

March 24, 1931.

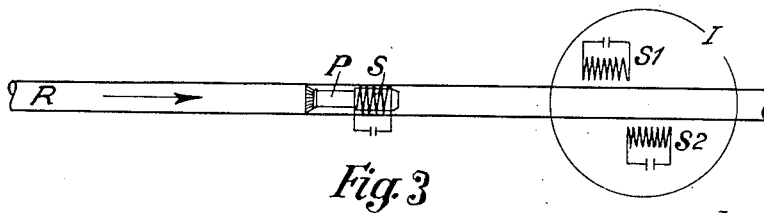
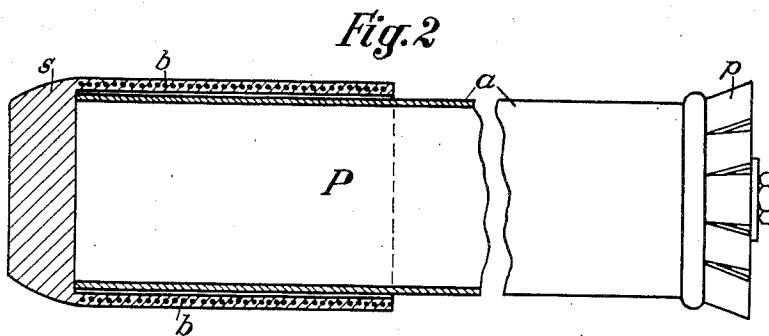
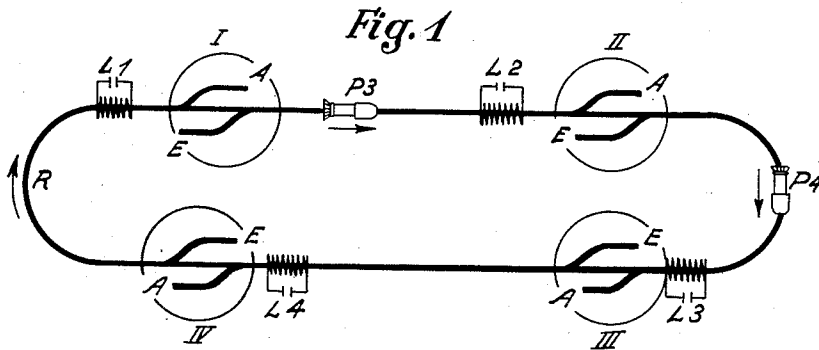
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1,797,651

CONVEYING SYSTEM

Filed May 3, 1927

3 Sheets-Sheet 1



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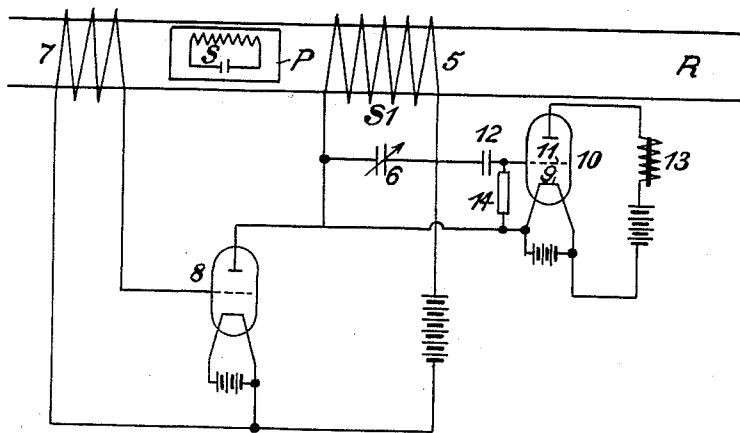


Fig. 4.

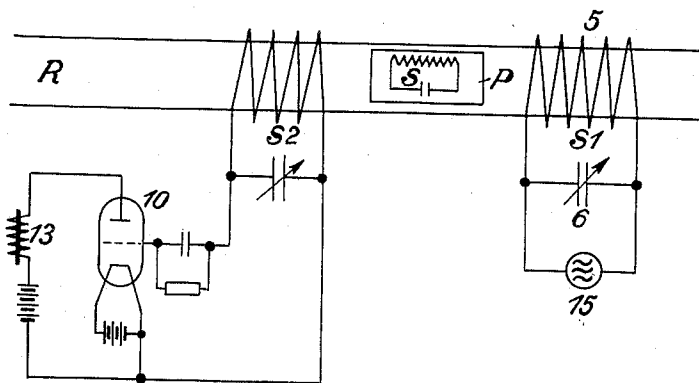


Fig. 5.

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Fig. 6.

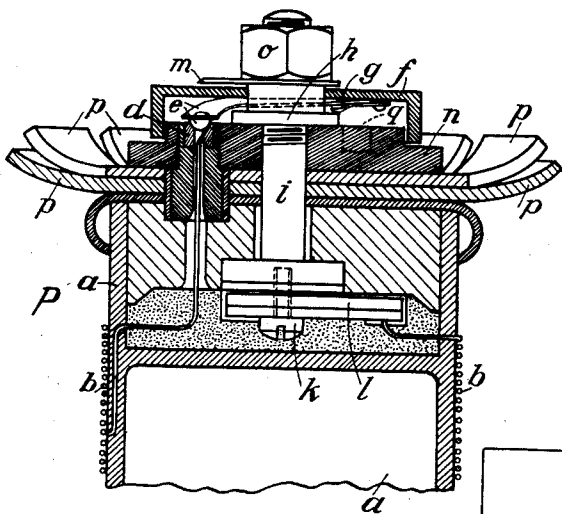


Fig. 8.

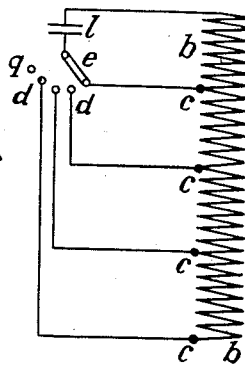


Fig. 7.

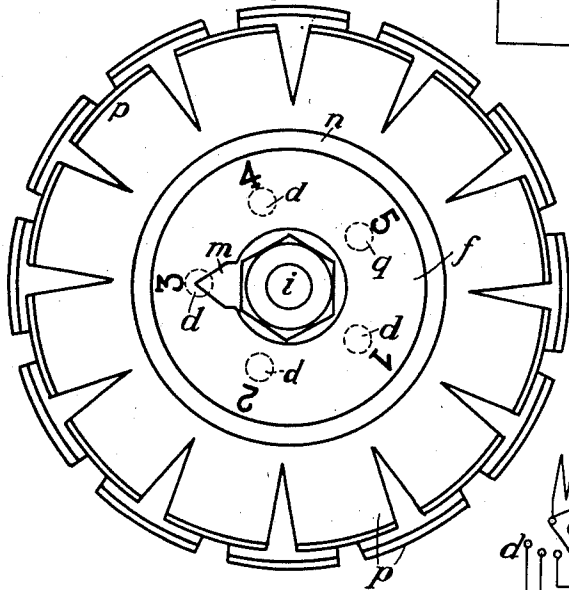


Fig. 9.

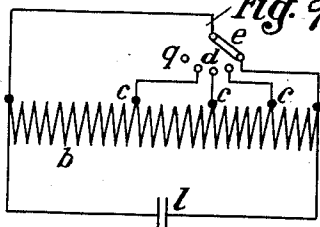


Fig. 10.

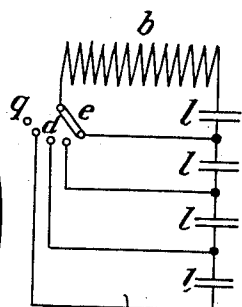
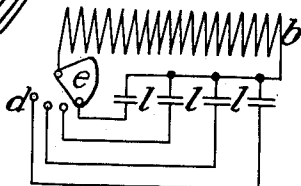


Fig. 11.



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CONVEYING SYSTEM

Application filed May 3, 1927, Serial No. 188,524, and in Germany May 5, 1926.

Our invention relates to conveying systems known, for instance, as pneumatic despatch systems, arrangements of cable conveyors or the like, or to means for the transportation of persons or animals, that is, systems wherein any bodies, such, for example, as pneumatic post carriers, are moving in predetermined ways.

This invention has for its object to avoid any mechanical contact being required to take place between the said bodies and means adapted to actuate switches which are to direct the bodies in a well-known manner.

To such end the switches are operated by the mutual or reciprocal effect of lines of force which are radiating from the bodies and the stations at which the bodies are to be guided by the switches.

The invention will be understood from the following description and be particularly pointed out in the appended claims, reference being made to the accompanying drawings which illustrate some examples of the invention as applied to pneumatic despatch systems.

In these drawings—

Fig. 1 is a diagrammatic view showing an example of the novel arrangement. Fig. 2 represents, partly in a longitudinal section, a carrier adapted for use in this arrangement. Figs. 3, 4, 5 are diagrammatic views illustrating modifications over Fig. 1. Fig. 6 shows a longitudinal section of the rear end of a carrier modified over the one represented in Fig. 2. Fig. 7 is a plan view thereof. Figs. 8, 9, 10, 11 each show an example of the manner in which the electrical arrangement of the carrier may be controlled.

In Fig. 1, R denotes an annular pneumatic post tube on which stations I, II, III, IV are located. Each station has an outlet tube A and an inlet tube E. The arrows indicate the direction in which the carriers are moving. An insulated socket is arranged before each of the stations I to IV. These sockets, not shown, are each surrounded with a coil that in conjunction with a condenser forms an oscillation circuit. The letters L1, L2, L3, L4 denote the different wave lengths of these oscillation circuits.

The carrier P represented in Fig. 2 has a case *a*, a packing collar *p* at one end of this case and a cap *s* at the other end thereof. The cap *s* forms the closure of the carrier and is made of an insulating material, such for instance, as leather. The cap *s* contains a coil *b* which has a sufficient self-capacity to constitute an oscillation circuit. A small condenser may be added to the coil *b* if the self-capacity is not sufficient.

Each station has a number of caps *s* which each contain an oscillation circuit tuned to definite wave lengths L1, L2, L3 or L4.

The operation is as follows:—Say, for instance, station I desired to send a carrier to each of the stations II, III, IV, then the official concerned provides the carriers with a cap corresponding to the oscillation circuit of the stations II, III, and IV, respectively. The carriers can then be put into the inlet E of the station I one after another. The carriers P4, P3 for the stations IV, III pass the oscillation circuit L2 of the station II without any effect being produced thereby, whereas the carrier destined for station II will actuate the switch thereof owing to the resonance action due to the reciprocal effect of the two oscillation circuits. The same is repeated for the other carriers when they arrive at the respective stations. In this way, by high frequency action, it is possible to direct any load without the aid of mechanical contacts.

Another arrangement adapted for controlling the carriers by means of tuned high frequency coils is shown in Fig. 3. It is not necessary for the carrier P, provided with an oscillation circuit S, to travel through a coil surrounding the tube R, but it may travel along two oscillation circuits S1, S2 disposed laterally of the tube or one behind the other and brought into mutual operation by the resonance carrier. The principle in each case is that the tuned oscillation circuits act upon each other on the passage of the carrier.

In Fig. 4, P again denotes one of the bodies conveyed which also in this case can be a carrier of the nature described. S indicates the oscillation circuit of this carrier, R the path of the body P, viz. a tube, S1 the stationary

oscillation circuit tuned to the circuit S. The coil 5 of the circuit S1 is arranged to enclose the tube R. 6 denotes the capacity of the circuit S1. The tube R is provided with a reaction coil 7 of an electron tube 8. The anode circuit of this tube is connected to the cathode 9 of an electron tube 10 the grid 11 of which is connected through a condenser 12 with the oscillation circuit S1. The tube 10 serves to amplify the oscillations of the circuit S1. A relay 13 in the anode circuit of the electron tube 10 is provided to govern a switch of the tube R. This switch is not shown. A resistance 14 is arranged between the cathode 9 and the grid 11.

The coils 5, 7 are so disposed with respect to each other, for instance so spaced apart that the coupling is not active, the tube 8 consequently being in its state of rest so that the oscillation circuit S1 is not excited. As soon as, however, the carrier P arrives between the coils 5, 7 its oscillation circuit S will tighten the coupling. The tube 8 hence begins to work. An alternating tension is hereby produced in the circuit S1. This tension, however, because of the velocity of the carrier P lasts too short a time to be able to bring about any effect, such, for example, to actuate a relay. The impulses of tension, arising in the circuit S1, are therefore amplified by the electron tube 10.

This is done as follows. As soon as the grid becomes positive under the influence of the impulses of the oscillation circuit S1, electrons flow from the cathode 9 to the grid 11 on which they accumulate. These electrons, after the current impulse has taken place, cannot return to the cathode immediately and will consequently suppress the anode current of the tube 10. The relay 13 hereby releases its armature which thus causes the switch, not shown, of the tube R to be adjusted so as to eject the carrier. The charge which the electrons have formed on the grid is equalized slowly over the resistance 14 and over the not completely insulating glass partition of the tube 10. As long as this equalization takes place the anode current is very small or equal to zero. When the equalization has been finished the anode current begins to flow again so that the armature of the relay 13 is again attracted and the switch of the tube R thus returned into its position of rest.

The resistance 14 may be dispensed with. The said equalizing of the charge of electrons then only takes place over the glass partition of the tube 10.

With the arrangement shown in Fig. 5 the stationary oscillation circuit S1 is constantly energized by means of a high frequency source 15. The amplifier 10 is connected with a third oscillation circuit S2 to which the oscillation circuit S of the carrier P will transmit energy from the circuit S1.

As shown in Figs. 6 to 11, the oscillation circuits of the caps *s* may be adjustable so that each carrier can be tuned to any station without its cap having to be replaced by another.

Here the carrier P, the casing of which is again denoted by *a*, carries a coil *b* which is in connection at different places *c* (Figs. 8, 9) with contacts *d*. The contacts *d* are in the reach of a sliding contact spring *e* that is fixed to a rotatable cap *f* (Figs. 6, 7). A sliding contact spring *g* of the cap *f* rests upon a metal disk *h* which is conductively joined to a screw bolt *i*. This is connected by a screw *k* with one coating of a condenser *l*. The other coating thereof is joined to one end of the winding *b*. A hand or pointer *m* for the cap *f* is fixed to the bolt *i*. The position of the contacts *d* is indicated on the cap *f* by numerals 1 to 4 (Fig. 7) which each denote a station. The contacts *d* are seated in an insulating disk *n* by means of which packing collars *p*, consisting in a well-known manner of leather, felt, or the like, are held in place under the pressure of a nut *o* of the bolt *i*.

To the row of contacts *d* a dead contact *q* is added to which the numeral 5 of the cap *f* relates.

With the arrangement shown in Fig. 8, the windings of the coil *b* will be switched into circuit as the sliding contact *e* is moved toward the dead contact *q*. If the contact *e* is on the contact *q* the whole coil is cut out. The tuning of the carrier can thus be varied by steps in accordance with the location of the places *c*.

This is effected by turning the cap *f*. Whenever the pointer *m* is set to any one of the numerals 1 to 4 then the spring contact *e* is on a definite contact *d*.

With the arrangement disclosed in Fig. 9 the entire coil *b* is short-circuited if the contact spring *e* is in the position shown. This coil is, however, wholly cut in if the spring *e* is on the dead contact *q*.

Whereas according to Figs. 8 and 9 the tuning is effected by cutting in or out windings of the coil *b*, it is according to Fig. 10 attained by cutting in or out condensers *l* arranged in series.

With the arrangement shown in Fig. 11 condensers *l* are cut in or out which are connected parallel to one another. The contact spring *e* must here be sector-shaped or made in a similar form.

The number of stations which corresponds to the number of contacts *d* may be greater or less than in the case represented. The numbering of the cap *f* depends upon this number.

The coil *b* may be covered with a protective coating or layer, not shown.

It is to be understood that the invention is not restricted in scope to the embodiments described, but that 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.

Thus, the bodies P, instead of being carriers for pneumatic despatch systems, may be those of any other conveying systems, such as carriers drawn by a cable along rails, or may be any other objects that are movable in predetermined ways, such, for instance, as means for the transportation of persons. The invention may also serve to cause the bodies P to bring about any other effects while they are moving, such, for example, as the operation of means for counting them.

We claim:

1. In a conveying system, carriers adapted for a predetermined constant radiation of lines of force, a guide way for such carriers that presents a number of branching points, means at these branching points for deflecting the carriers, and dispositivs each associated with a definite one of such deflecting means for the actuation thereof, these dispositivs adapted for cooperation by lines of force with carriers of a predetermined radiation of lines of force.

2. In a conveying system, carriers, a branched guide way therefor which presents a number of branching points, an oscillation circuit at each of these branching points, each oscillation circuit tuned differently from the others, oscillation circuits fitted to the said carriers, means for selectively tuning the latter circuits to those at the said branching points, and means, each adapted to be operated by one of the stationary oscillation circuits, to deflect the carriers at the branching points.

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