A. C. McCORD.

DEVICE FOR DELIVERING MAIL FROM FAST MOVING CARS.

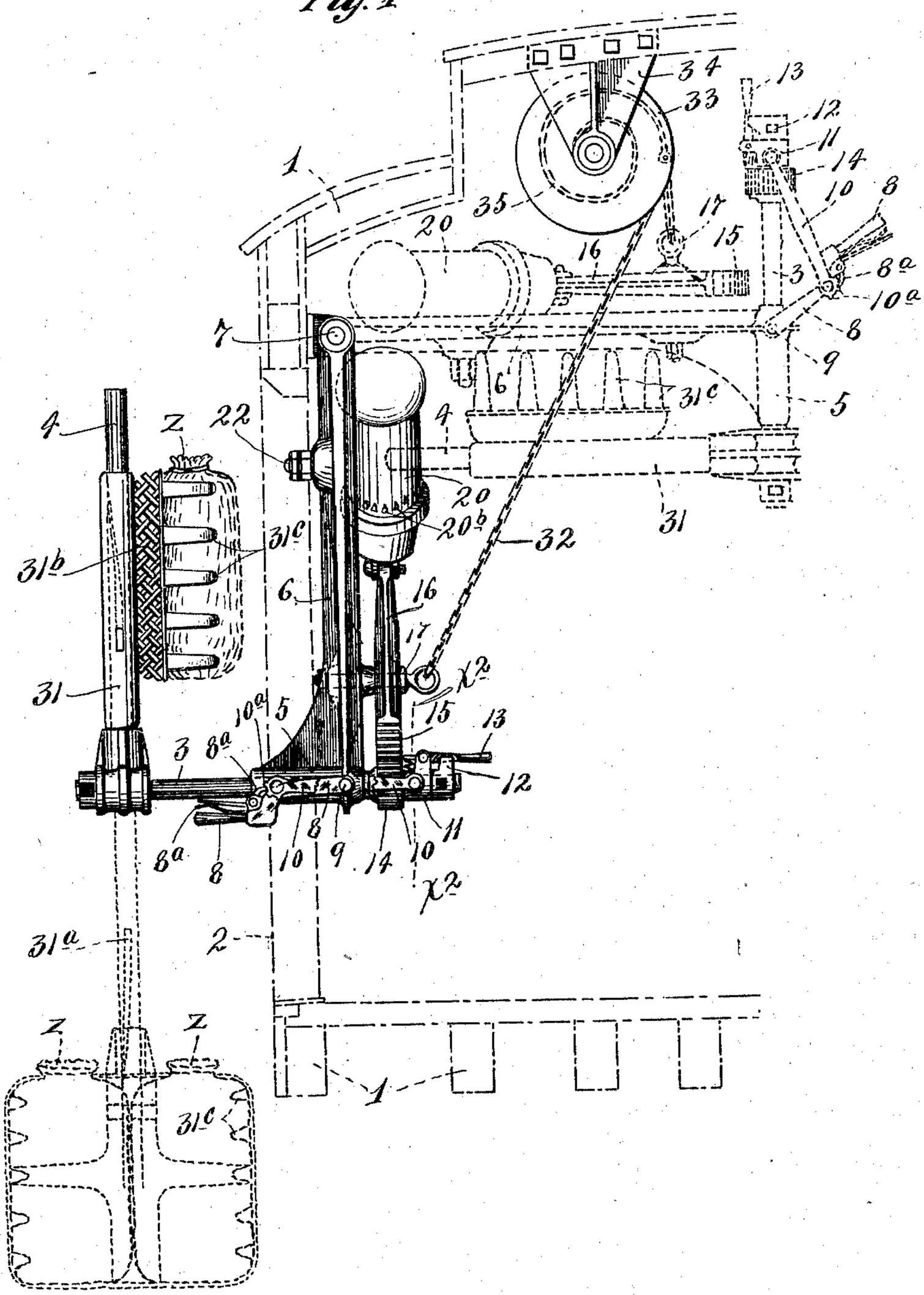
APPLICATION FILED JAN. 16, 1909.

967,224.

Patented Aug. 16, 1910.

3 SHEETS—SHEET 1.

Fig. 1



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3 SHEETS—SHEET 2.

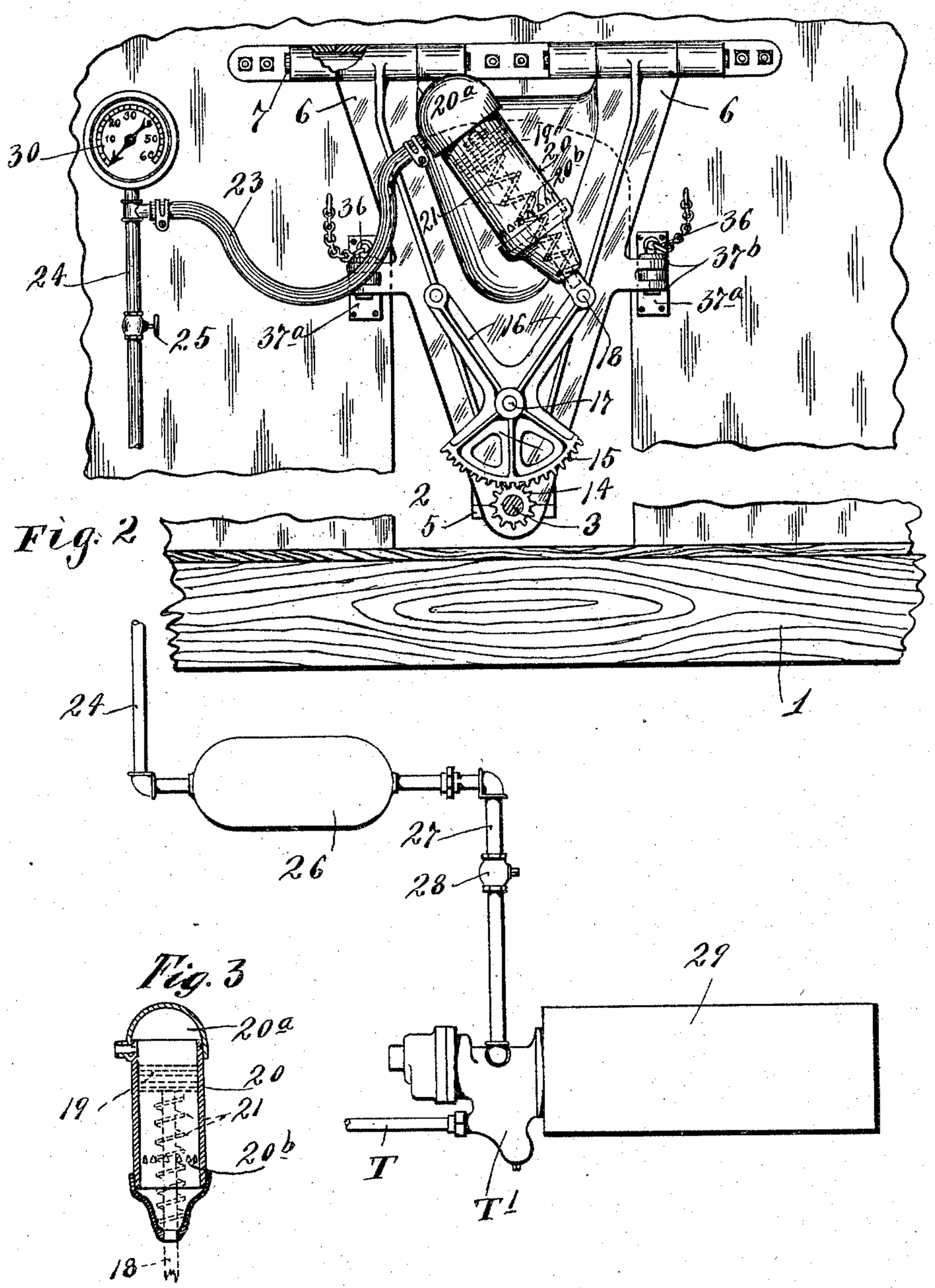

Fig. 2

Fig. 3

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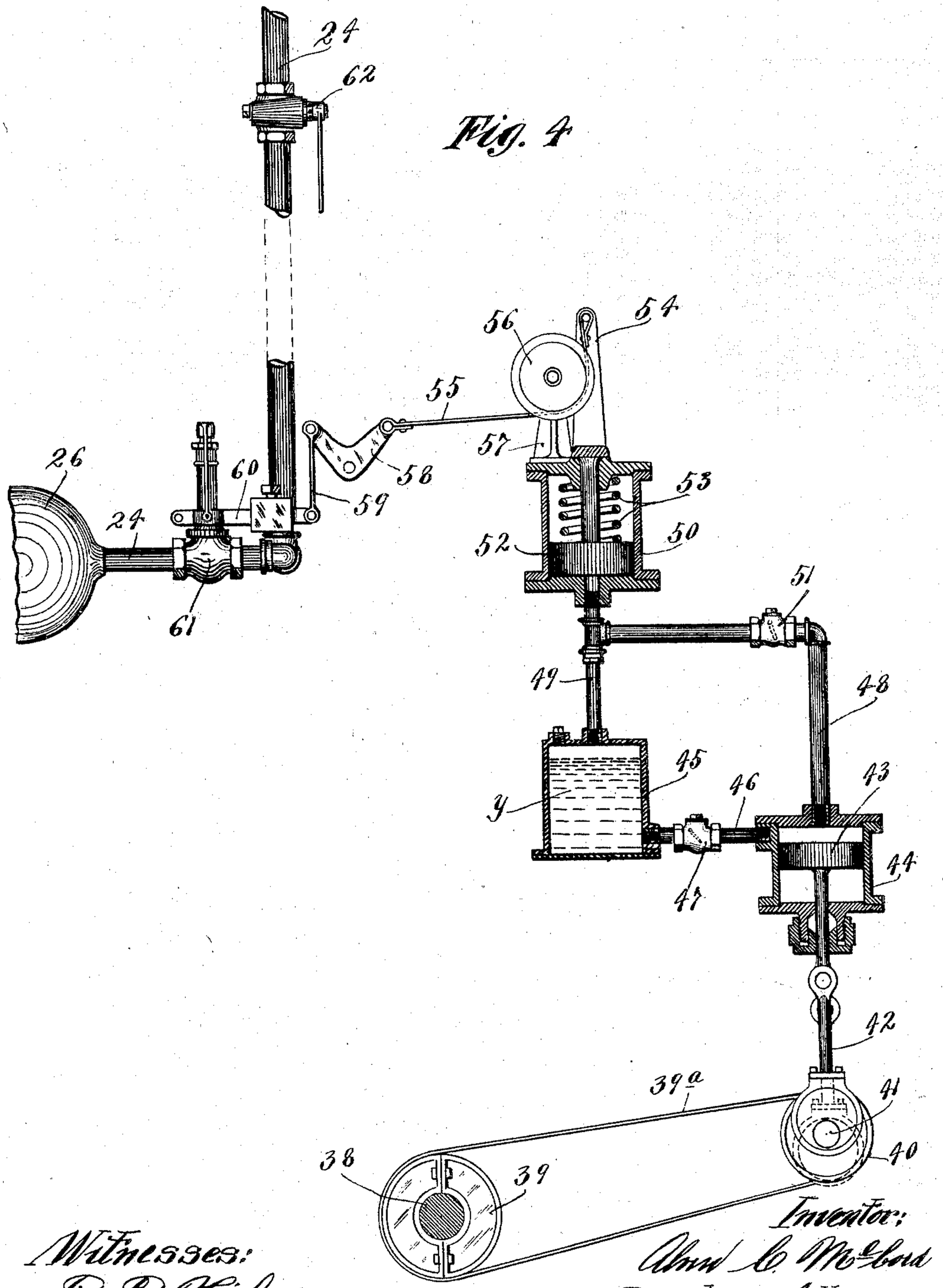
3 SHEETS—SHEET 3.

Fig. 4



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UNITED STATES PATENT OFFICE.

ALVIN C. McCORD, OF CHICAGO, ILLINOIS.

DEVICE FOR DELIVERING MAIL FROM FAST-MOVING CARS.

967,224. Specification of Letters Patent. **Patented Aug. 16, 1910.**

Application filed January 16, 1909. Serial No. 472,633.

To all whom it may concern:

Be it known that I, ALVIN C. McCORD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Devices for Delivering Mail from Fast-Moving Cars; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an efficient device for delivering mail bags or other things from a fast moving car, with safety, at the point desired; and to this end, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

The invention herein disclosed operates on the same principle as that disclosed in my companion application, Serial No. 472,632, filed of even date herewith. In both, a rotary dropper is suitably mounted on the car and is provided with actuating mechanism adapted to rotate the dropper substantially at the speed of the car but opposite to the travel of the car, at the desired point of delivery, so as thereby to be able to deliver the mail bag free from the accumulated momentum of the car. The difference between the two cases relates chiefly to the actuating mechanism for the rotary dropper. In the present case, a fluid pressure motor is employed to impart the required rotary motion to the dropper; and this motor takes its supply of air from the air brake train pipe. The air supply connections are then controlled by the operator, to afford air at the pressure needed to move the piston of the motor at the required speed. The dropper and its actuating mechanism are mounted on a swinging frame which is normally held in an uppermost or idle position directly underneath the roof of the car, but which can be swung down to a position in front of the car door opening, whenever so desired, for use in delivering the mail.

The invention is illustrated in the accompanying drawings, wherein like references refer to like parts throughout the several views.

In said drawings, Figure 1 is a view partly in front elevation and partly in section, with some portions removed and others shown in diagram only; and, in this view, the delivery device is shown in full lines in the position occupied thereby when swung down into the car door opening ready for use. The device is also shown in its raised or idle position, within the car, in dotted lines. Directions are taken with reference to the position of an observer looking backward from the front end of the car; or otherwise stated, the car, in Fig. 1, is assumed to be moving toward the observer; Fig. 2 is a view of the part shown in Fig. 1 chiefly in right side elevation, but with some parts shown in section on the line x^2 x^2 of Fig. 1, and with some parts broken away and others represented in diagram; Fig. 3 is a detail showing the fluid pressure motor detached in longitudinal section; and Fig. 4 is a view partly in elevation, partly in vertical section and partly in diagram, illustrating a modified form of the fluid supply connections, wherein the pressure is controlled from one of the truck axles of the car through an intermediate speedometer.

Referring to Figs. 1, 2 and 3, the numeral 1 represents the car body; and the numeral 2 the door opening in the side wall of the same.

The number 3 represents the shaft of the rotary dropper and the numeral 4 the radial delivery arm thereof fixed to the outer end of the shaft 3. The dropper shaft 3 is mounted, with freedom for rotary and sliding motion, in a long bearing hub 5 formed on the lower end of a triangular swinging frame 6, the upper end portions of which are hinged to the body of the car, directly above the door opening 2, by suitable hinge bearings 7, as best shown in Fig. 2.

A hand lever 8 is pivoted to the lower end portion of the swinging frame 6, on pivot bearings 9, as shown in Fig. 1; and this lever is connected by a pair of links 10 to opposite sides of a hub 11, which is loosely mounted on the inner end portion of the shaft 3 between lock collar 12 and a pinion 14 fixed to said shaft, as shown in Fig. 1. The two links 10 are located one on each side of the bearing hub 5; and, under the action of the pivoted lever 8, the loose collar 11 can be made to slide the dropper shaft lengthwise of its bearing hub 5, as required for projecting the dropper outward to its delivering position, outside the car door opening, and for returning the same back

again inward to its limit within its bearing hub 5. The hand lever 8 is provided with a spring dog 8^a and one of the links 10 is provided on its outer end with teeth 10^a with which the said spring dog can engage to interlock the lever and links and thus determine the extent of the outward throw of the dropper.

The loose collar 11 has pivoted thereto a spring-held locking lever 13 which is normally held in engagement with a notch of the lock collar 12; and, inasmuch as the loose collar 11 is held by the links 10 and the lever 8 from any rotary motion, it follows that, when the lever 13 engages the lock collar 12, the dropper will be held from any rotation in its bearing hub 5.

The pinion 14 engages with a sector gear 15 formed on the lower end of a two-armed lever 16 pivoted to stud bolt shaft 17 projecting from the swinging frame 6, as best shown in Fig. 2. One arm of this lever 16 is connected to the outer end of the rod 18 of a pistion 19 which works in a suitable cylinder 20 and is normally held in its innermost position by a retracting spring 21 wound about the piston rod 18 and reacting against the lower head of the cylinder 20. The cylinder 20 has cast integral therewith a stud shaft 22 which is pivotally secured to a suitable bearing formed on the swinging frame 6, as best shown in Fig. 1. The fluid motor made up of the parts 18 to 22, inclusive, is, therefore, supported by the swinging frame 6, and is itself free to oscillate thereon, and the reciprocation of its piston 19 will, of necessity, impart a rocking motion to the lever 16 and the sector gear 15. This, in turn, will rotate the pinion 14 fixed to the dropper shaft 3 and thereby rotate the dropper as required. Normally, the spring 21 holds the piston 19 in its innermost position, as already noted, and, when so held, the delivery arm 4 of the dropper will be in its uppermost position; and, as long as the lock lever 13 remains in engagement with the locking collar 12, as shown in full lines in Fig. 1, the piston 19 cannot be moved outward.

The motor cylinder 20 is provided with a relatively large clearance chamber 20^a on the fluid side of the piston 19. Said cylinder is also provided with a series of exhaust ports 20^b which become uncovered at the outward limit of the piston's travel. The clearance chamber 20^a is connected by a hose 23, or other suitable flexible connection, with supply pipe 24 which indirectly taps the air brake train pipe T (shown in Fig. 2). As shown, the pipe 24 is provided with a hand valve 25; and said pipe 24 leads from a reservoir 26 which, on account of its function, may be called the mail motor reservoir. The reservoir 26 is connected by pipe 27, containing check valve 28, with an extra auxiliary air reservoir 29 which, in turn, connects with the train pipe T through a standard triple valve T^1; under the control of the engineer's brake valve in the customary well-known way. Hence, under the brake reductions, the reservoir 29 will become charged with air under pressure and this will be communicated through the pipe 27 to the special mail motor reservoir 26 and will there be held, at maximum pressure, by the check valve 28 independent of any reductions in pressure which may be made in the auxiliary reservoir 29 by the setting of the brakes. The reservoir 26 may, therefore, be assumed always to be charged with air up to the normal pressure of the train pipe which is usually about seventy-five pounds. Hence, by manipulating the hand lever 25, air under pressure can be let through the pipes 24 and 23 into the clearance chamber 20^a of the motor cylinder 20. The amount of clearance afforded by this chamber and its connections, on the motor side of the hand valve 25, are made such that, if filled with air to the maximum available train pipe pressure, the piston 19 will be propelled at its maximum speed, upon the release of the lock lever 13. The maximum speed thus rendered available is sufficient to rotate the dropper up to the maximum speed of the car. Hence, if the car be running at less than its maximum speed, it is only necessary for the operator to use the valve 25 as a throttle and, thereby, let the air into the motor cylinder at sufficiently less pressure to get the lower piston speed desired.

A special gage 30 is located on the pipe 24, on the motor side of the throttle valve 25; which gage 30, instead of being graduated in pounds pressure, is graduated in car speed expressed in miles per hour, which graduation is, of course, predetermined by actual experiment. In practice, a speedometer gage would also be located near the gage 30, so that the operator could see the speed of the car at the time required. Then he would open the throttle valve 25 until the hands of the gage 30 came to the speed reading of the car, and he will, thereby, know that air will be available in the cylinder of the motor, at the proper pressure, for the piston speed desired; but the piston 19 thereof will be held from motion by the lock lever 13 engaging the lock collar 12, as hitherto noted.

The numeral 31 represents the body or hub portion of the mail bag holder, which has fixed thereto, as shown, a two compartment basket 31^b with yielding spring fingers 31^c adapted to hold two mail bags Z. This holder 31 is mounted for sliding movement, lengthwise of the delivery arm 4, in a spiral guideway 31^a of the proper pitch to impart to the bag holder 90 degrees of rotary mo-

tion about the axis of the arm 4 while the holder is moving from its innermost to its outermost position on the said arm. The purpose of this angular motion is to enable the bag holder to take the most favorable position for loading the same with the mail bags Z, when at its innermost position on the arm 4, and then to shift to the most favorable position for the discharge of the bags when at the outermost limit of its travel on the said arm.

The nutted pivot bolt 17, by which the lever 16, with sector gear 15, is pivoted to the swinging frame 6, has a ring-shaped head on its inner end, as shown in Fig. 1; and to this is attached the lower end of a chain 32, the upper end of which is secured to and wound about a hoisting pulley 33 mounted in suitable bearing hangers 34 depending from the roof of the car; and which pulley 33 is subject to a strong spring 35 tending to wind up the chain to its limit and of sufficient tension to hold the swinging frame 6 and all the parts carried thereby in whatever angular position the frame may be set.

Normally, the frame, with all the parts carried thereby, occupy the position shown in dotted lines in Fig. 1; or, in other words, it is held up by the spring pulley and chain, in a position where it will be out of the road, when idle.

At his convenience, sufficiently long before nearing a station, the operator can swing down the frame 6 and load the dropper with the mail bags Z. This might be at an intermediate point in the angular movement of the frame. Then he can lower the frame to its limit, so that the dropper will stand within the door opening and there lock the same by chained pins 36 engaging keeper lugs 37^a and 37^b fixed, respectively, to the side of the car and the sides of said frame 6, as best shown in Fig. 1. When nearing the station, the operator will manipulate the hand lever 8 to throw the dropper outward to its limit and there lock the same against inward sliding motion. Then he watches for the critical time, and precisely at the right instant, releases the lock lever 13 from the lock collar 12, thereby throwing the motor into action. The lock lever 13 may, therefore, be regarded as a trigger for the motor. The outward stroke of the motor piston 19 will, through the parts 15, 16 and 14, rotate the dropper shaft 3 and the arm 4 about 180 degrees or a little more, thereby bringing the delivery arm 4 and the bag holder from the position shown in full lines in Fig. 1 to the position shown in dotted lines in the said view; and, at this time, the tip of the arm 4 and the bag holder 31 will be at the lowest point of their rotary motion and be moving opposite to the direction of the car, at substantially the speed of the car, and the open face of the basket 31^b, together with the mail bags Z therein, will be facing backward. The tension of the spring fingers 31^c is light, and, inasmuch as the dropper itself is held for forward motion with the car, the bags Z will be released from said fingers when the arm 4 is at the lowest point of its rotary motion. This occurs before the piston 19 moves outward far enough to uncover the exhaust ports 20^b of the motor cylinder 20. As soon as this exhaust takes place, the spring 21 will become operative on the piston 19 to return the same inward to its normal position; and this return motion of the piston will turn the lever 16, sector gear 15 and pinion 14 in the opposite direction and thereby restore the dropper to its normal angular position *i. e.* to such a position that its arm 4 will be standing upright, as shown in full lines in Fig. 1, and that the lock lever 13, under its spring tension, will have reëngaged with the lock collar 12 to hold the dropper from further rotary motion. Then the operator takes hold of the lever 8 and throws the same inward to its limit, thereby sliding the dropper inward to its limit in its bearing hub 5. The frame 6 can then be unlocked from the side walls of the car, and be raised up into its idle or normal position, as shown in dotted lines in Fig. 1, where it will be held by the spring pulley until again needed. Centrifugal force is relied upon to move the bag holder 31 outward to the limit of its travel on the radial delivery arm 4 of the dropper; and after the dropper is restored to its normal angular position, with said arm 4 upright, gravity will force the holder 31 back downward to its innermost limit on said arm.

In the modification illustrated in Fig. 4, the fluid supply to the motor is automatically controlled by a speedometer driven from one of the truck axles of the car. In the said view, the numeral 38 represents one of the truck axles of the car, and to this is fixed a split pulley 39 which is connected by belt 39^a with a pulley 40 on a countershaft 41 suitably supported on the car. This countershaft is fitted with a pair of eccentrics, straps and rods, all marked 42. The eccentric rods are connected to the stems of pump pistons 43 working in pump cylinders 44. The cylinders 44 connect with a supply tank 45 containing oil or other suitable liquid Y. The connection between the parts 44 and 45 is through suitable pipes 46 fitted with one way check valves 47. The cylinders 44 also connect by pipes 48 with a two-way pipe 49, one arm of which leads back to the oil tank 45 and the other to the lower end of a cylinder 50. The pipes 48 are provided with check valves 51. In the cylinder 50 is located a piston 52, subject to a spring 53 which normally holds the same in its lowermost position. The upper end of the stem

of the piston 52 has thereon a jaw like bracket 54 connected by a strap 55 with a bell crank 58. The strap is guided by a pulley 56 journaled in bracket 57 fixed to the head of the cylinder 50. The bell crank 58 is connected by a link 59 to the operating lever 60 of a reduction valve 61, located in the air supply pipe 24 leading from the reservoir 26 to the hose 23 which connects with the motor cylinder 20, as in the other views. The spring 53 is of such tension that it will hold the piston 50 in its inner or lowermost position, and the reduction valve 61 in its closed position, when the car is standing still. The two-way pipe 49 is of the proper size to permit a predetermined proportion of the oil supplied thereto by the pipes 48 to pass through its opposite arms. Under the action of the eccentric driven pumps, it is, of course, obvious that the oil Y will be drawn into the pump cylinders 44 by their pistons 43 and be forced upward through the pipes 48 to the pipe 49, and the proper proportion will come under the piston 52 of the cylinder 50 and will thereby be made to move the piston 52 outward against the tension of the spring 53; and this, in turn, through the parts 54, 55, 58 and 59 will raise the operating lever 60 of the reduction valve and open the latter to a greater or less extent according to the amount of travel imparted to the piston 52.

The eccentric driven pumps will operate fast or slow according to the speed of the car. It follows that the amount of oil forced under the piston 52 will vary according to the speed of the car; and, hence, through the connections above noted, the reduction valve 61 will also be opened to a greater or less extent according to the rate of the car's speed. The parts are so proportioned that the said reduction valve will be thrown wide open, under the control of said speedometer, when the car is running at its maximum speed; and, hence, under that condition, air at maximum pressure will become available in the pipe 24 for the mail motor. If the car be running at any lower speed, the reduction valve 61 will be open less widely and will, therefore, pass the air more or less throttled or at a lower pressure varying with the speed of the car. Hence, the controlling valve in the pipe 24 in this modification may be an ordinary stop cock 62, which the operator will simply throw into its wide open position when he is ready to bring the mail motor into action. This means for controlling the fluid supply to the mail motor automatically by a speedometer driven from one of the car truck axles is to be preferred over the controlling means shown in the other views. Any other suitable form of speedometer might be used.

The reason why the geared sector lever 16 has two arms is to permit the piston rod 18 of the motor to be connected to one or the other of the two arms according to the direction of the car's travel.

What I claim is:

1. The combination with a car, of a delivery device, comprising a rotary dropper and a fluid pressure actuating device operative to rotate said dropper substantially at the speed of the car but opposite to the travel of the car, at the desired point of delivery, substantially as described.

2. The combination with a car, of a delivery device, comprising a rotary dropper projectable into a position beyond the side walls of the car and having on its outer end a radial delivery arm, a bag holder movable lengthwise of said arm, and a fluid actuating pressure device operative to rotate said dropper, substantially at the speed of the car but opposite to the travel of the car, at the desired point of delivery, substantially as described.

3. The combination with a car, of a delivery device, comprising a dropper, a fluid pressure actuating device operative to move said dropper substantially at the speed of the car but opposite to the travel of the same, and a movable frame supporting said parts adapted to be normally held in a position near the top of the car and to be moved downward into position in front of the door opening, when the delivery is to be effected, substantially as described.

4. The combination with a car, of a delivery device, comprising a dropper, an actuating device adapted to move the dropper substantially at the speed of the car but opposite to the travel of the same, and a swinging frame on which the said parts are mounted, which frame is adapted to be held up in an idle position near the roof of the car and to be swung down in front of the door opening to effect the delivery, substantially as described.

5. The combination with a car, of a delivery device, comprising a dropper, an actuating device adapted to move the dropper substantially at the speed of the car but opposite to the travel of the same, a swinging frame on which the said parts are mounted, and a spring-held hoisting pulley with flexible connection attached to the free end of said frame and adapted to balance the same at any desired angular adjustment of said frame, substantially as described.

6. The combination with a car, of a delivery device, comprising a rotary dropper, a swinging frame having its upper end portions hinged to the side wall of the car and having at its lower end a bearing hub in which the dropper shaft is mounted with freedom for rotary and sliding motions therein, and a fluid pressure motor on said frame connected to rotate said dropper, substantially at the speed of the car but oppo-

site to the travel of the same, and a hoisting device adapted to raise or lower the free end of said frame for shifting the delivery device from its idle to its working position and vice versa, substantially as described.

7. The combination with a car, of a delivery device comprising a frame having its upper end portions hinged to the side wall of the car, a rotary dropper having its shaft mounted in the lower end of said frame, with freedom for rotary and sliding motion thereon, lever and locking devices on said frame adapted to slide the dropper shaft lengthwise of its bearing and normally to hold the shaft from rotation therein, and a fluid pressure motor carried by said frame and connected to rotate said shaft opposite to the travel of the car, substantially at the speed of the car at the desired point of delivery, and a hoisting device for raising and lowering the free end of said frame from its idle to its working position, substantially as described.

8. The combination with a car, of a delivery device, comprising a dropper, a fluid pressure actuating device for moving said dropper opposite to the travel of the car, fluid connections for said actuating device and a speedometer driven from one of the rotary parts of one of the car trucks and operative to control the pressure of the fluid supplied to said actuating device according to the speed of the car, substantially as described.

9. The combination with a car, of the swinging frame having its upper end portions hinged to the side wall of the car above the door opening, the rotary dropper having its shaft mounted in a long bearing hub at the lower end of said frame, and provided with a pinion fixed thereto, a sector gear lever pivoted to the said frame and having its gear teeth in engagement with the said pinion, and a straight line reciprocating fluid pressure motor pivoted to said frame, so as to oscillate thereon, and having its piston stem connected to the upper end of said sector lever, and fluid supply connections for said motor, substantially as described.

10. The combination with a car, of the swinging frame, the rotary dropper having its shaft mounted in the lower end of said frame with freedom for rotary and sliding motions therein, lever devices on said frame for sliding said shaft and also for holding the same from rotation at all times except when in the delivering action, a pinion fixed to said shaft, a straight line reciprocating pneumatic motor having its cylinder pivoted to said frame, a sector lever pivoted to said frame with its gear teeth engaging said pinion and its opposite end connected to the piston rod of said motor, fluid supply connections for said motor and a spring-held hoisting pulley supported from the under side of the car roof and provided with a flexible connection connected to the free end of said frame, all for coöperation, substantially as described.

11. The combination with a rotary dropper having a radial delivery arm on the outer end thereof, of a bag holder mounted on said arm for travel lengthwise thereof, and which bag holder is keyed to the arm in a spiral keyway for causing said holder to turn ninety degrees on the axis of said shaft while shifting from one of its extreme positions to the other, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ALVIN C. McCORD.

Witnesses:
B. A. Middleton,
C. J. Copeland.