

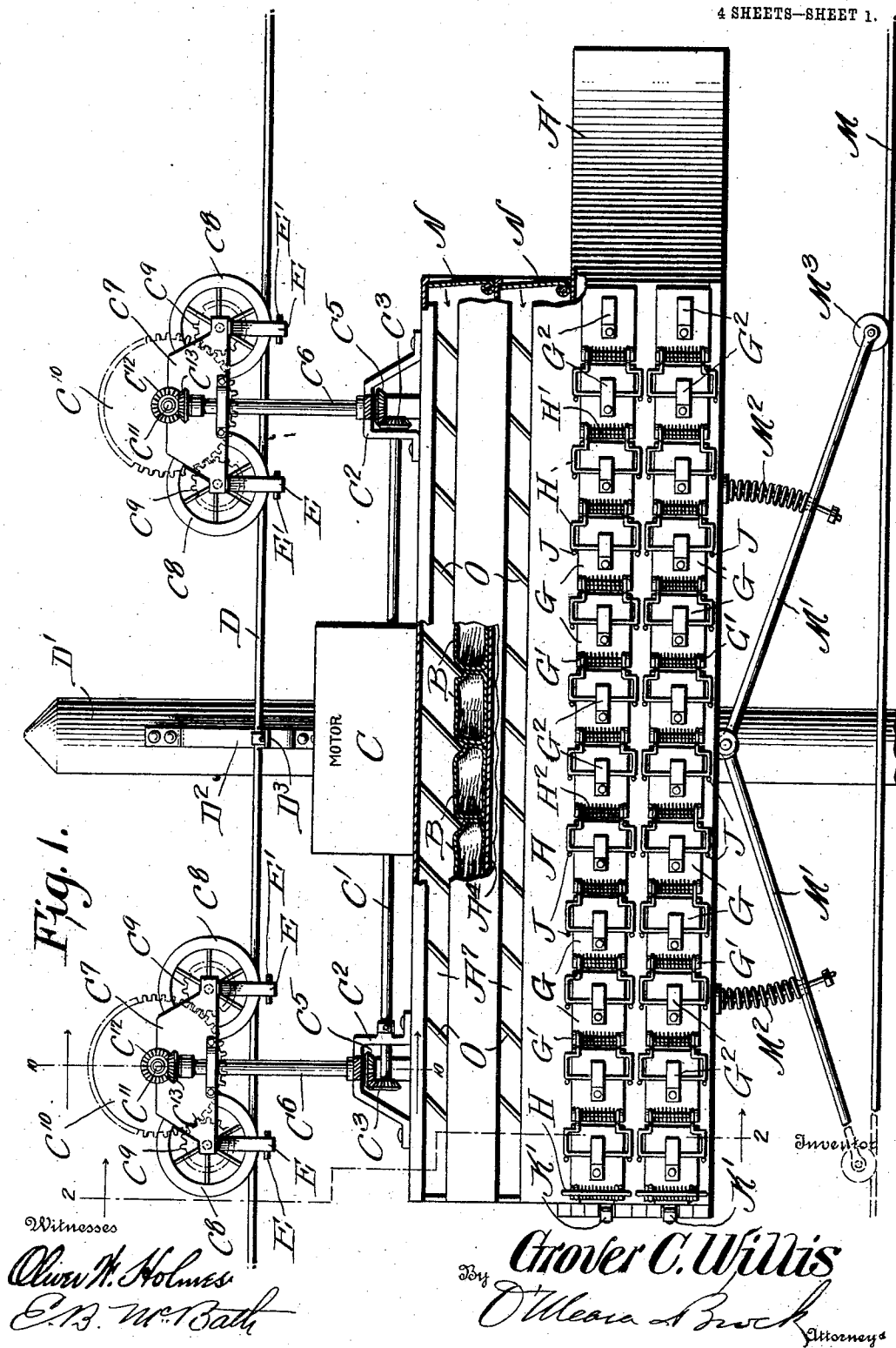
No. 869,121.

PATENTED OCT. 22, 1907.

G. C. WILLIS.
MAIL CARRIER.

APPLICATION FILED APR. 11, 1907.

4 SHEETS—SHEET 1.

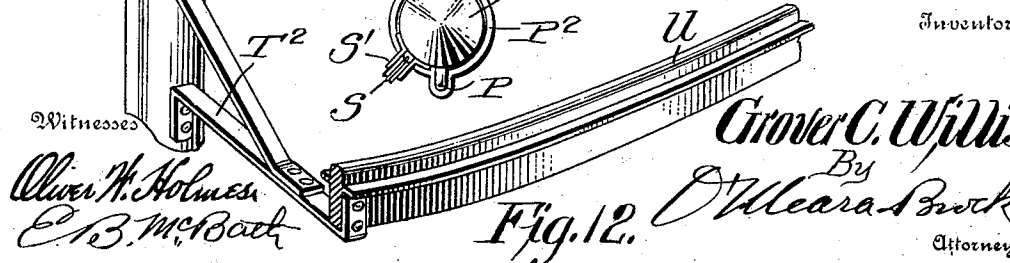
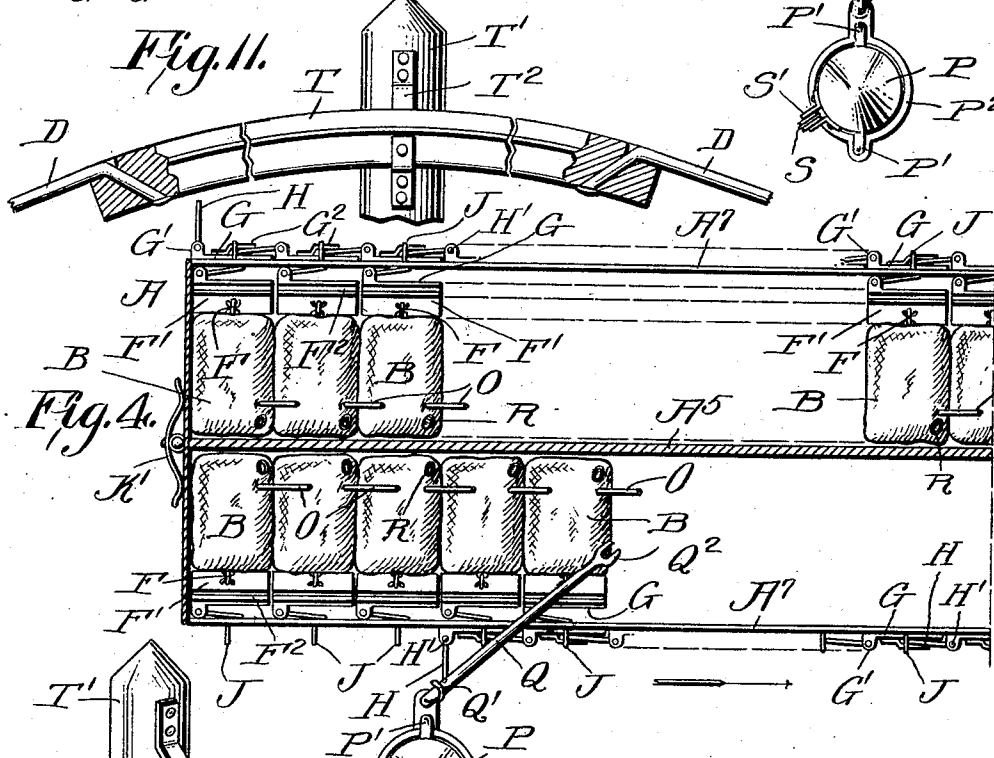
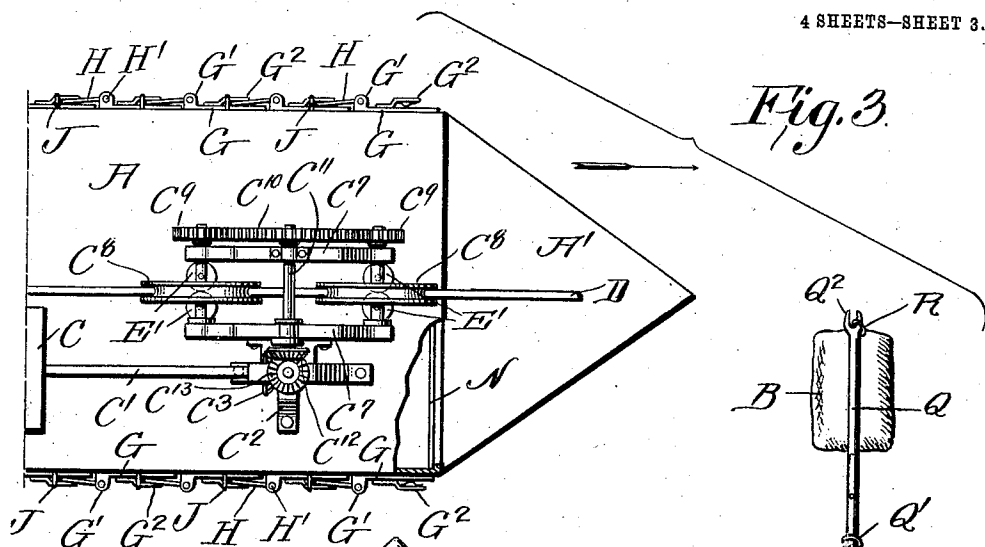


No. 869,121.

PATENTED OCT. 22, 1907.

G. C. WILLIS.
MAIL CARRIER.
APPLICATION FILED APR. 11, 1907.

4 SHEETS—SHEET 3.



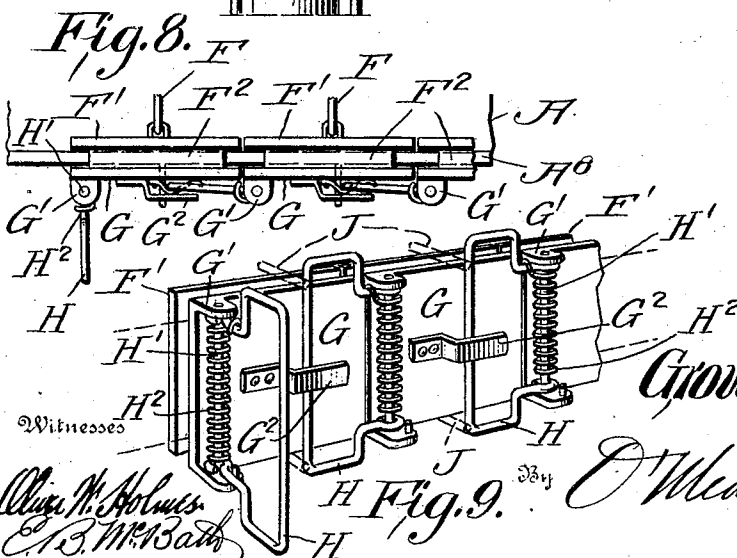
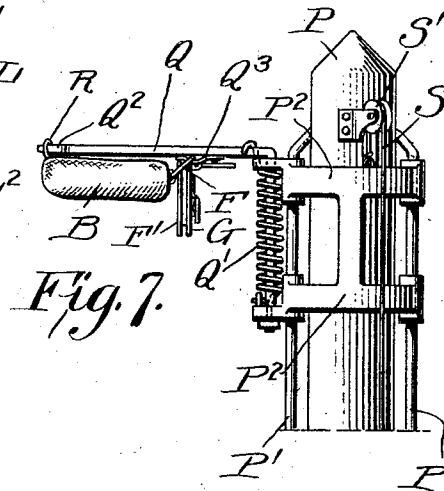
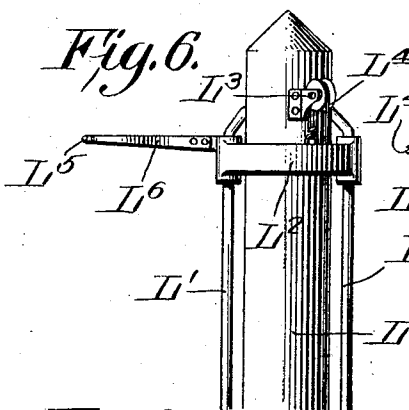
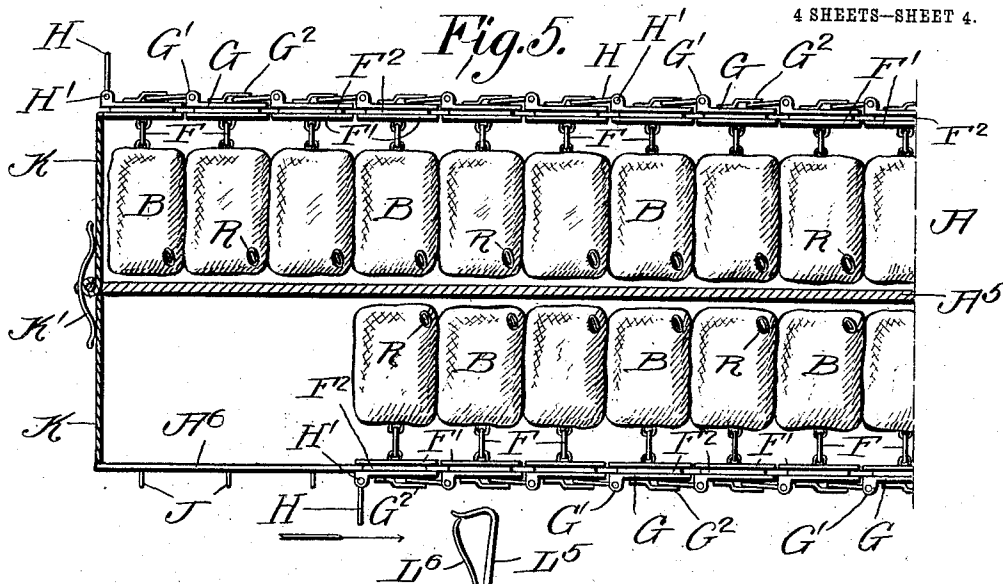
Witnesses
Oliver H. Holmes
E. B. McEach

Grover C. Willis,
By
O'Leary & Brock
Attorneys

G. C. WILLIS.
MAIL CARRIER.

APPLICATION FILED APR. 11, 1907.

4 SHEETS—SHEET 4.



Inventor

Grover C. Willis,

Witnesses

Oliver N. Holmes
E. B. M. Bath

Fig. 9.

O'Meara & Brock
Attorneys

UNITED STATES PATENT OFFICE.

GROVER C. WILLIS, OF VLIETS, KANSAS, ASSIGNOR OF ONE-HALF TO EDWARD HUTSON, OF VLIETS, KANSAS.

MAIL-CARRIER.

No. 869,121.

Specification of Letters Patent.

Patented Oct. 22, 1907.

Application filed April 11, 1907. Serial No. 367,499.

To all whom it may concern:

Be it known that I, GROVER C. WILLIS, a citizen of the United States, residing at Vliets, in the county of Marshall and State of Kansas, have invented a new and useful Improvement in a Mail-Carrier, of which the following is a specification.

This invention relates to a mail carrier for use upon rural routes.

The object of the invention is an automatically traveling carrier which will deliver at predetermined points along its route a sack of mail and which will also collect and bring back to its starting point empty sacks.

I am aware of the fact that a number of devices of this character and intended for the same purpose have been designed and in some cases tested. It has been proposed to propel devices of this nature by means of small electric motors placed within the carrier which traveled upon a track above which ran a trolley line from which the motor derived power. Such devices have not proven satisfactory in the sections where they have been tested for the reason that during the winter the coating of ice upon the trolley line would seriously interfere with the operating of the device serving to insulate the trolley wheel from the wire. The device, therefore failed to operate at the season of the year when the routes were usually in the worst condition and such a carrier was most needed. Another objection to devices of this kind, that is the electrically propelled carriers, was that they were only operable when used in a section or started from a station where electrical power was available and when extended into districts in which such power is not available they became inoperative as will be obvious. Devices of this kind have also been employed in which the mail matter was placed loosely into the compartments and simply dumped into a receiving box. This also was objectionable as in order to prevent damage, to the delivered mail from exposure to the weather it was necessary to provide complicated and expensive boxes which would automatically open to receive the mail and then automatically close to protect the same. A more serious obstacle has also been encountered where efforts have been made to operate a carrier previously suspended from a wire cable and in which the delivery mechanism was regulated by variously arranged triggers, each delivery station being provided with a special trigger which would aline only with a certain finger carried by the mail carrier. Devices of this kind however, have been found impracticable especially in the open western sections of the country, for when exposed broad-side to high winds the carrier would incline to one side by reason of the wind pressure upon it thus throwing the various triggers and fingers out of their proper alinement and the mail matter would either not be delivered at all or if delivered would in some cases be dis-

charged at the wrong point, thus causing much complaint and making it necessary to abandon such service. Devices have also been constructed in which two separate carriers were necessary only for the purpose of delivering mail while a separate carrier was provided especially for the purpose of collecting mail. This of course, increases the cost of the service and places an unnecessary expense upon the same.

This invention consists of a carrier to be driven by a small gasoline engine and provided with lower compartments adapted to receive sacks of mail and upper compartments designed to receive sacks *en route*, which sacks may be either empty or filled with out-going mail matter.

The invention consists also of spring operated rings carried by each sack and constructed so that when the sacks are placed in the carrier to be delivered to places upon the route each ring will be locked in a folded position and held by the ring of the adjacent sack with the exception of the last sack in the carrier, the ring of which will also extend outwardly in position to be gripped by a suitable crane placed at the point of delivery.

The invention consists also of the novel features of construction hereinafter fully described, pointed out in the claims and shown in the accompanying drawings, in which,

Figure 1 is a side elevation of the carrier showing a portion of a track supporting post, a portion of the side of the carrier being broken out and showing in section sacks which have been collected upon the route and are being returned to the main station. Fig. 2 is a section on the irregular line 2-2 of Fig. 1. Fig. 3 is a plan view of the forward end portion of the car, a small corner being broken away at the top and showing in plan view a post and crane carrying a mail sack to be collected by the carrier, the carrier traveling in the direction of the arrow. Fig. 4 is a horizontal section taken through the rear portion of the carrier and illustrating the manner in which sacks are collected from the delivering crane. Fig. 5 is a horizontal section through the rear end portion of the machine, said section being taken through the lower compartment showing in plan sacks to be delivered and showing also in plan view a receiving post with crane in position to catch one of the rings and withdraw one of the sacks from the carrier. Fig. 6 is a detail perspective view of the upper portion of a receiving post. Fig. 7 is a perspective view of the upper portion of one of the delivering portions of one of the delivering posts showing a sack in position thereon to be gathered by or delivered into the carrier. Fig. 8 is a detail plan view of plates carried by the sacks and illustrating the manner in which the spring actuated rings are locked in a folded position. Fig. 9 is a detail perspective view of said plates and rings, sides of the car being indicated in

dotted lines. Fig. 10 is an enlarged detail view illustrating the manner of driving the car, the track, a sleeve and other portions being shown in section. Fig. 11 is a detail view in elevation partly broken away and partly in section illustrating a track construction. Fig. 12 is a detail perspective view showing construction of the track upon a curve.

In constructing my carrier I employ a car body A, which is constructed with upper and lower decks, the lower deck having a forwardly projecting wedge-shaped portion A', at the front end thus reducing resistance of the air to the passage of the carrier.

The two decks are formed by a horizontal partition A² which divides the car into upper and lower compartments and these compartments are further sub-divided by horizontal partitions A³ and A⁴ and by a central vertical partition A⁵. From an inspection of Fig. 2, it will be obvious that over these partitions divide the two decks into four lower and four upper compartments each of which extends the length of the car, two of the lower ones being upon one side of the car, and two upon the opposite side. Two of the upper compartments are also upon one side of the car and two upon the opposite side. The four lower compartments are designed to receive sacks B, containing mail matter to be delivered at various points along the line while the four upper compartments are designed to receive sacks either empty or containing mail matter from various places along the line. These various compartments will therefore be distinguished as delivery and receiving compartments. The carrier or car is not provided with solid sides but on the contrary each side of the car is provided with slots A⁶ and A⁷, the slots A⁶ opening into the delivery compartments and the slots A⁷ into the receiving compartment the slots A⁶ being slightly wider than the slots A⁷.

Upon the car is mounted a motor casing C which contains a gasolene motor of any desired type. As the construction of the gasolene engine is not material and as not part of this machine as invented by me, I have simply designated upon the drawings, the casing containing the engine and have not shown any part of the engine itself. This engine operates a horizontally arranged shaft C' journaled adjacent itself in suitable bearings or brackets C² and carrying at the ends beveled gears C³. Vertically arranged shafts C⁴ also journaled in the brackets C² have at their lower ends beveled gears C⁵ which mesh with the gears C³. The shafts C⁴ extend upwardly through sleeves C⁶ which at their upper ends carry hangers C⁷ in which are journaled a flanged or grooved wheel C⁸ the shafts of which carry a gear wheel C⁹ which meshes with a larger gear wheel C¹⁰ mounted upon a shaft C¹¹ also carried by the hanger C⁷ and which also carries a smaller beveled gear C¹² meshing with a beveled gear C¹³ carried by the upper end of one of the shafts C⁴. The wheel C⁸ runs upon a suitable track D which is supported from posts D' being carried by brackets D². Throughout the greater portion of the route the track D is formed of a heavier wire or cable but at certain points where a flexible cable would not serve the purpose, a rigid track section is provided as will be hereinafter described. To hold the wheel C⁸ upon the track D I provide depending angled spring arms E which depend from opposite sides of the hanger C⁷ their angled lower end portions extending inwardly, and upon these end portions are

mounted in a horizontal plane rotatable disks E' which normally travel either in touch with each other or so closely together that the wheel C⁸ cannot lift from the track D, a sufficient distance to clear the flanges without being checked by the upper faces of the rollers or disks E coming into contact with the track. These disks spring apart as they pass the brackets D² thus riding around the brackets.

It will be obvious from the above description, that the car is suspended from the track D by the mechanism just described and by means of this gearing is positively driven in the desired direction and that moisture or a thin coating of ice upon the track will not prevent travel of the car. In order to arrange for the accurate delivery of the various sacks placed in the car at the starting point at their proper destination each sack is secured by a link F to a plate F'. The width of this plate is slightly greater than the width of the slots A⁶, so that when the sacks are arranged transversely in any of the lower compartments with the plates F' resting vertically against the sides of the car, they will not be drawn through the said slots.

To each of the plates F' is secured a parallel plate G, the two plates being spaced apart by a small block F² which block fits in the slot A⁶. This block F², therefore by having the plates F' and G secured or formed upon its opposite faces becomes practically a flanged block sliding in the slots A⁶ and capable therefore of movement only in the direction of the said slots. The plates G have outwardly projecting lugs G' formed thereupon and mounted between these lugs is a loop or ring H. This ring is not necessarily in the form of a circle nor is it necessary that it should be formed of one piece of metal and in fact, I have shown the rings H as being formed of an irregular rectangular-shaped loop pivotally mounted upon a shaft H' carried by the lugs G' and a coil spring H² is arranged around the shaft and one end bears upon the loop or ring H. Therefore, in referring hereafter to the part H as a ring it will be understood that the term is used in a broad sense and that the construction above described and very clearly shown in Fig. 9 is the preferred form. Each plate G also carries a spring catch G² the object of which is to grip and retain a ring carried by an adjacent plate. I also place along the sides of the car and adjacent the slots A⁶ pins J and the rings H are shaped so that a portion of the ring is of greater width than the plate G and when folded against one of said plates projects above and below it thereby engaging pins J above and below the slot in which the block F² rests. As soon however, as a ring is released from engagement with one of the springs G² and is forced by its spring into a position at right angles to the plate G or in what I will term in open position it clears all of the pins J. The rear end of the lower compartments are provided with outwardly opening hinged doors K² engaged by springs K' which normally hold the doors closed. A receiving post L carries parallel vertical rods L' grouped around the post and a collar L² encircles the post and slides upon the rods L'. The pulley L³ is carried by the upper portion of the post and a cord L⁴ is attached to the collar and comes over the pulley and thence downwardly within easy reach of the party to receive the mail. The collar carries a crane or arm L⁵ which is bent to form a hook member at its free end and is also

provided with a spring L^5 secured at one end to the arm or crane and having its free end adjacent the point of the hook member.

The party operating the mechanism just described, elevates the collar by drawing upon the cord L^4 to the proper height. This places the crane in position to engage a ring H. In order that the delivery of the sacks may be fully understood and to make clearer the object of some parts already described, it will be necessary to explain in detail the arrangement of the sacks in the carrier before it is started from the main station.

All mail to be delivered to a crane upon any particular receiving post is placed in the same sack and the sacks are then placed in the car by inserting them into the proper compartments through one of the doors K, allowing the block F^2 to enter and slide along one of the slots A^6 . The sacks are arranged in the car in the reverse order of the receiving stations along the route or in the reverse order in which the sacks of any particular compartments are to be withdrawn from it. Two of these four compartments are upon opposite sides of the car and will, therefore, deliver sacks to receiving posts placed respectively upon the right and left hand sides of the track D. It will also be obvious that receiving posts could be arranged directly opposite each other one upon the right-hand side and one upon the left hand side of the track and each would receive its proper sack, the post upon the right hand side receiving a sack from the right hand compartment and the post upon the left hand side receiving a sack from the left hand compartment. There are also an upper and a lower delivery compartment upon each side of the car, and consequently a crane intended to extract a sack from the upper compartment would be elevated slightly above a crane intended only to extract a sack from the lower compartment. The receiving posts, therefore, would be divided into two classes those upon the right hand side of the track and those upon the left hand side and these classes would be sub-divided into shorter and higher posts, and the sacks would therefore be arranged in each of the four compartments in the reverse order in which the posts of each class were arranged along the route.

As the various sacks are placed in the car in their proper order and the blocks F^2 slip to the front of the car the ring H of each sack will be folded down upon the plate G of the succeeding sack and the catch G^2 will slip over and engage said ring and hold it in folded position against the tension of its spring H^2 . All the rings will therefore be lying flat against the plates G and each ring will be in engagement with two vertical alining pins J which positively prevent any rearward slipping of the sack as long as the ring is folded against the side of the car or upon the plate G. The last sack placed in the compartment, however, will have its ring extending outwardly at right angles to the body of the car, for the reason that being the last sack there is no succeeding sack upon whose plate G the ring could be folded and clamped. Therefore, as the car starts out upon its route the last sack in each compartment will show a projecting ring in horizontal alinement with the proper crane. As the car passes the first receiving post, which we will assume to be upon the right hand side and arranged to extract a sack from the lower compartment, the ring of the last sack upon the right hand side

and in the lower compartment will be gripped by the crane, as will be obvious from Fig. 5 and the sack will, therefore, be held stationary while the car with the other sacks will proceed along the track.

The door K, will be forced open and the block F^2 will be released from the slot A^6 as the car passes, thus leaving the sack suspended upon the crane. This movement which is in reality upon the part of the car and not upon the part of the sack which as above stated, remains stationary, has exactly the same effect however, as if the car was stationary and the sack was drawn rearwardly, the block F^2 sliding in the slot. It will be obvious that such rearward sliding of the block F^2 would disengage the catch G^2 from the ring and the preceding sack which ring as soon as it became disengaged would spring into open position and will in a like manner be gripped and the sack extracted by the next crane in position to engage the ring.

The object of the pins J will now be plain since they make it impossible for a sack to be disengaged from its proper place in case a catch G^2 should be a little stiff or bent to stick, as without these pins failure of the catch G^2 to immediately release the ring H, engaged by it might result in the throwing out of an extra sack. The pins J, however, effectually prevent any sticking of one sack to the other and make it impossible for any ring to assume an open position until disengaged from a catch G^2 . In order that no swaying of the car by reason of a side wind which will prevent the proper picking out of the various sacks I arrange a wire M, below the track D and parallel thereto. Arms M' are pivoted upon the under side of the car and are pressed downwardly by springs M^2 . These arms carry rollers M^3 suitably grooved which travel upon the wire M and thereby serve to steady the car and prevent the lower portion of it swinging out of a true perpendicular. It will be understood therefore that the wire M, has no other object and is not intended as a support for the weight of the car. This wire may of course be supported in any suitable manner and as it is not intended to support the car need not be as spring or as securely supported as the track D.

The upper compartments also four in number are designed to receive sacks from various parts of the route and return them to the main station. These compartments open at the front instead of the rear being provided with hinged doors N which open inwardly and downwardly, as shown by the arrows in Fig. 1. These compartments also carry a plurality of rearwardly and downwardly projecting pins O. The delivery post P, is similar to the receiving post L being also provided with guide rods P' upon which travel two collars P^2 connected together, being practically a cut-out sleeve and these collars are provided with suitable loops in which are journaled an angled arm Q, normally held in the proper position by the coil spring Q' . The arm Q has its end bifurcated as shown at Q^2 and is provided upon its under side with a spring clip Q^3 . Each mail sack is provided at the end opposite the link F with a ring R and the sack is placed in position upon the arm Q, by engaging the ring R with the bifurcated portion Q^2 and a link F engages the spring clip Q^3 . Then by means of a cord S and pulley S' the collar is hoisted to the proper height and the spring Q' holds the arm Q in the path of the car. It may be well to

note here that one of the main differences between the receiving crane or arm L⁵ and the delivery arm Q is that the first is fixed whereas the last mentioned is pivoted so as to swing in a position parallel to the path of the car but is normally held by the spring Q' at right angles to said path.

When a car approaches the sack will strike one of the doors N according to height of the delivering post and the sack will enter the proper compartment the arm Q entering one of the slots A⁷. When the sack reaches the end of the compartment or comes into contact with another sack it will be stopped and as the car moves on, the arm Q will be partially rotated against the tension of the spring Q' and the sack withdrawn from engagement with the arm, as shown in Fig. 4. The downwardly and rearwardly projecting pins O will prevent displacement of the sacks and will also prevent the arm Q from accidentally displacing other sacks previously deposited as the pins O are arranged so as to permit the sacks to be freely slipped into place but afterwards tend to prevent their being moved in any direction which would result in their being removed from the car.

It will be obvious that upon curves and grades a wire track would not answer the purpose as the car must run steady as it approaches and passes a receiving and delivery post. To avoid any possible danger of failure to deliver the proper sack or failure to collect the sack, I construct wherever necessary solid sections of track, using the said form to distinguish between a flexible wire or cable track and one formed by one or more overhead rails. The manner in which a straight rail section could be interposed at various portions of the cable track is so obvious that no description or illustration of the same will be required. I have therefore shown these solid rail sections as used at two points where they are absolutely necessary, that is, where the track rises or falls and where it curves. It will be obvious that the cable could answer the purpose only upon straight sections. In Fig. 11 I have shown a rail section T, which is connected at each end to the usual wire track D. The section T is supported by posts and brackets T' and T². In this construction the car passes upon the track section T, upon which it rides in ascending and descending a sudden rise. Returning to the cable when the grade again becomes comparatively level. In Fig. 12 I have shown a solid track section U, forming a portion of the curve and to which the cable portions of the track would be connected at each end the same as in Fig. 11. It is believed that both of these constructions are clearly shown on the drawings. In describing the mail sacks in detail, I have referred to plates F' and G connected and spaced apart by a block F² thereby practically providing a flanged block. It will be perfectly obvious that this flanged block may be formed in one piece, the plates simply representing the inner and outer faces of the block respectively, or the device may be with equal accuracy referred to as a block having grooved edges.

For convenience of description and to avoid a multiplicity of terms, the said construction will be referred to in the claims simply as a block or as a flanged block which term will be construed to mean a construction substantially as shown in detail in Figs. 8 and 9.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A device of the kind described comprising a car having slotted sides, mail sacks having blocks sliding in said slots, rings carried by the blocks, and receiving cranes to engage the rings. 70
2. A mail carrying car having slotted sides, mail sacks having rings, means connecting the rings and sacks and extending through the slot, and means for locking said rings in folded position against the sides of the car, until a predetermined time. 75
3. A car having a slotted side, mail sacks, a flanged block connected to each sack, and slidable in the slot, a spring pressed ring carried by the outer face of each block and adapted to lie against the face of an adjacent block, and a catch carried by each block adapted to engage a ring of an adjacent block. 80
4. A mail carrier having longitudinally slotted sides, rearwardly opening doors, sacks having flanged blocks secured to the sacks and slidably held in said slots, spring pressed rings carried by the outer faces of the blocks and a catch carried by each of said outer faces. 85
5. The combination with a mail car having rearwardly opening end doors, longitudinally slotted sides, and projecting pins, adjacent the slots, of mail sacks, flanged blocks connected to the sacks and fitting in the slots, rings carried by the blocks, springs normally holding the rings at right angles to the car, and catches carried by the blocks adapted to engage the ring of an adjacent block and lock same against the face of the block, said ring engaging two of the pins while so locked. 90
6. The combination with a rearwardly opening car longitudinally slotted, of sacks having blocks working in the slots, rings carried by the blocks, a receiver comprising a crane adapted to engage one of the rings, and means for successively bringing the rings in position to be engaged by the receiver. 95
7. The combination with a car, of sacks arranged thereon in reverse order to which they are to be selected, rings carried by the sacks, means for retaining all but the last ring in a position parallel to the side of the car, and a crane arranged adjacent the path of the car to engage and hold the last ring. 100
8. The combination with a car opening rearwardly and longitudinally slotted, of sacks arranged in the car and transversely thereto, and in reverse order of delivery from the car, a block loosely connected to each sack, said block fitting in the slot, a spring pressed ring carried by the block, said ring normally extending outwardly, a catch carried by each block adapted to grip a ring of an adjacent block, a crane adjacent the path of the car in position to catch a free ring and means carried by the car to prevent rearward movement of any sack other than that engaged by the crane. 105
9. In a device for delivering mail a sack, a block connected to said sack, said block being flanged to provide grooves upon its edges, a spring pressed ring carried by the outer face of the block, the spring normally throwing the ring into the position at right angles to the block, and a catch carried by the outer face of the block and adapted to receive the ring of another block and hold the same against the face of the block, upon which the catch is mounted as and for the purpose described. 110
10. A device for delivering and collecting mail comprising a car longitudinally slotted and divided into upper and lower compartments, the lower compartments carrying mail to be delivered and having doors opening rearwardly and the upper compartments receiving mail collected and having doors opening inwardly and at the front end of the carrier, and a plurality of pins carried by said upper compartment, said pins extending downwardly and rearwardly, the sides of both the upper and lower compartments being longitudinally slotted, as and for the purpose set forth. 115
11. A mail carrier divided into mail delivery and mail receiving compartments, the sides of said carrier being longitudinally slotted, the mail delivery compartment opening rearwardly and the mail receiving compartment opening at the end of the carrier, means arranged in the path 120

of the carrier for engaging and successively removing sacks carried by the delivery compartments, means arranged adjacent the path of the carrier for delivering sacks to the receiving compartments, and means carried by said receiving compartment for holding the sacks delivered to the compartment against accidental withdrawal as and for the purpose set forth.

12. A carrier of the kind described having a motor thereon, an overhead track, a shaft journaled upon the top of the carrier and provided with beveled gears, vertically mounted shafts provided with bevel gears at their lower ends meshing with the beveled gears of the first mentioned shaft, sleeves supporting the carrier and inclosing the ver-

tical shafts, hangers carried by the said sleeves, flanged wheels mounted on the hangers and traveling upon the overhead track, means for driving said wheels from the vertical shafts, a wire arranged below the path of the carrier and in vertical alinement with the overhead track, spring pressed rods pivotally connected to the under side of the carrier and pressed downwardly, and rollers carried by said spring pressed rods and traveling upon the wire, as and for the purpose set forth.

GROVER C. WILLIS.

Witnesses:

W. W. BEATY,

W. W. CARLSON.