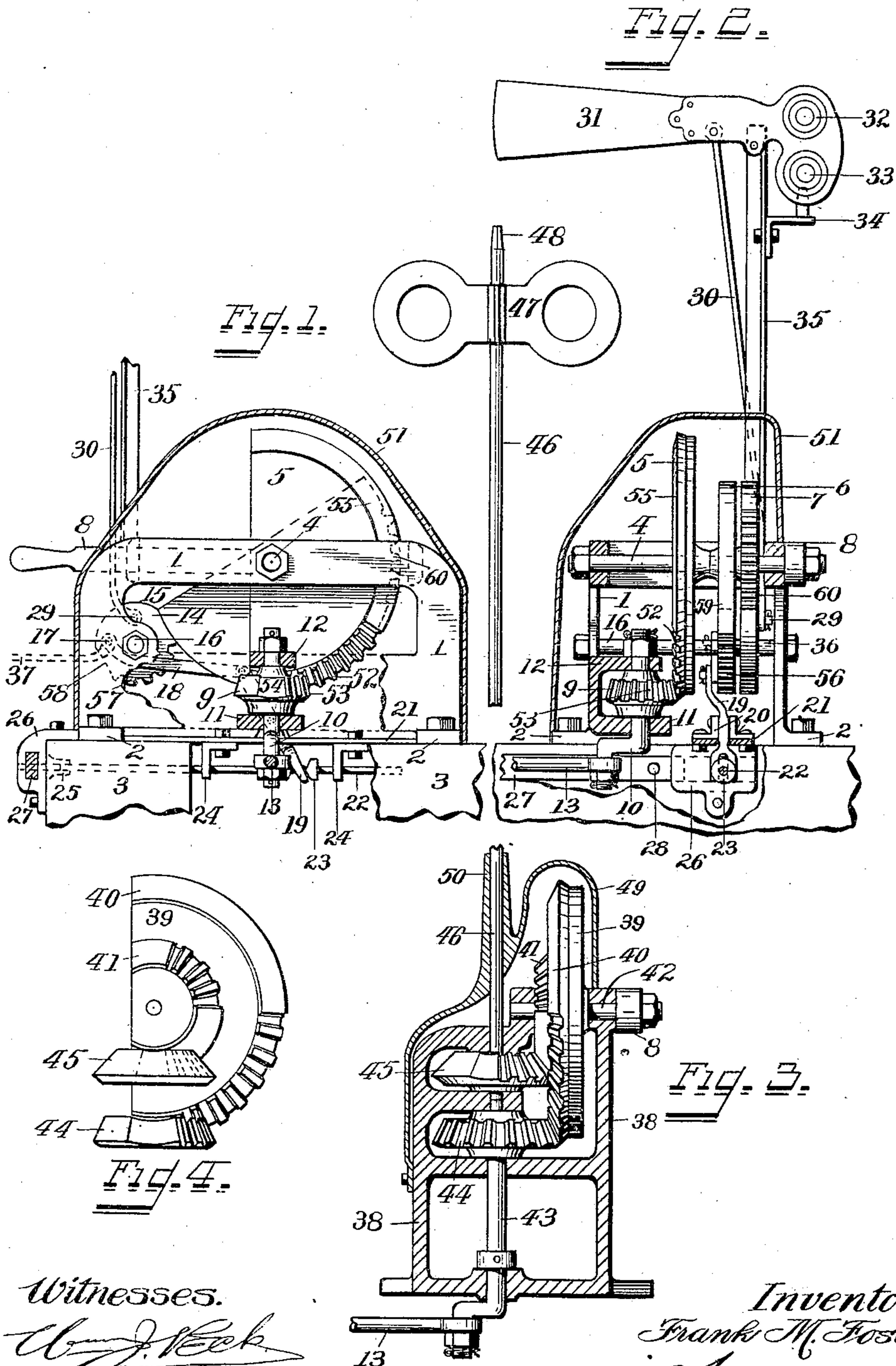


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F. M. FOSTER.
SWITCH STAND.

APPLICATION FILED MAR. 26, 1907.



Witnesses.

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SWITCH-STAND.

No. 855,763.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK M. FOSTER, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Switch-Stands, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to mechanism primarily intended for the operation of railway switches, where it is desired to operate a switch and a signal at said switch, and in some instances a signal at some distance from said switch, and in such manner that, when said switch is to be operated, to permit a train to pass from the main line on to a siding, said signals are set to danger then said switch is unlocked and finally said switch is operated and all of said settings and operations are accomplished by the movement of a single operating lever.

The object of my invention is to provide a simple mechanism for accomplishing the above results, which shall be cheap in construction, efficient in action, shall operate positively, and which may, if desired, be thoroughly protected from snow, mud, ice or other obstructions.

The novelty of my invention will be hereinafter more fully set forth and specifically pointed out in the claims.

In the accompanying drawing: Figure 1 represents a front elevation, partly in section and partly broken away, of a mechanism embodying my invention. Fig. 2 represents a side elevation of the same showing an adjacent semaphore or signal mounted thereon, the parts being shown in their proper positions when the switch is open from the main line to the siding and the adjacent semaphore being shown in the "danger" position. Fig. 3 is a view corresponding to Fig. 2 showing a modification in the construction, the parts being shown in the same relative positions and the usual rotary signal or target replacing the semaphore of Fig. 2. Fig. 4 is a front elevation of the gears used in Fig. 3: this figure being in the nature of a diagram.

The same numerals of reference are used to indicate identical parts in all the figures.

In its preferred form of construction, as shown in Figs. 1 and 2, 1 represents any suit-

able frame or stand provided with feet 2, by means of which the stand is rigidly attached to the cross ties 3, after the usual manner. Suitably journaled in the upper part of the frame 1 is a horizontal shaft 4 which carries, and has rigidly attached thereto, a series of intermittent gears 5, 6 and 7, and which has at its rearmost free end a suitable operating handle 8 rigidly attached thereto. The intermittent gear 5 is of the bevel type and meshes with the intermittent pinion 9, which pinion is mounted upon a suitable switch throwing crank 10 journaled in brackets 11 and 12 extended from frame 1. This switch throwing crank is adapted to carry and operate any suitable switch throwing connecting rod 13 which extends from the crank 10 to the point rails of the switch, after the usual manner of construction.

The intermittent gears 6 and 7 are of the spur type and engage the intermittent pinions 14 and 15 (15 in Fig. 1 being directly behind 14 and 14 and 15 in Fig. 2 being directly behind 6 and 7) which pinions are loosely mounted upon a shaft 16 carried by frame 1. The intermittent pinion 14 carries a pivot pin 17 which operates a bar 18 which is pivoted to a forked lever 19 which in turn is pivoted in brackets 20 suitably secured to a stationary bar 21, thus forming a fulcrum for the forked lever 19. This forked lever 19 engages a reciprocating rod 22 provided with collars 23 spaced apart and one on either side of the lever 19 and adjacent thereto, and this reciprocating rod 22 has its bearings in brackets 24 which are suitably secured to the bar 21. This rod 22 also has a guide 25 extending from the interlocking bar guide 26 as shown by the dotted lines in Fig. 1. The interlocking bar 27 which is secured to and operated by the point rails of the switch, is free to reciprocate in, and is guided by the bracket 26 and is provided with an aperture 28 which, when the position of the parts shown in Figs. 1 and 2 is reversed, comes in line with the rod 22, which rod upon being reciprocated enters said aperture 28 and securely locks the interlocking bar 27 and consequently the switch points, in place as will be readily understood.

The intermittent pinion 15 before referred to as being directly behind 14 in Fig. 1, carries a pivot pin 29 similar to the pin 17 of the pinion 14, which operates a link 30 having a vertical movement and extending upward to the semaphore 31 and is connected thereto

operate the same, and this semaphore may be provided with the usual colored bull's eyes or signals 32 and 33 behind which may be placed any suitable lamp, not shown, carried on a bracket 34 attached to the semaphore support 35. The arrangement of the last described parts being such that, when the semaphore is in the position shown, the light from the lamp shining through the bull's eye 32 will indicate the danger position, and when said semaphore is lowered, the bull's eye 33 will be brought into the position of the bull's eye 32, thus indicating the "clear" position, after the usual manner of semaphore signals.

Where it is desired to operate a distant signal, a pivot pin 36, dotted lines Fig. 2, directly behind the pin 17, Fig. 1, may be attached to and carried by the intermittent pinion 15 and may operate a link 37, shown in dotted lines Fig. 1, which may extend to any distance to operate said distant signal, or if preferred, the pin 36 and link 37 may be dispensed with and a grooved sheave or pulley may be employed to operate the distant signal through the medium of any suitable cables wound in opposite directions thereon after the usual manner of operating distant signals, as will be readily understood.

The construction shown in Figs. 3 and 4 is to be used where it is not desired to interlock the point rails, nor to operate a distant signal and wherein the usual target is substituted for the semaphore 31 before described, and in this construction the stand 38 is somewhat modified in form from that shown in Figs. 1 and 2 where it is referred to as 1, though retaining substantially the same elements, and in this construction, in place of the intermittent gears 5, 6 and 7, I employ the double intermittent gear 39 having the outer intermittent bevel portion 40 and the inner intermittent bevel portion 41, and this gear 39 is rigidly attached to the operating shaft 42 similar to shaft 4 of Figs. 1 and 2 except as to its length, and provided with the operating handle 8. Suitably journaled in the frame 38 is the switch throwing crank shaft 43, which is similar to the crank 10 before described and which carries and operates the connecting rod 13. This crank shaft 43 has attached to it near its upper end, the intermittent bevel pinion 44 adjacent to the outer portion 40 of the gear 39 before described, and an intermittent bevel pinion 45 adjacent to the portion 41 of the gear 39 is secured to and operates the target shaft 46 which is suitably journaled in the frame 38, extends upward for a suitable distance (in this figure being shown broken away so as not to interfere with Figs. 1 and 2) and carries on its upper end the usual target 47 and lamp support 48. Any suitable housing 49 may be attached to the frame 38 and provide an additional bearing 50 for the target shaft 46 and a

housing 51 may be employed to cover and protect the mechanism of Figs. 1 and 2 as will be readily understood.

Referring to Figs. 1 and 2 the operation of the construction shown therein is as follows: As before explained, the parts are shown in their proper positions when the switch is open, or set for the siding. To close the switch the operating handle 8 is moved from the position in which it is shown in Fig. 1 to a position diametrically opposite or through an arc of approximately 180 degrees, and in this movement, while the handle 8 is passing through the first 60 degrees of its movement, the toothed portion 52 of the intermittent bevel gear 5 engages the toothed portion 53 of the pinion 9 and imparts thereto a movement corresponding to about 180 degrees of travel of the crank 10, at which time the connecting rod 13 is operated to operate the point rails of the switch. At the completion of this partial rotation of the pinion 9 the cut-out portion 54 thereof, Fig. 1, engages the blank portion 55 of the gear 5, which engagement locks the pinion 9 against further rotation but permits the gear 5 to rotate freely. At the time of the disengagement of the teeth 52 and 53 before referred to, the teeth 56 of the intermittent spur gear 6 come into engagement with the teeth 57 of the pinion 14 and impart thereto a rotary motion corresponding to, approximately 180 degrees and this partial rotation of the pinion 14 is accomplished while the lever 8 passes through its second 60 degrees of movement. The partial rotation of this pinion 14 reciprocates the rod 22 through the medium of the link 18 and forked lever 19 before described and causes this rod 22 to engage the aperture 28 in the interlocking bar 27, which, by the operation of the connecting rod 13 and the point rails of the switch, has been brought into a position in line with said rod 22 to lock said bar 27 from further movement and when this partial rotation of the pinion 14 has been accomplished as before described, said pinion is locked from further movement by the engagement of the cut-out portion 58 with the blank portion 59 of the gear 6. At the time of the locking of the pinion 14 the teeth 60 of the gear 7 come into engagement with the teeth of the pinion 15 and during the third 60 degrees of movement of the lever 8 said pinion is given a rotary movement of approximately 180 degrees, which movement, through the medium of the link 30 and pin 29 sets the semaphore to the "clear" position, and simultaneously, through the pin 36 and link 37, sets the distant signal to a corresponding position.

It will be seen from the above description that, assuming the parts to be in proper positions when the switch is open for a siding, the first part of the movement of the handle 8 causes the closing of the switch, the second

part of said movement causes the locking of said switch, and the third part of the movement sets the signal to indicate that the track is clear and that the point rails are locked, and inversely it must follow that in opening the switch, the first part of the movement of the handle 8 sets the signal to danger, the second part unlocks the switch and third part throws the switch. It will also be apparent that in closing the switch, should any obstruction be interposed to prevent the point rails assuming their proper position, the oscillating rod 22 can not enter the aperture 28 of bar 27 which will prevent the handle 8 from being moved any further and will inform the operator that the point rails are not in the proper position and will leave the signal set to danger, thus preventing the signal from being set to "clear" until the obstruction is removed and the rod 22 engages the aperture 28 as before described.

The operation of the modification shown in Figs. 3 and 4 is similar in principle to the operations before described, though in this instance no interlocking mechanism is shown. The parts in Fig. 3 are shown in their proper position when the switch is open and in closing said switch the first 90 degrees of movement of the handle 8 imparts 180 degrees of movement to the switch throwing crank shaft 43 through the medium of the intermittent pinion 44, which pinion at the time of the disengagement of the teeth thereon, is locked from further movement in a manner similar to that described with reference to the pinion 9, Figs. 1 and 2, and the second 90 degrees of movement of the handle 8 imparts 90 degrees of movement to the pinion 45, shaft 46 and the target 47 to set the same to the "clear" position, and it will follow that the reversal of the movement of the handle 8 will cause first the setting of the target to danger and second the operating of the point rails of the switch, as will be readily understood.

It will be seen from the above description that I have provided a mechanism wherein it is impossible to operate the point rails of the switch from their closed to their open position, without first setting all the signals to the danger position, and it will also be observed that it will be impossible to set the signals to the clear position without first setting the switch points to their closed position and locking the same in place either through the interlocking mechanism of Figs. 1 and 2 or through the inherent interlocking mechanism of the intermittent gears themselves, and it will further be observed that force exerted upon the point rails of the switch cannot affect the gearing of the stand from the fact that the switch throwing crank operates through an arc of 180 degrees and from one dead center to the opposite dead center taken in line with the movement of the connecting

rod 13, and it will be further observed that through the employment of the mechanism shown the point rails of the switch may be operated to their open or closed position as, for instance when making up a train, which generally necessitates more or less switching back and forth, and that during all this time the adjacent and distant signals are left set to danger to indicate that the switch is not in condition to be used by a train passing through on the main line.

Having thus fully described my invention, I claim:—

1. In a switch stand the combination of a point rail operating crank, mechanism for operating said crank consisting of two members, one of said members having a greater movement than the other and the other of said members being interlocked at a certain point, signal operating mechanism, and a single main operating mechanism for operating said switch stand substantially as described.

2. In a switch stand the combination of a main operating mechanism, intermittent mechanisms carried thereby, a point rail operating mechanism intermittently operated by said intermittent mechanisms, and in intermittent signal operating mechanism operated by said last named intermittent operating mechanism, substantially as described.

3. In a switch stand the combination of a main operating mechanism, intermittent mechanisms carried thereby, a point rail operating mechanism intermittently operated by said intermittent operating mechanism, point rail interlocking mechanism intermittently operated by said intermittent operating mechanism, and signal operating mechanism intermittently operated by said intermittent operating mechanism, substantially as described.

4. In a switch stand the combination of a main operating mechanism, intermittent operating mechanisms carried thereby for performing a plurality of operations, said intermittent operating mechanism having a greater range of movement than that necessary to perform any one of its operations, point rail operating mechanism intermittently operated by said intermittent operating mechanism during part of its operation and locked thereby during part of its operation, and signal operating mechanism intermittently operated by said intermittent operating mechanism during part of its operation and locked thereby during part of its operation, substantially as described.

5. In a switch stand the combination of a main operating mechanism, intermittent operating mechanism carried thereby for performing a plurality of operations, said intermittent operating mechanism having a greater range of movement than that necessary to perform any one of its operations,

point rail operating mechanism intermittently operated by said intermittent operating mechanism during part of its operation and locked thereby during part of its operation, point rail interlocking operating mechanism intermittently operated by said intermittent operating mechanism during part of its operation and locked thereby during part of its operation, and signal operating mechanism operated by said operating mechanism, substantially as described.

6. In a switch stand the combination of a main operating mechanism, point rail operating mechanism, signal operating mechanism, and intermittent interlocking operating mechanism connecting the two last named mechanisms with said main operating mechanism to alternately operate said point rail

and said signal operating mechanisms, substantially as described.

7. In a switch stand the combination of a main operating mechanism, point rail operating mechanism, point rail interlocking mechanism, signal operating mechanism, and intermittent interlocking operating mechanisms connecting said three last named mechanisms with said main operating mechanism to alternately operate said point rail operating mechanism said point rail interlocking mechanism and said signal operating mechanism, substantially as described.

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Witnesses:

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