J. THORNTON & I. WERTHEIMER.

AUTOMATIC SAFETY SWITCH.

APPLICATION FILED MAR. 17, 1908.

903,631.

Patented Nov. 10 1908.

3 SHEETS—SHEET 1.

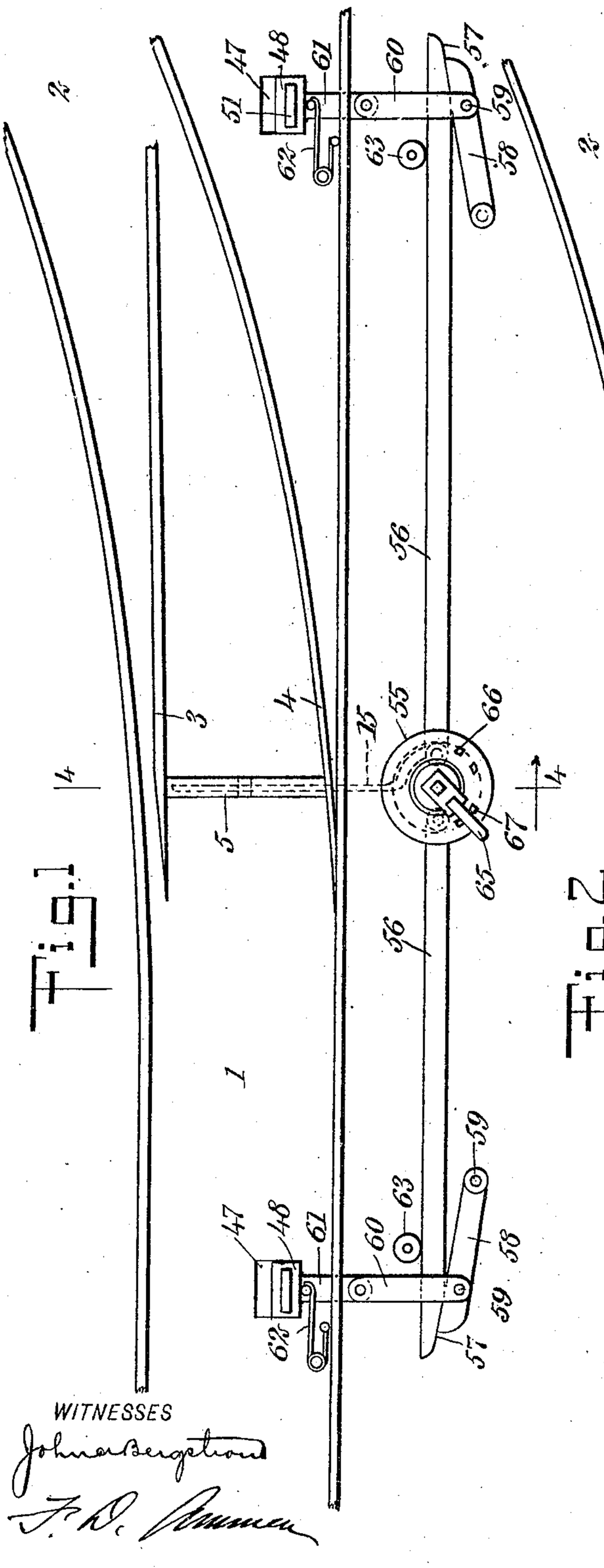

Fig. 1

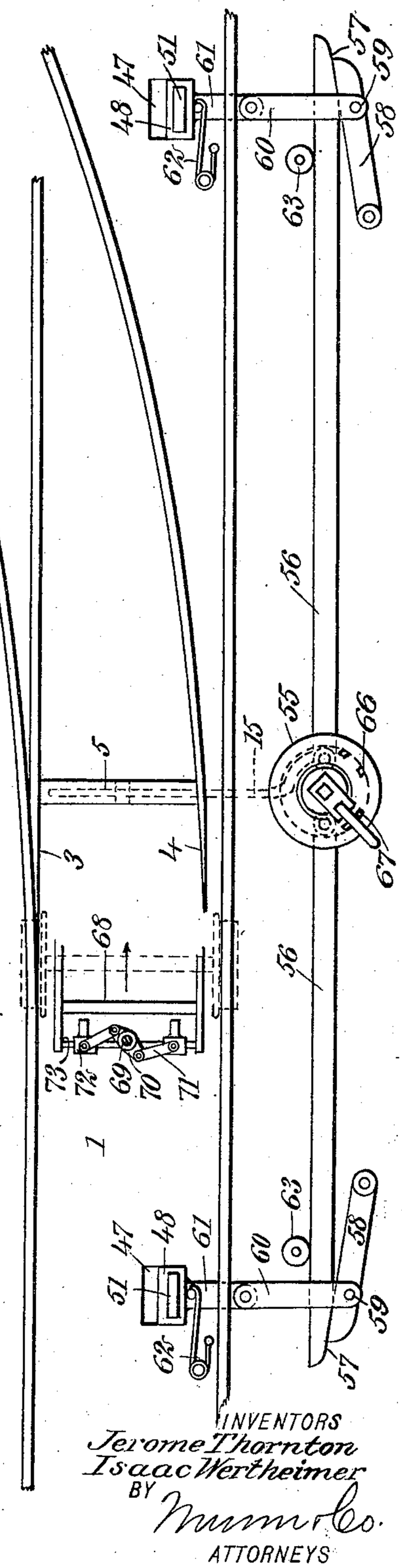

Fig. 2

WITNESSES

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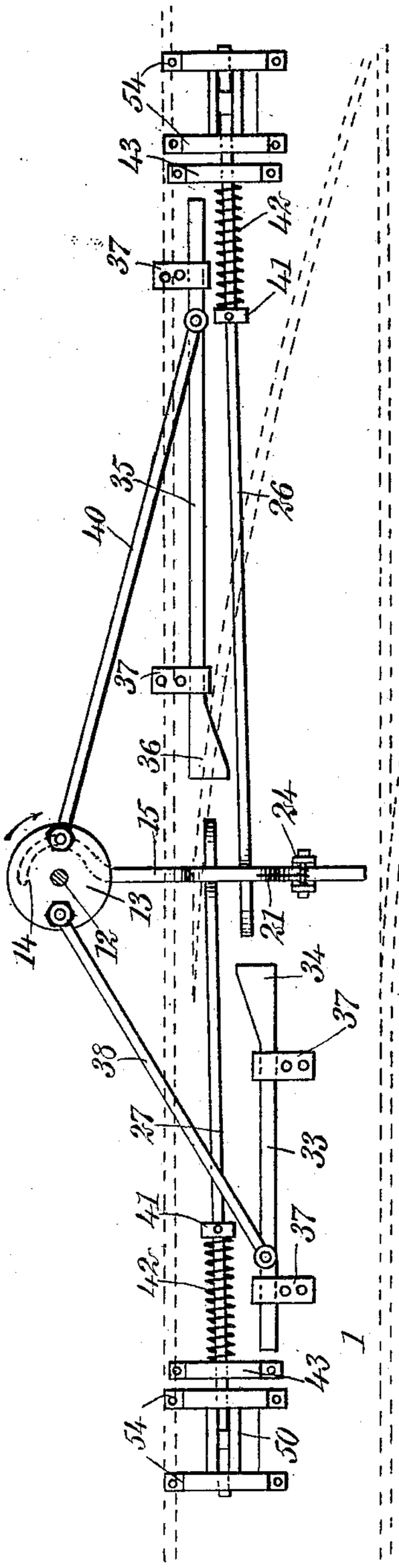

Fig. 1.

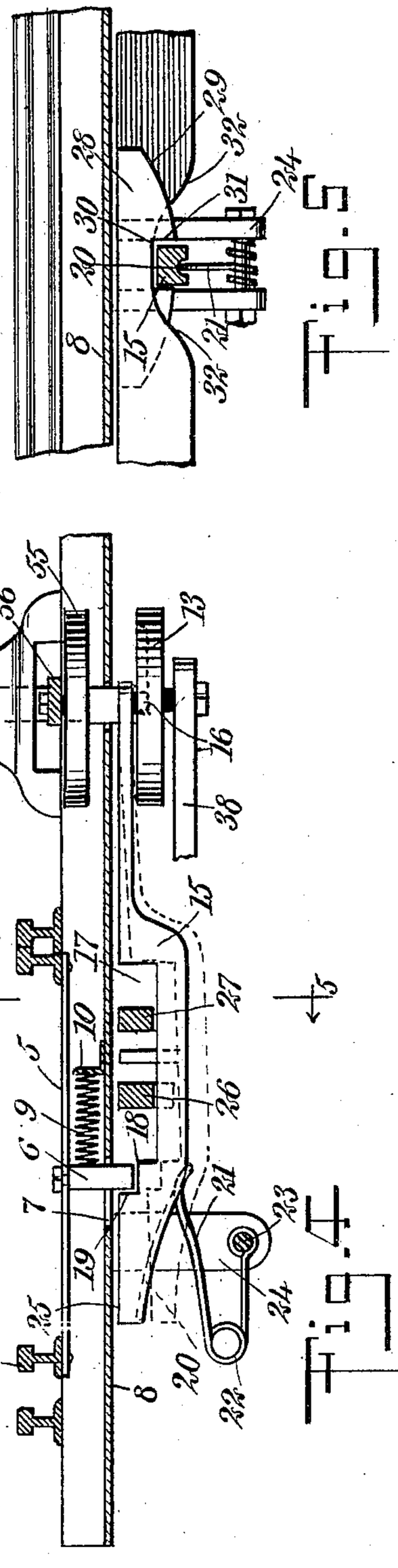

Fig. 2.

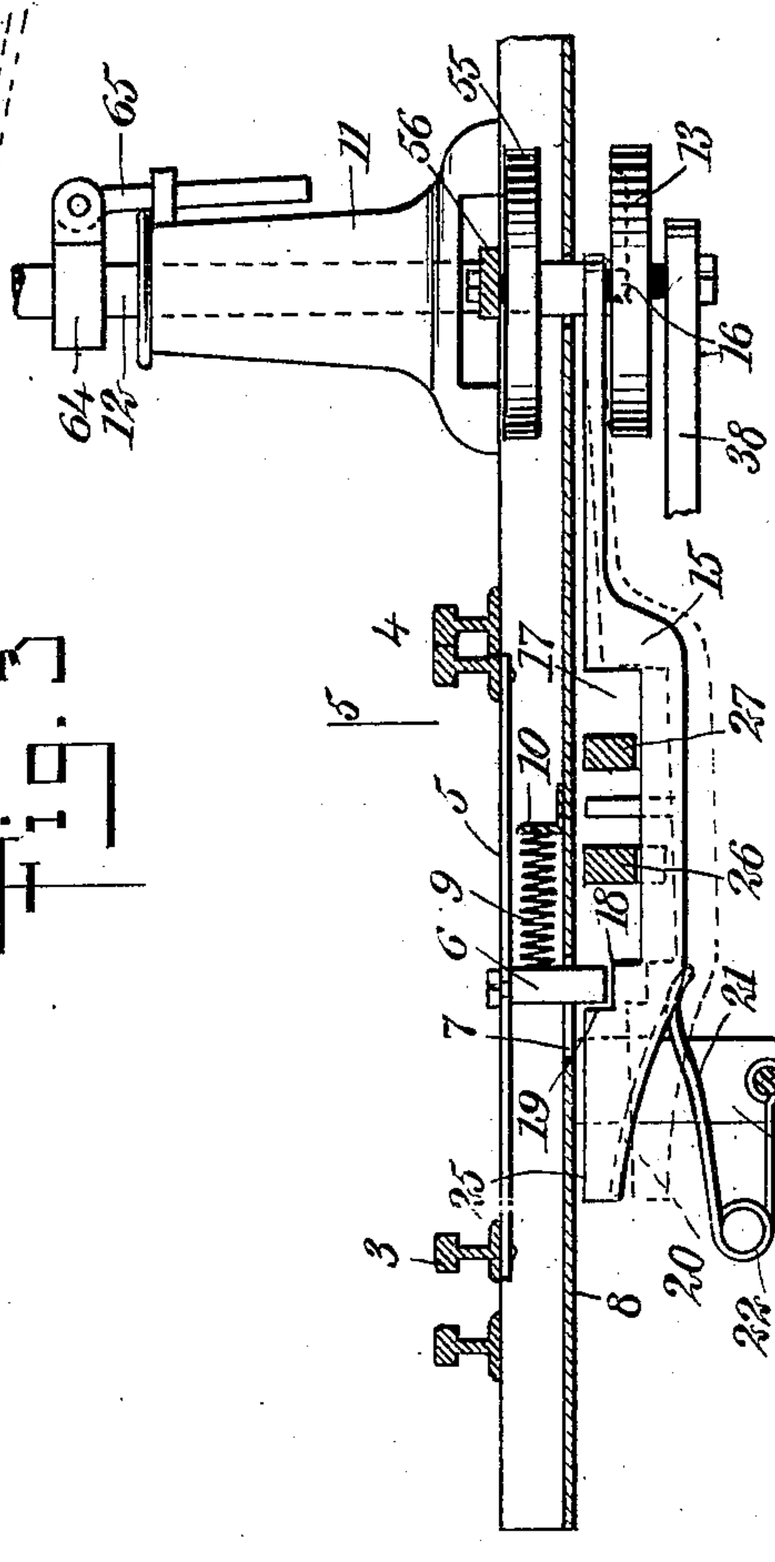

Fig. 3.

Fig. 4.

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3 SHEETS—SHEET 3.

Fig. 6

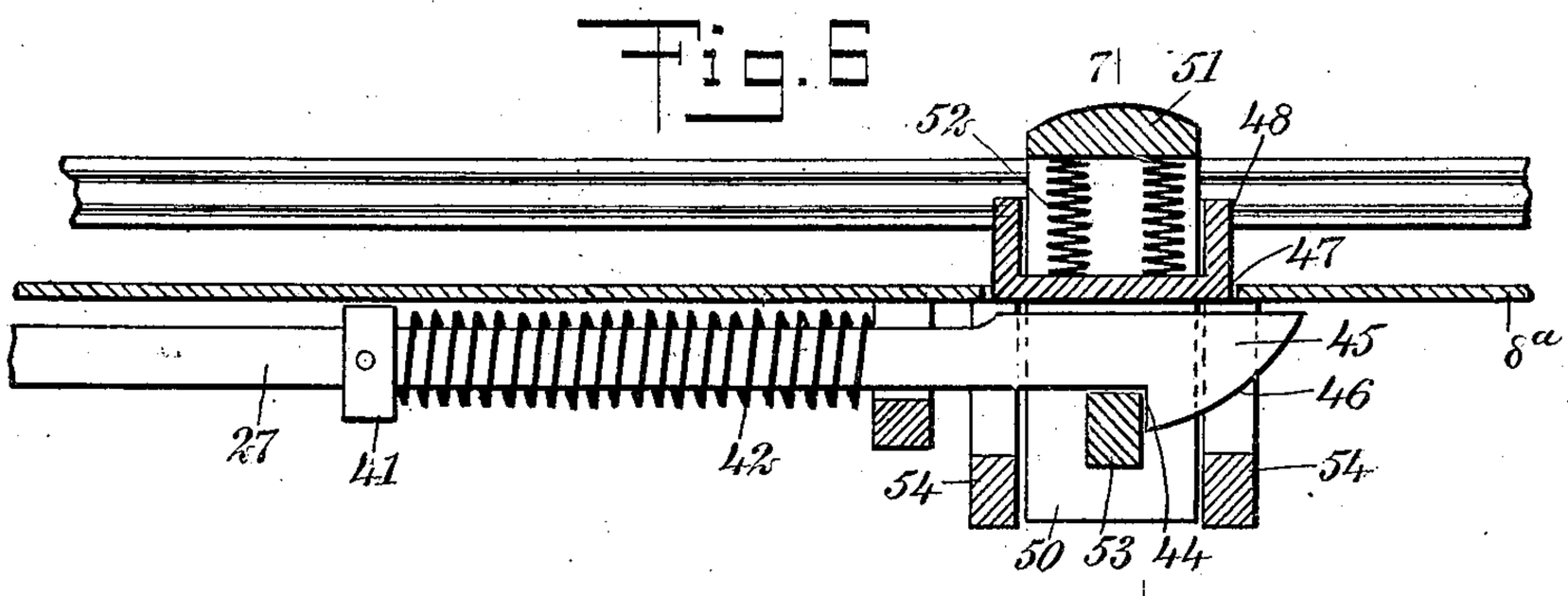

Fig. 7

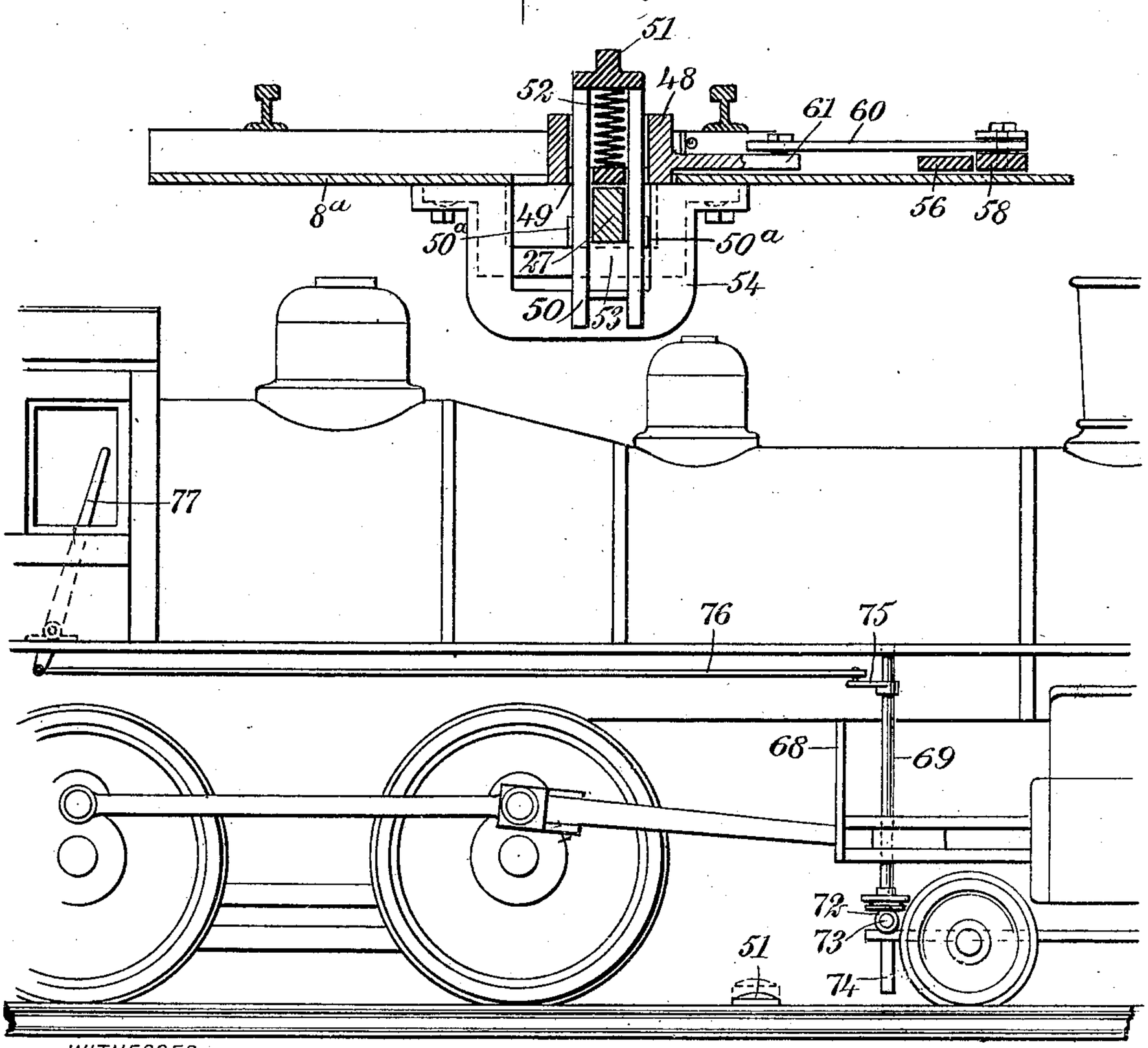

Fig. 8

WITNESSES

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UNITED STATES PATENT OFFICE.

JEROME THORNTON AND ISAAC WERTHEIMER, OF NEW YORK, N. Y.

AUTOMATIC SAFETY-SWITCH.

No. 903,631. Specification of Letters Patent. Patented Nov. 10, 1908.

Application filed March 17, 1908. Serial No. 421,638.

To all whom it may concern:

Be it known that we, JEROME THORNTON and ISAAC WERTHEIMER, both citizens of the United States, and residents of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Automatic Safety-Switch, of which the following is a full, clear, and exact description.

This invention relates to railway switches, and the object of the invention is to produce a switch which, if left open in such a way that a train running at high speed on the main track could run upon the siding, the switch will be closed automatically. In this way accidents will be prevented.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan of the switch, showing a short portion of the main track and siding; this view shows the switch in an open position; Fig. 2 is a view similar to Fig. 1, showing the switch in a closed position; this view also illustrates the construction of the trip devices carried by the locomotive or by a car of the train; Fig. 3 is a reverse plan showing the general arrangement of the mechanism for controlling the switch; Fig. 4 is a vertical section on the line 4—4 of Fig. 1; this view illustrates especially the means for engaging the switch points for throwing the same over to their open position; Fig. 5 is a vertical section on the line 5—5 of Fig. 4; Fig. 6 is a longitudinal section taken at the ends of the release bars which are released by track devices and which operate to throw the switch over to its closed position; Fig. 7 is a vertical section on the line 7—7 of Fig. 6; and Fig. 8 is a side elevation showing a portion of the locomotive and illustrating especially the trip device carried by the locomotive and showing the means for controlling the same.

Referring more particularly to the parts and especially to Figs. 1 and 2, 1 represents the main track and 2 represents the siding. The switch is composed of switch points 3 and 4, which are rigidly connected together by a connecting bar 5. In Fig. 1 the switch is shown in its open position, but when the switch points are thrown over to the other position so that the point 3 is against its adjacent rail, the switch will be closed, as indicated in Fig. 2.

Referring now to Figs. 3 to 5, and especially to Fig. 4, on the under side of the connecting bar 5 there is secured a block 6 which is mounted to slide in an opening 7 on the switch plate 8 disposed in the bed of the track beneath the rails. Against the face of this block 6 a spring 9 thrusts, the said spring tending to hold the switch in its closed position; that is, in the position shown in Fig. 2. The right-hand end of the spring, as shown in Fig. 4, thrusts against an angle clip 10 secured to the upper face of the plate 8. Opposite the connecting bar 5 at the side of the track, as shown, there is provided a switch post 11 in which there is mounted a vertical spindle 12 which extends downwardly through the switch plate 8. To its lower end there is attached a disk 13, and this disk is provided with an arcuate slot 14 as indicated in Fig. 3.

Disposed transversely of the track under the connecting bar 5, there is provided a lock bar 15, one end whereof is provided with a pin 16 which is received in the aforesaid arcuate slot 14. The middle portion of this lock bar 15 is offset downwardly as shown, so as to form a space 17 under the switch plate 8. Beyond this point the upper edge of the lock bar 15 is provided with a notch 18 having a vertical shoulder 19 which is adapted to engage the side of the block 6 remote from the switch post. Substantially beneath the notch 18 the lower edge of the lock bar is formed with a groove 20 as indicated most clearly in Fig. 5. This groove forms a guide and seat for the end of a spring 21 having a resilient coil 22, the said spring being anchored to a pin 23 mounted in a suitable bracket 24, as shown in Fig. 4.

The lower edge of the lock bar tapers or inclines upwardly at the groove 20. On the upper side and at the extremity of the lock bar beyond the notch 18, the lock bar presents a substantially straight upper edge 25 which lies adjacent to the under face of the switch plate 8. Extending toward the right from the lock bar 15 there is provided a release bar 26, and a similar bar 27 is provided which extends in the opposite direction. These bars extend longitudinally of the track, as shown in Fig. 3; their ends pro-

ject over the lock bar 15 and pass through the space 17. The form of the ends of these bars adjacent to the lock bar, is very clearly illustrated in Fig. 5. Each bar is provided with a catch or nose 28 having an inclined or curved lower face 29, and beyond this face a notch 30 is formed in each bar on its under edge, said notch presenting an abrupt shoulder 31. Beyond each notch an inclined edge 32 is formed on the lower side of the release bar.

It should be understood that when the switch is in its set position, that is, when the switch is open, the notches 30 are in alinement with each other as shown in Fig. 5, and the lock bar is disposed in the alining notches. This enables the lock bar to be maintained in its elevated position by the spring 21, so that it retains the switch points by engaging the block 6, as shown in Fig. 4. The means for setting the parts in this position will now be described.

In longitudinal alinement with the bar 26 and on the opposite side of the lock bar 15, there is provided a push bar 33, which has an enlarged butt end 34. A similar bar 35 is disposed at the right in alinement with the release bar 27, and this bar has an enlarged butt 36 opposite to the end of the release bar 27. These push bars 33 and 35 are guided longitudinally by means of suitable guide brackets 37 as shown. In order to actuate these bars, that is, in order to slide them longitudinally, they are connected with the spindle 12. For this purpose the bar 33 is connected by a connecting rod 38 with the under side of the disk 13, and a similar connecting rod 40 connects the disk 13 with the push bar 35. From this arrangement it should be understood that when the spindle 12 is rotated, the push bars 33 and 35 will slide longitudinally in their guides.

Near the outer ends of the release bars 26 and 27 collars 41 are rigidly attached thereto, and beyond these collars helical springs 42 are provided, which tend to force the release bars inwardly, the outer ends of the said springs thrusting against the sides of guide brackets 43. These guide brackets 43 are elongated so as to permit a lateral movement of the release bars, for a purpose which will appear hereinafter.

Referring now especially to Figs. 6 and 7, which illustrate the mechanism at the ends of the release bars, it will appear that the ends of the release bars are formed with vertical shoulders 44 beyond which each release bar is formed into a catch 45 with an inclined or curved lower edge 46. Over the shoulder 44 a switch plate 8^a is provided with an opening 47 in which there is slidably mounted, transversely of the track, a slide block 48. This slide block is provided with openings 49 in its bottom wall, which operate as guides for vertically disposed guide bars 50 which extend downwardly from a trip plate 51. This trip plate connects the upper ends of the guide bars 50, and between the guide bars springs 52 are arranged under the plate 51 and seat on the bottom of the slide block 48. These springs tend to hold the trip plate 51 in an elevated position as shown. Below the slide block 48 the guide bars 50 are connected by a catch bar 53, which consists simply of a horizontal transverse bar or post as shown in Fig. 6. This post is adapted to engage with the shoulder 44 so as to lock the release bars in a withdrawn position, holding the springs 42 in compression. On the sides of the guide bars 50, stops 50^a are provided.

On the under side of the switch plate at the side edges of the slide block 48, guide brackets 54 are provided, which are elongated as shown, so as to permit a shifting of the slide block and release bar transversely of the track.

From the construction shown in Figs. 6 and 7, it should be understood that when the trip plate 51 is depressed, the catch bar 53 will release the release bar, and the spring 42 will then force the release bar inwardly. This will displace the end of the release bar toward the left, removing it from its position directly under the plate 51. In setting the switch, the release bars are forced outwardly, as will be described hereinafter, and in their outward movement the tapered noses 45 operate to push the catch bars 53 downwardly so that the release bars will lock themselves automatically in their withdrawn position, as will be readily understood.

Means are provided for shifting the slide blocks 48 in the openings 47 transversely of the track; this mechanism is illustrated in Figs. 1 and 2. For this purpose the spindle 12 is provided with a disk 55 above the switch plate and cam bars 56 are pivotally attached to this disk and extend in opposite directions longitudinally of the track. At its extremities, each of these cam bars 56 is provided with an inclined or cam edge 57, and against this cam edge or cam face 57 a lever 58 is held, said levers being pivoted at 59. These levers 58 are connected respectively by links 60 with the aforesaid slide block 48. In order to facilitate the attachment, the said slide blocks 48 are provided with laterally projecting rigid arms 61. At each slide block 48 a spring 62 is provided, which tends to hold the slide block in its innermost position; that is, disposed toward the central line of the track.

The inner edges of the cam bars 56 are guided by guide rollers 63 near the slide blocks. When the switch has been set open, the cam bars are in their most extended position, at which time they hold the slide blocks 48 displaced toward the side of the

track. The details of the construction connecting the cam bars with the slide blocks, are illustrated further in Fig. 7.

In order to rotate the spindle 12 to set the switch, the upper end of the spindle is provided with a rigid collar 64, and to this collar a switch lever 65 is pivotally attached. On the side of the switch post a pair of stops 66 is provided at the right, and a similar pair of stops 67 is provided at the left. The lever 65 is adapted to be folded down between these stops so as to lock the spindle against being rotated. When it is desired to rotate the spindle, it is only necesary to raise the lever 65 so as to release it from the stops. The trip device which is carried by the train or locomotive is illustrated in Figs. 2 and 8. This trip device is made in duplicate form so that it will afford means for operating the trip plates 51 when the train approaches in either direction.

The locomotive frame 68 is provided with a vertical spindle 69 having a rigid cross head 70 attached thereto, and this cross head is connected by links 71 with slides 72 which are guided transversely of the locomotive frame on a guide bar 73, as shown most clearly in Fig. 2. These slides 72 have trips or trip arms 74 which extend downwardly therefrom as indicated in Fig. 8. These arms will aline with the trip plates 51 when they are disposed in the position shown in Fig. 1, but they will not be in alinement with the trip plates when the trip plates 51 are disposed in their inwardly shifted position, in the openings 47.

The spindle 69 is provided with a rigid arm 75 which is connected by a link 76 with a lever 77 in the cab of the locomotive. By means of this lever the spindle 69 may be rotated and set in such a position that the slides 72 will be drawn inwardly and out of alinement with the trip plates 51, even if the trip plates are in their active position; that is, in the position in which they are shown in Fig. 1. This arrangement is provided so as to enable a locomotive or train to run past a switch without actuating the trip devices if this should be desired. It should be understood, however, that the lever 77 is normally held in a position which will bring the trip arms 74 into alinement with the trip plates 51 if the trip plates are in their set position with the switch open. Our purpose in shifting the trip plates 51 laterally in the manner described above, is to reduce the wear and tear upon the parts which would result from the constant striking of the trip arms 74 on the trip plates. From the arrangement described it will be evident that in passing switches that are closed and in a safe position, a train running on the main track will not touch the trip plates.

The mode of operation of the entire switch will now be described: By rotating the switch spindle in the direction indicated by the arrow in Fig. 3, the connecting rods 38, 40 will operate to draw the push bars 33 and 35 inwardly. Their butt ends 34 and 36 strike against the ends of the release bars 26 and 27, and force these outwardly or away from the lock bar 15. In this way the inclined edges 29 of the noses 28 of the release bars force the lock bar 15 downwardly so that the notches 30 may come into alinement with the lock bar 15, holding them in a locked or withdrawn position, as indicated in Fig. 5. The latter part of the rotation which effects this result is utilized to enable the lock bar 15 to engage the block 6 of the switch in order to draw the switch over to the position in which it is shown in Fig. 4. It will, of course, be understood that the principal portion of this rotation does not affect in any way the lock bar 15 on account of its being connected with the disk 13 through the slip connection or slot 14. However, the length of the slot is less than the angular rotation which is given to the disk by the spindle, so that in the latter part of the movement, the pin 16 will be engaged by the end of the slot in such a way as to force the lock bar 15 transversely of the track. In this way the shoulder 19 will be hooked over the remote face of the block 6. The spindle will then be rotated back into its former position. The principal portion of this backward rotation will not affect the position of the switch points on account of the slot connection 14. It will, however, place the push bars 33 and 35 in their normal position as shown in Fig. 3. As the rotation is nearly over, however, the end of the slot will engage the pin 16, and a sufficient movement will be imparted to the lock bar 15 to draw the switch points over toward the switch post placing the switch in its open position, as indicated in Fig. 1. The outward movement of the release bars 26 and 27 which is given to them by the push bars 33 and 35, locks the release bars by means of their shoulders 44 at the bars 53. Now, when either of the trip plates 51 is depressed, the corresponding release bar will become released, and its spring 42 will force it longitudinally of the track and in the direction of the lock bar 15. During this movement the inclined edge 32 of the release bar will ride up on the upper edge of the lock bar, as will appear from an inspection of Fig. 5, and depress the lock bar into the position in which it is indicated in dotted lines in Fig. 4. This will release the block 6, and the spring 9 will then throw the switch suddenly over to its closed position.

The trip plates 51 and their contiguous mechanism constitute track devices for operating the switch, and they will be referred to as such in the claims.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. In an automatic safety switch, in combination, movable switch points adapted to open or close a siding, a spring tending to hold said switch points in the closed position of said siding, a transversely disposed lock bar connected with said switch points and affording means for moving the same to open said siding against the force of said spring, longitudinally disposed release bars engaging said lock bar and affording means for actuating the same to release said switch points, means for locking said release bars in a displaced position when said switch points are set in their open position, and track devices for releasing said release bars.

2. In an automatic safety switch, in combination, switch points having a position which opens a siding and having a position which closes the siding, a spring tending to hold said switch points in the closed position of said siding, a lock bar extending transversely under the track, means for advancing and withdrawing said lock bar longitudinally, said lock bar being adapted to shift said switch points laterally, longitudinally disposed release bars, means for guiding the same to slide longitudinally, said release bars having inclined faces adapted to depress said lock bar to release said switch points, means for locking said release bars in a withdrawn position when said switch points are set in the open position of said switch, and trip plates adapted to release said release bars and disposed on the track on opposite sides of said switch points.

3. In an automatic safety switch, in combination, movable switch points, a spring tending to hold said switch points in the closed position of the switch, a lock bar adapted to connect with said switch points to shift the same against the face of said spring, a spindle, sliding release bars adapted to release said switch points from said lock bar, means actuated by said spindle for withdrawing said release bars when the switch points are moved to the open position, and a slip connection between said spindle and said lock bar.

4. In an automatic safety switch, in combination, switch points, a lock bar for moving said switch points to the open position of the switch, release bars sliding longitudinally in the roadbed and adapted to release said switch points from said lock bar, a spring tending to return said switch points, a spindle, push bars adapted to abut the ends of said release bars and sliding against the same to withdraw said release bars, means for locking said release bars in a withdrawn position, and trip plates in the roadbed and adapted to release said release bars when struck.

5. In an automatic safety switch, in combination, switch points having a connecting bar with a projecting member, a spring tending to hold said switch points in the closed position of said switch, a lock bar disposed under said projecting member and adapted to engage the same to draw said switch points into the open position, a spring pressing said lock bar toward engagement with said member, longitudinally sliding release bars actuating said lock bar, and track devices for actuating said release bars.

6. In an automatic safety switch, in combination, switch points, a spring tending to force said switch points toward the closed position of the switch, mechanism for locking said switch points in their open position, release bars for releasing said mechanism, having catches formed thereupon, trip plates having means for engaging said catches to lock said bars in a withdrawn position, trip plates for releasing said release bars, and means for actuating said release bars when released.

7. In an automatic safety switch, in combination, switch points, a spring tending to hold said switch points in a closed position, a spindle, a disk rigidly attached to said spindle and having a slot therein, a transversely disposed lock bar, means whereby said lock bar may connect with said switch points for shifting the same, release bars slidably mounted longitudinally and adapted to release said lock bar from said switch points, springs tending to slide said release bars, push bars slidably mounted in alinement with the ends of said release bars and adapted to withdraw the same, connecting rods connecting said push bars with said disk for actuating the same, means for locking said release bars in a withdrawn position, and trip plates for releasing said release bars.

8. In an automatic safety switch, in combination, switch points, a spindle, a lock bar connected with said spindle and adapted to actuate said switch points, track devices, means connecting said track devices with said lock bar for controlling said switch points, cam bars actuated by said spindle, and means for displacing said track devices laterally in the track actuated by said cam bars.

9. In an automatic safety switch, in combination, switch points, a spring tending to move said switch points to close the switch, a spindle, a lock bar adapted to hold said switch points in the open position for the switch, a disk rigid with said spindle and having a slot, a pin attaching said lock bar to said spindle at said slot, longitudinally disposed release bars coöperating with said lock bar to release the same, push bars adapted to slide longitudinally, connecting rods connecting said push bars with said

disk, springs tending to move said release bars to release said lock bar, and track devices including means for locking said release bars in a withdrawn position.

10. In an automatic safety switch, in combination, switch points, a spindle, means actuated by said spindle for controlling said switch points, track devices affording means for controlling said switch points and mounted to slide transversely of the roadbed, cam bars actuated by said spindle, and means for connecting said cam bars with said track devices to shift said track devices to an inoperative position.

11. In an automatic safety switch, in combination, switch points, a spindle, means actuated by said spindle for controlling said switch points, track devices mounted to move transversely of the roadbed, springs tending to hold said track devices in an operative position, cam bars actuated by said spindle, and mechanism actuated by said cam bars and connecting with said track devices for shifting said track devices transversely of the roadbed.

12. In an automatic safety switch, in combination, switch points, a spindle, means for controlling said switch points from said spindle, track devices movable transversely of the roadbed, levers adjacent to said track devices, links connecting said track devices with said levers, cam bars actuated by said spindle and adapted to displace said levers to shift said track devices, and means for controlling said switch points from said track devices.

13. In an automatic safety switch, in combination, switch points, a spring tending to move said switch points to the closed position of the switch, a spindle, a lock bar affording means for drawing said switch points to the open position of the switch, a disk, mechanism adapted to be set by said disk and affording means, when released, for releasing said switch points from said lock bar, and a track device controlling said releasing mechanism, said disk having a slip connection with said lock bar permitting a partial movement of said releasing mechanism independent of said lock bar.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JEROME THORNTON.
ISAAC WERTHEIMER.

Witnesses:
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JOHN P. DAVIS.