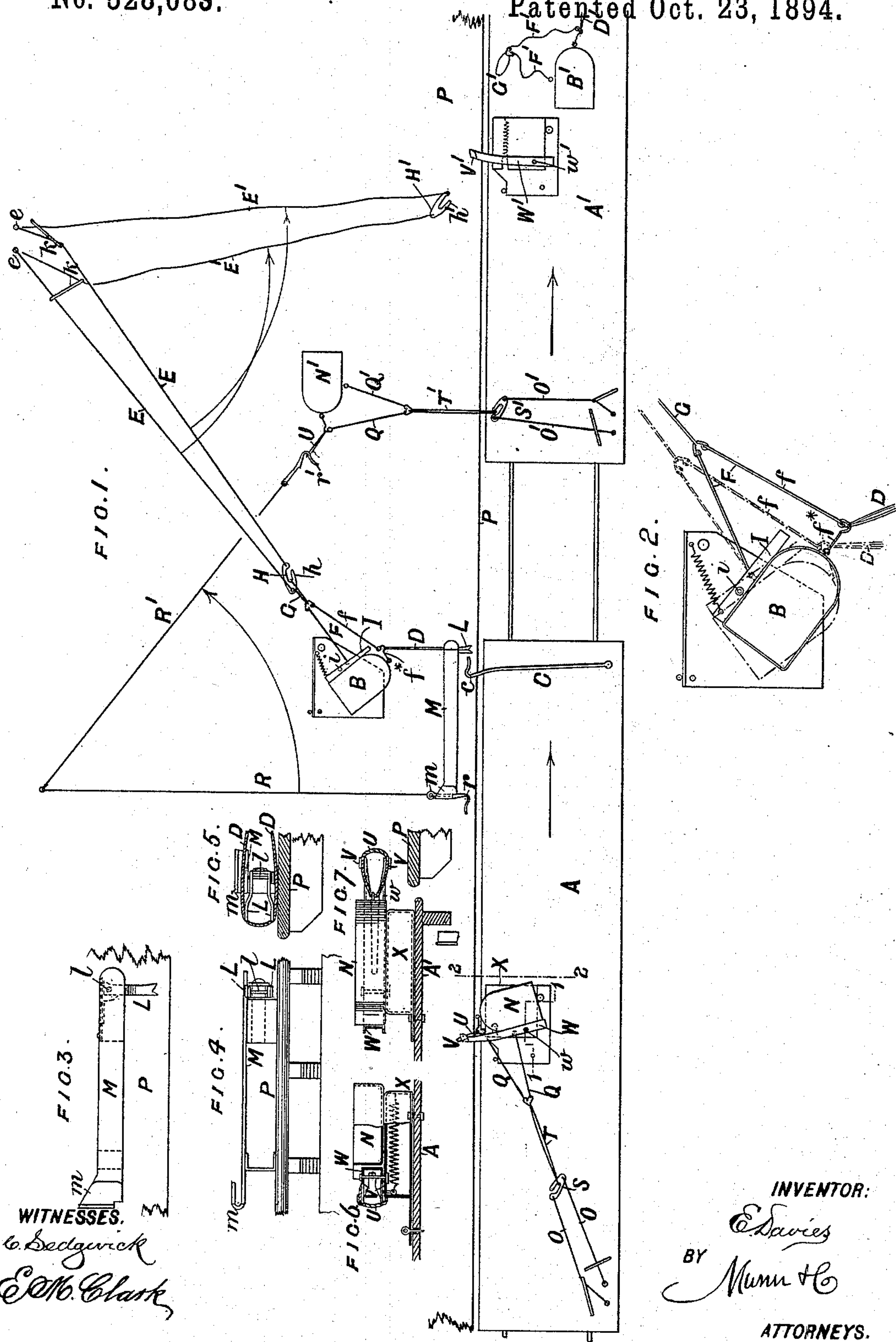


(No Model.)

E. DAVIES.
APPARATUS FOR DELIVERING MAIL BAGS TO OR FROM TRAINS IN
MOTION.

No. 528,083.

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WITNESSES.
C. Sedgwick
E. M. Clark

INVENTOR:
E. Davies
BY
Munn & Co
ATTORNEYS.

UNITED STATES PATENT OFFICE.

EDWARD DAVIES, OF NEAR STOURBRIDGE, ENGLAND.

APPARATUS FOR DELIVERING MAIL-BAGS TO OR FROM TRAINS IN MOTION.

SPECIFICATION forming part of Letters Patent No. 528,083, dated October 23, 1894.

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To all whom it may concern:

Be it known that I, EDWARD DAVIES, farmer, of Whittington Hall Farm, near Stourbridge, in the county of Worcester, England, have invented new and useful Improvements in Apparatus for Delivering or Transferring Mail-Bags or other Parcels from or to Trains in Motion, of which the following is a full, clear, and exact description.

My invention relates to apparatus for transferring mail bags and other parcels to and from a railway train in motion, and it has for its object to provide means whereby these operations may be performed without concussion and consequent liability of injuring the contents of the bag or parcel, and it consists essentially in means whereby the parcel is constrained to move in such a path that its transfer to or from the train in motion will be effected, and while being so transferred it will be caused to gradually acquire, or gradually cease to partake in, the traveling motion of the train so as when finally landed on the train, or at the roadside, as the case may be, it will come gradually to a virtual state of rest. To accomplish this result the parcel is controlled throughout its transit to or from the train so as to impart the desired direction and varying velocity of motion, the control being exerted both from the roadside and from the train conjointly. The means by which this control is effected and the desired direction and varying velocity of motion are imparted, comprises two main members, the one attached to the mail car and the other attached to the roadside platform, acting conjointly on the parcel. These two members act as radius links and their relative arrangement is such that, during their conjoint action on the parcel, the pull of the one member is always approximately at right angles to that of the other. These members will hereinafter be distinguished as the delivering and receiving members respectively, irrespective of whether the delivery is effected to or from the train. Generally the parcel would be supported in its transit by sliding on a platform, means being in each case provided whereby the parcel is connected and disconnected at proper times with the said controlling devices. Theoretically the pull of the receiving member should com-

mence at the instant when its connection with the parcel is effected, which takes place when the said member is at right angles to the direction of motion of the train, but in practice this condition cannot be fulfilled and hence the parcel is liable to be subjected to a sudden jerk which it is the object of one of the present improvements to avoid.

The object of another improvement is to provide means whereby the disconnection of the delivering member from the parcel after the transfer has been completed is effected automatically by the motion of the delivering member itself.

Reference is to be had to the accompanying drawings, forming part of this specification, wherein I have represented the mail car in two positions which it successively occupies in traveling in the direction of the arrow past a parcel receiving and delivering platform, both the operations of delivering and picking-up a parcel by the mail car being illustrated in Figure 1. Fig. 2 is a plan view, on a larger scale, of the connections with the parcel by which the first pull is rendered gradual. Fig. 3 is a plan, Fig. 4 an elevation, and Fig. 5 an end view of the device by which the loop of the parcel to be picked up by the car is held distended and in position to be engaged by the hook of the receiving member on the car and also by which the hook of the receiving member on the platform is held in position to engage the loop on the parcel to be delivered by the car. Fig. 6 is a sectional elevation, on line 1—1, and Fig. 7 is a section, on line 2—2, of the parcel platform and fence on the car, drawn to a larger scale.

I will describe the operations of picking-up and delivering a parcel in the order in which they occur, and will therefore first describe the means employed in picking-up a parcel from the roadside platform, and as in each operation the same parts are shown twice, namely, in their initial and final positions, I will distinguish the final positions of the parts by the addition of a numeral to the reference letters. Thus A A' is the mail car and B B' is the parcel to be picked up, in their initial and final positions, and so on for the other parts.

The receiving member is composed of two

parts C and D whereof the part C is a rod or rope pivoted at one end to the floor of the car as near as possible to the front end and off side thereof, while its other end terminates in a hook *c* projecting from the side of the car in position to engage in the part D which is a loop of rope attached to the parcel B and held distended by a suitable appliance hereinafter described, in position to be caught by the hook *c*, the two parts C and D when thus connected acting as a radius link. The part C if a rigid rod is held yieldingly by a spring but if a rope be used its hook *c* may be held by a clip similar to that *m* hereinafter described for the hook *r*. In any case it is preferred that the part C should be pivoted near the opposite side of the car to that at which the parcel enters, in order that the pull shall be in the direction most favorable for bringing the parcel into the car. It is necessary before any pull can come on the parcel that the slack of the loop D be taken up and in order to effect this and so minimize the suddenness of the subsequent pull on the parcel, the loop D is not attached to the parcel in the direct line of pull but is so connected thereto that when the pull commences to take effect it acts indirectly on the parcel, in such manner that the latter is swung round upon itself under the control of the delivering member, the effect being that the parcel does not swing on its center of gravity but acquires a preliminary motion which is partially rotatory and partially one of translation, whereby its inertia is to some extent overcome before it receives the complete motion of translation which it acquires when the pull of the receiving member acts directly upon it.

The delivering member is constituted by a pair of ropes E, a hooked cross-piece H, a V-shaped sling F, and a connecting loop G. The ends of the sling F are permanently attached to the parcel, so that this sling and the attached loops D and G accompany the parcel in its flight. The one end of the sling is connected to the parcel near the rear end thereof, and the other to the front end, the connecting loop G being at the apex of the sling, while the loop D is connected to the part *ff*^x of the sling at an intermediate point in its length, situated at a short distance from the front end of the parcel. In the initial position of the sling the part *ff*^x of the sling is straight, as shown in dotted lines in Fig. 2, and as the loop D is attached at an intermediate point and the pull upon it is in a direction nearly at right angles to the part *ff*^x, the first effect of the pull after the slack of the loop D is taken up is to shorten the effective length of the part *ff*^x of the sling, as shown in full lines in Fig. 2, and so cause the parcel to be slued round. To permit of this sluing motion of the parcel and keep the sling F taut and ready to act, the parcel is held against a fence I, pivoted at *i* and acted on by a spring in such manner as to allow the fence to yield when the combined pull

of the two radius links comes upon it. This fence is pivoted upon a base plate fixed on the roadside platform P.

The delivering member and its automatic disconnecting device are as follows: The part E of this member is composed of two ropes made fast to and working about different centers *ee* and connected at their other ends to the opposite ends of a cross bar H provided with a hook *h* with which engages the connecting loop G. The relative position of the centers of motion *ee* is such that at different points in the angular motion of the ropes E the position of the hook *h* varies with regard to the direction of the pull of the loop G, the initial position being such that the loop G is pulled into the hook *h*, the mouth of the hook *h* becoming so directed as the final position of the delivering member is approached, that the loop G slips out of it. This occurs when the ropes E are about at right angles to the railway, and the change of position of the hook is brought about by stops *kk* on the platform against one of which the one rope E abuts when in its initial position, so that this rope is deflected from the straight line and its effective length thus shortened, while when in the final position E' this rope is free from the stop and extended to its full length at the same time that the other rope abuts against the other stop and its effective length is shortened.

The device by which the loop D is held distended so as to be caught by the hook *c*, consists of a D-shaped frame L, shown in Figs. 3, 4 and 5, pivoted about a vertical axis *l* on a supporting frame M fixed on the platform P near its edge, the ends of the arms of the distender L being notched for the loop D to lie in, the loop D passing completely around the distender, as shown. The distender stands normally at right angles to the railway in such a position that the hook *c* will pass between its arms and so catch the part of the loop D which lies across the arms of the distender. The distender is held in position by a spring applied against its heel end, the position of the distender with regard to the parcel being such that the loop D is extended at right angles to the railway, as shown. The effect of this arrangement and of the two radius members acting conjointly on the parcel throughout its flight, and exerting a pull at about right angles to one another, is that the parcel is acted on gradually, both as regards the initiation, the change of direction, and the arrest of its actual or relative motion, as the case may be.

I will now describe the operation of delivering a parcel from the car and although the parts are similar in construction and operation to the foregoing I will, to avoid confusion, refer to them by different reference letters, the parts in their initial and final positions being indicated by the same letters with a distinguishing numeral.

N is the parcel to be delivered. The de-

5 delivering member is constituted by a pair of
 ropes O, a sling Q, and a connecting loop,
 while the receiving member is a rope R, ter-
 minating in a hook *r* which is held in a clip
 10 *m* in position to engage with the loop at-
 tached to the parcel, the rope R being kept
 taut by a shoulder on the hook *r* abutting
 against a notch in the clip *m*. The other end
 of the rope R is made fast to a point on the
 15 platform about which the link works as a
 center, the rope in its initial position stand-
 ing at right angles to the railway, as shown.
 The pair of ropes O work about two fixed
 points situated near the rear end and off side
 20 of the car, the relative effective lengths of
 these ropes being varied at different points
 in their angular motion by stops which de-
 flect them as previously described in respect
 of the ropes E on the platform, so that it is
 unnecessary to again describe them in detail.
 The hooked cross-bar S connected to these
 ropes and the sling Q are also similar in con-
 25 struction and operation to H and F before
 described, the only differences being that
 whereas in the present case the length of the
 ropes O is necessarily limited by the width
 of the car a longer loop T is used to connect
 the sling Q to the hook *s*. The loop U is held
 30 distended by a forked distender V which is
 somewhat similar to the distender before de-
 scribed but is formed on the end of the fence
 W against which the parcel rests. This fence
 is pivoted at *w* and is acted on by a spring
 which tends to keep the ropes O, loop T, and
 35 sling Q, taut but yields when the pull of the
 rope R acting on the sling Q through the
 loop U causes the parcel N to move round
 upon itself, the loop U being attached to the
 sling Q in the same position as the loop D
 40 was attached in the first described arrange-
 ment. In practice the same loops are used
 both for picking-up and delivering, the loops
 being shifted accordingly, D and T being the
 same loop while G and U are also the same
 45 loop although lettered differently to distin-
 guish their different functions. The parcel
 N rests upon a raised platform X upon which
 the fence W is pivoted the platform X being
 at a higher level than the roadside platform
 50 P which is in turn slightly higher than the
 floor of the car. Where the two operations
 of delivering and picking up are performed
 in close proximity, as here represented, the
 hook *r* is held at a higher level than the dis-
 55 tender L so as to pass clear over it, the rela-
 tive positions of the various appliances be-
 ing such that the parcel B is drawn from the
 platform P before the parcel N is delivered
 to the platform P.
 60 It will be obvious that suitable apertures
 must be provided in the side of the mail car
 for the ingress and egress of the parcels and
 their connections, which apertures would be
 closed by vertically-sliding shutters, and in
 65 order to avoid danger to the attendants within
 the car the latter might have two floors, the
 parcels being delivered from and received in

the space between the floors to which access
 would be had by trap doors in the upper floor
 on which the attendant stands.

70 The operation of the apparatus as a whole
 is as follows—it being supposed that the par-
 cel, N, is to be thrown off or delivered from the
 mail-car, and the parcel, B, is to be picked up
 by or delivered to a mail-car, at the same way-
 75 side station: Assuming the mail-car to be in
 the position indicated by letter, A, in Fig. 1, and
 to be traveling in the direction of the arrow,
 the first operation is the picking up of the
 parcel, B. This is effected by the hook *c* en-
 80 gaging the part of the loop D which is dis-
 tended over the fork L whereupon loop D be-
 comes detached from fork L and as soon as
 the slack of the loop D is taken up C and D
 act together as one member through which by
 85 the continued advance of the mail car a pull
 is transmitted to the parcel B. The first ef-
 fect of this pull is, owing to the mode of at-
 tachment to the parcel, to slue the parcel
 round upon itself and cause it to advance
 90 slightly in the direction of its ultimate flight,
 as shown in Fig. 2 after which the parcel is
 dragged along by the car acting through D
 and E, any centrifugal tendency of the parcel
 in its flight being under the control of the de-
 95 livering member E, the two ropes composing
 which swing through the arcs indicated by
 the arrows in Fig. 1. The connection of the
 delivering member with the parcel is main-
 tained until said member E swings to a posi-
 100 tion about at right angles to the railway at
 which moment the hooked bar H connecting
 E to the loop G of sling F has assumed such
 a position relatively to the direction of the
 pull on it that the loop G slips off the hook.
 105 By this time the parcel will have been safely
 landed within the mail car. This action has
 just taken place by the time the mail car
 reaches the position A'. The length of the
 sling F and loop G is sufficient to admit of
 110 the parcel being so landed and disconnected
 without the hook bar being permitted to ap-
 proach so near to the car as to risk fouling
 it. Meanwhile during the picking up of the
 parcel B the throwing off or delivery from
 115 the car of the parcel N will have been in
 progress, that is to say, when the mail car
 has advanced so far that the hook *r* of re-
 ceiving member R engages the loop U where-
 upon by the continued motion of the mail
 120 car the slack of said loop is taken up the par-
 cel is first slued round on itself and then
 swung outward by the pull of the link or
 member R under the control of the delivery
 member O, until on the car reaching the po-
 125 sition A' the disconnection of loop T' from
 hooked bar S' takes place and the parcel is
 landed, as shown in Fig. 1, stationary on the
 platform, which will then be quite clear to
 receive it, the parcel B having by that time
 130 been picked up as above described.

I claim—

1. In apparatus for transferring parcels to
 and from a train in motion, the combination

with the parcel, with the mail car and with a roadside platform, of two main members adapted to act conjointly as radius links in directions at about right angles to each other, 5 the said links being respectively attached to centers fixed respectively on the car and on the roadside platform, and of means of automatically making and severing connection of the said links with the parcel, the said links 10 and connections being arranged to operate substantially as specified.

2. In an apparatus for effecting the transfer of a parcel to or from a train in motion, consisting of two main members acting conjointly as radius links attached to centers on 15 the car and roadside platform respectively, and means of automatically disconnecting the delivery link from the parcel, said means consisting of a hook adapted to be engaged 20 with the parcel, said hook being formed on a cross bar attached at its opposite ends to two flexible connections constituting the delivery link, said connections being attached to different centers so as by their conjoint 25 action on the hook to vary its position with regard to the line of strain, as specified.

3. In an apparatus for effecting the transfer of a parcel to or from a train in motion, consisting of two main members acting con-

jointly as radius links attached to centers on 30 the car and roadside platform respectively, the combination with the parcel and with the delivering and receiving links, of a sling attached to the parcel and to which the receiving link is connected at a point such that 35 the direction of the initial pull on the parcel will not pass through the center of gravity of the parcel, as specified.

4. In an apparatus for effecting the transfer of a parcel to or from a train in motion, 40 consisting of two main members acting conjointly as radius links attached to centers on the car and roadside platform respectively, the combination with the delivery member or link, and its means of automatic disconnection 45 from the parcel sling, of a pivoted spring fence for holding the delivering member taut and in readiness to act, substantially as described.

EDWARD DAVIES.

In presence of—

HENRY RICHARD JOHN DENTON,
St. Mark St., Wolverhampton, Iron-Founder, &c.

ALFRED DUDLEY,
85 Knox Road, Blakenhall, Wolverhampton, Clerk.