

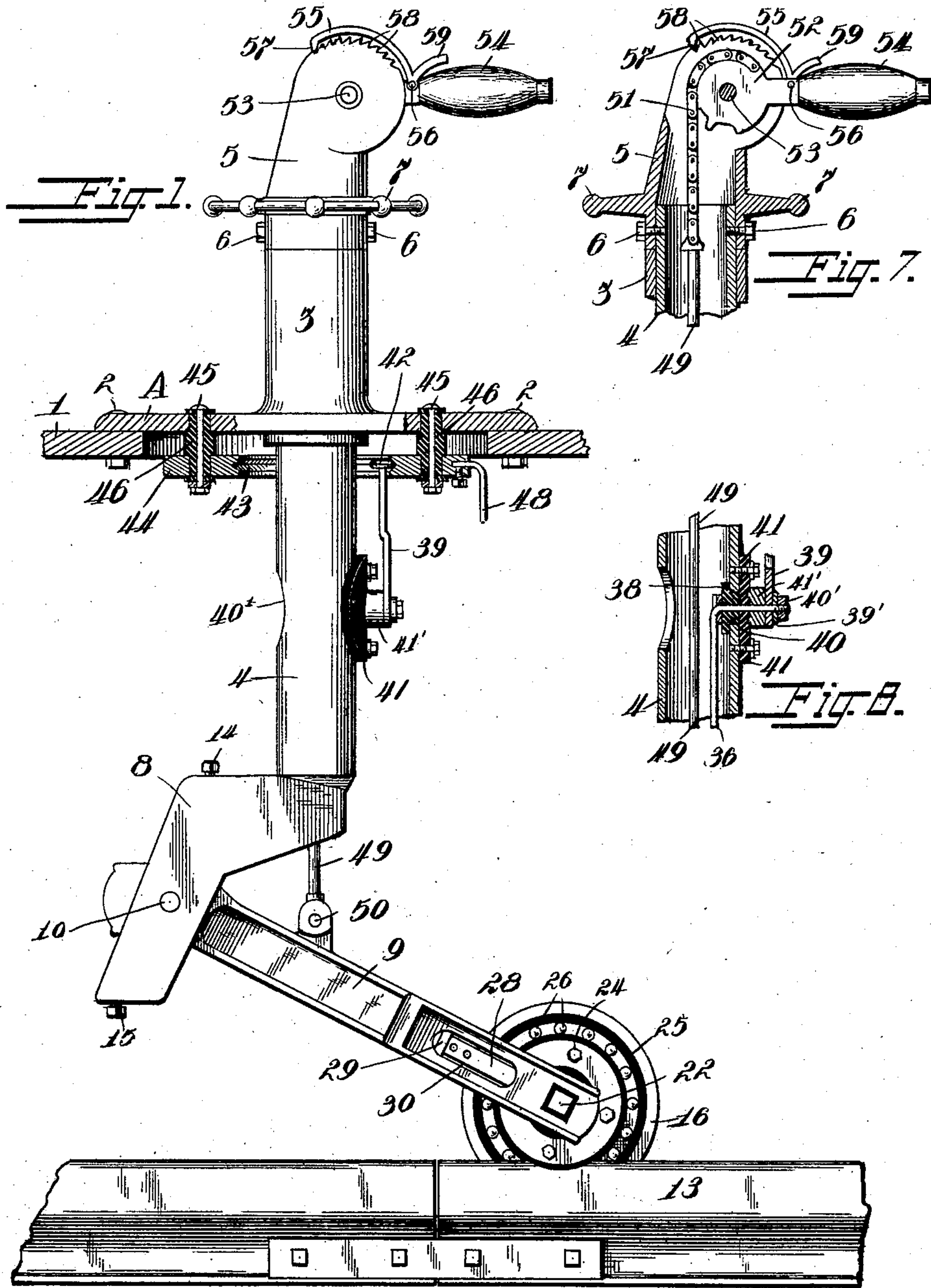
No. 859,867.

PATENTED JULY 9, 1907.

C. A. BLUHM.  
TROLLEY.

APPLICATION FILED FEB. 27, 1906.

3 SHEETS—SHEET 1.



Witnesses  
Milton Lenox  
Watts T. Estabrook

Inventor  
Charles A. Bluhm  
by *Thos. & DuBois*  
Attorneys

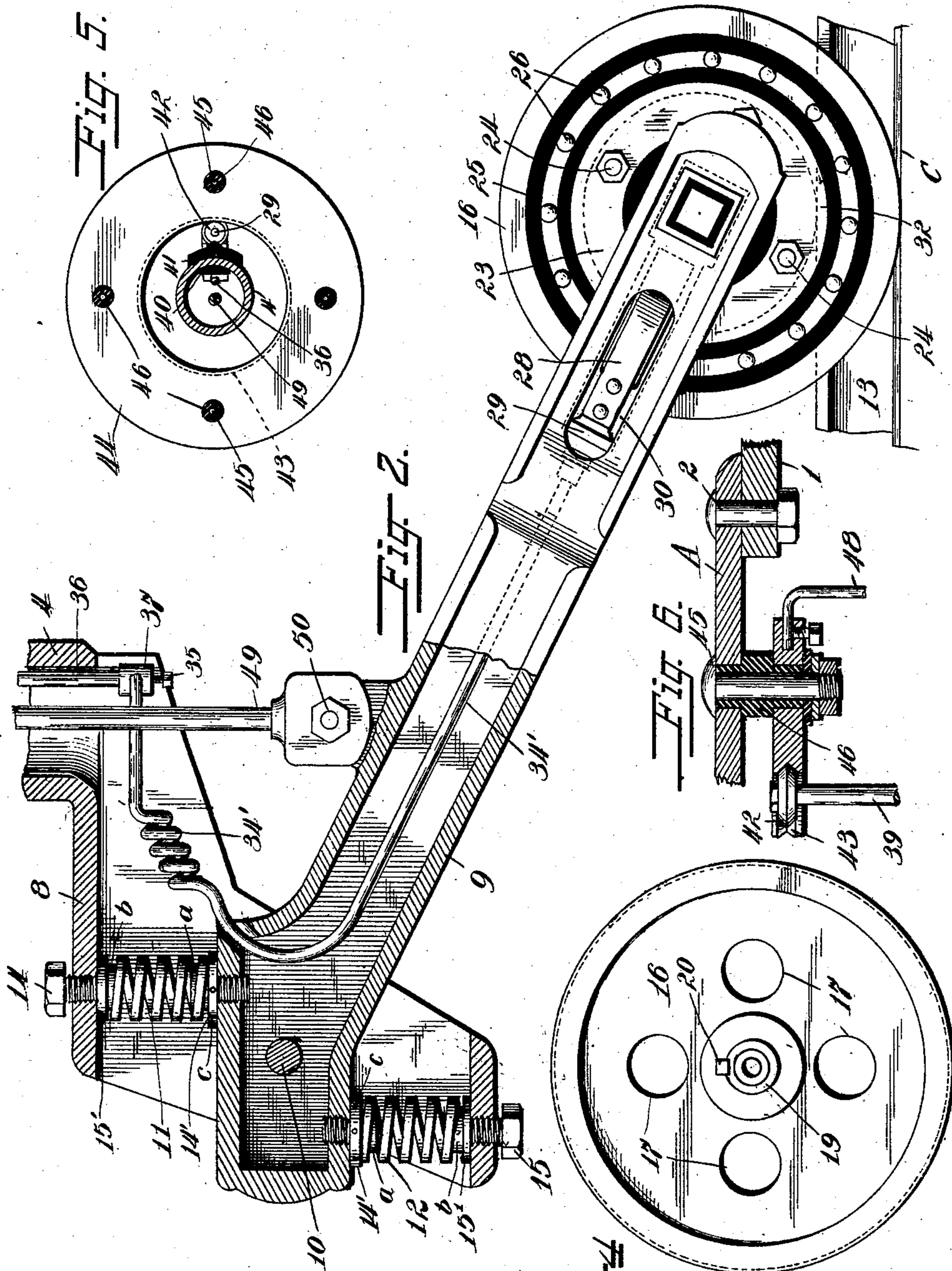
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3 SHEETS—SHEET 2.



Witnesses  
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by Fig. 4

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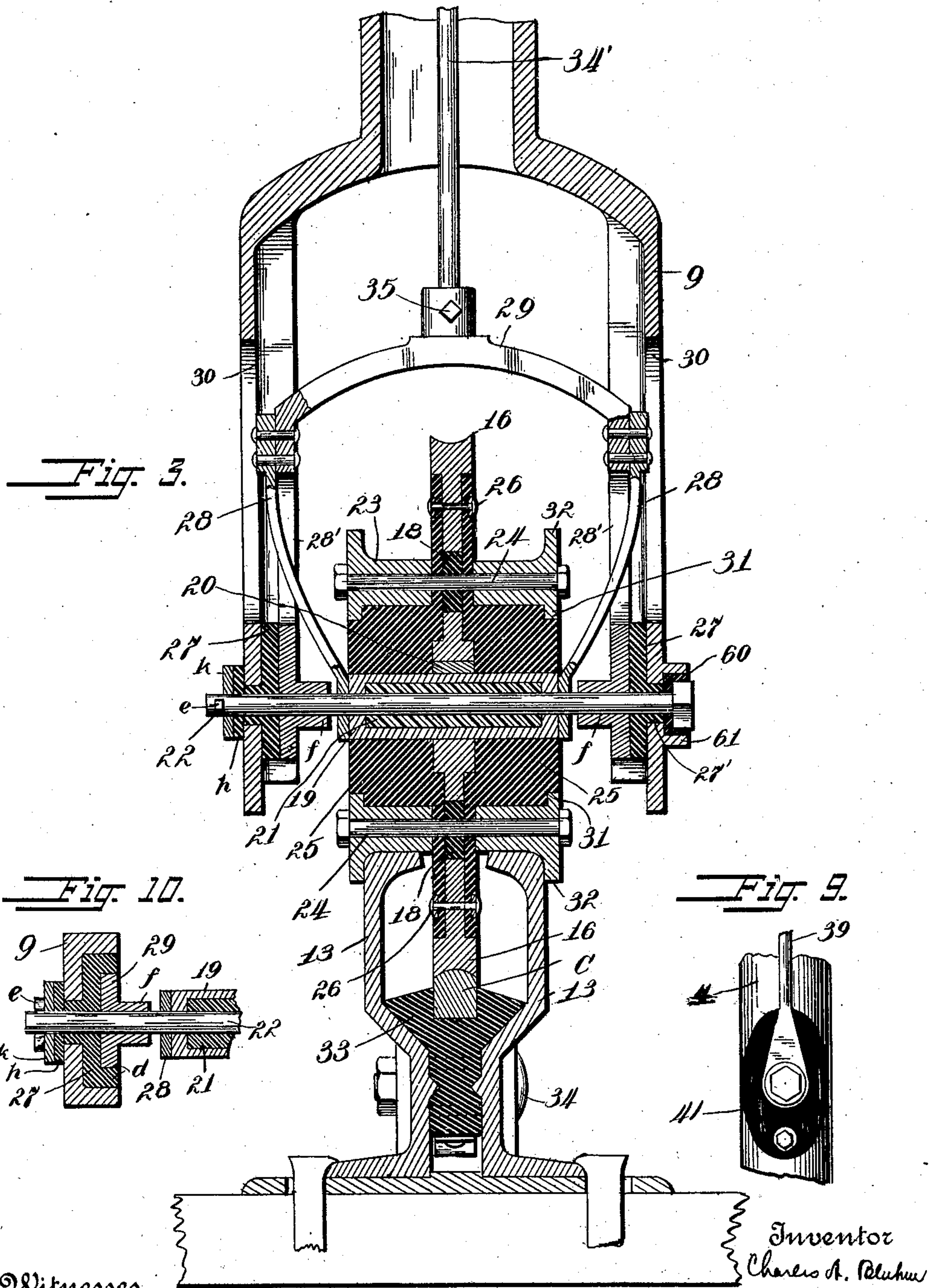
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3 SHEETS—SHEET 3.



Witnesses  
Milton Lenox  
Walter T. Estabrook

By

Inventor  
Charles A. Bluhm  
Thos. G. Outcalt  
His Attorney



# UNITED STATES PATENT OFFICE.

CHARLES A. BLUHM, OF MICHIGAN CITY, INDIANA.

## TROLLEY.

No. 859,867.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed February 27, 1906. Serial No. 303,264.

To all whom it may concern:

Be it known that I, CHARLES A. BLUHM, a citizen of the United States, residing at Michigan City, in the county of Laporte and State of Indiana, have invented certain new and useful Improvements in Trolleys, of which the following is a specification.

My invention relates to an improvement in trolleys, and it has to do more particularly with that type of trolley adapted for use in third-rail systems, which may be used with equal facility on surface roads as well as underground or on elevated systems.

My invention comprises a trolley wheel, and hoist for lifting the wheel from the conductor or cable of a third rail, the wheel being adapted to have both a contact and a traction surface and to operate in a hollow guarded third-rail made to accommodate the wheel, and means for adjusting the trolley, which includes raising, lowering and reversing it.

My invention further consists in details of construction for carrying out the objects of the invention, and embodying such means in practical operative form.

In the accompanying drawings, Figure 1 is a view in side elevation showing the entire trolley, mounted for use with the wheel running in the third-rail, Fig. 2 is an enlarged detail partly in elevation, with parts broken away to show the internal construction, Fig. 3 is an enlarged transverse section through the trolley wheel, third-rail and a portion of the harp, Fig. 4 is a detached view of the metal portion of the wheel, Fig. 5 is a plan view partly in section of the annular terminal, Fig. 6 is an enlarged vertical section through a fragment of this terminal and its connected parts, and Figs. 7, 8, 9 and 10 are details of portions of my improved trolley.

A, represents a base plate secured to the platform 1, of the car or locomotive by bolts or similar means 2, 2, and erected from the center of this base plate is the hollow column 3, which forms a support for the hollow shank 4 of the trolley, this shank being fitted to turn in the column and securely guided and supported therein, the head 5 of the trolley is secured by screws or bolts 6, 6, to the upper end of the hollow shank 4, and this head is provided with a hand wheel 7, by which the head and trolley shank may be turned laterally and reversed.

At the lower end of the shank 4 an elbow 8 is formed, integral preferably, and hollow. The trolley harp 9 is pivotally connected with this elbow at its upper end by means of the pin 10, the upper end of the harp being inserted into the hollow center of the elbow, and guided in its up and down movements by the side walls thereof, and prevented from lateral play. Springs 11, and 12 are interposed between the upper end of the harp and the top and bottom walls of the elbow and opposite sides of the pivot whereby to normally throw the lower end of the harp downwardly with the trolley

wheel in contact with the edges of the slot or guard rails 13, and the conductor or cable C of the third-rail, and the tension of these springs 11 and 12 is regulated by means of the screw bolts 14' and 14'. These screw bolts 14', 14' are screwed into the trolley harp 9, and are provided with heads *a, a*, to receive one end of the springs 11 and 12, and secured to elbow 8, are the screws 14 and 15 which enter the flanged collars 15', 15', which collars have heads *b, b*, to receive the other ends of the springs 11 and 12, thereby preventing any lateral play. Holes or openings *c*, are formed in the screw bolts 14', to receive a pin whereby the tension of the springs 11 and 12 can be regulated.

The trolley wheel comprises a metal rim 16 shown in detail in Fig. 4, it having orifices 17, 17, for the insulating material 18. This metal rim is secured to the hub 19 by the key 20 or otherwise, and the hub 19 which is preferably filled with graphite 21 is mounted on the journal bearing 22 upon which it turns. Annular guide rims 23, 23, are secured on opposite sides of the central rim 16 by means of bolts 24, 24, which extend through orifices in the side rims and through the insulating plugs 18, 18 in the orifices 17, 17, and insulating cores 25, 25 of suitable material such as rubber or pressed paper, gutta percha or other non-conducting material is interposed between the hub and side rims, and the side rims and metal rim 16 as shown in Fig. 3, the insulating material being held to said metal rim by the rivets 26, 26.

The journal bearing 22 is insulated from the harp by blocks of insulating material 27, 27 at the outer ends. The hub of the insulating block 27 is placed in position in the openings 27' of the harp 9, and then the terminal 29 is placed in the orifice *d* of the block 27, then the journal bearing 22 is passed through the several parts, it being provided at its head with a cup-shaped insulating block 60 in the hub 61 of harp 9, and at its other end a paper washer *h* is received against the harp 9, and a metal washer *k* is placed between the washer *h* and the split key or cotter *e*, for holding the journal bearing 22 in place, whereby all the parts are thoroughly insulated. The terminal 29 is provided with a hub *f* to prevent the bolt heads of the trolley wheel from striking the inner sides of the harp.

Springs 28, 28 press inwardly from the terminal 29, to which they are secured, at their free ends, through openings 28', upon the opposite ends of the hub 19, they having the double function of conducting the current from the wheel through hub to the terminal, they acting as contacts and projecting inwardly through the slots 30, 30, in the opposite sides of the harp. The side pressure of these spring contacts 28, 28 has the secondary function of centering the trolley wheel. The side rims 23, 23 are internally flanged as at 31 to retain the insulation in place and externally flanged as at 32, to



embrace the slot and guard rails of the third rail whereon they have running contact, thus insuring the perfect centering and contact of the metallic rim 16 of the trolley wheel with the conductor cable C, as shown in Fig. 3, the conductor or cable being secured to an insulating core 33 interposed between and secured to the slot or guard rails 13, 13 by bolts 34, as shown in Fig. 3.

A conductor wire 34' is secured at one end to the terminal 29 by means of a binding scrow 35 and thence it extends through the harp to the conductor rod 36 where its outer end is fastened in the binding post 37 by another binding screw 35 and this conductor rod 36 extends out laterally at its upper end through an orifice 38 in the side of the trolley shank 4, where it is connected with the contact 39, it being insulated from the shank by the collar 40 and washer 41 in the orifice and on the outer surface of the shank and a steel collar 41' is placed between the washer 41 and contact 39, and a washer 39' is held between the nut 40' and the contact 39. This contact 39 is constructed of spring metal, and has a V-shaped roller 42 at its upper end which travels in an annular groove 43 in the annular terminal 44, the contact being of spring metal tends to keep the roller in place, and this annular terminal is secured beneath the base plate A by bolts 45, 45, the insulating sleeves 46, 46, being employed to prevent the current from passing through to the base plate. A wire 48 extends from the annular terminal to the controller and from the controller the current is conveyed to the motor. In this way, provision is made for the uninterrupted circuit between terminals 39 and 44 regardless of the position of the trolley wheel. The shank 4, is provided with an opening 40', whereby an instrument can be inserted, if at any time the conductor rod needs repairing.

The trolley wheel is raised from the slot by the rod 49 which is connected with the harp at 50 and extends up through the hollow shank 4 of the trolley, a chain 51 connecting its upper end with the segment 52 which is pivoted in the head 5 at 53. This segment is provided with a handle 54 and a pawl 55 is pivoted to this handle at 56, and provided with a tooth 57 in position to engage teeth 58 on the crown of the head, whereby to lock the trolley wheel after it shall have been raised, it being raised by pressing down upon the handle 54, and locked by the tooth 57 of the spring pawl entering one of the crown teeth 58 of the head 5. After the trolley wheel is thus raised the trolley may be swung around and reversed by simply turning the hand wheel 7, after which to again take current the operator places his thumb upon the latch 59 of the pawl, and allows the trolley to descend into the slot by permitting the handle 54 to slowly rise.

From the foregoing it will be seen that a simple mechanism is provided for operation in connection with a thoroughly insulated and safe third-rail, one which may be raised and lowered by the motorman at will to shut off the current or turn it on and which may be swung around, centered and reversed without leaving his position in the car or locomotive.

Slight changes might be resorted to in the form and arrangement of the several parts described without departing from the spirit and scope of my invention,

and hence I do not wish to limit myself to the exact construction herein set forth, but;

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. The combination with a trolley shank having an elbow thereon, of a harp pivotally mounted on and laterally supported by the elbow, and springs pressing expansively upon the harp on each side of the pivot for maintaining the trolley wheel carried thereby in contact with the conductor or cable.

2. The combination with a trolley shank having a hollow elbow at its free end, of a harp pivotally mounted and laterally supported within and between the side walls of the elbow, and springs pressing expansively upon the harp on each side of the pivot for maintaining the trolley wheel carried thereby in contact with the conductor or cable.

3. The combination with a third rail comprising slot or guard rails, insulating material and conductors or cables, of a trolley wheel comprising metallic center having a metal hub with a core of insulating material and side rims insulated from each other and secured together, the center rim engaging the conductor or cable, and the side rims having flanges which center the wheel upon the third rail, spring contacts engaging the hub of the wheel, a terminal to which these contacts are engaged, conductor rod and terminal.

4. The combination with a trolley wheel and harp, of a base, a column shank supported thereon and pivotally supporting the trolley harp, means for lifting the trolley harp, a stationary terminal plate having a circular central opening and a groove therein, a conductor and a contact wheel thereon adapted to travel in said groove and connections from said contact to the trolley wheel.

5. The combination with a trolley wheel comprising a rim contact portion and a traction portion, of a base, a column shank supported thereon and pivotally supporting the trolley harp, a stationary terminal plate, a conductor on the column shank and a wheel on the conductor in frictional contact with said plate, and connections from said contact and terminal to the trolley wheel.

6. The combination with a trolley harp, journal bearing secured thereto, and insulating material between the journal and harp, of a trolley wheel comprising a metallic center and metal side rims insulated from each other, a hub insulated from the rims, means passing through the metallic center for clamping the rims and insulations in place, terminals engaging a metal portion of the wheel and conductor extending from the terminal.

7. The combination with a hollow trolley shank having a hollow extension thereon, of a harp its extension pivotally mounted in and laterally supported by the hollow extension, and springs pressing expansively upon the harp on each side of the pivot for maintaining the trolley wheel carried thereby in contact with the conductor of a third rail.

8. The combination with a trolley and harp, of a hollow column suitably supported, a lifting rod connected to the harp, a rotatable cap on the column, and a lever pivoted in the cap, adapted to raise and reverse the trolley wheel.

9. The combination with a trolley wheel and harp, of a hollow column, a hollow column shank within the column, having pivoted connection with the trolley harp, a cap on the free end of the hollow column shank, a lever pivoted in the cap, and a lifting rod connecting said lever and trolley harp.

10. The combination with a pivoted trolley harp and wheel, of a hollow column, a hollow column shank within the column, a cap secured to the hollow column shank at its free end, and rotatable on the hollow column, a lever pivoted in the cap and a lifting rod connecting said trolley harp and lever.

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

CHARLES A. BLUHM.

Witnesses:

WORTH W. PEPPLE,  
HENRY H. BLUHM.