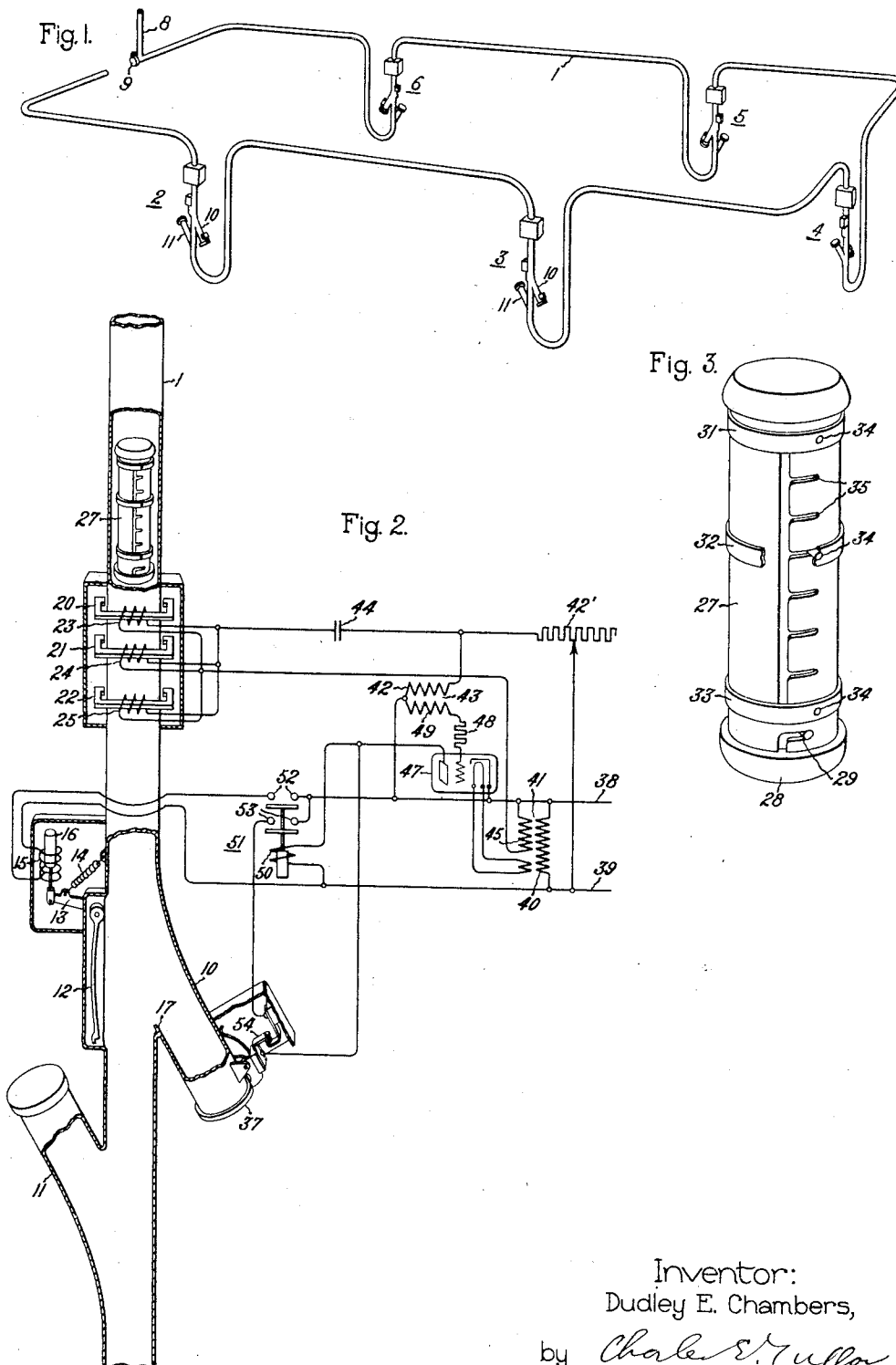


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CARRIER CONVEYER SYSTEM

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CARRIER CONVEYER SYSTEM

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My invention relates to carrier conveyer systems of the type in which a plurality of stations in the system are connected in series by a single conveyer. It is the object of my invention to provide improved means for selectively controlling the carriers of said system.

My invention will be better understood from the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

Referring to the drawing, Fig. 1 represents a series conveyer system which embodies my invention; Fig. 2 is a combined circuit diagram and an enlarged view of a portion of the system at one station thereof; and Fig. 3 is a perspective view of a carrier used in the conveyer system.

In Fig. 1 the conveyer system is shown comprising the pneumatic tube 1, which connects in series the several stations represented at 2, 3, 4, 5, and 6. Beyond the last station 6 of the series the tube connects by the branch 8 with suitable exhausting means, not shown, the end of the tube 1 being closed by the door 9 which in the customary manner permits the discharge of a carrier travelling beyond the last station. At each station the tube is provided with a discharge-Y 10 by which the carrier intended for that station may be discharged. The carriers not intended for that station travel on through to the next station. The tube at each station may also be provided with a second or entrance-Y 11 by which carriers may be inserted in the system. For causing a carrier to be deflected into a discharge-Y the tube at each station is provided with a pivotally mounted deflector 12 which normally lies in an offset portion of the tube and by means of the connected lever 13 and spring 14 is maintained in the inoperative position. The deflector 12 is moved to a position to cause the deflection of a carrier by the electromagnet 15 whose core 16 connects with lever 13 and opposes the spring 14. In its operative position the end of deflector 12 engages the projection 17 on the discharge-Y of the tube.

The apparatus by which selection is made of the particular carrier or carriers which should be discharged at each station will now be described. At a short distance ahead of the discharge-Y at each station is a group of inductance devices which in the present case is represented as comprising three cores 20, 21 and 22 having thereon windings 23, 24 and 25 respectively. These inductance devices are spaced along the tube of the carrier and are so mounted that the relative spacing between the devices may be varied in the manner and for the purpose

which will appear hereinafter. The carriers which are employed in the system may be of the usual form having a detachable end 28 which may be secured to the cylindrical body portion in any desired manner, for example, by the bayonet joint 29. The carrier is provided with three magnetic portions which are adapted to partially bridge the paths between the ends of the cores 20, 21 and 22 thereby to reduce the reluctance of the magnetic paths and to increase the inductance of the windings 23, 24, and 25. These magnetic portions are illustrated as comprising the three rings 31, 32, and 33. These rings are adjustably mounted on the carrier each being retained in adjusted position by means of a pin 34 which is adapted to engage into one of a number of slots 35 formed in the carrier. If the relative spacing of the rings of a carrier is the same as the relative spacing of the cores of the inductance devices at any station, it will be seen that as the carrier passes that station the several rings of the carrier will simultaneously reduce the reluctance of the magnetic path of the several inductance devices and therefore increase for an instant at least the inductance of all three inductance windings.

In a manner now to be explained, a simultaneous increase in the inductance of the three windings 23, 24 and 25 at any station will cause energization of the electro-magnet 15 by which the deflector 12 is operated to deflect the carrier to the outlet-Y 10, whence it emerges by pushing open the door 37.

Connected across a source 38, 39 of alternating current, which for example may be at 110 volts, 60 cycles, is the primary 40 of the transformer 41. The primary 42 of the grid transformer 43 is connected between lead 38 and a divided circuit one branch of which includes the rheostat 42' connecting back with lead 39 while the other branch connects through the capacitor 44 with the reactance coils 23, 24, and 25 all arranged in shunt and includes the secondary 45 of transformer 41 which secondary is arranged to act cumulatively with respect to the potential between the leads 38 and 39. The vapor electric or arc discharge device 47 has its grid connected through resistance 48 with the secondary 49 of transformer 43, its cathode connected directly with lead 38 and its anode connected with the winding 50 of relay 51. This relay has one set of contacts 52 which serve to close the circuit of the winding of electromagnet 15 and has a second set of contacts 53 which serve to close a hold-

ing in circuit for itself including the door operated contact 54.

The operation of the above described apparatus is as follows. The cores 20, 21 and 22 of this station are assumed to have a predetermined relative spacing. The carrier intended for this station has its rings spaced correspondingly, being retained by the notches 35. As long as the inductance of all three windings 23, 24, and 25 is low no current will flow through the vapor discharge device 47 for the reason of the fact that during each half cycle during which the anode is positive the potential of the grid is negative due to the connection of the transformer 43 and is sufficiently advanced in phase by the capacitor 44 to prevent either any flow of current through the device 47 or any flow of current except at a point in the positive half wave near the latter end thereof. The anode current in the latter case is insufficient to cause the operation of relay 51. If a carrier passing through the station has all of its rings so positioned that they simultaneously decrease the reluctance of the magnetic path of each of the several cores thereby increasing materially the reactance of the three windings, the phase of the grid potential is suddenly retarded a sufficient amount to cause the vapor device 47 to pass current at the beginning of each positive half cycle. Hence the relay 51 is strongly energized. By the operation of this relay the deflector 12 is operated and the relay is automatically held in through the contact 54. This holding provision is advantageous inasmuch as the operation of the vapor electric device 47 is of very short duration depending of course upon the speed at which the carrier is travelling. If the spacing of the rings on the carrier does not correspond to the spacing of the cores the windings of the cores will not have their inductances increased simultaneously and no operation of the vapor electric device 47 will be produced. As the deflected carrier passes out of the discharge-Y 10 it forces open the door 37 which by the operation of contact 54 opens the holding circuit of the relay 51, thus allowing this relay to become restored to the open circuit position.

It will be understood that at each of the several stations of the system cores 20, 21 and 22 will be differently spaced whereby each will be able to select a carrier or the carriers which have their rings spaced in the same manner. While I have shown the station provided with three cores and the carrier provided with three rings, it will be understood that where there are a relatively few number of stations two cores and two rings only may be necessary. On the other hand where there are a great number of stations in the system, a greater number of cores and rings may be employed if desired.

I have chosen the particular embodiment described above as illustrative of my invention and it will be apparent that various other modifications may be made without departing from the spirit and scope of my invention, which modifications I aim to cover by the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In combination, a conveyer, a carrier ar-

ranged to be conveyed thereby, means including a grid controlled valve for deflecting said carrier, means for supplying to said grid a voltage having a phase advance such that the current passing the valve is ineffective to cause the deflection of the carrier and means on said conveyer responsive to the presence of the carrier for delaying the phase of the grid voltage whereby the deflecting means is actuated.

2. In combination, a conveyer, a carrier arranged to be conveyed thereby, said conveyer having a deflector for said carrier, a grid controlled valve for controlling said deflector, a source of alternating current connected to energize said valve, means for supplying to said grid a voltage whose phase is advanced such that the current passing the valve is ineffective to actuate said deflector, and means comprising an inductance associated with said conveyer and controlled by the presence of said carrier for retarding the phase of said grid voltage.

3. In combination, a conveyer, a carrier arranged to be conveyed thereby having a plurality of spaced magnetic rings thereon, said conveyer having a deflector for said carrier, a source of alternating current, a grid controlled vapor electric device connected to be energized from said source and to control the operation of said deflector, a plurality of electromagnets associated with said conveyer and spaced to correspond with the spacing of the rings of said carrier, and circuit means including a capacitor and said electromagnets for supplying a voltage to said grid, the phase of said voltage being normally advanced such that insufficient current is passed by said device to operate said deflector and the phase of said voltage being retarded by said carrier passing said electromagnets such that sufficient current passes said device to operate said deflector.

4. In a pneumatic conveyer system including a conveyer tube for the carriers, carrier selective means comprising a plurality of inductance devices having a predetermined spacing along said tube, a carrier having a plurality of magnetic rings thereon correspondingly spaced, a vapor electric discharge device adapted to be operated in response to the simultaneous increase in inductance of said devices, a carrier deflector in said tube, a relay between the vapor electric device and the deflector whose winding is provided with a holding-in circuit and means operable by the discharge of a carrier for opening said circuit.

5. In a conveyer system, carrier selective means comprising a plurality of alternating current magnets associated with and having a predetermined spacing along a conveyer of said system, a carrier having magnetic members correspondingly spaced, means for deflecting the path of movement of said carrier and a grid controlled electron discharge device for controlling said deflecting means, said magnets being connected with said grid to cause a phase shift of the grid potential relative to the anode potential of the device in response to the passage of the carrier past the magnetic members.

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