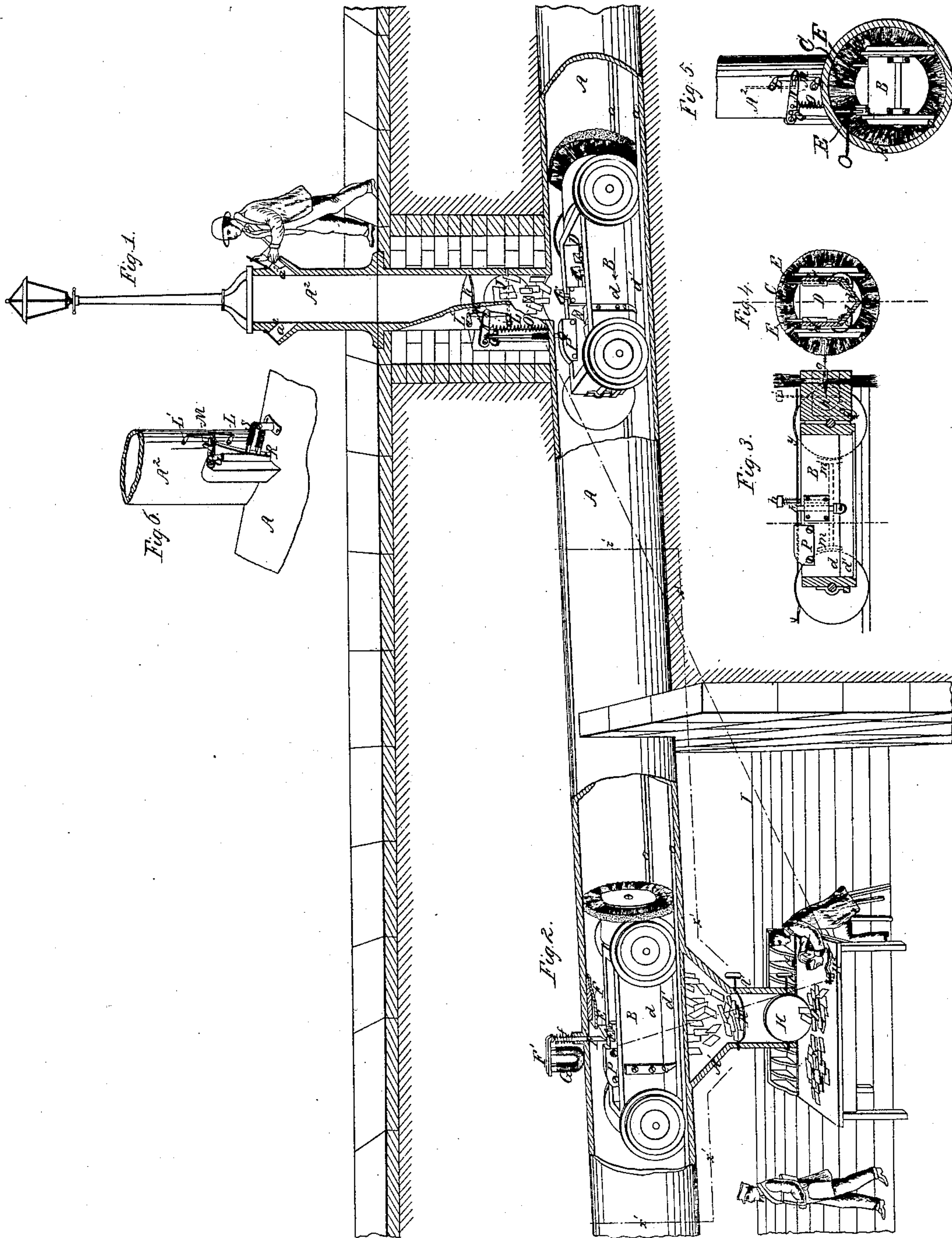


A. E. BEACH.

Receiving and Delivering Letters, &c.

No. 59,739.

Patented Nov. 13. 1866.



Witnesses;
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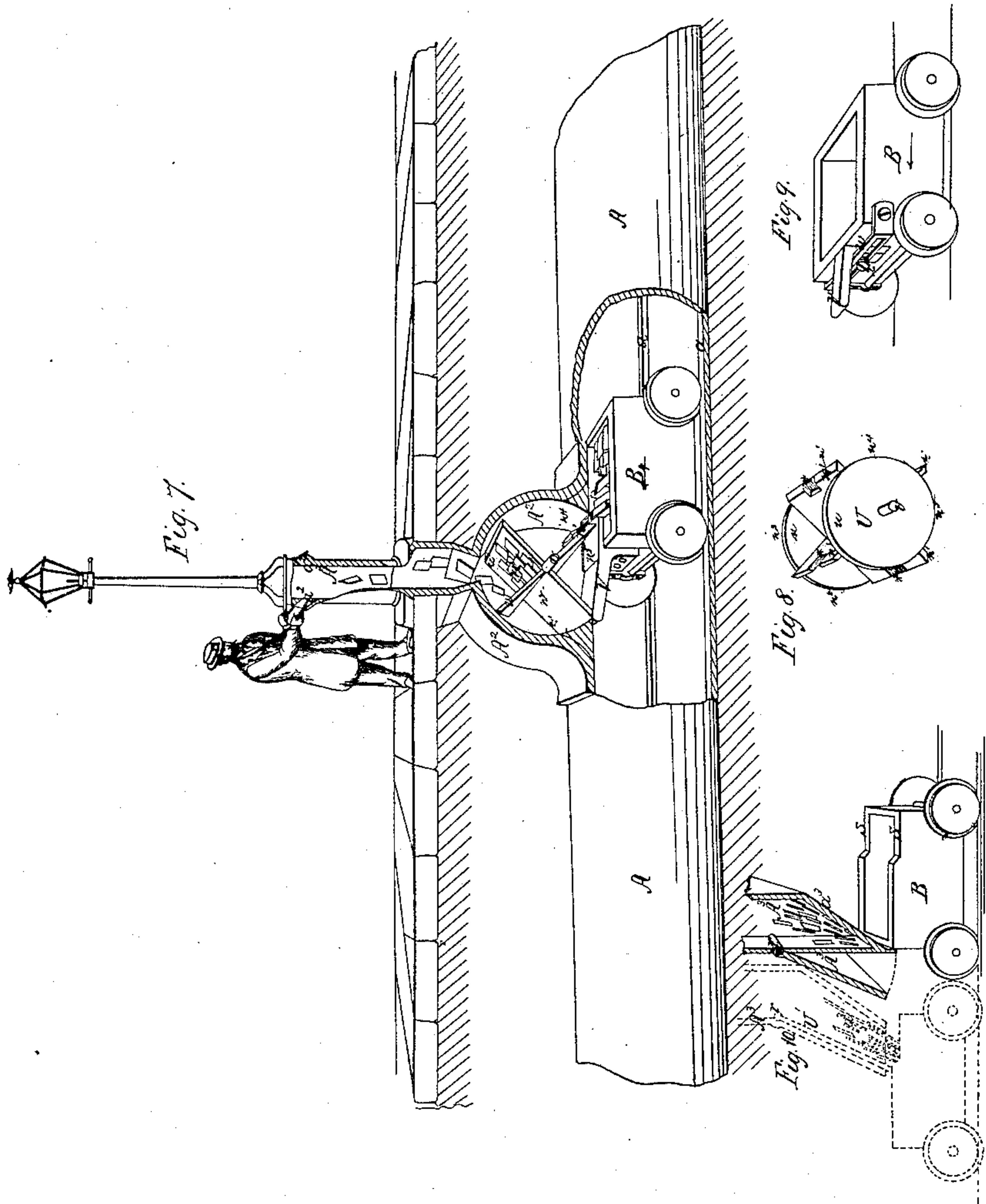
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UNITED STATES PATENT OFFICE.

A. ELY BEACH, OF STRATFORD, CONNECTICUT.

IMPROVED METHOD OF RECEIVING AND DELIVERING LETTERS, PARCELS, &c.

Specification forming part of Letters Patent No. 59,739, dated November 13, 1866.

To all whom it may concern:

Be it known that I, A. ELY BEACH, of Stratford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in the Collection and Delivery of Letters, Parcels, and other Freight; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

Sheet 1, Figure 1, represents a portion of the tube, car, and delivering apparatus. Fig. 2 represents a portion of the tube, car, and receiving apparatus. Fig. 3 represents a side sectional elevation of a car. Fig. 4 is an end elevation of the same. Fig. 5 is a cross-sectional elevation of the tube, car, and delivering apparatus. Fig. 6 is an elevation of a portion of the delivering apparatus, showing the application thereto of an electro-magnet. Sheet 2, Figs. 7, 8, and 9 illustrate the operation of the rotary or oscillating box-receptacle, and the action of the car in connection therewith. Fig. 10 illustrates the construction and operation of a swing-valve for discharging letters and freight from a receiving-box or depository into a car or conveyer.

Similar letters of reference indicate the same parts in all the figures.

The object of these improvements is to facilitate the collection, transportation, and delivery of letters, parcels, and other freight; and they are intended for use more especially in connection with tubes in which cars or conveyers or other receptacles for freight are made to travel.

First, my invention consists in so constructing the car or conveyer that at certain specified places on the route of the car or conveyer the contents, or a part thereof, will be discharged from the car or conveyer.

Secondly, my invention consists in so constructing the car or conveyer which carries the letters or freight and the depository or receiver wherein the letters or freight are deposited that when the car or conveyer passes near the receiver the freight therein contained will be transferred to the car or receiver.

Thirdly, my invention consists in so constructing the car or conveyer that it will both receive and deliver freight at given places or

stations, or will receive and not deliver, or will deliver and not receive, or will pass the stations without either delivering or receiving, all at the will of the operator.

Fourthly, my invention consists in the combination of an electric apparatus with the receiver, and also with the car or conveyer, and also with the tube or track, or with either of them, in such a manner that the car or conveyer may be caused either to receive or to deliver freight at given places, or to pass such places without delivering or receiving, at the will of the operator.

Fifthly, my invention consists in the employment of sundry new mechanical devices used in connection with the receiver, car, tube, and track, or with either of them, to be hereinafter more fully described.

There are various ways in which my present invention may be practically carried out. For example, it may be used in connection with the tube and conveyers described in the Letters Patent heretofore granted to me for improvements in the transportation of letters, parcels, &c.

In the said patent, although an endless trough or conveyer is generally mentioned, it will readily be understood that suitable separate boxes or cars might be substituted, if connected together and operated by an endless belt, rope, or cable, to which separate boxes or cars these present improvements could be readily applied by any person skilled in the art from the description hereinafter given. I therefore deem it unnecessary specially to describe the whole mechanism and devices mentioned in my said former patent, but will describe, as one example of the use of my present improvements, the application or employment thereof in connection with the pneumatic tube, in which air is the motor by which the freight-receptacles or conveyers are moved.

Referring to Sheet 1, A is a pneumatic tube, in which runs, upon track *a a*, a pneumatic car or conveyer, B, and C is the brush-valve thereof, attached to one end of the car. The tube, car, and valve may be of the usual construction, and the propulsion of the car by air is effected in the well-known manner, a description of which is here unnecessary.

The car may have a brush or other valve at either end.

A portion of the car is made hollow and

open at the top, so as to form a receptacle, D, in which letters, parcels, and freight may be deposited. The bottom or some other part of the receptacle is made movable, so that it can be opened and the freight discharged. In the present example the bottom is divided into two parts, *d d*, hinged to the sides *d' d'* of the receptacle. The bottoms *d d* are kept closed by springs *e e* attached to the sides *d' d'*, the lower ends of the springs being made to press upward against the underside of the bottoms and keep them closed. Upon the inside of each side *d'* there is a vertical sliding rod, E, the head of which forms an incline plane, and the lower end bears upon the inside of the bottoms *d d*, as shown. When the rods E are pressed down the bottoms *d d* open, and the freight is discharged. When the pressure is removed the springs *e e* close the bottoms and lift the rods E.

The discharge of freight will be more clearly understood by reference to Fig. 1, which represents a delivery-station on a supposed pneumatic-tube route. The car advances in the direction of the arrow, and at F, projecting from or into the tube A, are one or more inclined planes or studs, so constructed and arranged that as the car advances they will come in contact with and depress the rods E, which depression causes the bottoms *d d* to open, and the contents of the car or receptacle D are at once discharged. That portion of the tube A at the point where the discharge takes place is provided with an aperture and a discharge-pipe, A¹, into which the freight falls. This pipe is provided with two valves, H H¹, to permit the extraction of the freight and at the same time prevent the escape of air through the pneumatic tube. When the lower valve, H, is closed by the attendant the upper valve, H¹, is to be opened, and the freight will fall upon the lower valve. The upper valve may be then closed and the lower valve opened, whereby the freight will be discharged upon the table or other receptacle placed under the tube A¹. When the upper valve is closed the freight falls thereupon, and remains until it is opened for discharge, as described. The rods E are intended to be so made as to be readily removed from the car, or to be capable of being moved aside, and when so removed it is obvious that the bottoms *d* would not open on reaching a given place or station, because there would be no contact between the heads of the bolts E and studs F, and the car would pass such station without discharging its contents.

One or more sets of rods, E, or equivalent devices, may be employed upon each car, and each set may be arranged in different positions; and the studs F may be differently placed at different stations, a distinctive arrangement of studs being employed for each station, if desired.

If on starting a car from a given station the operator desires to make the car discharge at the next station, the rods E are so arranged

upon the car by him that they will come in contact with the studs F at that station and open the car-bottom; but if it is desired to have the car pass such station and discharge at the next station, then the rods E are correspondently arranged upon the car by the operator at the starting-station. In this manner the operator may cause the several cars to discharge their contents at such stations only as may be desired.

Instead of making the rods E removable, the studs F may be made removable and subject to the will of the operator at a given station, so that when the operator fixes the studs in proper position the rods E or equivalent devices upon the advancing car will strike the studs and discharge the contents of the car; but when the studs F are removed out of proper position no discharge from the car will take place.

A convenient method of operating the studs F or their equivalent devices so as to put them in or out of position, and thereby govern the discharge of the contents of the car at given stations at the will of the operator, consists in the employment of an electro-magnetic apparatus and one or more conducting-wires, with which the studs or equivalent devices are to be so connected that by the closing of the electric circuit the studs will be moved into or held in the proper position to cause the opening of the car-bottom.

The skilled mechanic will have no difficulty in so applying an electric apparatus as to accomplish the above-described purpose, and I shall therefore describe only one form for its application, although there are many forms that might be described as forming part of my invention.

Referring to Fig. 1, F' is a vertically-moving stud, the lower end of which passes through the tube A. The shank of the stud is girdled by a spring, *f*, to keep it in place. The upper end of the stud F' forms an armature of an electro-magnet, G. The electric wire I is shown in red.

At H², or any other convenient position subject to the will of the operator, is a circuit-key. When the electric circuit is closed by the operator the magnet G' and its armature or stud F' will be firmly held together, and the lower end of the stud F' will be thereby prevented from rising, so that the rods E upon the advancing car will come in contact with the stud F', and the contents of the car will be thereby discharged in the manner before described; but when the circuit is open, the armature or stud F' being no longer held by the magnet, the stud F' will not depress the rods E, and the car will pass the station or magnet without discharging its contents. One or more studs F' may be employed.

It will readily be understood that one or more electric conducting-wires I will be extended between the several stations upon the route of the cars or conveyers, and that the operation of the studs or any devices needed

for the control either of the discharging of the contents of the conveyers, or for the loading thereof, or the regulation of the speed thereof, or signalizing from one station to another, may be readily effected by means of the electric current passing through the wires.

The conducting-wires are to be laid or extended within the tube, by which they are protected and convenient access to them always afforded.

Another modification would consist in such an attachment of a stud to the car and such an arrangement of an electric device that the car itself would be made to open and close the circuit at the proper times.

The collection of the letters, parcels, or freight and the gathering thereof into the passing car or conveyer may be done in the following manner: Communicating with the tube A, and rising therefrom above the surface of the ground, is a receiving-tube or depository, A², which may form the base of a lamp-post. In the lower part of tube A² are two swing-valves, J K, and when there is no car or conveyer passing below tube A² the lower valve, J, is always closed and the upper valve, K, is always open; but when a car or conveyer approaches it operates both of the valves—opens the lower valve, and closes the upper valve. Passage of air through tube A² is prevented by these valves. These valves instead of being flat may be made of dish form, or in the form of boxes.

Letters or freight deposited through the aperture a² of the receiver fall down and remain upon the upper surface of the lower swing-valve J, upon the pivot-bar of which is a crank, L, which is connected by means of a rod, M, with a crank, L', upon the pivot-bar of the upper valve, K. Both valves are simultaneously operated by means of a rock-lever, N, one end of which is pivoted to a suitable standard and the other end is slotted and attached by a pivot through the slot to the connecting-rod M. When the lever N is pushed upward the lower valve opens and the upper valve closes. When the lever falls the lower valve closes and the upper valve opens.

Connected with the lever N is a spring, O, the pressure of which is so arranged as to pull down the lever N and keep the valve J always closed and the valve K open until some other force is applied to overcome the power of the spring and lift the lever N.

The lifting of the lever N is effected by means of an inclined projection or stud, P, which is attached to some part of the car or conveyer.

Pivoted to and extending from the lever N is a vertical rod, Q, the lower end of which passes through the tube A and occupies such a position therein that when the car or conveyer passes near the receiver A, the lower end of the rod Q will come in contact with and be lifted by the stud P upon the car, which lifting will close the upper valve K and open the lower valve J, and the letters and freight which were deposited upon the valve

J will, by the opening thereof, fall down into the receptacle of the car or conveyer, as shown in Fig. 2.

As soon as the car and stud have passed, the upward pressure upon the rod Q will be removed, and the pressure of the spring O will act in the manner described, closing the valve J and opening K, and any letters or freight which entered the receiver and rested upon the upper surface of valve K will now fall and rest upon the upper surface of valve J, ready for delivery into the next passing car or conveyer.

One or more studs, P, may be used upon each car, and the studs are intended to be removable at pleasure, so that the receiving-valves will be operated and the letters and freight collected when the car passes near the receiver, or not operated, according to the will of the operator who starts the car, and who places the studs P upon the car.

The arrangement and manipulation of the studs P and rods Q are intended to be substantially similar to the arrangement and manipulation before described in connection with the studs F and rods E.

The assistance of an electro-magnet is to be employed, when desired, in connection with the rods Q or studs P, substantially in the same manner and for the same purpose, as I have already described in connection with the rods E and studs F. For example, the pivot which connects the rod Q and the lever N may be provided with a spring, R, as shown in Fig. 6, the lower part of which spring serves as an armature for a magnet, S. When the circuit is closed, the magnet withdraws the spring, and thus pulls the pivot out of connection with the rod Q, the upper end of which being slotted may then rise without operating the lever N; and if a car passes the station when the pivot is thus withdrawn, no transfer of letters or freight will take place from that station into the car, because the valves J K will not be operated. Thus the collection of the letters and freight and the successive deposit thereof into the passing cars, or into any car appointed to collect freight from any appointed receiver, is readily and effectively accomplished.

Sheet 2 of the drawings illustrates a method of employing a rotating valvular box or receptacle arranged below the pillar, lamp-post, or other repository, and so constructed that when the car or conveyer passes under the said depository it will operate the said rotary box and cause its contents to be transferred into the car or conveyer.

In Sheet 2, Fig. 7 is a view, in part sectional, showing the method of operating the rotary box by means of the car, and the transfer of letters from the box onto the car without stoppage of the latter. Fig. 8 is a perspective view of the rotary box removed from its tube. Fig. 9 is a perspective view of the car, showing the nose and its mode of adjustment.

U is the said rotary valvular box or receptacle, of which *u* are the sides and *w* the par-

titions which divide the receptacle into separate receiving-compartments $u^2 u^3 u^4 u^5$, as shown. v is a central shaft, suitably mounted in the receiving-tube A^2 , on which shaft the box or receptacle U rotates.

The interior of the receiving-tube A^2 corresponds in form to the periphery of the circle described by the rotating box U .

Letters or freight deposited through the aperture a^2 of the pillar or lamp-post fall down into the uppermost compartment of the rotary box or receptacle U , and there remain until a car or conveyer approaches, when the front end or nose V of the car comes in contact with one of the partitions of the box and causes the latter to make a partial rotation, thereby dumping the freight contained in the said uppermost compartment of the box into the car, and at the same time carrying an empty compartment of the box upward under the receiving-tube A^2 , where it remains to catch any letters or freight that may be dropped through the aperture a^2 .

The rotary box is operated by the striking against its lower partition of a nose-piece, V , which is attached to the front of the car when it advances in the direction of arrow 4, as illustrated in Fig. 7.

The car in passing under the rotary box leaves the latter in such position that one of its partitions projects slightly below the roof of the tube A , so that the nose of the next advancing car will strike the said partition, rotate the box, and transfer its freight onto the car in the manner as before described.

The partitions of the box are so arranged that they serve as valves within the receiving-tube A^2 to prevent the air from passing either up or down through the tube A^2 , as will readily be understood by referring to Fig. 7.

The nose V is intended to project a little above the top of the car, and it may also be made adjustable, both vertically and laterally, upon the car, and also easily removable therefrom by means of slotted strap w and screw x , as shown in Fig. 9.

When it is desired to send the car through the tube without operating any of the boxes, the attendant either removes the nose V from the car, or lowers it so that it will not strike the partitions of the box, as before described.

By arranging the boxes upon different planes the nose of the car, when properly adjusted, will only strike and operate those boxes that are upon the lowest plane.

By another higher adjustment of the nose, the boxes upon the next higher plane will also be operated.

In some cases the extremities of the partitions may be cut out, as shown in red at $*$, Fig. 8, so that when the nose is laterally adjusted it will pass through said cut without operating the box. The cuts $*$ are to be covered by bristles or other light substance to prevent the leakage of air.

In the above manner, by a proper arrangement of the position or formation of the rotary

boxes with a proper adjustment of the car nose, any desired number of the boxes upon a given route of the pneumatic tube may be operated at the will of the director, and the collection of freight may be timed and regulated as desired.

Fig. 10, Sheet 2, illustrates a modification of my improvement, in which one side of the letter or freight receptacle A^3 is made movable, so as to form a swing-valve, U' . This valve is hinged at r to the receptacle A^3 , as shown, and in the hinge at r is a spring, which acts to close the valve U' , so that its lower end will rest against the lower edge of the inclined bottom a^3 of the receptacle A^3 , as shown.

Letters and freight deposited in the receptacle will rest upon said bottom, as shown, until the valve U' is opened, as shown in red. The letters and freight will then fall from the receptacle.

The opening of the valve U' is effected by the contact therewith of the front part of the car B , which pushes the valve forward into the position shown in red, and on the opening of the valve the letters and freight immediately fall into the car, as shown. The lower end of the valve rests upon the car and is held open by the car until the car has passed beyond the valve, when the spring at the hinge r causes the valve to close.

To prevent the escape or loss of any letters or freight the valve U' is allowed to close just before the car has advanced beyond the valve U . This is effected by having the rear portion of the car at s made lower than the front part of the car, so that the valve on reaching said lower portion will no longer be held open, and will consequently close, as illustrated in red, Fig. 10.

The devices which are used to discharge the freight from the car or to cause the passage of the freight from the receiver into the car may be operated by the weight of the car, or by contact with the car in any manner, or by electrical mechanism, or by the agency of the air-blast derived from the pneumatic tube when such tube is used.

My invention is not limited to any particular form of construction for any of the parts of the mechanism herein mentioned; nor to any particular method of propulsion or form of the car or conveyer. Such forms will be selected for use as the skill and experience of the constructor shall dictate, or as may be demanded by the nature of the place or the particular service in which my invention is to be employed.

In order to facilitate and insure the correct action of the mechanism in collecting and delivering the freight, the speed of the car may be reduced on passing the stations.

One method of reducing the speed of the car consists in having it so constructed that at certain points upon the route a portion of the valve of the car, or a portion of the car may be opened, so as to allow the air to pass by or through the car, thus reducing the pressure of

air upon the valve and causing the speed of the car to be reduced.

This construction is illustrated in Sheet 1, Fig. 3, and is shown by the red lines.

The rear part of the car and the valve is provided with an opening, *g*, in which is set a swing-valve, *h*, which, when opened, allows a portion of the air to pass through the valve and under the car, as shown by the arrows. When the valve is closed no air can pass through.

The opening and closing of the valve are effected by the striking of the head of the valve-rod *i* against a stud or projection arranged and operating in the tube at certain points in substantially the same manner as the studs *H* *H*¹, either with or without the electro-magnetic arrangement. By the foregoing means the car may be wholly stopped at the station when desired.

In connection with the above method of reducing the speed, the cars may be provided with suitable brakes *m*, so arranged that the head of a rod, *n*, connecting with the brake will, when the car approaches a receiving or delivering station, come in contact with a stud arranged in the tube in such a manner that the rod *n* will be pressed down and cause the brakes to press upon the wheels of the car, and thereby check the speed of the car until the freight has been received or delivered; after which, the rod *n* having passed the stud, the pressure of the brakes upon the car will be released, the rod being thrown up by a girdle-spring, *n'*.

In lieu of brakes the tube or track may be provided with longitudinal springs *y*, placed near the receiving and delivering stations in such a manner that the car-wheels will pass under the springs, which will press upon the wheels and check the speed of the car until the stations have been passed, when the springs no longer operating, the original speed of the car will be resumed. (See Fig. 3.)

Another method for arresting or reducing the speed of the car at the time of passing the receiving and delivering stations consists in enlarging the tube near said stations, as shown in red at *x' x'*, Fig. 1, so that the brush-valve *C* attached to the car will not wholly fill the tube, and the air will consequently pass by the car and valve without acting upon the latter

with full force, and in consequence of such reduction of impelling force the speed of the car will be diminished; but when the car has passed beyond the tubular enlargement the air will then again act upon the car with full force and increase the speed of the car to its maximum.

Each car may be divided into two or more compartments, with delivering mechanism connected with each compartment.

Having thus described my invention, the following is what I claim and desire to secure by Letters Patent:

1. The method, substantially as herein described, of automatically collecting letters, parcels, and other freight.

2. The method, substantially as herein described, of automatically delivering letters, parcels, and other freight.

3. The employment of the studs and rods, or their substantial equivalents, to operate the delivering and receiving mechanism, substantially as herein shown and described.

4. The employment of an electro-magnetic apparatus, in combination with the receiving and delivering mechanism, substantially as and for the purpose herein set forth.

5. The means herein described, or their equivalents, for reducing the speed, substantially as described.

6. In the collection of letters, parcels, and other freight, the employment of a moving box or receiver, *U*, or its equivalent, operating substantially as described.

7. The employment of the adjustable nose, or its equivalent, with the car, substantially as and for the purpose herein shown and described.

8. The combination of a swinging valve with the freight-receptacle, substantially as herein shown and described.

9. In the collection and delivery of letters, parcels, and other freight, the employment of the several mechanisms herein shown and described, or their substantial equivalents, operating separately or otherwise, substantially as herein shown and described.

A. ELY BEACH.

Witnesses:

WM. F. MCNAMARA,
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