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ARRANGEMENT FOR THE DESTINATION-MARKING OF DISPATCH
CONTAINER IN TRANSPORTATION SYSTEM
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Fig. 3

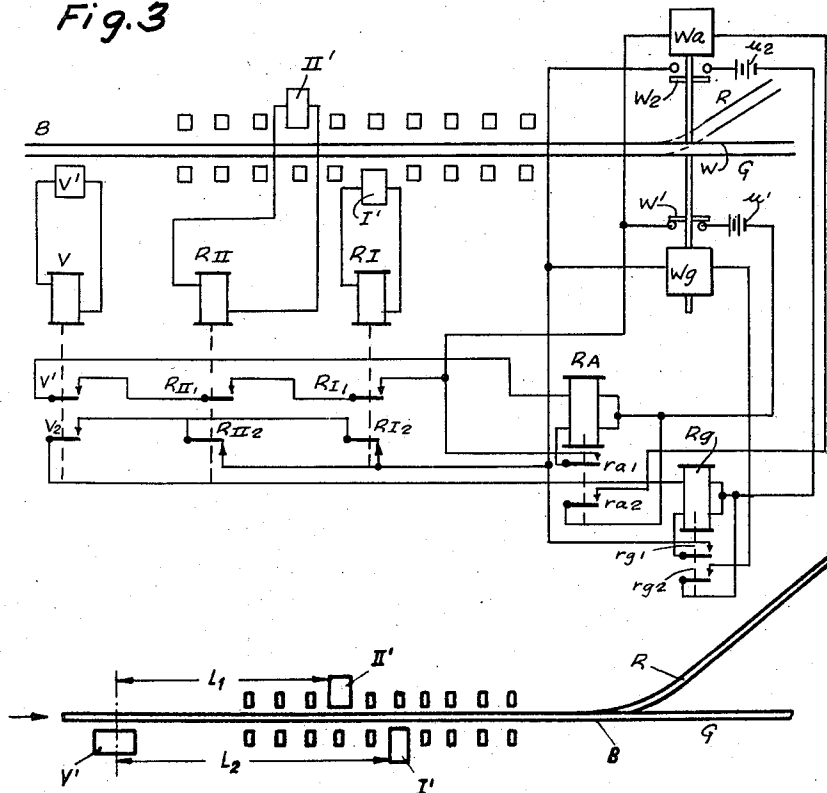


Fig. 2

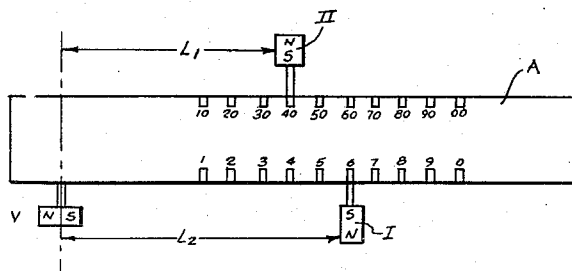


Fig. 1

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ARRANGEMENT FOR THE DESTINATION-MARKING OF DISPATCH CONTAINER IN TRANSPORTATION SYSTEM

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2 Claims. (Cl. 104—88)

In certain transportation or conveying systems the dispatch vehicles such as driverless tramway cars, hanging cages of wire tramways, carriers of pneumatic tube plants or of other such systems, are equipped with destination-markings by means of which they are able to prepare their route themselves. For example, dispatch containers for pneumatic tube conveyor systems have been provided with an element arranged to cooperate with either one or another of several so-called scanning means located adjacent the track and each serving to set a predetermined routing switch.

Various modes of scanning have been employed. For instance, the marking element of the vehicle may initiate a mechanical operation in order to set the next following routing switch, but it is also possible for this element to close a contact and thereby to affect a control circuit for the switch-setting mechanism. A dynamic control action may be provided by means of magnets fixed to the vehicle in order to affect the inductance of an element included in a magnetic circuit which acts on an electric circuit to bring about the desired control action. The latter mode has great advantages over the former as there is no abrasion of cooperating parts. In various plants, in particular suspension railways, the vehicle can happen to swing laterally, whereby its control element can change position and thus require special precautions to be adopted.

Arrangements have also been proposed in which these drawbacks are avoided. Their main feature is that the scanning means are positioned all on the same level and beside each other along the dispatch path while the destination-marking element of the vehicle is displaceable on it lengthwise. Another exciting element, fixed to the vehicle but not displaceable on it, cooperates with an additional scanning means along the dispatch track in order that the control mechanism be operated at the moment at which both the displaceable and non-displaceable elements of the vehicle are facing the respective scanning means.

Preferably the scanning means serving to operate the control mechanism is affected magnetically. The exciting elements preferably consist of permanent magnets but may instead be electromagnets energized by direct current. The scanning means may comprise a choke wound on an iron core having two limbs an air gap between which is adapted to be bridged by the magnet on the vehicle. This choke is connected in an electric circuit and by varying the magnetic circuit of the core the inductance of the choke is affected in well-known manner to affect in turn the electric circuit and initiate the respective control action.

In the case of large conveying plants, having a large number of routing switches and thus a large number of scanning means arranged to initiate the control operations, the scanning means may be located in two rows extending lengthwise of the dispatch path and on opposite sides thereof. Each such row has a displaceable exciting element allocated to it on each of the containers. The number of possible switching operations is in this case the mathematical product of the respective numbers of switching positions on either side of the dispatch container. If each row has 10 positions for the respective scanning

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means, then there are 100 possibilities of switching. A third and fourth such row may be added, the number of switching possibilities increasing by one tens-power for each row added.

However, care must be taken that the non-displaceable additional magnetic element shall be unable to excite a scanning means of the control station intended only to be excited by a displaceable element on a container and in this way to initiate undesirable switching. To prevent any misrouting so caused, the additional magnetic element, and the scanning means for cooperation with it, may be arranged outside the paths of the elements provided for destination-marking. Such precaution may be undesirable for reasons of construction, but if adopted, and if the distance of these additional elements from the path of the other elements be somewhat small, then misrouting may occur especially where the plants concerned are somewhat large and the tolerances hence adequately greater than they are in the case of smaller plants. Such misrouting will be initiated by a displaceable element of the dispatch container, which element causes the excitation of the scanning device arranged to actuate the respective control station without any other scanning means becoming excited. The routing switch will thus not be set although the destination-marking of the dispatch container agrees with the marking peculiar to the respective control station. Conversely, routing switches not to be controlled for the moment may happen to be affected. Misrouting is also possible where a plurality of elements for destination-marking are provided, or if the dispatch containers follow upon each other in such a close succession that the additional scanning means will be operated by an element of a container immediately behind another container that has not yet left the control station.

In order to preclude any misrouting, the invention provides that the direction of magnetization of the said non-displaceable exciting element be at right angles to that of those elements which are displaceable to permit of destination-marking.

The latter elements are selectively displaceable in a row of notches adapted to hold them in position. These notches are distinguished from each other by reference characters such as numerals, whereby the vehicle shall be easy to adjust as to its destination. Also it will be easy to ascertain the destination of such a vehicle whilst it is being dispatched.

Instead of one element which is displaceable as described, the vehicle may have a number of elements invariably fixed to it in a row. For each destination-marking a predetermined one of these elements is caused to be magnetized. In this way it will be possible for the destination-marking to be provided with the aid of purely electric means.

The invention is explained hereafter more fully, reference being had to the drawing in which

Fig. 1 is a diagrammatic plan view of a dispatch vehicle as provided by the invention, Fig. 2 is a diagrammatic plan of a part of the dispatch path, this part being adapted to cooperate with this container, Fig. 3 shows the circuit arrangement of a control station for a routing switch.

A dispatch vehicle A, Fig. 1, is provided with permanent magnets V, I, II fitted to its longitudinal sides. The magnetization of magnet V is in the direction of travel whereas the magnetization of the magnets I, II is at right angles to that of magnet V. Magnet V is invariably fixed to the container A. The magnets I, II are respectively displaceable along the two sides of the vehicle A and are adapted to be inserted in any one of ten notches provided in it. In the example here contemplated the notches are designated 1, 2, 3 . . . 0 and 10, 20, 30 . . . 00. The dispatch path B, Fig. 2, is provided

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with scanning means V', I', II' associated with it in the path of the magnets V, I, II. The scanning means V' serves to affect an electric circuit by which the scanning means I', II' are rendered effective. In fact, as soon as vehicle A, traveling along path B, has reached the position in which magnet V is facing the scanning means V', then in the example here shown the magnet I excites the scanning means I' while by magnet II the scanning means II' is excited. The control mechanism of the next following routing switch is connected for operation by the scanning means I', II'. This routing switch is hence set to determine the route of vehicle A. If the magnets I, II are in positions other than those here represented, then the scanning means I', II' will not be excited at the same moment since the two magnets I, II will not simultaneously face these scanning means. Consequently the control mechanism will not be actuated and the respective routing switch will not be set.

According to another feature of the invention the magnet V is used to restore the routing switch to normal when the control position is reached and this is still in its operative position but not intended to be set at this time.

The distances L1, L2, Figs. 1 and 2, indicate that the magnets V, I, Fig. 1, are spaced apart at the same distance as are V', I', Fig. 2, and that this also applies for the magnets V, II, Fig. 1, as compared with V', II', Fig. 2.

As illustrated by way of example, the vehicle A has the magnet II inserted in the notch 40. Magnet I is seated in notch 6. This vehicle may hence be said to be vehicle 46, intended to be deflected or ejected by control station 45.

For controlling the routing switches, an arrangement such as that shown in Fig. 3 may be adopted. The section of the dispatch track B which is shown, comprises a routing switch W for directing a vehicle into the path R. The switch mechanism may be of any known construction depending upon the nature of the track. Wa and Wg are solenoids, electric motors or other motive devices for the switch, Wa being arranged to move the switch from the position G to the position R and Wg being arranged to restore it from position R to position G. Contacts w2 and contacts w1 are arranged to be opened and closed respectively when the switch is in position G, whilst when the switch is moved to position R, contacts w2 are closed and contacts w1 opened. As previously stated, the scanning circuits V1, I', II' each comprise iron cored inductive chokes, air-gaps of which are adapted to be bridged by the magnets carried by the vehicle and thereby affect control circuits and energize relays V, RI and RII respectively. Such control circuits are well known and are described, for example, in U. S. Patents Nos. 2,609,433 and 2,518,865.

Assuming that the incoming vehicle A is required to set the switch W from position G to position R. With switch W in position G, contact w1 has been closed. If the destination-marking of the vehicle agrees with the marking peculiar to the control station represented, by way of example, in Fig. 3, the relays RI and RII will be energized over the scanning means V', I', II'. The contacts v1, RII1, RII1 of these relays hence close. These contacts are serially connected in a circuit which also includes the upper operating winding of a relay RA, a battery u1, and the said contact w1. This winding when energized closes the contacts ra1, ra2 of relay RA. Contact ra1 completes a circuit for a lower holding winding of RA independent of contacts V1, RII1 and RII1. Contact a2 completes the circuit of the drive Wa for the routing switch W over contact w1 and battery u1. This drive then acts to move the routing switch into position R. Thereby contact w1 is opened and contact w2 is closed. The holding circuit for relay RA is opened at contact w1.

The switch W remains in this position until another

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vehicle arrives at the control station. Assume that the destination-marking of this vehicle does not agree with the control marking of the station. Contact w2 has been closed as stated. The break contacts R12 of relay RI and RII2 of relay RII are now at rest. Since, however, each vehicle carries a magnet V, relay V will energize from the scanning means V' whereas the relays RI and RII, or at least one of them, remain at rest. Thus, in any case either contact R12 or contact RII2 remains closed while contact v2 of relay V becomes closed. Contact v2 is connected in series with the contacts R12, RII2 joined in parallel. Included in the circuit of these contacts is the upper winding of a relay RG. This relay RG hence energizes over battery u2 and contacts w2 in consequence of contact v2 closing. The contacts rg1, rg2 of RG therefore also close. At contact rg1 a circuit is closed for a holding winding of relay RG. Contact rg2 closes a circuit for the drive Wg for the routing switch W over contact w2. This drive then restores the switch W to the at-rest position G in which contact w2 is opened and the holding circuit for relay RG opened.

If, with the routing switch in position R, a vehicle incoming to the control station has its destination-marking adjusted to agree with the marking of this station, then neither the drive Wg nor drive Wa will be operated, because contact w2 has been closed while contact w1 is open, and because the break contacts R12, RII2 of the relays RI, RII will be opened by these relays responding. Accordingly the routing switch remains in position A.

The relays V, RI, RII, RA and RG will, of course, be located at a convenient place adjacent the control station.

The invention is not restricted in scope to the embodiment here disclosed, but modifications may be made within the scope indicated by the appended claims, without departing from the spirit or sacrificing any of the advantages of this invention. The term "vehicle" as used throughout the specification and claims is used in its generic sense as meaning any kind of carrier for transporting objects.

What is claimed is:

1. An arrangement for the destination control of vehicles, comprising a fixed magnet carried by said vehicle and at least one other magnet selectively displaceable with respect to said fixed magnet along the length of the vehicle, the spacing between said magnets adapted to characterize a particular destination for said vehicle, a plurality of fixed scanning means located along the dispatch track of said vehicle, there being one scanning means per magnet, said scanning means being responsive to the fields of said magnets, switch means for said track and a control circuit responsive to said scanning means for controlling said switch means, characterized in that said magnets are so positioned that the direction of magnetization of said fixed magnet is at right-angles to that of said displaceable magnet, and that each of said scanning means are similarly positioned with respect to each other so as to respond to the excitation caused by its associated magnet exclusively.

2. An arrangement for the destination control of vehicles according to claim 1, wherein said control circuit comprises means responsive to the operation of the scanning means associated with said fixed magnet for restoring said switch means to normal in the event that it has been actuated by a preceding vehicle and the displaceable magnet on the vehicle next preceding is in a position not requiring actuation of said switch means.

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