

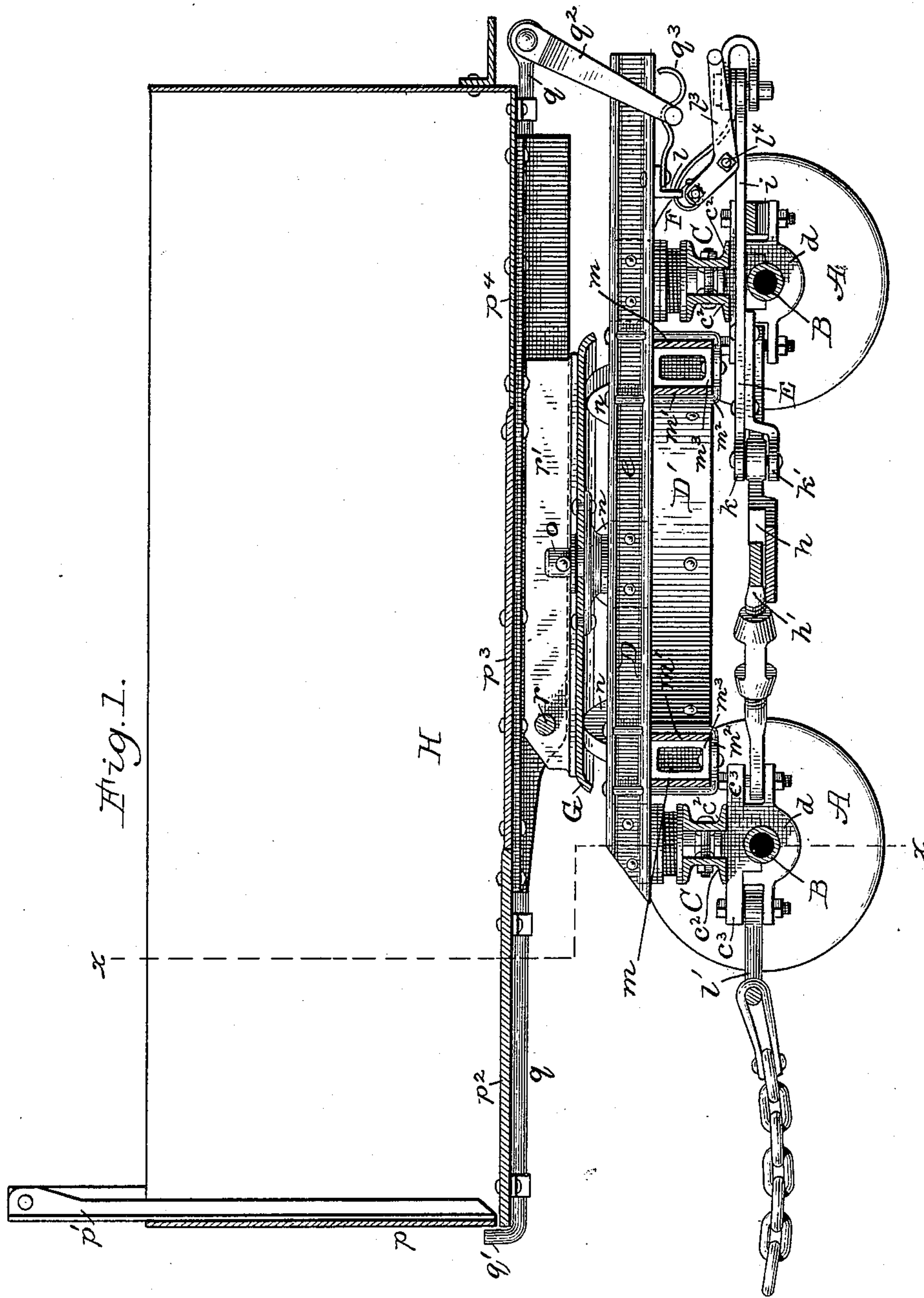
(No Model.)

3 Sheets—Sheet 1.

D. KING.
TRAMWAY CAR.

No. 467,009.

Patented Jan. 12, 1892.



Attest:
Philip F. Larnes.
Howell Bartle.

Inventor:
Daniel King.
By *Wm. C. Mott*
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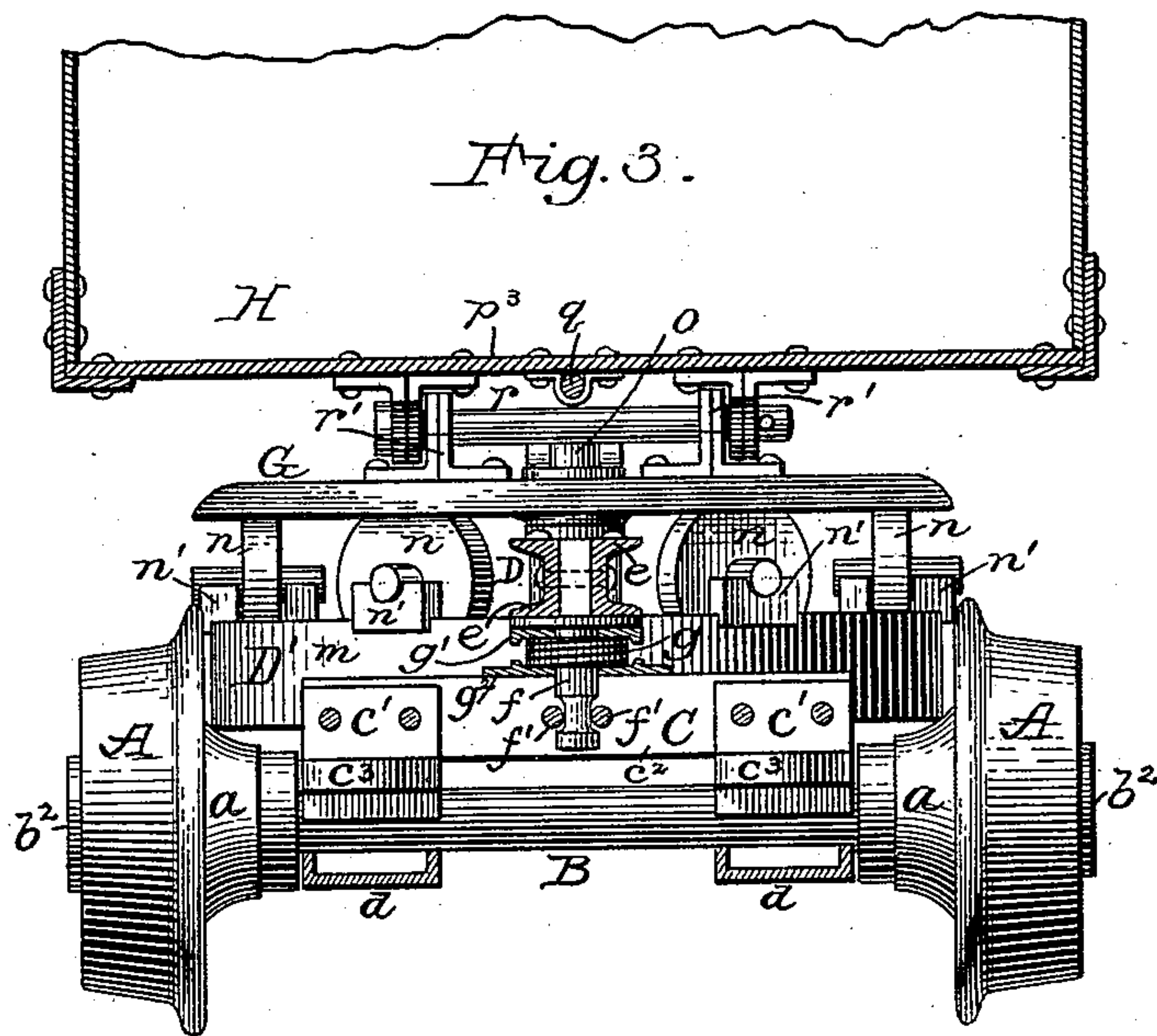
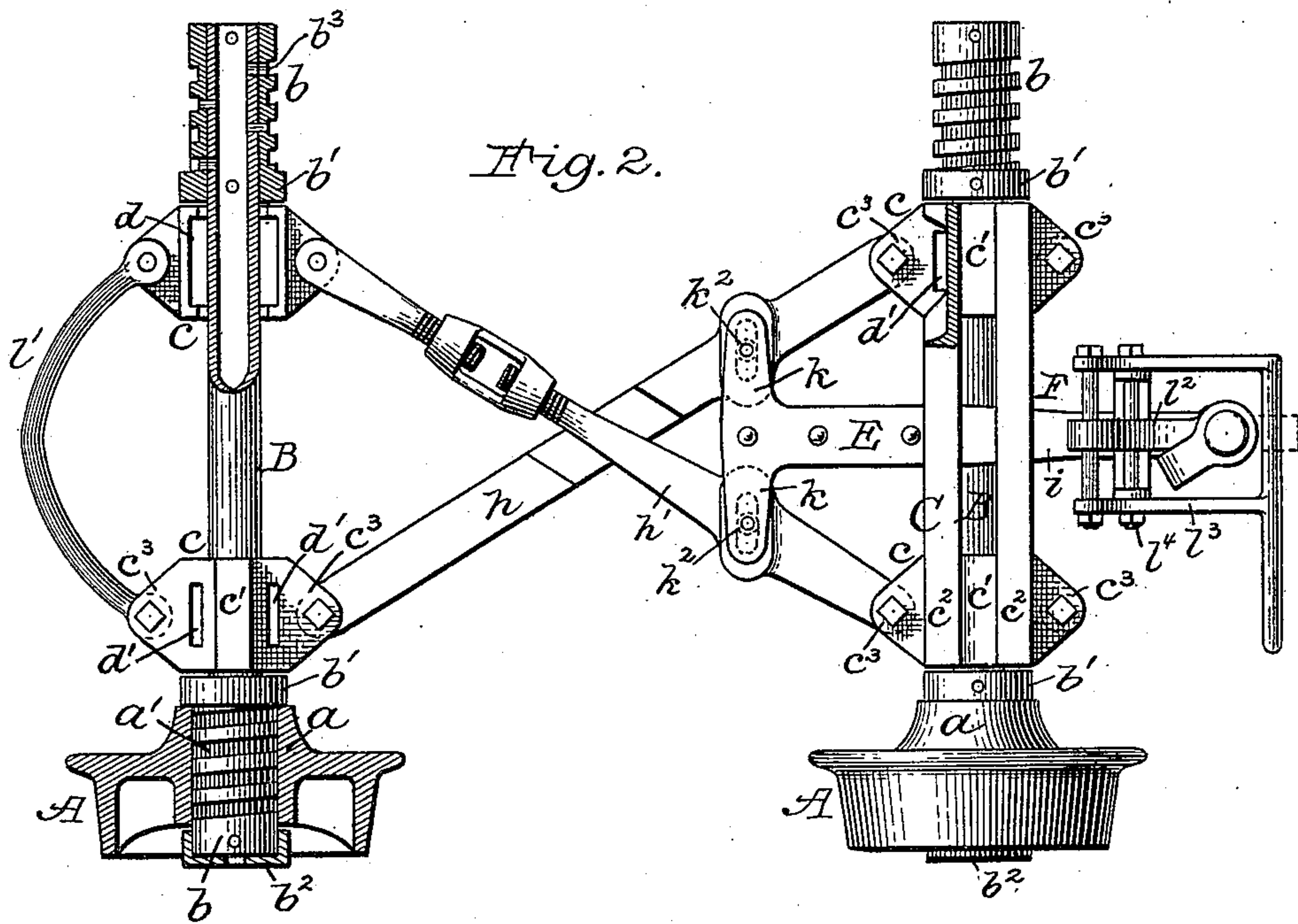
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3 Sheets—Sheet 2.

D. KING.
TRAMWAY CAR.

No. 467,009.

Patented Jan. 12, 1892.



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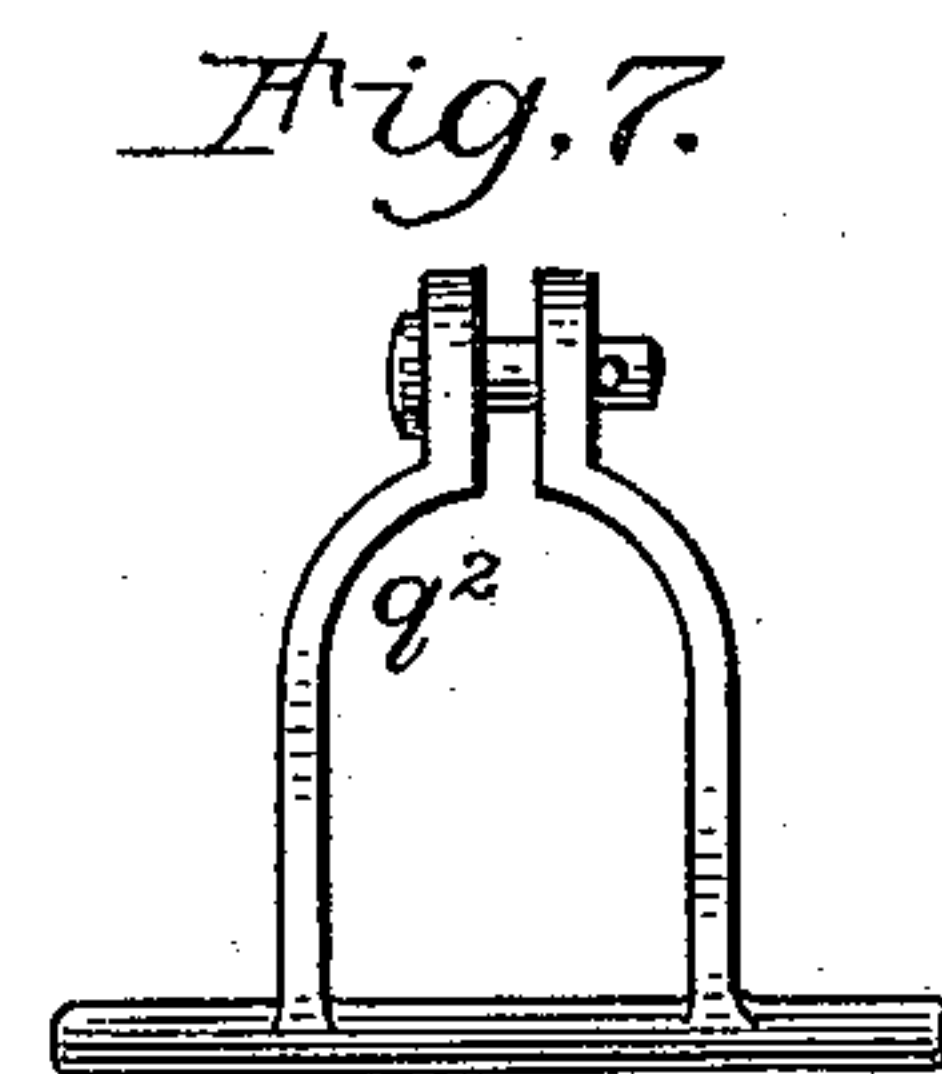
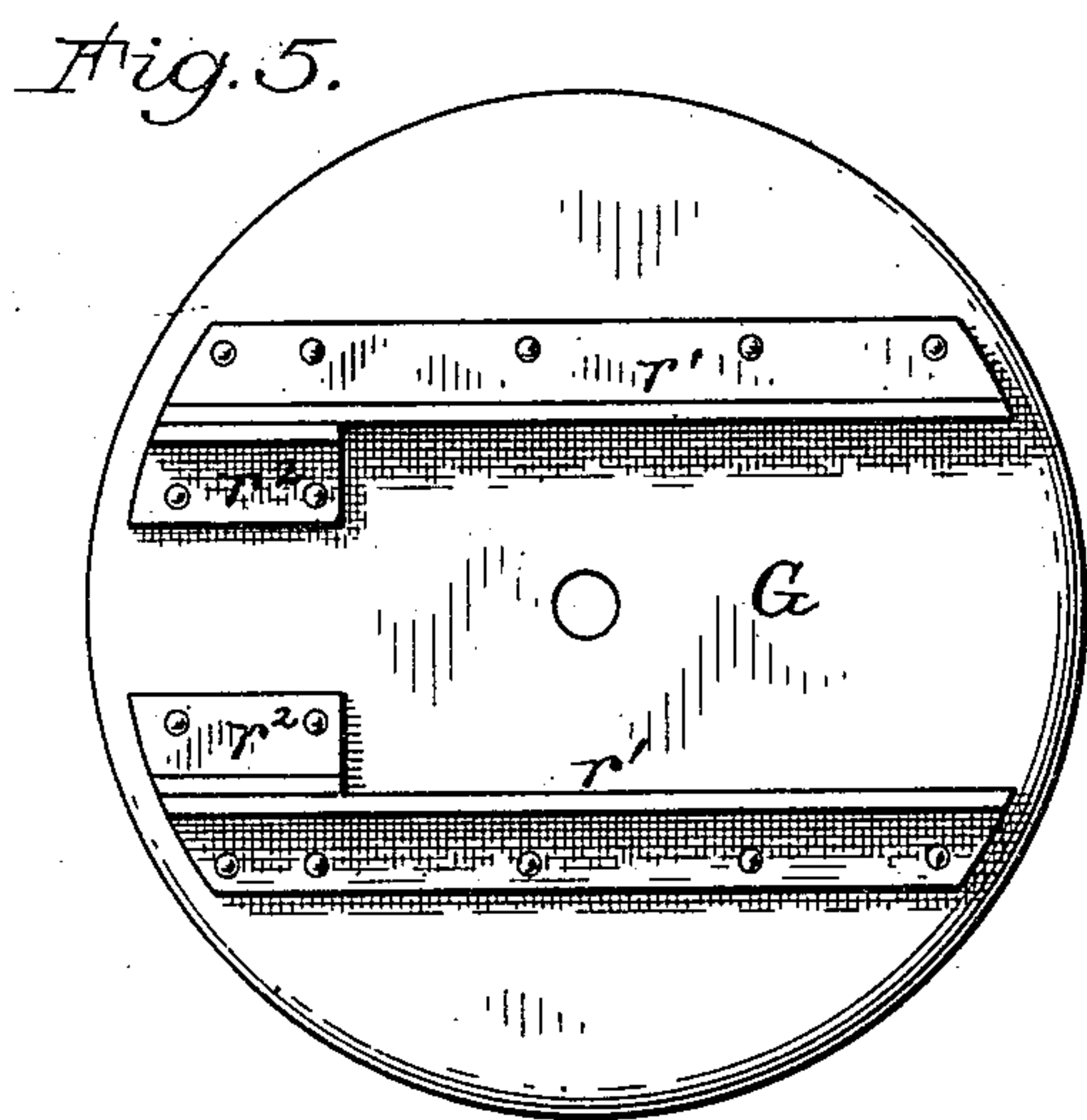
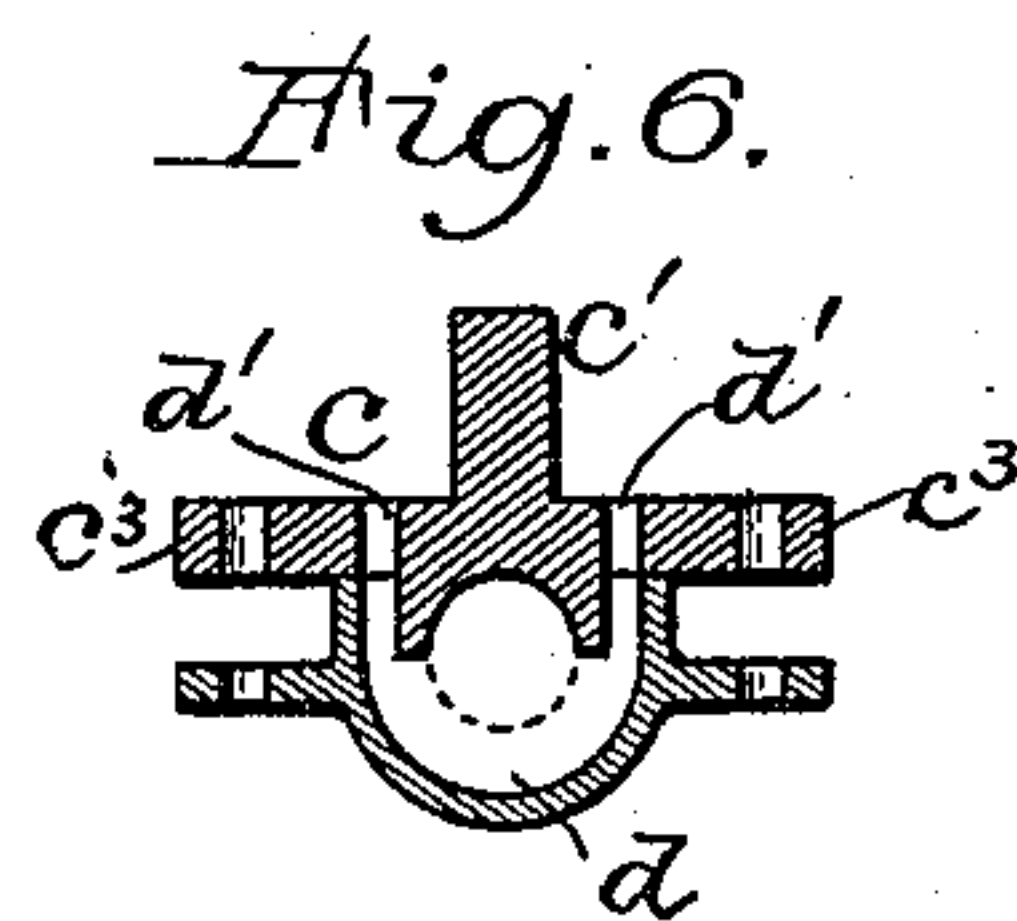
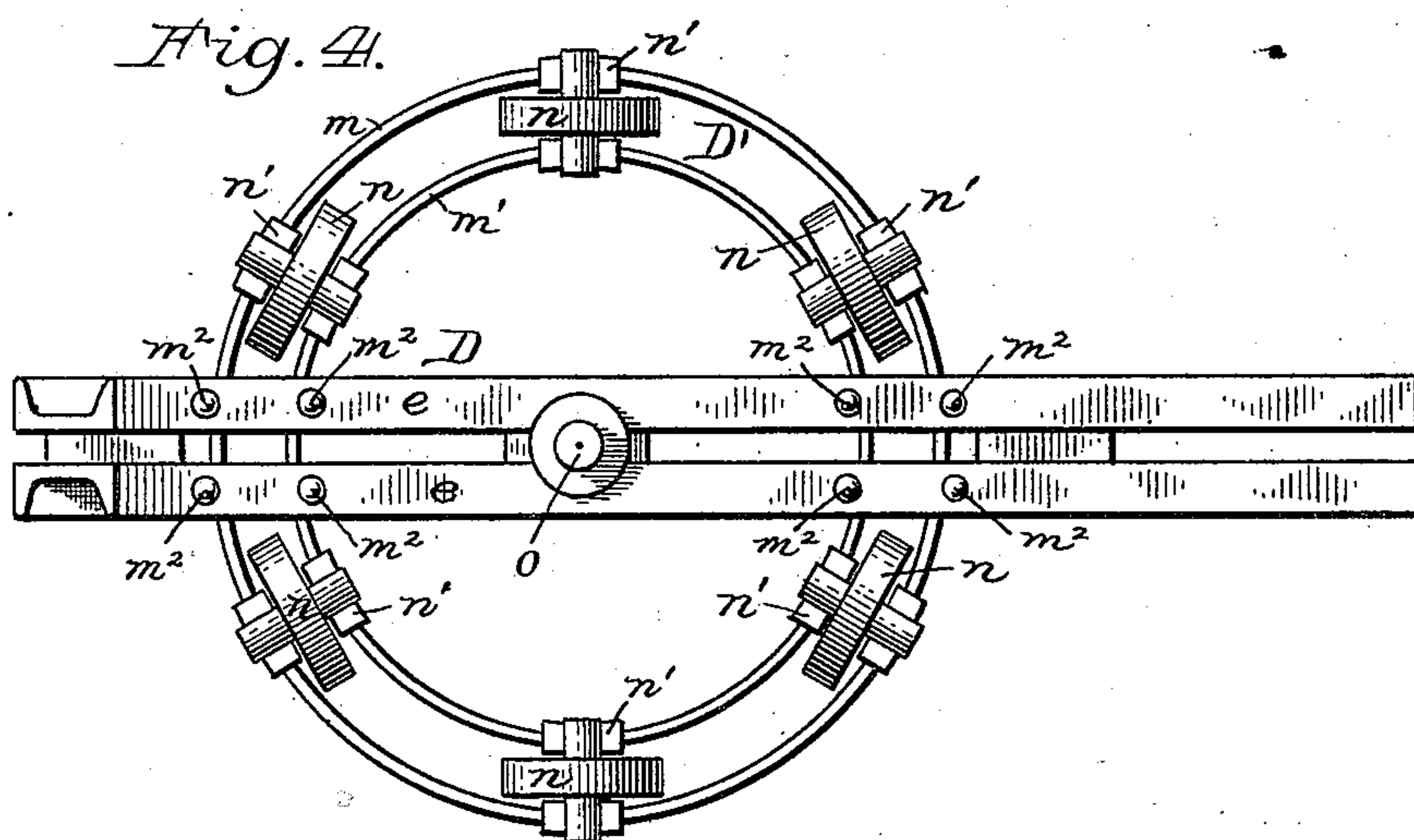
(No Model.)

3 Sheets—Sheet 3.

D. KING.
TRAMWAY CAR.

No. 467,009.

Patented Jan. 12, 1892.



Attest:
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UNITED STATES PATENT OFFICE.

DANIEL KING, OF FINKSBURG, MARYLAND.

TRAMWAY-CAR.

SPECIFICATION forming part of Letters Patent No. 467,009, dated January 12, 1892.

Application filed October 1, 1891. Serial No. 407,410. (No model.)

To all whom it may concern:

Be it known that I, DANIEL KING, of Finksburg, in the county of Carroll and State of Maryland, have invented certain new and useful Improvements in Tramway-Cars; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of my invention.

My said improvements are especially applicable to tram-cars employed in connection with mining operations and in and around iron-furnaces and manufacturing establishments, wherein the rail-tracks frequently involve sharp curves.

The objects of my invention are to provide a compact, strong, durable, and comparatively inexpensive car which can be conveniently loaded and dumped at either side of a track, or at the end of a track, or at any portion thereof, and which can be easily moved to and fro and run, pulled, or driven around the sharpest curves ever required without undue expenditure of power.

After describing my invention as illustrated in the drawings the several features deemed novel will be duly specified in the several clauses of claim hereunto annexed.

Referring to the drawings, Figure 1 illustrates one of my cars in vertical central section. Fig. 2 is a plan and partial sectional view of the axle, axle-frames, and wheels. Fig. 3 is a vertical cross-section on line *x*, Fig. 4 is a plan view of the turn-table base. Fig. 5 is a plan view of the turn-table. Fig. 6 is a section of one of the axle-boxes. Fig. 7 illustrates a combined handle and link by means of which the car-body is locked in place and its gated side controlled.

I will first describe the wheels A, axles B, and axle-frames C, these involving several novel features in construction and organization. The four wheels A, as here shown, are flanged, as is common for tram-cars, and they have hubs *a*, which are axially fitted to revolve independently of the axles; or, in other words, the wheels are not keyed or otherwise rotatively secured to the axles. Various forms of wheels may be used without departure from the main features of my invention. The two axles B are straight and tubular, and

hence are cheap, strong, and light, good iron piping being suitable for this purpose. At each end of each axle there is a cast-metal tubular sleeve *b*, having at its inner end an integral collar *b'*, the main portion of the sleeve being preferably spirally scored, as shown, for the reception of any suitable packing, as at *a'*, of metal or ropes for affording an expansive bearing-surface for contact with the interior of a wheel-hub *a*, thus providing a frictional journal upon which the wheel is mounted and which will normally cause the wheel to rotate with the axle, but which will nevertheless allow either the axle or the wheel to be rotated independently of each other, as is desirable when rounding a curve. The wheels are secured in place by means of caps *b²*, pinned to the sleeve and axle and centrally perforated to admit of the introduction of oil to the interior of the axle, and thence, by way of the radial ducts *b³*, lubricating the wheel-journal. Each axle between the wheels and adjacent to the two sleeve-collars *b'* is provided with axle-boxes *c c*, each box resting upon a properly-journalled portion of the axle and each having a vertically-projecting flat shank *c'*, which is bolted between and to a pair of overlying angle or channel iron bars *c² c²*, these being arranged back to back. It will be seen that each pair of axle-boxes, with the angle-iron bars and their bolts, constitute a simple, inexpensive, and durable axle-frame, and that the sleeves *b* confine the axles against longitudinal movements in their boxes. Each box has also at its sides an integral pair of ears *c³ c³*, which are suitably perforated for the reception of vertical bolts by which an oil-box *d* is suspended beneath the axle-box, and access thereto for oil and waste is afforded by suitable apertures at *d'* in the ears *c³*. The two axles are coupled together by means of independent connections, one of which couples the two axle-frames centrally, somewhat after the manner of "hounds," and the other connection couples the two axles diagonally to provide for their angular adjustment with relation to each other.

The central axle-coupling connection consists of a hound-frame D, composed of two parallel channeled angle-irons *e e*, arranged back to back and bolted together and to the interposed flat shanks of vertical pivot-bolts *f f*, the

lower portions of which are cylindrical and annularly grooved centrally, so that when interposed between the angle-bars of the axle-frame they can be locked thereto as against vertical displacement by lateral pins or bolts $f' f'$, but be free to admit of pivotal or swiveling movements, as with ordinary king-bolts. This hound-frame D is a base on which any car-body may be mounted, and for cushioning the car-body and relieving rail shocks I employ suitable springs g , which encircle portions of the pivot-bolts between suitable annular caps g' and bases g^2 .

The wheels, the axles, the axle-frames, and the hound-frame constitute a cheap, durable, comparatively light, and thoroughly satisfactory spring-mounted truck-frame, upon which any form of car-body may be employed.

The diagonal connection of the axles is effected in a manner well known by means of a pair of links h and h' , each link at one end being hinged to one of the boxes of one axle and at the other end to the diagonally-opposite box of the other axle, and the link h' is provided with a turn-buckle h^2 , which enables a desirable adjustment. The link h is centrally offset, so that, although crossing each other, both links may occupy substantially the same horizontal plane.

The draft-bar E is T-shaped, having a long arm i provided with a shackle or bolt-hole at its outer end, and its transverse arms k at its rear end are duplicated, as at k' , and afford intervening spaces occupied by portions of the crossed links $h h'$, which are provided with laterally-elongated slots occupied by vertical bolts provided with rollers k^2 , carried by and between the duplicated arms $k k'$, so that a straight pull on the draft-bar will cause an even draft on both axles, while a pull to either side will cause a corresponding angular variation of the two axles with relation to each other, as when rounding a curve in a tramway. Instead of using the bar E as a draft-bar, a draft chain or pole may be applied to the projecting end of the hound-frame D, so that said bar would then be used as a mere hand-lever for adjusting the angle of the axles while rounding a curve.

When a car is to be used with free runs on an incline, it is desirable to have the draft-bar locked against lateral movement, and to that end I have provided the outer end of said bar with a spring latch or locking device F, which, when in its normal position, engages with a pendent stud l , secured to the underside of the hound-frame; but when the outer end of the latch-lever is lifted the draft-bar may be freely swung to the right or the left by hand, or in response to the curved-line movement of a draft-animal, or in following a locomotive or another car; but in these latter cases the rear axle-boxes should be provided with a sharply-bent draft-bow, as shown at l' , and provided with a short chain having a ring free to slide on the bow and a hook for coupling with the draft-bar

of the following car. When a draft-hook is applied to the hole in the end of the draft-bar after the locking device F has been lifted, the latter will be so held up as to leave the box free to be swung laterally. As here shown, a heavy flat curved spring l^2 has its base on the draft-bar, and its free end is so elevated that it will normally occupy a recess in the lower end of the pendent stud l , which need only be a short piece of angle-iron. At its free end the spring is bent downward and forward, so as to pass beneath a cross-bolt in the rectangular lever l^3 , which is hinged at l^4 to the draft-bar, these several parts constituting the spring locking device F. With a clevis applied as shown it will be seen that the draft-bar will not be locked to the hound-frame when the clevis is parallel with the draft-bar and that by swinging the clevis laterally the free end of the spring can rise and engage with the lug l .

The hound-frame D in the dumping-car shown serves as the main portion of a turn-table base, the other portion D' being rigidly suspended from said hound-frame. This portion D' of the turn-table base is here shown to be circular in form; but this is immaterial so long as it will afford supports for suitable rollers or an otherwise suitable general bearing for a superimposed turn-table. In its best form this circular base portion is a frame composed of two concentric strips or bands of plate-iron $m m'$, supported in four straps or yokes m^2 , which are attached to and rigidly pendent from the hound-frame D. In each strap and between the bands $m m'$ there is a clamping and spacing block in the form of a rectangular frame m^3 , which is bolted to the bottom of the strap. The table bearing-rollers n are located between the concentric bands $m m'$, each having its own journal-block n' , both bearings being afforded by one casting, serving also as a spacing-block with respect of the bands and having a support on the upper edges of the bands, as well as being confined in place by lateral bolts near the lower edges of said bands.

The turn-table G is a comparatively light circular plate of iron centrally provided with a heavy pivot-bolt o , the lower end of which is located centrally with reference to the axles and bolted between the two channeled angle-irons of the hound-frame D; or said bolt, if annularly grooved, may be confined against rising (but left free to rotate) by means of two lateral bolts or pins in the hound-frame D. The under side of the turn-table, near its periphery, has an annular bearing upon the rollers n .

It will be understood that the turn-table can carry bearing-rollers, and the turn-table base may then afford a mere annular track for such rollers without substantial departure from certain features of my invention; but as here shown the turn-table is at a desirable height from the track, the working parts are well protected, and the organization as a whole

is strong, light, durable, and comparatively inexpensive.

The car-body H is preferably composed of angle-iron and plate iron or steel, and it has at one side or end a gate p mounted, as is common, on pendent pivoted arms p' , and the bottom or floor of the car-body is preferably composed of several metal plates of different thicknesses, as at $p^2 p^3 p^4$, the thickest plate p^2 being at the discharging or gate side or end, and hence exposed to the greatest wear. The gate p is locked in its closed position by means of a rotative bolt q , having at one end a locking-finger q' , which engages centrally with the outer lower surface of the gate, and at the other end it is provided with a handle q^2 in the form of a loop or shackle pivotally connected to the bolt. This shackle-handle is long and wide enough to swing over the underlying end of the hound-frame D and to lock therewith by aid of a suitable spring q^3 , secured to the under side of said frame, thus firmly holding the car-body in its normal position.

The car-body is secured to the top of the turn-table G by means of angle-irons and a transverse bolt r . The turn-table plate is strengthened and braced by the two long angle-irons $r' r'$, one end of each having a reinforcement in a similar short piece of angle-iron r^2 . The bottom of the car-body is also similarly strengthened and braced by angle-irons parallel with each other and with those on the turn-table, and the dumping-bolt r is seated at or near each of its ends in holes, each of which passes through four pieces of angle-iron side by side, thus securing ample strength at the pivotal connection of the car-body with the turn-table. It will be seen that the car-body can be tilted for discharging in any position and that it may be loaded by the use of a scraper, because its gated side or end can nearly reach the ground and the inclination of the car-body is only sufficient to secure a complete discharge of its contents.

It is to be understood that the car-body may be arranged so that it will normally stand crosswise of a track instead of lengthwise, as shown, in which case the circular portion D' of the turn-table base should be provided at one or both sides of the car with a projecting rigid arm, with which the gate-locking-bolt handle q^2 may engage, as it now does with the end of the hound-frame, said bolt-handle in both cases serving also as a means for conveniently pulling the car-body from its tilted to its normal position.

I am aware that angularly-adjustable car-axes are not new; but I know of no prior dumping-car organization wherein two such axes were employed in combination with a turn-table or other dumping-car-body support which was mounted upon both axes and pivoted centrally thereto and with the axial line of the car-body or its turn-table located between the two axes. This combination constitutes an important feature of my invention,

and it enables my cars to be used successfully and with the expenditure of comparatively little power under the many varied conditions and requirements incident to tramway service in and about mines, iron-works, and in other similar connections.

My cars are specially well suited for the varied uses in and around blast-furnaces, and especially as substitutes for the "barrows" ordinarily employed, which, while weighing as much as my cars do, have only about one-third of their carrying capacity, although considerably higher than my cars above the tread of the wheels; and the barrows are expensive, costing nearly fifty per cent. more than my cars. A cinder-kettle may be obviously mounted on my truck-frame and turntable for transporting and dumping slag.

In matters of detail in construction and combination the car shown and described embodies many novel features which so far contribute to promptness and ease in operation as to render the car specially desirable, and it will be readily seen that nearly all of the parts involve but little labor and expense in developing them from such stock metal as can be readily found and purchased in the market.

It will be seen that the angle-bars or angle-irons shown and described have in some cases a single angle, while in others they are of the double-angle form commonly called "channeled iron," and it is to be understood that all of such bars are employed for securing great strength with light weight, and also because of the economy involved by the use thereof in the building of the car.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a dumping-car organization, the combination, substantially as hereinbefore described, of a pair of axles angularly adjustable with relation to each other, a dumping-car body mounted upon a turn-table, and a turn-table base pivotally connected with or swiveled to both axles centrally and having a seat for the axis of the turn-table between said axles.

2. In a tramway-car truck, the combination of two axles angularly adjustable with relation to each other and rotative in their boxes, and wheels frictionally journaled on the ends of said axles, substantially as described, whereby said wheels and axles will rotate together normally, but each be capable of independent rotation, as when rounding curves on a tramway.

3. In a four-wheel car-truck, the combination of two axles and their wheels, four axle-boxes between the wheels, axle-frames attached to the two boxes and overlying the axle, limbs or bars pivotally coupling each two diagonal boxes, and a hound-frame swiveled upon both axle-frame bars centrally, substantially as described.

4. The four-wheeled tram-car truck, sub-

stantially as described, the same embodying, in combination, two axles and their wheels, two axle-frames, each consisting of two axle-boxes and two overlying parallel angle irons or bars separated from each other, but bolted together, and a hound-frame composed of two separated angle irons or bars bolted together and pivoted or swiveled to the axle-frames centrally between the wheels.

5. In a dumping-car, the combination, with two axles, a suitable car-body, and a turn-table, of a turn-table base consisting of a pair of connected parallel angle-iron bars supported upon both axles centrally between their wheels, and a pair of concentric bands or rings suspended below said angle-bars and provided with rollers for supporting the car-body and turn-table, the axial bolt of the latter having its bearing upon the pair of angle-bars between the two axles, substantially as described.

6. In a dumping-car, the combination, substantially as described, of a dumping-car body having a hinged gate at one side or end, a turn-table on which said body is mounted, a turn-table base mounted upon and swiveled to two axles centrally, a rotative locking-bolt for controlling said gate, and a loop-shaped handle hinged to one end of said bolt and adapted, as described, to serve as a handle for operating the bolt and also as a locking-link for engaging with the turn-table base and securing the car-body against tilting or rotating.

7. In a four-wheeled tram-car truck, the combination of two axles angularly adjust-

able with relation to each other, a pair of links diagonally connecting said axles, and a T-shaped bar coupled at its cross-arm with both of said links by means of slot-and-pin connections and serving as a lever for varying the angle of the axles, substantially as described.

8. In a four-wheeled tram-car truck, the combination, with a truck-frame and angularly-adjustable axles, of links diagonally connecting these axles, a lever for controlling said links and axles and also serving as a draw-bar, and a locking device for confining said lever against lateral movement, substantially as described.

9. In a tram-car truck, the combination, with a straight rotative tubular axle and its wheels, of journal-boxes between the wheels, and sleeves secured to the ends of the axle, serving as journals for the wheels and also as collars for confining the axle against longitudinal movement in its boxes, substantially as described.

10. The combination of a pair of car-axes hollow at their ends, radially perforated, angularly adjustable with relation to each other, and rotative in their journal-boxes, and car-wheels rotatively mounted on the ends of the axles, but provided with frictional bearings lubricated by way of the radial ducts extending from the interior of the ends of the axle.

DANIEL KING.

Witnesses:

GEORGE F. MORRELL,
DANIEL KNEPPER.

It is hereby certified that in Letters Patent No. 467,009, granted January 12, 1892, upon the application of Daniel King, of Finksburg, Maryland, for an improvement in "Tramway Cars," an error appears in the printed specification requiring correction as follows: In line 130, page 3, the word "limbs" should read *links*; and that said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 19th day of January, A. D. 1892.

[SEAL.]

CYRUS BUSSEY,
Assistant Secretary of the Interior.

Countersigned:

W. E. SIMONDS,
Commissioner of Patents.