(No Model.) 2 Sheets—Sheet 1.

M. S. REILEY.

RAILWAY TRAIN TELEGRAPH.

No. 484,375. Patented Oct. 11, 1892.

Fig. 1.

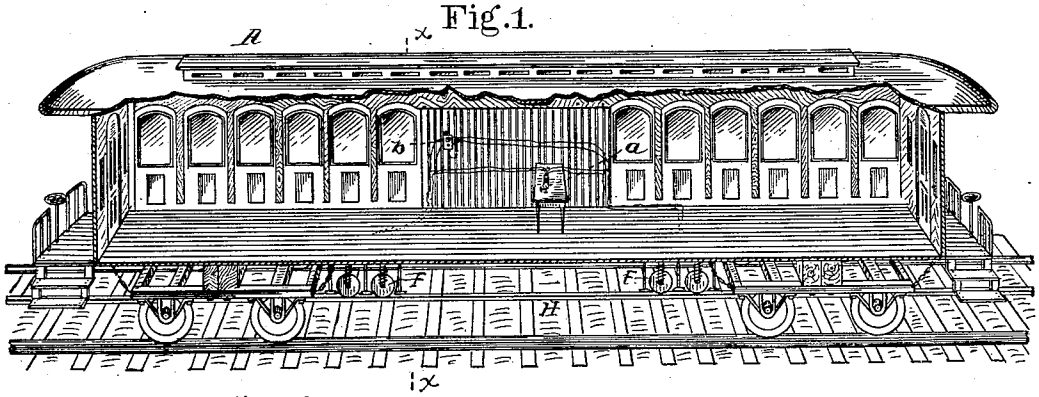


Fig. 2.

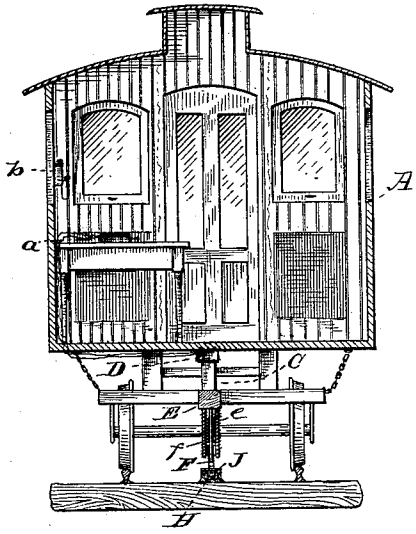


Fig. 3.

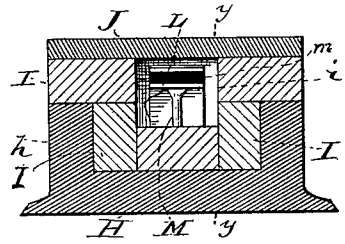


Fig. 12.

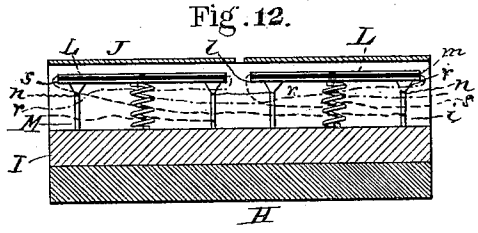
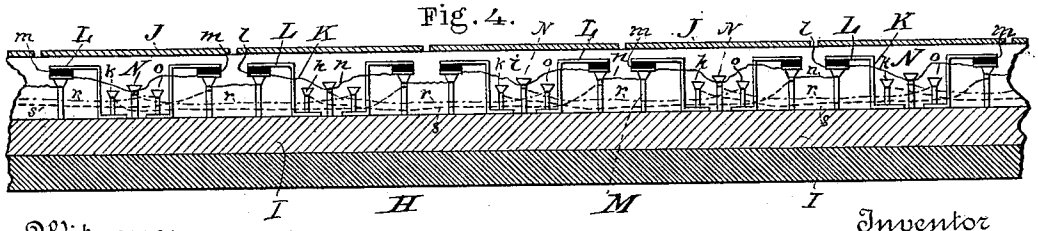


Fig. 4.



Witnesses

H. D. Neely.

L. Jackson.

Inventor

Matthew S. Reiley

By his Attorney M. D. Peck

(No Model.) 2 Sheets—Sheet 2.

M. S. REILEY.

RAILWAY TRAIN TELEGRAPH.

No. 484,375. Patented Oct. 11, 1892.

Fig. 5.

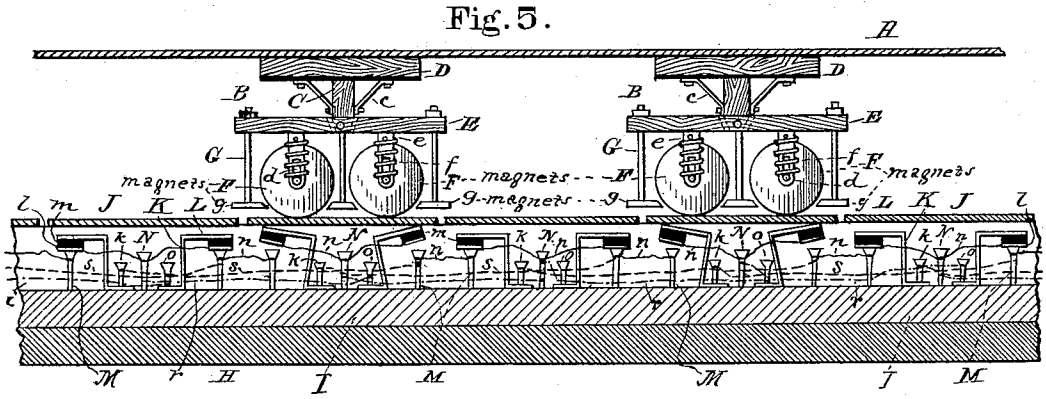


Fig. 6.

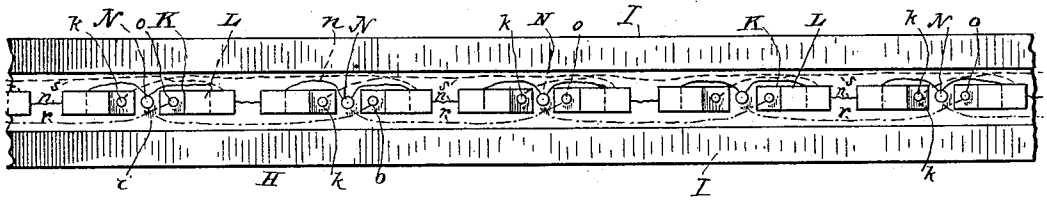


Fig. 7.

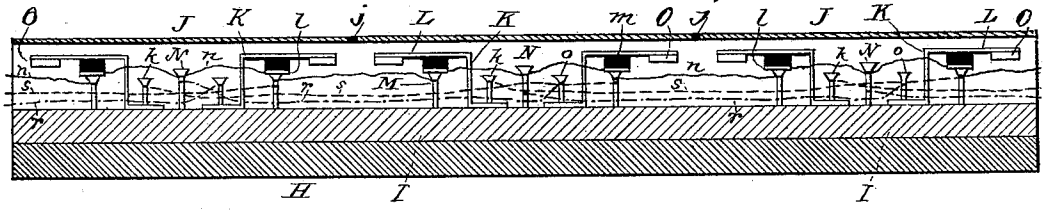


Fig. 8.

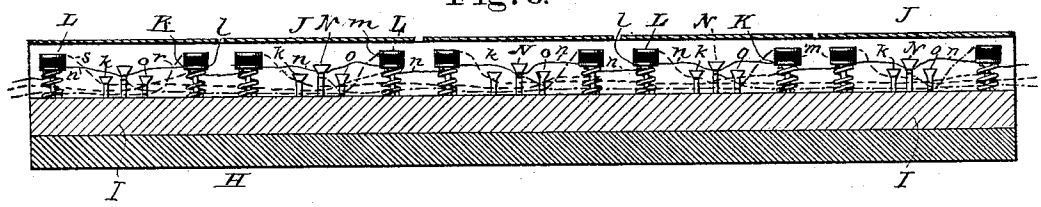


Fig. 9.

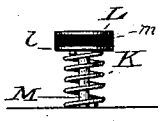


Fig. 10.

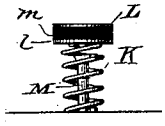
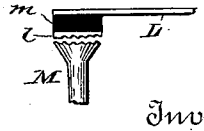


Fig. 11.



Witnesses

H. D. Neely.

L. Jackson.

Inventor

Matthew S. Reiley

By his Attorney M. D. Peck

UNITED STATES PATENT OFFICE.

MATTHEW S. REILEY, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO MELVIN D. PECK AND JAMES McKENDREE REILEY, OF SAME PLACE.

RAILWAY-TRAIN TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 484,375, dated October 11, 1892.

Application filed January 4, 1888. Serial No. 259,754. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW S. REILEY, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Railway-Train Telegraphs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to a device for ready and sure communication between railroad-trains while in motion and at rest, and also for communicating between trains and stations adjacent to the road and between stations, and has for its object to provide magnets and other apparatus upon the train, that will come in direct contact with a fixed conductor upon the bed of the road parallel to the path over which the vehicle moves in such a way as to break the current in the main conductor underneath the car or vehicle and to force the entire current of the conductor through the car, thereby avoiding the necessity of depending upon a partial or induced current of the main conductor, as has been the case heretofore; and it consists in the construction of apparatus hereinafter described, and more particularly pointed out in the claims.

Referring to the drawings, Figure 1 represents a longitudinal section of a car on the track, showing a telegraphic and telephonic communication with magnetized wheels on the central under side of the car, that rest on a central way or track between the rails. Fig. 2 is a cross-section of the car on the line $x\ x$ of Fig. 1, showing the communicating apparatus on the inside thereof, which is attached to the trucks underneath, having slotted pendants carrying the magnetized wheels, that run on the plate of the central way. Fig. 3 is an enlarged cross-sectional view of the central way. Fig. 4 is a longitudinal section of the central way on the line $y\ y$ of Fig. 3, showing the movable arms connected by the conductors in the groove of the way. Fig. 5 is a longitudinal section of the central way with the contact-magnet wheels of the car upon the track, showing the arms in the groove under the wheels raised to the plate and the course of the current through the car. Fig. 6 is a top view of the central way with the contact-plate removed, showing the top of the movable arms. Fig. 7 is a longitudinal sectional view of a modified form, showing a weighted spring-arm. Fig. 8 is a longitudinal sectional view of the central way, showing the arms in another form, adapted to be raised from the post by the expansion of a spiral spring. Fig. 9 is an enlarged view of one of the arms held with a spiral spring on the post. Fig. 10 is a like view of the same, showing the arm raised off from the post or in an elevated position, as when it rests against the plate. Fig. 11 is an enlarged view of a modified form of the spring-arm shown in Fig. 5. Fig. 12 is a longitudinal sectional view of the central way, showing the arms of a single section in one piece covering two posts and held by a central spring and adapted to be drawn up to the way-plate by contact-magnet wheels of the car and reseated on the posts by the contraction of the spring.

Like letters of reference refer to corresponding parts in each figure of the drawings.

A represents a car of usual construction on a track or way, having therein a telegraph-key a and telephone b, with communicating wires leading underneath the car to permanent magnet-wheels F in contact with the conductor in the road-bed. On the under side of the car there are trucks B, which consist of two separate frames securely fastened to a beam D at about the center of the width of the car, one in front of the other, having pendants C extending downward from the center of the beam and braces c extending from the beam to the sides of the pendants. Upon the lower end of the pendants C there are pivoted rock-bars E, which extends lengthwise of the track over a central way and have extending downward from beneath each one two bearings e, one in front of the other. These bearings are provided with vertical slots d in each side to receive the journals of magnet-wheels F, that are adapted to fit therein, and around each slotted side of the bearings there is a coil or

other suitable spring *f*, made to rest upon the journal of the wheel at its lower end and to press against a pin through the bearing above for the purpose of enabling the journal in the slot to be thrown upward without injury to the truck when the wheel comes in contact with an obstruction on the track, and to be at once pressed back into position and held there by the spring.

The wheels F are strong magnets and rest upon metallic section-plates J, that cover the central way and have direct contact with the conductor inside the car.

Near each end and in the center of the rock-bar E there are depending rods G, so situated that there is one at the front and rear of each wheel F. On the lower end of these rods there are metallic plates *g*, near to and over the way-plate, that set well up under the wheels F on each side and extend in front and rear of the trucks. These suspended plates *g* constitute strong magnets that act by induction upon spring-arms L beneath the way-plate, and in the event of any loss of magnetic power in the contact-wheels F that operate through the way-plate J to raise the spring-arms in contact with it, these suspended magnetized plates *g* aid the wheels in performing their perfect function.

The central way H is upon the bed of the road parallel to the path over which the vehicle moves, and it is composed of a bed-piece, preferably of cast metal, about eight inches wide, having upwardly-projecting flanges *h* on each side. This bed-piece is lined with dry wood, vulcanite, or other suitable non-conducting material I, extending over the top of the flanges *h*, leaving a groove *i* within the lining, though it has been found most convenient to use strips of wood an inch thick and of sufficient width for this purpose. The bed-piece thus constructed is covered with iron plates J about one-half inch thick laid in sections of about ten feet each in length over the groove and disconnected at their ends to prevent the magnetic current from passing from one plate to the other. If found desirable these plates may be placed near together and their ends insulated by ebonite or other suitable non-conducting material *j*, as shown in Fig. 7. These insulators also serve the purpose to prevent water and other foreign matter from entering the groove and disturbing the conductor. Within the groove *i* of the central way there are spring-arms K arranged in pairs and independently secured to the lining I of the bottom, which are preferably made angular in form with a base-piece resting on the bottom of the groove and secured thereto by projecting pins *k* and *o*. From the outer ends of the base-pieces there are vertical portions of the spring-arms K, rising to near the plates J, covering the groove, when they are turned laterally in opposite directions from each other to form spring-arms L, which are parallel and near to the plate above. Two of these spring-arms are placed under each section-plate J and are provided with an insulated conductor-plate *l* on the under side of the ends of each arm. The insulators *m* thus used may be of glass, porcelain, vulcanite, or of any other well-known suitable material. Underneath the conductor-plates *l* there are metallic contact-posts M secured to the bottom of the groove, which extend upward and are provided with a flat head upon which the plates of the spring-arms rest when not drawn upward to the way-plate above by the contact-magnets of the train, which move upon the section-plates over the line-conductor.

It is sometimes preferable to make the conductor-plates *l* serrated on their under side and to form the top of the contact-posts M with corresponding serrations, as shown in Fig. 11, so that after the passage of the train as the arm drops down upon the post to again form the regular conductor-line, the contact between the roughened plate and head of the post will be insured as against all jarring or vibrations of the road-bed resulting from the fast movement of the train over it and keeps the regular current-line intact.

Between the vertical portions of the spring-arms K and the pins *k* and *o*, that hold their base-pieces to the bottom of the groove, there are metallic circuit-posts N, that project upward from the bottom of the groove to about the same height as the contact-posts M under the ends of the arms and terminate in an enlarged head. These circuit-posts N, together with the contact-posts M and plates *l* on the spring-arms, form the points of attachment and serve as a part of the regular line-conductor *n* (shown in solid lines) when the contact-magnets of the train are not over them upon the section-plates J. When the magnets F of the car are over the spring-arms, the arms are instantly drawn from the contact-posts M to the section-plate J beneath the magnets, thereby breaking the regular line-current *n* beneath the car and forcing it through another line of conductors. For this purpose switch-conductors *r* and *s* are secured to the posts in the groove of the bed-piece, so that when the regular line conductor *n* is broken the current will be discontinued at the rear and front of the car on the regular line conductor, to establish a perfect line with the switch-conductors.

As shown in Fig. 5, the spring-arms K of two sections being drawn to the plates J by the contact-magnets F of the car on the plates, thereby breaking the regular line conductor *n*, the current is discontinued, takes back on the regular line *n* at the circuit-post N, to which a switch-conductor *r* (shown in a line of dots and dashes) is secured and follows this switch to the pin *o*, its next point of attachment, which secures one of the raised spring-arms in the groove under the magnet-wheel of the vehicle, the current passing down through the pin *o* into the base and then up through the spring-arm to the sec-

tion-plate J. This raised spring-arm K then being in contact with the plate J, and all conductors in the groove beneath the car being cut off by the raised arms, the entire current of the conductor is then forced through the raised arm and section-plate to the magnet-wheel on the plate, thence through the indicator in the car to the contact magnets F on the other end of the vehicle, when it passes down through another section-plate and raised arm to the pin *k*, holding the arm, to which a switch-conductor *s* is secured, (shown by a line of dashes in the drawings,) which conveys the current to the contact-post M beyond the car and the next point of attachment of the switch, where it again takes into the regular line-circuit *n* until it comes in contact with another train provided with like magnets for taking up the current, when it is thrown through the car in like manner, as before, and so on without limit to distance or the number of trains through which it may pass. I do not, however, limit my invention to the particular form of spring-arm hereinbefore described, as they may be constructed in various other forms without departing from the spirit of my invention.

As illustrated in Fig. 7, the spring-arms L may be extended beyond the contact-posts M and be weighted at O on the under side of their ends to insure their being more quickly seated on the post and to provide a steady contact therewith during the short period of jarring and vibration of the road-bed after the train has passed.

I also show another form of the spring-arm L in Fig. 8, enlarged in Fig. 9 and 10, that is more simple in construction, which is sometimes preferred, that is operated by substantially the same line of conductors as those heretofore described. In this form I substitute for the angular arm K, heretofore set forth, a coil-spring secured to the bottom of the groove and surrounding the contact-posts M to its top, where there is an arm in the form of an insulated button secured to the end of the wire and held in contact with the top of the post by the contraction of the coil. In making the additional connections with this form of arm it is only necessary to provide a substitute connection for the vertical portion of the angle-arm before described, which is readily done by extending the switch-conductors from the elevated pins *k* and *o* to the top plate of the insulated button or spring-arm. This spring-arm may be made in a continuous bar of sufficient length to cover an entire section, as shown in Fig. 12, instead of using two arms. In this instance the insulated bar or arm L is provided with a divided plate on its upper side and with a continuous plate *l* on its under side, which is held down upon the top of the contact-posts M by means of a coil-spring secured to its center and fastened to the bottom of the groove. If desired, two or more coil-springs may be used for this purpose. In this form of arm the plate *l* constitutes the regular line conductor between posts M of each section, and the switch-conductor *r* is secured to the extreme end of one of the upper plates of each section-bar, and attached to the contact-post M at the extreme other end of the adjoining section, and the switch-conductor *s* is secured to the extreme end of the upper plate of the section bar or arm and fastened to the coil-spring in the center of the adjoining section-bar. This form of arm is more simple of construction and is manufactured at a greatly-reduced expense. As the magnets of the train pass over the section under which it is placed an oscillating movement is produced, raising first one end of the bar and then the other to the section-plate J, and releasing them in the same order, when they resume their position upon the contact-posts and are held there by the slight traction of the coil-spring.

From the arrangement of the conductor in the central way it will be observed that a loop may be readily attached thereto and the current carried through the stations along the way in the same manner as heretofore in using the conductor on poles or in the ground, so that the information conveyed from one running train to another as to their location and approach can be known at the way-stations at all times. In like manner the switches along the road are readily connected by loops to the conductor of the main line in the central way.

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

1. In a railway-train telegraph, the combination, with magnets supported upon and beneath the vehicle near its ends and connected by a conductor through the vehicle, of a line conductor having spring-arm connections beneath plates on the road-bed, the magnets resting on said plates, whereby the entire current of the conductor is adapted to be broken by magnets and conducted through the vehicle, as set forth.

2. The combination, with a line conductor having spring-arm connections covered by metal section-plates supported upon the road-bed, of magnets secured to the under side of a vehicle near its ends, a part of which are in continuous contact with and the other part moving over the plates covering the conductor, said magnets being connected by a conductor passing through an instrument in the vehicle, as set forth.

3. The combination, with a pendant beneath the car, having a rock-bar secured to its lower end, of vertically-slotted bearings attached to the bar, one in front of the other, having magnetized wheels journaled in the slots and in contact with metallic plates on a grooved central way, and coil-springs around the bearings resting on the journals, whereby the current is extended through the car from the conductor in the central way, as set forth.

4. The combination, with a rock-bar beneath the car, having vertically-slotted bearings one in front of the other, with magnetized wheels journaled in the slots and in contact with metallic plates on a grooved central way, of depending rods from the rock-bar to the front and rear of each wheel, having magnetic plates secured thereto and carried over and near to the plates of the central way, as set forth.

5. The combination, with a central way having a continuous metallic bed-piece with upwardly-projecting flanges, of a lining in the bed-piece, composed of non-conducting material having a groove with a conductor therein covered with a metallic section-plate, as set forth.

6. The combination, with a central way having a groove therein covered with metallic plates, of a conductor in the groove, having spring-arms adapted to be raised to the plates to break the regular line-circuit, as set forth.

7. The combination, with a central way lined with non-conducting material and having a groove therein containing a conductor, of spring-arms connected with the conductor, adapted to open and close the regular line-circuit, as set forth.

8. In a central way having a groove therein, the combination, with a regular line conductor, of insulated spring-arms independently connected within the groove, adapted to open and close the regular line-circuit, as set forth.

9. The combination, with a central way having a groove therein provided with a conductor, of spring-arms in pairs forming a part of the conductor under section-plates over the grooves, as set forth.

10. The combination, with a central way having a groove with a conductor therein, of insulated spring-arms independently attached within the groove and resting on contact-posts forming part of the regular line conductor, as set forth.

11. The combination, with a central way having a groove with a conductor therein, a part of which is secured to contact-posts, of spring-arms having the other part of the conductor secured to insulated plates thereon resting on the posts, as set forth.

12. In a central way having a groove therein, the combination, with a conductor secured to contact-posts forming part of the line and to insulated spring-arms resting on the posts forming the other part of the line, of a circuit-post connected with the conductor between the arms, adapted to convey the current through the raised arm of the adjoining section into the vehicle over the section, as set forth.

13. The combination, with a central way having a groove with a conductor therein, of arms attached to the bottom of the groove and extending to near a plate covering its top and having spring-arms parallel to said plate, resting on contact-posts connected with and forming part of the conductor, as set forth.

14. In a central way having a groove, the combination, with a conductor, of angle-arms with base-pieces secured to the bottom of the groove having right-angled vertical portions extending to near the top of the groove, the upper part of the arm being bent at right angles to the vertical portion, forming a spring-arm parallel to the plane of the base-piece and resting on a contact-post communicating with the conductor, as set forth.

15. The combination, with a conductor in the groove of a central way secured to contact-posts, of insulated spring-arms extending over and beyond the posts and resting thereon, forming a part of the conductor, the extended portion of the arms being weighted, as set forth.

16. The combination of a central way having part of the conductor attached to contact-posts within its groove and the other part to insulated plates on spring-arms, the lower plates on the arms resting on the contact-posts and united to circuit-posts between each pair of arms, said arms being secured in the groove by pins, as set forth.

17. The combination, with a central way upon the road-bed, parallel to the path of the vehicle, having a conductor attached to contact-posts and insulated plates on spring-arms resting on the posts, of circuit-posts between each pair of arms connected with the conductor, and projecting pins holding the arms having switch-conductors attached thereto, conveying the current from the regular line conductor through the raised arms to and from the vehicle, as set forth.

18. The combination, with a vehicle having yielding magnetized wheels in pairs supported thereon one in front of the other, said wheels being connected by a conductor through an instrument in the vehicle, of a central way upon the road-bed parallel to the path of the vehicle, having a groove covered with metallic section-plates and containing a conductor therein, one part of which is secured to contact-posts and the other parts to spring-arms under said section-plates, said arms being secured by projecting pins having switch-conductors attached thereto and communicating with circuit-posts connected with the conductor between the arms and with the contact-posts under the arms whereby the current is conveyed from the regular line conductor through the raised arms to and from the vehicle, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

MATTHEW S. REILEY.

Witnesses:
L. JACKSON,
O. M. BALL.