(No Model.) 3 Sheets—Sheet 1.

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SWITCH AND SIGNAL APPARATUS.

No. 342,907. Patented June 1, 1886.

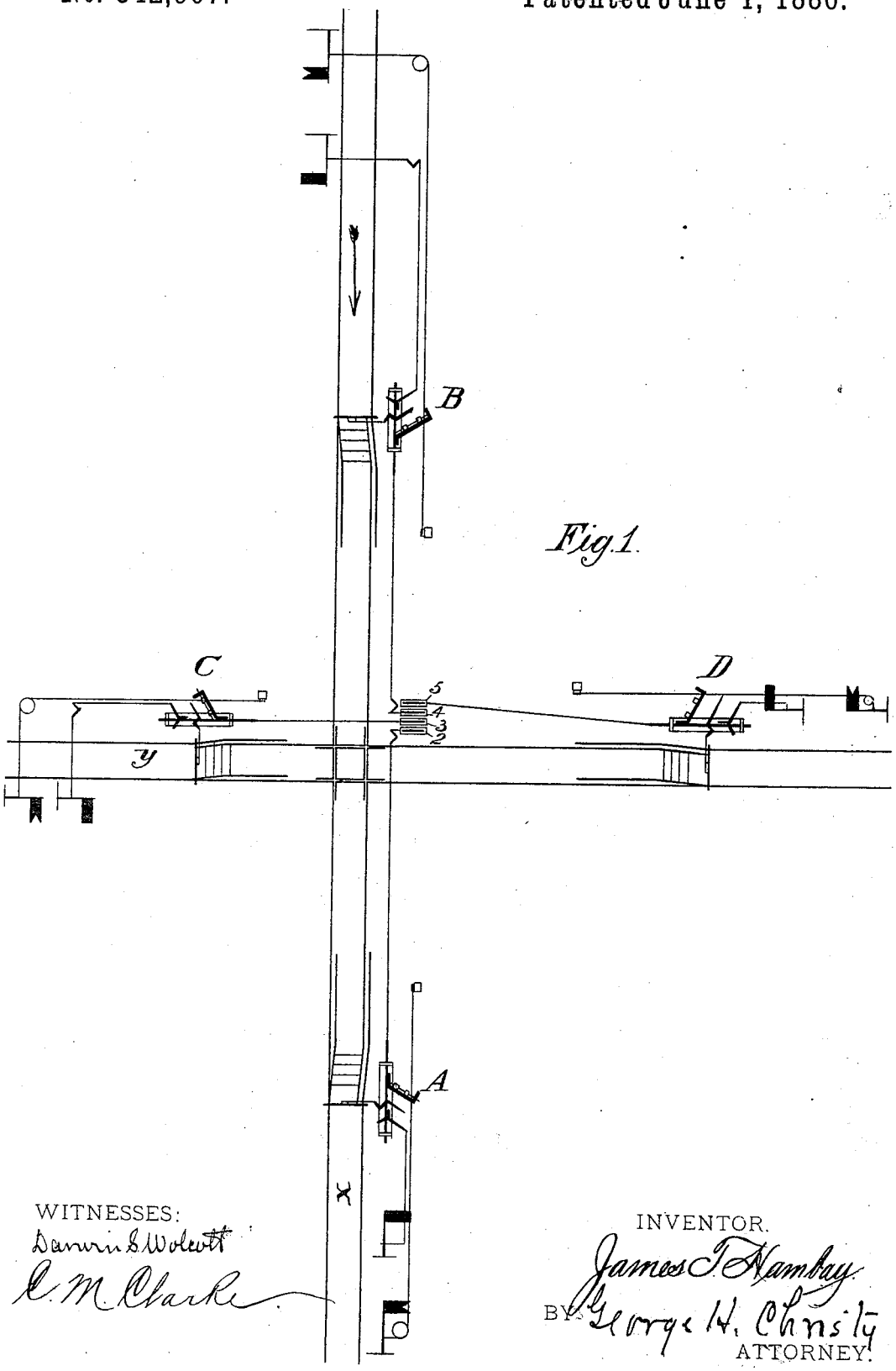

Fig. 1.

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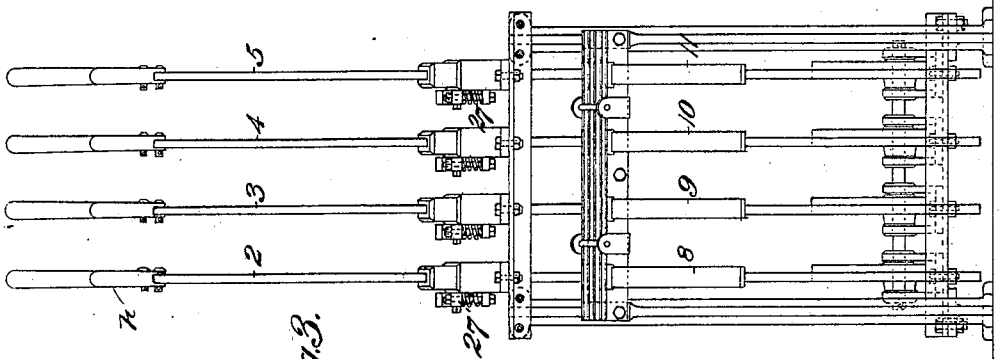

Fig. 3.

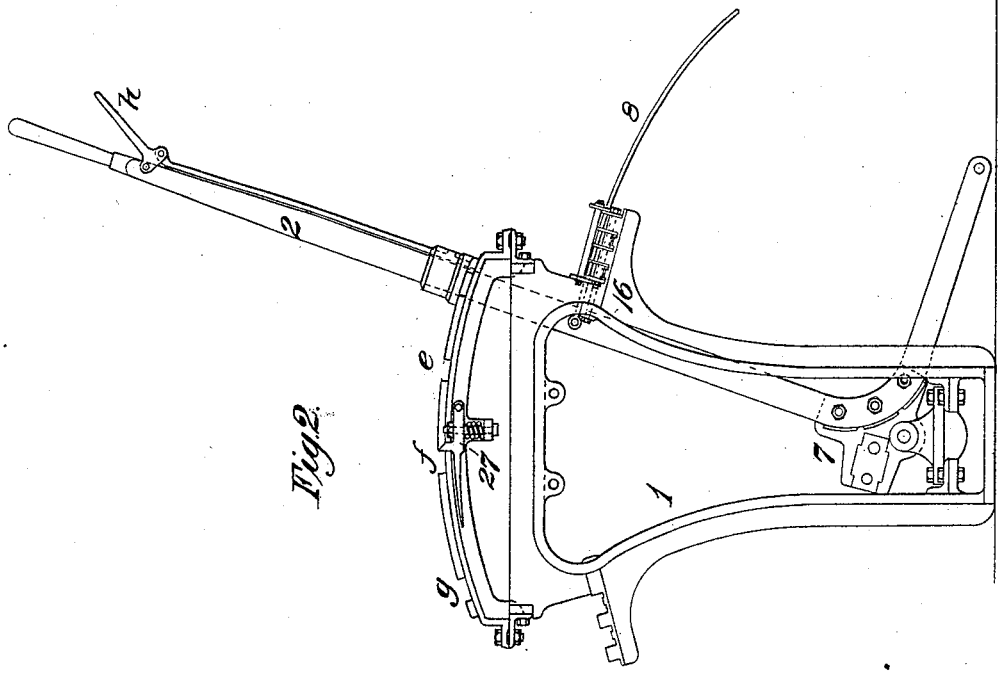

Fig. 2.

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SWITCH AND SIGNAL APPARATUS.

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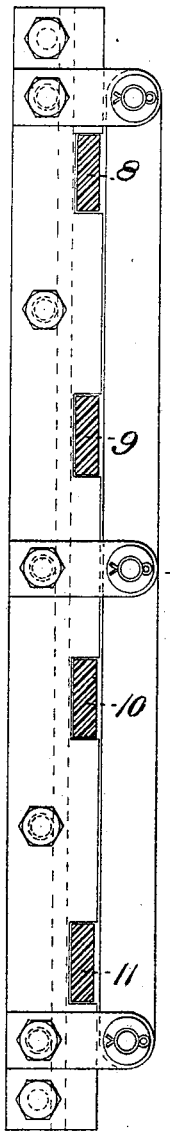

Fig. 6.

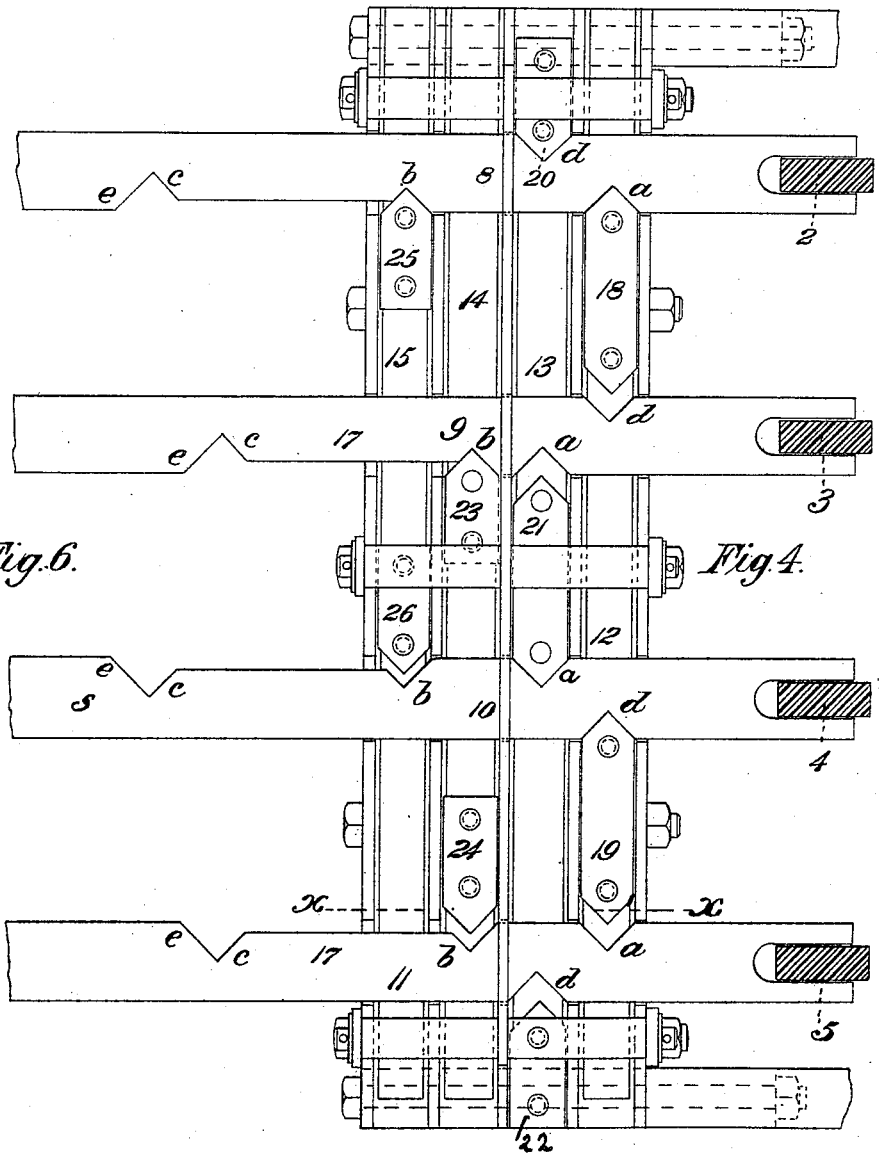

Fig. 4.

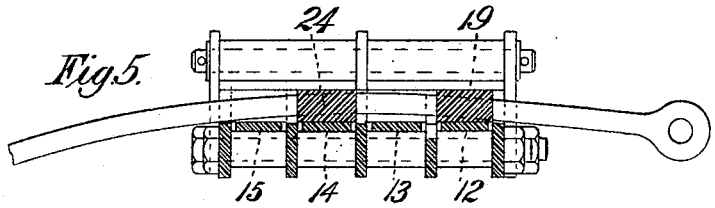

Fig. 5.

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JAMES T. HAMBAY, OF PITTSBURG, PENNSYLVANIA.

SWITCH AND SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 342,907, dated June 1, 1886.

Application filed June 11, 1885. Serial No. 168,351. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. HAMBAY, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Switch and Signal Apparatus, of which improvements the following is a specification.

In the accompanying drawings, which make part of this specification, Figure 1 is a diagrammatic view of a railroad-grade crossing, showing the arrangement of the derailing switches, the signal-station, and the switch and signal operating mechanisms. Fig. 2 is a view in side elevation of my improved interlocking apparatus. Fig. 3 is a rear elevation of the same. Fig. 4 is a top plan view of the interlocking mechanism. Fig. 5 is a sectional view, the section being taken on the line *x x*, Fig. 4. Fig. 6 is a side elevation of the locking mechanism, the locking-bars being shown in section.

The invention herein relates to certain improvements in interlocking apparatus employed for the operation of switches and signals through the medium of switch and signal interlocking mechanism located at or within convenient proximity of the switch, and my invention has for its object such a construction of the operating mechanism that only two lever movements will be necessary for the setting of switches and their guarding-signals so as to clear one line of track at a crossing, and the locking of the switches and signals of the other line of track at "danger," and also to prevent the setting of the switches and signals in such position as to clear one line of track until the signals of the other line have been set to "danger."

The frame 1 is of the usual form and construction employed in interlocking apparatus, and is provided with a segmentally-shaped top having notches *e*, *f*, and *g*, and provided with slots, through which pass the levers 2, 3, 4, and 5. Each of these levers has its lower end bent at an angle to the vertical portion, and is secured to a block, 7, pivotally mounted on a shaft secured in the lower part of the frame 1, said blocks being provided with a socket for the reception of a counter-weight.

The levers 2, 3, 4, and 5 are provided with the usual catch devices, operated by the levers *h*, said catches being adapted to engage the notches *e*, *f*, and *g*. To these levers 2, 3, 4, and 5 are attached locking-bars 8, 9, 10, and 11, which project rearward through the frame, and are supported on sliding bars 12, 13, 14, and 15, mounted in a frame secured to brackets 16, formed on the frame 1. One edge of each of the locking-bars is provided with V-shaped notches *a*, *b*, and *c*, the last two being located at the ends of cut-away or recessed portions 17 of the bars, and the opposite edge of each locking-bar is provided with a V-shaped notch, *d*. These notches *a*, *b*, *c*, and *d* are located in such positions along the bars as to permit of the insertion therein of the blocks 18, &c., secured to the sliding bars, and having one or both ends of a shape corresponding to the shape of the notches. The notches *b* in each of the locking-bars are of a less depth than the other notches in the bars, and will therefore permit of such movements of the blocks 23 and 24 or 25 and 26 when in line with said notches as will enable the locking-bars to move the length of their recessed portions 17; but the nothes *c* are of sufficient depth to permit of a full movement of the blocks when in line therewith, and consequently the locking-bars can be moved a full stroke. The lower bent ends of the levers 2, 3, 4, and 5 are connected by any suitable means known in the art to the interlocking switch and signal operating mechanisms A B C D, located in convenient proximity to the derailing-switches in the tracks X and Y on each side of the crossing of said tracks.

This interlocking switch and signal operating mechanism is so constructed that the switch-rails' home and distant signals are shifted and locked in orderly succession by the progressive movement of a slide—that is to say, the signals are normally locked at "danger," and remain in that condition until by the movement of the slide the switch-rails have been shifted and locked. Then by the continued movement of the slide the home signal is shifted and locked; and, finally, the distant signal, which has been locked during the previous movements, is shifted and locked.

For a full and exact description of this interlocking switch and signal operating mechanism reference should be had to application No. 152,609, filed by me January 12, 1885.

Before describing the operation of the levers and their adjuncts it should be stated that a stroke or movement of each lever to the first notch, *e*, effects only such movement of the switch and signal operating mechanism connected thereto as will shift and lock the switch-rails without changing the signals from their normal or danger position, the shifting of the levers to notch *f* will shift the switch-rails and home signal, and that a full stroke of each lever to notch *g* will shift its switch and both signals. The levers 2 and 4 are connected to the switch and signal mechanisms A and B, and the levers 3 and 5 to the mechanisms C and D. The normal position of the levers is to the right of the frame, as shown in Fig. 2, their switch and signal mechanisms being in such positions as to hold the switch-rails in line with the derails and all the signals at "danger." If it be desired to clear the line X for a train moving in the direction of the arrow *x*, the operator will move the lever 2 to the first notch of the segment, drawing with it the locking-bar 8, and so operating the mechanism A as to set the switch-rails adjacent to that mechanism in line with the rails of the main track. This movement of the locking-bar 8 will force the blocks 18 and 25 with their slides 12 and 15 to the left, and the block 20 with its slide 13 to the right, (see Fig. 3,) the movement of the slide 12 causing the block 19 to move out of the notch *d* in locking-bar 10 and into notch *a* of bar 11, thereby locking said bar 11. The movement of the slide 13 will shift the blocks 21 and 22 so as to engage the bars 9 and 11, the block 21 moving out of the notch *a* of the bar 10, and the movement of the slide 15 will cause the block 26 to enter the notch *b* of the bar 10. This stroke of the lever 2 moves the locking-bar sufficiently far to bring its notch *c* in line with the block 25, at which point the movement of the bar and lever are stopped by the shoulder *e*, formed by the outer wall of the notch *c* abutting against the block 25, which was shifted only sufficiently far to clear the short wall of the recess *b*, the movement of said block being sufficient, however, to force the block 26 into the notch *b* of bar 10, thereby preventing any further movement of the block 25 when struck by the shoulder *e*. It will be observed that by the shifting of the blocks 21 and 22 into engagement with the bars 9 and 11 effectually locks such bars and their levers 3 and 5 until the bar 8 is returned to its original position, as there is only one notch on the same edge, as the notch *d*, from which the block 20, connected to same slide as the blocks 21 and 22, was forced by the first movement of the bar 8. After the lever 2 has been moved to half-stroke, effecting the various locking and interlocking movements above stated, the lever 4 and its bar 10, which has been freed from engagement with all the blocks except the block 26, is also moved, thereby shifting the switch rails and signals operated by the mechanism B into line with the rails of the main track. This movement of the bar 10 shifts the block 26 and its slide 15 to the left, the notch *c* in the bar 8 being in line with the block 25 on the slide 15. A stroke of the lever 4 would bring the notch *c* of the bar 10 into the plane of movement of the block 26, and as the notches *c* on these bars 8 and 10 are of sufficient depth to permit of such a shifting of the blocks 25 and 26 on the bar 15 as to allow the shoulders *e*, formed by the outer walls of the notches *c* on both bars 8 and 10 to pass by the blocks 25 and 26, either one of said bars can be moved a full stroke. As the train in this instance is supposed to be moving in the direction of the arrow, the signals operated by the mechanism B should be set so as to clear the track X. This change of the signals is effected through said mechanism by moving the lever 4 the full length of its stroke, as above stated. This movement of the lever 4 causes the slide 15 and its blocks 25 and 26 to move to the left in Fig. 3, the block 25 fully entering the notch *c* in the bar 8, thus locking said bar, the lever 2, and its connections. To restore the parts to normal position, the lever 4 is thrown clear back the full amount of its stroke, thereby shifting the switch-rails and signals operated by the mechanism B to "danger," and the bar 10 to such a position that its notch *b* will be in line with the block 26, which is forced into said notch when the lever 2 is thrown back from the position to which it was first moved, thereby shifting the mechanism A and the switch-rails operated thereby to normal position and the locking-bar 8 to such a position that its notches *a*, *b*, and *d* will be in line with the blocks 18, 25, and 20, respectively. The return movement of the lever 4 moves the locking-bar 10 to such a position as to bring its notches *a* and *d* in line with the blocks 21 and 19. While the levers 2 and 4 and their locking bars 8 and 10 are in their normal position, as shown in Figs. 1 and 3, the levers 3 and 5 may be operated in a manner similar to that described in connection with the levers 2 and 4. It will be observed that the sliding bars 12 and 13, with their blocks, serve to lock one set of levers—as, for example, 3 and 5—while the levers 2 and 4 are in operation, and that the sliding bar 15 serves as the locking device between the levers 2 and 4, and, while permitting sufficient movement of one of the levers to set the switch-rails, prevents such a movement as will set the signals until the other lever has been moved far enough to shift its switch, and when both switch-rails have been shifted to proper position either one of the levers can be moved to set the proper signals. The sliding bar 14, with its blocks 23 and 24, effects the same locking functions as regards the locking-bars 9 and 11. It will be observed that either one of the levers of a set may be

moved to the first notch, *e*, and in practice I prefer first to move that lever which in the operation of clearing one line of track is not moved beyond half-stroke, and then shift the other lever a full stroke—as, for example, if a train is moving along the line of track X in the direction of the arrow, the lever 4 should be first moved to half-stroke, and then the lever 2 can be moved its full stroke, effecting during its full stroke the locking of the lever 4 at half-stroke. Thus it will be seen that only two lever movements are necessary to set the switches and signals in proper position to clear one line of track and to lock the similar parts of the crossing-line of track.

The slide 12, with its blocks 18 and 19, serves as between stroke-locks—as, for example, if the lever 4 and its locking-bar 10 be moved the blocks 21 and 22 will be forced into the notches *a* and *d* in the bars 9 and 11 and the blocks 18 and 19 in the notches *d* and *a* of the bars 9 and 11. Now, if the bar 10 should for any reason be stopped when the notch *b* is opposite the block 21, it is obvious that either of the levers 3 or 5 could be pulled over, as the block 21 could then be shifted; but this movement of the levers 3 and 5 is prevented by the blocks 18 and 19. The same accidental movement of the levers 2 and 4 could occur were it not for the blocks 18 and 19 while the lever 3 is being operated. After the train has passed the distant signal the rear of the train is protected by throwing the lever 4 from the notch *g* to the notch *f*. Such movement of the lever 4 moves the slide of the switch and signal mechanism at B to throw the distant signal to "danger," but does not alter the position of the home signal and switch, and in order to prevent the lever 4 or any of the other levers from being thrown clear back, thereby setting both "signals" at danger and shifting the switch-rails, a spring-detent, 27, is attached to the segmental top of the frame 1 at the rear of the notch *f*, said detent being adapted to stop the movement of the lever at said notch until depressed by the foot or hand of the operator. This movement of the lever to guard the rear of the train is not sufficient to move its locking to such a position as will permit of the movement of any of the other levers. It will be observed that if any of the levers is moved forward beyond the notch *e* all the other levers are locked.

I claim herein as my invention—

1. In an interlocking switch and signal system, interlocking switch and signal operating mechanisms located at or in convenient proximity to the switches included in such system and operated from a centrally-located station to effect the orderly movement of the switches or switches and signals governing the movement of the approaching train, in combination with a pair of operating-levers with interlocking mechanisms suitably constructed to permit of only a partial stroke or movement of one of such levers, and then a partial or full stroke of the second lever, the full movement of the second lever locking the first lever, substantially as set forth.

2. In an interlocking switch and signal system, interlocking switch and signal operating mechanisms located at or in convenient proximity to the switches included in such system and operated from a centrally-located station to effect the orderly movements of the switches or switches and signals governing the movements of approaching trains, in combination with two pairs of operating-levers provided with interlocking mechanisms suitably constructed to permit of only a partial stroke or movement of one lever of one of the pairs, such partial movement locking both levers of the second pair, and then permitting of a partial or full stroke of the second lever of the operating pair, and thereby locking the lever first operated, substantially as set forth.

3. In an interlocking switch and signal system, a pair of operating-levers, in combination with locking-bars attached to such levers, provided with notches *b* and *c*, located at the ends of recessed portions of their edges, and sliding blocks constructed to engage said notches and operated by the locking-bars as moved by the levers, substantially as set forth.

4. In an interlocking switch and signal system, two pairs of operating-levers, as 2 and 4 or 3 and 5, in combination with the locking-bars attached to said levers, each locking-bar being provided with a notch at one of its edges, as *a a d d*, said notches having the same relative location, and sliding blocks 20, 21, and 22, adapted to engage said notches and operated simultaneously by the movement of any of the levers, substantially as set forth.

5. In an interlocking switch and signal system, the combination of two pairs of operating-levers, as 2 and 4 or 3 and 5, locking-bars attached thereto, each locking-bar being provided with a notch in one of its edges, as *a a d d*, said notches having the same relative location, and sliding blocks 18 and 19, adapted to engage said notches and operated simultaneously by the movement of any of the levers, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JAMES T. HAMBAY.

Witnesses:

DARWIN S. WOLCOTT,

R. H. WHITTLESEY.