(No Model.) 2 Sheets—Sheet 1.

R. GILLHAM.

PNEUMATIC CARRIER.

No. 303,834. Patented Aug. 19, 1884.

Fig. 1.

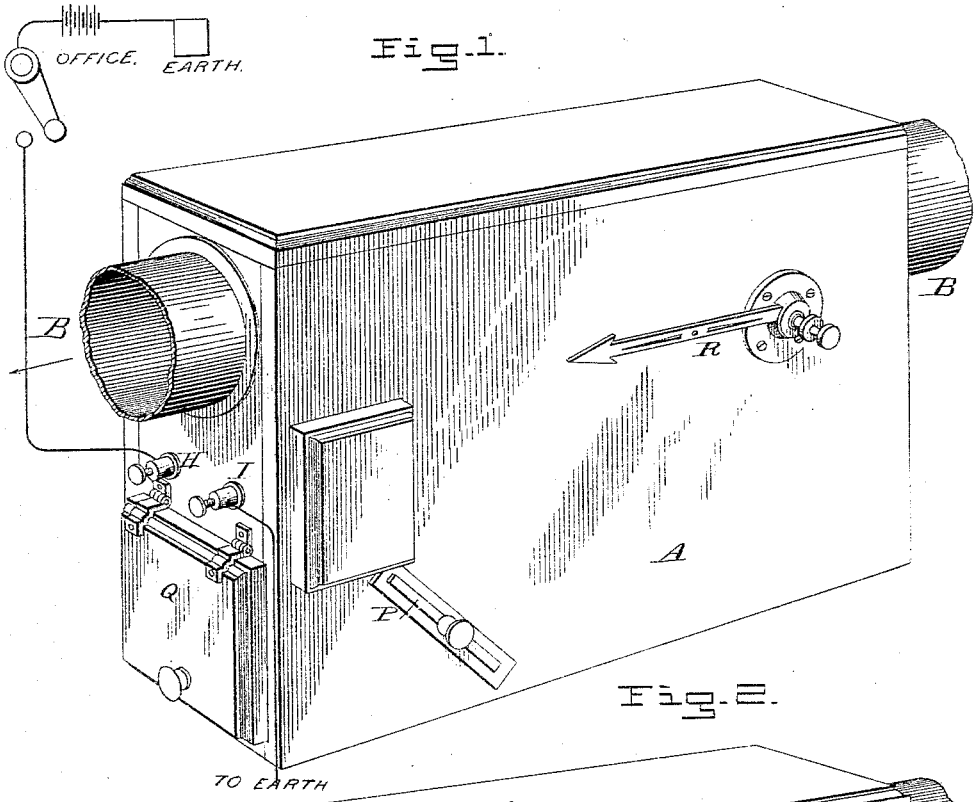
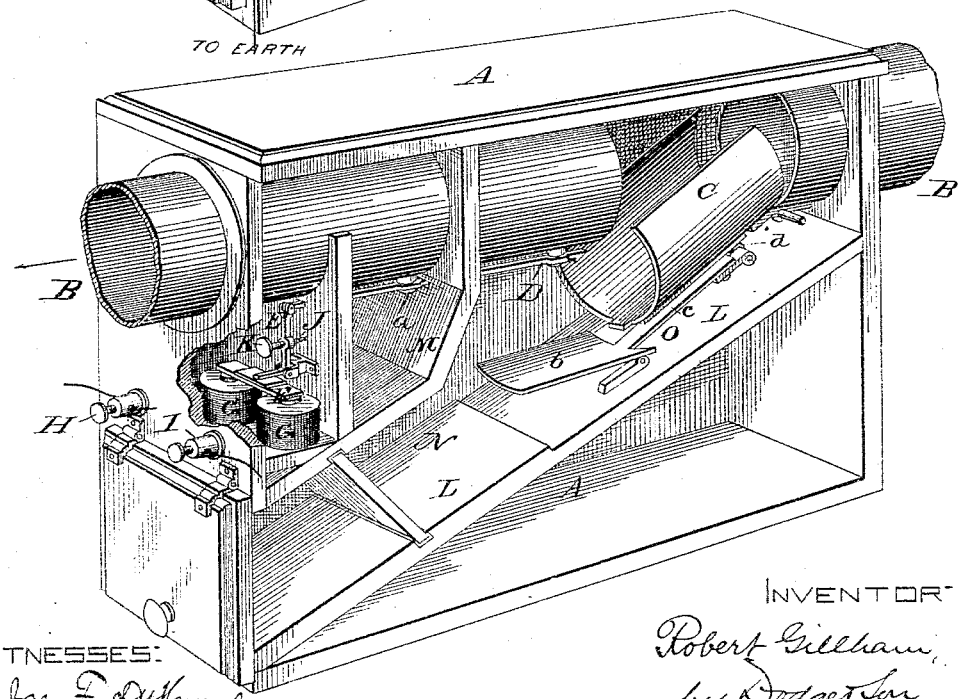


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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PNEUMATIC CARRIER.

No. 303,834. Patented Aug. 19, 1884.

Fig. 3.

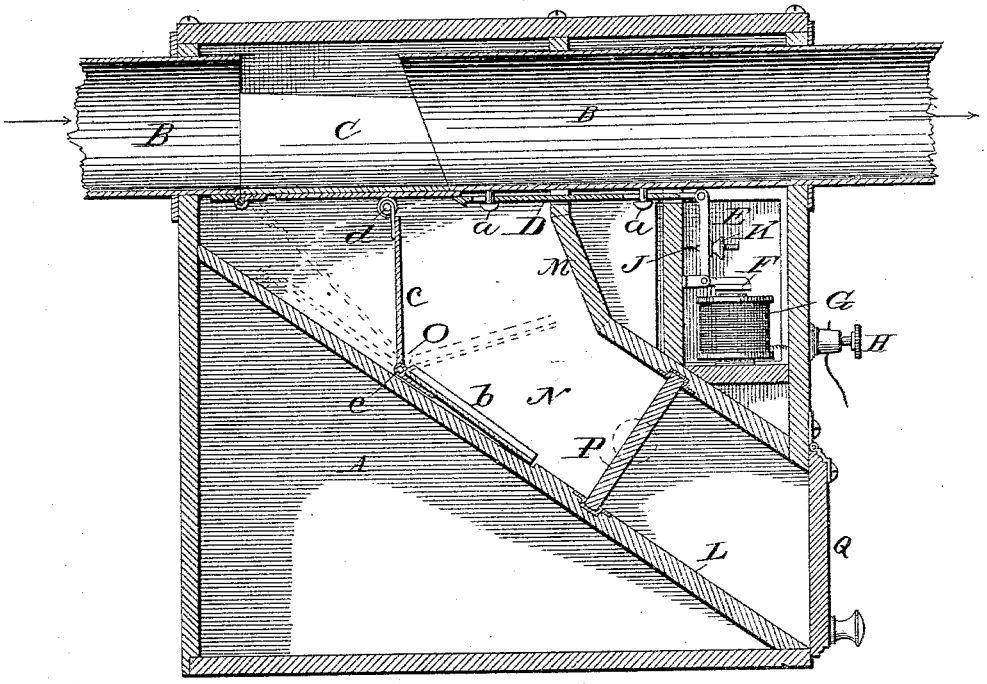
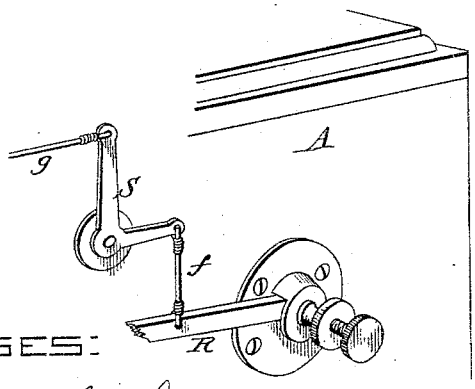


Fig. 4.



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UNITED STATES PATENT OFFICE.

ROBERT GILLHAM, OF KANSAS CITY, MISSOURI, ASSIGNOR TO THE PNEUMATIC CARRIER COMPANY, OF SAME PLACE.

PNEUMATIC CARRIER.

SPECIFICATION forming part of Letters Patent No. 303,834, dated August 19, 1884.

Application filed July 31, 1883. (No model.)

To all whom it may concern:

Be it known that I, ROBERT GILLHAM, of Kansas City, in the county of Jackson and State of Missouri, have invented certain Improvements in Pneumatic Carrier Systems, of which the following is a specification.

My invention relates more particularly to pneumatic carrier systems; but it is in a measure applicable also to other systems—as, for instance, inclined tracks or troughs.

The leading features of the invention are gravitating hinged sections, one for each station, a catch for retaining the same normally in line with the main tube or conductor, mechanism for effecting the release of the catch from a distance, a pivoted angular lever for automatically restoring the hinged section or bridge to its normal position, and an air-lock to prevent the escape of air in removing a carrier from the box, all of which features will be fully described.

In the annexed drawings, Figure 1 represents an exterior perspective view of a station-box; Fig. 2, a perspective view of the same with one side removed to show the interior; Fig. 3, a longitudinal vertical section through the box; Fig. 4, a perspective view showing a slight modification.

This invention is designed as a modification of or improvement upon that for which application for Letters Patent was filed, in the joint names of Albert Brisbane and myself, on the 19th day of March, 1883, Serial No. 88,715, in which, as in the present case, the opening of the bridge or gate of each station was effected or controlled, through the aid of electricity, by an operator at a distant or central station, and it is to be understood that any parts of said apparatus that may be necessary or desirable may be used in connection herewith.

Referring now to the drawings, A represents a station-box, and B the pneumatic tube or conductor entering at one end and passing out at the other, but divided at a point within the box, and having the separated ends set apart a distance equal to or slightly greater than the diameter of the tube or conductor, and connected by a bridge-piece, C, hinged or pivoted to the lower side of the tube or conductor, as shown. The bridge-section C is curved in the arc of a circle concentric with the tube or conductor, and of like diameter therewith, but is preferably cut away at the upper side, as shown, about one-quarter to one-third of the circumference being cut out. This still leaves the opening too narrow to permit the carrier to escape between the sides or edges thereof, and consequently prevents the carrier from being carried across the space between the ends of the tube or conductor when the bridge is dropped down, as otherwise might occur by reason of the inertia or momentum of said carrier. It is of course understood that a current of air will be produced through the tube by a fan or equivalent means, or that the tube or conductor will be inclined to cause the travel of the carrier through it in one direction, which direction is indicated in the drawings by arrows.

As stated, the bridge-piece or movable section C is hinged at the lower side of the tube or conductor B, and the hinge is located at the rear end of said section relatively to the travel of the carrier, so that when permitted to fall it forms a chute or incline downward from the tube toward the bottom of the box in the direction in which the carrier moves. This is for the purpose of directing the carrier downward into the box when the bridge or falling section is dropped down. The bridge or section C is retained normally in its horizontal position by a sliding catch, D, the forward end of which is beveled to permit the section C to crowd or press it back in rising to its seat. The catch or slide D is slotted and held in position by headed studs *a*, or may be carried in loops or guides, and is jointed at its rear end to the upright arm of an elbow-lever, E, the short arm of which carries a soft-iron armature, F.

Directly below the armature F is an electro-magnet, G, the helix of which has its ends in electrical connection with the binding-posts H I, which receive, respectively, the two branches of the line or circuit wire from a suitable battery. One branch of the wire is preferably grounded, as usual, to prevent unnecessary expense, and the other runs to one pole of a battery, the other pole being grounded to complete the circuit. As in the case above referred to, a

switch is provided at the main station, by which the circuit may be completed or broken, it being normally open in order that the magnet G may remain inert and not attract the armature F until it is desired to cause the bridge or section C to fall. Whenever the switch is closed so as to complete the circuit, the magnet becomes energized, attracts the armature F, which causes the elbow-lever to rock upon its pivot and to withdraw the slide or catch D against the tension of a light spring, J, which is furnished with a regulating-nut, K. The spring serves to return the slide to its locking position as soon as the attractive force of the magnet ceases, the circuit being completed for an instant only, merely sufficient time to insure the release and fall of the bridge C.

L represents an inclined floor or diaphragm, running down from a point just below the tube at one end of the box to the bottom of the box at the other end, and above this is a second board or partition, M, which, with the first, forms a funnel-shaped hopper or chute, N, extending from beneath the bridge C to the lower front end of the box A.

O represents an elbow-lever pivoted upon the bottom board or floor, L, having at one side of its pivot a concave or spoon-shaped plate, *b*, and at the opposite end an upright arm, *c*, which latter carries at its upper end an anti-friction roller, *d*. The upright arm is either inclined slightly out of a vertical position, or the roller *d* is set to one side of a vertical plane passing through the pivot *e*, so that when the bridge C is released it will fall by gravity, and in falling will carry back the arm *c* to the position shown in dotted lines in Fig. 3. In thus throwing back the arm *c* the concave plate or arm *b* is raised, as shown in dotted lines in said figure, in which position it is struck by the carrier, which enters the box A through the tube B, and, falling over the depressed bridge C, enters the hopper N. The weight and momentum of the carrier are sufficient to depress the plate or arm *b* to the position shown in full lines in Fig. 3, thereby of course raising arm *c*, the roller *d* of which runs along the under side of bridge-section C, advisably between suitable guides, and raises said section to its normal position. In rising the bridge-section forces back the catch or slide D, which immediately is pressed forward again beneath the section and locks it in position. As the parts are thus restored to their normal position, the carrier rolls over the spoon-shaped plate or arm and stops against a transverse gate or slide P which passes through one side of the box A and across the hopper or chute N, being fitted snugly in grooves or guides to prevent the escape of air past it.

Below the gate P, at the lower end of the box A, is a close-fitting gravitating door, Q. When the bridge C is depressed and the carrier caused to fall into the box A, the carrier runs down to and rests against the gate or slide P, which, being withdrawn, permits the carrier to roll down to the door Q. As a strong current of air is at the time passing through the tube, and as the open upper side of the bridge at all times affords communication between the tube and the interior of the box, the suction produced draws the door Q firmly to its seat, and holds it closed until the slide P is shoved into place, when, there being no longer any force to hold the door closed, it swings outward and permits the carrier to drop out. All entrance or escape of air to the interior of the box or tube from without is at such time prevented by the slide P. An indicator, R, is attached to the shaft or axle of bridge-section C, and serves to show outside of the box the position of the bridge within, and thus to notify the attendant when to operate the slide P.

In some cases it may be found inconvenient or undesirable to employ electricity for releasing the falling section, and in such cases a bell-crank, S, may be secured to the side of the box, or at other suitable point, and have one arm attached by a link or wire, *f*, to the indicator R, and the other connected by a wire, *g*, with a pull in easy reach of the operator at the central station. The bridge-section should be mounted upon pivot-points, or otherwise constructed to permit a free and easy movement of the section, and all other working parts should be nicely fitted and adjusted, to work freely, quickly, and with certainty.

The tube and internal working parts will preferably be made of brass, the case of wood with metal trimmings, and exposed metal portions will be plated, to give the whole a neat and handsome appearance.

It is of course to be understood that, while I do not claim herein anything in the application before referred to, this apparatus or any part thereof may be used therewith, as found desirable.

Having thus described my invention, what I claim is—

1. In combination with a pneumatic tube or conductor provided with a falling section, substantially as described, a catch arranged to lock beneath said section, and means, substantially such as described and shown, for withdrawing said catch from a distance.

2. In combination with conductor B and bridge or falling section C, latch D, lever E, connected therewith, and provided with armature F, and electro-magnet G, adapted to be placed in a battery-circuit, all substantially as and for the purpose set forth.

3. In combination with conductor B and falling section C, latch D, lever E, provided with armature F, spring J, and nut K, and electro-magnet G, all constructed and arranged substantially as shown and described.

4. In combination with a conductor and a hinged section thereof, a pivoted support beneath said section, provided with an arm, which

is raised by the falling back of the support into a position to be struck by the carrier passing through the conductor and dropping through the opening left by the depression of the falling section.

5. In combination with conductor B and bridge-section C, elbow-lever O, located beneath said section, and provided with arm *c* and plate *b*, substantially as set forth.

6. In combination with box A, tube or conductor B, provided with hinged section C, lever O, consisting of plate *b* and upright arm *c*, hopper N, slide P, and gravitating door Q, all constructed and arranged to operate substantially as explained.

7. In a pneumatic carrier or conveyer system, the combination of a box provided with an inclined chute or hopper, a conductor passing through said chute, and having a falling section therein, and an opening communicating with the interior space of the chute or hopper, a transverse gate across said hopper, and a gravitating door below the gate, all substantially as explained, whereby the carrier may be removed without permitting the entrance of air from outside the box and the gravitating door prevented from opening until the slide is closed.

8. In a pneumatic carrier, the combination, substantially as set forth, of box A, provided with hopper N, valve P, and door Q, conductor B and bridge C, latch D, lever E, provided with armature F, electro-magnet G, and lever O, provided with arm *c* and plate *b*.

9. In combination with conductor B and bridge C, lever O, provided with plate *b*, and upright arm *c*, having friction-roll *d* in rear of the vertical plane of pivot *e*, as and for the purpose explained.

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ALBERT BRISBANE.