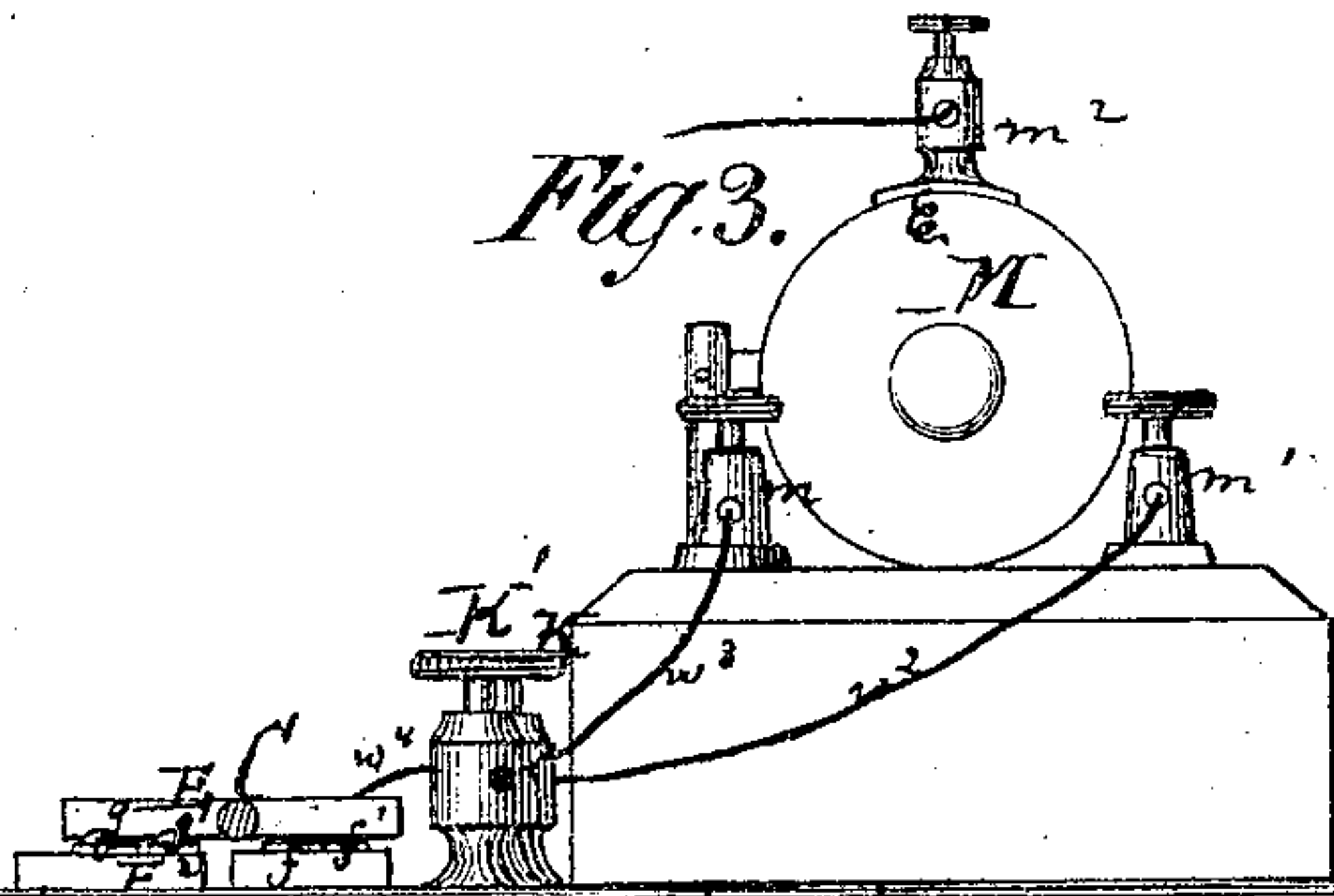
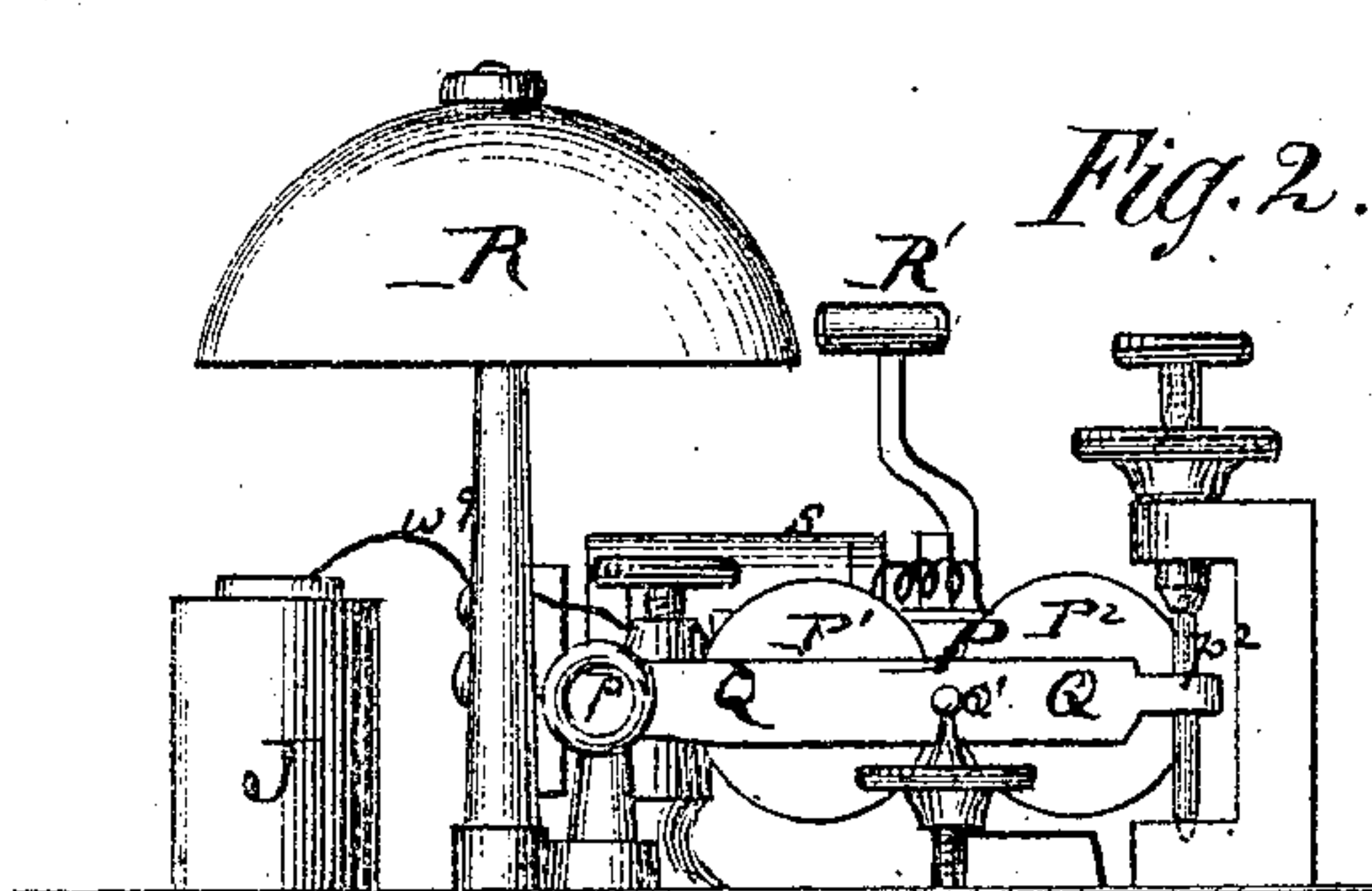
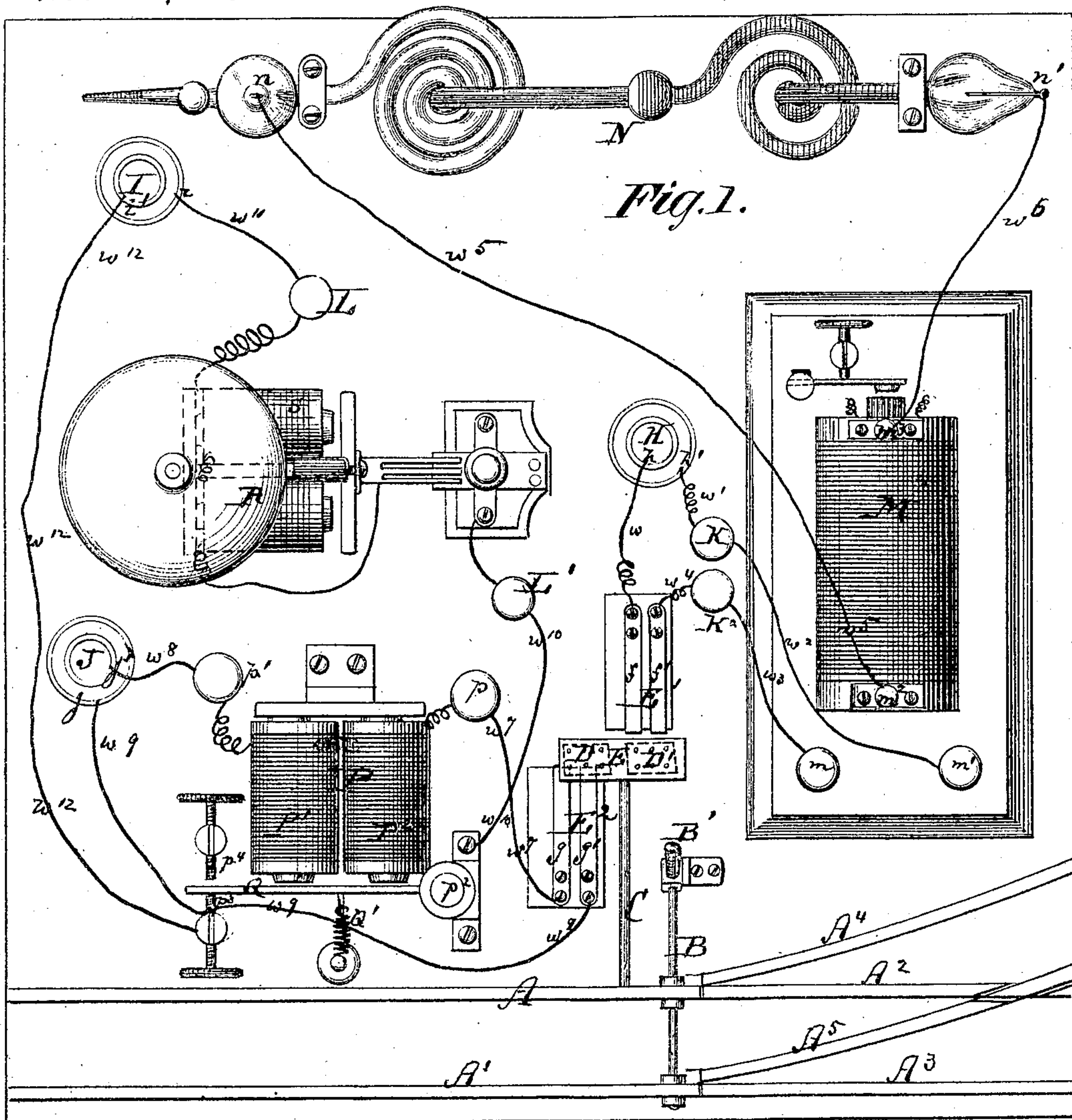


H. W. SPANG.
Electric Railway Signal Apparatus.
No. 141,395. Patented July 29, 1873.



Witnesses:
John Becker.
N. A. Graham

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UNITED STATES PATENT OFFICE.

HENRY W. SPANG, OF READING, PENNSYLVANIA.

IMPROVEMENT IN ELECTRIC RAILWAY SIGNAL APPARATUS.

Specification forming part of Letters Patent No. **141,395**, dated July 29, 1873; application filed May 11, 1872.

To all whom it may concern:

Be it known that I, HENRY W. SPANG, of Reading, in the county of Berks and State of Pennsylvania, have invented a new and Improved Electric Railway Alarm and Signal Apparatus, of which the following is a specification:

This invention relates to the combination of a railway switch or movable rail with an electric alarm or signal apparatus, so that when a switch or rail is moved from its proper line the attention of a railroad employee or other person will be attracted to the misplacement of the switch or rail by the sound of an electro-magnetic alarm-bell, or by the light of an illuminated Geissler tube, or other visible or audible signal.

In the accompanying drawing, Figure 1 represents a top view of my invention, showing the instruments on an enlarged scale. Figs. 2 and 3 are detail side and end views, respectively, of the alarm apparatus.

Similar letters of reference indicate corresponding parts.

A A¹ are switch or movable rails, to which is connected switch-rod B of switch-lever B¹. A² A³ are the stationary main-line rails; A⁴ A⁵, the stationary side rails. C is a metallic rod, connected to the rail A or switch-rod B, and carrying a cross-piece, E, of wood or other insulating material, upon which are fastened metallic conductors D D'. *f f'* and *g g'* are two pairs of metallic conductors on opposite sides of the cross-piece D, and fastened, respectively, to plates E¹ E², of insulating material. The insulated conductors D' and *f f'* form an electric circuit-closer, and the insulated conductors D and *g g'* an electric circuit-breaker, in case the switch or rail is misplaced. H, I, and J are electric batteries, and *h h' i i' j j'* their respective poles. K K' L L' are connecting screws or posts. M is an induction-coil, and *m m¹* are its connecting-screws of primary wire, and *m² m³* its connecting-screws of secondary wire. N is a Geissler tube, of suitable form, and *n n¹* are its connecting-points. A coil-form of Geissler tube may, however, be used for railway-signal purposes. P is a relay magnet, with or without adjusting-screw *p³* with platina point and adjusting-screw *p⁴*, with insulating point reversed. *p¹ p²* are its electro-

magnets, whose wires are connected to connecting-screws *p p¹*. *p²* is a connecting point of the armature-lever Q, to which is attached the adjustable spring Q'. R is an electro-magnetic alarm-bell, whose wires are connected to connecting-screws L L'. A wire, *w*, connects the metallic conductor *f* with the pole *h* of the battery H, and a wire, *w¹*, the pole *h'* with the connecting-screw K. A wire, *w²*, connects the screw K with the connecting-screw *m¹* of the induction-coil M, and a wire, *w³*, connects the screw *m* of the induction-coil M with a connecting-screw, K'. *w⁴* is a wire connecting the screw K' with the metallic conductor *f'*. A wire, *w⁵*, connects the screw *m²* of the induction-coil M with the connecting-point *n* of the Geissler tube N, and a wire, *w⁶*, connecting the screw *m³* with the connecting-point *n¹* of the Geissler tube N. A wire, *w⁷*, connects the metallic conductor *g* with the connecting-screw *p*, and the wire *w⁸* the screw *p¹* with the pole *j'* of the battery J; while the pole *j* of the battery J is connected by a wire, *w⁹*, with the metallic conductor *g'*. A wire, *w¹⁰*, connects the screw L' with the connecting-point *p²* of the armature-lever Q, and a wire, *w¹¹*, connects the screw L with the pole *i* of the battery I; and the wire *w¹²* the pole *i'* of battery I with the adjusting-screw *p³* having the platina point.

When the switch is in its proper position the conductor D' is not in contact with the conductors *f f'*, and the electric current of the battery H is broken; but when the switch is misplaced the conductor D' is brought in contact with the conductors *f f'*, and the electric circuit closed, which, flowing over the primary wire of induction-coil M, induces a current in the secondary wire, which, flowing through the Geissler tube N, illuminates it; or, if the wires of the electro-magnetic alarm-bell R were connected to connecting-screws K K', the electric current would cause the bell to be sounded.

When the switch is in its proper position, the conductor D is in contact with the conductors *g g'*, and the electric current of the battery J is closed, which, passing over the electro-magnets *p¹ p²* of relay-magnet P, attracts the armature-lever Q from adjusting-screw *p³*, and opens current of the battery I;

and when the switch is misplaced, the conductor D is moved off the conductors $g g'$, and the current of battery J is broken, the spring Q' drawing the armature-lever Q against the adjusting-screw p^3 , and closing the current of the battery H, which, flowing over the primary wire of the induction-coil M, induces a current in the secondary wire, which, flowing through the Geissler tube N, illuminates it; or, if the wires of the electro-magnetic bell R were connected to connecting-screws L L', the electric current of battery I would cause the bell to be sounded.

The Geissler tube, of any shape or form, should be placed in an elevated box, with an opening at one or both ends; and, in order that the illuminated Geissler tube can be distinctly seen during the day, the box should be deep so that the central or back part of it is dark.

The metallic conductors used for closing

and breaking the electric circuit should be well insulated with suitable material, and inclosed in an iron box so as to protect them from the weather and from being tampered with.

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

1. A Geissler or vacuum coil, bulb, or tube illuminated by electricity, in combination with a track or railway switch circuit-closer, for general railway-signal purposes.

2. In combination with a railway-signal apparatus, a visual signal illuminated by an induced electrical current, for the purpose set forth.

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Witnesses:

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