

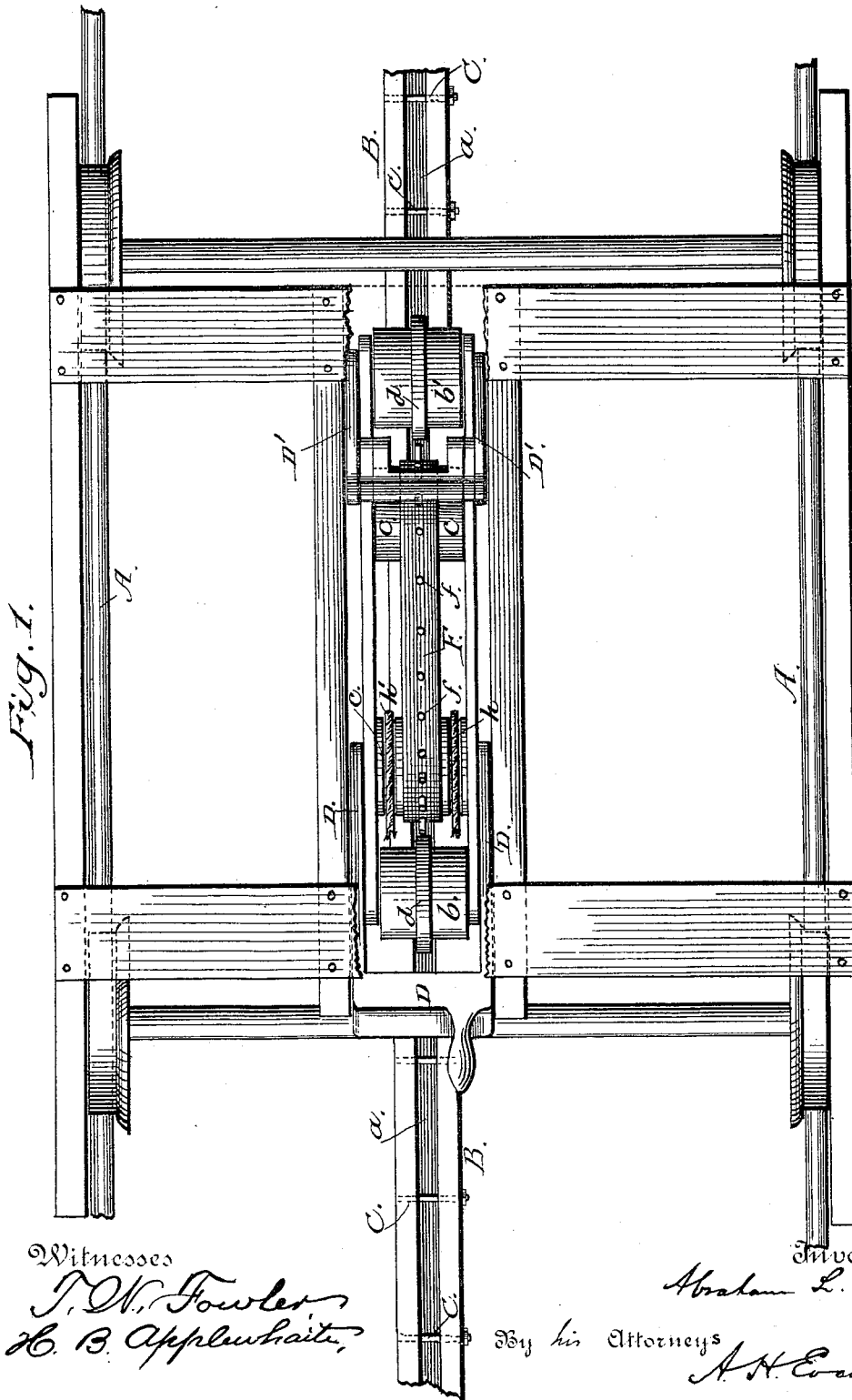
(No Model.)

2 Sheets—Sheet 1.

A. L. RICH.
STREET CAR MOTOR.

No. 348,416.

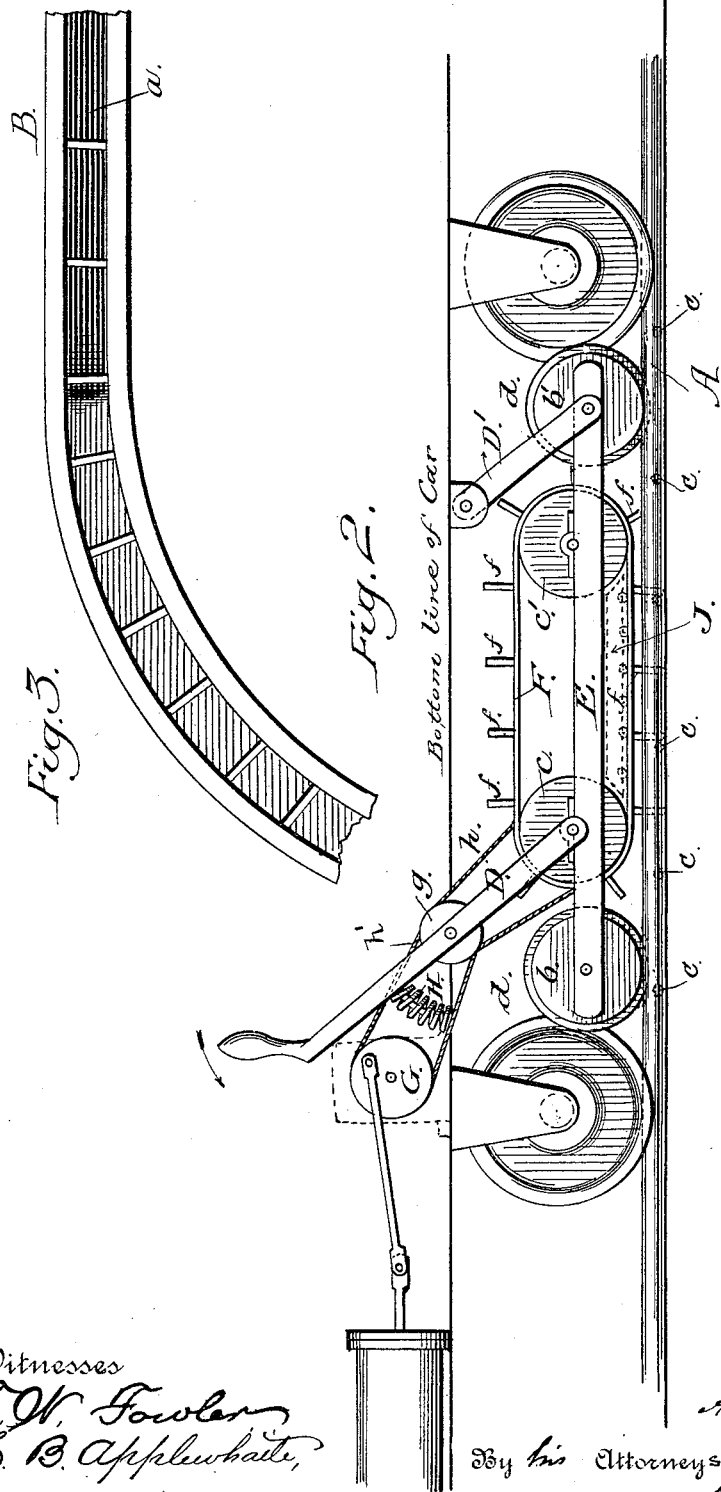
Patented Aug. 31, 1886.



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Witnesses
T. W. Fowler
H. B. Applewhite,

Inventor
Abraham L. Rich

By his Attorneys
A. H. Evans & Co

UNITED STATES PATENT OFFICE.

ABRAHAM LINCOLN RICH, OF ALLEGHENY, PENNSYLVANIA.

STREET-CAR MOTOR.

SPECIFICATION forming part of Letters Patent No. 348,416, dated August 31, 1886.

Application filed May 5, 1886. Serial No. 201,156. (No model.)

To all whom it may concern:

Be it known that I, ABRAHAM LINCOLN RICH, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Street-Car Motors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—
Figure 1 represents a plan view of a motor embodying my improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a detail, to be referred to.

My invention relates to devices for propelling street-cars; and it consists in the construction and combination of devices hereinafter described and claimed.

To enable others skilled in the art to make and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A represents the usual side rails of a street-railway. In the center, between these rails, there is laid a center track or channel rail, B. This center rail is provided with a longitudinal slot or channel, *a*, extending throughout its entire length, the slot being sufficiently narrow to prevent the wheels of a vehicle from dropping into the same. This channel in practice will be about four or five inches deep and two or three inches broad at the bottom. At intervals of one or two hundred feet there may be located openings (not shown) on the sides of the channel, to remove any dirt which may collect inside, the said dirt being scraped to these openings with a suitable tool by a track-man. At regular intervals or spaces of three or four feet, or whatever distance practice may determine, there are placed cross-pins or "stationary cogs" C, which are fastened or bolted in such a manner that they can be removed readily and replaced should they become broken or worn.

Secured to the bottom of the car or motor, directly over the channel B, by connecting-rods D D', there is a longitudinal frame, E, in which there are mounted four wheels, *b b' c c'*. The wheels *b b'* are located at each end of the frame and rest upon the channel-rail and are provided with a central flange or shoulder, *d*.

This flange will be about one-half inch wide and about one-half inch deep, and is designed to serve as a guide to keep the frame directly in engagement with the slot in the channel-rail B, the said flanges being designed to run in the channel while the remaining portion of the wheels are designed to rest on the top of the rail and on each side of the slot. Between these wheels, and within the frame, 60 there are mounted the wheels *c c'*, which are arranged slightly higher than the wheels *b b'*, so that they do not come into actual engagement with the channel-rail.

Around the wheels *c c'* there is passed an endless chain or belt, F, of suitable material, preferably a flat woven steel belt or chain, which will be about three inches wide and of a thickness sufficient to answer the purpose for which it is used. At regular intervals or spaces along this belt, and at suitable distances apart, there are fastened projections or teeth *f*. These teeth will be of such size and shape as to work freely in the slot *a* when the belt is in operation, and to extend down far enough below the stationary pins or cogs in the channel-rail to catch thereon.

The forward end of the longitudinal frame E is secured by the connecting-rod D, which extends beyond said frame and serves as a lever, the purpose of which will be hereinafter described. At the point where this lever or rod is secured to the bottom line of car or motor there is mounted a band-wheel, *g*, which is to be connected with the wheel *c* by belts *h*, while another belt, *h'*, extends from this wheel to a pulley, G, which receives and delivers the power generated by a small engine on the car. The reason for placing this wheel on the same axis with the lever is, that it will always be the same distance from the wheel *c*, to which it is connected by the double line of belting, without regard to what position the lever may be in, and thereby keeping the connecting-belt taut at all times. Above where the connecting rod or lever D is secured to bottom line of car or motor, there is fastened under the lever and resting on a base or cross beam an expanding spiral spring, H, which exerts an elevating pressure on the upper end of the lever D, and causing a downward pressure on

the lower end, and keeping the longitudinal frame E and wheels mounted therein in their proper position on the channel-rail.

The power for operating the motor may be furnished by any practicable method, as by a steam, gas, or oil engine.

The operation of my motor is substantially as follows: The engine being started, its power is communicated to pulley G and motion transmitted to connecting-wheel c, thereby moving the belt, whose projections or cogs engaging the stationary pins or cogs in the channel-rail propel the car. The mechanism described is also used in stopping and checking or controlling speed, and when descending grades by applying power in reverse motion, enabling cogs on belt to offer resistance to onward motion of the car. The motor is capable of moving in either direction, backward or forward, on same track. By depressing connecting-rod or lever D the whole contrivance can be thrown out of gear with the stationary pins or cogs, and elevated above the track in case any serious obstruction is to be passed over, or, if such action should become necessary or desirable from any other cause. The points where the connecting-rods are secured to the bottom line of car should be the same distance apart as are the points where the connecting-rods are secured to longitudinal frame E; also, the connecting-rods should be of equal lengths, so that the longitudinal frame will remain in a horizontal position when on the track or when being raised from or depressed to its normal position. The stationary pins or cogs are placed sufficiently low in the channel to clear the flanges of the guide-wheels.

Should practice demonstrate the existence of a tendency of the cog-belt to slip on the wheels around which it passes to an extent that would require an absolute preventive of such slippage, there could be affixed to the inner side of the cog-belt a number of cogs at regular intervals to work into depressions mortised into the rim or face of the cog-belt wheels.

If in practice there should be discovered a liability of the belt to rise and throw the projections out of gear between the two belt-wheels, there may be fastened under the longitudinal frame, between the two belt-wheels c c', and extending down until it almost touches the track, a block, J. This would prevent any rising of the belt, the block could be lubricated, or there could be fastened to the bottom thereof a number of small rollers, which would prevent any friction on the inner side of the belt.

A motor of this description would be capable of climbing heavy grades, and of overcoming the obstacles which are often unsurmountable to other motors, and would provide a more pleasant and rapid means of traveling than is offered by horse-cars.

In rounding short curves where any difficulty should be likely to arise from the wheels binding in the channel, the latter could be

widened (see Fig. 3) on the inner or shorter side of the curve, and the depth lessened to an extent that it would be shallow enough to allow the wheels of any vehicle to drop in without inconvenience or damage; or, if necessary, the lever could be depressed and the machine elevated from the track, thereby permitting the car to round the curve with the momentum already attained.

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

1. The combination, with a street-railway having a centrally-disposed slot or channel-rail, of a frame pivotally secured to the car-body, and having flanged guide-wheels engaging the channel-rail, substantially as described.

2. The combination, with a street-railway having a centrally-disposed channel-rail, of a frame pivoted to the car-body, and having flanged wheels mounted therein and engaging the channel-rail, the connecting-arms D', and the connecting arms or lever D, for elevating the frame and wheels, substantially as herein described.

3. The combination, with the frame E, pivotally secured to the car-body, and having flanged guide-wheels mounted therein, the wheels c c', a belt passing around said wheels, and having teeth or projections extending therefrom, and the channel-rail having spaced pins engaged by said teeth or projections, substantially as herein described.

4. The combination, with a railway having a centrally-disposed channel-rail, with transverse pins secured therein, of a frame pivotally secured to the car-body, the wheels c c', mounted in said frame, and an endless belt having projections engaging the transverse pins in the channel-rail, substantially as herein described.

5. The combination, with a railway having a centrally-disposed channel-rail, with transverse pins secured therein, of a frame pivoted to the car-body, an endless belt passing around wheels or pulley, and having projections engaging the channel-rail, and means for imparting motion to said belt, substantially as herein described.

6. The combination, with the centrally-disposed channel-rail having transverse pins secured therein, of a pivotally-secured frame having wheels mounted therein, a belt having projections engaging the channel-rail, and a lever pivoted to the frame and car-body, and adapted to raise said frame and belt from the channel-rail, substantially as herein described.

7. The combination, with a centrally-disposed channel-rail having transverse pins, as described, of a pivotally-secured frame with band-wheels mounted therein, the endless belt having projections or teeth extending therefrom, a lever for raising said frame and belt from engagement with the channel-rail, and a spring for returning said frame to its normal position, substantially as herein described.

8. The combination, with a centrally-dis-
posed rail having the slot *a* and transverse
pins C, of the frame E, pivoted to the car-
body, and having wheels *b b'* and *c c'*, the belt
5 having teeth or projections extending there-
from and engaging the pins C, the band-wheel
g, belts *h*, and the pulley G, to which power
is applied, substantially as herein described.

9. A frame pivotally secured to the car-
10 body, and an endless belt having projections
extending therefrom, in combination with a
channel-rail having transverse pins engaged
by the projections on the belt, substantially as
herein described.

10. The combination, with the centrally-dis- 15
posed channel-rail, of the frame E, having
flanged wheels mounted therein and resting
upon said rail, the band-wheels *c c'*, journaled
within the frame and above the rail, and a
belt having projections which engage trans- 20
verse pins in the channel-rail, substantially as
herein described.

ABRAHAM LINCOLN RICH.

Witnesses:

PAUL HUETHER,
H. C. HAYDEN.