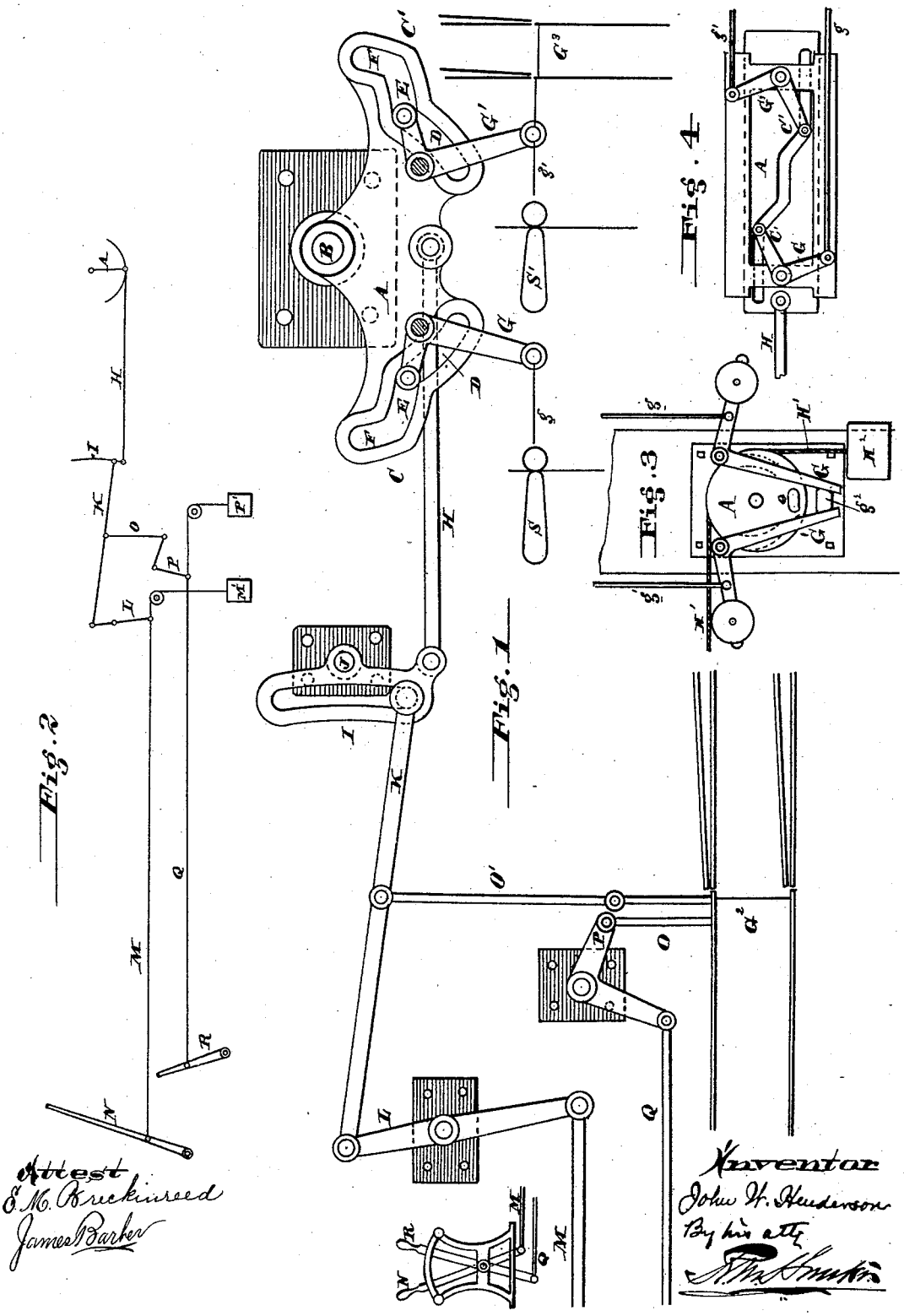
(No Model.) 2 Sheets—Sheet 1.

J. W. HENDERSON.

MECHANISM FOR OPERATING LONG DISTANCE SWITCHES, SIGNALS, &c.

No. 342,439. Patented May 25, 1886.



Attest
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(No Model.) 2 Sheets—Sheet 2.

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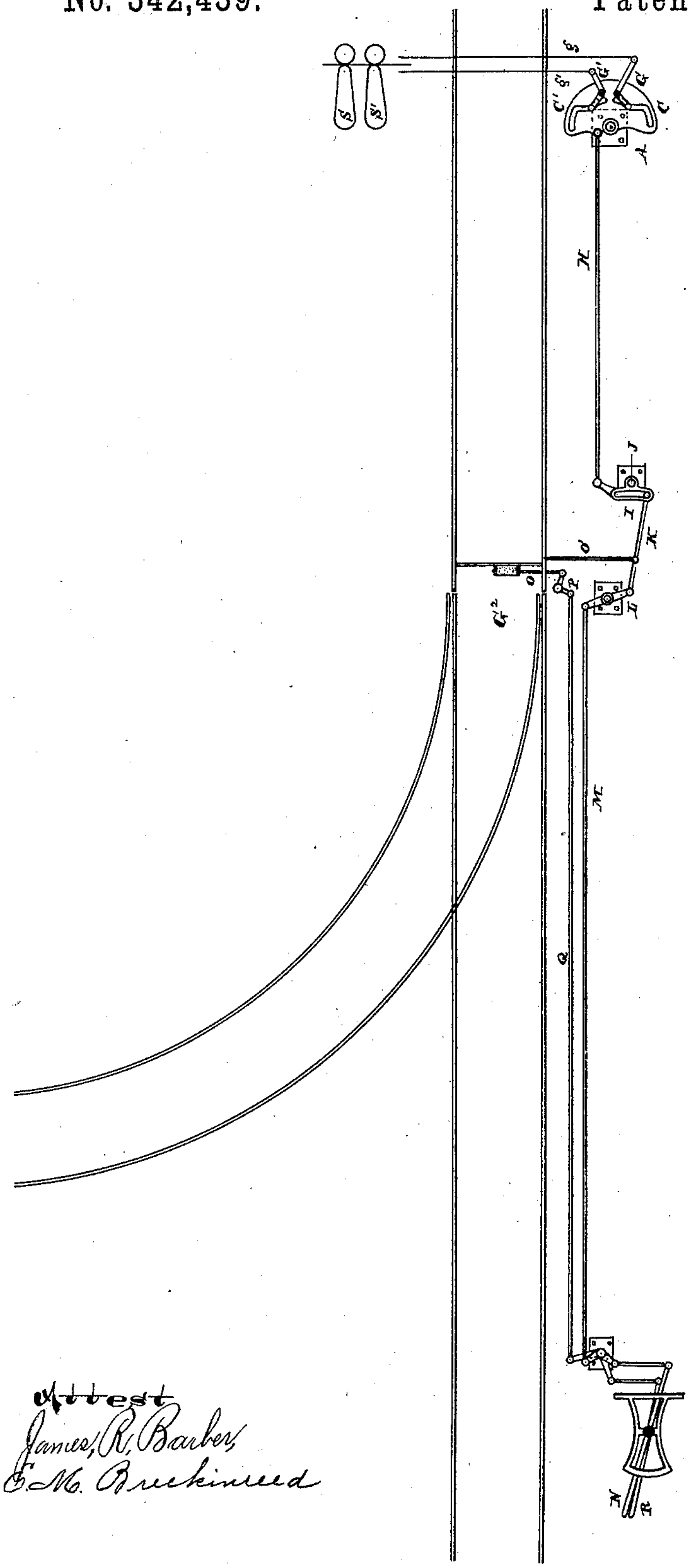

Fig. 5

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UNITED STATES PATENT OFFICE.

JOHN W. HENDERSON, OF PHILADELPHIA, PENNSYLVANIA.

MECHANISM FOR OPERATING LONG-DISTANCE SWITCHES, SIGNALS, &c.

SPECIFICATION forming part of Letters Patent No. 342,439, dated May 25, 1886.

Application filed April 11, 1885. Serial No. 161,904. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HENDERSON, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Mechanism for Operating Long-Distance Switches, Signals, &c., of which the following is a specification.

My invention has reference to railroad signals and switches; and it consists in certain improvements set forth in the following specification, and shown in the accompanying drawings, which form part thereof.

Heretofore in operating signals and switches over long distances it has been customary to use a separate set of pipes, rods, or cables to each switch, signal, or other mechanism to be operated. My object is to provide suitable devices by which the number of pipes, rods, or cables may be largely reduced, thus reducing the cost and simplifying the device by dispensing with one or more signal or switch levers.

In the drawings, Figure 1 is a plan view of a switch and signal mechanism embodying my improvements. Fig. 2 is a diagram representing substantially the same system as shown in Fig. 1, only employing line-cables in place of rods. Fig. 3 is an elevation of the lower part of a signal-post, showing a modified arrangement of cam mechanism for directly operating the signals. Fig. 4 shows a sliding cam-plate, which may be used instead of a pivoted cam. Fig. 5 is a plan view showing the general arrangement of the mechanism embodying my improvements.

A is the cam-plate, and may be adapted to slide in guides, or be pivoted, as shown, its fulcrum being at B. This cam-plate is provided with two cam-slots, C C′, having parts D and F concentric with the fulcrum B, and connected by part E, which is the actuating portion of the camway or slot. The parts D E F of these camways C C′ are arranged in opposite order, so that when one is operating the pivoted lever G the other is inoperative, and vice versa, whereby either of the levers G G′ may be operated separately, but not both together. These levers G G′ are adapted to operate switches or signals, or both. The cam-plate is connected to one end of the pivoted link I by rod H, the fulcrum of which link is midway on its operating-slot, as shown.

K is a rod having one end working in the link, and the other end hinged to one end of the lever L, the other end of which is connected to the long line rod, tube, or cable M, which may be of any length, and connected to the operating-lever N at the switch or signal tower or station.

O′ is a rod connecting the rod K with one of the movable switch-rails. One arm of the bell-crank lever P operates the switch G^2 by rod O, and the other arm of said bell-crank is connected to the line rod, pipe, or cable Q, also extending to the operating tower or station, and connected to a lever, R. The duty of this rod, pipe, or cable Q is to shift the switch, and rod K is thereby moved back and forth in the link by the switch through rod O′.

As shown, a pull upon the lever N and cable, rod, or pipe M would cause the cam C to operate the lever G without moving lever G′; but if we first push the lever R the rod K will be raised in the link directly or through the agency of the switch G^2, and then a pull upon the lever N would cause the lever G′ to be actuated and lever G would remain inactive. If the switch-lever R is moved to close the switch G^2, as shown, a movement of lever N in one direction will operate the cam-plate A without moving the switch G^2, but will operate the signal S by the rod *g*, connecting with lever G. If now the lever N be moved in the opposite direction, then the signal S′ will be actuated by rod *g′*, connected with lever G′. If the switch G^2 be opened first by lever R, then the movements of the signals S S′ will take place in the reverse order for the corresponding movements of lever N. In place of the signal S′, a switch, G^3, may be operated.

In the cam mechanism shown in Fig. 3 the cam-plate A is supposed to be operated by a cable, H′, weighted as at H^2, in lieu of the rod H shown in Fig. 1, and the cam is shown as placed in a vertical plane in place of a horizontal one. The levers G G′ there shown are weighted, and have their movement in one direction limited by a stop, g^2, and are alternately or independently actuated by the lug *e* on the cam-plate in place of an irregular slot.

It is evident that a large combination of movements may be had with a small number

of pipe-lines if one of the levers G or G′ be made to actuate a second rod, M, simply duplicating the mechanism shown in Fig. 1.

In case two switches or signals or one switch and one signal should be so arranged as to be required to move separately and never both at once, and they should have no connection with any third switch or signal, rod M could be attached directly to cam A without any intermediate link mechanism, and moving the lever N (which should stand central) one way would operate one switch or signal, and moving it the other way would operate the other switch or signal. It will be noticed, further, that by this method of the arrangement of switches and their signals the position of the switch determines through the position of K in link which signal will be moved, thus interlocking the switch and the signals.

If desired, the rod Q may be a cable, and be weighted, as at P′, (see Fig. 2,) to keep it under tension sufficient to operate the switch and the rod K, or rod K alone, by a movement of lever R. For very long distances this would perhaps be cheaper and very satisfactory.

It is evident that instead of a double cam-plate a single one might be used, in which a pull on the cable or light rod M before and after the rod K is moved from one end to the other of the link would move the lever G in first one direction and then in the other, or could first open the switch and then close it.

The device is equally adapted to a straight cam-plate reciprocated in guides, as shown in Fig. 4, and the particular form or construction of the slots or camways therein is immaterial to my invention.

If desired, the cam-plate may be dispensed with entirely, and the device to be operated may be worked directly by rod H or the link I.

While I have described my invention as particularly adapted to operating railroad switches and signals, it is to be understood that I do not in anywise limit myself to that purpose, as the principles involved are adapted to many engineering uses, and while I prefer the construction shown I do not limit myself to the details thereof, as they may be modified in various ways without departing from my invention.

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

1. Devices to operate switches or signals, or both, or their mechanism at long distances by means of a rod or cable, consisting of a cam-plate adapted to actuate two switches or two signals, or one of each, combined with a rod or cable, and intermediate link mechanism, substantially as set forth, to cause a pull upon the last-mentioned rod or cable to move the said cam-plate in either direction to operate either one or the other of said switches and signals, substantially as and for the purpose specified.

2. Devices to operate switches or signals, or both, or their mechanism at long distances by means of a rod or cable, consisting of a cam-plate adapted to actuate two switches or two signals, or one of each, combined with a rod or cable, and intermediate link mechanism, substantially as set forth, to cause a pull upon the last-mentioned rod or cable to move the said cam-plate in either direction to operate either one or the other of said switches or signals, and an auxiliary rod or cable to control the action of said intermediate link mechanism, substantially as and for the purpose specified.

3. A pivoted cam having two irregularly-shaped camways therein, a part in each of said camways being concentric with said pivot, in combination with two levers having pins or rollers working in said camways and so located with respect to said cam-plate that when one of said levers is actuated the other has its pin or roller in the concentric part of the camway and is unacted on, and vice versa, a cable, an operating-lever to pull said cable, and intermediate mechanism, substantially as set forth, connecting said cable and cam-plate, whereby the cam plate may be moved in either direction by a pull upon said cable, substantially as and for the purpose specified.

4. A pivoted cam-plate having two irregularly-shaped camways therein, a part in each of said camways being concentric with said pivot, in combination with two levers having pins or rollers working in said camways and so located with respect to said cam-plate that when one of said levers is actuated the other has its pin or roller in the concentric part of the camway and is unacted on, and vice versa, an operating rod or cable to move said cam-plate, and intermediate link mechanism, substantially as set forth, whereby a pull on said rod or cable may be made to oscillate said cam-plate in either direction desired, substantially as and for the purpose specified.

5. A pivoted cam-plate having two irregularly-shaped camways therein, a part in each of said camways being concentric with said pivot, in combination with two levers having pins or rollers working in said camways and so located with respect to said cam-plate that when one of said levers is actuated the other has its pin or roller in the concentric part of the camway and is unacted on, and vice versa, an operating rod or cable to move said cam-plate, intermediate link mechanism, substantially as set forth, whereby a pull on said rod or cable may be made to oscillate said cam-plate in either direction desired, and an auxiliary rod or cable to control the action of said intermediate mechanism, substantially as and for the purpose specified.

6. A cam-plate and an operating-lever therefor, in combination with intermediate link devices, substantially as set forth, whereby a movement of said lever in one direction may be made to move said cam-plate in either of two directions, substantially as and for the purpose specified.

7. The combination of a cam-plate with rod H, link I, rod K, a line, rod, or cable to move

said rod H longitudinally, and switch mechanism, to shift said rod in said link, substantially as and for the purpose specified.

8. The combination of a cam-plate with rod H, link I, a pin to oscillate said link, and mechanism, substantially as set forth, to shift said pin in said link, substantially as and for the purpose specified.

9. The combination of a cam-plate with rod H, link I, rod K, lever L, rod or cable M, lever N, lever P, rod Q, lever R, and connecting mechanism by which a movement of the lever P shifts the rod K in the link, substantially as and for the purpose specified.

10. The combination of a cam-plate having slots D E F with levers G G′, rod H, link I, rod K, lever L, rod or cable M, lever N, lever P, rod Q, lever R, and connecting mechanism by which a movement of the lever P shifts the rod K in the link, substantially as and for the purpose specified.

11. The combination of link I, rod K, a cable or rod to move said rod K always in the same direction when oscillating the link in the act of raising a signal or setting a switch, and mechanism, substantially as set forth, to shift said rod K in said link I, substantially as and for the purpose specified.

12. The combination of link I, rod K, a cable or rod to move said rod K always in the same direction when oscillating the link in the act of raising a signal or setting a switch, and mechanism consisting of rod O, lever P, and rod or cable Q to shift said rod K in said link I, substantially as and for the purpose specified.

13. Devices to operate switches or signals or other mechanism at long distances by means of a pipe, cable, or rod, consisting of an actuating pipe, rod, or cable having a terminal end connecting with the switch, signal, or mechanism, or two of them, in combination with a second line rod, pipe, or cable extending from the operating-station to or near the said switch signal or mechanism or terminal end of the first-mentionod rod, pipe, or cable, and intermediate mechanism, substantially as described, connecting with both of said lines of pipes, rods, or cables, whereby two successive pulls upon the first-mentioned line or rod, pipe, or cable may cause a reciprocation of the terminal end of said pipe, rod, or cable first mentioned, the second line of pipe, rod, or cable being connected with said intermediate mechanism and adapted to operate it independently of the first-mentioned pipe, rod, or cable, the said intermediate mechanism being acted upon by the second line of pipe, rod, or cable between the successive pulls on the first-mentioned line of pipe, rod, or cable, the various parts of the mechanism being always connected in the same manner, substantially as and for the purpose specified.

14. The combination of lever N, line M, lever L, rod K, link I, lever R, line Q, lever P, and a connection between the lever P and rod K, substantially as and for the purpose specified.

15. The combination of lever N, line M, lever L, rod K, link I, lever R, line Q, lever P, rod O, switch G^2, rod O′, rod H, and a cam-plate actuated thereby, substantially as and for the purpose specified.

16. A cam-plate having two irregularly-shaped slots, in combination with signal or switch mechanism actuated alternately thereby, pivoted link I, a connection between said link and cam-plate, rod K, adapted to work in said link, and means to reciprocate said rod longitudinally, substantially as and for the purpose specified.

17. The cam-plate A, having cam-slots C and C′, each formed of concentric parts D and actuating parts E, arranged in opposite orders, in combination with pivoted link I, rod K, adapted to work in said link, means to reciprocate said rod, and rod H, connecting the link with the cam-plate, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

JOHN W. HENDERSON.

Witnesses:
R. M. HUNTER,
E. M. BRECKINREED.