

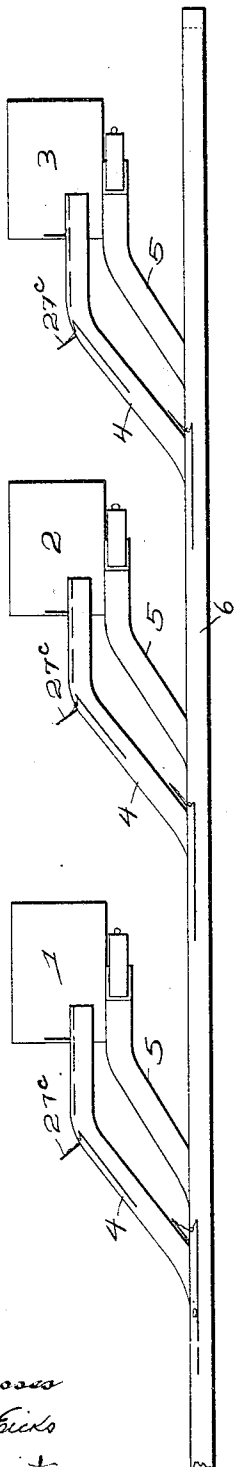
No. 839,646.

PATENTED DEC. 25, 1906.

E. ROBERTS.
PNEUMATIC TUBE SERVICE.
APPLICATION FILED APR. 4, 1905.

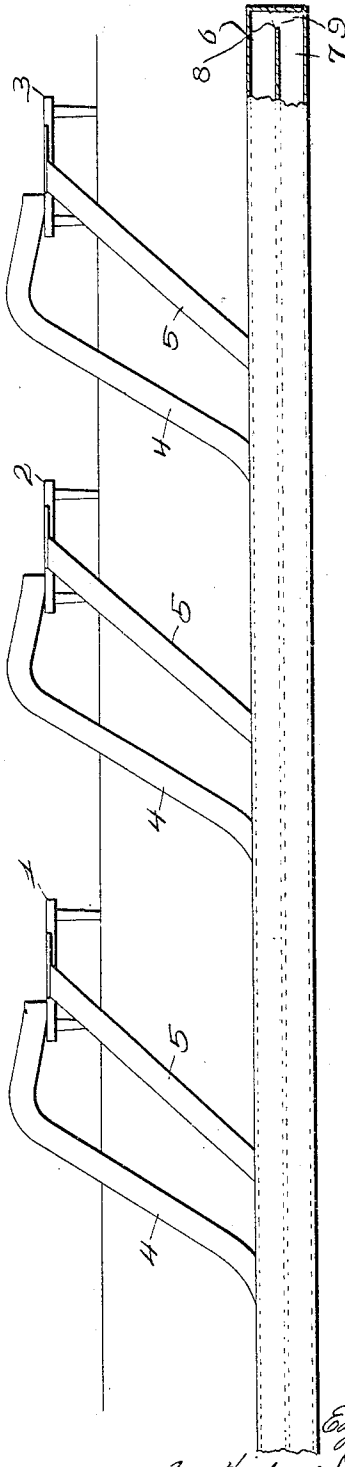
4 SHEETS—SHEET 1.

Fig. 1



Witnesses
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Fig. 2



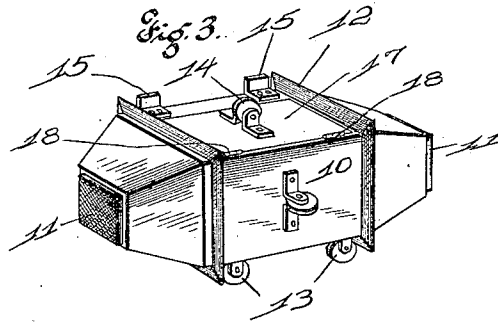
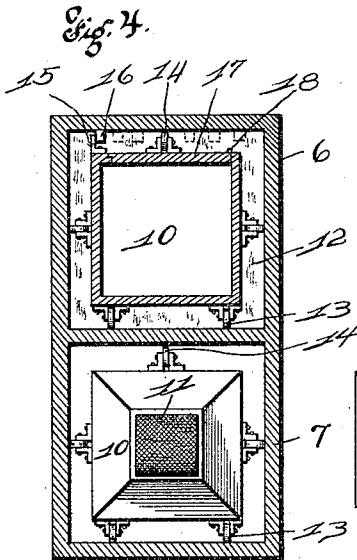
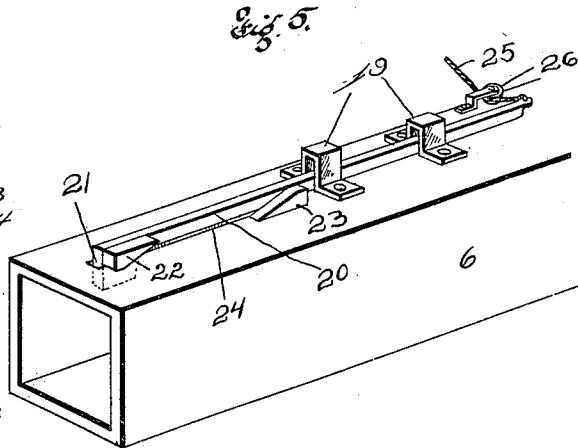
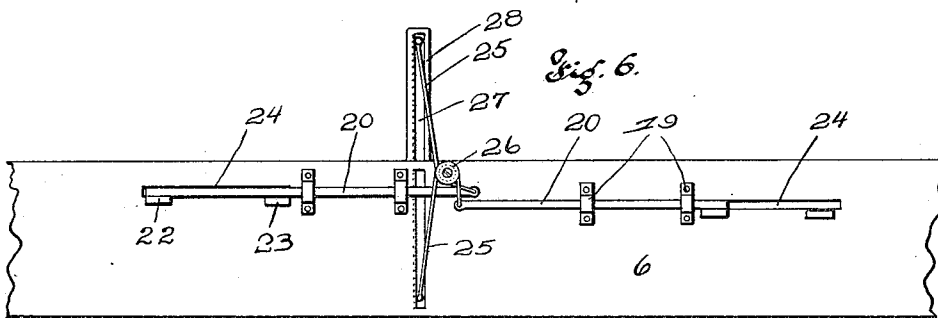
Inventor
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4 SHEETS—SHEET 2.



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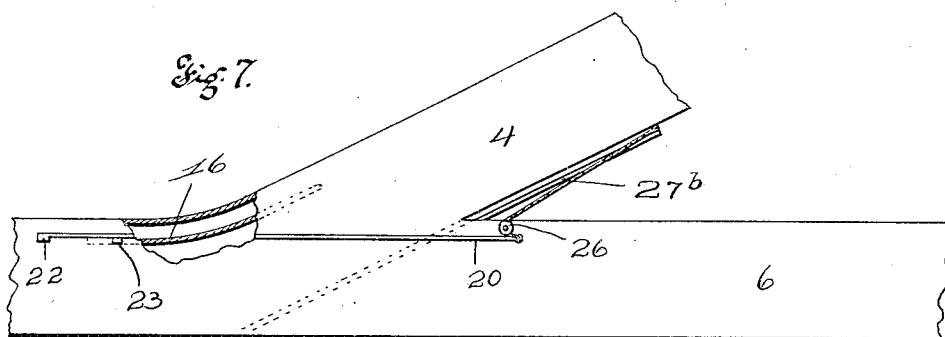
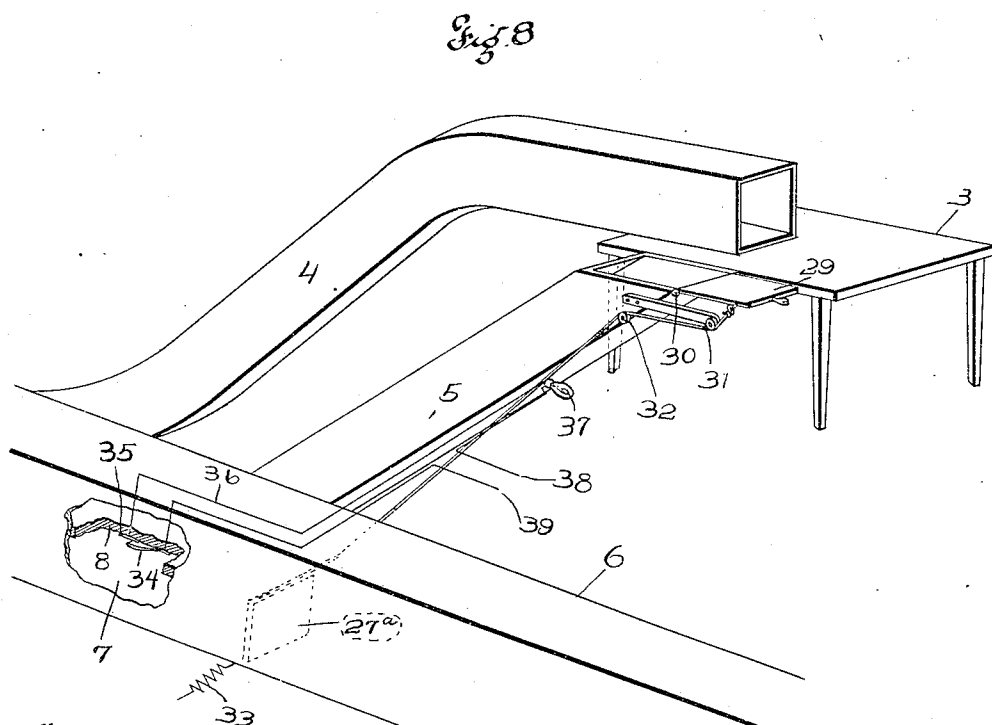
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4 SHEETS—SHEET 3.



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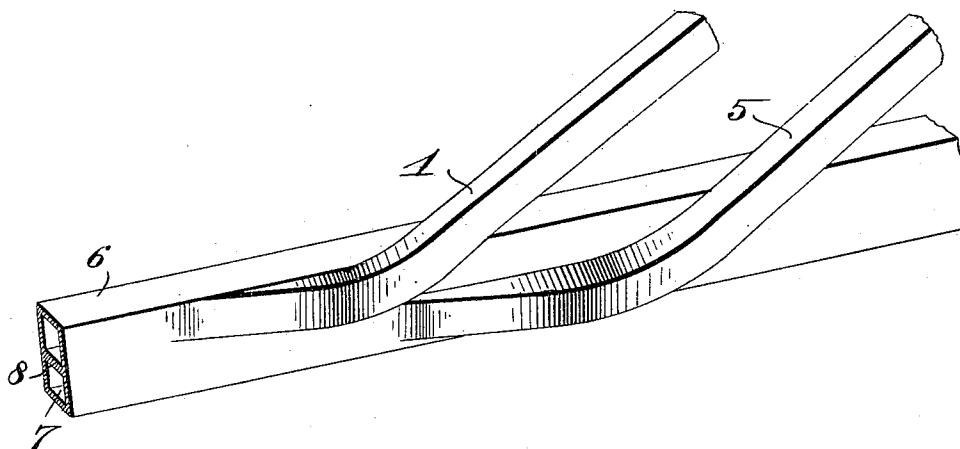
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4 SHEETS—SHEET 4.

Fig. 9.



WITNESSES:

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UNITED STATES PATENT OFFICE.

EDGAR ROBERTS, OF EAST ST. LOUIS, ILLINOIS.

PNEUMATIC-TUBE SERVICE.

No. 839,646.

Specification of Letters Patent.

Patented Dec. 25, 1906.

Application filed April 4, 1905. Serial No. 253,899.

To all whom it may concern:

Be it known that I, EDGAR ROBERTS, a citizen of the United States, and a resident of East St. Louis, Illinois, have invented certain new and useful Improvements in Pneumatic-Tube Service, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to pneumatic underground tube systems adapted for carrying freight; and it consists of the novel construction herein described and claimed.

The object of my invention is to provide a pneumatic-tube system for carrying small packages of freight wherein a single tube may be used for making deliveries to a dozen or more stations connected therewith, the return service being accomplished through a separate return-tube, preferably placed beneath the outgoing tube, but connected therewith in such a manner that the same supply of air will be utilized simultaneously in both tubes.

Figure 1 is a plan view of a portion of a pneumatic-tube system and illustrating three stations connected to one of my combination-tubes. Fig. 2 is a side elevation of the same. Fig. 3 is a perspective view of one of the cars. Fig. 4 is a vertical cross-section taken through one of my combination-tubes and showing cars in each of its ducts. Fig. 5 is a detail perspective view of a portion of the receiving-duct having applied thereto the valve-operating dog. Fig. 6 is a top plan view of a duct having applied thereto additional valve-operating devices. Fig. 7 is a detail plan view of a portion of one of the station combinations shown in Figs. 1 and 2. Fig. 8 is a perspective view of additional station details. Fig. 9 is a perspective view of a portion of the ducts of my improved apparatus and showing the branch pipes connected thereto, valves and valve mechanisms being detached from the branch pipes.

1, 2, and 3 indicate a series of tables or platforms located at various stations along the line and connected to the combined sending and receiving tubes by means of curved branches 4 and 5. The said combination of sending and receiving tubes is composed of an outgoing duct 6 and an incoming duct 7, the latter being preferably located directly beneath the former and both inclosed in a single shell or casing, but said ducts being

separated by an intermediate partition 8, except at the end of the line, where the said partition is cut away, as indicated by 9, in order to permit the air from said duct 6 to pass immediately into said duct 7.

10 indicates one of the cars, the body of which is preferably rectangular in cross-section in order to conform to the cross-section of the ducts through which it travels, and both ends of said car are preferably tapered outwardly and provided with resilient bumpers or cushions 11. A suitable packing-flange 12 extends around the cars adjacent to each end of same for the purpose of forming air-tight joints with the walls of the ducts.

The cars used in my system are quite large, as they are each supposed to carry a maximum of two hundred and fifty pounds of freight. They are provided upon their bottoms with common supporting-wheels 13 and upon all their remaining sides with a single guide-wheel 14, which is preferably located in the center of said sides. (See Fig. 3.) Each car is provided with two longitudinally-alined guide-ears 15. At the base of each delivery branch 4 is fixed a curved guide 16, with which the said ears come in contact in order that the proper car may be switched into the proper station, each station having its special guide, as 16, but each located laterally at a different point with respect to width of the duct, so that the cars designed to be switched into station 1 will be directed to that station only and the cars directed to any other station will be caused to enter that station and no other. In Fig. 4 I have indicated by dotted lines a series of guides 16, although, of course, they do not appear thus in practice, because but a single guide could be seen in a view like Fig. 4.

Access to the cars 10 is had by way of doors 17, which are provided with hinges 18. Upon the duct 6 at each station is mounted in suitable guides 19 a valve-operating dog 20, which carries at one end a downwardly-projecting lug 21 in the path of the ears 15, carried by the incoming cars. Said dog also carries a projection 22, which rides upon a cam 23 when said dog is moved by the car, and thereby elevates the dog and withdraws the lug 21 from the path of the said car-ears 15, and said lug 21 is adapted to move in a slot 24, formed in the top of the duct directly beneath said dog. The end of the said dog 20 which is opposite said lug 21 has attached to it a rope or chain 25, which passes over a

guide-pulley 26 and thence passes and is connected to a laterally-moving slide valve or gate 27, which is mounted in guides 28 and which is adapted to be thrown into the duct and cut off the passage of air beyond the said valve and causes the entire supply of air to be more naturally projected into the branch duct 4 in order to elevate the heavy car as it is received into the said branch duct.

In Fig. 7 I have shown a valve 27^b operating at an angle through the duct 6 to cause the air to be projected into the branch duct 4, and the said valve 27^b is arranged at the same angle as is said branch duct 4 and it operates identically with the transversely-operating valves 27. The branch duct 4 extends upwardly for a distance of eight to twenty feet, depending upon the depth at which the combination-tube is placed in the ground, and I find that it requires the entire force of air to lift the heavy cars to the height mentioned.

Additional valves and valve-operating mechanism similar in construction with the valves and mechanism just described are located in each of the delivery branch pipes 4, as indicated in Fig. 1, and the valves in said branch pipes are for the purpose of normally closing the ends of said branch pipes, as if the ends of said pipes were always open the proper suction could not be maintained through the ducts. In Fig. 6 I have shown the valve-actuating mechanism duplicated—that is, with a dog 20 on each side of the valve 27—and said mechanisms operate in opposite directions to one another in order to close and then to open the valve as the carrier successively strikes the lugs 21 on the ends of the pair of dogs. In this manner the valve is automatically opened and closed. The lifting-cam 23, that is struck by the projection 22 of the valve-opening mechanism, is of course arranged at the outer end of the corresponding slot 24 in place of at the inner end, as is the cam of the closing mechanism.

In Fig. 8 are shown details of the sending branch duct 5, the upper end of said duct being sufficiently closed by a cover 29, which is hinged at 30 and has connected to it a cord or chain 31, which passes over guide-pulleys 32 and from there passes to and is connected with a slide-valve 27^a in the lower or return duct 7. Said last-mentioned valve 27^a is preferably normally held in a closed position by means of a common spring 33. An electrical contact-spring 34 is fixed upon the inner surface of the return-duct 7 and projects into the path of the ears 15, carried by the return-ears, and whenever such a car passes said contact 34 it is pressed against another contact 35 and closes an electric circuit 36, in which is included an indicator in the form of an electric lamp 37. 38 and 39, respectively, indicate the ends of the said circuit, to which a common battery or other

source of current (not shown) is to be connected for supplying said lamp with current.

The operation is as follows: Air is to be supplied under pressure to the left-hand end of the outgoing duct 6, and then when one of the cars is passed therein and subjected to said pressure it will be quickly forced to the proper receiving-station, depending upon the relative position of the ears 15 upon the car and the corresponding guide 16 at the base of the receiving branch duct. As soon as the car reaches the proper receiving branch duct 4 its ears 15 will come in contact with the curved guide 16, and the said car will thereby be switched into the receiving branch duct, and about the same time said ears 15 will strike the downwardly-projecting lug 21 and close the adjacent valve 27 and compel all of the air to pass behind said car and force the same up the inclined branch duct 4, past the additional valve 27^c, and be delivered upon one of the tables 1, 2, or 3. The valves 27^b, that are arranged parallel with the ducts 4, will be moved diagonally into the ducts 6 by their corresponding actuating mechanisms, so as to more naturally deflect the pressure of air into and through the branch ducts to elevate the cars. The operators at the stations 1, 2, and 3 upon returning a car first load the same through the hinged door 17 and then open the door 29 and drop the car into the return-duct 5, an instant after the signal-lamp 37 indicates that another car has just passed the electrical contacts 34 and 35. The operators should watch this signal in order that there be no collision between the inserted car and another car traveling along the incoming duct 7. Opening the door 29 to the position in which it is shown in Fig. 8 also permits the spring-valve 27 to close, and thereby obstructs the incoming duct 7, so that the operators should be careful to always keep the door 29 closed, except immediately after inserting a car. The returning cars pass downwardly through the ducts 5 and pass from thence into the return-duct 7, and the doors 29 are closed to allow the pressure of air to draw the cars into the duct 7, after which they will be carried along by the continued current of air therein. The spring-valves 27^a in the duct 7 are normally open, so that other cars traveling along the duct 7 will not engage therewith.

I do not limit myself to the actual construction of details herein shown and described, as same may be varied by skilled mechanics without departing from the scope of my invention.

Having fully described my invention, what I claim is—

1. The herein-described pneumatic underground tube system, comprising the combined outgoing and incoming ducts, both contained within a single casing and connected by an air-passage at their outer ends; and

suitable branch receiving and sending ducts, connected to said outgoing and incoming ducts; substantially as specified.

2. The herein-described pneumatic underground tube system, comprising the combined outgoing and incoming ducts, both contained within a single casing and connected by an air-passage at their outer ends; and suitable branch receiving and sending ducts
10 connected to said outgoing and incoming

ducts, in combination with suitable valves; substantially as specified.

In testimony whereof I have signed my name to this specification in presence of two subscribing witnesses.

EDGAR ROBERTS.

Witnesses:

ALFRED A. EICKS,
EDW. M. HARRINGTON.