

No. 760,345.

PATENTED MAY 17, 1904.

L. A. PEASE & J. A. BRADY.  
MAIL CATCHER AND PROJECTOR.

APPLICATION FILED AUG. 12, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 2

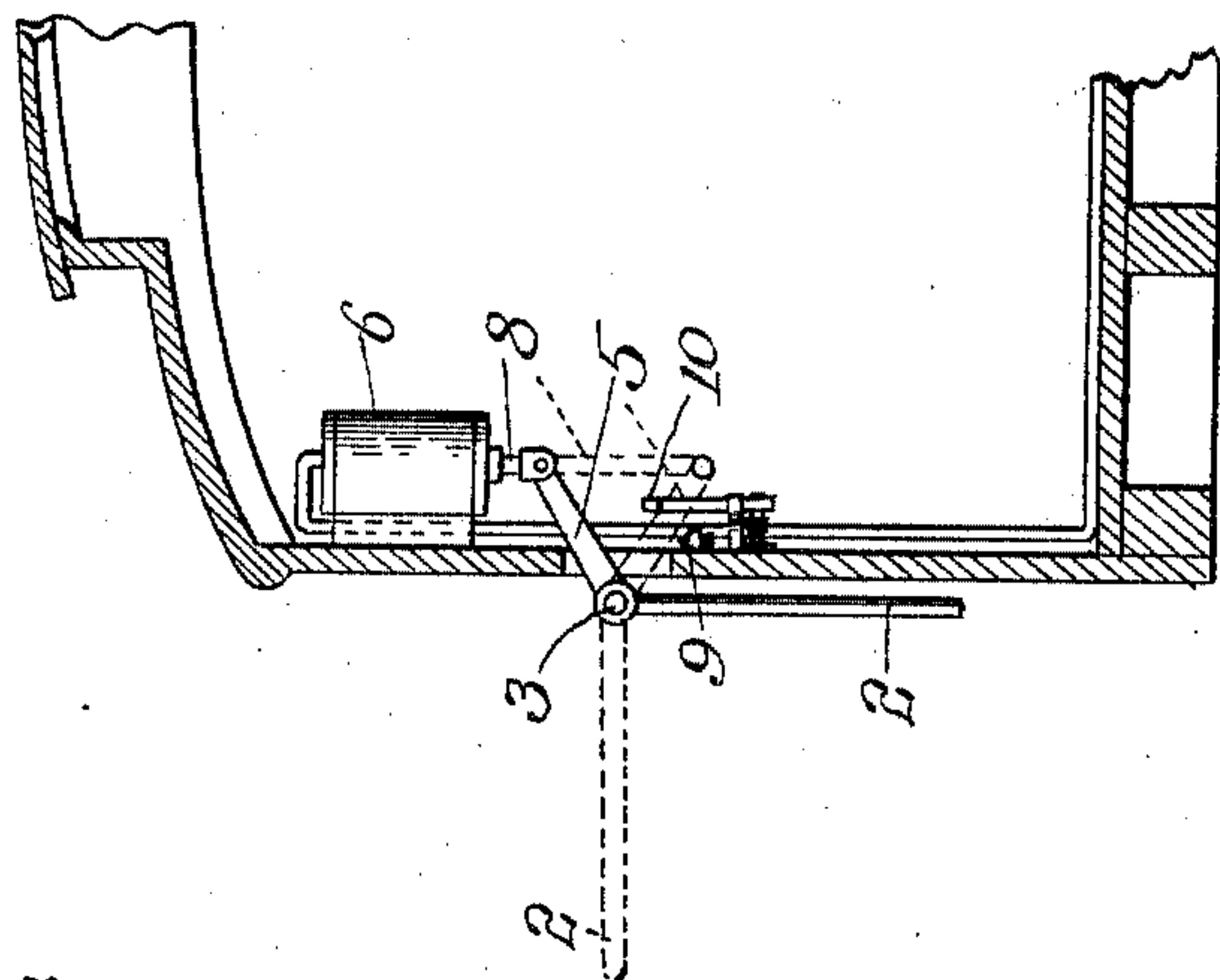


Fig. 7

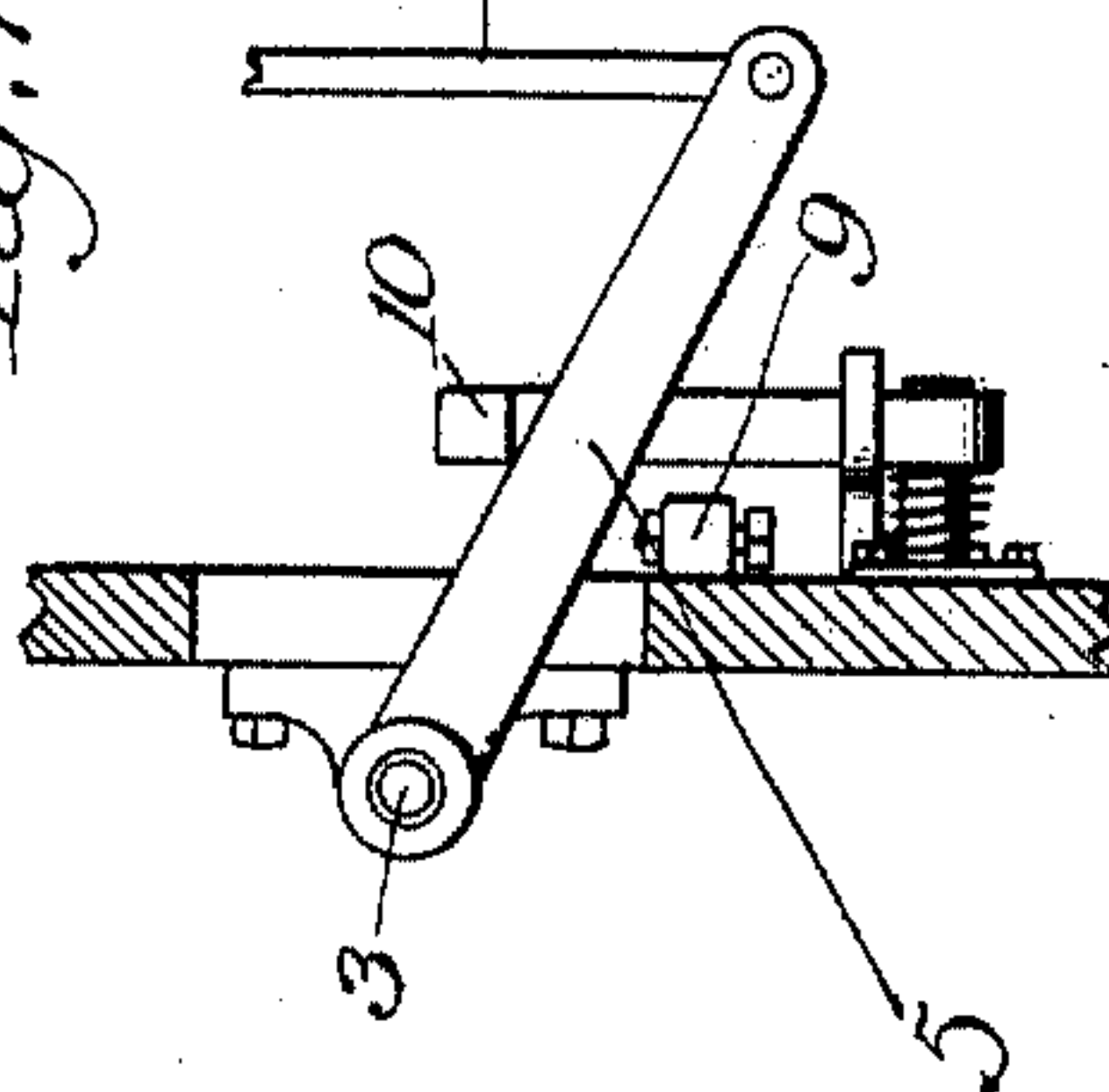
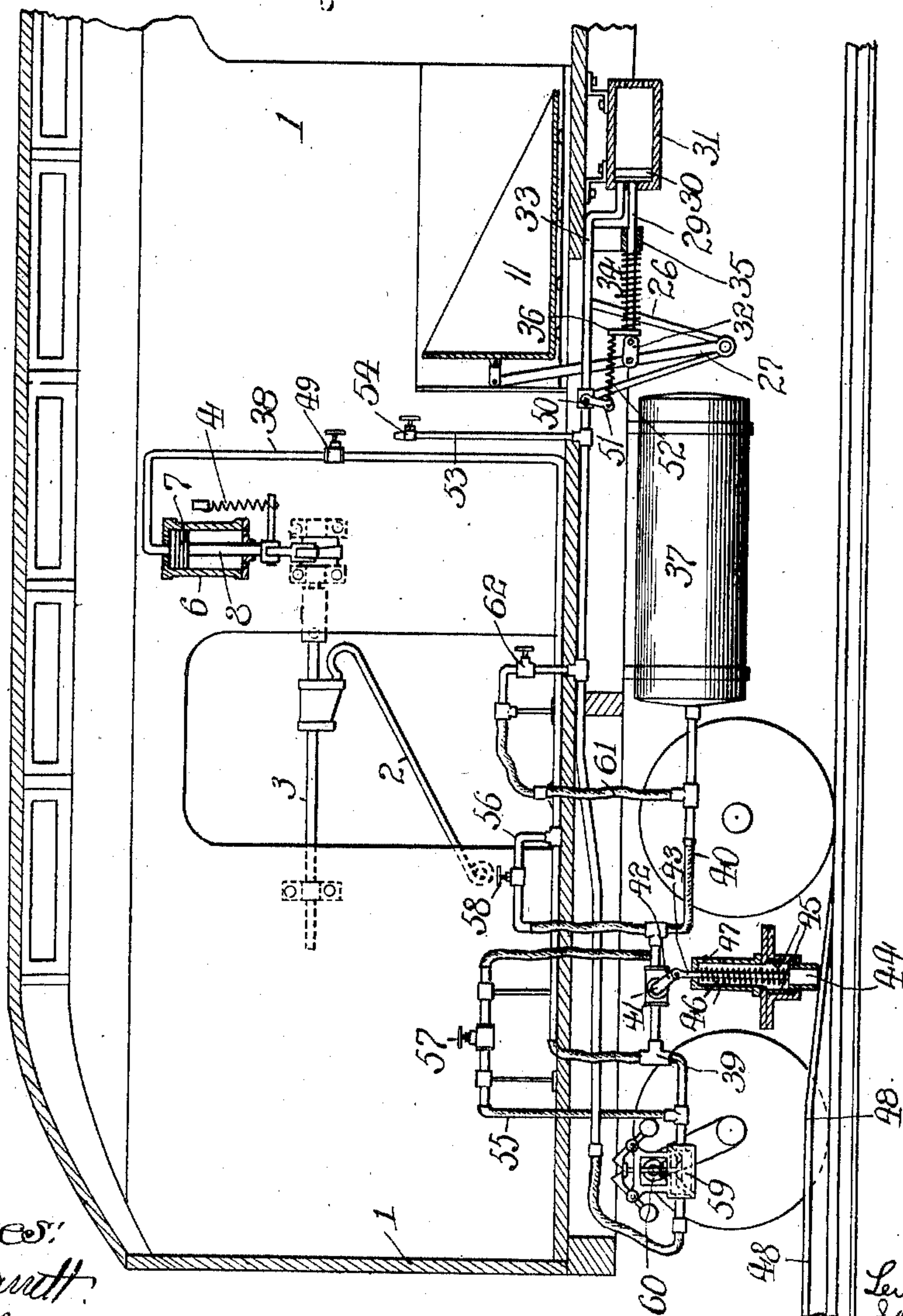


Fig. 1



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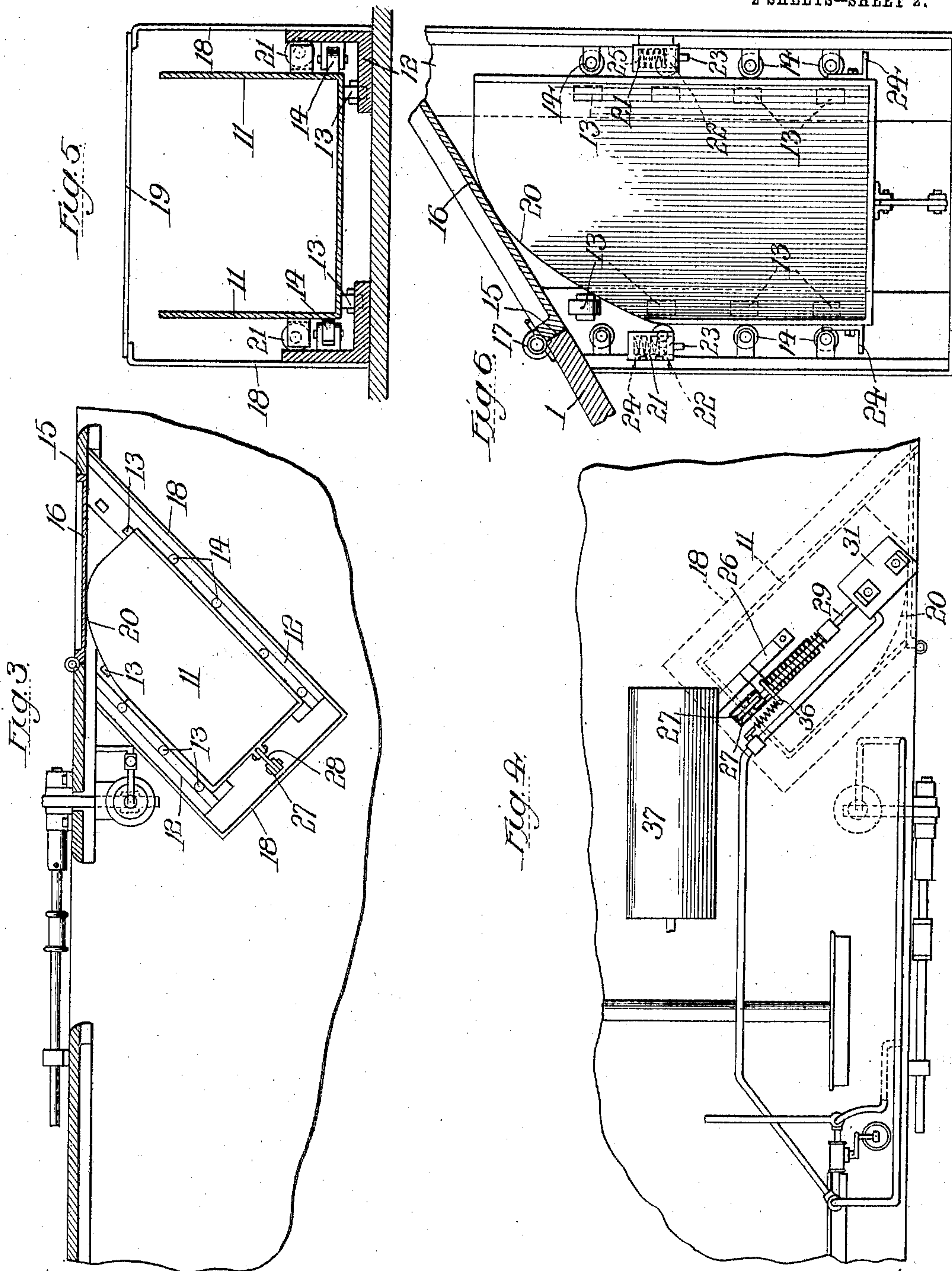
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2 SHEETS—SHEET 2.



Witnesses:

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# UNITED STATES PATENT OFFICE.

LEWIS A. PEASE AND JOHN A. BRADY, OF HIGHWOOD, ILLINOIS.

## MAIL CATCHER AND PROJECTOR.

SPECIFICATION forming part of Letters Patent No. 760,345, dated May 17, 1904.

Application filed August 12, 1903. Serial No. 169,185. (No model.)

*To all whom it may concern:*

Be it known that we, LEWIS A. PEASE and JOHN A. BRADY, citizens of the United States, residing at Highwood, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Mail Catchers and Projectors, of which the following is a specification.

This invention relates to railway mail-cars, and relates particularly to mail-receptacle catching and projecting devices.

As the invention relates to mail-receptacle-catching devices, the object of the invention is to provide means to impart movement to the mail-receptacle-engaging member, whereby it will be moved into and out of operative position which will be simple in construction and efficient in operation and which may be controlled automatically by means without the car at predetermined points along the route or manually by a person on the car.

At the present time the common method of discharging mail-matter from through trains at points or stations at which the train does not stop is to throw the mail-receptacle from the train while it is going at full speed, the mail-receptacle usually being thrown practically at right angles to the direction of the motion of the train and striking the ground with the velocity which it has acquired due to the movement of the car. Where the velocity of the mail-receptacle is high, as when the train is moving at a high rate of speed, said mail-receptacle attains a very high momentum, particularly when the contents of the same are heavy. When a mail-receptacle the momentum of which is high strikes the ground or other receiving-surface, it is subjected to a very severe strain, which in many cases operates to tear or break the receptacle, destroying the same and releasing the contents thereof, which are thus very apt to be lost or destroyed. As is well known, many mail-receptacles are annually destroyed in this manner, causing large loss to the Government in replacing the same, and much mail-matter is lost or destroyed, thus causing much annoyance and perhaps irreparable injury and loss to people using the mails.

As the invention relates to mail-receptacle

projectors, a primary object of the invention is to provide means for discharging mail-receptacles from rapidly-moving cars whereby the velocity of the sack and its consequent momentum will be neutralized or overcome, so that the mail-receptacle will remain practically stationary or will "fall dead" upon striking the ground or other surface, thus relieving the same from all strain due to its momentum and effectually preventing the tearing or breaking of the same and the consequent loss and destruction of the mail-matter.

A further object of the invention is to provide means which will be simple in their construction and efficient in their operation and which are controllable by means without the car disposed at intervals along the route or manually by a person on the car.

A further object of the invention is to provide means whereby the velocity at which the mail-receptacle is projected or discharged from the car will be automatically regulated according to the speed of the car, increasing as the speed of the car increases and decreasing as the speed of the car decreases.

Our invention consists of the various features, combinations of features, and details of construction hereinafter described and claimed.

In the accompanying drawings our invention is fully illustrated.

Figure 1 is a partial longitudinal vertical section of a car equipped with devices of our invention, the same being shown in elevation. Fig. 2 is a partial transverse section of a mail-car, showing our improved catching device in end elevation. Fig. 3 is a partial horizontal sectional view of a mail-car equipped with our improved catching and projecting devices, showing a top plan thereof. Fig. 4 is a partial bottom plan view of a mail-car equipped with our improved catching and projecting devices. Figs. 5 and 6 are enlarged detail views of the projecting-car. Fig. 7 is an enlarged detail showing means for securing the catching-arm in operative position.

Referring now to the drawings, 1 designates a mail-car, which as regards its general features may be of any usual or approved construction.



Any desired or approved form of mail-receptacle-engaging member may be used. As shown said mail-receptacle-engaging member is of the familiar type, comprising an arm 2, rigidly secured to a rod or bar 3, pivotally mounted on the side of the car, thus providing for moving said arm 2 into operative or inoperative position, as desired. The mail-receptacle-engaging member 2 is maintained normally in inoperative position by suitable means and is adapted to be moved into operative position by a suitable motor applied thereto. As shown, the mail-receptacle-engaging member is maintained normally in inoperative position by means of a spring 4, applied to an arm 5, secured to the rod 3. As shown also, the mail-receptacle-engaging member 2 is adapted to be moved into operative position by a compressed-fluid motor comprising a cylinder 6, a piston 7, working in said cylinder, and a piston-rod 8, to which the arm 5 is operatively connected, the relation being such that movement of the mail-receptacle-engaging member 2 under the influence of the said motor will bring it into operative position, as shown in dotted lines in Fig. 2. A stop 9 limits the movement of the mail-receptacle-engaging member 2 under the influence of said motor, and a catch 10, which, as shown, is adapted to engage the arm 5, operates to secure said mail-receptacle-engaging member 2 in operative position. Said catch 10 is adapted to be manually retracted to release the arm 5, thus allowing the spring 4 to return the mail-receptacle-engaging member 2 to its normal inoperative position.

Broadly stated, a mail-receptacle projector of our invention consists of a support for a mail-receptacle mounted to reciprocate freely in a rearward direction relatively to the movement of the car and means to advance said support with great velocity. In the preferable construction shown the mail-receptacle support of our projector consists of a car 11, mounted to reciprocate on guides or ways consisting of angle-bars 12, in which are revolvably mounted rollers 13 and 14. The car 11 runs on the rollers 13 and is guided laterally by the rollers 14, thus reducing the friction of said car to a minimum. The guides or ways 12 are secured to the floor of the car 1 at an angle to the side of the car, a desirable angle being about thirty degrees, (30°.) As shown also, the car 11, which is preferably made of suitable sheet metal and of a size to contain several mail bags or receptacles, has a plane smooth bottom. The front thereof is open, and the sides and rear end thereof are inclosed. The projector is preferably located at about the middle of the mail-car 1, and formed in the side of said car 1 is an opening 15, which registers with the guides 12 and is large enough to permit the passage there-through of the projector-car 11. The opening 15 is preferably closed by a light door 16,

which is held normally closed by springs 17, applied to the hinged end thereof. Preferably, also, the projector-car 11 is inclosed by a casing 18, which surrounds the same on all exposed sides and is provided with a hinged top 19, through which access may be had to the projector-car 11 when desired, as for the purpose of placing a mail bag or receptacle therein. As shown, the door 16 is adapted to be opened to permit the passage through the opening 15 of the projector-car 11 by said car itself, which as it advances strikes against said door and forces the same open against the force of the springs 17. In order that the action of the projector-car 11 on the door 16 in opening the same may be continuous, the front end of said car, which contacts with the door 16, is rounded, as shown at 20. In the preferable construction shown also stops are provided which limit the forward movement of the projector-car 11 and which will stop the same suddenly and with a yielding or cushion action. As shown, said stops consist of cylinders 21, rigidly secured to the upwardly-extending flanges of the angle-bars 12. Fitted to the cylinders 21 are plungers 22, rods 23, secured in which extend through the ends of the cylinders 21 and into the path of travel of projections 24 on the projector-car 11. Coiled springs 25, inserted between the plungers 22 and the front ends of the cylinders 21, maintain the plungers 22 normally in operative position.

The means for actuating the projector-car 11 are as follows: Pivoted to a bracket 26, depending from the bottom of the mail-car 1, is a lever 27, which extends upwardly through an opening in the floor of the mail-car and the free end of which is connected to the rear end of the projector-car 11, preferably by a link 28. Between its ends the lever 27 is connected, as by a link 32, to a piston-rod 29, rigidly secured in a piston 30, working in a cylinder 31, secured to the bottom of the mail-car 1. Fluid under pressure is admitted to the cylinder 31 from a suitable source of supply through a pipe 33, the relation being such that when fluid is admitted to said cylinder under a sufficiently high pressure the projector-car 11 will be forced outwardly with great velocity. The projector-car 11 is maintained normally in retracted position by a suitable spring applied thereto. As shown, said projector-car is maintained normally retracted by a spring 34, inserted between a bracket 35 on the mail-car, to a suitable guide-bearing in which the piston-rod 29 is fitted, and a collar 36, secured to said piston-rod, said spring surrounding said piston-rod as a guide. The cylinders 6 and 31 are connected with a suitable source of supply of fluid, preferably air, under pressure. As shown, said source of supply consists of a tank or reservoir 37, which may be one of the reservoirs which supply the compressed air for operat-



ing the air-brakes or a separate tank within which a desired pressure is maintained by means of suitable connection with an air-compressor on the engine either through the pipes  
 5 of the air-brake system or through independent pipes. As shown, the cylinders 6 and 31 are connected with the tank or reservoir 37 by pipes 33 and 38, which communicate at 39 with a pipe 40, which leads directly to the  
 10 tank or reservoir 37. The pipe 40 is controlled by a valve 41, which is maintained normally closed by means of a spring applied thereto and which is adapted to be opened at predetermined points along the route by means  
 15 without the mail-car 1. In the preferable construction shown an arm or lever 42 is secured to the valve-stem, the free end of which is connected by a rod 43 with a shoe 44, which is movable in guides 45, formed on the car-  
 20 truck or other suitable support on the car. A spring 46, inserted between the shoe 44 and a bracket 47 and which surrounds the rod 43 as a guide, operates to maintain the shoe normally at the lower limit of its movement and the valve  
 25 41 normally closed. The shoe 44 is adapted to be raised at desired points along the route by means of cam-rails 48, supported in the path of travel of the shoe 44 and above the normal depressed position thereof, the relation being  
 30 such that movement of said shoe under the influence of the cam-rail 48 will operate to open the valve 41, thus admitting air or other fluid under pressure from the tank or reservoir 37 into the cylinders 6 and 31. As soon as the  
 35 shoe 44 runs off from a cam-rail 48 the spring 46 will close the valve 41. The pipe 38 is also provided with a valve 49, preferably located so as to be conveniently operated by a person in the car. Said valve 49 is preferably a  
 40 three-way valve constructed to open and close the pipe 38 and also provided with an exhaust-opening through which the air may escape from said pipe when the valve is turned into proper position. The pipe 33 is pro-  
 45 vided with a cock 50, which is maintained normally closed by a suitable spring. Secured to the stem of said valve is an arm or lever 51, the free end of which is connected, by means of a spring-link 52, with a part actu-  
 50 ated from the piston 30, as shown, with the collar 36 on the piston-rod 29. The strength of the spring-link 52 is so adjusted and the relation of parts such that as the piston 30 approaches the limit of its outward stroke  
 55 under the influence of the fluid under pressure admitted to the cylinder 31 said link will open said cock 50 against the force of the spring applied thereto, thus permitting the air to escape from the cylinder 31, reducing  
 60 the pressure therein, so that the spring 34 can retract said piston 30 and the projector-car 11 to their normal positions. As the piston is retracted the tension on the spring-link 52 will become less, thus allowing the cock 50 to  
 65 close under the influence of the spring applied

thereto. The pipe 33 is also provided with a branch pipe 53, which extends inside of the car and is provided with a petcock 54, adapted to be manually operated by a person in the car. The cock 54 affords convenient means for  
 70 relieving the pressure in the cylinder 31 in case the automatic device should fail to work for any reason. The pipes 33 and 38 are respectively connected with the pipe 40 around the  
 75 valve 41 by by-passes 55 and 56, which extend inside of the car and are provided within said car with stop-cocks 57 and 58, which afford convenient means whereby a person on the car may admit fluid under pressure from the  
 80 tank 37 to either the cylinder 6 or 31 to operate either the catching or projecting device independently of the automatic valve 41 at points remote from the cam-rails 48, as should it be desired to discharge more mail-  
 85 bags than the projector-car 11 would contain at one time or should the automatic valve 41 fail to operate. In the preferable construction shown also the pipe 33 is provided between the automatic valve 41 and the by-  
 90 pass 55 with means to regulate the volume of fluid under pressure which will be delivered to the cylinder 31, and thus the initial pressure in said cylinder. As shown, said means consist of a throttle-valve 59, which is  
 95 controlled by a governor 60, which, as shown, is driven from one of the axles of the mail-car. The relation is such that the throttle-valve opening will become larger as the speed of the train increases, and vice versa. Thus  
 100 when the speed of the train is high the air will be admitted to the cylinder in greater volume, causing a greater initial pressure, while when the speed of the train is less a smaller volume of air will be admitted to said  
 105 cylinder, correspondingly reducing the initial pressure therein. As the velocity at which the projector-car 11 is advanced depends directly upon the pressure in the cylinder, it is obvious that the governor 60 will operate to  
 110 automatically regulate the velocity of said projector-car 11 to that of the car 1.

To provide for operating the projector in case the throttle-valve 59 or the governor 60 should get out of order or should become in-  
 115 operative from any cause, and thereby close or obstruct the pipe 33, said pipe 33 is connected with the pipe 40 between the tank 37 and the throttle-valve 59 by a pipe 61, which extends into the car and is provided with a  
 120 manually-operated valve 62.

To provide for catching and discharging mail on both sides of the car, a complete equip-  
 125 ment comprises a catcher and projector on each side of the car. Such complete equipment will, however, merely involve a duplication of the devices heretofore described, excepting that the projector-cars 11 on opposite sides of the mail-car will be directed toward  
 130 opposite ends of the mail-car.

Owing to the relative movement of the car-



body and trucks, as in rounding curves, the connections between parts carried on the car-body and on the trucks are flexible, thus providing for desired relative movement of said car-body and trucks without subjecting said parts to a strain.

Beginning with the devices in the positions shown in the drawings and assuming that the tank or reservoir 37 contains fluid, as air, under desired pressure—say eighty pounds per square inch—the operation of our catching and projecting devices is as follows, the description being limited to the automatic operation thereof, it being understood that the same operation will be produced by means of the manually-operated valves 57 and 58: As the mail-car approaches a cam-rail 48, the valve 49 in the pipe 38 is turned by the operator on the car so as to open said pipe, and any mail receptacle or receptacles which it is desired to discharge at the point or station where the cam-rail 48 is located is placed in the projector-car 11. As the shoe 44 runs upon the cam-rail 48 the valve 41 will be opened in the manner heretofore described, allowing fluid under pressure to pass from the tank or reservoir 37 into the cylinders 6 and 31. The fluid under pressure entering the cylinder 6 will force the piston 7 outwardly, thus, through its connections with the catcher-arm 2, moving said catcher-arm into operative position, which is defined by the stop 9, and in which position it will be secured by the catch 10, in which position it will remain until released. At his convenience the operator removes the mail-receptacle from the catcher-arm 2, and the shoe 44, having passed out of engagement with the cam-rail 48, thereby allowing the spring 46 to close the valve 41, turns the cock 49 to allow the air to escape from the cylinder 6 and trips the catch 10, whereupon the spring 4 will return said arm 2 to its normal inoperative position. Fluid under pressure entering the cylinder 31 will force the piston 30 outwardly with great velocity, which, as heretofore explained, will be regulated to the speed of the mail-car by the throttle-valve 59 and the governor 60. The outward movement of said piston 30, through its described connections with the lever 27, will operate to advance the projector-car 11 outwardly with a velocity which, owing to the difference in the lengths of the lever-arms, will be a multiple of that of the piston 30. At a desired point in the forward movement of the projector-car 11 the projections 24 thereon strike the plungers 22, which will operate to arrest the forward movement of said projector-car 11 suddenly, discharging the contents of said projector-car therefrom with a velocity equal to the highest velocity of said car and in a rearward direction relatively to the movement of the mail-car. As stated, a desirable angle at which to discharge mail-receptacles is at about thirty degrees relatively

to the direction of movement of the mail-car. When discharged at a rearward angle relatively to the direction of movement of the mail-car, the movement of the mail receptacle or receptacles may be resolved into two components, one directly opposite to the direction of movement of the car and the other at right angles thereto. When the angle of discharge is thirty (30) degrees, the rearward component is approximately five-sixths ( $\frac{5}{6}$ ) of its actual travel or velocity and its lateral component five-twelfths ( $\frac{5}{12}$ ) thereof. Thus if a mail-receptacle be projected from the car at an angle of thirty (30) degrees and with a velocity of ninety (90) feet per second its velocity in the direction opposite to the movement of the mail-car will be approximately seventy-five (75) feet per second and its velocity at right angles to the direction of movement of the mail-car will be approximately thirty-seven and one-half ( $37\frac{1}{2}$ ) feet. If, therefore, the mail-car is traveling at the rate of forty miles per hour, or approximately sixty feet per second, it will be necessary in order to entirely overcome or neutralize the velocity of the mail-receptacle due to movement of the mail-car to project said mail-receptacle from said car with an actual velocity of approximately seventy-two feet per second. If this exact relation could be secured, it is obvious that the mail-receptacle would fall dead, except for a slight movement away from the mail-car, which when said car is moving at a high rate of speed would be overcome and neutralized by the suction of the mail-car and following cars, tending to draw said mail-receptacle toward or under it. In fact, but for this suction of the mail-car the angle of discharge could be considerably less than shown. As the piston 30 approaches the outward limit of its movement the spring-link 52 operates to open the exhaust-cock 50, thus reducing the pressure in the cylinder 31 and allowing the spring 34 to return the projector-car 11 to its normal retracted position, which will also operate to close said exhaust-cock 50, all in the manner heretofore described.

The governor 60 operates to regulate the volume of air delivered to the cylinder 31, and thus to automatically regulate the velocity at which the mail-receptacle is discharged, according to the velocity of the mail-car.

If it is desired to operate the projector independently of the catcher, this may be done by turning the valve 49 into position to close the pipe 38.

We claim—

1. The combination with a mail-car and a mail-receptacle-engaging member comprising a pivoted supporting-bar, of an arm on said bar, a compressed fluid motor, connection between the motor-piston and the arm on said supporting-bar, a source of supply of fluid under pressure, a pipe connecting said motor with said source of fluid-supply, a valve which controls said pipe, means to maintain said valve nor-



mally closed and means to open said valve, said means comprising a shoe carried by the car and a cam-rail without the car, substantially as described.

5 2. The combination with a mail-car and a mail-receptacle-engaging member comprising a pivoted supporting-bar, of an arm on said bar, a spring applied to said arm to maintain the same normally in inoperative position, a compressed-fluid motor, connection between the  
10 motor-piston and the arm on said supporting-bar, a source of supply of fluid under pressure, a pipe connecting said motor with said source of fluid-supply, a valve which controls said  
15 pipe, means to maintain said valve normally closed and means to open said valve comprising a shoe on the car and a cam-rail without the car, substantially as described.

3. The combination with a mail-car and a  
20 mail-receptacle-engaging member comprising a pivoted supporting-bar, of an arm on said bar, a spring applied to said arm to maintain said mail-receptacle-engaging member normally in inoperative position, means to  
25 move said mail-receptacle-engaging member into operative position against the force of said spring, comprising a compressed-fluid motor, connection between the motor-piston and the arm on said supporting-bar, a source  
30 of supply of fluid under pressure, a pipe connecting said motor with said source of fluid-supply, a valve which controls said pipe, means to maintain said valve normally closed, and means to open said valve comprising a  
35 shoe carried by the car and a cam-rail without the car, and a catch constructed for automatic engagement and manual disengagement for securing said mail-receptacle-engaging member in operative position, substantially  
40 as described.

4. The combination with a mail-car and a mail-receptacle-engaging member, of a compressed-fluid motor, connection between said motor and mail-receptacle-engaging member,  
45 a source of supply of fluid under pressure, a pipe which connects said motor with said source of fluid-supply, a valve which controls said pipe, means to maintain said valve normally closed, means to open said valve at pre-  
50 determined points comprising an actuating member without the car, a by-pass around said valve, and a manually-operated valve which controls said by-pass, substantially as described.

55 5. The combination with a mail-car and a mail-receptacle-engaging member, of a compressed-fluid motor applied to said mail-receptacle-engaging member, a source of supply of fluid under pressure, a pipe which connects said motor with said source of fluid-  
60 supply, a valve which controls said pipe, means to maintain said valve normally closed, mechanically-controlled means to open said valve at desired points, and an exhaust-valve

in said pipe between said main controlling- 65 valve and motor, substantially as described.

6. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and 70 is rearwardly directed relatively to said car, a motor applied to said mail-receptacle support to advance the same with great velocity, and means for controlling the operation of said motor, substantially as described. 75

7. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and is rearwardly directed relatively to said car, 80 means to maintain said mail-receptacle support normally retracted, a motor applied to said mail-receptacle support to advance the same with great velocity, and means for controlling the operation of said motor, substan- 85 tially as described.

8. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on the car so as to be freely movable in opposite directions and 90 is rearwardly directed relatively to said car, a motor applied to said mail-receptacle support to advance the same with great velocity, and means without the car for controlling the operation of said motor, substantially as de- 95 scribed.

9. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and 100 is rearwardly directed relatively to said car, means to maintain said mail-receptacle support normally retracted, a motor applied to said mail-receptacle support to advance the same with great velocity, and means without 105 the car for controlling the operation of said motor, substantially as described.

10. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and 110 is rearwardly directed relatively to said car, a pivoted lever, connection between said lever and said mail-receptacle support, a motor applied to said lever, and means for controlling 115 the operation of said motor, substantially as described.

11. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and is rearwardly directed relatively to said car, means to maintain said mail-receptacle sup- 120 port normally retracted, a pivoted lever, connection between said lever and said mail-re- 125 ceptacle support, a motor applied to said lever, and means for controlling the operation of said motor, substantially as described.



12. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and is rearwardly directed relatively to said car, means to maintain said mail-receptacle support normally retracted, a lever pivoted at one end, connection between said lever and said mail-receptacle support, a motor applied to said lever between its pivotal point and its point of connection to said mail-receptacle support, and means for controlling the operation of said motor, substantially as described.

13. The combination with a mail-car, of a mail-projector, comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and is rearwardly directed relatively to said car, a pivoted lever, a connection between said lever and said mail-receptacle support, a motor applied to said lever, and means for controlling the operation of said motor, said means comprising a member without the car, substantially as described.

14. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and is rearwardly directed relatively to said car, a motor applied to said mail-receptacle support to advance the same with great velocity, means for controlling the operation of said motor, and stops which limit the movement of said mail-receptacle support under the influence of said motor, substantially as described.

15. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and is rearwardly directed relatively to said car, a motor applied to said mail-receptacle support to advance the same with great velocity, means for controlling the operation of said motor, and yielding stops which limit the movement of said mail-receptacle support under the influence of said motor, substantially as described.

16. The combination with a mail-car, of a mail-projector comprising a projector-car, guides or ways on which said projector-car is freely movable in opposite directions, said guides or ways being rearwardly directed relatively to said car, a motor applied to said projector-car to advance the same with great velocity, and means for controlling the operation of said motor, substantially as described.

17. The combination with a mail-car, of a mail-projector comprising a projector-car, guides or ways on which said projector-car is freely movable in opposite directions, said guides or ways being rearwardly directed relatively to said mail-car, a motor applied to said projector-car to advance the same with great velocity, means for controlling the operation of said motor, and stops which limit the movement of said projector-car under the

influence of said motor, said stops comprising a rigid projection and a yieldingly-supported plunger, one secured to said projector-car and the other to a rigid support, substantially as described.

18. The combination with a mail-car, of a mail-projector comprising a projector-car, guides or ways on which said projector-car is freely movable in opposite directions, said guides or ways being rearwardly directed relatively to said mail-car, a lever pivoted at one end, connection between said lever and said projector-car, a motor applied to said lever between its pivotal point and its point of connection to said projector-car, and means for controlling the operation of said motor, substantially as described.

19. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on said mail-car so as to be freely movable in opposite directions and is rearwardly directed relatively to said car, a motor applied to said mail-receptacle support to advance the same with great velocity, means for controlling the operation of said motor, and means to vary the speed of said motor as the speed of the car varies, substantially as described.

20. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and is rearwardly directed relatively to said car, a compressed-fluid motor applied to said mail-receptacle support to advance the same with great velocity, a source of supply of fluid under pressure, a pipe which connects said source of fluid-supply with said motor, a valve which controls said pipe, means to maintain said valve normally closed, means to open said valve, comprising an actuating member without the car, a throttle-valve in said pipe between the controlling-valve therein and said motor, a governor applied to said throttle-valve, driving connection between said governor and an axle of the mail-car, the relation being such that the acceleration of said governor will operate to increase the size of said throttle-valve opening, substantially as described.

21. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and is rearwardly directed relatively to said car, a compressed-fluid motor applied to said mail-receptacle support to advance the same with great velocity, a source of supply of fluid under pressure, a pipe which connects said source of supply with said motor, a valve which controls said pipe, means to open said valve at predetermined points, an exhaust-valve between said controlling-valve and said motor, means to maintain said exhaust-valve normally closed, and connection between said exhaust-



valve and a movable part of the motor whereby said exhaust-valve will be opened as said motor approaches the end of its operative movement, substantially as described.

5 22. The combination with a mail-car, of a mail-projector comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and is rearwardly directed relatively to said car,  
10 a compressed-fluid motor applied to said mail-receptacle support to advance the same with great velocity, a source of supply of fluid under pressure, a pipe which connects said source of fluid-supply with said motor, a valve which  
15 controls said pipe, means to maintain said valve normally closed, means to open said valve at predetermined points, an exhaust-valve in said pipe between said controlling-valve and said motor, means to maintain said exhaust-valve  
20 normally closed, and a spring-link which connects said valve with a reciprocating portion of the motor whereby said exhaust-valve will be opened as said reciprocating part approaches the end of its operative movement,  
25 substantially as described.

23. The combination with a mail-car, of a projector comprising a mail-receptacle support which is mounted on said car so as to be freely movable in opposite directions and is  
30 rearwardly directed relatively to said car, a

compressed-fluid motor applied to said mail-receptacle support to advance the same with great velocity, a source of supply of fluid under pressure, a pipe which connects said source of fluid-supply with said motor, a valve which  
35 controls said pipe, means to maintain said valve normally closed, means to open said valve at predetermined points, a throttle-valve in said pipe between the controlling-valve therein and said motor, a governor applied to said throttle-valve, driving connection between said  
40 governor and an axle of the car, a by-pass around said controlling-valve, one end of which communicates with the fluid-supply pipe between the source of fluid-supply and  
45 said controlling-valve and the other end of which communicates with said fluid-supply pipe between said controlling-valve and the throttle-valve, and a manually-operated valve which controls said by-pass, substantially as  
50 described.

In testimony that we claim the foregoing as our invention we affix our signatures, in presence of two subscribing witnesses, this 4th day of August, A. D. 1903.

LEWIS A. PEASE.  
JOHN A. BRADY.

Witnesses:

F. J. SAIGER,  
C. J. McDERMOTT.