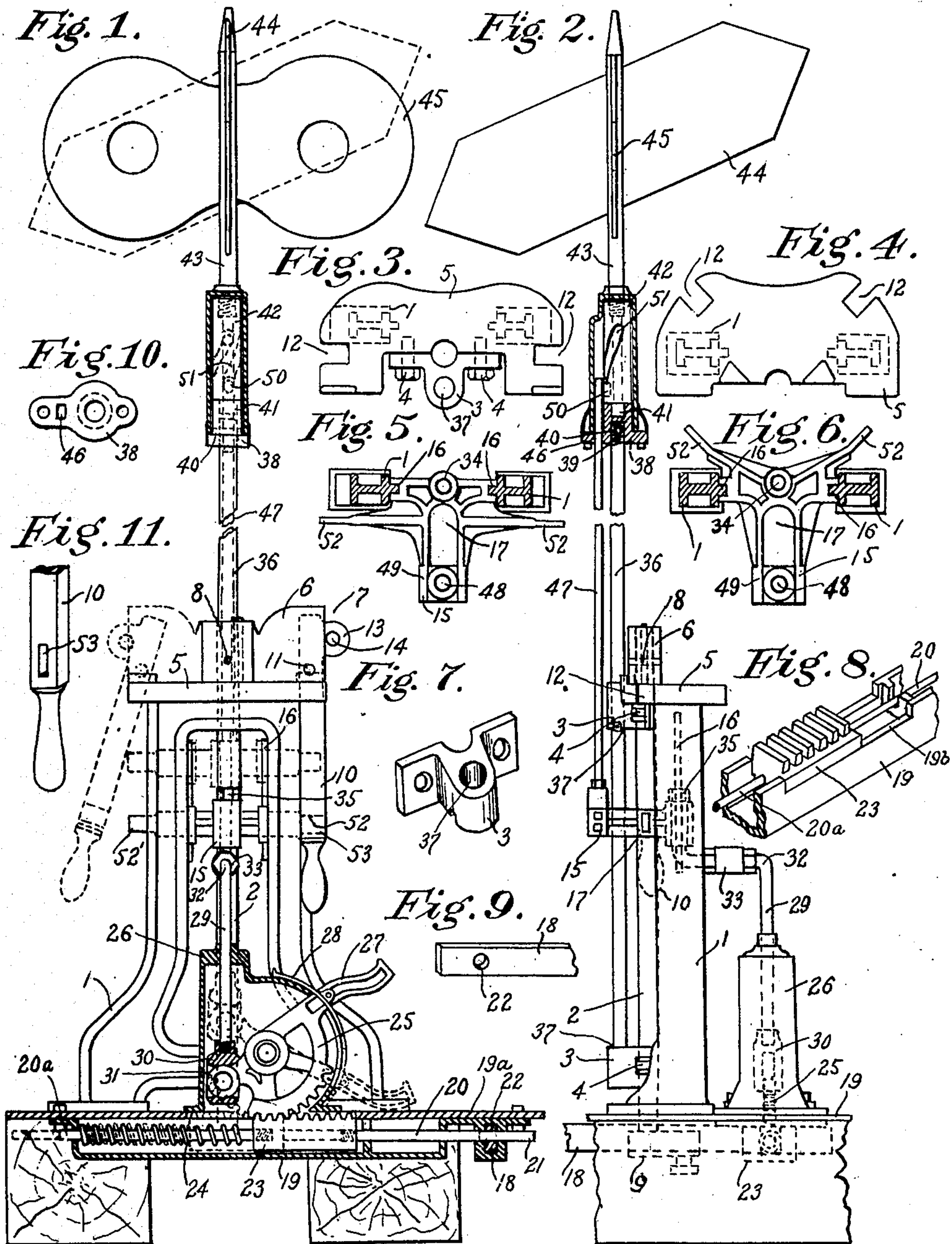


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SWITCH STAND.
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UNITED STATES PATENT OFFICE.

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SWITCH-STAND.

No. 913,185.

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To all whom it may concern:

Be it known that I, FRANK C. ANDERSON, 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 specification.

My invention relates to means for insuring safety in the use of railroad switches.

The object of my invention is to provide a switch stand having mechanism whereby the target operates with the interlocking mechanism independently of the switch operating mechanism, and also to provide means whereby an employee in operating the switch to close it cannot show the target in a clear position and lock the switch if there should be an obstruction between the point rail and the stock rail preventing the point rail from bearing against the stock rail or if the switch should be disconnected from the switch stand. I also provide means whereby an employee cannot lock the switch stand when in open position, and means whereby the switch stand with target and operating mechanism can be destroyed under traffic and leave the point rails in locked position.

My invention consists in a switch stand, a main shaft in said switch stand by means of which the switch point rails are moved, a target shaft independent of said main shaft, a target mounted on said target shaft, a handle plunger adapted to engage the handle, an interlocking bar adapted to be attached to the point rail and to move therewith, an interlocking plunger adapted to engage and hold said interlocking bar, means whereby the movement of said handle plunger and target is controlled by said interlocking plunger and means whereby the locking of said main shaft in stationary position is controlled by said handle plunger.

My invention also consists in the parts and in the details and construction of parts as will hereinafter be more fully described and claimed.

In the drawings: Figure 1 is a front elevation of a switch stand embodying my invention. The dotted lines represent the position of the parts when the switch is open and the target is in "danger" position. Fig. 2 is a side elevation of same. Fig. 3 is a plan view of the top plate of the stand in which the main shaft is revolved 180° as in Fig. 1. Fig. 4 is a plan view of a modification of the

top plate in which the main shaft is only revolved 90°. Fig. 5 is a plan view of the handle plunger as used when the main shaft is revolved 180°, parts of the stand being shown in section. Fig. 6 is a similar view of a handle plunger as used when the main shaft is only revolved 90°. Fig. 7 is a detail perspective view of the yoke which forms a bearing for the target shaft and a partial bearing for the main shaft. Fig. 8 is a perspective view of part of the interlocking plunger guide, part of the interlocking plunger and the rack thereon showing the manner in which the rack is mounted in the guide. Fig. 9 is a detail perspective view of the end of the interlocking bar showing the hole which receives the interlocking plunger. Fig. 10 is a bottom plan view of the hub which supports the cam. Fig. 11 is a perspective view of part of the handle.

As shown in the drawing my invention consists of the stand 1 in which is journaled vertically the main shaft 2, said shaft having bearings formed partly in the stand 1 and partly in the yokes 3 which are secured to said stand by means of the bolts 4. The main shaft extends upwardly through the top plate 5 of the stand and has keyed to it above the top plate 5 the fulcrum-head 6 of the jointed handle lever 7, the main shaft being supported by the pin 8 taking through the fulcrum head 6. At its lower end, the main shaft 2 carries the crank 9 to which would be attached the connecting rod of the point rail of the switch. The fulcrum head 6 of the jointed handle lever 7 has the handle 10 pivoted at 11 therein and said handle is adapted to enter the slots 12 in the top plate 5 to hold the main shaft 2, and consequently the point rails, stationary. The handle 10 has the projection 13 above its pivotal connection at 11, which projection has an opening 14 adapted to receive the bow or shackle of the padlock. The handle plunger 15 is mounted within the stand 1 so as to slide vertically on the guides 16 thereof and has the opening 17 by which it is adapted to slide over the main shaft 2.

The interlocking bar 18, adapted to be attached to the point rail of the switch and to move therewith, has a bearing in the interlocking plunger guide 19 near its end, and the interlocking plunger 20 is horizontally and slidably mounted in the interlocking plunger guide 19 so that its end 21 will enter the hole 22 in the interlocking bar 18. The

parts are so proportioned that the end 21 of the interlocking plunger 20 can only enter the hole 22 of the interlocking bar 18 when the point rail of the switch has been brought
 5 closely against the stock rail, thus making it safe for trains to pass over the switch. The interlocking plunger 20 has the rack 23 rigidly attached thereto within the interlocking plunger guide 19, and supported and
 10 guided thereby, as is best shown in Fig. 8. The guide 19 is rigidly secured to plate 19^a and is provided with recess 19^b to support and limit the movement of the plunger rack 23, thus controlling the movement of
 15 the target and interlocking mechanism. The plate 19^a is the means provided to make the interlocking and target mechanism independent of the switch operating mechanism in order to permit the operating mechanism
 20 to be destroyed under traffic and leave the switch in locked position. A coil spring 24 is confined between the rack 23 and the end of the interlocking plunger guide 19 around the continuation 20^a of the interlocking
 25 plunger 20 so that the end 21 of the interlocking plunger 20 will be made to enter the hole 22 in the interlocking bar 18, automatically, when said hole 22 has reached the proper position.

30 For withdrawing the interlocking plunger 20 from the hole 22 to open the switch, the segmental gear 25 is mounted in the housing 26 in mesh with the rack 23, and has the treadle 27 extending outside the housing 26
 35 so that it may be depressed by the foot of the operative throwing the switch. Preferably a cover 28 is placed over the opening through which the treadle 27 extends and is attached to and moves with said treadle 27.

40 The plunger rod 29 is mounted vertically in the housing 26 and carries at its lower end the stirrup 30 within which is engaged the bell crank extension 31 of the segmental gear 25 so that when the segmental gear 25 is de-
 45 pressed by means of the treadle 27, the bell crank extension 31 rises and carries upward with it the plunger rod 29. This plunger rod 29 is offset at 32 and is preferably provided with the turnbuckle 33 forming part of its
 50 horizontal extension, past which said plunger rod 29 again extends upwardly into the opening 34 in the handle plunger 15, in which it is secured preferably by the nut 35. The
 55 handle plunger 15 is thus raised to the position shown by dotted lines, Fig. 1, by depressing the segmental gear 25 and is allowed to fall again only when the end 21 of the interlocking plunger 20 has been permitted to enter the hole 22 in the interlocking bar
 60 18 under gravity and pressure of the coil spring 24.

The target shaft 36 is rigidly mounted in the yokes 3 along side the main shaft 2, the opening 37 being provided in the yokes 3 to
 65 receive said target shaft 36, thus adapting

the yokes 3 to form supports both for the main shaft 2 as hereinbefore described, and for the target shaft 36 as above stated. The handle plunger 15 has opening 17 through
 70 which the target shaft 36 and main shaft 2 pass. Upon the upper end of the target shaft 36 is mounted the hub 38 rigidly secured thereto preferably by means of
 75 threads 39 and pin 40 passing through the hub and target shaft. Said hub 38 has in its upper part the socket 41 which forms a pivotal bearing for the cam 42. The cam 42 carries rigidly attached to it the target 43
 80 which has the usual blades 44 and 45 signifying closed and open positions, respectively of the switch. It will thus be seen that the target 43 with its blades 44 and 45 operates independently of the main shaft 2 by which
 85 the point rails of the switch are moved. The hub 38 also has the preferably rectangular opening 46 in the lower portion which forms a guide for the operating rod 47
 90 screwed to the handle plunger 15 in threaded socket 48 in its extension 49. The operating rod 47 is also preferably formed rectangular to correspond with the opening
 95 46 and carries near its upper end a roller bearing 50 which engages within the slot 51 of the cam 42, said slot 51 being of such shape that when the handle plunger 15
 100 travels from its lowermost to its uppermost position raising the operating rod 47, the roller bearing 50 will act to revolve the cam 42 and consequently the target 43 with its
 105 blades 44 and 45 through one-quarter of a revolution, thus changing the signal given by the target from "clear" to "danger", indicating that the switch is in unlocked position. It is obvious that the signal of the target cannot
 110 return from "danger" to "clear" position unless the handle plunger 15 has again fallen to its lowermost position and as the handle plunger 15 is controlled through the
 115 plunger rod 29, segmental gear 25 and rack 23 by the interlocking plunger 20 bearing against the interlocking bar 18, said handle plunger cannot fall unless the interlocking
 120 plunger 20 enters the hole 22 in the interlocking bar 18. Therefore it is necessary for the point rail to which the interlocking bar 18 is attached to come closely against
 125 the stock rail of the switch, and thus permit the hole 22 to reach the proper position to admit the end 21 of the interlocking plunger 20 before the target 43 can show a
 130 "clear" signal. The plunger 15 is provided with a lug 52 on one side to enter hole 53 of handle 10 when the switch is in closed position and it is also provided with a lug 52' on the other side to hold the handle 10 out of
 135 position to be locked when the switch is set for siding as shown by dotted lines in Fig. 1. It will therefore be seen that by providing these lugs, it is impossible for an employee to lock the switch by mistake except when it is

in a perfectly closed position and at the same time a right and left switch stand is provided for, with interlocking mechanism to conform with it in either right or left position.

In order to prevent locking of the switch in unsafe position, such as might result from an obstruction being between the point rail and stock rail or the switch disconnected from the switch stand, I provide the handle 10 with a hole 53 in such a position as to receive the lug 52 only when the handle plunger 15 has dropped to its lowermost position which it is permitted to occupy by the entering of the interlocking plunger 20 into the hole 22 in interlocking bar 18, as shown by full lines in Fig. 1. The parts are so proportioned that unless the holes 53 of the handle 10 admits the lug 52 the handle 10 cannot drop to a position whereby the opening 13 in the extension 14 on the opposite end of the handle 10 will admit the bow of the padlock for locking the switch, thus informing the employee that the switch is not in proper position. It will therefore be seen that it is necessary for the lug 52 of the handle plunger 15 to enter the hole 53 of the handle 10 and the interlocking plunger 20 to enter the hole 22 into interlocking bar 18 before the target can show a clear signal and before the switch can be locked, as shown by heavy lines in Fig. 1.

As the target shaft 36 and operating shaft 47 may be of any desired length, the target 43 can be placed sufficiently high to enable employees on a train to see said target, and as said target is at all times controlled by the interlocking apparatus and not by the switch throwing apparatus, it is obvious that there can be no deception to such employees on the train as to the true condition of the switch. Neither will it be possible for the employees on the train who are signaled by an employee who is supposed to have closed the switch and locked it, to be deceived by the signal given by such employee, as they are truthfully informed by the target as to whether such employee had closed and locked the switch in safe position.

The target mechanism, being independent of the switch mechanism, is the same whether the main shaft of the switch throwing mechanism be designed to revolve through a greater or a less degree of movement, it only being necessary to modify the top plate 5 and the handle plunger 15 as illustrated in Figs. 4 and 6, respectively.

Although the target mechanism is entirely independent of the switch throwing apparatus, it forms a perfect index to the completeness of the operation of the switch throwing apparatus, whether the inefficiency of the switch throwing apparatus should be due either to the carelessness of the operative or to some defect or obstruction in the parts of

the switch or switch throwing apparatus which would tend to deceive the operative, such as an obstruction between the point rail and stock rail of sufficient size to leave the switch in a dangerous position while at the same time not being large enough to cause an appreciable amount of opposition to the operative in bringing the handle of the switch around to the position for locking, as is possible with the ordinary form of switch stand. In such ordinary form of switch stand, although the obstruction would be present with all of its possibilities of causing disaster, the switchman, if he did not detect such obstruction by an appreciable increase of force required to close the switch would bring the handle of the switch into position and lock it, the target would falsely indicate a "clear" track and the employee having charge of an oncoming train being guided by the signal shown, would have no knowledge of the obstruction and consequent danger resulting therefrom. The same may be said in case the rod between the main shaft of the switch stand and the point rail should become disconnected. In this case the switch stand could be locked and show the target in clear position, at the same time leaving the switch open, which condition might not be detected by the employee, who is supposed to have thrown the switch, by the consequent less degree of force required to bring the handle of the switch into position for locking.

With my improved switch operating mechanism, the duty of detecting any irregularity in the switch itself is removed from the operative to the interlocking mechanism, which, being allowed only a slight margin of movement and not being subjected to heavy strains, will continuously and unfailingly indicate both the degree and perfection of the work of the operative and the efficiency of the mechanism.

While I have shown and described a peculiar construction herein, I do not wish to be understood as limiting myself to it but

What I claim as new and desire to secure by Letters Patent is:

1. In a switch stand, a main shaft therein adapted to move the point rails of the switch, a handle lever by which said main shaft is revolved, means for locking said handle lever, a target shaft mounted on said switch stand, a target mounted on said target shaft, an interlocking bar slidably mounted and independent of said switch stand and connected to one of said point rails, said interlocking bar having a hole therein, an interlocking plunger slidably mounted and independent of said switch stand adapted to enter said hole, operative connection between said interlocking plunger and said target, means for operating said plunger and for operating said target through said operative connection independently of said main

shaft, and a lug forming part of said operative connection and movable therewith, adapted to engage said handle lever and thereby to control the locking of said handle lever whereby the position of said target and the locking of said handle lever are controlled by the position of said point rail independently of said main shaft.

2. In a switch stand, a main shaft therein adapted to move the point rail of the switch, a handle lever by which said main shaft is revolved, a slot in said switch stand adapted to receive said lever to hold said main shaft stationary, a hole in said lever adapted to receive the bow of a padlock, a target shaft mounted on said switch stand, a target mounted on said target shaft, a handle plunger mounted in said switch stand and vertically slidable therein, operative connection between said handle plunger and said target, an interlocking bar adapted to be attached to the point rail of the switch and to move therewith, an interlocking plunger adapted to engage said interlocking bar to hold it in fixed position, operative connection between said interlocking plunger and said handle plunger provided with means for operating said interlocking plunger manually, and a lug adapted to move with said handle plunger and to engage said handle lever to control the insertion of the bow of a padlock into said opening in said handle lever, whereby the position of said target and the locking of said handle lever are controlled by the position of said point rail independently of said main shaft.

3. In a switch stand, a main shaft therein adapted to move the point rail of the switch, a handle lever by which said main shaft is revolved, a slot in said switch stand adapted to receive said lever to hold said main shaft stationary, a hole in said lever adapted to receive the bow of a padlock, a target shaft rigidly mounted on said switch stand, a cam pivotally mounted on said target shaft, a target rigidly mounted on said cam, a handle plunger mounted in said switch stand and vertically slidable therein, an operating rod attached to said handle plunger, a projection on said operating rod engaging said cam, a projection on said handle plunger adapted to engage said handle lever, an interlocking bar adapted to be attached to the point rail of the switch and to move therewith, an interlocking plunger, operative connection between said interlocking plunger and said handle plunger provided with means for operating said interlocking plunger manually, said interlocking bar having a hole adapted to receive said interlocking plunger whereby said target is allowed to assume a clear position, said interlocking bar and interlocking plunger being slidably mounted independently of said switch stand, said

handle lever having an opening adapted to receive the lug on said handle plunger whereby the bow of the padlock may be inserted in said opening in said handle lever when said interlocking plunger is within said hole in said interlocking bar.

4. In a switch stand, a main shaft therein adapted to move the point rail of the switch, means for revolving said shaft, means for locking said shaft in stationary position, a target mounted on said switch operating mechanism independently of said main shaft, an interlocking bar adapted to be attached to the point rail of the switch, a hole in said interlocking bar, an interlocking plunger adapted to enter said hole in said interlocking bar, said interlocking bar and said interlocking plunger being mounted independently of said switch, operative connection between said interlocking plunger and said target provided with means for operating said interlocking plunger manually therewith, whereby said operative connection is adapted to control the means for locking said main shaft and whereby the position of said target is controlled by the position of said point rail independently of said main shaft.

5. In a switch stand, a main shaft adapted to move the point rails of a switch, a handle lever by which said main shaft is revolved, a target shaft mounted on said switch stand, a target mounted on said target shaft, a plunger slidably mounted in said switch stand and having rotary engaging connection with said target whereby said target is rotated and obstructive engaging means with said handle lever, substantially as and for the purposes set forth.

6. In a switch stand, an interlocking bar connected to the point rail of a switch, a plunger adapted to engage and hold said interlocking bar, a rack secured to said plunger, a segmental gear engaging said rack and having a treadle by which to throw said plunger out of engagement with said interlocking bar and a spring engaging said rack to return said plunger, substantially as and for the purposes set forth.

7. In a switch stand of the character described, a main shaft adapted to move the point rail of a switch, interlocking mechanism connected to and adapted to be moved by the movement of said switch, a target shaft having operative connection with said interlocking mechanism, and yokes adapted to hold said main shaft and said target shaft, substantially as set forth.

8. In a switch stand of the character described, a target shaft, a target mounted in the top thereof, a cam secured to the target and rotatably mounted on the target shaft, an operating rod having means adapted to engage said cam and means for reciprocating

said operating rod longitudinally, whereby said target is revolved, substantially as set forth.

9. In a switch stand of the character described, an interlocking bar having a single opening therein, a plunger adapted to engage within said opening to hold said interlocking bar, a rack secured to said plunger, a segmental gear having a treadle for reciprocating said rack longitudinally, the longitudinal movement of said rack being controlled by said interlocking bar according to the position of said opening, substantially as set forth.

10. In a switch stand of the character described, an interlocking bar, a plunger adapted to engage and hold said interlocking bar, a handle plunger having lugs thereon and means for simultaneously moving said plungers, substantially as and for the purposes set forth.

11. In a switch stand, a main shaft adapted to move the point rails of a switch, an interlocking bar connected to said switch, a plunger adapted to engage and hold said interlocking bar, means for operating said plunger, vertical guides on said switch stand, a handle plunger adapted to engage and move upon said vertical guides, and lugs upon said handle plunger, substantially as and for the purposes set forth.

12. In a switch stand of the character described, switch throwing and interlocking mechanism, a target shaft, a cam having a spiral groove therein mounted and adapted to revolve thereon, a target on said cam, an

operating rod adapted to be reciprocated lengthwise thereof and having a bearing adapted to traverse said spiral groove to revolve said target, substantially as set forth.

13. In a switch stand, a main shaft adapted to move the point rails of a switch, a target shaft independent of said main shaft, a target mounted on said target shaft, a handle plunger adapted to engage the handle, an interlocking bar adapted to be attached to the point rail and to move therewith, an interlocking plunger adapted to engage and hold said interlocking bar, means whereby the movement of said handle plunger and target is controlled by said interlocking plunger and means whereby the locking of said main shaft in stationary position is controlled by said handle plunger, substantially as set forth.

14. The combination with a switch stand of the character described, of an interlocking bar having a hole therein, an interlocking plunger adapted to enter said hole, a guide for said interlocking plunger mounted independently of said switch stand, and operative connection between said switch stand and said interlocking plunger capable of automatic disengagement, whereby displacement of said switch stand will not be communicated to said interlocking plunger, substantially as set forth.

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