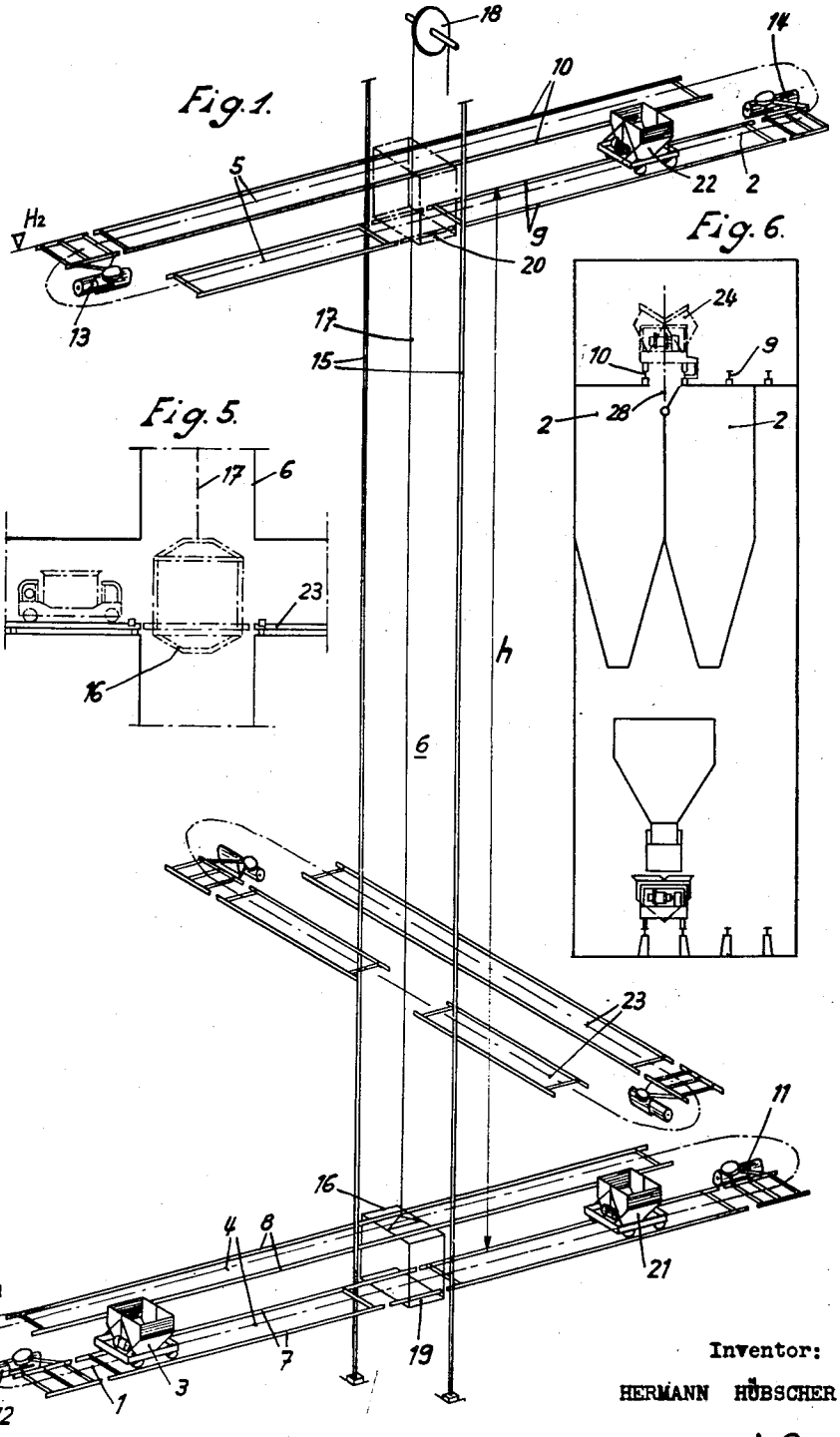


Fig. 5.

Fig. 6.

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Fig. 2.

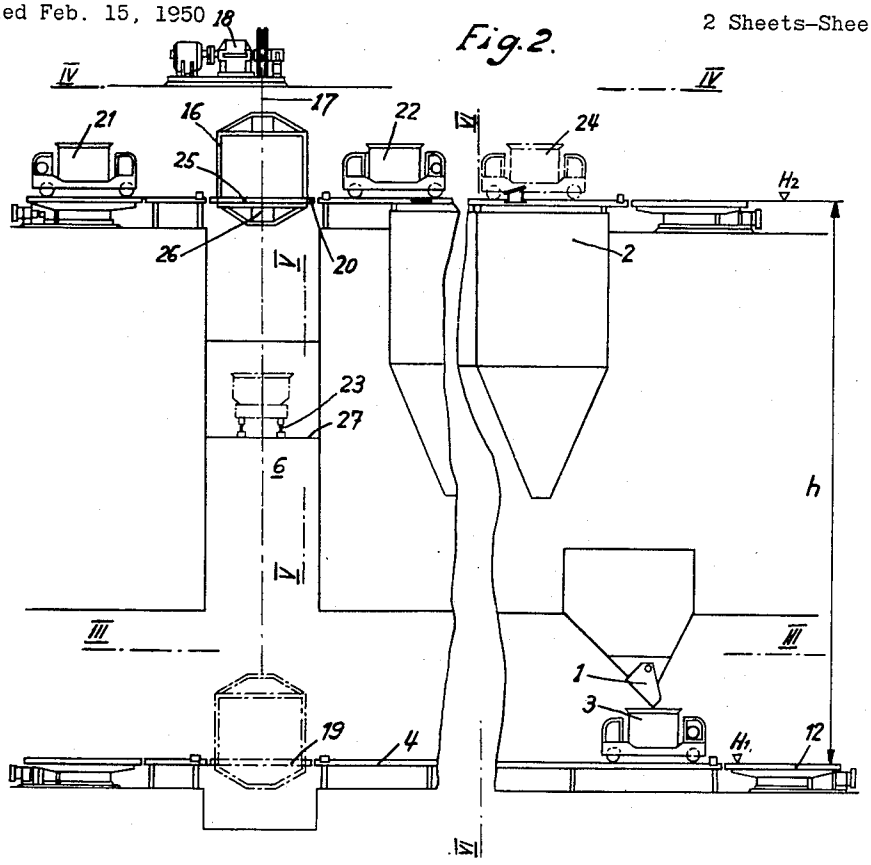


Fig. 3.

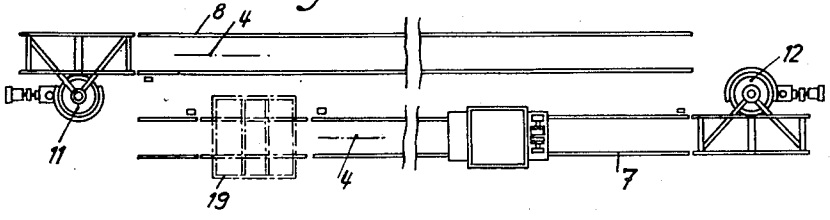
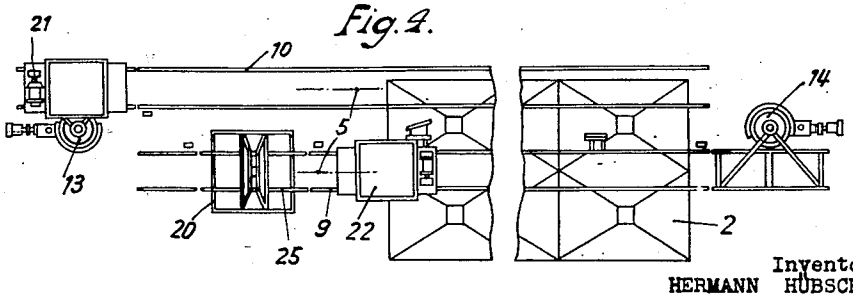


Fig. 4.



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DEVICE FOR TRANSPORT OF GOODS

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Claims priority, application Switzerland February 19, 1949

2 Claims. (Cl. 104—128)

The present invention relates to a device for the transport of goods, by means of transport vehicles, between stopping points located at different levels in height and which are connected together by rail tracks and a lift or elevator, the lift including a portion of the rail track to support a vehicle while the latter is disposed in the lift.

Known transport devices of this character have the considerable disadvantage that a completely automatic operation can only be carried out with difficulty, and thus the rail tracks and the lift device cannot be used to the full extent.

In the device according to the invention the rail track systems located at the different levels of the stopping points are each provided with two rail sections capable of being connected together to form a closed track, one of the rail sections being located in the plane of a rail part on the lift. Thus, when a transport vehicle has passed out of the lift device onto one of the track systems, the next vehicle on that track system may pass directly into the lift. The whole operation can be carried out easily without excessive delay or even entirely automatically. Thus, the two rail systems can be used by constantly running vehicles which move in synchronism with a continuously moving lift device.

At least one rail system may consist of two rails, which at their ends are connected together by a transfer table for conveying the vehicle from one rail to the other. The lift device is preferably provided with a travelling cage which is provided with a rail part for the reception of the transport vehicle, on to which it is possible to travel from each of the rail systems. The lift cage may also be fitted with a device, for example, a rotary platform or turntable supporting the rail part, by means of which a transport vehicle can be caused to travel out of the cage in a direction transversely to the rail section from which the vehicle moved into the cage.

The invention is described hereinafter with reference to the accompanying drawing, in which two examples of construction are illustrated, and wherein:

Fig. 1 shows diagrammatically and in perspective the first example of construction.

Fig. 2 is an elevation of a second example of construction, and

Figs. 3 to 6 are cross sections on the lines III—III, IV—IV, V—V and VI—VI of Fig. 2 respectively.

The transport device according to Fig. 1 is provided with two points or stations **1** and **2** at different levels H_1 and H_2, between which, for example, a dischargeable material such as coke or coal is to be transported. The transport between these two points is effected in a transport vehicle **3**, which is passed partly over the rail systems **4** and **5** and partly moved in a lift device **6**. The rail systems **4** and **5** are provided with rails **7**, **8** and **9**, **10** arranged parallel to one another, which at their ends are connected together by transfer tables **11**, **12** and **13**, **14** respectively. The lift device is provided with vertical guide rails **15**, within which a travelling cage **16** can be moved on a rope gear **17** by means of a driving device **18**.

The transport vehicle **3** is filled at the point **1** with dischargeable material, for example from a bunker not shown; after being filled it moves on the track **7** to the hoisting position **19**. When the travelling cage **16** is on a level with the hoisting position, the vehicle **3** can be caused to travel into the lift cage and lifted by the latter through the height *h* from the rail system **4** to the rail system **5**. From the position **20** at the level of the rail

system **5** the vehicle is caused to pass on the rails **9** and moved in a direction towards the point **2** where the transported material can be discharged for example into a bunker not shown.

After being emptied the vehicle is moved in the same direction onto the transfer table **14**, and the latter carries the vehicle to the adjacent end of the track **10** and the vehicle is then caused to travel along the track **10** to the transfer table **13**. The transfer table **13** returns the vehicle back again on to the track **5** and in front of the platform **20**. The vehicle can now again be caused to travel into the lift cage and then lowered by the latter to the level of the platform **19**. After passing off the platform **19** the vehicle reaches the transfer table **11** and is carried by the latter to the track **8** on to the transfer table **12** and from the latter is returned to the charging point **1**. According to the length of the track system and the type of lift employed, further vehicles **21** and **22** can be dealt with so that the rail system and the lift device can always be fully utilised.

The transport vehicles **3**, **21** and **22** are each provided with a motor, by means of which they can be moved on the rail systems. The rail systems may be provided with inclined portions of gentle slope, which if necessary may be fitted with a rack drive to assist the movement of the vehicles over such inclined portions. The hoisting or lift device **6** serves to convey the vehicles through at least the major portion of the difference in height H_1 of the point **1** and the height H_2 of the point **2**. It conveys the vehicle preferably in a vertical direction; it is however apparent that inclined elevators may be used if desired. In addition to the rail systems **4** and **5** further rail systems at other levels may be used, for example the rail system **23** which is associated with the lift device **6**. The rail system **23** is directed perpendicular to the systems **4** and **5**. In this case a rotary device is preferably provided in the lift cage **16**, for example a turntable, by means of which the vehicle can be turned in the desired direction of outward travel during the lifting movement.

In the transport device shown in Figs. 2–6 a material capable of discharge is to be conveyed from the point **1** at the height H_1 to the point **2** at the height H_2. The difference in height *h* present in this case is overcome by a hoisting device **6**. The transport from the point **1** to the hoisting point **19** is effected over the rail system **4** and the transport between the hoisting point **20** and the point **2** by the rail system **5**. The two rail systems **4** and **5** consist of two parallel rails **7**, **8** and **9**, **10**, which at their ends are connected together by the transfer tables **11**, **12** and **13**, **14**. The lift cage **16** is provided with a rail portion **25**, which is supported on a pivot **26**. The rail portion can thus be turned with a vehicle **3**, **21**, **22** or **24** resting thereon, so that the vehicle can be caused to travel into and out of the cage **16** either in the direction of the rail systems **4** and **5** at the points or stations **19** and **20** or on the contrary in the direction of rail system **23** arranged at right angles thereto at the point or station **27**.

The emptying of the vehicles **3**, **21**, **22** and **24** at the discharge station **2** is effected by opening the vehicle body and contents then fall between the rails of the track downwardly through the opening **28** into one of the bunkers at the point **2**. The vehicles are filled at the station **1** by shaking the bunkers at that station.

The devices described may, for example, be used for the transport of coal, coke, ores and so forth. Besides permitting the fullest possible utilisation of the rail system and the lifting device and the consequent possibility of the automatic arrangement of the operation, there is the further advantage that in particular goods capable of being discharged are transported while being protected. That is, during the entire transport the goods can remain in the same container and do not require changing over. This advantage is of particular importance when piece goods are to be conveyed, as the transfer of piece goods from one vehicle to another gives rise to difficulties and particularly in the case of automatic, mechanical changing over or transfer.

It will be understood that it is also possible to move the transport vehicles to and fro and in and out of the lift cage on the separate sections of the rail tracks, that

is, without coming to rest in the cage **16** for movement in the latter between the various levels.

What I claim is:

1. Apparatus for the transport of goods between different levels, comprising rail tracks at the different levels, a lift arranged to travel between stopping places at the different levels of said rail tracks, a vehicle on the rails, a rail section located in the lift to be interposed in the rail tracks at each of the levels when said lift is disposed at the related stopping point, and a movable rail section at the ends of said rail tracks at each level and adapted to lead from one track to another.

2. Apparatus for the transport of goods between different levels, comprising rail tracks at the different levels, a lift arranged to travel between stopping places at the different levels of said rail tracks, a vehicle on the rails, a rail section mounted on a turntable in said lift arranged to be interposed in the rail tracks at the different levels when the lift is disposed at the related stopping point, and transfer tables disposed at the opposite ends of said rail tracks at each of the levels to convey the vehicle from one to the other of said rail tracks at each level.

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