

(No Model.)

3 Sheets—Sheet 1.

J. T. HAMBAY.

SWITCH AND SIGNAL INTERLOCKING APPARATUS.

No. 361,510.

Patented Apr. 19, 1887.

Fig. 1.

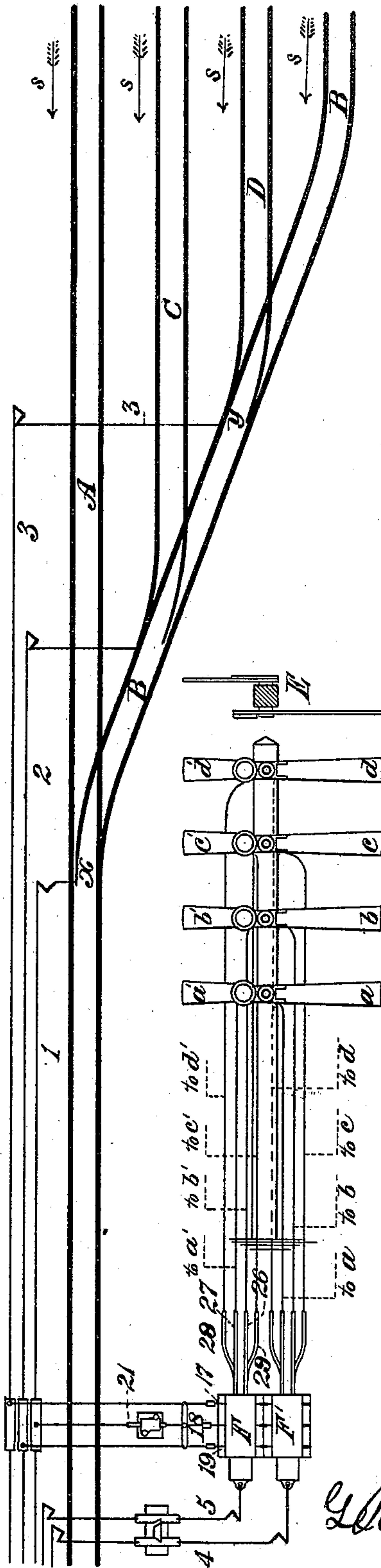
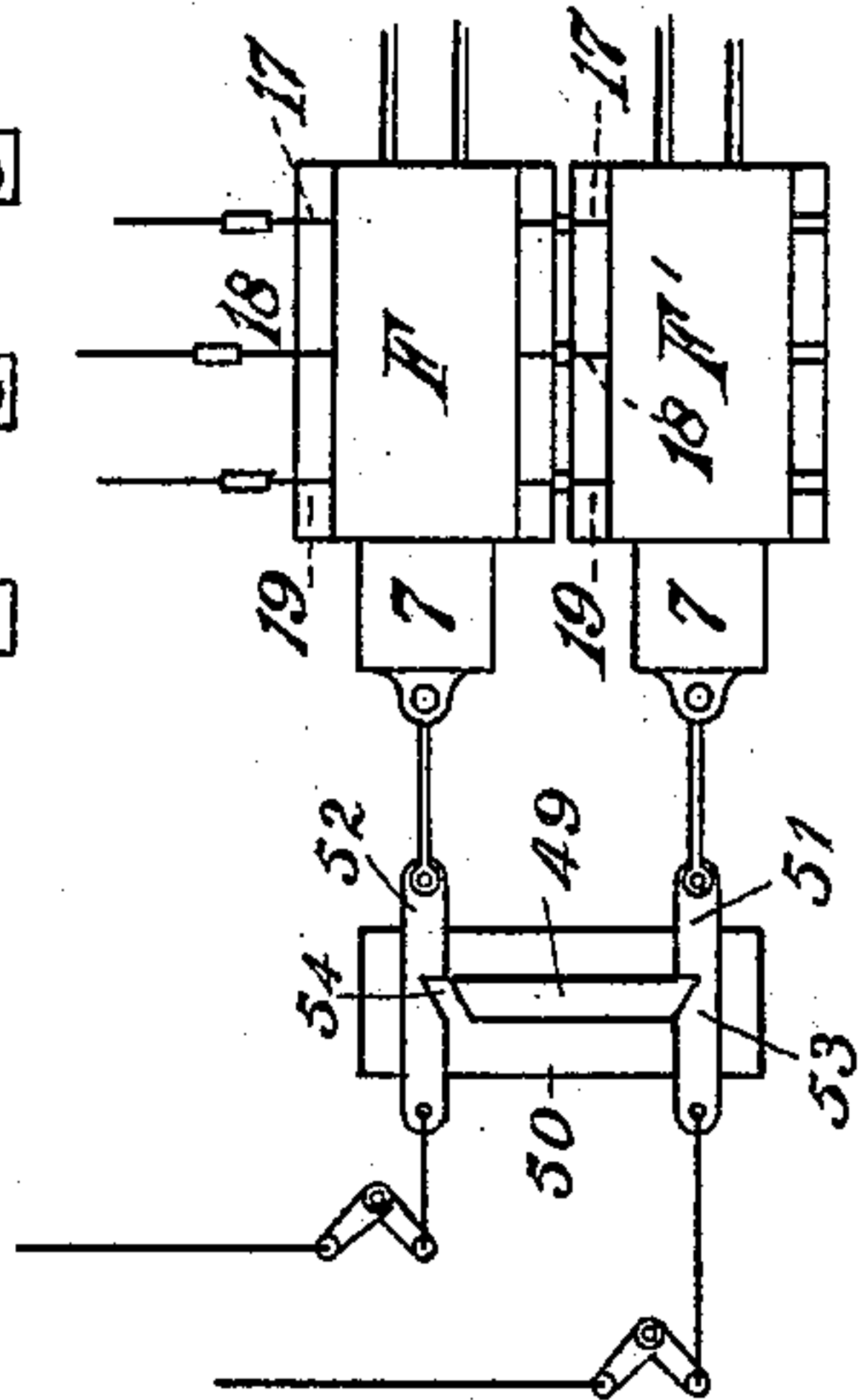


Fig. 2.



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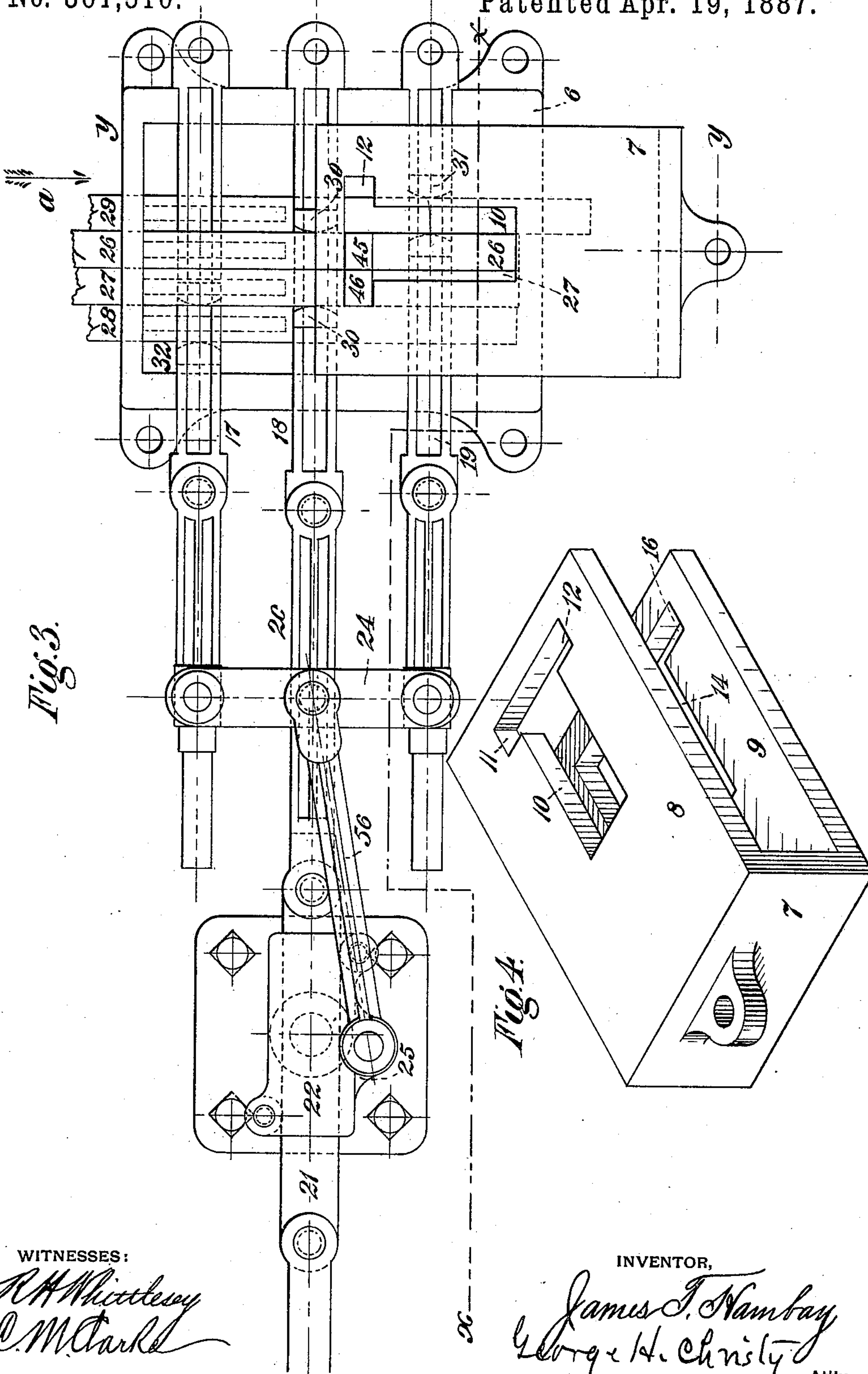


Fig. 3.

Fig. 4.

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Fig. 5.

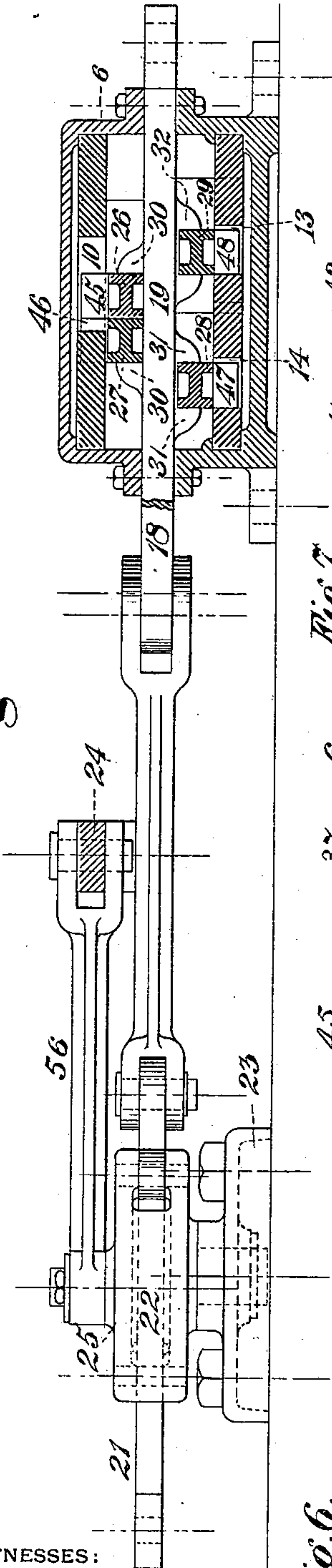


Fig. 7.

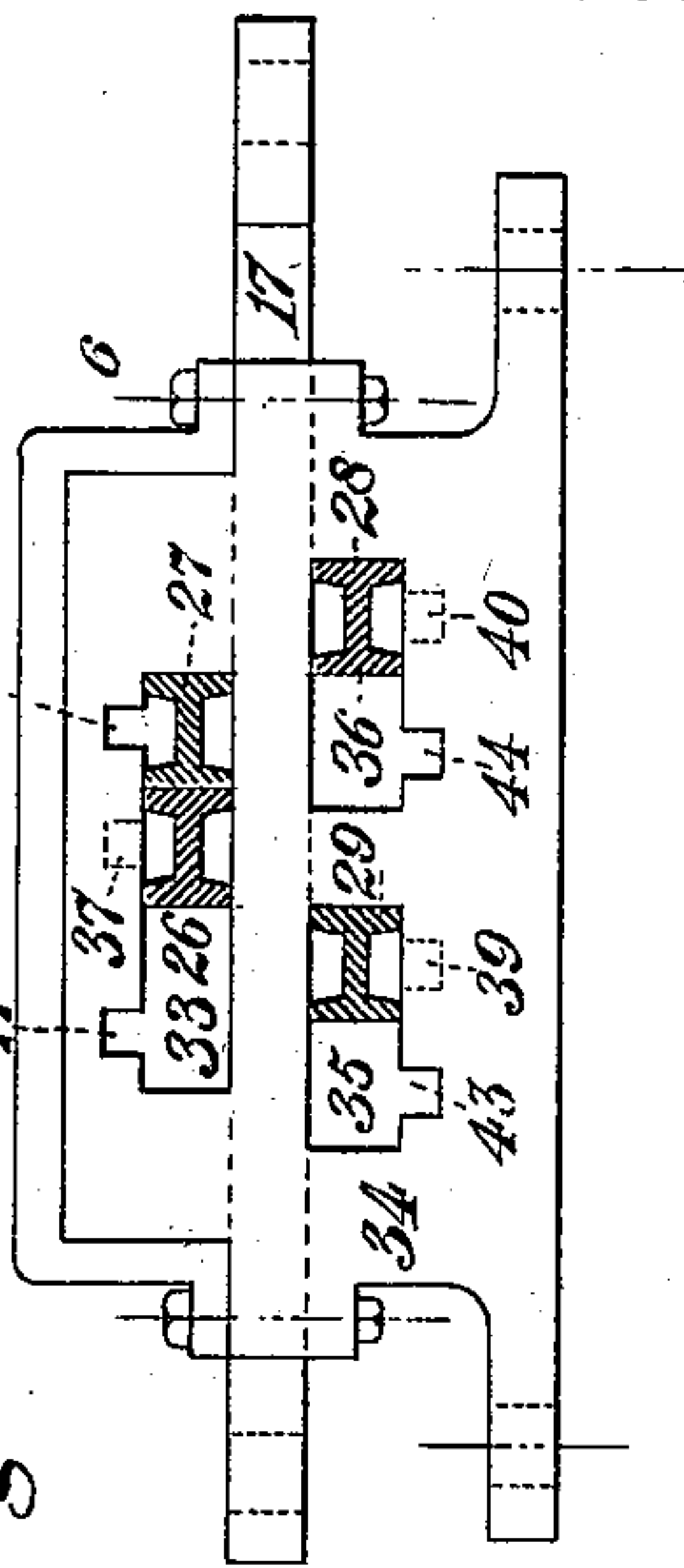


Fig. 6.

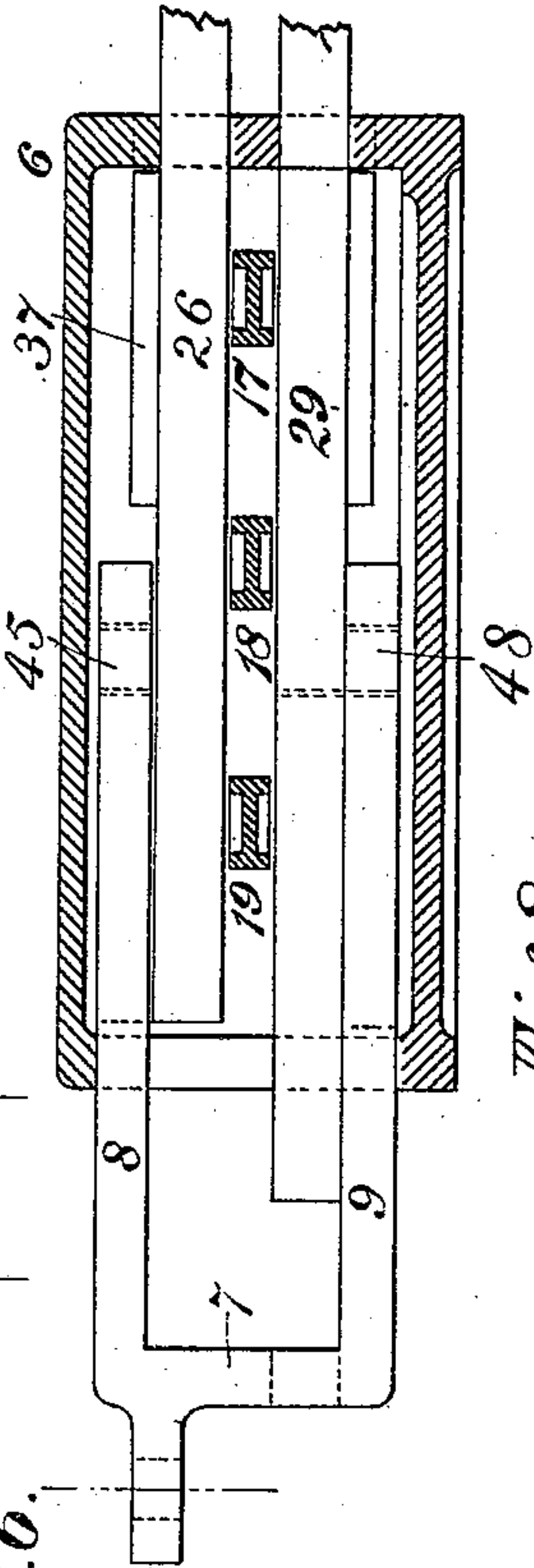


Fig. 8.

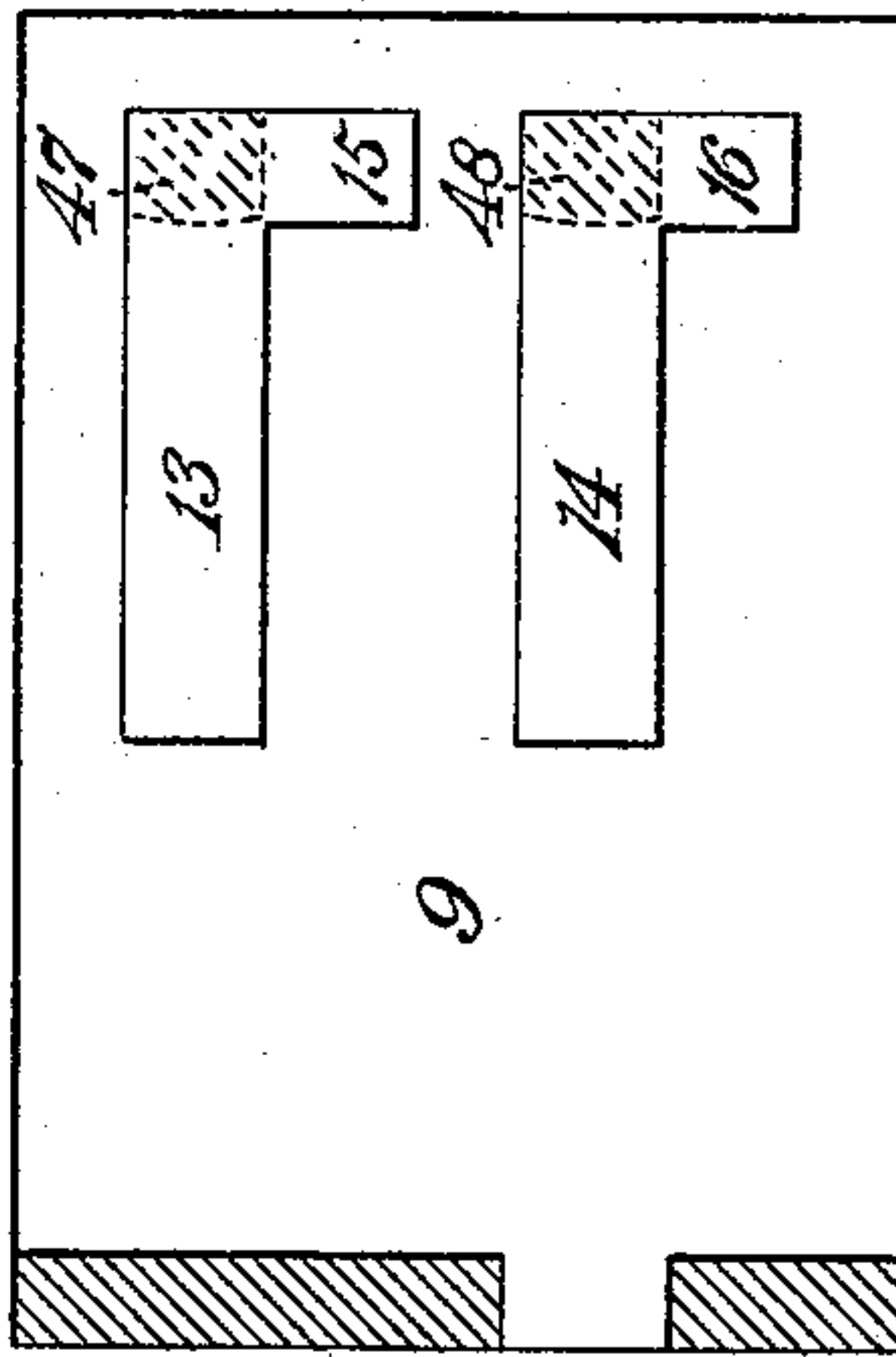
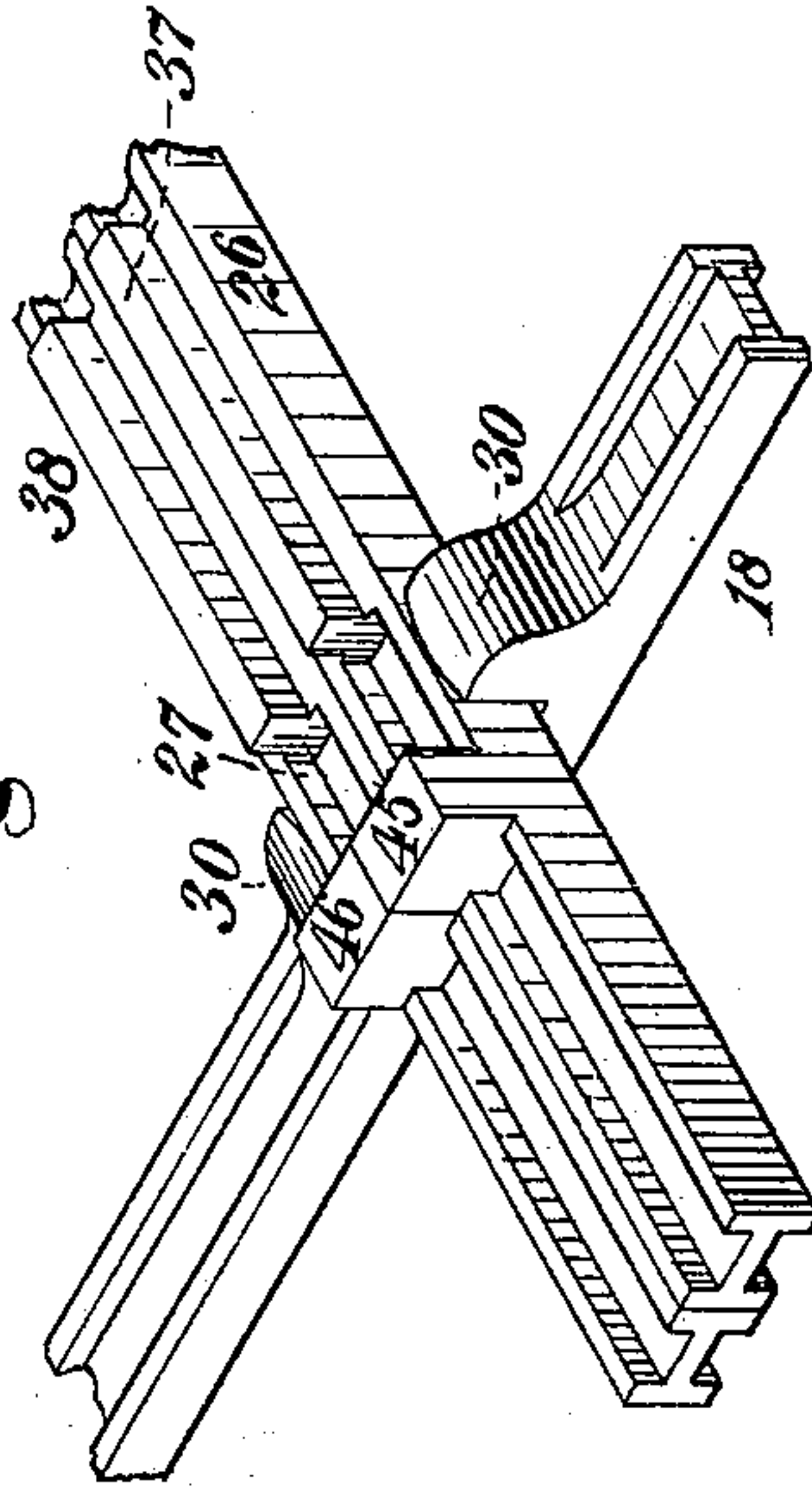


Fig. 9.



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UNITED STATES PATENT OFFICE.

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SWITCH AND SIGNAL INTERLOCKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 361,510, dated April 19, 1887.

Application filed June 2, 1886. Serial No. 203,930. (No model.)

To all whom it may concern:

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

10 In the accompanying drawings, which make part of this specification, Figure 1 is a diagrammatic view showing main and branch railway-lines and the switch and signal connections for operating the same. Fig. 2 is a similar view on an enlarged scale of the double interlocking signal-operating mechanism. Fig. 3 is a top plan view of the interlocking signal-operating mechanism. Fig. 4 is a perspective view of the slotted signal-operating slide. Fig. 5 is a view of the signal-operating mechanism, partly in elevation and partly in section, the section being taken on the line x x , Fig. 3. Fig. 6 is a longitudinal section of the same on the line y y , Fig. 3. Fig. 7 is an end elevation of the mechanism, looking in the direction of arrow a in Fig. 3. Fig. 8 is a plan view of the bottom plate of the slide. Fig. 9 is a detail view showing the manner of connecting the signal rods and their shifting bars.

30 The invention herein relates to certain improvements in apparatus for regulating and controlling signals for branch lines of railways by and in accordance with the movements of the switch-rails leading to such branch lines; the various switch movements effecting such a regulation of the signal-operating mechanism as will permit of the setting of only that signal which will designate the position of the switch moved, and simultaneously the locking of all other switches and their signals, the signal-operating mechanism effecting in its movement to "safety" a lock as against the movement of its switch-rails until the signal is returned to "danger;" and it is a further object of said invention to effect the desired operating and locking movement without resort being had to a complicated system of levers and their interlocking devices, the mechanism hereinafter described being so constructed as to permit of the operation or shifting of all the signals by one lever only.

In general terms, the invention consists in the construction and combination of parts, substantially as hereinafter described and claimed.

The main and branch lines of track are represented, respectively, by the letters A, B, C, and D, and their respective semaphores by the letters a , b , c , and d , said semaphores being pivoted on a post, E, located in convenient proximity to the switch-points of the branch lines, as shown in Fig. 1. Within convenient proximity to the signal-post is located the switch-locking and signal-operating mechanism F, connected by suitable rods to the switch-operating rods 1, 2, and 3, and also connected by rods 4 and 5 to suitable levers located in the signal-station in which are placed the levers for operating the switch-points.

Within a box or frame, 6, is mounted a slide, 7, composed of upper and lower plates, 8 and 9, the upper plate having a longitudinal slot, 10, and the lateral notches 11 and 12, and the lower plate, 9, being provided with two longitudinal slots, 13 and 14, each of which is provided with a lateral notch, 15 and 16. The purpose or function of the slots and notches will be hereinafter more fully stated.

Within the box or frame 6 are mounted the bars 17, 18, and 19, arranged between the plates 8 and 9 and adapted to move transversely of the plates. The ends of these bars project, as shown, beyond the sides of the box or frame 6. The bars 17 and 19 are connected by suitable rods or pipes to the rods connecting the switch-points leading from the track B to the tracks C and D and their operating-levers, as shown in Fig. 1; or they may be connected to switch-points in any other suitable manner, so as to cause said bars 17 and 19 to move simultaneously with said switch-points.

The bar 18 is connected by a link, 20, to a slide, 21, passing through a sleeve, 22, pivotally mounted on base-plate 23, said slide 21 being also connected at its opposite end to the rod connecting the switch-points leading from the track A to the track B and the operating-

lever, (see Fig. 1;) or said slide 21 may be connected in any other suitable manner to said switch-points. The bars 17 and 19 are pivotally connected to the opposite ends of a bar or plate, 24, which is connected at a point mid-way of its length to a lug, 25, projecting from the sleeve 22 by a rod, 56, as shown in Fig. 3.

On each side of the bars 17, 18, and 19, and between the plates of the slide 7, are placed the inner ends of the signal-bars 26, 27, 28, and 29, arranged parallel with said plates and adapted to move back and forth in the frame, as will be hereinafter more fully set forth.

The signal-bars 26 and 27, above the shifting-bars 17, 18, and 19, are arranged between stops 30, formed on or secured to the shifting-bar 18, and the signal-bars 28 and 29, below the shifting-bars, are located between the stops 31 and 32, formed on the shifting-bars 19 and 17, respectively. The signal-bars 26 and 27 project through a slot, 33, in the rear plate, 34, of the box or frame 6, and the bars 28 and 29 through slots 35 and 36, respectively, in said plate, as shown in Fig. 7. Each of these signal-bars 26, 27, 28, and 29 are provided with ribs 37, 38, 39, and 40, of a length somewhat greater than the length of movement of said signal-bars, and so located on said bars that when the bars are at the rearward limit of their movement, the signals being normal or at "danger," the forward ends of the ribs will be entirely within the box or frame 6, as shown in Fig. 1. The slots 33, 35, and 36 are of a height to permit of the passage of the bodies of the signal-bars through them, the edges of said slots being notched, as at 41, 42, 43, and 44, to permit of the passage of the ribs on the signal-bars when said bars are properly shifted therefor in the slots, which are of a sufficient length to permit of such lateral movement of the bars as will bring the ribs into or out of line with the notches.

On the signal-bars 26 and 27 are formed lugs 45 and 46, which project up into the slot 10 of the upper plate, 8, and on the signal-bars 28 and 29 are formed lugs 47 and 48, which project in the slots 13 and 14 of the lower slide-plate, 9, as shown in Fig. 5. The slide 7 is connected by a suitable rod, 4—as shown in Fig. 1, to a lever or other operating mechanism located in the signal tower or station.

The normal position of the switches is "closed"—i. e., with the switch-points in such position as to give clear main track—as indicated in Fig. 1, with the signals at "danger." While the several switches are closed, as stated, the parts of the signal-operating mechanism are arranged as shown in the several views, and it is only necessary in order to permit a train to pass along the main line A to operate the lever connected by the rod 4 to slide 7, thereby pushing the slide inward. As the lug 46 on the rod 27 is in engagement with the notch 11 in the upper plate, 8, (see Fig. 3,) the rib 38 being in line with the notch 42, the movement of the slide will operate said rod and shift the signal *a* to "safety." The posi-

tions of the rods 26, 28, and 29 during this movement of the slide is such that the lugs 45, 47, and 48 on said rods are in line with the slots 10, 13, and 14 in the slide-plates, thus permitting of the movement of the slide independent of the signal-rods 26, 28, and 29, and the ribs 37, 39, and 40 are out of line with the notches 41, 43, and 44, in which position any longitudinal movement on their part is prevented.

If it should be desired to admit a train to the branch B, the slide 7 is moved back to set the signal *a* at "danger;" then the lever connected to the switch-rod 1 is operated to shift the switch-points at *x* into proper position for the track B. The switch-rod 1, being so connected to the shifting bar 18 (see Fig. 1) that its movement in setting the switch-points will move the bar 18 in the frame 6, thereby laterally shifting the signal-bar 26 from the position shown in Fig. 3 in such a position that the lug 45 on the signal-bar 26 will engage the notch 12 in the upper plate, 8, and the rib 37 of said bar will be in line with the notch 41 in the rear plate, 34, of the frame. Simultaneous with this movement of the bar 26 the bar 27 will be shifted in the same direction as the bar 26, so as to disengage the lug 46 from the notch 11 and bring it into line with the slot 10, the rib 38 being moved out of line with the notch 42. The movement of the shifting bar 18 does not affect the bars 28 and 29, said bars remaining in a locked position, above described. Having shifted the signal-bars 26 and 27 by the setting of the switch-points at *x* for the track B, as stated, the slide 7 is again thrust forward, thereby moving the signal-bar 26 and setting the signal *b* at "safety."

If now it is desired to admit a train onto the branch line D, the slide 7 is returned to its normal position, thereby setting the signal *b* at "danger." Then the operator pulls the lever connected to the rod 3, leading to the switch-points at *y*, thereby setting said switch-points in position for said branch, the switch-points at *x* being left in position for the track B. The movement of the switch-rods 3 will shift the bar 17, thereby moving the signal-bar 28 laterally and causing its lug 47 to enter the notch 15 in the lower plate and bringing its rib 40 into line with the notch 44 in the rear plate, 34. The movement of the bar 17 in shifting the signal-bar 28 will also cause the plate 24 to rotate on its pivotal connection with the bar 19 as a center, and thereby cause the sleeve 22 to rotate on its pivotal point, said sleeve and plate being connected by the link 56. This turning of the sleeve 22 will turn the slide 21, which is connected at one end to the shifting-bar 18, its opposite end being connected by a rod to the switch-rod 1, as hereinbefore stated. As the end of the slide connected to the switch-rod 1 is held as against longitudinal movement, the rotation of the sleeve and plate will move the bar 18 through the frame 6, thereby shifting the signal-bars 26 and 27 laterally. This lateral movement

is sufficient to bring the lugs 45 and 46 on said bars into line with the slot 10, which is of a width slightly greater than the combined width of the lugs 45 and 46. While the lugs 45 and 46 of said bars are in line with the slot 10, the ribs 37 and 38 thereof are out of line with the notches 41 and 42. The movement of the slide 7 will now shift the signal-rod 28 and shift the signal *d* to "safety." The operation of clearing the track C is similar to the operation above described, with the exception that the rod 2 and the bar 19 are operated. It will be noticed in the above-described apparatus that all the signals must be at "danger" before any of the switches can be shifted, and that the movement of any one of the switches effects such movements in the mechanism as to permit only that signal pertaining to the switch shifted to be operated, the operating mechanism of all other signals being locked by the switch movement into the frame or case. It is a further characteristic of the invention herein that after a switch and signal have been set for any line it is impossible to move any of the other switches or signals until those already set have been returned to "danger."

For trains moving in the direction of the arrows *s*, short-arm semaphores *a'*, *b'*, *c'*, and *d'* are mounted in the signal-post E, said semaphores being connected by suitable rods to signal-bars of a second signal-operating mechanism, F, (see Fig. 1,) similar in construction and operation to the mechanism F', hereinbefore described. The shifting-bars of this mechanism F are connected to the shifting-bars of the mechanism F', as clearly shown, and the slide for operating the signal-bars of the second mechanism is connected by a rod, 5, to a lever in the operating-tower.

In order to prevent the operation of the signals for trains moving in one direction while the signals for trains moving in the opposite direction are set, a simple locking mechanism is interposed at any point along the line of the rods 4 and 5. This locking mechanism consists of a sliding bolt, 49, mounted on a suitable bed or foundation, 50, and provided with beveled ends. In the adjacent edges of the plates 51 and 52, forming a portion of the connections between the slides 7 and their operating-levers, are formed notches 53 and 54, adapted to engage the ends of the bolt 49, which is of such a length that when one end is in engagement with the notch in one of the plates the opposite end of the bolt will be in

line, or approximately so, with the inner edge of the other plate, as shown, thus rendering it impossible to shift the bolt, except when the notches are in line. The shape of the notches and the ends of the bolt is such that the movement of either of the plates will automatically shift said bolt.

I claim herein as my invention—

1. In a switch and signal interlocking apparatus, two or more shifting-bars, in combination with two or more signal-bars provided with lugs, and a slide provided with longitudinal slots and lateral notches for the reception of said lugs, substantially as set forth.

2. In a switch and signal interlocking apparatus, two or more signal-shifting bars, one of which is connected to the switch controlling all the branches or sidings, and the other connected to one of the secondary switches, three or more signal-bars connected to signals indicating the positions of the several switches, a slide for operating the signal-bars, and mechanism operated by the shifting-bar connected to one of the secondary switches in the movement of said switch to "safety," for locking the controlling-switch at "safety" for the secondary switch and its signals at "danger," substantially as set forth.

3. In a switch and signal interlocking apparatus, the shifting-bar 18, in combination with the signal-bars 26 and 27, connected to the shifting-bar and provided with lugs 45 and 46, and the plate 8, having the longitudinal slot 10, and lateral notches 11 and 12, substantially as set forth.

4. In a switch and signal interlocking apparatus, the shifting-bars 17 and 18, in combination with the plate 21, mounted in the pivotal sleeve 22, said sleeve being in operative connection with the bar 17, substantially as set forth.

5. In a switch and signal interlocking apparatus, the shifting-bars 17 and 18, in combination with signal-bars 26, 27, and 28, a slide for operating the signal-bars, the plate 21, forming a portion of the connection between the bar 18 and its operating-switch, said plate being mounted in the pivotal sleeve 22, said sleeve being connected and operated by the rod 17, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JAMES T. HAMBAY.

Witnesses:

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