TRANSPORT SYSTEM COMPRISING TRAVELING WAGONS DRIVEN BY MEANS OF FUEL CELLS

The invention relates to a truck for transporting workpieces to be machined on or in a workpiece carrier between machining stations on or in rails, with movement elements, for example running wheels.

Prior art

A deck crane which is operated with a fuel cell as the drive source is known from JP 2003276983 A. However, the present invention relates to transport systems which consist of a rail track on which a number of trucks are arranged, which transport workpieces to a number of machining stations arranged one behind another. The rail track forms a closed system which can guide the trucks by means of switches onto secondary tracks and from these back into the

main track. Lifting arrangements which can guide the trucks onto rail tracks arranged at different levels, for example to bridge internal thoroughfares, are likewise provided. Such a system is described in DE 43 05 347 A, for example, and a truck is described in DE 195 06 670 A.

The trucks known thus far are either supplied with electrical energy with current conductors fastened to the rail tracks and sliding contacts, and in some cases rolling contacts, or they contain power storage devices (batteries and/or super-capacitors), which have to be recharged at charging stations from time to time.

If workpieces which require a very clean environment (clean rooms) are transported, sliding or rolling contacts are not possible for the purpose of energy transmission because they contaminate the air. Supplying the truck drives by means of batteries carried in each truck has the disadvantage of what is known as the memory effect, which occurs owing to regular partial discharge and leads to only part of the energy stored in the batteries actually being usable. The quantity of energy which can be stored in super-capacitors is relatively small for their volume and their weight, which leads to the travel of a truck to the next charging station having to be relatively short in order that the remaining energy is sufficient to manage this distance. The result of this is

that many charging stations have to be provided in a complete transport system, with the corresponding cost consequences.

Object

It is an object of the present invention to improve the drive on trucks.

Solution for achieving the object

The object is achieved by virtue of the fact that a fuel cell is assigned to the movement elements as the drive.

The disadvantages affecting the systems described above can be eliminated by providing the trucks with energy sources which neither contaminate the air nor have the undesirable effect of partial energy use. These conditions are satisfied by fuel cells. The functioning of the fuel cells concerned is not discussed in greater detail here. It is of importance only that both methanol and hydrogen can be used as the energy carrier and that in one case water vapor and in small quantities carbon monoxide and carbon dioxide are produced as exhaust gas and in the other case only water vapor is produced.

The trucks comprise a gas tank which is filled with one of the energy carriers mentioned at a filling station by automatic docking of a filler pipe. In a further embodiment, the emptied cartridge is removed automatically from the trucks at a filling station and a cartridge filled with methanol or hydrogen is inserted. The time for filling-up or for changing the cartridge of the individual truck is reached when the energy quantity specified in the electronic tank monitoring system is reached by the continuously determined

energy quantity measurement. A further advantage of the novel system can be seen in the fact that, at the same volume, the energy quantity stored in the truck tank or in the truck cartridge exceeds by a multiple that of the energy which can be stored in batteries or super-capacitors. This increases functional autonomy considerably and, as a result of this, substantially fewer charging or filling stations are necessary.

The design of the rail tracks and of the other system components, such as bends, switches, lifting arrangements, positioning devices etc., which make up the complete transport system, remains unchanged in relation to that described in the "prior art".

PATENT CLAIMS

1. A truck, in particular for transporting workpieces to be machined on or in a workpiece carrier between machining stations on or in rails, with movement elements, for example running wheels, characterized in that a fuel cell is assigned to the movement elements as the drive.

2. Truck as claimed in claim 1, characterized in that the fuel cell is connected to a tank for an energy source.