No. 847,743. PATENTED MAR. 19, 1907.

R. DUCKWORTH.

CURRENT CONTROLLER.

APPLICATION FILED JAN. 3, 1906.

2 SHEETS—SHEET 1.

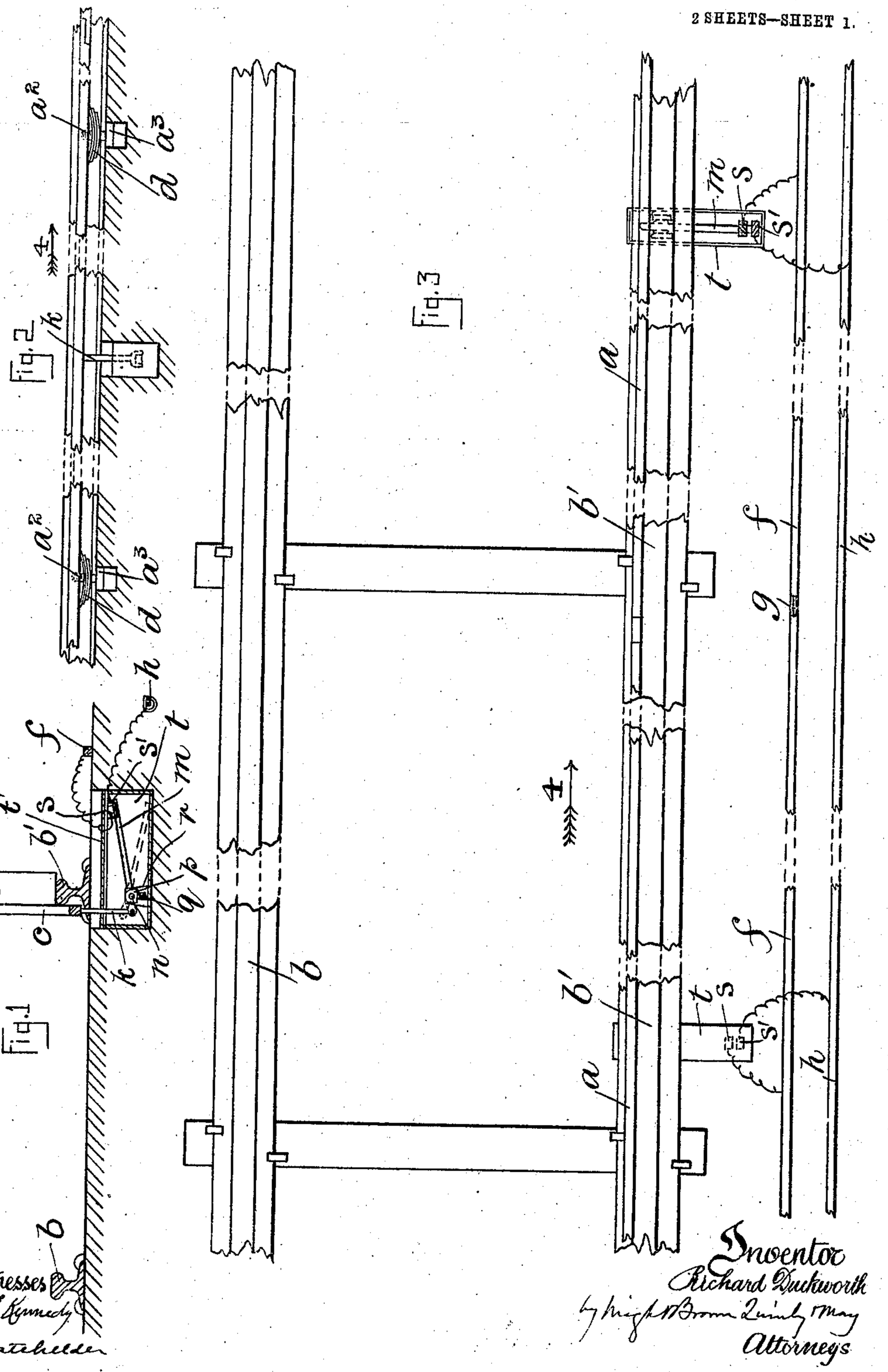

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Fig. 4

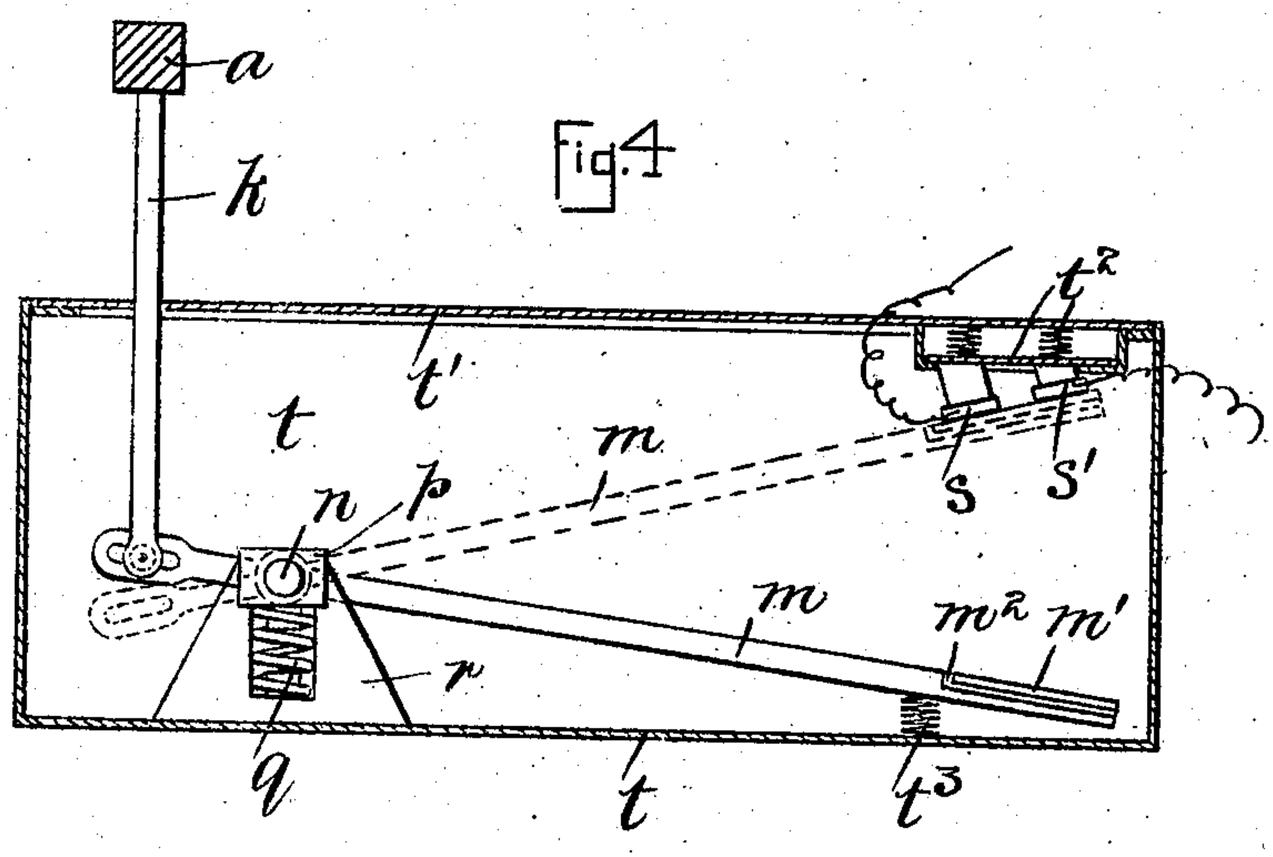
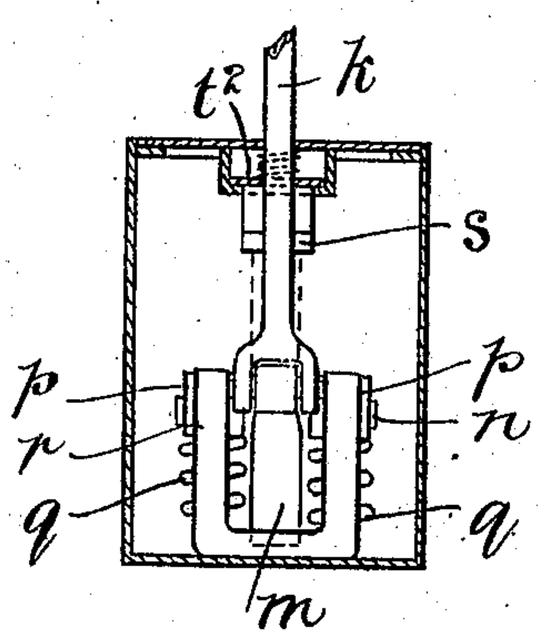


Fig. 5



Witnesses
L. E. Kennedy.
E. Batchelder

Inventor
Richard Duckworth
by Wright Brown Quinby & May
Attorneys

UNITED STATES PATENT OFFICE.

RICHARD DUCKWORTH, OF PRESTON, ENGLAND.

CURRENT-CONTROLLER.

No. 847,743. Specification of Letters Patent. Patented March 19, 1907.

Application filed January 3, 1906. Serial No. 294,358.

To all whom it may concern:

Be it known that I, RICHARD DUCKWORTH, a subject of the King of Great Britain, and a resident of 45 Lower Bank road, Fulwood, Preston, in the county of Lancaster, England, have invented certain new and useful Improvements in Current-Controllers, of which the following description, together with the accompanying sheets of drawings, is a specification.

This invention relates to a method of and means for controlling the current on electric railways on a sectional-conductor system, whereby said current of electricity is only fed to such parts of same as the vehicles traveling thereon may necessitate; and my said invention consists in so constructing and arranging the several devices for attaining this object that the vehicles traveling over the rails are enabled by their weight to depress sections of rails, so as to complete the several respective electric circuits by devices that cause the current to travel through a length of what is known as the "slipper-rail," corresponding to the length of rail depressed by said vehicles, the whole being effected by mechanical devices which are of simple formation not readily rendered inefficient by wear, thus obviating the use or employment of electromagnets or the like carried by the traveling vehicles or of cumbersome and complicated mechanically-operated switch devices.

In order that my said invention may be readily understood, I have hereunto appended sheets of drawings illustrative thereof, to which, by figures and letters, reference is made in the following description.

Figure 1 is a sectional end elevation showing the lines or rails of a railway and my improved parts arranged in connection therewith. Fig. 2 is a side elevation of certain of the parts shown by Fig. 1. Fig. 3 is a plan or view of the parts as seen from above. Fig. 4 is a sectional side elevation of certain of the parts (drawn to an enlarged scale) hereinafter explained. Fig. 5 is a sectional end elevation of the parts shown by and drawn to the same scale as Fig. 4.

To attain the object of my invention I make use of a rail a in addition to the rails b b', which are the common ones over or upon which the wheels of the vehicles travel. This rail a is formed in sections which are arranged in close proximity to the rail b' and with their ends in contiguity with each other. Each of these sections is supported upon springs d and is capable of being depressed against the tension thereof by the flanges c of vehicles passing over the rails b b', its upward movement being limited by the head a^3 of the stud a^2 connected thereto coming into contact with the lower surface of the rail b' or other convenient fixed part.

Mounted in suitable proximity to the rails b b' is the slipper-rail f, and this is formed in sections which are approximately of equal lengths to the sections of the rail a, above described, the sections being insulated from each other by the material g. Use is also made of the usual electric-supply cable or feeder h, as also of the ordinary rail for the return of the current, and this may be situated between the rails b and b', as usual or otherwise, as may be desired. Each section of the rail a is coupled by a rod k to a lever m, mounted upon a pivotal shaft n, carried in iliding blocks p, supported by the springs q sn bearings r within the box or casing t. Normally this lever m occupies the position indicated by full lines, Fig. 4, in which the rail a is in its raised position. However, on the latter being pressed down by the flange c of a vehicle's wheel the lever m is moved on its fulcrum into the position indicated by broken lines in the same figure, wherein the contact-piece m' (which is insulated from the remainder of the lever m by the insulating-strip m^2) connects the terminals s and s'. The terminal s is connected to the slipper-rail f, and the terminal s' is in circuit with the cable h. Hence when the terminals are joined together as described current will be fed from the cable h to the slipper-rail f and by the usual connections to the motor on the vehicle. It will thus be seen that the current passing from the cable h to the slipper-rail f has only to pass through the simple contact-piece m instead of through levers or other complicated and movable parts, as has heretofore been the case. The terminals s s' are insulated from the cover t' of the box or casing t, and said insulators may be mounted upon a spring device t^2 or upon other resilient bearings. A spring t^3 is preferably mounted beneath the lever m, as shown by Fig. 4.

From the foregoing description it will be seen that as a vehicle is traveling along the rails b b' one of its wheels (which is constructed with a deeper flange c, as and for the purpose hereinafter described) will depress a section of the rail a, as shown by Fig. 1, and

this completes an electrical circuit between the cable *h* and a portion of the slipper-rail *f*, as above described, so that current is fed to its motor. However, immediately it has passed over and left any section such section is free to be and is raised by its springs *d* clear of the said succeeding section, so as to quickly cut off the current from its corresponding section of the slipper-rail.

By arranging the switch-operating rail *a* and the slipper-rail *f* in sections of approximately equal lengths and joined with or in proximity to each other the electric current may be supplied to the motors on the vehicles irrespective of the lengths of such vehicles, thus obviating the disadvantages arising from the use or employment of current-controllers having the switch-operating devices or the current-feeders mounted at some distance apart from each other and to be coupled by parts carried by the vehicles.

By the use of the spring-supported sliding blocks *p* and the yielding terminals *s* and *s'* it will be readily understood that in the operation of the lever *m* to complete the contact liability of breakage of parts is practically prevented and that while the movement of the lever may be rapid such movement is in a direction which will cause the contact-plate to be brought into positive contact with the terminals and be held there positively while the rail *a* is depressed, the terminals being so positioned in the path of movement of the contact-plate that no relative lateral movement takes place between the terminals and the contact-plate. Hence wear of these parts is practically eliminated. Furthermore, the movement of the contact-plate toward the terminals being in a direction in opposition to the weight of the longer arm of the lever and the plate there is no liability of a continuation of the contact upon the release of the rail *a*, the weight of the lever and plate causing the lever to drop to its normal position immediately upon such release of the rail *a*. This is due to the fact that the contact-plate is entirely free from frictional engagement or contact with any part of the apparatus.

The flanges *c* of the wheels of the vehicle or train which are required to operate the switch mechanism for controlling the feed of the electric current to the motor or motors thereon are of greater depth than are those on the other wheels thereof, so that only such wheels as are desired will press the rail *a* and bring the controlling devices into operation, the other parts of said vehicle or train passing over said rail without moving it. Hence it will be seen that any ordinary train or vehicle which does not require current from the cable *h* may travel over the rails *b b'* without operating or disturbing my said controlling mechanism.

Such being the nature and object of my invention, what I claim is—

1. In electric railways, a current-controlling device comprising a movable rail arranged in sections, a slipper-rail arranged in sections insulated from each other, a feeder normally out of electrical contact with the slipper-rail, yielding terminals for said slipper-rail and feeder, and yielding means for making and breaking a circuit between said terminals, said means including a contact-plate and being operated by the movable rail.

2. In electric railways, a current-controlling device comprising a feeder, a sectional slipper-rail normally out of electric contact with said feeder, yielding terminals for said slipper-rail and feeder, a contact-plate movable in a manner to make and break a circuit between said terminals, and yielding means, operated by the passage of a portion of the car, for imparting movement to said contact-plate.

3. In electric railways, a current-controlling device comprising a movable rail arranged in sections having their ends in close proximity, and adapted to be moved in one direction by the wheel of a passing vehicle, a slipper-rail arranged in sections insulated from each other and of lengths approximately equal to those of the movable rail, a feeder normally out of electrical contact with the slipper-rail, and means, operated by said movable rail for making and breaking a circuit between said feeder and the section of slipper-rail corresponding with the section of movable rail being operated, said means comprising a pivotally-mounted lever having a contact-plate and operated by said movable rail, said lever being yieldingly mounted at its pivot-point, and insulated terminals located in the path of movement of said contact-plate, said plate and terminals being free from relative lateral movement.

In testimony whereof I have affixed my signature in the presence of two witnesses.

RICHARD DUCKWORTH.

Witnesses:
JOHN WHITEBEAR,
JAMES HENRY ELLISON.