(No Model.)

F. E. KINSMAN.

STREET CAR LIGHTING.

No. 549,136. Patented Nov. 5, 1895.

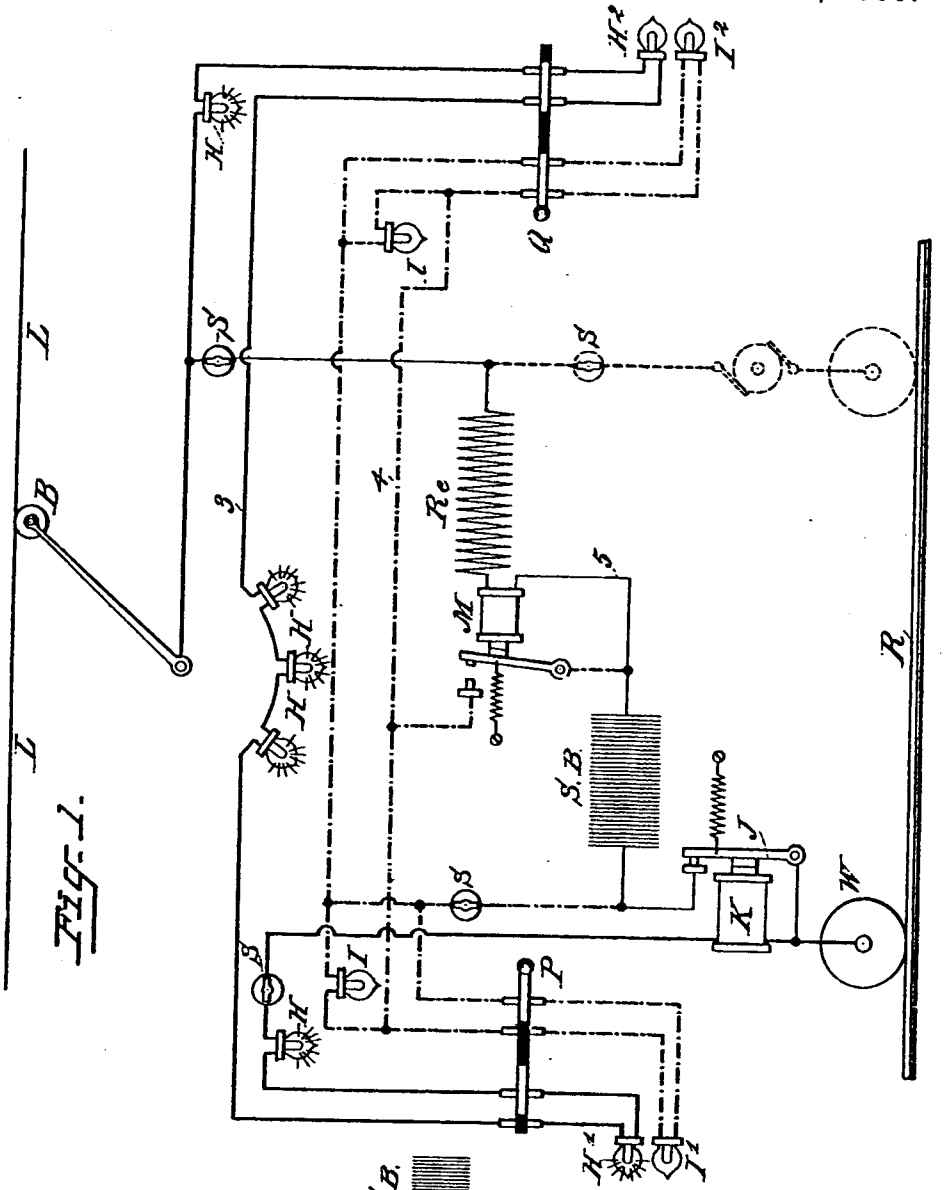

Fig. 1.

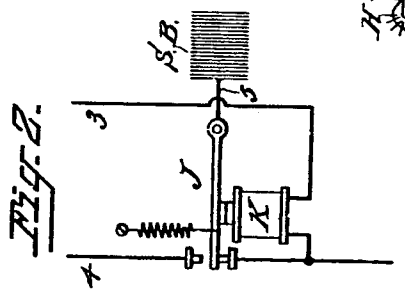

Fig. 2.

WITNESSES:

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FRANK E. KINSMAN, OF PLAINFIELD, NEW JERSEY.

STREET-CAR LIGHTING

SPECIFICATION forming part of Letters Patent No. 549,136, dated November 5, 1895.

Application filed February 27, 1895. Serial No. 539,853. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. KINSMAN, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented a certain new and useful Improved Street-Car Lighting System, of which the following is a specification.

My invention relates to the electric lighting of street-railway cars, and is designed as an improvement on those systems in which the lamps for lighting are operated in a branch from a line or supply wire exterior to the car, as is the case in the present systems of electric propulsion of cars.

The object of my invention is to provide for accidental disconnection of the branch from the supply-wire, which frequently arises from the trolley leaving the supply-wire, as also from the accidental breakage of the lamps used for lighting said car, and is intended as an improvement upon the Patent No. 516,636, granted to Willard M. Miner March 13, 1894, in which I hold an interest.

To this end my invention consists in the simple and effective combination of devices hereinafter described, and specified in the claims, whereby in the event of either the disconnection or breakage mentioned a substitute means of illumination may be automatically provided.

As my invention is primarily intended for application to electric-railway cars, I have illustrated the invention diagrammatically in the accompanying drawings as so applied, wherein—

Figure 1 presents the preferred arrangement, and Fig. 2 a modification of a portion thereof.

L indicates a section of line or working conductor which serves to supply current to a branch 3 on the car, the circuit of said branch being completed, as usual, through the rails R or any other return-conductor in the usual or proper manner.

B is any collecting device which moves over the conductor L and takes up the current for use on the car.

The drawings indicate the ordinary trolley, the conductor L being in the case illustrated an overhead wire; but, as will be well understood, my invention is not limited to cars propelled from overhead wires nor to any particular construction of collector.

H indicates any number of electric lamps for lighting the car operated by the current taken from the supply-wire L and included in the branch 3, represented in heavy lines, to the return R by way of the wheel W, or otherwise.

In the present instance I have shown my invention as carried out in connection with incandescent lamps H, which together are of proper voltage for operation from a five-hundred-volt circuit.

I indicates the substitute lamps, which are to be used for lighting the car in the event of the failure of lamps H from any cause. Lamps I in circuit 4, represented in broken lines, may be of any desired candle-power; but they are run in multiple to adapt them for operation by a small number of couples of storage-battery S B. The storage-battery S B is normally disconnected from the substitute lamps I.

In the preferred manner of carrying out my invention the battery S B is in a special branch 5, indicated by a fine line, which contains a resistance Re, and which passes to the return R through the armature J of a magnet K, located in the circuit 3 in series with the lamps H. In the circuit 5 is also located a magnet M, whose armature controls the multiple circuit 4 of lamps I. In this arrangement the storage-battery and resistance are in multiple with the lamp-circuit 3. From the circuit 5 in advance of the resistance Re a branch through the motor O leads to the return R. The resistance Re is of a sufficient number of ohms to prevent the charging of the storage-battery until the current passing through the motor has reached a certain voltage. Sufficient current, however, passes the resistance Re to enable the magnet M to hold up its armature, which it does until a rupture occurs in either branch 3 or 5. A rupture of the circuit in branch 3 by means of the trolley leaving the conductor or the breaking of a lamp H or cessation of current over the conductor L de-energizes the magnet K, allowing its armature to fall back and break the return connection for circuit 5. This will

cause the magnet M to be de-energized and the battery thrown into circuit, thereby lighting the supplemental lamps I. So, also, any of these three accidents, save the breaking of a lamp H, will cause magnet M to be de-energized and the supplemental lamps I brought into operation. By placing the secondary battery in a branch by itself any failure of lamps H will not cut off the current from the motor.

The circuits and lamps thus far described are those for lighting the interior of the car. I also propose to combine with them suitable lamps for the headlights, which are indicated at $H' I' H^2 I^2$, the former of which are designed for use when the car is running in one direction and the latter for use when the car is running in the opposite direction. The lamps $H' H^2$, as will be seen, are in the series circuit and are the lamps normally in use, while lamps $I' I^2$ are in the multiple circuit from the storage-battery and are for emergency use.

I provide at each headlight a suitable switch for throwing the lamps of the headlight into and out of circuit in accordance with the direction of travel of the car. The switch P is shown in a position such as to throw the lights $H' I'$ into circuit, while the switch Q is in the reverse position. The switches illustrated are simply diagrammatic representations of any form of switch adapted to this purpose and consist of bars of metal properly insulated from one another and adapted to bridge the conductors in the respective circuits 3 and 4. I have also indicated the ordinary switches S in the several branches of the system.

The operation of the system is as follows: Should current fail in the conductor L of the trolley leave said conductor, the armature K will fall back, breaking the return for circuit 5. The armature of magnet M will also fall back and close the circuit for the supplemental lamps, which thereby will be immediately lighted to take the place of lamps in the branch of the power-circuit; also, should any one of the lamps H break and rupture the circuit 3 armature J will fall back, breaking the return of circuit 5 and at the same time de-energizing magnet M and allowing the circuit 4 to be completed and the supplemental lamps to be lighted. As a modification of this system, I may arrange the magnet K and its armature J substantially as shown in Fig. 2, said armature in this arrangement when attracted closing the return for circuit 5, and when released by magnet K it breaks said return and closes circuit 4 through the supplemental lamps, the circuit 3 passing through the magnet K, as in Fig. 1. By this arrangement I am enabled to dispense with the magnet M and the circuit-breaker controlled thereby. By this construction any failure in current in circuit 3 will throw the supplemental lights into circuit. The remainder of the system will remain unchanged, the resistance and storage-battery still being in circuit 5 in multiple with the circuit 3.

In my system a small storage-battery may be used, which on account of the resistance Re need not be brought into charging-circuit until the motor is receiving a definite voltage and lamps H the required voltage. Any number of lamps may be used adapted to the voltage of the line. Any running down of the storage-battery will also take place through the motor and may thereby assist in its operation.

What I claim as my invention is—

1. In a car lighting system, the combination with the branch from the main line, exterior to the car, containing the lamps in series, of a branch in parallel therewith containing a storage battery and a resistance, supplemental lamps in an open circuit from said battery, and means operable by a failure of current in the main line branch to close the circuit of the supplemental lamps.

2. The combination with the branch from the main line circuit exterior to the car, containing lamps in series, of a magnet in said branch, a storage battery in a circuit in parallel with said branch, supplemental lamps supplied from said battery, and a circuit breaker in the circuit from the battery to ground controlled by a magnet in said branch.

3. The combination with the branch from the main line containing lamps in series and a magnet in series therewith, of a storage battery, a resistance, and an armature for said magnet in series in a circuit arranged in parallel with said branch, supplemental lamps in multiple circuit from said battery and means controlled by the failure of current to said battery for lighting the supplemental lamps.

4. The combination in a car lighting system, of a branch of the main line circuit, lamps in series therein located within the car and in the head-light, a storage battery in circuit in parallel with said branch, supplemental lamps in circuit with the storage battery and located in the car and also in the head-light, and means controlled by the current in said branch for lighting the supplemental lamps upon the failure of the others.

5. In a car lighting system, the combination with lamps in a branch of the main line circuit located in each head-light of the car, a storage battery charged from the main line circuit, supplemental lamps in a circuit from the battery also located in each head-light, and means at each head-light for simultaneously shunting the circuit from both kinds of lamps therein, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 26th day of February, A. D. 1895.

FRANK E. KINSMAN.

Witnesses:
WM. H. CAPEL,
HENRY T. HIRSCH.