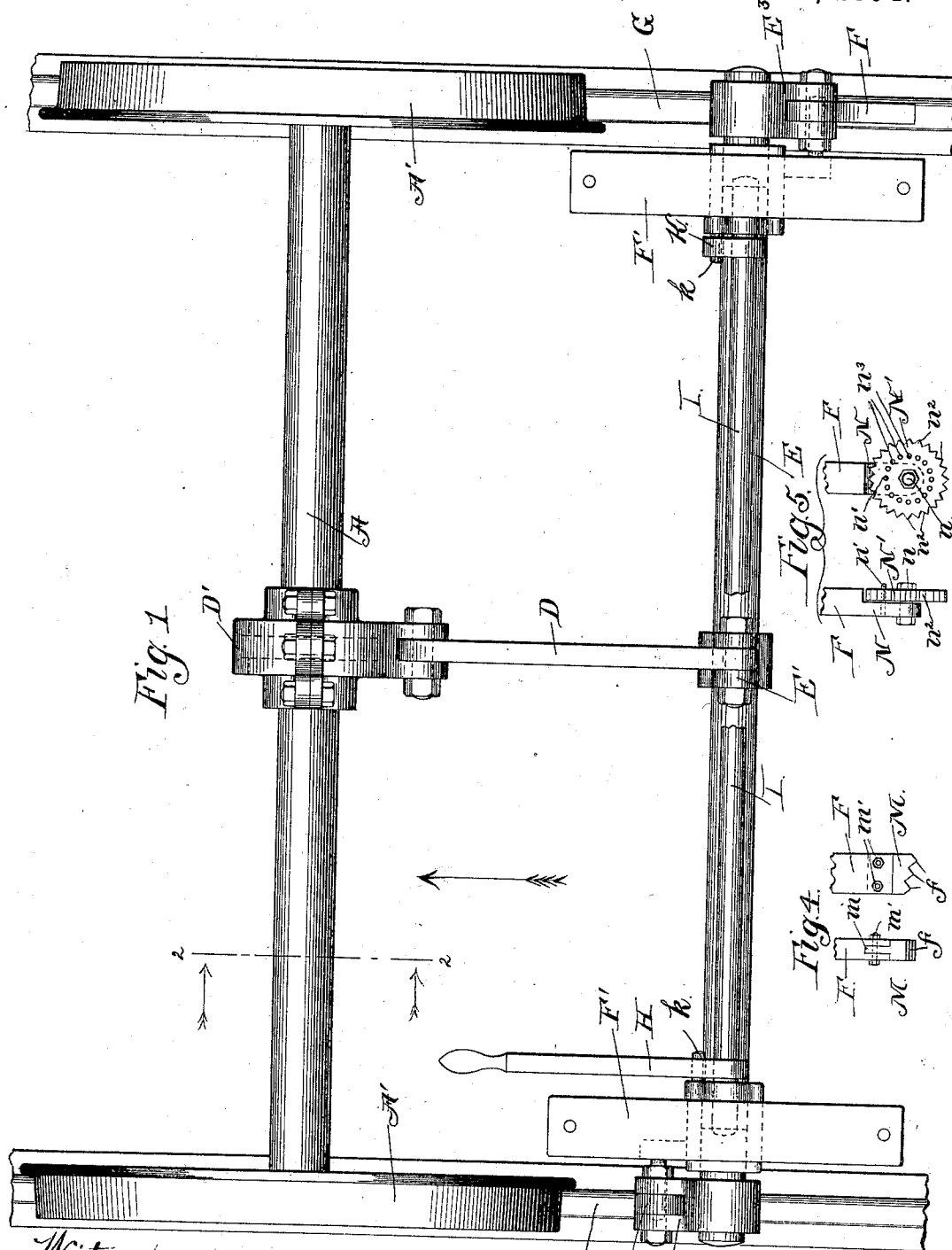


2 Sheets—Sheet 1.

No. 513,598.

Patented Jan. 30, 1894.



Witnesses:

St. Graham.

Jno. L. Condra

Inventors.

Ernest Schmitz and James Mendenhall

By *Dayton, Poole & Brown,*
Attys.

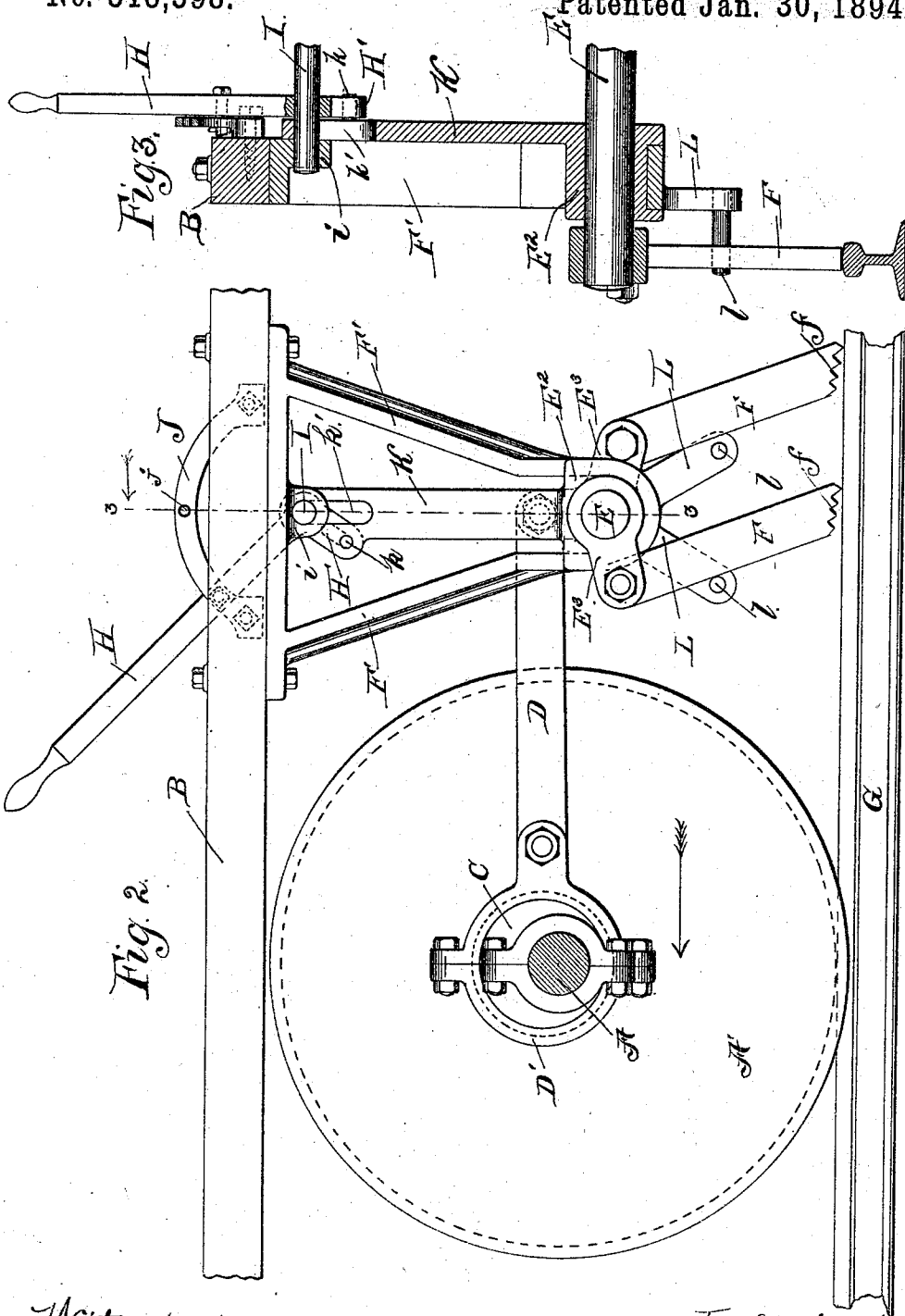
(No Model.)

2 Sheets—Sheet 2.

E. SCHMITZ & J. MENDENHALL.
STARTER AND PROPELLER FOR ELECTRIC CARS.

No. 513,598.

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Ernest Schmitz & James Mendenhall.
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UNITED STATES PATENT OFFICE.

ERNEST SCHMITZ AND JAMES MENDENHALL, OF CHICAGO, ILLINOIS.

STARTER AND PROPELLER FOR ELECTRIC CARS.

SPECIFICATION forming part of Letters Patent No. 513,598, dated January 30, 1894.

Application filed April 4, 1893. Serial No. 469,057. (No model.)

To all whom it may concern:

Be it known that we, ERNEST SCHMITZ and JAMES MENDENHALL, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Starters and Propellers for Electric Railway-Cars, &c.; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Our invention relates to appliances for starting and propelling electric-railway cars and similar vehicles when the same are stalled or impeded in their progress by ice-covered rails or by similar obstructions of the tracks.

The primary object of our invention is to produce attachments or appliances which shall be automatically actuated by the truck-axles, and in consequence of the slipping of the truck-wheels upon the rails and which shall directly engage the rails by thrusting movements so as to propel the vehicle over the obstructed portion of the road-way; furthermore to produce attachments or appliances which shall operate as above stated, and which shall be simple, compact and durable in construction and also capable of application to various kinds of railway vehicles and also applicable to different parts of the same vehicle so as to propel the vehicle in opposite directions; also to produce a starting or propelling mechanism of the type above described, in which the thrust-bars shall be capable of being readily moved out of contact with the rails so as to be rendered inoperative when not required for use, and which shall be as readily movable so as to engage the rails when obstructions are encountered.

To the above purposes our invention consists in certain peculiar and novel features of construction and arrangement, as hereinafter described and claimed.

The more precise nature of our invention will be better understood when described with reference to the accompanying drawings, in which—

Figure 1, is a plan view of one of the axles of an electric railway vehicle and of a starting and propelling mechanism embodying our

invention, connected therewith, the floor timbers of the vehicle being omitted. Fig. 2, is a view, principally in side elevation and partly in vertical longitudinal section, on the line 2—2 of Fig. 1, of one end of the vehicle with the starting and propelling mechanism applied thereto; the floor timbers of the vehicle being shown. Fig. 3, is a transverse vertical section of an end portion of the starting and propelling mechanism, taken on line 3—3 of Fig. 2. Fig. 4, comprises a detached edge view and also a detached side elevation of the lower end of one of the thrust-bars, showing a detachable bearing-shoe connected thereto. Fig. 5, comprises a detached side elevation of the lower end of one of the thrust-bars, showing a detachable bearing-disk, connected thereto.

In said drawings A designates one of the truck-axles of an electric railway car or other vehicle, and A' the truck-wheels thereof, the axle A, being a motor axle and a motor of any suitable or preferable type, (not shown) being mounted upon said axle. This axle A, is journaled in any suitable manner beneath the floor B of the vehicle, and at any desired point, intermediate of its ends, said axle carries an eccentric C. The eccentric C is embraced by a strap D' to which is connected one end of a pitman D, the opposite end of said pitman being connected to a rock-arm E' which is carried by a rock-shaft E. The rock-shaft E extends parallel with the axle A and at its ends is journaled in bearing boxes E² which are movably mounted in the lower ends of two hangers F'. Each of these hangers is shown as of approximately V form, or with its top bar as of triangular form, and is bolted to the under side of one of the side-sills of the car floor B as shown. The ends of the rock-shaft E protrude outwardly beyond the bearing boxes E² and at each of said ends the rock-shaft carries a rock-arm E³; said rock-arms extending oppositely from each other. The outer end of each rock-arm E³ is pivotally connected to the upper end of a thrust-bar or leg F, the lower ends of which are preferably serrated as shown at f. It will be obvious from the above description, that, as the axle revolves the eccentric C will impart longitudinal reciprocatory movements to the pitman D, and that said pitman will conse-

quently oscillate the rock-shaft E. This oscillation of the rock-shaft E, acting through the rock-arms E³, will raise and depress the thrust-bars F and swing said bars forward during each rising movement of the same. Hence, if the wheels A' run upon an ice-coated part of the track-rails G, the wheels will slip and the axles will revolve rapidly, while the vehicle will tend to stand still. The revolution of the axles A will alternately raise and depress the thrust-bars F and swing same forward. At each depression of the thrust-bars, their serrated lower ends *f* will break through the ice-coating and come directly into contact with the heads of the rails; the alternate advancing movements of the thrust-bars pushing the car or vehicle along until the coated sections of the rails have been passed.

In order to avoid all possibility of the thrust-bars F reaching dead centers, during their forward or advancing movements, a pair of studs or pins *l* are set in front of the bars, so as to extend across the path or movement of same; each stud being carried at the lower end of an arm L which projects obliquely downward from the bend of the corresponding hanger F'. Thus, as the thrust-bars swing forward they strike the studs *l* and are prevented from either reaching to or passing forwardly beyond a dead center or, in other words, a vertical position.

While running upon unobstructed rails, it is undesirable to have the thrust-bars F come into contact with the rails, and for this reason we have provided means for lifting the thrust-bars out of contact with the rails. As illustrated a hand-lever H is pivoted at its lower end upon a rock shaft I, which extends horizontally beneath the floor B, transversely of the same, and above the rock-shaft E; a pin in said lever engaging openings *j* in a sector-plate J which is secured to one of the side sills of the floor. From the lower end of the lever H extends a longitudinally slotted arm H', into the slot of which extends a pin or stud *k* which enters an offset or arm *k'* of the rock-shaft I. The upper ends of the bars K are slotted longitudinally, as at K', to receive the ends of the rock-shaft I, said ends of the shaft being shown as journaled in brackets *i* pendent from the upper parts of the hangers F. Thus it will be seen that by throwing the hand-lever H rearward, the bearing-blocks E², bars K, and rock-shaft E together with the thrust-bars F will be raised bodily so as to lift the thrust-bars out of contact with the rails. It will also be seen that by detaching the hangers F from the car-floor, and turning the attachments end for end and disconnecting the pitman D, the attachments may be secured to the opposite end of the car. Obviously the attachments may be connected to the motor-axles of other than electric-railway vehicles without departing from the essential spirit of our invention.

In Fig. 4, we have shown a slight modification in the construction of the thrust-bars F, a detachable shoe M being connected to the lower end of each thrust-bar and the lower end of such shoe being formed with the serrations *f*. The upper end of the shoe is shown as formed with a tongue *m* which enters a groove formed in the lower end of the thrust-bar; bolts *m'* being passed transversely through the lower end of the thrust-bar and through the tongue *m*. Thus it will be seen that, when the serrations *f* of a shoe become blunted by use, the shoe can be quickly removed and a new one substituted for the worn shoe.

In Fig. 5, we have shown a further modification of the thrust-bar. In this instance a disk N' having peripheral serrations or teeth *n*² is detachably secured to the lower end of the shoe; an axle-bolt *n* being passed through the center of the disk and transversely through a downward extension N of the lower end of the shoe F. A circular series of holes *n*³ is formed through the disk N' concentrically to the middle of the disk, and a pin *n'* is inserted removably through the upper part of the extension N and enters one of the holes *n*³. Thus it will be seen that but a few of the serrations *n*² at a time come into contact with the head of the rail, and that when these few serrations become dulled, the pin *n'* can be withdrawn and the disk N' turned and the pins finally reinserted, so as to bring unused serrations into working position. After all of the serrations have become dulled, the disk can be removed from the axle-bolt *n* and a fresh disk can be substituted.

It is obvious that large disks having marginal serrations can be centered directly upon the outer ends of the crank-arms E³, the thrust-bars F being in such instance omitted, and suitable stop-attachments corresponding to the pins *n'* being used. The large disks would then serve the purposes of the thrust bars. It is also obvious that a crank-arm may be substituted for the eccentric C upon the axle A.

Having thus described our invention, what we claim therein, and desire to secure by Letters Patent, is—

1. A starting and propelling mechanism for railway vehicles comprising a plurality of thrust-bars actuated from a driving axle through the medium of a rock-shaft and having alternate rising and falling and advancing and receding movements, and operating by contact at their lower ends one with one and the other with the other of the two track-rails upon which the vehicle rides, substantially as set forth.

2. A starting and propelling mechanism for railway vehicles comprising a plurality of thrust-bars, operating by contact at their lower ends with the track-rails, and connected at their upper ends to rock-arms carried by a rock-shaft which is journaled beneath the vehicle body, and a pitman connected to a rock-

arm carried by the rock-shaft, and also connected to an eccentric upon a driving axle of the vehicle, substantially as set forth.

3. A starting and propelling mechanism for
5 railway vehicles comprising a plurality of thrust-bars operating by contact at their lower ends with the track-rails and connected at their upper ends to rock-arms carried by a vertically adjustable rock-shaft; said shaft
10 being connected by a pitman with an eccentric upon a driving axle of the vehicle, substantially as described.

4. A starting and propelling mechanism for
15 railway vehicles, comprising a plurality of thrust-bars, operating by contact with the track-rails and connected to rock-arms carried by a vertically adjustable rock-shaft, which is journaled beneath the vehicle body, a rocking-lever carried by a second rock-shaft which
20 is connected to the actuating rock-shaft so as to raise and lower the same, and a pitman

connecting the actuating-shaft with an eccentric carried by a driving-axle of the vehicle, substantially as described.

5. A starting and propelling mechanism for 25
railway vehicles, comprising a plurality of thrust-bars actuated from a driving-axle of the vehicle and having alternated rising and falling and receding and advancing movements, and also operating by contact with the
30 track-rails, and arms carrying pins or studs extending across the path of the forward movement of the thrust-bars, substantially as set forth.

In testimony that we claim the foregoing as 35
our invention we affix our signatures in presence of two witnesses.

ERNEST SCHMITZ.

JAMES MENDENHALL.

Witnesses:

TAYLOR E. BROWN,
G. W. HIGGINS, Jr.