

F. WOLF.
COLLISION PREVENTING DEVICE FOR RAILROADS.
APPLICATION FILED OCT. 30, 1907.

912,346.

Patented Feb. 16, 1909.

3 SHEETS—SHEET 1.

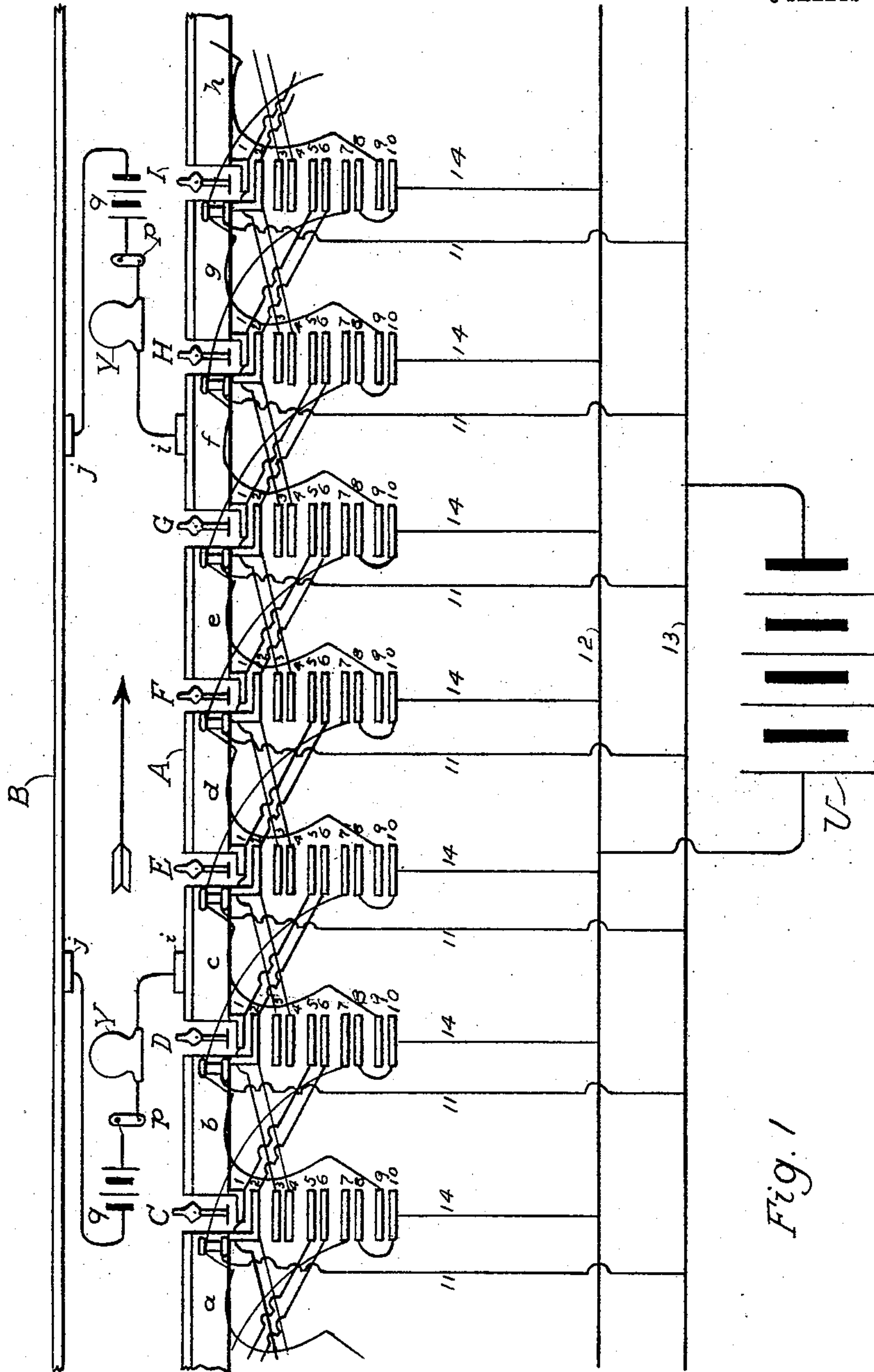


Fig. 1

WITNESSES:

Melanie Wolf
Daniel Sommer

INVENTOR

Felix Wolf

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3 SHEETS—SHEET 2.

Fig. 2.

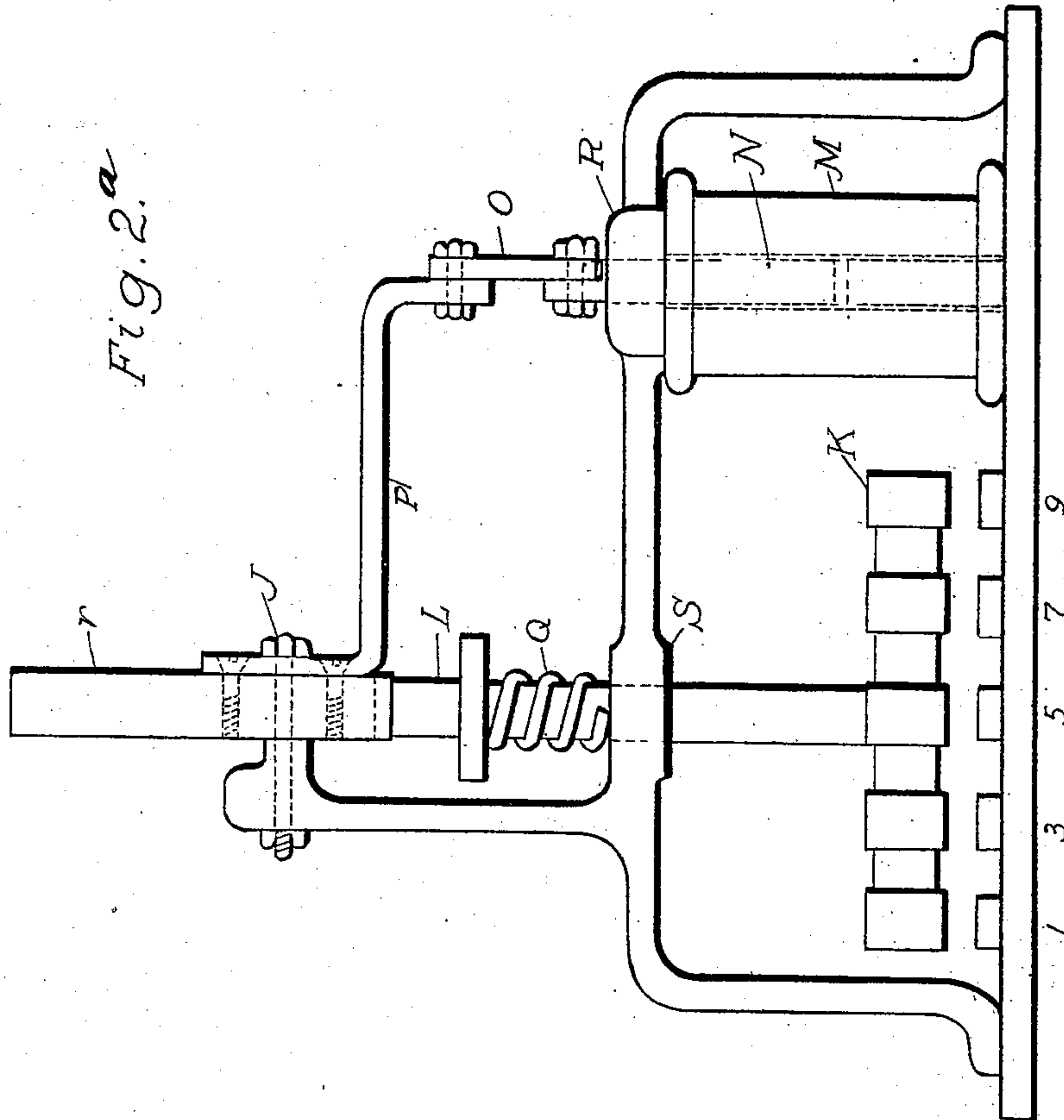
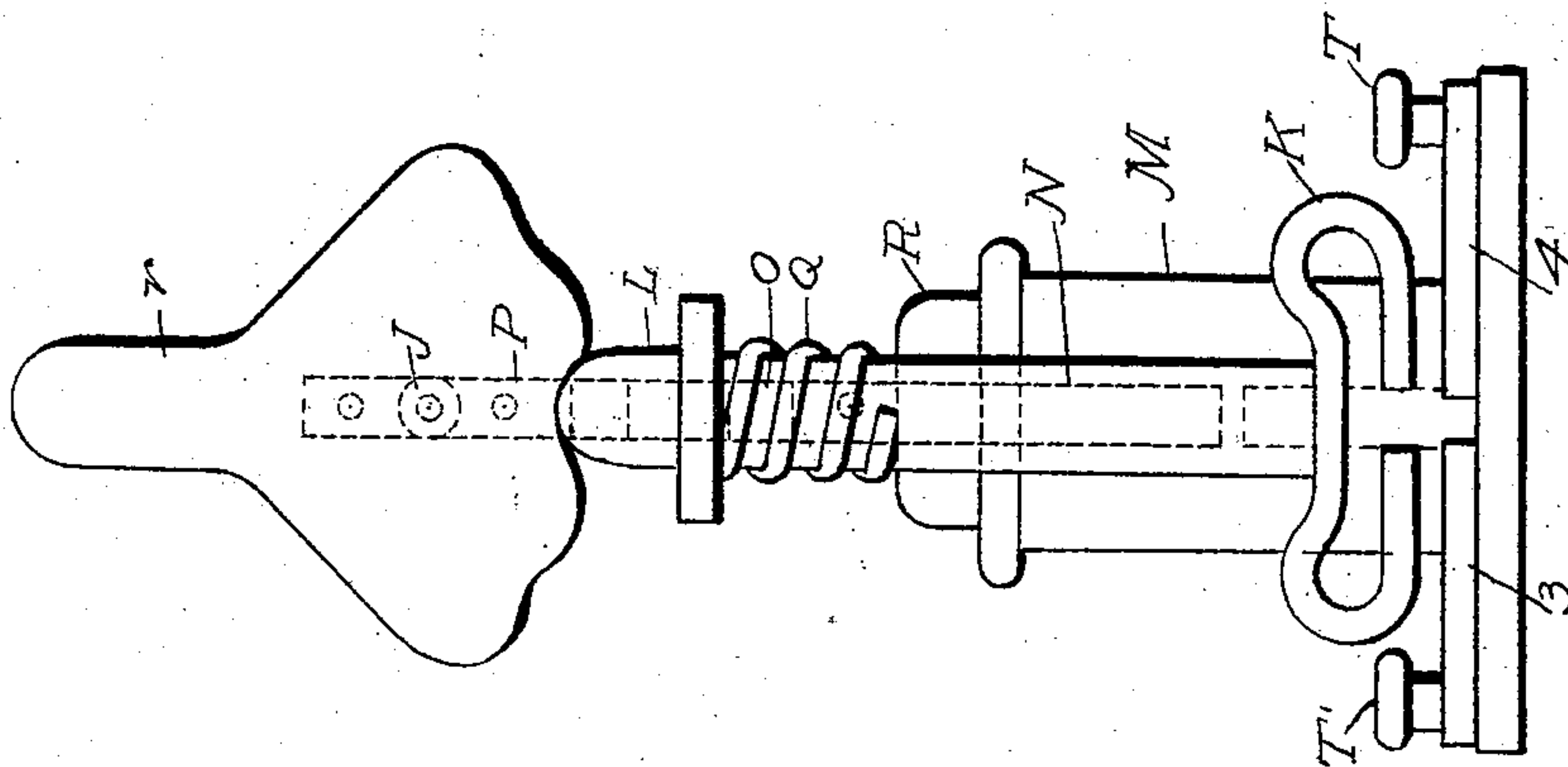


Fig. 2.



WITNESSES:

Melanie Wolf
Samuel Sommer

INVENTOR

Felix Wolf

F. WOLF.
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3 SHEETS—SHEET 3.

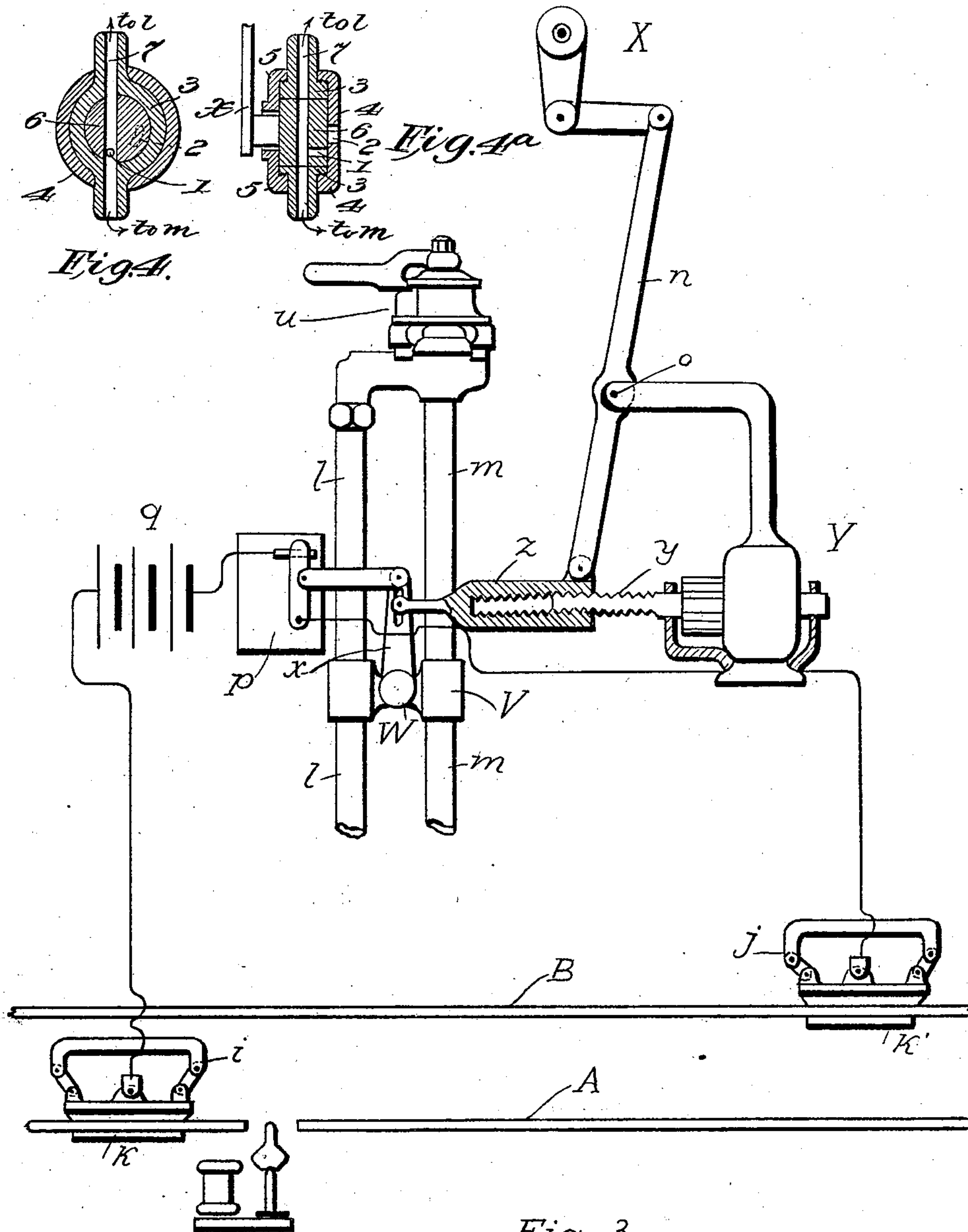


Fig. 3.

WITNESSES:

Melanie Wolf
Daniel Spruuey

INVENTOR

Felix Wolf

UNITED STATES PATENT OFFICE.

FELIX WOLF, OF NEW YORK, N. Y.

COLLISION-PREVENTING DEVICE FOR RAILROADS.

No. 912,346.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed October 30, 1907. Serial No. 399,945.

To all whom it may concern:

Be it known that I, FELIX WOLF, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Collision-Preventing Devices for Railroads, of which the following is a specification.

My invention pertains to railroad safety devices, and has for its object to prevent collisions which are happening on railroads and generally end with most disastrous results, and consists in the peculiar and advantageous arrangement of certain devices hereinafter described, which, in emergency, automatically actuate the brakes and shut off the power of the locomotive, independent from any signaling apparatus, and also independent from the engineer's appliances.

In the accompanying drawings forming part of this specification similar reference characters denote corresponding parts.

Figure 1 is a general diagrammatic view of my invention, Fig. 2, and Fig. 2^a, represent two views of the contact arrangement, Fig. 3 represents the part of the invention mounted on the locomotive of the train, Fig. 4, and Fig. 4^a represent two views of a valve W shown in Fig. 3.

To carry out my invention, I interrupt one rail A of each railroad track, at convenient distances, sufficiently far apart, and make sure that the other rail B forms a continuous electrical conductor, which shall be insulated from the other interrupted rail A. At each interruption of rail A I mount alongside the track contact devices C, D, E, F, G, H, and I, as shown in detail in Fig. 2.

In the preferred arrangement of the contact device, *r* is a cam, fulcrumed at J, which can be thrown over in either direction parallel to the track. This cam in being thrown over presses down the contact piece K, by means of the rod L, and draws out the armature from the spool of the long-range electro-magnet M, which is employed to automatically disengage the contacts 1—2, 3—4 . . . 9—10. The contact piece K is composed of five strips of metal, which run parallel in the same direction as the contact strips 1—2, 3—4 . . . 9—10, and are insulated from each other, which has for its purpose to form connection between each pair of contact strips as 1—2, 3—4 . . . 9—10.

To automatically disengage the contacts I employ an electromagnet M. If the contacts

are closed by contact piece K, and a current is sent through the electromagnet M, it will attract the armature N, and will pull along link O which is hinged to crank P, having a common fulcrum with cam *r*. If link O is pulled downwards by means of the armature N, crank P will turn about J and will force cam *r* to its original upright position, and the spring Q will lift up the contact piece K, and press the rod L against the edge of the cam *r*, and the contacts between each pair of contact strips contained in the instrument will be broken.

R and S are guides to maintain the direction of the armature N and the rod L. T and T' are binding posts which serve to connect the contact strips to the necessary wires.

The above described contact arrangement is mounted alongside of rail A at each interruption in such a manner that the tongue of cam *r* protrudes in such a way at the side of rail A, that some part K, of a contact shoe *i*, mounted on the locomotive will engage with the tongue of the cam *r* while the train is in motion, and throw the cam over to one side, according to the direction the train comes from, thereby connecting each pair of contact strips, mounted in the device. The tongue of cam *r* may be protected by a short piece of rail, running parallel and close to rail A, at each interruption, so that the tongue of cam *r* shall be in the slot between rail A and the protecting short piece of rail. Each contact arrangement has five pairs of contact strips, 1—2, 3—4 . . . 9—10. Strips 1 and 2 of each contact device form the ends of the rail parts of the interrupted rail A, and are connected with strips 3 and 4 of the previous contact arrangement, also with strips 5 and 6 of the following contact arrangement.

Assuming the train to run in the direction of the arrow and considering contact arrangement F, E would be the previous contact arrangement, and G the following one. Strips 3 and 4 are connected with the terminals of the rail parts of the following interruption; strips 5 and 6 are connected with the terminals of the rail parts of the previous interruption; strip 7 is connected to the upper part of the electromagnet of the previous contact arrangement; strips 8 and 10 are connected to one pole of an electric source U by wire 14, which is intended to furnish current to any electromagnet on the road, in case the circuit through the same

should be completed; strip 9 is connected to the upper part of the electromagnet of the following contact arrangement. Wire 11 of each electromagnet is connected to the other pole of the electric source U. Wires 12 and 13 are run alongside the track from the poles of the electric source, to which the wires 11 and 14 of each contact arrangement are connected. If, for instance, all the contacts of the contact arrangement F are closed by throwing over the cam of this instrument in either direction, the instrument will connect rail pieces *d* and *e* by means of the strips 1 and 2. It will also connect *e* and *f* by means of the contact strips 3 and 4, which have wires running to contact strips 1 and 2 of contact arrangement G, which form the terminals of rail pieces *e* and *f*. Furthermore it will connect rail pieces *c* and *d* by means of the contact strips 5 and 6, which have wires running to contact strips 1 and 2 of the contact arrangement E, forming terminals of rail pieces *c* and *d*. Consequently by throwing over the cam *r* of the contact arrangement F, it can be seen that the rail pieces *c*, *d*, *e*, *f*, will form one continuous electrical conductor. By throwing over the cam at F it can be seen that a complete electrical circuit is formed through the electromagnet of E, through contact strips 7 and 8, that is the previous contact arrangement, also through the electromagnet at G by means of the contact strips 9 and 10, that is the following contact arrangement, and thereby opening all the contacts of E, which the train passed as soon as the train passes F; but by means of contact strips 5 and 6 the rail parts *c* and *d* of contact arrangement E are still connected. Contact strips 9 and 10 which form a circuit through the electromagnet of the following contact arrangement G are provided to open the contacts of this contact arrangement, when a train runs in the opposite direction.

Fig. 3 shows the arrangement mounted on the locomotive of the train. *i* and *j* are contact shoes which slide on the rails, and serve to form electrical contact between the devices on the locomotive and the rails. *i* which slides on rail A has an extension K, adapted to throw over cam *r* of any contact arrangement, which the contact shoe passes. *u* indicates the engineer's valve of the air brake, which connects pipes *l* leading from the air reservoir to the engineer's valve, and *m* which leads from the engineer's valve to the train pipe, leading to the brake cylinders, and actuating the brakes. Pipes *l* and *m* I connect with a short piece of pipe V, interrupted by a valve W, adapted to cut out the engineer's brake valve, when the valve W is turned and to connect pipes *l* and *m*, also adapted to connect pipe *m* with the atmosphere if turned further, and thus set the

brake. The valve W is a plug valve and has a part 6 which turns in part 3. Part 6 and part 3 have a corresponding bore 7. Part 6 has a side-bore 1 which branches off from bore 7. The casing of the valve consists of 2 parts 4 and 5. Part 4 has an oblong hole 2, which meets bore 1, when the valve is turned far enough. This valve is generally closed, and therefore the brake is controlled by the engineer's brake valve, but if valve W is turned the engineer's brake valve is cut out and connection is established through pipe *l*, pipe V, to the train pipe *m*, without touching the engineer's valve at all. X represents either a valve on the steam pipe, or an electric switch, depending on the kind of locomotive to which the device is applied, and is situated on such a place that the driving power has to pass X before it reaches the controlling device. Y is an electric motor, capable of running in one direction, fitted with a screw *y*, which runs in a threaded sleeve *z*. Sleeve *z* is linked to lever *x*, actuating the valve W. When motor Y is running it opens valve W by means of the screw *y*, sleeve *z*, and lever *x*. To the sleeve *z* is linked a lever *n*, fulcrumed at *o*, which actuates X, and shuts off the power of the locomotive, when Y is driven. *p* is an electric switch, linked to sleeve *z*, which interrupts the electrical connection between contact shoe *i* and contact shoe *j*, when sleeve *z* is sufficiently moved out. *q* is a battery carried on the locomotive, intended to drive motor Y, when the circuit between the rails A and B is completed. Contact shoe *j* is connected with one pole of the electromotor Y. The other pole of the electromotor Y is connected to one terminal of the switch *p*. The other terminal of the switch *p* is connected to one pole of battery *q*. The other pole of the battery *q* is connected to contact shoe *i*, sliding on rail A.

It will be seen that the circuit of the battery 9 is not complete, because the rails A and B are insulated from each other, and therefore the arrangement mounted on the locomotive will be inactive. Should the circuit be completed by short-circuiting the rails A and B, which are insulated from each other, the motor Y will run, open valve W, thereby actuating the brake, shut off the power at X, and as soon as this is done it will open the electric switch P, and thereby shut off its own power. If, for instance, one train is situated between G and H, and another train which is moving in the direction indicated by the arrow has just passed contact arrangement D, then all the contacts of contact arrangement D will be closed; therefore, rail parts *b* and *c* will be electrically connected; but through contact strips 3 and 4 of contact arrangement D, the rail pieces *c* and *d* are also connected; through

contact strips 5 and 6 the rail parts *a* and *b* are connected, therefore, when the train passes contact arrangement D, the four rail pieces *a*, *b*, *c*, *d*, will form a continuous electrical conductor. Through contact strips 7 and 8 a complete electrical circuit is formed through the electromagnet of contact arrangement C, thereby disengaging all the contacts of this contact arrangement. The other train situated between G and H, has just passed H, thereby connecting *g* and *f*, also *g* and *h*, and *f* and *e*, also actuating the electromagnet of I, which interrupts all the contacts of contact arrangement I. In this way the rail parts *d* and *e* are not connected, and the train will be able to move on. But as soon as the moving train passes E, it will connect rail parts *c* and *d*, also *b* and *c*, also *d* and *e*, therefore, rail parts *b*, *c*, *d*, *e*, will form a continuous electrical conductor, the electromagnet of D will be actuated, and all the contacts of D will be disengaged. But as the train situated between G and H, which has passed contact arrangement H, will connect *g* and *f*, *f* and *e*, and *g* and *h*, therefore, rail parts *b*, *c*, *d*, *e*, *f*, *g*, *h*, will form a continuous electrical conductor, the circuit between each pair of contact shoes on the trains will be connected through rail B, which forms a continuous electrical conductor, and the motors in both trains will work, actuate the brakes, shut off the power of the locomotives, the moving train, or trains, will automatically be brought to a stop, and the power of the motor will be shut off by the electric switch *p*, after the motor has done its work. This action may take place while the trains may be far apart, and altogether out of sight from each other.

It will be gathered from the foregoing, that, in addition to the new and practical advantages, ascribed to my novel device, the same works automatically, is absolutely independent of the attention and presence of mind of the engineer, is also independent from any signaling apparatus, needs little attention, works in nighttime just as prompt as in daytime, and is adapted to prevent collisions in stopping one, two, or more trains if they get within dangerous distances of each other.

I do not wish to restrict myself to the particular construction and arrangement shown, as I realize, that considerable changes can be made in the details of construction, without departing from the scope of the invention, but

What I claim and desire to secure by Letters Patent is:

1. An electrical system, arranged to stop automatically one, two, or more trains at the same time, by actuating the brake and shutting off the power of the locomotive, the track arrangement readjusting itself automatically, using the rails to conduct the

electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement.

2. An electrical system, arranged to stop automatically one, two, or more trains at the same time, by actuating the brake and shutting off the power of the locomotive, the track arrangement readjusting itself automatically, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail.

3. An electrical system, arranged to stop automatically one, two, or more trains at the same time, by actuating the brake and shutting off the power of the locomotive, the track arrangement readjusting itself automatically, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, means to preserve the contacts of each contact arrangement until the train passes a predetermined following contact arrangement.

4. An electrical system, arranged to stop automatically one, two, or more trains at the same time, by actuating the brake and shutting off the power of the locomotive, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, means to preserve the contacts of each contact arrangement until the train passes a predetermined following contact arrangement, and provisions to automatically, or electrically disconnect the contacts at the proper time.

5. An electrical system, arranged to stop, automatically one, two, or more trains at the same time, by actuating the brake and shutting off the power of the locomotive, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the

interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, means to preserve the contacts of each contact arrangement until the train passes a predetermined following contact arrangement, and an electromagnet to automatically disengage and readjust the contact arrangement at the proper time.

6. An electrical system, arranged to stop automatically one, two, or more trains at the same time, by actuating the brake and shutting off the power of the locomotive, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, an electromagnet to automatically disengage and readjust the contact arrangement at the proper time, and the electromagnet to be actuated by the following or previous contact arrangement of the next instrument.

7. An electrical system, arranged to stop automatically one, two, or more trains at the same time, by actuating the brake and shutting off the power of the locomotive, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, an electromagnet to automatically disengage and readjust the contact arrangement, and means to connect the electromagnet to a suitable source of electricity.

8. An electrical system, arranged to stop automatically one, two, or more trains at the same time, by actuating the brake and shutting off the power of the locomotive, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, means to preserve the contacts of each contact arrangement until the train passes a predetermined following contact arrangement, and an interrupted device, adapted to automatically interrupt the contacts of the previously passed contact arrangement.

9. An electrical system, arranged to stop

automatically one, two, or more trains at the same time, by actuating the brake and shutting off the power of the locomotive, the track arrangement readjusting itself automatically, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement having a contact piece adapted to form contacts between two or more parts of the interrupted rail, and to connect an electromagnet, which is intended to disengage the contact arrangement, to a suitable source of electricity.

10. An electrical system, arranged to stop automatically one, two, or more trains at the same time, by actuating the brake and shutting off the power of the locomotive, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, the contact arrangement also having provisions to interrupt automatically the contacts at the proper time, and means to actuate the contact arrangement by the passing train.

11. An electrical system, arranged to stop automatically one, two, or more trains at the same time, by actuating the brake and shutting off the power of the locomotive, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, the contact arrangement also having provisions to interrupt automatically the contacts at the proper time, means to actuate the contact arrangement by the passing train, also means to form electrical connections between the devices on the train and the rails.

12. An electrical system, arranged to stop automatically one, two, or more trains at the same time, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, the contact arrangement also having provisions to interrupt automatically the contacts at the

proper time, means to actuate the contact arrangement by the passing train, also means to form electrical connections between the devices on the train and the rails, and means to automatically operate the brake and shut off the power of the locomotive.

13. An electrical system, arranged to stop automatically one, two or more trains at the same time, the track arrangement readjusting itself automatically, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, the contact arrangement also having provisions to interrupt automatically the contacts at the proper time, means to actuate the contact arrangement by the passing train, also means to form electrical connection between the devices on the train and the rails, and a motor to automatically operate the brake and shut off the power of the locomotive.

14. An electrical system, arranged to stop automatically one, two, or more trains at the same time, the track arrangement readjusting itself automatically, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, the contact arrangement also having provisions to interrupt automatically the contacts at the proper time, means to actuate the contact arrangement by the passing train, also means to form electrical connection between the devices on the train and the rails, a motor to operate the brake and shut off the power of the locomotive, and an electric source to furnish power to the motor.

15. An electrical system, arranged to stop automatically one, two, or more trains at the

same time, the track arrangement readjusting itself automatically, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, the contact arrangement also having provisions to interrupt automatically the contacts at the proper time, means to actuate the contact arrangement by the passing train, also means to form electrical connection between the devices on the train and the rails, a motor to operate the brake and shut off the power of the locomotive independent of the engineer's appliances, and an electric source to furnish power to the motor.

16. An electrical system, arranged to stop automatically one, two, or more trains at the same time, the track arrangement readjusting itself automatically, using the rails to conduct the electric current, one of the rails to form a continuous electrical conductor, the other rail being interrupted at suitable distances, the parts of the interrupted rail being connected at the interruptions to a suitable contact arrangement, the contact arrangement being adapted to electrically connect two or more parts of the interrupted rail, the contact arrangement also having provisions to interrupt automatically the contacts at the proper time, means to actuate the contact arrangement by the passing train, also means to form electrical connection between the devices on the train and the rails, a motor to operate the brake and shut off the power of the locomotive independent of the engineer's appliances, an electric source to furnish power to the motor, and an electric switch to shut off automatically the power of the motor at the proper time.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FELIX WOLF.

Witnesses:

MELANIE WOLF,
DANIEL SOMMA.