No. 610,809. Patented Sept. 13, 1898.

C. E. HARRIS.

COMBINED SWITCH AND SIGNAL MECHANISM.

(Application filed Jan. 24, 1898.)

(No Model.) 3 Sheets—Sheet 1.

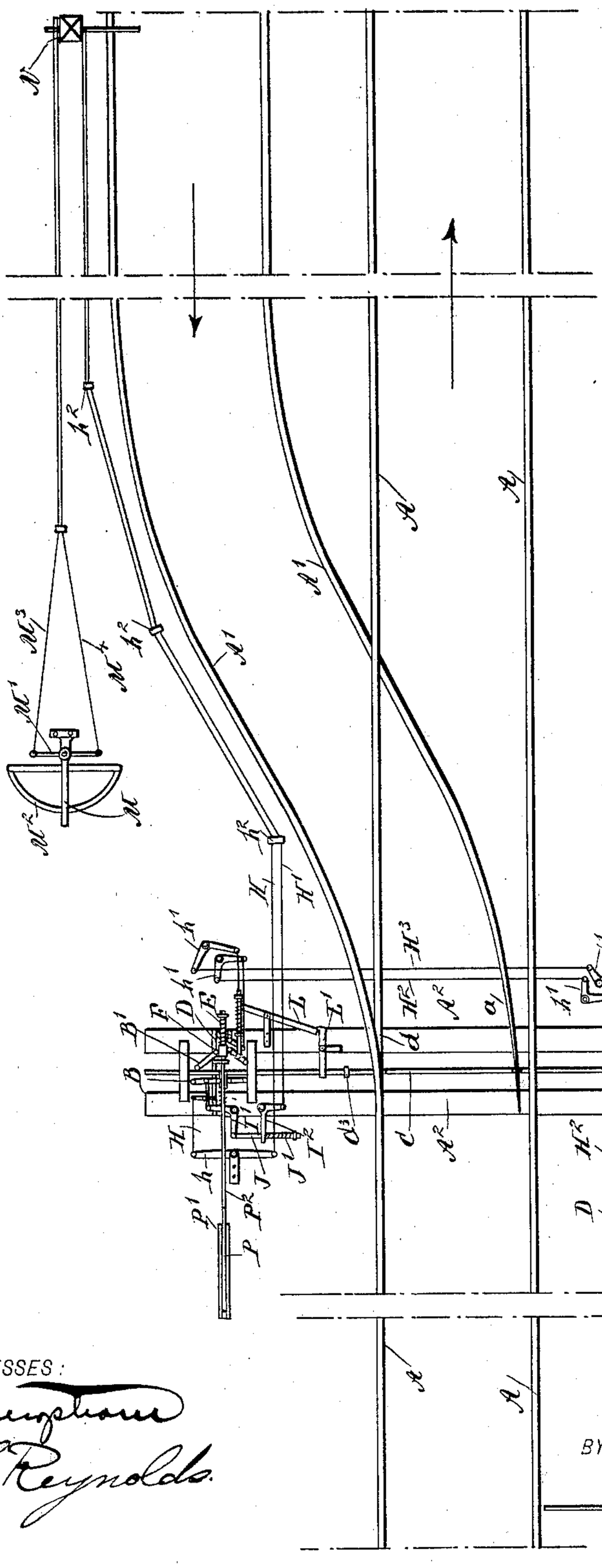

Fig. 1

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Fig. 2

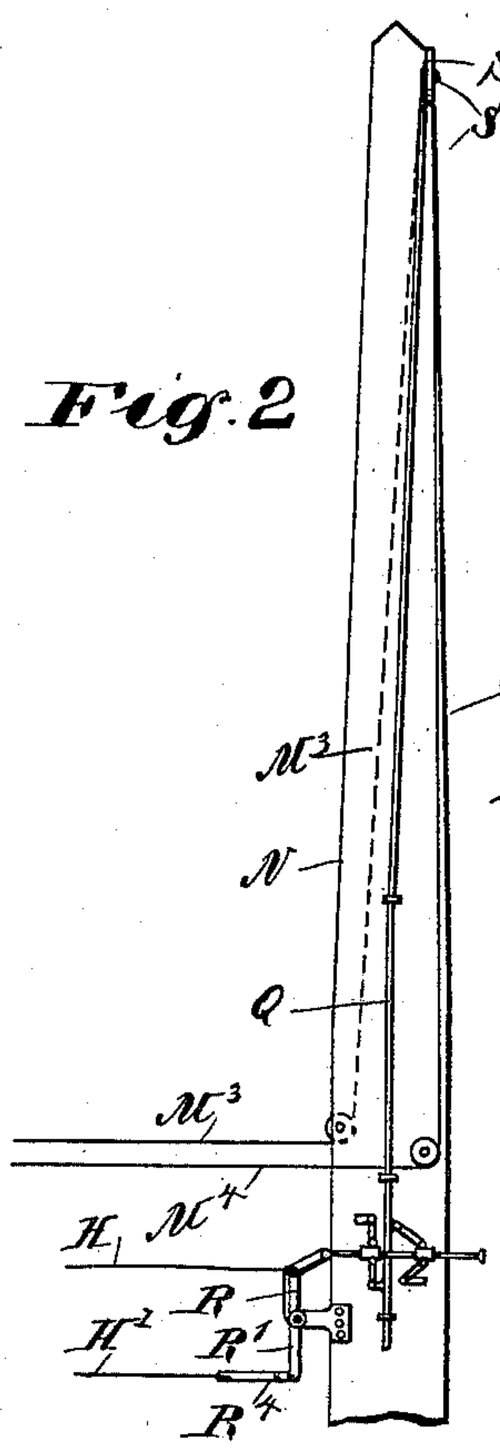

Fig. 5

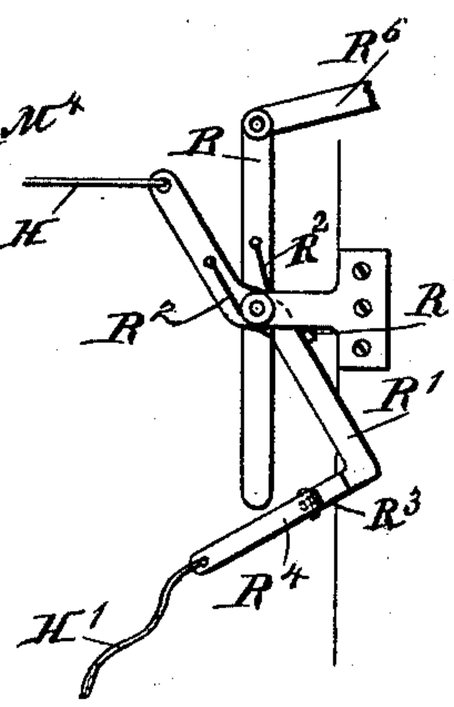

Fig. 4

Fig. 3

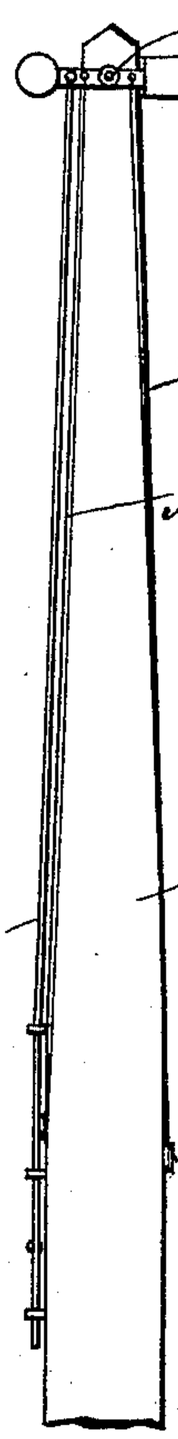

Fig. 6

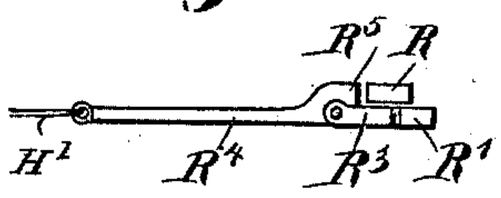

Fig. 7

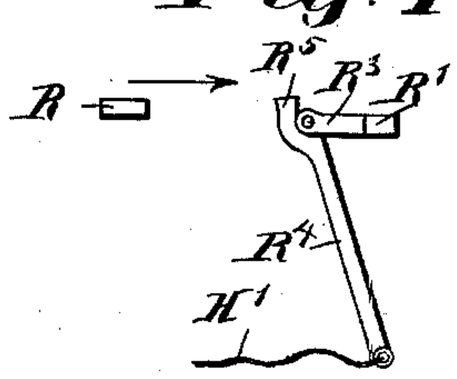

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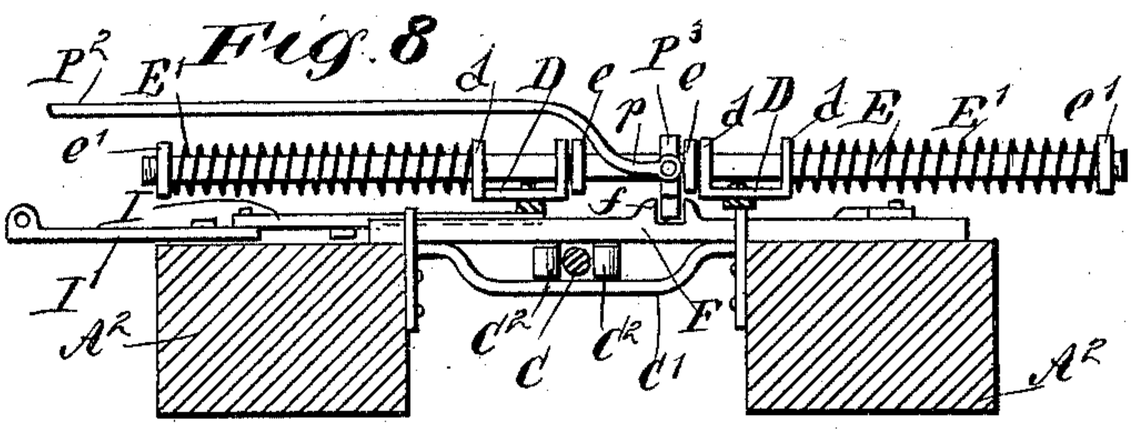
Fig. 8



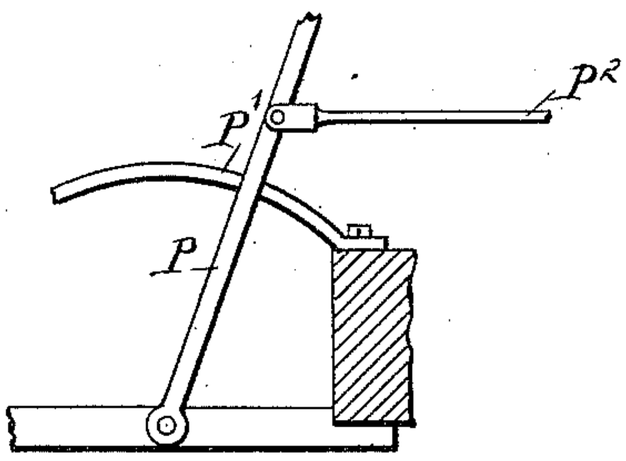


Fig. 9

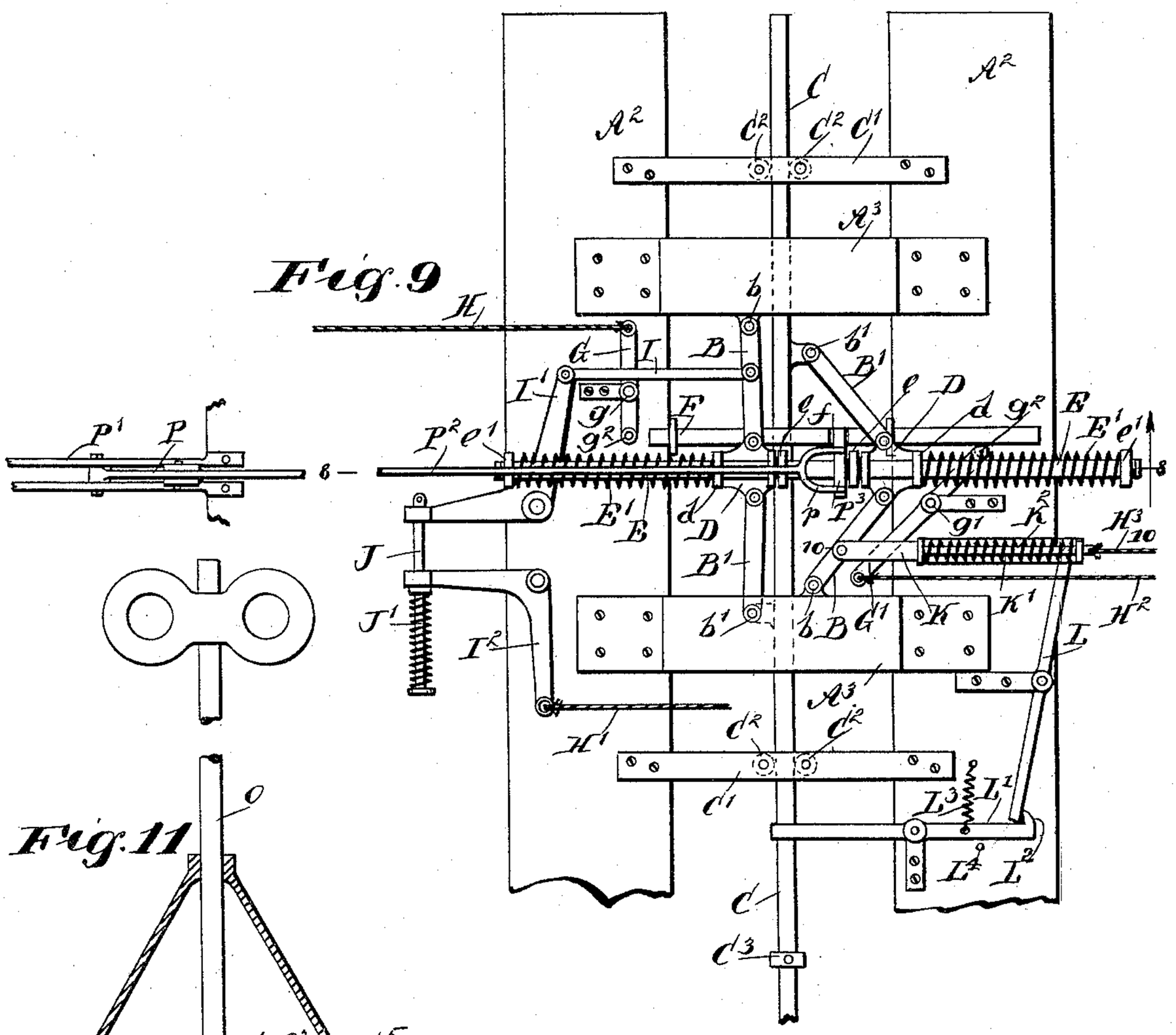


Fig. 11

Fig. 10

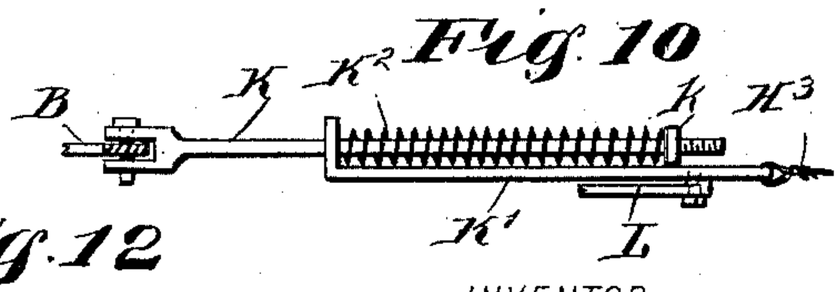
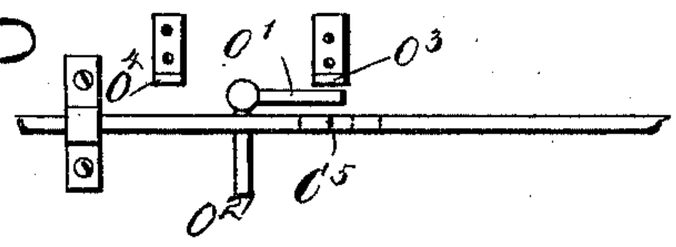


Fig. 12



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UNITED STATES PATENT OFFICE.

CHARLES E. HARRIS, OF ELLWOOD CITY, PENNSYLVANIA.

COMBINED SWITCH AND SIGNAL MECHANISM.

SPECIFICATION forming part of Letters Patent No. 610,809, dated September 13, 1898.

Application filed January 24, 1898. Serial No. 667,767. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HARRIS, of Ellwood City, in the county of Lawrence and State of Pennsylvania, have invented a new and Improved Combined Switch and Signal Mechanism, of which the following is a full, clear, and exact description.

My invention relates to certain improvements in connection with switch-operating signaling mechanisms by which a signal-lever is used for throwing the switch and operating signaling mechanism, the two being connected so that the signaling mechanism is thrown to "danger" before the switch is moved.

My invention further consists of certain features which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a diagram or plan showing a section of track and the different parts of my mechanism in their relation to the track and to each other. Figs. 2 and 3 are elevations at right angles to each other of one of the signal-posts. Fig. 4 is a detail, on an enlarged scale, of the mechanism for controlling the signal upon said post. Figs. 5, 6, and 7 are details showing the operation of a portion of this mechanism. Fig. 8 is a cross-sectional elevation of the switch and signal operating mechanisms, taken at one side of the bar E. Fig. 9 is a plan view, upon an enlarged scale, of these mechanisms. Fig. 10 is a detail elevation of the mechanism connecting the rod or wire H^3 with this operating mechanism. Fig. 11 is an elevation showing the operation of a switch indicating or signal mechanism, and Fig. 12 is a plan view showing the means for operating the same.

The means for operating the switch and the signal mechanism herein shown are in part similar to the means shown for operating the switch in the Patent No. 589,655, granted to me the 7th of September, 1897, and consists, in brief, of two sets of toggle-levers B and B′, one of the levers being pivoted at *b* to a fixed pivot and the other lever at *b′* being pivoted to a reciprocating rod C, which is connected to operate the switch-points. These levers B and B′ are connected at their adjacent ends to a slide D, which is mounted to slide upon a rod E, said rod having springs E′ surrounding different ends and bearing, respectively, against the collars *e′*, fixed upon the rod E and against the collars *d* of the slides D. At the central portion of its length the rod E is provided with two collars *e*, located a short distance from each other. The operating connection is made to the rod E by means of a rod P^2, which is forked to form a yoke *p*, which embraces a sliding collar or arm p^3, mounted to slide upon the rod E and located between the two collars *e*. This slide or arm p^3 engages a notch *f* upon a rod F, said rod being supported to slide parallel with the rod E. The rod F operates the pivoted levers G and G′ by engagement of its ends with the ends of the pivoted levers. These levers are preferably provided with friction-rollers g^2, which engage the rod F. When the levers G and G′ have been swung to a certain point, the rollers g^2 roll upon the side of the rod F. The lever G has a rod or cable H fixed to the opposite end thereof, said rod extending to one end of a lever located upon the distant signal-post and adapted to operate the signal thereon. The exact connection from the lever H to this signal-post will vary according to circumstances. As shown in Fig. 1, these connections consist of a pivoted lever *h*, interposed in the connections, so as to change the direction of the rod H and also of guiding-staples h^2. The connection of these rods to the operating-lever of the distant signal is shown in Fig. 2. The complementary rod or cable H′ is operated by the means of the bell-crank levers I′ and I^2 and the link I, which connects the bell-crank lever I′ with the lever B of one of the toggle mechanisms. A yielding connection is provided between the two bell-crank levers I′ and I^2, consisting of the rod J, fixed to one of the levers and passing through a hole in the other and provided with a spirally-coiled spring J′, surrounding the end thereof and bearing against the lever I^2 and a head upon the rod J.

The operation of the toggle-levers B and B′, which move the switch, is the same as that described in the patent referred to, excepting that the connection of the operating-lever P thereto is by means of the sliding collar P^3, which causes a certain amount of

lost motion in the rod P^3 before the bar E is moved. This enables the rod F, through its connecting mechanisms, to operate the distant signal before the throw of the switch is commenced. The switch-points *a* and *a'* are connected to the bar C and are directly thrown thereby. The bar C is mounted in guides formed upon the bar C', which extends between two adjacent ties A^2 and has friction-rollers C^2 mounted thereon upon each side of the bar C.

A second signal mechanism is mounted upon the post N' in the opposite direction from the switch to that of the signal mechanism described, which is mounted upon the post N. This signal mechanism is operated through the rods H^2 and H^3, which are connected to the bell-crank levers *h'* wherever necessary to change their direction. The rod H^3 is connected to a mechanism (shown in detail in Fig. 10) by which its operation is delayed until after the switch has been thrown. The rod K of this mechanism is pivoted upon one of the levers B of the toggle mechanism.

Mounted to slide upon the rod K is a bar K'. Between the right-angular end of the bar K' and an adjustable nut *k* upon the rod K is placed a spirally-coiled spring K^2, which encircles the rod K. When the toggle-levers to which the bar K is pivoted are moved so as to be brought into a straight position corresponding with the position of the other toggle-levers, (shown in Fig. 9,) the bar K is moved to the left, so as to compress the spring K^2.

A lever L is pivoted upon the bar K', near the end of said bar that is farthest from the toggle-lever B, and at its center said lever L is fulcrumed upon a fixed pivot. The opposite end of this lever is restrained against motion by means of an upturned end or hook L^2 upon a lever L'. This prevents the bar K from being moved under the influence of the compressed spring K^2 until a tappet or collar C^3, which is mounted upon the switch-operating rod C, engages the opposite end of the lever L' and releases the lever L from the hook upon the other lever. This permits the spring K^2 to move the bar K' and, through the connecting-rods H^3, operate the signal upon the post N'. The bar L' is brought back to its normal position ready for locking the end of the lever L by means of a spring L^3 and is stopped at the proper position by a pin L^4 or other convenient stop. The signal mechanism mounted upon the signal-posts N and N' is shown in Figs. 2 to 7, inclusive. The operating-rods H and H' are connected to opposite ends of a pivoted lever R'. Upon the same pivot is mounted a lever R, which is normally locked to the lever R' and moves therewith. A spring R^2 is connected at opposite ends to the levers R and R' and is pivoted to separate the levers into the position shown in Fig. 5.

To the lower end of the lever R' is fixed an arm R^3, to the end of which is pivoted a bar R^4, which has a shoulder R^5, adapted when the parts are in the position shown in Fig. 6 to engage the lower end of the lever R and lock the two together. The bar R^4 will be held in this locking position so long as the lower rod H' remains unbroken. As soon as this is broken, however, the strain upon the other rod H will pull the parts into the position shown in Figs. 5 and 7, the rod R^4 being swung around to one side, as shown in Fig. 7. The extent of separation of the levers is controlled by a lug R^7 upon the lever R', which lug engages the supporting-bracket.

In case the signal is at "danger" it will remain so, as the operating rods or wires H and H' are disconnected from the signal mechanism. This position of the parts is the one shown in Fig. 4. If the signal indicates a clear track, the right-hand toggle of Fig. 4 will be straight—that is, the parts will be in their other position. If the wire H breaks, the wire H' will pull the levers to the danger position, while if the other one breaks the spring R^2 will accomplish the same result, the lug R^7 acting as a stop against which the spring may act. In either case the signal will be thrown to "danger."

The signals are operated by direct connections of a rod Q to a semaphore-arm S. This rod Q is operated by two sets of toggle-levers B^9 and B^{10}, similar to the toggle-levers B and B', previously described. These toggle-levers are connected to the blocks D^{10}, mounted to slide upon the bar E^{20}, and controlled by springs E^{30}, which correspond to the similar parts previously described for the switch-operating mechanism. Being identical in construction with the similar parts of the switch-operating mechanism further description of their operation is therefore not thought to be necessary. The lever R is connected to the rod E of this mechanism by means of a link R^6.

In order that the operator may be certain that the distant signal has been properly set, I have shown a return-signal, which consists of an arm or finger M, mounted upon a vertical shaft and adapted to swing over an indicating-arc M^2. This shaft is turned by means of an arm M' and rods M^3 and M^4, connected therewith. These rods extend to the distant signal, passing about suitable rollers, which change their direction and are connected directly to the semaphore-arms, one on each side of the pivot. It follows from this construction that the movement of the finger M will correspond with the movement of the semaphore-arm. I have also provided a switch indicating or signal mechanism located alongside the switch-points. This consists of a vertical staff O, mounted upon suitable supports and adapted to have an oscillating or partial rotary motion. This is provided near its lower end with two radially-extending arms or pins O' and O^2, said pins being at right angles to each other and one at a higher elevation than the other. The

rod C, which is connected to and operates the switch-points, is extended beyond the track and into the base forming the support for the staff O. This is provided adjacent the staff with two pins or shoulders C^4 and C^5, adapted, respectively, to engage the arms O^2 and O'. These arms O^2 and O' are so located that they are respectively beneath and above the main body of the rod C. When the rod C is moved in one direction, the shoulder C^4 will engage the arm O^2 and give the staff O a partial rotation. When this is done, the arm O' will swing over the rod C, where it will be engaged by the shoulder C^5, when the rod C is reciprocated in the opposite direction. By this means reciprocation of the rod C will give a partial rotation of the staff O.

To prevent rotation of the parts farther than desired, stops or locks are provided consisting of upwardly-projecting arms or pins O^3 and O^4, which are so placed as to engage the arms O' and O^2 when they are rotated away from the rod C.

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

1. A combination comprising a switch-operating mechanism, a signal-operating mechanism, and a common operating-lever, said switch and signal operating mechanisms each comprising toggle-levers for moving and locking the parts, and the operating-lever having taut connection with the signal-operating mechanism and slack connection with the switch-operating mechanism whereby the movement of the signal precedes that of the switch, substantially as described.

2. A switch and signal operating mechanism, comprising a bar mounted to slide longitudinally in bearings, a block mounted to slide on said bar, an operating-lever connecting with said block to slide it, stops upon the bar on each side of said sliding block permitting of a limited free movement of the block thereon, connections from the sliding block to the signal-operating means, and from the sliding bar to the switch-throwing mechanism, substantially as described.

3. A combined switch-operating and signaling mechanism, comprising an operating-lever, a switch-throwing mechanism having a slack connection with said lever, a signaling mechanism having a taut connection with the operating-lever, and a second signal and its operating mechanism having uprights connected with the switch-throwing mechanism, a spring interposed in said connection, a catch between said spring and the signal, and releasing means therefor operated by the switch-throwing mechanism at the completion of its throw, substantially as described.

4. A switch indicator or signal, comprising a vertical shaft having a target thereon, two radial arms projecting from the shaft at different angles and elevations, an extension of the rod connecting the switch-points lying adjacent said shaft and having projections at top and bottom adapted each to engage one of the arms upon said shaft to rotate it, substantially as described.

5. A switch indicator or signal, comprising a vertical shaft having a target thereon, two radial arms projecting from the shaft at different angles and elevations, an extension of the rod connecting the switch-points lying adjacent said shaft, and having projections at top and bottom adapted each to engage one of the arms upon said shaft to rotate it, and fixed stops engaged by said arms and limiting their sway, substantially as described.

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Witnesses:
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A. C. GROVE.