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R. G. THORNHILL & C. C. THOMPSON.

AUTOMATIC MAIL BAG EJECTOR.

APPLICATION FILED APR. 22, 1907.

Fig. 1.

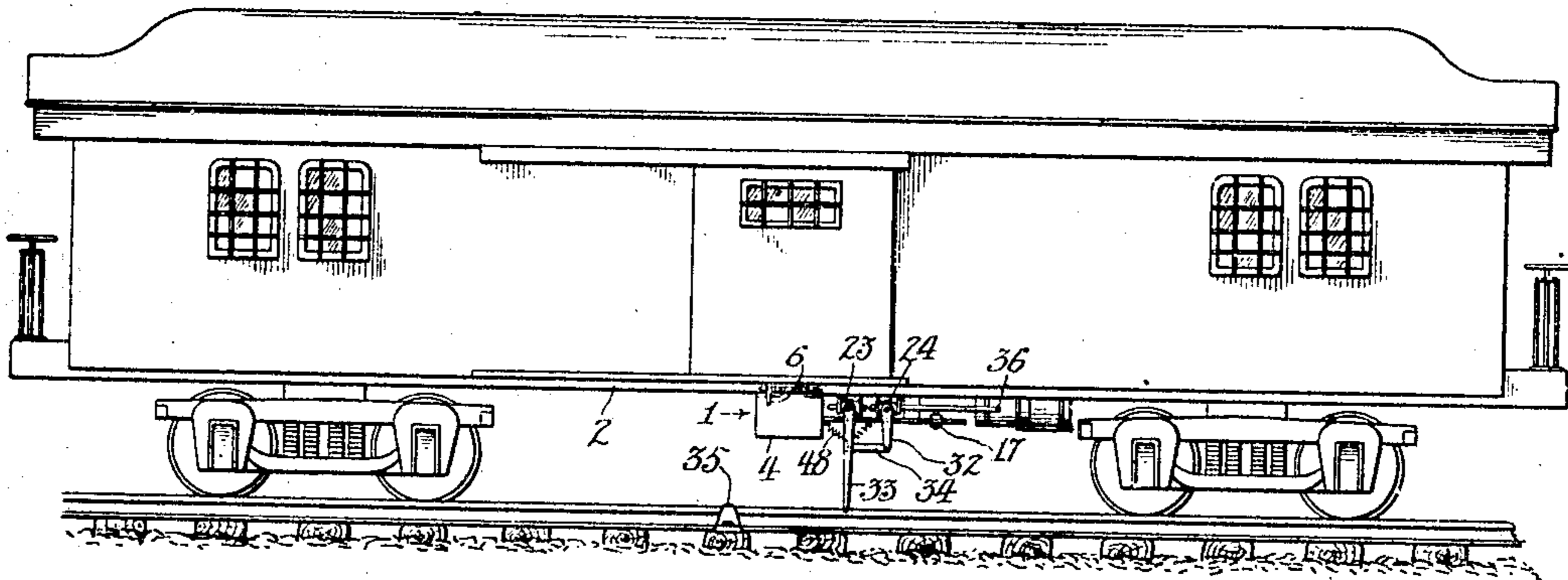


Fig. 2.

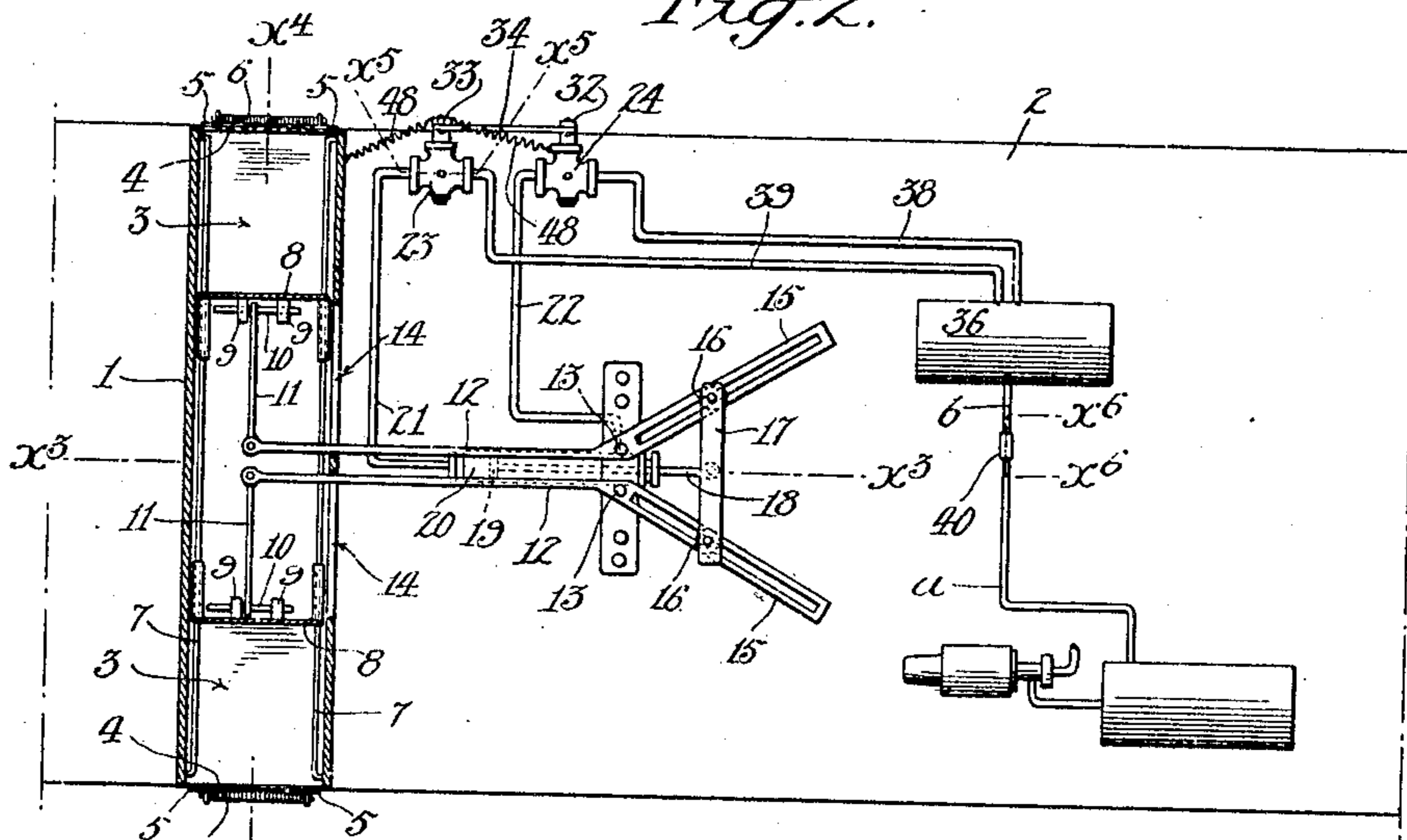


Fig. 3.

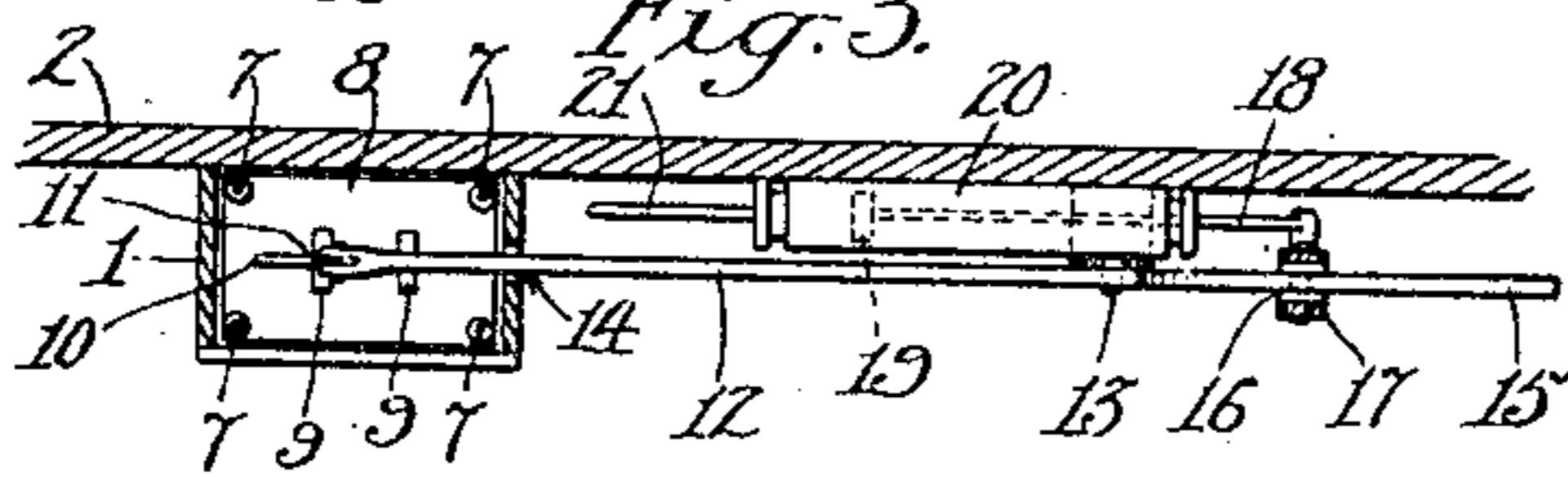


Fig. 4.

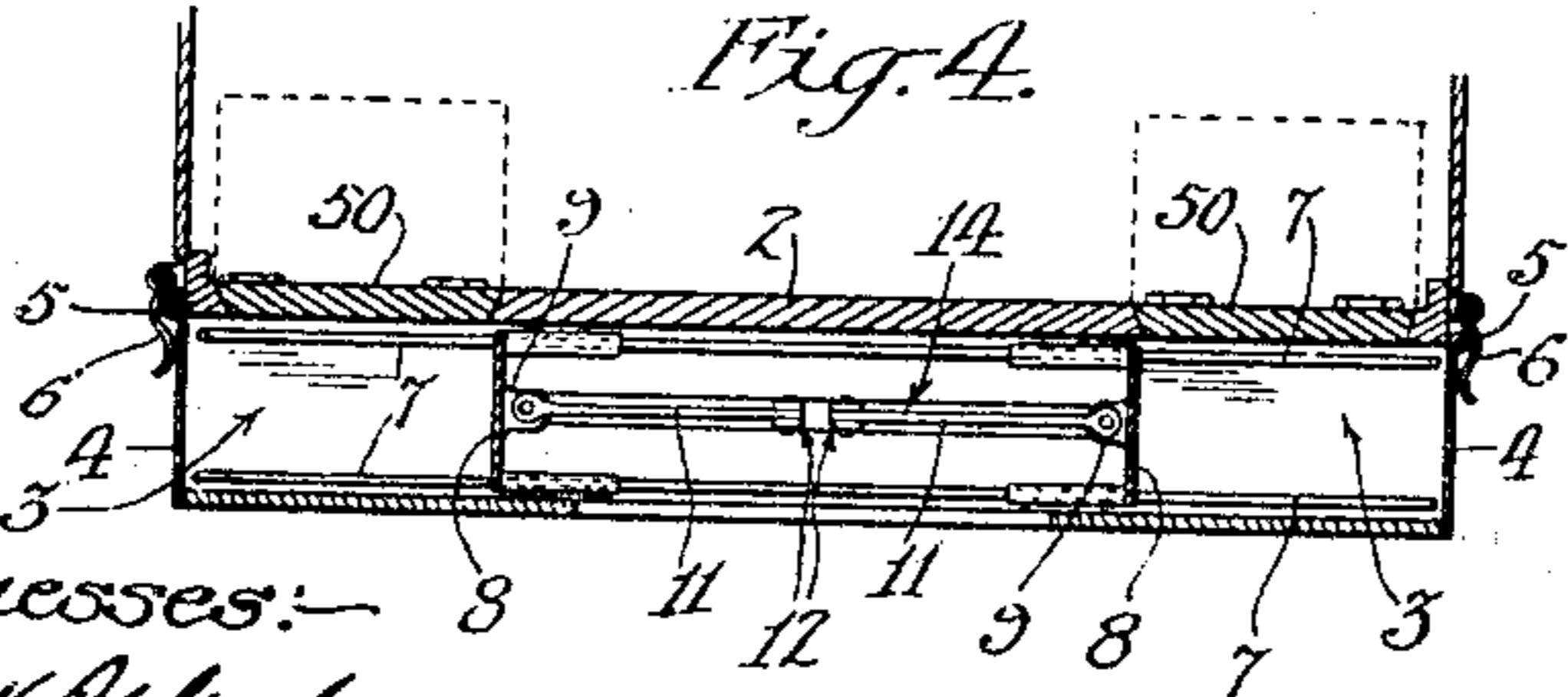


Fig. 5.

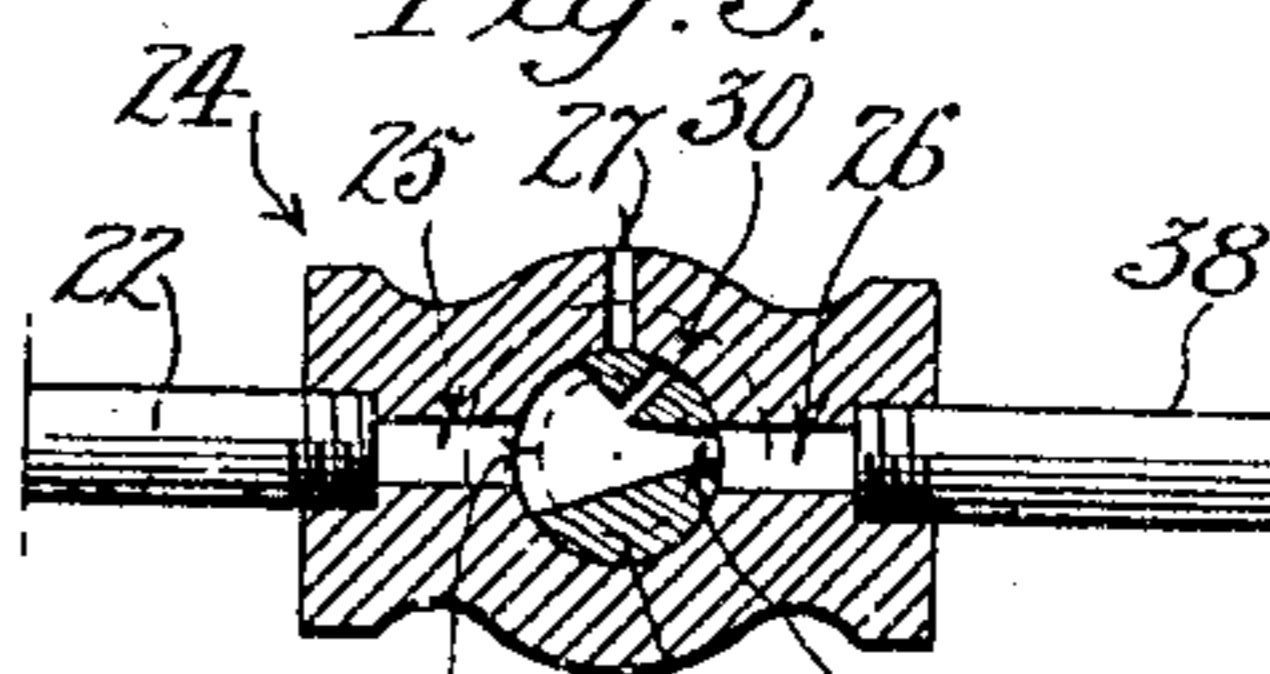
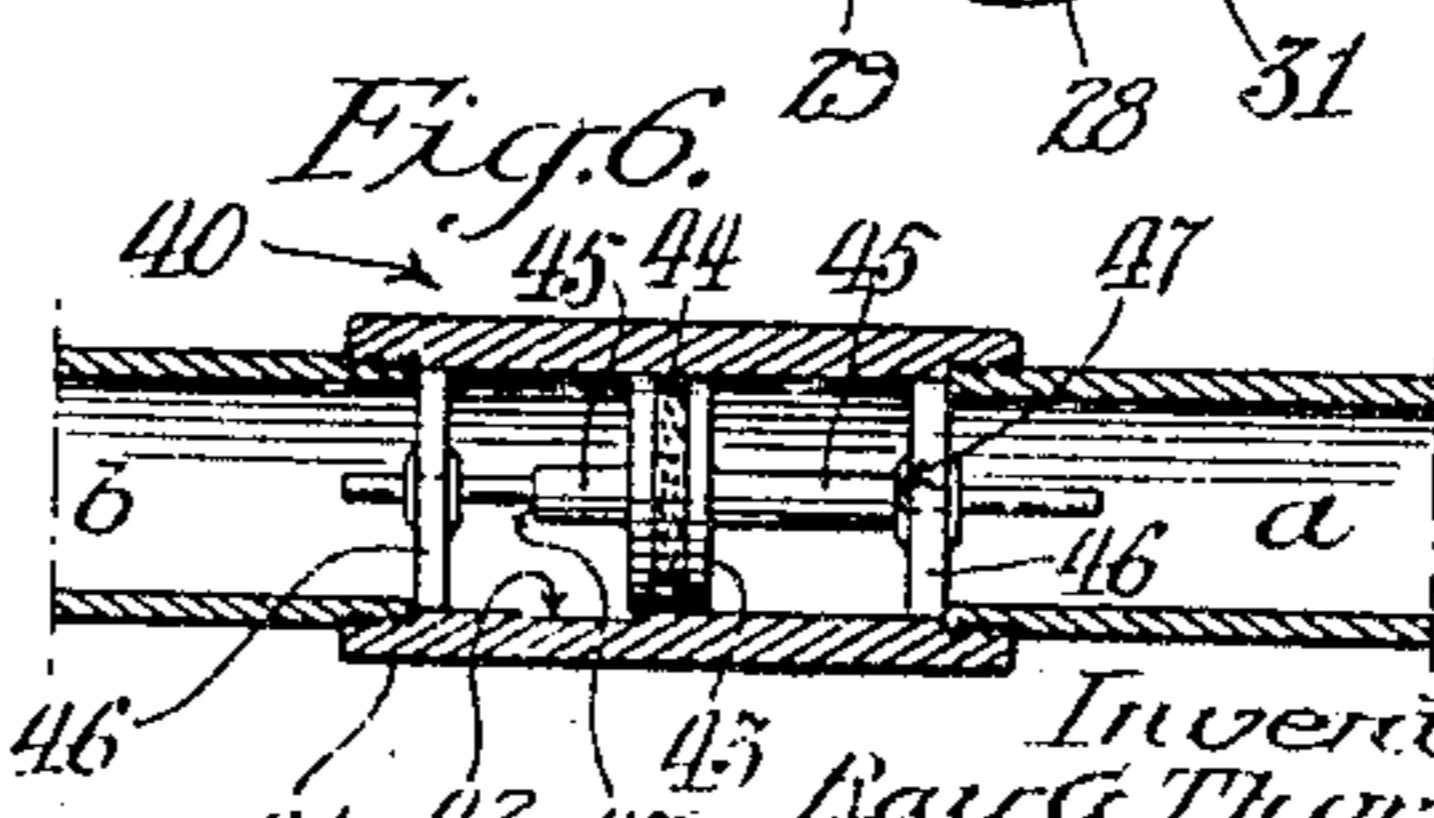


Fig. 6.



Witnesses:  
Frank C. Mahan,  
Louis W. Gratz.

Inventors:  
Ray C. Thornhill,  
Charles C. Thompson.  
Thornhill & Thompson, Attys.

# UNITED STATES PATENT OFFICE.

RAY G. THORNHILL AND CHARLES C. THOMPSON, OF LOS ANGELES, CALIFORNIA.

## AUTOMATIC MAIL-BAG EJECTOR.

No. 871,458.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed April 22, 1907. Serial No. 369,712.

*To all whom it may concern:*

Be it known that we, RAY G. THORNHILL and CHARLES C. THOMPSON, both citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Automatic Mail-Bag Ejector, of which the following is a specification.

This invention relates to automatic mail bag ejectors designed to be carried by mail cars, and the main object of the invention is to cause one or more mail bags to be automatically ejected from either side of the mail car by means of compressed air when the car passes over a definite point on the road. The compressed air employed for this purpose is taken from the air brake system of the car, and a further object is to prevent the operation of the mail bag ejector from interfering with the air brake apparatus, and preventing the operation of the air brake apparatus from interfering with the operation of the mail bag ejecting apparatus.

Another object is to enable the mail bags to be placed in the delivery mechanism from the interior of the mail car.

Other advantages of the invention relate to details in the construction, combination and arrangement of parts as will be hereinafter pointed out in the description.

Referring to the drawings:—Figure 1 is a side view of a mail car equipped with the invention. Fig. 2 is an inverted plan view, enlarged, of the mail bag ejecting device with the delivery boxes shown in section. The view is taken looking from the track up toward the underside of the car. Fig. 3 is a section on line  $x^3-x^3$  Fig. 2. Fig. 4 is a section on line  $x^4-x^4$  Fig. 2. Fig. 5 is an enlarged section on line  $x^5-x^5$  Fig. 2. Fig. 6 is an enlarged section on line  $x^6-x^6$  Fig. 2.

The entire apparatus is mounted underneath the deck of the car and in its preferred form comprises a box 1 arranged transversely of the deck 2 of the car and extending the full width of the deck. The box 1 forms at each end what may be termed delivery boxes 3. The outer end of each delivery box is normally closed by a door 4 hinged at 5 and normally held closed by a spring 6. Rods 7 extend longitudinally of the box 3 and form guiding ways for a pair of ejecting plungers 8. Each ejecting plunger 8 has a pair of lugs 9, and slidably mounted in each pair of lugs 9 is a rod 10 which carries an arm 11. A pair of operating levers 12 are piv-

oted at 13 and extend through slots 14 formed in the box 3, and the operating arms 12 are connected to the respective arms 11. The other ends of arms 12 are provided with slotted extensions 15 which are engaged by rollers 16 carried at each end of the cross-head 17, the latter being mounted in the end of a piston rod 18. The piston rod 18 is carried by a piston 19 mounted in an air cylinder 20, and the piston is operated in either direction by means of compressed air which may be introduced into either end of the cylinder through pipes 21 and 22.

Valves 23 and 24 are arranged under the deck of the car and each valve casing has ports 25 and 26 arranged opposite each other, and each valve casing also has an air escape port 27. The plug 28 of each valve is formed, as shown in Fig. 5, with three ports 29, 30 and 31, and the plug of valve 24 is provided with a short arm 32 while the plug of valve 23 is provided with a long arm 33 which is connected by a link 34 with the arm 32. The long arm 33 serves as a trip lever and is adapted to be actuated by a trip device 35 on the track, each trip device being located at the point where the mail bags are designed to be delivered, and the trip devices 35 are preferably arranged in pairs one on each side of the track to obviate the necessity of employing two levers 33 on each side of the car. This enables the lever 33 to be actuated by one or the other of the trip devices 35 according to the direction in which the car is moving.

A pipe 21 is connected with port 25 of valve 23 and pipe 22 is connected with port 25 of valve 24. 36 is an air reservoir used exclusively in the operation of the mail bag ejecting device and receives its supply of air from the air brake system of the car through a pipe *b*. A pipe 38 extends from the reservoir 36 to port 26 of valve 24, and a pipe 39 extends from the reservoir 36 to port 26 of valve 23.

Connected to the pipe *b* is an automatic valve 40 which is connected by a pipe *a* with the air brake system, as shown in detail in Fig. 6. This valve comprises a cylindrical casing 41 having at one side of its center a small recess forming a by-pass 42. A piston 43 having suitable packing 44 is arranged within the casing 41 and is guided by a double stem 45, both ends of the stem being slidably mounted in spiders 46. The piston 43 is limited in its movement by shoulders 47

formed in the double stem 45, which shoulders are adapted to strike against the spiders 46. When in one position, as shown in Fig. 6, the piston 14 shuts off communication between pipes *a* and *b*, and when in the other position the piston 43 lies midway of the by-pass 42 and thus places pipes *a* and *b* in communication with each other through the by-pass 42. When the air pressure in reservoir 36 becomes lowered by using the automatic mail ejector, the pressure in pipe *b* falls below the pressure in pipe *a*, and then the piston 43 is moved toward pipe *b* so that it stands over the by-pass 42 and allows air to pass from pipe *a* into pipe *b* and through reservoir 36. The piston 43 remains in that position even after the pressure in reservoir 36 has been equalized with the pressure in pipe *a*, but when the air brakes of the car are actuated the pressure in pipe *a* falls whereupon the piston 43 is immediately moved toward pipe *a* and into the position shown in Fig. 6 on account of the greater pressure existing in pipe *b*, and thus the piston valve 43 immediately shuts off communication between pipes *a* and *b* and prevents any back flow of air from reservoir 36 into pipe *a*. In this manner the reservoir 36 is always kept supplied with air at the proper pressure; and the operation of the air brakes does not interfere with the operation of the mail bag ejector, nor does the operation of the mail bag ejector interfere with the operation of the air brakes. It should be noted that the by-pass 42 is very small and the feeding of air therethrough to the reservoir 36 takes place very slowly and thus the escape of this air from the air brake system is inappreciable, being in effect like a small leak which occurs only at intervals and thus it is not felt by the air brake system.

The lever 33 is normally held in mid position by a pair of coil springs 48, and the plug 28 of valve 23, when in such normal condition, shuts off communication between pipes 39 and 21 and places pipe 21 in communication with the atmosphere through the medium of the port 27. The valve 24 which is connected with the valve 23, when in normal position, stands as shown in Fig. 5, with its port 31 in communication with port 26 and its port 29 in communication with port 24, and shutting off port 27 and placing pipe 38 in communication with pipe 22. Thus when the valves are in normal position the air pressure which enters the cylinder 20 through pipe 22 holds the piston 19 to the left, the left end space in the cylinder being in communication with the atmosphere through pipe 21 and port 27 of valve 23.

The mail bags which are to be delivered are placed in the delivery boxes 3 through trap doors 50. When the car arrives at the point where the mail bags are to be discharged, as soon as the lever 33 is rocked by

passing over the trip device 35, the plug 28 of valve 23 is turned so that communication is established between pipes 39 and 21, whereupon compressed air immediately rushes through pipe 21 and into the cylinder and forces the piston 19 to the right. Simultaneously with the operation of valve 23, the plug 28 of valve 24 is turned so that its port 30 registers with port 27 which shuts off the air pressure from pipe 38 and allows the air to exhaust from the right end of cylinder 20 through pipe 22 and ports 29, 30 and 27 to the atmosphere. As the piston moves to the right, the piston rod 18 carries out the cross-head 17 and the latter draws together the slotted extensions 15, thus rocking the operating arms 12 and forcing the two ejecting plungers 8 outwardly, and the latter force the mail bags out of the delivery boxes, the spring pressed doors 4 readily yielding to permit the outward passage of the mail bags. This operation takes place very quickly.

What we claim is:—

1. An automatic mail bag ejector comprising a pair of delivery boxes arranged to discharge on each side of the car, plungers in the boxes, a pair of pivoted arms having slotted extensions, a connection between each arm and its associated plunger, a cross head engaging the slotted extensions, a piston rod carrying said cross head, a cylinder, a piston therein carrying said piston rod, a compressed air supply, valve mechanism for controlling the supply of compressed air to said cylinder, and means operated by a trip on the track for controlling said valve mechanism.

2. An automatic mail bag ejector comprising a pair of delivery boxes arranged to discharge on each side of the car, trap doors in the floor of the car permitting the bags to be placed in the delivery boxes, plungers in the boxes, a pair of pivoted arms having slotted extensions, a connection between each arm and its associated plunger, a cross head engaging the slotted extensions, a piston rod carrying said cross head, a cylinder, a piston therein carrying said piston rod, a compressed air supply, valve mechanism for controlling the supply of compressed air to said cylinder, and means operated by a trip on the track for controlling said valve mechanism.

3. An automatic mail bag ejector comprising a pair of delivery boxes arranged to discharge on each side of the car, trap doors in the floor of the car permitting the bags to be placed in the delivery boxes, plungers in the boxes, spring pressed doors normally closing the outer ends of the delivery boxes, a pair of pivoted arms having slotted extensions, a connection between each arm and its associated plunger, a cross head engaging the slotted extensions, a piston rod carrying said cross head, a cylinder, a piston therein

carrying said piston rod, a compressed air supply, valve mechanism for controlling the supply of compressed air to said cylinder, and means operated by a trip on the track 5 for controlling said valve mechanism.

4. An automatic mail bag ejector comprising a pair of delivery boxes arranged to discharge on each side of the car, plungers in the boxes, a pair of pivoted arms having slot- 10 ted extensions, a connection between each arm and its associated plunger, a cross head engaging the slotted extensions, a piston rod carrying said cross head, a cylinder, a piston therein carrying said piston rod, a com- 15 pressed air supply, valve mechanism for controlling the supply of compressed air to said cylinder, means operated by a trip on the track for controlling said valve mechanism, a reservoir between said compressed air sup- 20 ply and the valve mechanism, and means between said reservoir and the air supply for automatically preventing air from flowing back from the reservoir if the pressure of the supply falls below that of the reservoir and 25 for draining air slowly from the supply into the reservoir when the pressure of the reservoir falls below that of the air supply.

5. An automatic mail bag ejector comprising a pair of delivery boxes arranged to 30 discharge on each side of the car, plungers in the boxes, a pair of pivoted arms having slot- ted extensions, a connection between each arm and its associated plunger, a cross head engaging the slotted extensions, a piston rod 35 carrying said cross head, a cylinder, a piston therein carrying said piston rod, a pair of valves each having an operating arm, a link connecting said arms, a pipe extending from one end of said cylinder to one valve, a pipe 40 extending from the other end of the cylinder to the other valve, a reservoir, and a pipe ex-

tending from each valve to the reservoir, one of said latter arms being longer than the other and adapted to be operated by a trip device on the track. 45

6. An automatic mail bag ejector comprising a pair of delivery boxes arranged to discharge on each side of the car, plungers in the boxes, a pair of pivoted arms having slot- 50 ted extensions, a connection between each arm and its associated plunger, a cross head engaging the slotted extensions, a piston rod carrying said cross head, a cylinder, a piston therein carrying said piston rod, a pair of 55 valves each having an operating arm, a link connecting said arms, a pipe extending from one end of said cylinder to one valve, a pipe extending from the other end of the cylinder to the other valve, a reservoir, a pipe extend- 60 ing from each valve to the reservoir, one of said latter arms being longer than the other and adapted to be operated by a trip device on the track, an air brake system, a pipe ex- 65 tending from the air brake system to said reservoir for supplying the reservoir, and a valve in said latter pipe comprising a cylin- 70 drical casing with a by pass, a piston in the casing, and means for limiting the movement of the piston whereby when the piston is over the by pass air is allowed to flow 70 through the by pass toward said reservoir and when the piston is away from the by pass air is prevented from flowing back from the reservoir.

In testimony whereof, we have hereunto 75 set our hands at Los Angeles, California, this 11th day of April 1907.

RAY G. THORNHILL.

CHARLES C. THOMPSON.

In presence of—

GEORGE T. HACKLEY,  
FRANK L. A. GRAHAM.