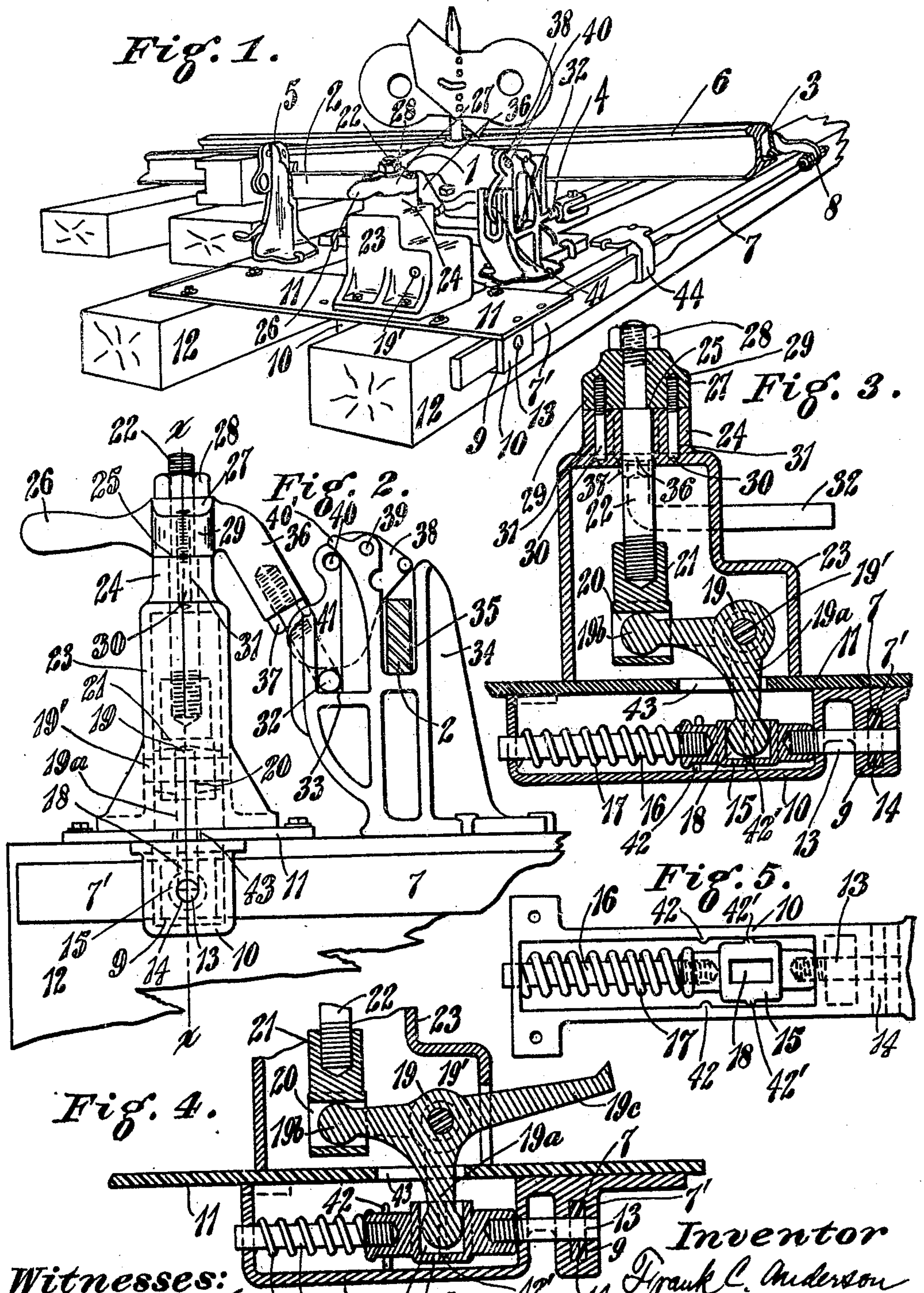


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 SWITCH INTERLOCKING MECHANISM.  
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# UNITED STATES PATENT OFFICE.

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## SWITCH-INTERLOCKING MECHANISM.

946,952.

Specification of Letters Patent. Patented Jan. 18, 1910.

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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-Interlocking Mechanism, 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 means whereby an employee in operating the switch to close it cannot lock the switch stand should there be an obstruction between the point rail and the stock rail preventing the point rail from bearing against the stock rail, or should the switch be disconnected from the switch stand, and also to provide means whereby the switch stand with target and operating mechanism may be destroyed under traffic and leave the point rails in locked position.

My invention consists in the combination with a switch stand and the operating lever thereon, of a latch to engage the lever, means for locking the latch, an arm adapted to engage the latch, an interlocking plunger operatively connected to the arm, and an interlocking bar secured to the point rail of the switch and having an opening adapted to receive the interlocking plunger, said arm being adapted to prevent the locking of the latch, except when said plunger is in the opening in said interlocking bar.

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

In the drawing: Figure 1 is a perspective view showing my improved switch interlocking mechanism installed in connection with an ordinary switch stand. Fig. 2 is a side elevation of the latch and its stand, and the latch engaging arm and its housing, together with the adjacent part of the interlocking bar. Fig. 3 is a cross section on the line  $x-x$  of Fig. 2, the latch and its stand being omitted. Fig. 4 is a partial cross section on a line corresponding to the line  $x-x$  of Fig. 2, illustrating the mechanism as being provided with a treadle. Fig. 5 is a plan view of part of the interlocking plunger casing with the plunger and its spring therein.

As illustrated, my improved device is installed in connection with an ordinary switch stand 1 which has a throwing lever 2, this throwing lever being adapted to operate the inside mechanism of the stand, which is connected to the point rail 3 of the switch by means of a connecting rod 4, so that when the throwing lever 2 is operated the switch will be opened or closed. With the lever 2 in position as illustrated in Fig. 1, the switch is in open position and the lever is resting in an ordinary latch 5. As is well known, when the lever 2 is thrown to the other side the switch will be closed, but, as is also well known, in order to make the switch thoroughly safe in closing it, it is necessary to draw the point rail 3 closely against the stock rail 6, so that the flanges of the wheels passing over the track will not strike the end of the point rail or otherwise be diverted to throw the train from the track. Switchmen, when hurrying with their work, are liable to forget this important necessity, so that should there be an obstruction between the point rail and the stock rail, or should the point rails, or any part of the switch, be damaged in such a way as to prevent close contact of the point rail with the stock rail, the switchman, with the mechanical advantage afforded him by the leverage of the throwing lever, is liable to force these parts, not noticing the increased power necessary to do this, with the result that he may lock the stand while the point rail is held away from the stock rail by an obstruction, or other cause, with the danger as above noted. On the other hand, should the switch stand mechanism be disconnected from the point rail, the switchman might operate the switch stand and lock it without noticing the decreased power necessary to do so, with the result that the switch would be left entirely open, with equal danger. It will also be noted that if the switch stand and its operating mechanism is torn loose from its foundation, such as by the striking of an object thrown or falling from a train, as often occurs, there will be nothing to hold the point rail against the stock rail, so that this destruction of the switch stand is very likely to result in derailing a train. It is therefore desirable to provide a means for maintaining the point rail in its proper position independently of



the operating mechanism of the switch stand, and in such position that it cannot be disturbed through any ordinary accident.

I avoid all of the difficulties above enumerated by providing an interlocking bar 7 connected to the point rail 3 at 8 and having a flat part 7' which slides in a slot 9, transversely through the end part of a casing 10 which is mounted on the lower side of a plate 11 and embedded in one of the sleepers 12 upon which the switch stand and other mechanism is mounted. This casing 10 is elongated at right angles to the interlocking bar 7 and forms a guide and inclosure for the interlocking plunger 13, one end of which is adapted to enter an opening 14 in the interlocking bar 7. It will be noted that when the end of the interlocking plunger 13 is in the opening 14 in the interlocking bar 7, the interlocking bar will be prevented from movement and thus will hold the point rail 3 in stationary position. This opening 14 in the interlocking bar 7 is so positioned that when the interlocking plunger 13 is inserted therein the point rail is held closely against the stock rail 6.

The interlocking plunger 13 is provided with a block 15 to which it is attached at one end, and to the other end of this block 15 a guide rod 16 is attached, which passes through and is guided by the other end of the casing 10. Surrounding the guide rod 16 and confined between the end of the casing through which the guide rod passes, and the adjacent end of the block 15, is a helical spring 17 which tends to force the block 15 against the other end of the casing and maintain the interlocking plunger 13 in the opening in the interlocking bar 7. The block 15 is provided with an upwardly opening slot 18, and for withdrawing the interlocking plunger 13 from the opening in the interlocking bar 7 when it is desired to operate the switch, a bell crank 19 is mounted to swing in a vertical plane with one of its arms 19<sup>a</sup> in the slot 18 of the block 15 and the other of its arms 19<sup>b</sup> in the slot 20 of a head 21. This head 21 is attached to the vertically extending rod 22 which passes through the upper side of a housing 23, this housing serving as an inclosure for the bell crank 19 and the head 21, and supporting a transverse pin 19' upon which the bell crank turns. The rod 22 is screwed into the head 21, and the interlocking plunger 13 and the guide bar 16 are screwed into the block 15.

The casing 23 is provided with a boss 24 at its top where the rod extends through it and this rod 22 above the boss is diminished in size so that it has a shoulder 25, and a handle 26 has a hub 27 which fits onto this diminished part of the rod 22 against the shoulder 25 and is held down by a nut 28.

The hub 27 of the handle has laterally ex-

tending wings 29 into which pins 30 are screwed to extend vertically parallel to the rod 22, while the boss 24 has corresponding lateral extensions provided with openings 31 in which the pins 30 may slide vertically. With this arrangement, the handle 26 may be grasped to raise the rod 22 and the head 21 thereon, upon which the vertical motion thereof will be transmitted through the bell cranks 19 to the block 15 with the result that the interlocking plunger 13 moves horizontally against the pressure of the helical spring 17 and is withdrawn from the opening in the interlocking bar 7, which will allow the switch to be thrown. The pins 30 sliding in the openings 31 serve to prevent any slight turning of the handle with the rod 22 and head 21 which might be permitted by the somewhat loose connection between the head 21 and the arm 19<sup>b</sup> of the bell crank. This turning of the handle is prevented for the reason that the handle is required to maintain an arm 32 in a yoke 33 of a double-yoked latch stand 34, the other yoke 35 of which receives the throwing lever 2 of the switch stand. This arm 32 extends horizontally through the yoke and is bent upwardly in an inclined direction and screwed into a downwardly inclined lug 36 on the hub 27 of the handle 26. A lock nut 37 is provided to hold the arm 32 firmly in the lug 36, this arrangement permitting the arm to be adjusted in the lug. Should the handle be allowed to turn slightly the arm 32 might be drawn laterally from the yoke 32 of the latch stand. This arm 32 within this yoke is only allowed to slide vertically therein when the handle 26 is raised to withdraw the interlocking plunger 13 from the locking bar 7, and to cause this arm 32 to engage with the latch 38 which is pivoted at 39 in the upper part of the latch stand, and has a projection into the yoke 35 which receives the throwing lever 2, and also has a projection with an opening under an ear 40' of the stand to receive the bow of a lock for locking the switch stand. In order that this latch 38 may be engaged by the arm 32, it has a backward downward extension 41 into the yoke 33 over the arm 32.

The parts are so proportioned that when the handle 26 is raised, withdrawing the interlocking plunger 13 from the interlocking bar 7, the downward rearward extension 31 of the latch 38 will be raised, withdrawing it from the yoke 35 to allow the switch throwing lever 2 to be thrown, opening the switch. Then, when the switch is opened, the interlocking bar 7 will have been drawn to such position that its opening 14 no more aligns with the interlocking plunger 13. Thus the plunger cannot enter the opening and will bear against the side of the interlocking bar, while the helical spring 17 will remain compressed and the handle 26 will



remain in raised position, due to its operative connection with the plunger thus held back. The handle being in raised position, the arm 32 will also be raised and this arm  
 5 will engage with the backward downward extension 41 of the latch 38 and will prevent the latch from swinging into such position that it may receive the bow of the lock in the opening 40 therein. Now, when it is  
 10 desired to close the switch and the lever 2 is thrown back into the yoke 35 of the latch stand 34, if, for any reason, the point rail 3 has not been brought tightly against the stock rail 6, the opening 14 in the interlocking  
 15 bar 7 will not be brought into alinement with the interlocking plunger 13 and the interlocking plunger cannot be moved to allow the handle 26 to come down, and the arm 32 on the handle, holding the rearward  
 20 part of the latch 38 up, will not allow the insertion of the bow of the lock into the opening 40. When it is impossible to lock the switch stand, the switchman will be sure to notice this fact, and will see that the cause  
 25 for the failure of the complete closing of the switch is removed.

Where it is desired to provide for operating the interlocking mechanism with the foot as well as with the hand, the bell crank  
 30 19 may be provided with a third arm 19<sup>c</sup> extending outside the housing 23 to form a treadle for the engagement of the foot, thus operating the bell crank directly and raising the arm 32 through the medium of the  
 35 rod 22 in the head 21 with which the arm 19<sup>b</sup> of the bell crank engages. The other arm 19<sup>a</sup> will operate the interlocking plunger 13 in the usual manner. This construction is best illustrated in Fig. 4 of the drawing.

The casing 10 is provided interiorly with lugs 42 and the block 15 has lugs 42' adapted to engage with the lugs 42 to limit the  
 45 backward movement of the interlocking plunger 13, and prevent its withdrawal from its guide in the end of the casing. The housing 23 is mounted on the upper side of the plate 11, this plate being provided with a slot 43 through which the arm 19<sup>a</sup> of the  
 50 bell crank extends. The plate 11 is spiked or screwed to the sleepers 12 on which the switch stand is supported, and the double-yoked latch stand 34 is secured to one of the sleepers 12 adjacent to the plate 11 in the  
 55 usual manner. Preferably, an additional guide 44 is provided for the interlocking bar 7, the flat part 7' of which passes through this guide 44. It will be seen that, with this construction, the casing 10, on the  
 60 lower side of the plate 11 which is secured to the sleeper 12, is entirely out of position for ready contact of passing objects on trains, and thus is not liable to be disturbed. It will also be noted that the interlocking  
 65 bar 7 is below the upper side of the sleeper

12 and thus also out of position for being disturbed in a similar manner. The interlocking plunger, when it is in the opening  
 14 in the interlocking bar 7, will maintain the switch in closed position entirely inde-  
 70 pendent of the mechanism above the plate 11. Therefore, the switch stand, latch stand, and even the housing 23, may be knocked off their foundations without disturbing this interlocking plunger 13, the  
 75 arm 19<sup>a</sup> of the bell crank, in such case, merely being withdrawn from the slot 18 in the head 15 of the interlocking plunger 13 without resistance.

From the above description, it will be  
 80 noted that 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  
 85 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. At the  
 90 same time, the parts essential for insuring a closed switch are entirely out of the way of passing objects and liability of destruction of these parts almost entirely eliminated.

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 switch interlocking mechanism, the combination with a switch stand adapted to move the point rails of a switch, and a throwing lever by means of which said  
 105 switch stand is operated, of an interlocking bar attached to one of the point rails and provided with an opening, an interlocking plunger adapted to enter said opening, a latch to retain the throwing lever having means for locking it, and an arm operatively  
 110 connected to said interlocking plunger adapted to prevent the locking of the latch except when said plunger is in said opening, substantially as and for the purposes set forth.

2. In switch interlocking mechanism, the  
 115 combination with a switch stand adapted to move the point rails of a switch and a throwing lever by means of which said switch stand is operated, of an interlocking bar attached to one of the point rails, a casing, a  
 120 plunger slidable in the casing, the interlocking bar having an opening and the plunger being adapted to enter the opening, a housing, a bell crank adapted to turn in the housing, a rod slidable in the housing, an arm attached to and adapted to move with the rod, said bell crank having operative engagement with said rod and with the plunger in the casing, and a latch to retain said throwing  
 125 lever having means for locking it, said arm



being adapted to engage with said latch to prevent the locking of the latch except when said plunger is in said opening, substantially as and for the purposes set forth.

5 3. In switch interlocking mechanism, the combination with a switch stand adapted to move the point rails of a switch, and a throw-  
 10 ing lever by means of which said switch stand is operated, of an interlocking bar attached to one of the point rails and provided  
 15 with an opening, an interlocking plunger adapted to enter said opening, an arm operatively connected to said interlocking plun-  
 20 ger, a double-yoked latch stand, said arm extending into one of the yokes thereof and the other yoke being adapted to receive the  
 25 throwing lever, and a latch pivotally mounted in the latch stand having projections into both the yokes thereof and being provided  
 with an opening to receive the bow of a lock, said arm being adapted to engage with the latch, whereby the bow of the lock is pre-  
 vented from being inserted in the opening in the latch except when said interlocking plun-  
 ger is in the opening in said interlocking bar, substantially as and for the purposes set forth.

4. In switch interlocking mechanism, the combination with a switch stand having  
 30 means for moving the point rails of a switch, and means for locking said switch stand to prevent movement of the point rails, of an  
 35 interlocking bar attached to one of the point rails, a casing having a slot in which the interlocking bar slides, an interlocking plun-  
 40 ger, the casing having an opening in which the plunger slides, and the interlocking bar having an opening adapted to come in aline-  
 45 ment with the opening in the casing to admit the plunger, a block secured to the plunger inside the casing, a guide bar secured to the  
 block, the casing having an opening in which the guide bar slides, a spring engaging the block and the interior of the casing and  
 50 adapted to insert the interlocking plunger into the opening in the interlocking bar, and operative connection between the block and the means for locking the switch stand,  
 substantially as and for the purposes set forth.

5. In switch interlocking mechanism, the combination with a switch stand adapted to move the point rails of a switch, a throwing  
 55 lever by means of which said switch stand is operated, an interlocking bar attached to one of the point rails and provided with an open-  
 60 ing, an interlocking plunger adapted to enter said opening, an arm operatively connected to said interlocking plunger, of a dou-  
 65 ble-yoked latch stand, one yoke of which is adapted to receive the throwing lever and the other yoke to receive said arm, a latch  
 pivoted in the latch stand having a projection adapted to engage with the throwing lever, and another projection adapted to en-

gage with said arm, an ear on the latch stand and an opening in the latch to receive the bow of a lock, whereby said latch may be locked in position to hold the throwing lever in the yoke of the latch stand, the arm being  
 70 adapted to engage with the latch to hold said opening behind said ear except when said interlocking plunger is in the opening in said interlocking bar, substantially as and  
 75 for the purposes set forth.

6. In switch interlocking mechanism, the combination with a switch stand and sleep-  
 80 ers on top of which the switch stand is mounted, the switch stand having a throw-  
 ing lever, and being operatively connected to the point rails of a switch, a latch on  
 85 top of the sleepers, a housing mounted on top of the sleepers, a rod vertically movable in the housing, and an arm attached to the  
 rod adapted to engage with said latch to control the position thereof, of an inter-  
 90 locking bar also attached to the point rails of the switch and having an opening there-  
 in, and an interlocking plunger adapted to enter the opening, said plunger being oper-  
 95 atively connected to the vertically movable rod, said housing and the interlocking bar and interlocking plunger being mounted be-  
 low the tops of said sleepers, substantially as and for the purposes set forth.

7. In switch interlocking mechanism, the combination with a switch stand having  
 100 means for moving the point rails of a switch, and means for locking it, of an interlocking bar attached to one of the point  
 105 rails, and provided with an opening, an interlocking plunger adapted to enter said opening, a housing, a rod slidable vertically  
 in the housing, an arm attached to and adapted to move with the rod and adapted  
 110 to engage with the means for locking the switch stand, a head on the rod, and a bell  
 crank adapted to engage with the head and adapted to engage to withdraw the inter-  
 locking plunger from the opening in the interlocking bar, substantially as and for  
 the purposes set forth.

8. In switch interlocking mechanism, the combination with a switch stand having  
 115 means for moving the point rails of a switch and means for locking it, and a throwing  
 lever by means of which said switch stand is operated, of an interlocking bar attached  
 120 to one of the point rails and provided with an opening, a casing having a slot in which  
 the interlocking bar slides and having an opening with which the opening in the in-  
 125 terlocking bar is adapted to come in aline-  
 ment, a plunger slidable in the opening in the casing, a block attached to the plunger,  
 and a guide bar attached to the block, the casing having an opening in which the guide  
 130 bar slides, a spring engaging with the block and with the interior of the casing to insert  
 the plunger into the opening in the inter-



locking bar, when it is in alinement with the opening in the casing in which the plunger slides, a plate on the under side of which the casing is mounted, and a sleeper on which the plate is mounted, the casing and said interlocking bar being below the top of said sleeper, a housing on the upper side of the plate, a bell crank adapted to turn in the housing and detachably engaging with the head attached to the plunger, the plate having a slot through which the bell crank extends, and operative connection between the bell crank and the means for locking the switch stand, substantially as and for the purposes set forth.

9. In switch interlocking mechanism, the combination with a switch stand adapted to move the point rails of a switch, and a throwing lever by means of which said switch stand is operated, of an interlocking bar attached to one of the point rails, an interlocking plunger adapted to engage with the interlocking bar, a housing, a rod slidable in the housing, a bell crank forming operative connection between said bar and the plunger, a hub on the bar, a handle on the hub, an arm secured to the hub adapted to engage with the means for locking the switch stand, and means for preventing the turning of the hub when the rod is slid in the housing by means of the handle, whereby said arm is maintained in position to engage with the means for locking, substantially as and for the purposes set forth.

10. In switch interlocking mechanism, the combination with a switch stand adapted to move the point rails, of a switch, a throwing lever by means of which said switch stand is operated, a double-yoked latch stand to receive the throwing lever, and a latch therein to retain the throwing lever, said latch being provided with means for locking it, of an interlocking bar attached to one of the point rails, an interlocking plunger adapted to engage with the interlocking bar, a rod operatively connected to the interlocking plunger, a handle attached to the rod, an arm attached to the rod extending into one of the yokes of the latch stand and adapted to engage therein with the latch, and means for preventing the turning of the rod and the handle and arm attached thereto, substantially as and for the purposes set forth.

11. In switch interlocking mechanism, the combination with a switch stand having means for moving the point rails of a switch, and means for locking said switch stand, of an interlocking bar attached to one of the point rails and provided with an opening, an interlocking plunger adapted to enter said opening, a casing in which said plunger is slidably mounted, a block, within said casing, attached to said plunger, a guide bar attached to the block and slidable in the casing, a spring engaging with the block and

with the interior of the casing to insert the plunger into the opening in the interlocking bar, operative connection between the block attached to the plunger and the means for locking the switch stand, and engaging means between the block and the interior of the casing to limit the movement of the interlocking plunger, substantially as and for the purposes set forth.

12. In switch interlocking mechanism, the combination with a switch stand having means for moving the point rails of a switch, and means for locking said switch stand, of an interlocking bar attached to one of the point rails, an interlocking plunger adapted to engage with said interlocking bar, a housing, a rod vertically slidable in the housing, operative connection between the rod and the interlocking plunger, a hub on the rod, a handle on the hub, an arm attached to the hub adapted to engage with the locking mechanism of the switch stand, and pins forming slidable engaging means between the hub and the housing to prevent the turning of the hub and maintain the arm in engagement with the means for locking the switch stand when said rod is slid by means of the handle, substantially as and for the purposes set forth.

13. In switch interlocking mechanism, the combination with a switch stand having means for moving the point rails of a switch, and means for locking said switch stand, of an interlocking bar attached to one of the point rails, an interlocking plunger adapted to engage with said interlocking bar, a housing, a rod vertically slidable in the housing, operative connection between the rod and the interlocking plunger, a hub on the rod, a lug on the hub, an arm secured in the lug, and means for adjusting said arm in said lug, the arm being adapted to engage with the means for locking the switch stand, substantially as and for the purposes set forth.

14. In switch interlocking mechanism, the combination with a switch stand adapted to move the point rails of a switch, and a throwing lever by means of which said switch stand is operated, of a latch to retain the throwing lever having an opening to receive the bow of a lock to lock it, a sleeper on which said switch stand and latch are mounted, an interlocking bar attached to one of the point rails and provided with an opening, an interlocking plunger adapted to enter said opening, a casing in which said interlocking plunger is slidable, said casing and the plunger therein and the interlocking bar being below the top of the sleeper, a housing mounted above the sleeper, a bell crank adapted to turn in the housing and having an arm in detachable engagement to slide the plunger in the casing, a rod slidable vertically in the housing, a head on the rod, another arm of the bell crank being in engage-



ment with said head, a hub on the rod above  
the housing, a handle on the hub, a lug on  
the hub, an arm secured in the lug, means  
for adjusting the arm in the lug, said arm  
5 being adapted to engage with said latch to  
hold it in position to prevent the insertion of  
the bow of the lock into the opening therein  
unless said interlocking plunger is in the  
opening in said interlocking bar, and pins  
10 forming slidable engagement between said

hub and said housing to prevent the turning  
of the hub and said arm when the rod is  
slid in the housing by means of said handle,  
substantially as and for the purposes set  
forth.

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