W. ASHCRAFT.

TROLLEY RETRIEVER.

APPLICATION FILED OCT. 15, 1908.

**1,016,467.** Patented Feb. 6, 1912.

Fig. 1.

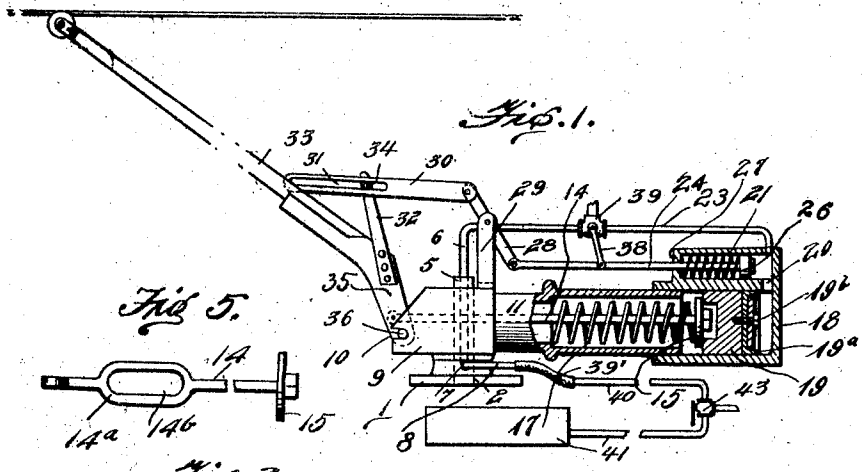



Fig. 5.




Fig. 2.

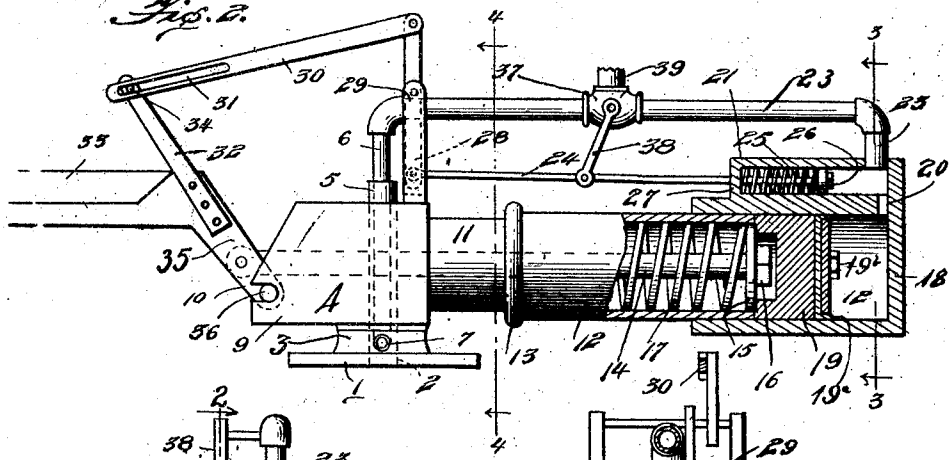



Fig. 3.

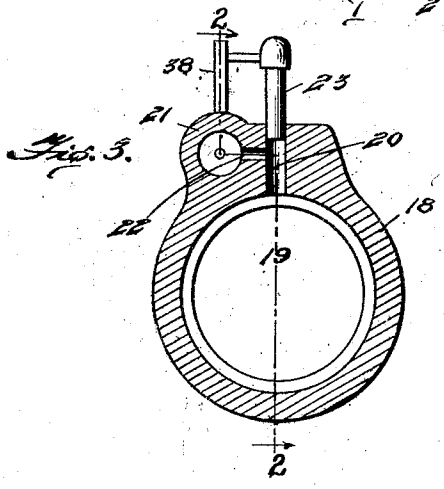
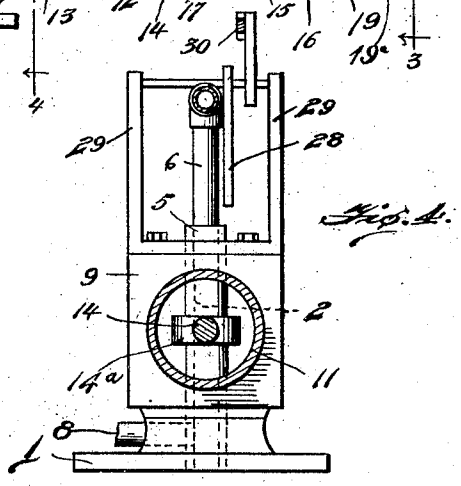



Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## TROLLEY-RETRIEVER.

1,016,467. Specification of Letters Patent. Patented Feb. 6, 1912.

Application filed October 15, 1908. Serial No. 457,926.

*To all whom it may concern:*

Be it known that I, WILLIAM ASHCRAFT, a citizen of the United States, residing at Grandin, in the county of Carter and State of Missouri, have invented certain new and useful Improvements in Trolley-Retrievers; and I do 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.

This invention relates to mechanism for automatically lowering a trolley when it becomes accidentally disengaged from the trolley wire.

One of the objects of the invention is the provision of a trolley retriever adapted to be automatically operated by the trolley pole and connected with the compressed air reservoir of the car.

Another object of the invention is the production of mechanism adapted to be operated by compressed air supplied from the air reservoir of the car and provided with a valve capable of being opened by the upward movement of the trolley and the pressure of the compressed air.

With the foregoing and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1 is a side elevation of this improved retriever applied with the pole in operative position; Fig. 2 is a longitudinal section partly in side elevation showing the pole and its connected parts in the position they assume after the trolley leaves the wire and drops to lowered inoperative position and taken on line 2—2 of Fig. 3; Fig. 3 is a transverse section taken on the line 3—3 of Fig. 2; Fig. 4 is a similar view taken on the line 4—4 of Fig. 2; and, Fig. 5 is a plan view of the operating rod.

Corresponding and similar parts are indicated in all of the views of the drawings and in the following description by similar reference characters.

In the drawings, the numeral 1 designates the base adapted to be rotatably mounted on a car roof and formed with the opening 2, through which an air conduit is arranged to extend. The base 1 is formed with an upright member 3 on which rests a hollow block 4, said block being formed with openings in its upper and lower walls through which a tubular member 5 extends. The tubular member 5 connects the block 4 and the base 1, and an air conduit 6 extends through said member and is formed at its lower end with a lateral opening 7 having connection with an air conduit 8.

The hollow block 4 is open at its front end and is provided with an extension 9, the side walls of which are provided with slots as 10. A tubular extension or neck 11 projects laterally from the block 4 at the side opposite the extension 9 and communicates with the interior of the block 4. A cylinder or casing 12 is secured to the member 11 and is preferably provided on the outer face of its overlapping end with a reinforcing rib 13. A pull or piston rod 14 extends through the block 4 and members 11 and 12 and has loosely mounted thereon a washer or piston 15, held by a nut 16. A coiled compression spring 17 is mounted on the rod 14 between the outer end of the member 11 and the washer 15 and is adapted to hold the trolley pole up against the wire and to hold it yieldably in lowered position and to return it to operative position as will be hereinafter described. The bore in the neck 11 is of sufficient diameter to provide sufficient room for the oscillation of the rod 14 on the raising or lowering of the pole. A piston 19 is mounted in a fixed cylinder 18 to which one end of the casing 12 is secured. The piston 19 normally engages the washer 15 and the nut at the rear of said washer 15 rests in a recess at the end of the piston 19. The flange $19^a$ and nut $19^b$ at the rear of said piston hold the piston spaced a suitable distance from the rear of cylinder 18, when the pole is in operative position, to provide space for the entrance of the piston operating fluid which enters behind said piston when the pole leaves the wire as will be hereinafter more fully described. The cylinder 18 is formed with an air port 20 and is provided with an auxiliary cylinder 21 which communicates by a port 22 with the port 20 and an air conduit 23 is suitably connected with the port 20.

A piston rod 24 is slidable within the auxiliary cylinder 21 and a compression spring 25 embraces the inclosed end of said piston rod and is adapted to normally hold the piston 26 on said rod, adjacent the port 20 and bears at its outer end against the outer

head 27 of the auxiliary cylinder 21. The piston rod 24 extends toward the block 4 above and parallel with the members 12 and 13 and is pivotally connected at its forward end to one end of a lever 28, said lever being fulcrumed intermediately of its ends on a vertical arm 29 carried by the block 4. The free upper end of the lever 28 is pivotally connected with one end of a link 30, said link 30, having a longitudinal slot 31 at its other end. This slotted link 30 is connected with an arm 32 fixed to the lower end of the trolley pole 33, by a lateral pin 34 arranged to slide in the slot 31.

The trolley pole 33 is formed with a downwardly bent end 35, which end is provided at its free end with a pin 36, extending laterally on opposite sides and adapted to operate in the slots 10 of the block extension 9, which forms a bearing for the pole. The pull rod 14 is pivoted to said bent pole end intermediately of its ends, for raising and lowering said pole. The rod 14 is constructed as shown in Fig. 5 with an enlarged longitudinally slotted head $14^a$ the slot $14^b$ thereof encircling the tubular member 5 to provide for the free vertical movement of the rod 14. The air conduit 23 preferably extends in a plane parallel with the piston rod 24 and above the same and connects with the conduit 6 at its forward end. A three-way valve 37 is arranged in the conduit 23 intermediately of its ends and a handle or operating lever 38, for said valve is pivotally connected to the piston rod 24. This valve 37 is designed to control the passage of air through the conduit 23 and is provided with an exhaust opening 39, which preferably exhausts to the atmosphere.

The lower end of the conduit 6 is connected with a flexible conduit 39′ preferably formed of rubber by the pipe 8 and said flexible conduit is connected with a metallic conduit 40 which is arranged to extend downwardly on the car and is connected at its lower end with a compressed air reservoir 41, which supplies air to the car brakes.

Normally when the trolley wheel is on the wire the arm 32 with its lateral pin 34 occupies the position shown in Fig. 1, the pin being near the inner end of slot 31 and the piston 19 near the rear of the cylinder 18 and the washer 15 in engagement therewith the tension of the spring 17 being exerted to hold the trolley pole 33 yieldably in engagement with the trolley wire. When the trolley pole becomes accidentally disengaged from the trolley wire, said pole will be elevated by means of the tension exerted by spring 17 which forces the piston 19 to its extreme rearward limit, said spring being always under compression upon the rod 14, and the pin 34 will slide along the slot 31 to its extreme inward movement bearing against the inner wall of slot 31 and thereby forcing the lever 28 into vertical position and the rod 24 and lever 38 forward, thereby opening the valve 37 and establishing communication between conduit 6 and conduit 23. When the three-way valve 37 has thus been opened by means of the piston rod 24, and lever 38 the compressed air will flow through the conduit 23 into cylinder 21 and cylinder 18, thereby holding the piston 26 in withdrawn position thereby holding the valve 37 open and forcing the piston 19 and rod 14 forward thereby exerting a pushing action on pole 33 and causing it to move downwardly until the piston 19 engages the inner end of the cylinder 12 and assumes the position shown in Fig. 2. A spring 17 is tightly compressed between the washer 15 and the inner end of the cylinder 11 during this downward movement of the pole and exerts a cushioning or counterbalancing effect on the pole preventing it from falling against the car roof, said pole being held in lowered position against the tension of spring 17 by the piston 19 under the action of the compressed air introduced through the cylinder 21 into the cylinder 18 in front of said piston 19 and thus prevents the spring from elevating the pole. It is to be understood that the spring 17 is sufficiently strong at all times to lift the pole, but is prevented from so doing by the positive pushing action exerted by the piston 19 against the end 16 of the rod. The distance the pole is held above the car roof is determined by the engagement of the piston 19 with the front end of the cylinder 12. The lowering of the trolley pole 33 into this position will be followed by the pin 34 moving outward in slot 31 to a point near its extreme outer end. When it is desired to replace the trolley on the trolley wire, the trolley pole 33 is pulled downwardly by means of an operating cord, (not shown) which causes pin 34 to engage the outer end wall of slot 31 and exert a pull on link 30 and through it on link 28 and rod 24, operating valve 37 to cut off communication between pipes 6 and 23 and thereby allow the air in cylinders 18 and 21 to pass out through the exhaust opening 39 to the atmosphere releasing piston 19 and the spring 17 which is further compressed on the downward pull on the pole, will then exert its tension to lift the trolley pole 33 into engagement with the trolley wire and assume the position shown in Fig. 1.

The valve 43 is preferably a three-way valve and is adapted to be closed by the conductor or motorman when the car is crossing steam railroads to cut off the compressed air from the retriever thereby allowing the trolley pole to rise against the trolley wire which is held at a higher point than usual over said crossing without the retriever operating to lower the pole. After

the crossing has been passed, the valve 43 is again opened to turn on the air supply to the retriever.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention, as defined in the appended claims.

Having thus described my invention what I claim is:—

1. A trolley retriever comprising a base, a trolley pole supported on the base, an arm on the trolley pole, a slotted link, a lateral pin on said arm, operable in the slot of said link, a lever pivotally connected to said slotted link, means for supporting said lever, a piston rod pivoted to said lever, a piston mounted on said rod, a valve connected to be operated by said rod, and a compressed air conduit controlled by said valve, means for supplying compressed air to said conduit, a cylinder inclosing said piston and connected to receive air from said conduct, a second cylinder continuously communicating with said first-mentioned cylinder, a piston movable within said second cylinder, a rod connected with said trolley pole, a spring embracing said rod, abutments on said rod and cylinder for said spring, the piston in said second cylinder being operable by compressed air to move said rod to lower said pole, said spring being operable to elevate the pole when the compressed air is exhausted from said second cylinder.

2. A trolley retriever comprising a supporting structure, a trolley pole pivotally connected to said structure and having an arm extending laterally therefrom, a lever fulcrumed intermediately of its ends on said structure, a link pivotally connected with one end of said lever and having a sliding connection with said arm, means for limiting the movement of said link and arm in opposite directions relative to each other, a rod connected with the other end of said lever, a valve controlled by the movement of said rod, means connecting said valve and rod whereby the valve is opened and closed by the movement of the rod in opposite directions, compressed air operated means for lowering the pole when said valve is opened, and resilient means for elevating and supporting said pole.

3. A trolley pole retriever comprising a supporting structure, a trolley pole pivotally connected to said structure, a cylinder mounted on said structure, a piston in said cylinder, a rod connected at one end to said pole with its other end extending into said cylinder and provided with an abutment, a coiled spring on said rod within said cylinder arranged between the abutment of said rod and the rear end of the cylinder, means for supplying compressed air to said cylinder in front of said piston to force the piston into engagement with said rod to move it rearward and thereby lower the pole, resilient means for cushioning the lowering movement of the pole and for elevating it when said lowering means is disengaged from said rod, and means for controlling the air supply to said cylinder, said means being connected with said pole and operable on the rising of the pole beyond a predetermined point to admit air to said cylinder and to exhaust it on the lowering of the pole beyond a predetermined point.

4. A trolley retriever comprising a supporting structure, a trolley pole pivotally connected to said structure, a cylinder mounted on said structure, a piston in said cylinder, means for limiting the rearward stroke of said piston, a rod connected at one end to said pole and having its free end extending into said cylinder into the path of movement of said piston and adapted to be engaged and moved by said piston, an abutment on said rod, a coiled spring on said rod with one end engaging said abutment and its other end engaging the rear end of said cylinder, a compressed air conduit opening into said cylinder in front of said piston, a three-way valve in said conduit, valve actuating means connected with said pole and operable by the raising of the pole beyond a predetermined point, and means operable by the air supply to hold said valve in open position.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM [illegible]CRAFT

Witnesses:
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