(No Model.) 2 Sheets—Sheet 1.

A. K. MANSFIELD.

SWITCH OPERATING MECHANISM.

No. 386,020. Patented July 10, 1888.

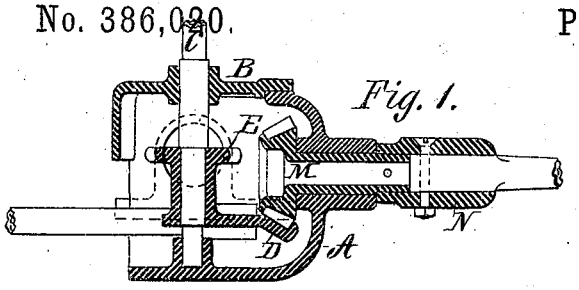

Fig. 1.

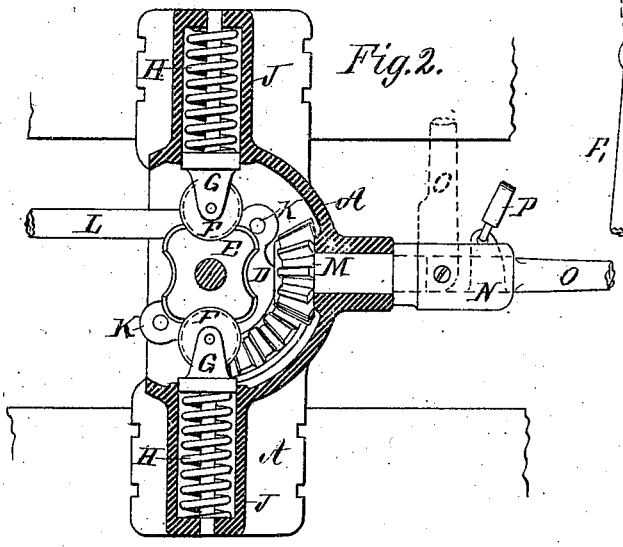

Fig. 2.

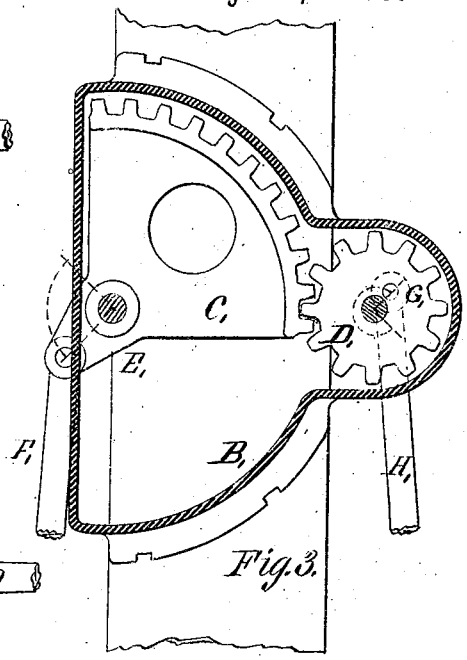

Fig. 3.

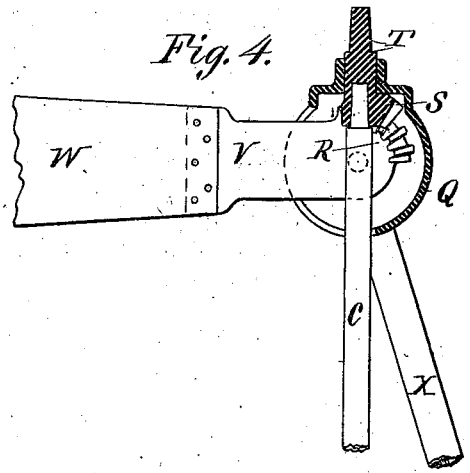

Fig. 4.

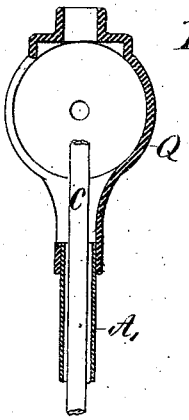

Fig. 5.

Witnesses:
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C. F. Hitchcock

Inventor:
Albert K. Mansfield.

(No Model.) 2 Sheets—Sheet 2.

A. K. MANSFIELD.

SWITCH-OPERATING MECHANISM.

No. 386,020. Patented July 10, 1888.

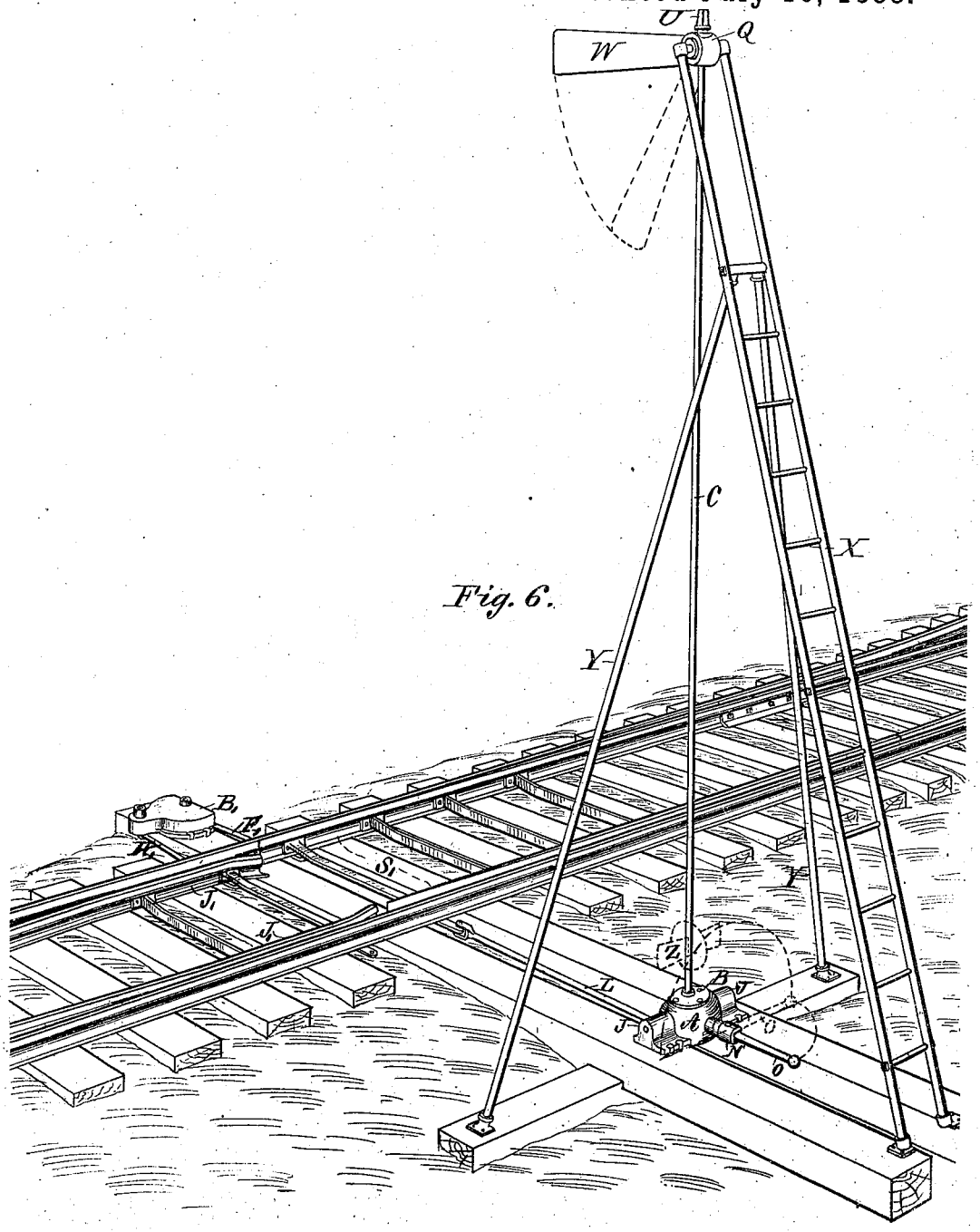

Fig. 6.

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C. J. Hitchcock

Inventor:
Albert K. Mansfield,

UNITED STATES PATENT OFFICE.

ALBERT K. MANSFIELD, OF CHICAGO, ILLINOIS.

SWITCH-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 386,020, dated July 10, 1888.

Application filed July 7, 1887. Serial No. 243,703. (No model.)

To all whom it may concern:

Be it known that I, ALBERT K. MANSFIELD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Switch-Operating Mechanism, of which the following is a specification.

My invention relates to apparatus for operating railway-switches; and the objects of my improvements are to render it possible for trains to run through such switches safely, either from main track or from siding, without first opening the switch by hand; to communicate motion from the switch to the guard-rails in such way as to make the latter more effective; to operate a "semaphore-signal" from the vertical signal-shaft of the switch-stand; to simplify the manner of supporting the signal when it is placed high above the ground, and to otherwise improve the construction of such mechanism. I attain these objects by the means illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the switch-stand proper. Fig. 2 is a horizontal section of the same. Fig. 3 is a horizontal section of the guard-rail stand or mechanism connecting guard-rails with switch. Fig. 4 is a partial section of the mechanism operating signal and lamp at the top of the high-signal stand. Fig. 5 is section showing an alternative construction of the device shown in Fig. 4, and Fig. 6 is a perspective view of the complete device.

Similar letters refer to similar parts in all the views.

The main casting of the switch-stand is composed of the two parts A and B, the latter being a cover or top piece carrying a bearing for the vertical shaft C.

D is a segment of a bevel-gear, formed on the hub of which is the cam E, which engages with the rollers F F. These rollers are pivoted to the followers G G, which are acted on by the springs H H, inclosed in the pockets J J, which latter are formed in the main casting A. The segment D also contains the two pivot-holes K K, to either of which the connecting-rod L, connecting switch to stand, may be pivoted.

M is a bevel-pinion meshing with the segment D, and preferably made so that it forms its own hollow shaft or stud, as shown. On the outer end of the pinion is fastened the collar N, to which is suitably pivoted the hand-lever O in such manner that the lever may, when not in use, be swung around in line with the axis of the pinion and locked in that position with the padlock P, or by other suitable means. When it is desired to use the lever, it is unlocked and then swung through ninety degrees to a position at right angles to the axis of the pinion, when by throwing it (the lever) through one hundred and eighty degrees the switch may be opened or closed.

At the top of the vertical shaft C is the cast-box Q, in which are formed bearings for the bevel-segments R and S, the latter being fitted to the top of the shaft C and carrying the rectangular-shaped support T, to receive a signal-lamp, while the segment R carries an arm, V, to which is fastened the semaphore-blade W. These segments R and S are so proportioned that a quarter of a revolution of the shaft C produces a sixth of a revolution or other suitable movement of the semaphore-signal. The box Q is supported by a diagonally-braced structure consisting of the combination of the shaft C, ladder X, and braces Y Y, all of which are supported on suitable foundations. The braces and the sides of the ladder are made of iron pipe, which is specially suitable, from its stiffness and from the ease with which connections may be made.

Instead of the semaphore-signal a revolving signal, Z, of any suitable form and at any desired height from the ground may be applied to the shaft C. When the signal is near the ground, the box Q and all its supporting parts are dispensed with. When the signal (semaphore) is away from the ground, but not so far as to require a ladder to reach it, the construction of Fig. 5 is used, in which the box Q is supported by means of a piece of pipe, A′, which is properly fastened to the top B of the stand, and which surrounds the signal-shaft C.

B′ is a cast-box containing the spur-segments C′ and gear D′, which mesh with each other. The segment C′ has the arm E′, to which is pivoted the connecting-rod F′, while the gear D′ carries a stud, G′, to which is pivoted the connecting-rod H′. The connecting-rod H′ is connected to the movable guard-rails J′ J′, which

are suitably tied together and arranged to turn about their heels or ends farthest from the switch. The segment C' is moved through about ninety degrees by the movement of the switch. The gear D' is made of such size that it is turned through about two hundred and seventy degrees by the segment. The result is, (the positions of the pivotal connections of connecting-rods to gears being chosen as shown in Fig. 3,) any force of the wheels of a passing train acting against the guard-rails becomes a force acting in the same direction in each of the connecting-rods F' and H'. The guard rails are, as their name implies, used to protect the points of the switch. To do this properly either guard when in action should stand at proper guarding distance from its adjacent main rail—that is, it should be so far from the main rail as to allow the flanges of wheels to pass freely between rail and guard and yet so near as to hold the flanges of wheels which run on the other main rail over away from that rail to keep them from running against or rubbing against the switch-point. It will thus be seen that the guard in action is the one opposite the switch-rail in action—that is, the switch-rail which is lying against its main rail. Therefore in throwing the switch over the guard and switch must move in opposite directions. Yet, as will be seen from Fig. 3, the guard receives a slight movement in the same direction as the movement of the switch before moving across to its new position. This is occasioned by the fact that the pivot-connection of the rod H' with the gear G' is carried by the movement of the driving-segment C through three-fourths of a revolution or about one-eighth of a revolution past either dead-center. The result is that any force tending to press the guard-rail away from its main rail tends also to revolve the gear G' in the direction in which it last moved, which in turn tends to move the switch in the direction in which it last moved—that is, to force it farther home.

The switch shown in Fig. 6 is of the kind known as a "split" or "Lorenz" switch. Guard-rails have heretofore been used before the points of such switches, but have been stationary and therefore not effective, for the function of a guard is to move the wheels away from the main rail opposite the guard, and manifestly two stationary guards cannot move the wheels at the same time away from each main rail.

By the arrangement shown each switch-rail is protected when it is in action and the guard-rail is moved away from the side where it would not be useful. The movement of the guard to accomplish this is quite small, being only about one and a half inch. This arrangement not only makes it safer to run against the points of split switches, but increases the life of such switches by reducing flange-wear at their points. If preferred, one guard-rail only may be used, and the mechanism shown may in any case be modified in various ways without altering the spirit of the invention.

It is not essential that the cam E be applied to the vertical shaft C. It may be applied to any other revolving or moving part of switch or stand, and the springs—either one or more—may be suitably arranged to act on it. I prefer the construction shown, however, for it is compact and has the advantage that if one spring becomes broken the other remains in action. Moreover, friction is much reduced by applying two equal springs acting opposite to each other, for friction of the shaft in its bearings, which would be caused by one spring, is entirely eliminated by the other. The rollers F may also be dispensed with by allowing the followers G to engage directly with the cam E.

The mechanism connecting switch to guard may easily be embodied in the switch-stand, if preferred; or the guard may be operated by entirely independent mechanism. Moreover, it is not essential that the signal-lamp be mounted on the shaft C. It may be held on some stationary support provided for it, and lenses or glasses be moved before it.

The stiffness of the springs H H and the shape of the cam E are such that when the lever O is locked in its dead position the switch cannot in any way be thrown by hand. A train, however, running through the closed "trailing" switch, either from side or main track, will, by the well-understood action of the flanges of the first wheels of the train, throw the switch nearly over, when the movement will be completed and the switch held to its new position by the action of the springs and cam.

What I claim as my invention is—

1. In combination with the two rails of a main track and the movable point-rail of a split switch, a movable guard-rail, which, when the switch-rail lies in action against its main rail, stands at suitable guarding distance from the other main rail, and when the switch-rail is out of action the guard-rail is beyond guarding distance from its main rail, together with connecting mechanism, substantially as set forth.

2. In combination, a movable split switch, a movable guard, the general direction of whose motion from one extreme position to the other is opposite to the direction of motion of the switch, but the first increment of whose motion is in the same direction as the motion of the switch, and connecting mechanism between switch and guard, substantially as described.

3. The combination of split switch S', guard J', switch-crank E', having a movement of less than half a circle, guard-crank G', having a movement of more than half a circle, and connecting parts, substantially as set forth.

4. In a switch-stand, the segmental gear D, carrying the crank K and the cam E and attached to the vertical revolving shaft C, in combination with horizontal lever-shaft O,

spring H, and connecting parts, substantially as set forth.

5. In a switch-stand, the combination of a shaft making about one-fourth of a revolution with a shaft making about one-half a revolution, a hinged operating-lever on and arranged to be locked in line with the axis of the latter shaft, and connecting parts, substantially as set forth.

6. In combination, the vertical revolving shaft C, having its upper bearing in the box Q, the fixed inclined ladder X, supporting box Q, the inclined tubular braces Y Y, extending from the foundation to a high point of the ladder, the switch-stand A, supporting the lower end of shaft C, the operating-lever O, the switch S, and connecting parts, substantially as set forth.

In testimony whereof I hereunto subscribe my name.

ALBERT K. MANSFIELD.

Witnesses:

ALLAN L. BENNETT,

CHAMPION I. HITCHCOCK.