(No Model.) 3 Sheets—Sheet 1.

C. E. SCRIBNER & E. P. WARNER.

APPARATUS FOR ILLUMINATING CARS OF CABLE ROADS.

No. 469,873. Patented Mar. 1, 1892.

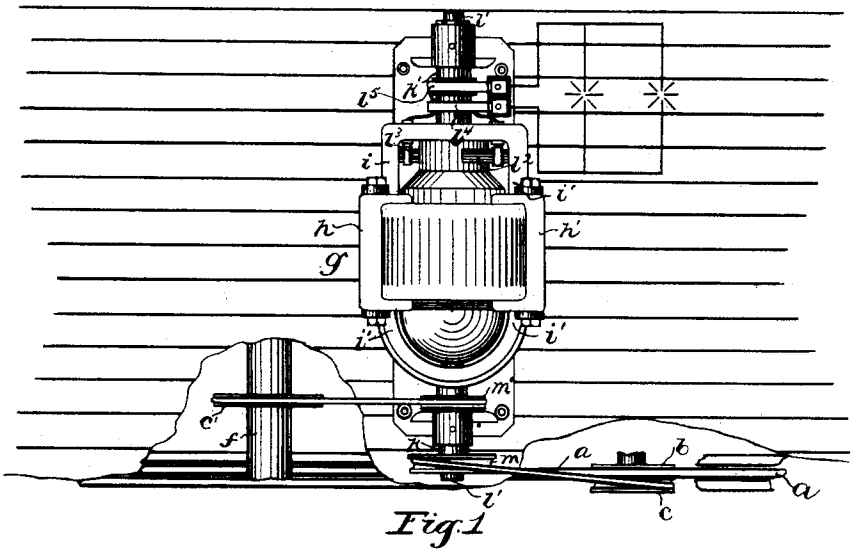


Fig. 1

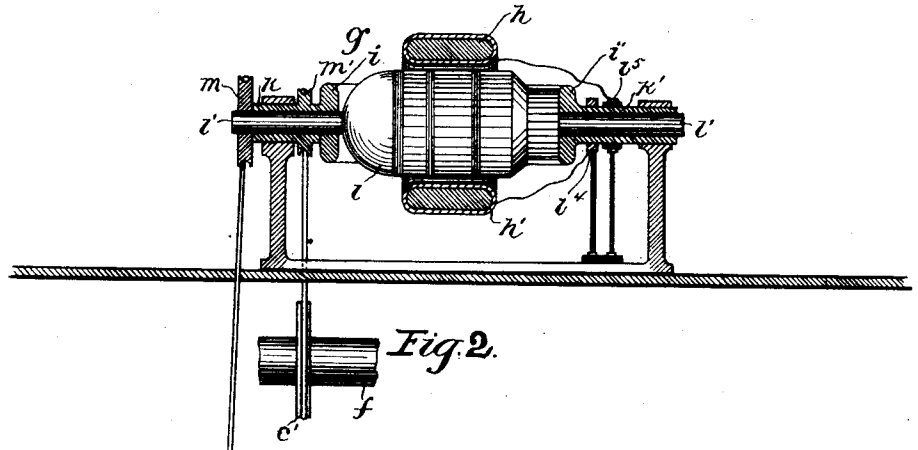
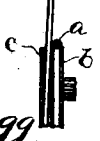


Fig. 2.



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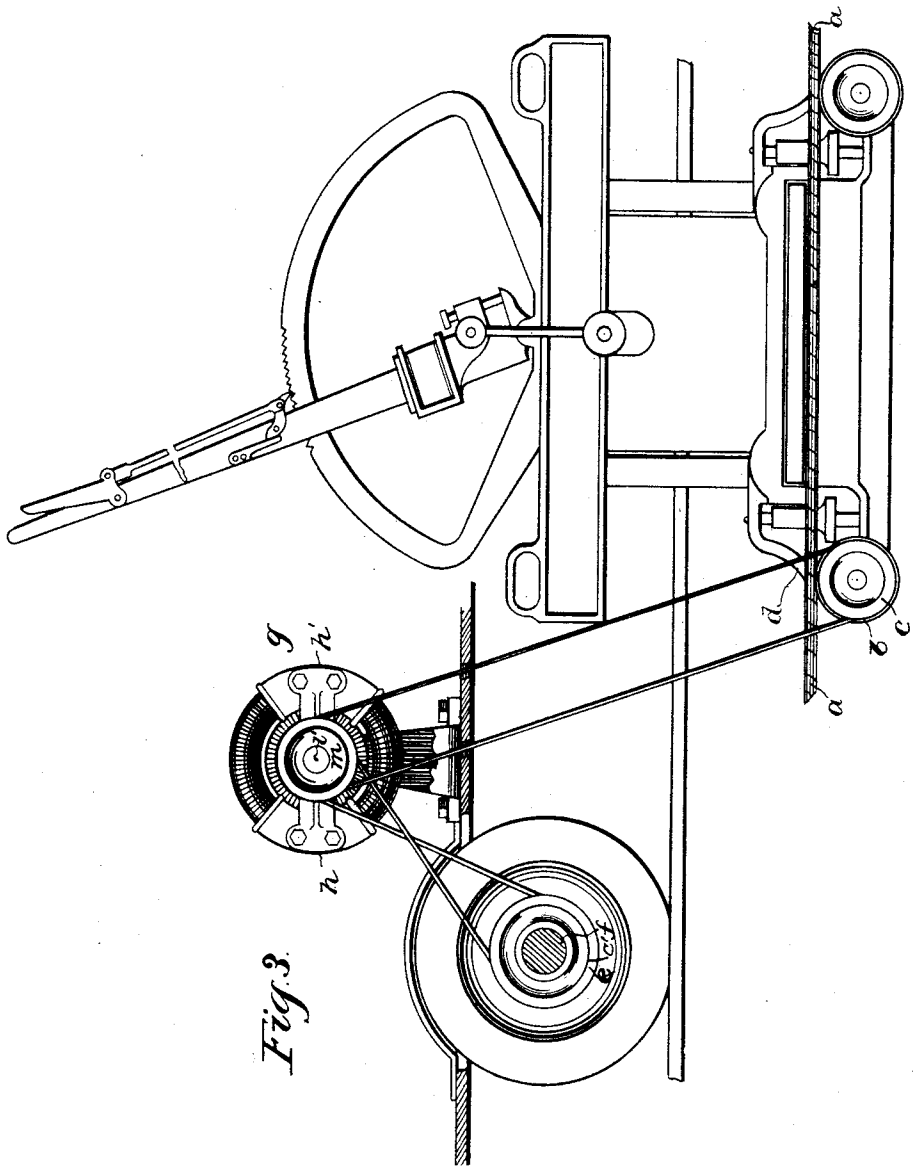

Fig. 3.

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(No Model.) 3 Sheets—Sheet 3.

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APPARATUS FOR ILLUMINATING CARS OF CABLE ROADS.

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Fig. 5.

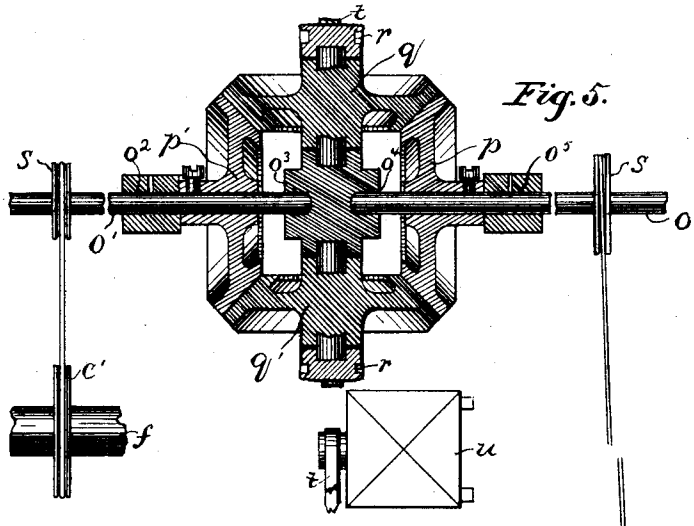


Fig. 4.

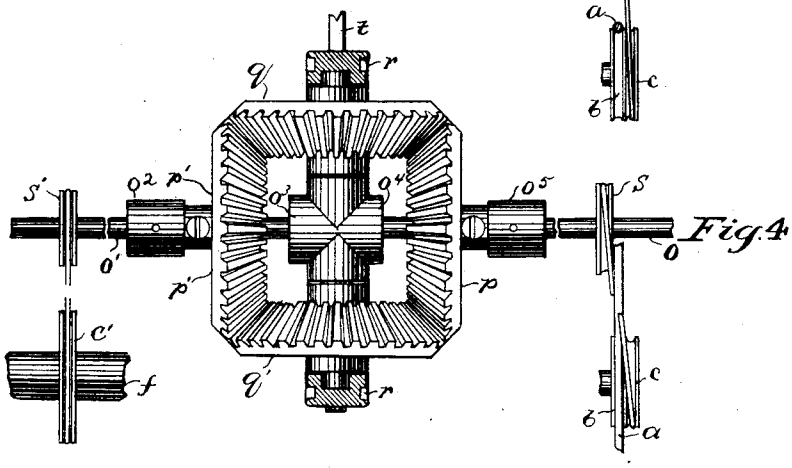
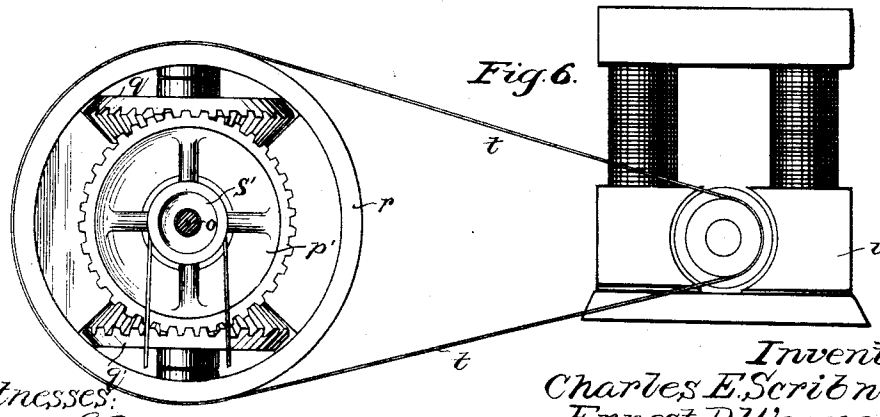


Fig. 6.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR ILLUMINATING CARS OF CABLE ROADS.

SPECIFICATION forming part of Letters Patent No. 469,873, dated March 1, 1892.

Application filed October 13, 1891. Serial No. 408,567. (No model.)

To all whom it may concern:

Be it known that we, CHARLES E. SCRIBNER and ERNEST P. WARNER, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Apparatus for Illuminating Cars of Cable Roads, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to apparatus for the electric illumination of cars of cable roads. Its object is to provide means for keeping a dynamo mounted upon a car in constant rotation, whether the car be in motion or not. To accomplish this we provide a pulley in connection with the car-axle, or with a separate wheel rolling upon the track, which pulley, through intermediate gear, serves to communicate rotary motion to the dynamo while the car is in motion, and a second pulley in connection with a wheel bearing upon the cable, which serves to give motion to the dynamo while the car is at rest. Motion may be transmitted to the dynamo either directly, by belts from the two pulleys to the dynamo, or by means of a special form of gear. In the former case the field-magnets and the armature of the dynamo are both constructed so as to be capable of independent rotation. The field-magnets are belted to one of the pulleys and the armature to the other. The belts are arranged so that the field-magnets and armature shall revolve in opposite directions. It is plain that while the car is not in motion the pulley which bears upon the cable is kept in continuous rotation by the passage of the cable over it. This motion is communicated to the field-magnets of the dynamo. On the other hand, while the car is securely gripped to the cable there is no rotation of the wheel bearing upon the cable, and the field-magnets remain stationary. The armature, however, is now kept in rotation by the rotation of the car-wheels as they roll upon the track. When the car is not securely gripped to the cable, there may be some relative motion between the car and the cable and some relative motion between the car and the track. In this case the field-magnets are revolved in one direction with a speed depending upon the relative motion between the car and cable, and the armature is revolved in the opposite direction with a speed depending on the relative motion of the car and track. Obviously the dimensions of the driving and driven pulleys may be chosen so as to secure a constant relative speed of rotation between the armature and field-magnets of the dynamo, whether the car be in motion with the same speed as that of the cable or with less, or be standing still, and thus a constant electro-motive force or current may be maintained.

When our special gear is employed to transmit motion to the dynamo, the latter may be of the ordinary construction. This gear consists of two miter gear-wheels secured to separate shafts whose axes are in the same straight line, and a third "idle" miter-wheel meshing with both the others and secured in a separate block adapted to revolve in the same plane as the two miter-wheels. In this compound gear, when either of the shafts is revolved while the other remains stationary, the idle-wheel is rolled around upon the miter-wheel of the stationary shaft, and hence the block carrying the idle-wheel is given a rotary motion in the same direction as that of the moving shaft. When this device is employed in our invention, one of the shafts is belted or geared to the axle of the car and the other to the wheel bearing upon the cable. The block carrying the idle-gear is belted to the dynamo to be driven. The effect of this device is the same as that of the other—to maintain the speed of rotation of the dynamo, and thus the electro-motive force, constant, whatever the speed of the car.

Our invention is illustrated in the accompanying drawings.

In the drawings, Figure 1 is a plan of a dynamo whose fields and armatures are both capable of rotation in connection with our mechanism for maintaining constant speed of rotation. Fig. 2 is a vertical section through the axis of the armature. Fig. 3 is a side elevation showing, also, the mechanism of the grip and the disposition of our invention in connection therewith. Fig. 4 is a plan of the compound gear in connection with our mechanism and a dynamo. Fig. 5 is a vertical sec-

tion through the axis of the compound gear, showing more clearly its construction. Fig. 6 is a side elevation of the gear belted to a dynamo.

We will designate parts in the drawing by letters of reference, like parts being indicated by similar letters of reference in the several figures.

Referring to the drawings, *a* is the cable.

b is a wheel bearing upon the cable.

c is a grooved pulley secured to wheel *b*.

In Fig. 3 it will be seen that the wheel *b* is journaled upon the frame of the grip mechanism *d* and supports the cable when the latter is released by the grip. The grip mechanism itself we need not describe in detail, as it is wholly immaterial in our invention.

c' is a pulley mounted upon the axle *f* of the car-wheels.

Referring to Figs. 1, 2, and 3, the dynamo *g* consists of the field-magnets *h h'*, which are of such form as to be capable of easy revolution. The fields are provided with lateral extensions *i i'* of some non-magnetic material, which encircle the ends of the armature. The ends of these extensions are shaped into the sleeves *k k'*, which constitute bearings upon which the fields are journaled. The armature *l* is of the usual construction. Its shaft *l'* is journaled in the sleeves *k k'*. Thus the fields and armatures are both capable of independent rotation. The current from the armature is collected by the brushes l^2 l^3, attached to the frame of the machine, and is delivered from the dynamo at the springs l^4 l^5. The armature-shaft carries the pulley *m*, which is connected by a belt passing through the slot in the conduit to the wheel *c*. One of the sleeves *k* of the field-frame carries the pulley *m'*, which is belted to the pulley *c'*. When the car is stationary, the fields *h h'* also remain stationary, while the wheel *b* is kept in revolution by the passage of the cable over it. If, however, the car is in motion with the cable, the cable is stationary with reference to wheel *b*, while the fields *h h'* are kept in rotation in the opposite direction by the car-wheels rolling upon the track.

Referring now to Figs. 4, 5, and 6, we will proceed to describe the compound gear in detail. *o o'* are shafts journaled at o^2 o^3 o^4 o^5 and movable independently. Rigidly secured to them are the miter-gears *p p'*. It is preferable that there should be two or more of the idle-wheels *q q'*, in order to preserve the balance of the mechanism. All the gears may be of the same diameter. The wheels *q q'* are journaled in the block *r*. This block serves, also, to support the shafts *o o'* and is free to revolve upon them. A pulley *s* upon the shaft *o* is connected by belt to the wheel *b* and the pulley *s'* upon shaft *o'* to wheel *c'*, as in the apparatus before described. The block *r* is circular, and its periphery is adapted to receive a belt *t*, by which it is connected to the dynamo *u*. When now the car is stationary, the gear-wheel *p'* is also stationary, while the wheel *p* is being rotated by the passage of the cable over wheel *b*. Hence through the instrumentality of the wheels *q q'*, which roll upon the stationary wheel *p'*, the block *r* is caused to rotate in the same direction as the shaft and at half the angular velocity of shaft *o*. When the car is firmly gripped to the cable, the shaft *o* becomes stationary, while the shaft *o'* revolves, causing a revolution of the block *r* still in the same direction. When, however, the car is going slowly—say at half the speed of the cable—both shafts *o* and *o'* are rotating with the same angular velocity, equal to one-half that of either when the other was stationary. Hence the wheels *q q'* would roll upon neither of the wheels *p p'*, and the block *r* would be carried round with the same angular velocity as when the car was stationary or at full speed.

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

1. The combination, with a moving cable, of a rotary wheel fixed to the car and in contact with the cable, adapted to transmit rotary motion to parts of a mechanism, and a second wheel journaled to the car and adapted to roll upon a rail or plane when the car is in motion and to transmit rotary motion to other parts of the said mechanism, substantially in the manner described.

2. The combination, with a cable car, of a wheel attached to the car and resting upon the cable, adapted to communicate rotary motion to the field-magnets of a dynamo upon the car, and a second wheel attached to the car and resting upon a stationary plane or rail, adapted to communicate rotary motion in the opposite direction to the armature of the dynamo, substantially as described.

3. The combination, with a moving cable and a car adapted to be secured thereto, of a wheel attached to the car and resting in contact with the cable, adapted to communicate rotary motion to one part of a mechanism upon the car, another wheel attached to the car, resting upon a stationary plane or rail and adapted to communicate rotary motion to another part of said mechanism, and intermediate bodies or mechanism adapted to convert the reciprocal rotary motion of the two parts of said mechanism into a continuous rotation in a constant direction of a conductor in relation to a magnetic field, substantially as described.

In witness whereof we hereunto subscribe our names this 14th day of September, A. D. 1891.

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