H. F. ROACH.

AUTOMATIC SWITCH AND SIGNAL.

APPLICATION FILED NOV. 2, 1908.

929,880.

Patented Aug. 3, 1909.

5 SHEETS—SHEET 1.

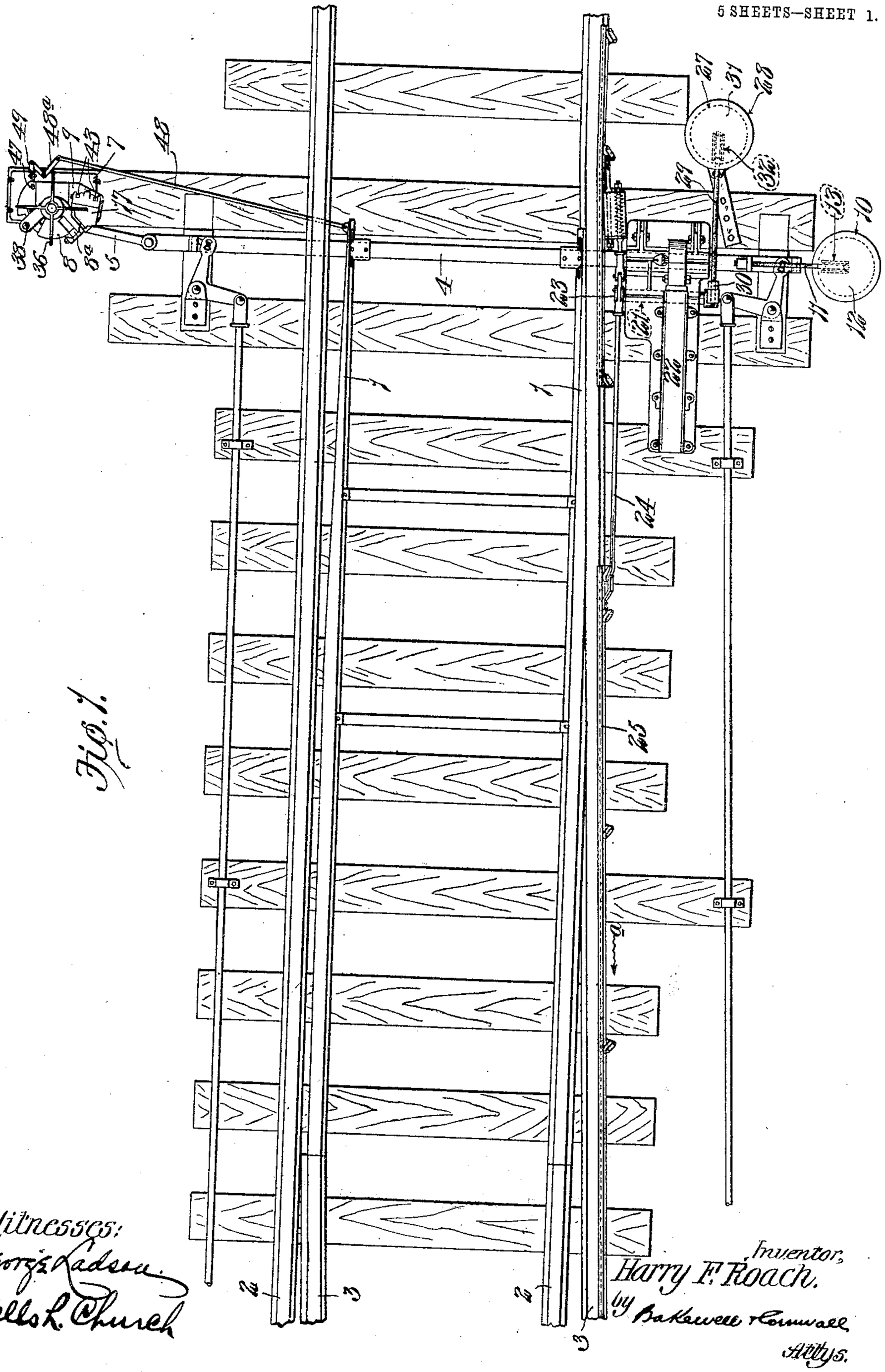

Fig. 1.

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5 SHEETS—SHEET 2.

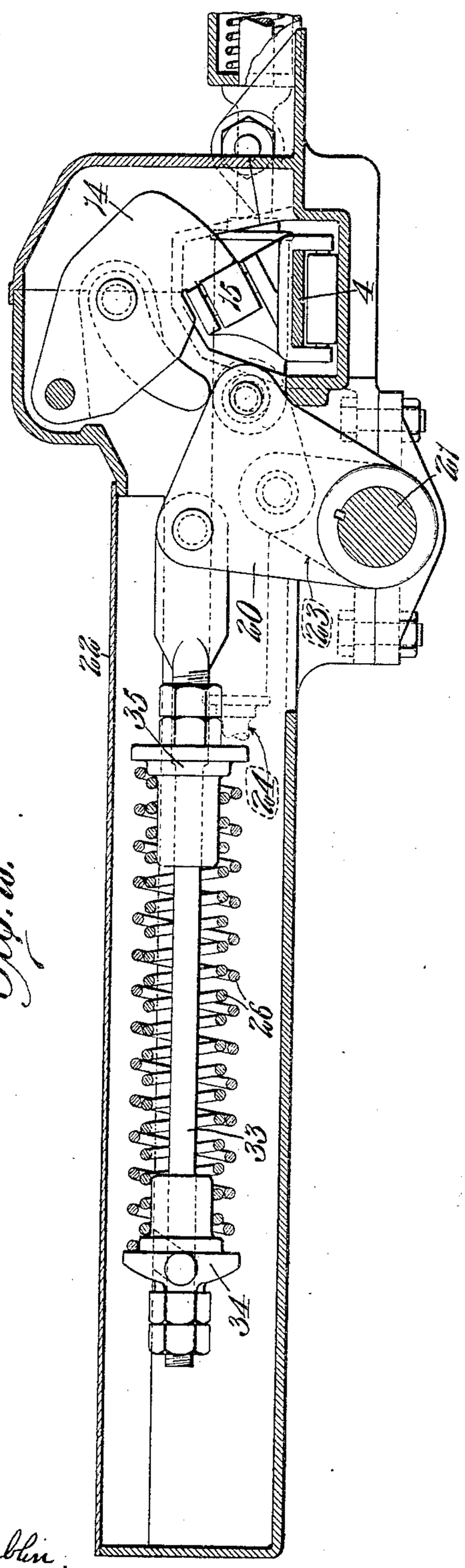

Fig. 2.

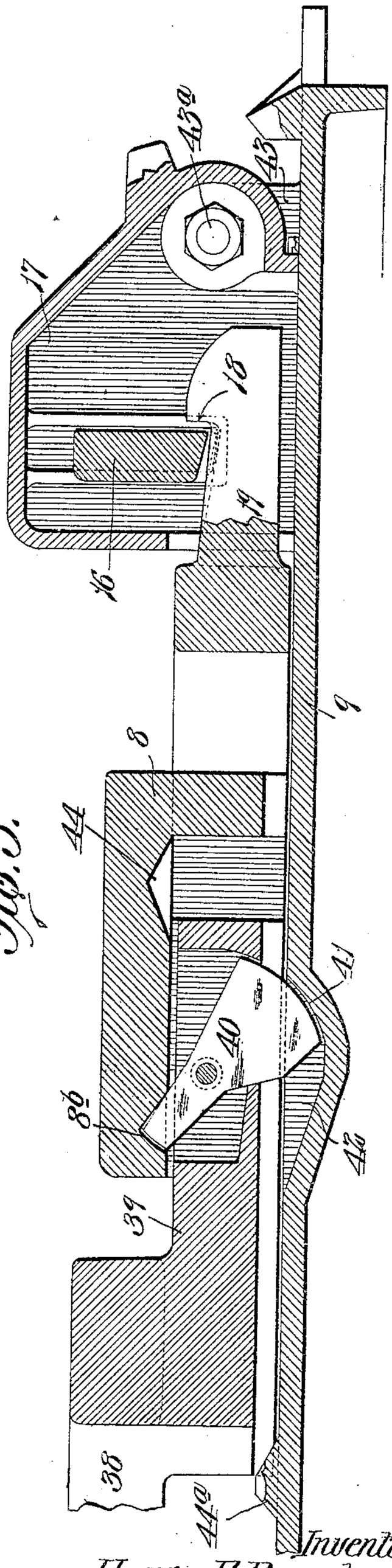

Fig. 3.

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5 SHEETS—SHEET 3.

Fig. 4.

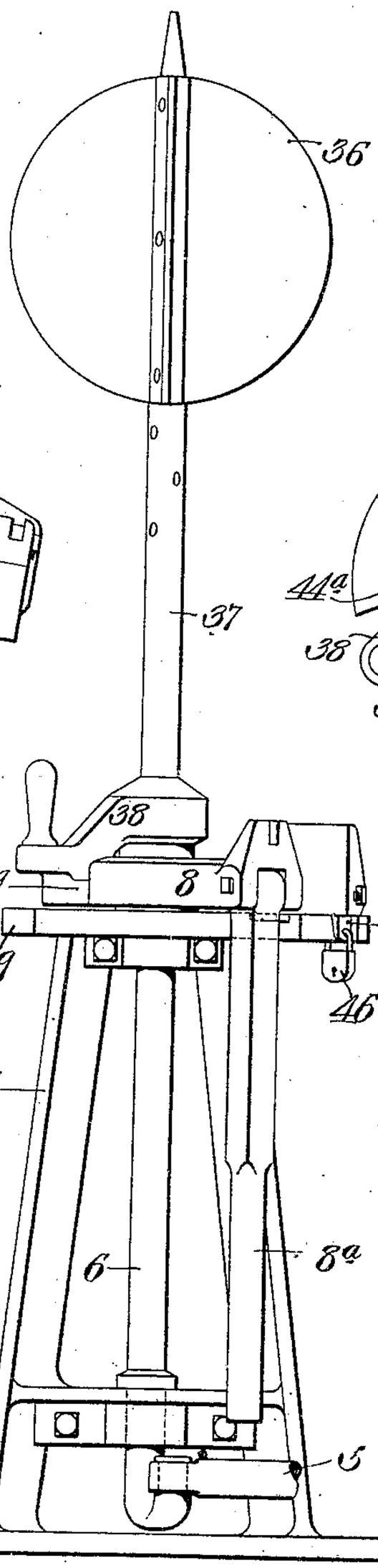


Fig. 5.

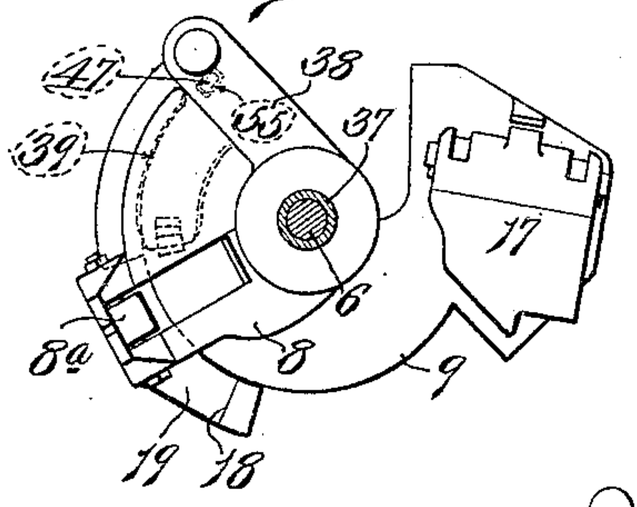
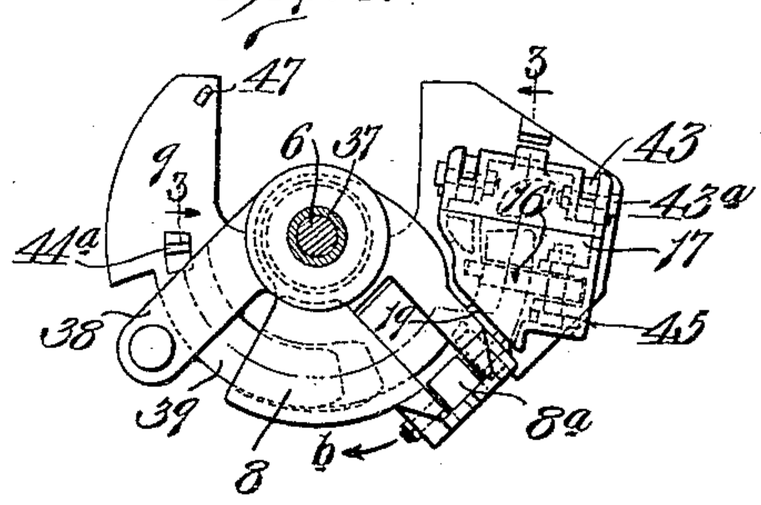


Fig. 6.



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5 SHEETS—SHEET 4.

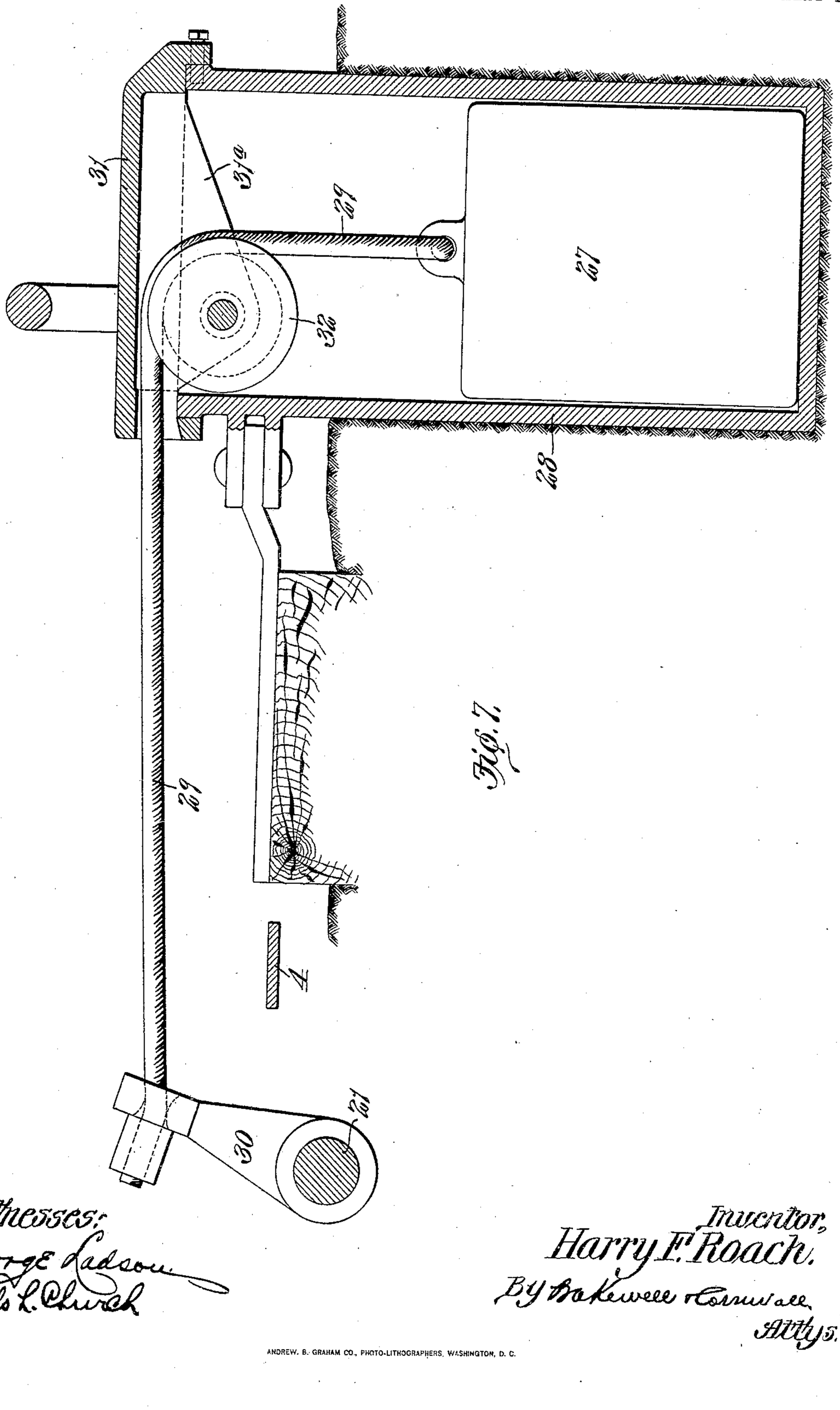

Fig. 7.

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5 SHEETS—SHEET 5.

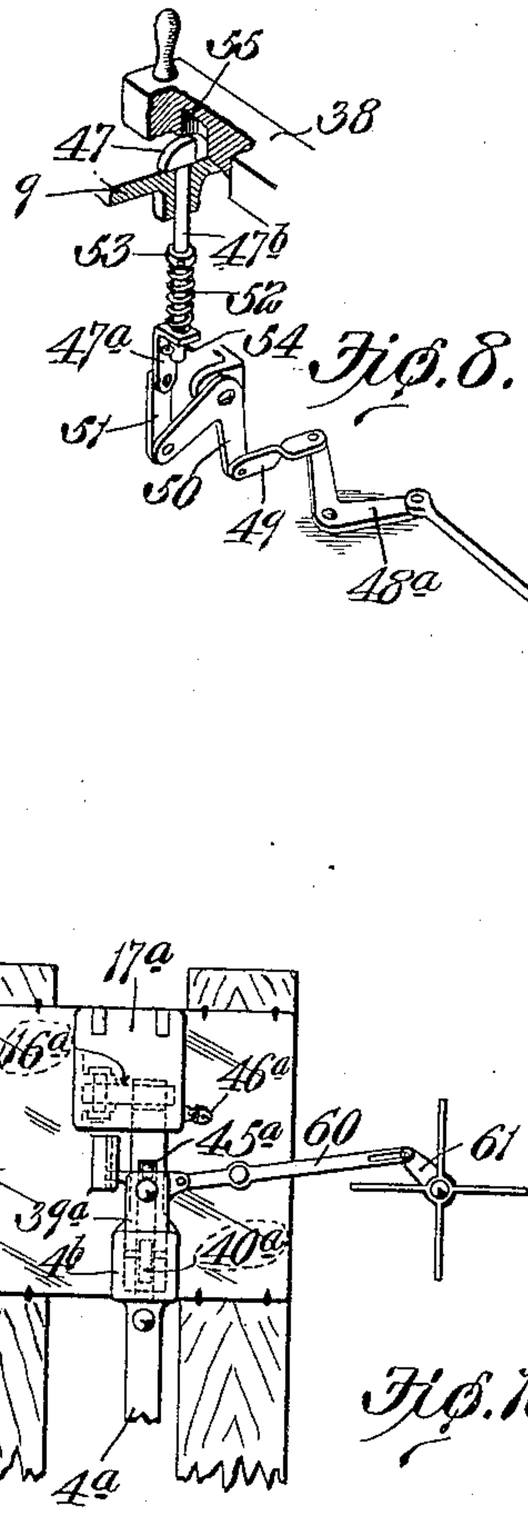

Fig. 8.

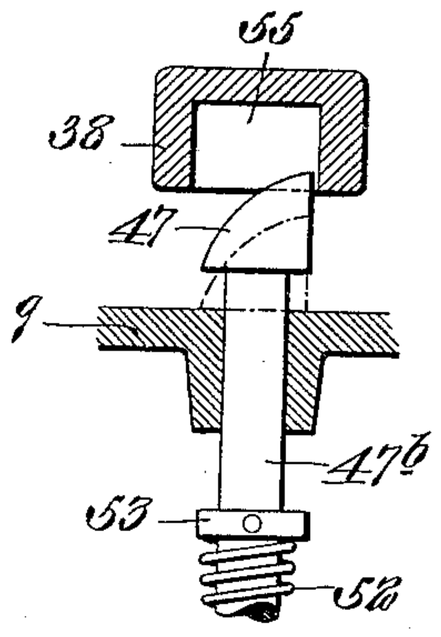

Fig. 9.

Fig. 10.

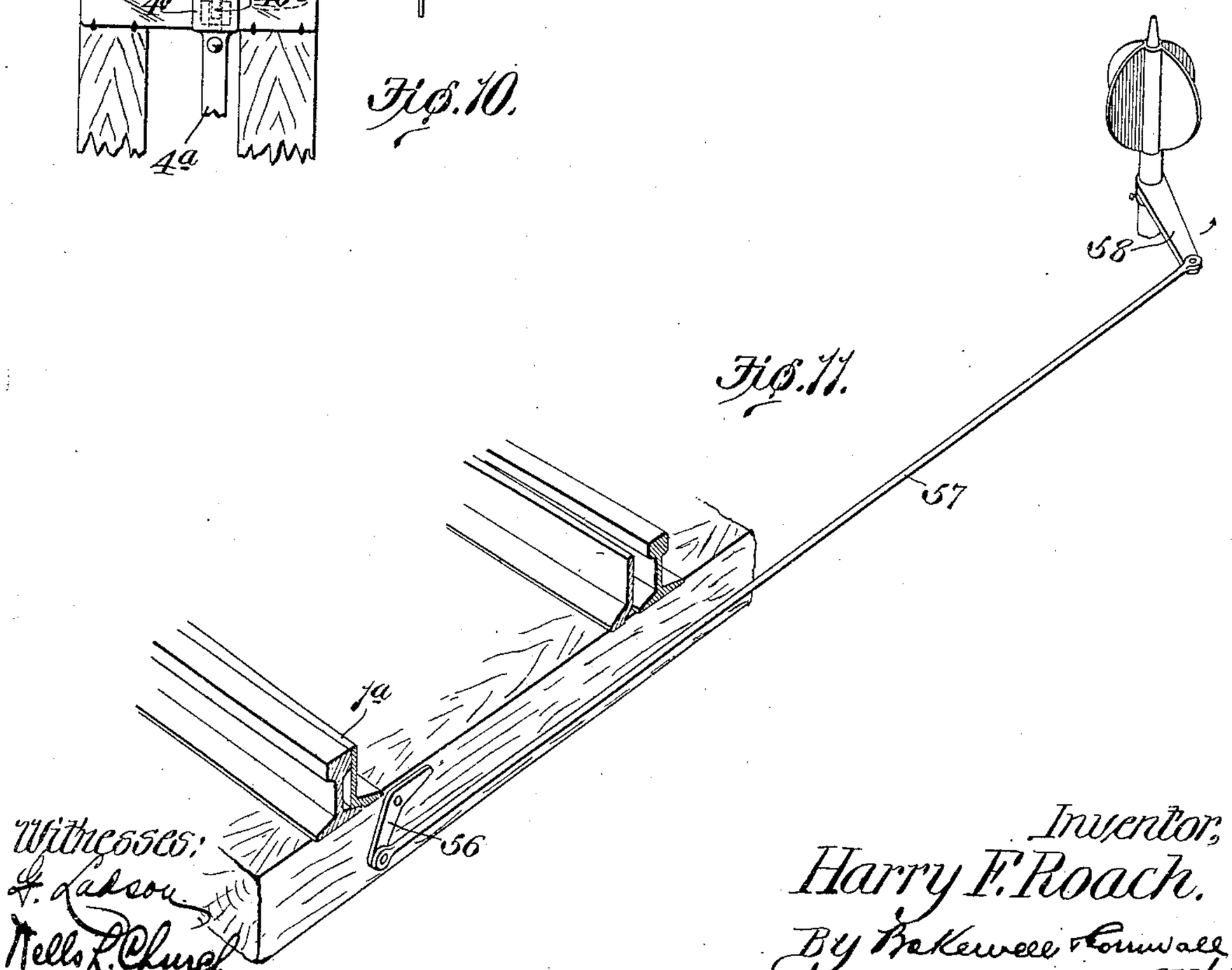

Fig. 11.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC SWITCH AND SIGNAL.

No. 929,880. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed November 2, 1908. Serial No. 460,695.

To all whom it may concern:

Be it known that I, HARRY F. ROACH, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Automatic Switches and Signals, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to automatic switches of that type in which the switch-points are locked automatically when they arrive in position to open the siding, and are thereafter released automatically and returned to their normal position to close the siding by mechanism that is operated by a train passing from the main line onto the siding or from the siding onto the main line.

The main object of my present invention is to provide an automatic switch of the type referred to and a signal comprising means for moving the signal into one position when the switch-points are thrown to open the siding, and means for preventing the signal from returning to its normal position when the switch-points return automatically into position to close the siding, thus requiring the switchman or tower-man to operate mechanism which moves the signal back to its normal position to indicate that the siding is closed.

Other objects and desirable features of my invention will be hereinafter pointed out.

Figure 1 is a top plan view of an automatic switch and a signal constructed in accordance with my invention; Fig. 2 is a detail vertical sectional view of part of the mechanism employed for tripping the locking device which coöperates with the head rod; Fig. 3 is an enlarged detail vertical sectional view taken on approximately the line 3—3 of Fig. 6; Fig. 4 is an elevational view of the switch-stand; Figs. 5 and 6 are top plan views of the switch-stand showing the switch-point operating lever and the signal-operating lever in their different positions; Fig. 7 is an enlarged detail view, partly in vertical section of the auxiliary means employed for actuating the tripping arm; Fig. 8 is a perspective view of the operating mechanism for the switch-point controlled stop that limits the movement of the signal-operating lever in one direction; Fig. 9 is a detail view of said stop; Fig. 10 is a top plan view of a modified form of my invention; and Fig. 11 is a perspective view of another means for controlling the signal from the switch-points.

Briefly described, my invention consists in an automatic switch and a signal mechanism which is so constructed that the signal or target has no positive connection with the switch-points so that it can move independently of same. Means is provided for locking the signal in position to indicate that the siding is closed, and means is provided for automatically releasing the signal and moving it into position to indicate that the siding is open when the switch-points are moved into position to open the siding. Means is also provided for preventing the signal from returning to its normal position when the switch-points move back into their position to close the siding so as to require the switchman to go to the switch-stand after a train has passed through the switch and manually turn the signal into position to indicate that the siding is closed.

Referring to the drawings which illustrate the preferred form of my invention, 1 designates switch-points, and 2 and 3, respectively, designate the rails of a main line and a siding, the switch-points normally occupying the position shown in Fig. 1 so as to close the siding. The switch-points are connected to a head rod 4 that is connected by means of a link 5 to a crank arm on the lower end of a vertically disposed shaft 6 that is journaled in a switch-stand 7 located adjacent to the track. A switch-point operating bar 8 is rigidly connected to the shaft 6 above the top plate 9 of the switch-stand so as to enable said shaft to be turned manually to move the switch-points into position to open the siding, said lever 8 having a hinged handle 8^a of well-known construction.

Means is provided for automatically moving the head rod in the opposite direction to restore the switch-points to their normal position and thus close the siding, and the means herein shown for accomplishing this consists of a weight arranged inside of a vertically disposed cylinder 10 and connected to a cable 11 that is fastened to one end of the head rod 4, the cylinder or housing 10 in

which the weight is arranged, being buried in the ground and provided with a removable top 12 carrying a pulley 13 over which the cable 11 travels. I wish it to be understood, however, that it is immaterial, so far as my broad idea is concerned, what means is employed for restoring the switch-points to normal position as springs, pneumatic means, or any other suitable devices could be used for this purpose without departing from the spirit of my invention.

The switch-points are locked automatically when they arrive in position to open the siding by means of a pivotally mounted locking device 14 that is adapted to engage an abutment or shoulder 15 on the head rod 4, and means is also provided for locking the switch-points when they are in their normal position. consisting of a pivotally mounted dog 16 arranged inside of a closed housing 17 on the top plate of the switch-stand and adapted to engage a shoulder 18 on an extension or laterally projecting arm 19 connected to the switch-point operating lever 8, said arm 19 being adapted to project into the housing 17 so that the dog 16 can drop into engagement with the notch on said arm. My broad idea is not limited to such a construction, however, as the switch-points could be locked in various ways without departing from the spirit of my invention.

The means herein shown for tripping the locking device 14 that coöperates with the abutment 15 on the head rod, is substantially the same as that covered by my pending application Serial No. 447,731, filed August 10, 1908, said means consisting of an arm 20 on a horizontally disposed rock shaft 21 journaled in bearings on the base plate of a housing 22 inside of which the locking device 14 and the tripping arm 20 are arranged, as shown in Fig. 2. The rock shaft 21 is provided at one end with an arm 23, to the upper end of which a link 24 is connected, and the opposite end of said link is connected to a wheel-operated member 25 arranged adjacent the outside rail of the siding. This wheel-operated member normally lies above the tread of the rail with which it coöperates, and is mounted in such a manner that it moves longitudinally in the direction indicated by the arrow *a* in Fig. 1 when it is depressed by a wheel traveling over same. The longitudinal movement of the wheel-operated member 25 rocks the shaft 21 in one direction so as to store up energy in means that move said shaft in the opposite direction when said wheel-operated member is released, and thus cause the arm 20 on said shaft to trip the locking device 14 and move it out of engagement with its coöperating abutment on the head rod.

The means herein shown for moving the tripping arm into engagement with the locking device 14 is slightly different from the mechanism shown in my pending application above referred to, and consists of coiled springs 26, as shown in my pending application, and also a weight 27 arranged inside of a cylinder 28 and connected to a cable 29 that is secured to an arm 30 on the rock shaft 21, said cylinder being buried in the ground and having a removable top 31 provided on its underneath side with wings 31[a] that carries a sheave or pulley 32 over which the cable 29 passes. The springs 26 are mounted on a plunger 33 that is connected to the tripping arm 20, and said springs are interposed between a stationary abutment 34 inside of the housing 22 and a rigid collar 35 on the plunger 33 so that when the wheel-operated member 25 is depressed the shaft 21 will be rocked in a direction to store up energy in said springs and also lift the weight 27 which constitutes an auxiliary means for operating the tripping arm.

The switch-stand is provided with a signal or target 36 consisting of two different colored disks arranged at right angles to each other and connected to a tubular-shaped member or sleeve 37 that is rotatably mounted on the upper end of the shaft 6 which operates the switch-points, said switch stand forming the subject-matter of my pending application Serial No. 460,696, filed November 2, 1908. A signal operating lever 38 is connected to the lower end of the member 37, and said lever is provided with a laterally projecting arm 39 that normally extends into a slot or guideway formed on the underneath side of the switch-point operating lever 8, as shown in Fig. 6. A pawl 40 is pivotally mounted in a slot in the arm 39, and when the switch-point operating lever 8 is locked by the locking dog 16 on the switch-stand, and the signal occupies a position indicating that the siding is closed, the lower end of said pawl abuts against a shoulder 41 formed by the end wall of a recess 42 in the top plate of the switch-stand, and the upper end of said pawl projects into a notch 8[b] in the lever 8, as shown in Fig. 3, so as to securely lock the signal operating lever 38 in position. The housing 17, inside of which the locking dog 16 is arranged, is hinged or pivotally connected to lugs 43 on the top plate of the base stand by means of pins 43[a], and said housing is provided with a perforated lug 45 that alines with an opening in a depending flange on the top plate so as to enable said housing to be locked in position by inserting a padlock 46, or other suitable device, through said lug and flange, as shown in Fig. 4, and thus prevent an unauthorized person from operating either the switch-point operating lever 8 or the signal operating lever 38. When it is desired to open the siding the switchman removes the padlock 46 and swings the housing 17 upwardly to disengage the locking dog 16

from the extension 19 on the switch-point operating lever. He then moves said lever in the direction indicated by the arrow *b* in Fig. 6, so as to shift the switch-points into position to open the siding, and when said lever 8 comes into engagement with the signal operating lever 38 it will impart movement to said lever and thus turn the signal 36 into position to indicate that the siding is open.

As shown in Figs. 3 and 6, the normal position of the levers 8 and 38 is such that the switch-point operating lever 8 can move a slight distance before it comes into engagement with and imparts movement to the signal operating lever 38. The first portion of the movement of lever 8 depresses the upper end of the pawl 40 of lever 38 and when the lever 8 engages the lever 38 and starts to move same said pawl will swing upwardly out of the recess 42 in the top plate of the switch-stand, the lever 8 being provided with a notch 44, as shown in Fig. 7, to provide a clearance for said pawl. The switch-points are locked automatically when they arrive in position to open the siding by means of the locking device 14, as previously described, and the signal 36 is also locked automatically when it reaches its position to indicate that the siding is open, by means of a lug 44[a] on the top plate, behind which the dog 40 drops when the signal operating lever 38 reaches the end of its stroke. When the wheels of a train that passes from the main line onto the siding or from the siding onto the main line strike the wheel-operated member 25, said member will be moved downwardly and thus cause the springs 26 to be compressed and the weight 27 to be raised. As soon as the wheels pass off said wheel-operated member and release same said springs and weight operate to move the tripping arm 20 into engagement with the locking device 14 and disengage it from the head rod which is then returned to normal position so as to open the siding by the force of the weight that moves vertically in the cylinder 12. The shaft 6 of the switch-stand is also rotated simultaneously back to normal position and thus carries the extension 19 on the switch operating lever 8 into position to be locked by the dog 16 in the housing on the switch-stand. The siding is now closed and the switch-points are locked but the signal indicates that the siding is open because the signal operating lever 38 did not return to its normal position when the switch-point operating lever 8 returned to normal position. Therefore, it is necessary for the switch-man to disengage the pawl 40 of the signal operating lever from the lug 44[a] on the top plate of the switch-stand and then manually operate said lever so as to restore the signal to its normal position to indicate that the siding is closed.

In Fig. 8 I have shown a means for preventing the switchman from returning the signal-operating lever 38 to normal position in case the switch-points do not move clear back to their normal position, so as to notify the switchman that the switch-points are misplaced and that a train will be derailed if he leaves the switch-points in this condition. Said means consists of a stop 47 that projects upwardly through the top plate 9 of the switch-stand in the path of movement of the signal-operating lever 38. This stop is carried by a vertically movable member 47[a] that is connected up to one of the switch-points by a system of links and levers, as shown in Figs. 1 and 8, said system comprising a long link 48 that extends from one of the switch-points to a bell crank 48[a], a link 49 connecting said bell crank to a second bell crank 50, and a link 51 that connects the bell crank 50 to the member 47[a] which carries the stop 47. The stop 47 is not rigidly connected to the member 47[a] but is connected thereto in such a manner that the stop can yield or move downwardly without imparting movement to the member 47[a]. As shown in Fig. 8, the stop is provided with a rigid shank 47[b] that passes freely through an opening in the member 47[a], and a coiled expansion spring 52 is interposed between the member 47[a] and a rigid collar 53 on the shank 47[b] to force the stop upwardly said shank being provided at its lower end with a cotter 54 that contacts with the member 47[a] to limit the upward movement of the stop. When the switch-points move from their normal position into position to open the siding, the stop 47 will be forced upwardly and when the signal-operating lever 38 comes into engagement with the inclined face on said stop it will depress it far enough to permit said stop to snap into a recess 55 on the underneath side of the lever 38. When the switch-points move clear back to their normal position the stop 47 will be withdrawn from the recess 55 so that the switchman can restore the lever 38 to normal position after he has released the pawl 40, as previously described. In case the switch-points do not move clear back to normal position, however, the stop 47 will not be withdrawn from the recess 55 but will remain in the position shown in Fig. 9 and consequently will prevent the switchman from moving the lever 38. This will notify the switchman that something is wrong and he will then have to remedy the defect or discover what it is before he leaves the switch-stand. Another mechanism for accomplishing the same result; namely, preventing the signal from being set in position to indicate that the siding is closed before the switch-points move clear back to their normal position is shown in Fig. 11, said mechanism consisting of a vertically disposed bell crank lever 56 arranged adjacent

one of the switch-points and having one of its arms connected by a link 57 to an arm 58 which is fastened to the member that carries the signal or target. The other arm of the bell crank lever 56 is adapted to come into engagement with the base flange of the switch-point 1^a in case the switchman attempts to restore the signal to normal position before the switch-points move clear back to normal position, thus notifying the switchman that there is a defect that has to be remedied before the main line is open.

As previously described, it is not absolutely necessary that the locking mechanism for the switch-operating shaft 6 and the signal-carrying member 37 be on the switch-stand, and in Fig. 10 I have illustrated a construction wherein the locking mechanism for said parts is carried by a base plate 9^a mounted on the track ties adjacent the head rod 4^a. This base plate carries a pivotally mounted housing 17^a that can be locked by a padlock 46^a or other suitable device, and a pivotally mounted locking dog 16^a is arranged inside of said housing for engaging a shoulder on one end of the head rod 4^a that projects into said housing, said dog being adapted to lock the head rod when the switch-points are in their normal position; namely, when the siding is closed. A reciprocating member 39^a that extends into a chamber or recess formed by a hollow device 4^b that is connected to the head rod 4^a is provided with a pivotally mounted pawl 40^a similar to the pawl 40 shown in Fig. 3, one end of the pawl 40^a coöperating with a shoulder on the base plate and the other end of said pawl coöperating with a shoulder on the device 4^b when the switch-points and signal are in normal position. The member 39^a is pivotally connected to one end of a lever 60 which has its opposite end pivotally connected to an arm 61 on the rotatable member that carries the target or signal, and the base plate is provided with a stop 45^a behind which the pawl 40^a on the member 39^a drops when the signal arrives in position to indicate that the siding is open, the head rod having a slot through which the pawl 40^a extends so that it can coöperate with the rigid stop 45^a on the base plate.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a railway track structure, an automatic switch comprising switch-points and means for causing said switch-points to move automatically into position to close the siding after a train has passed onto the siding or from the siding onto the main line, and a signal connected up to the switch-points in such a manner that it moves into position to indicate that the siding is open when the switch-points are thrown to open the siding and then remains in this position when the switch-points return to their normal position to close the siding; substantially as described.

2. In a railway track structure, an automatic switch comprising switch-points and means for causing said switch-points to move automatically into position to close the siding after a train has passed onto the siding or from the siding onto the main line, a signal that moves into position to indicate that the siding is open when the switch-points are thrown to open the siding, and means for preventing the signal from returning to its normal position to indicate that the siding is closed when the switch-points move back to normal position to close the siding; substantially as described.

3. In a railway track structure, an automatic switch comprising switch-points and means for causing said switch-points to move automatically into position to close the siding after a train has passed onto the siding or from the siding onto the main line, a signal, and means whereby the signal moves into one position when the switch-points are thrown in one direction and remains in said position when the switch-points return to their normal position; substantially as described.

4. In a railway track structure, an automatic switch comprising switch-points and means for causing said switch-points to move automatically into position to close the siding after a train has passed onto the siding or from the siding onto the main line, in combination with a signal that moves automatically into position when the switch-points are thrown in one direction and remains in this position when the switch-points return to their normal position so that it will have to be independently operated to restore it to normal position; substantially as described.

5. In a railway track structure, an automatic switch comprising switch-points and means for causing said switch-points to move automatically into position to close the siding after a train has passed onto the siding or from the siding onto the main line, a signal, and mechanism for causing the signal to move automatically into one position when the switch-points move in one direction and thereafter remain in said position when the switch-points return to normal position; substantially as described.

6. In a railway track structure, an automatic switch, a signal that is adapted to be manually operated in one direction while the switch-points remain at rest, and means for causing said signal to move automatically with the switch-points in the opposite direction; substantially as described.

7. In a railway track structure, an automatic switch comprising switch-points and means for causing said switch-points to move automatically into position to close the siding after a train has passed onto the siding or

from the siding onto the main line, a signal, means for causing the signal to move into one position when the switch-points are thrown, and means for locking said signal in this position and preventing it from returning with the switch-points when they move back to normal position; substantially as described.

8. In a railway track structure, an automatic switch, a signal, means for locking the switch-points and signal in normal position, means for causing the signal to move into one position when the switch-points are thrown in one direction, and independent means for locking the signal in the position to which it has been moved so as to prevent it from moving with the switch-points back to normal position; substantially as described.

9. In a railway track structure, switch-points, a signal, means for moving said switch-points and signal into one position, means for locking the switch-points, and means for causing the switch-points to return automatically to their normal position when a train passes through the switch without affecting or changing the position of the signal; substantially as described.

10. In a railway track structure, switch-points, a signal, means for moving the switch-points and signal into one position, and automatically operated means adapted to be operated by a train that has passed from the main line onto the siding or from the siding onto the main line for restoring the switch-points to normal position without changing the position of the signal; substantially as described.

11. In a railway track structure, switch-points, a signal, means for causing the signal to change its position when the switch-points are moved in one direction, automatic means for locking the switch-points in the position to which they have been moved, and mechanism adapted to be operated by a train that has passed over the switch-points for releasing the switch-points and returning them to normal position without changing or affecting the position of the signal; substantially as described.

12. In a railway track structure, switch-points, a signal, means for normally holding the switch-points in position to close the siding, mechanism for moving the switch-points in position to open the siding and simultaneously set the signal in a position indicating that the siding is open, means for locking the switch-points in this position, and means adapted to be operated by a train that has passed over the switch-points for releasing the switch-points and causing them to move back to normal position without shifting the signal from the position into which it has been moved; substantially as described.

13. A railway track structure, comprising switch-points, a signal, means for normally holding the switch-points and signal in a certain position, means for moving the switch-points and signal simultaneously into a different position, independent locking means for the switch-points and the signal, and automatic means adapted to be operated by a train that has passed over the switch-points for tripping the switch-point locking device so that said switch-points can return to normal position while the signal remains locked in the position to which it has been moved; substantially as described.

14. In a railway track structure, switch-points, a signal that is adapted to move independently of said switch-points, means for causing the signal to move with the switch-points in one direction, and a device separate and distinct from said means for holding the signal at rest when the switch-points move in the opposite direction; substantially as described.

15. In a railway track structure, switch-points, a signal that is adapted to move independently of the switch-points, means for locking the switch-points and signal in normal position to close the siding, means for moving the switch-points and signal into a different position to open the siding, means coöperating with the signal to lock it in the position to which it has been moved, and independent means coöperating with the switch-points to automatically lock them in the position to which they have been moved; substantially as described.

16. In a railway track structure, switch-points, a signal that is adapted to move independently of the switch-points, means for locking the switch-points and signal in normal position, means for moving the switch-points and signal into a different position, means coöperating with the signal to lock it in the position to which it has been moved, independent means coöperating with the switch-points to lock them in the position to which they have been moved, and mechanism adapted to be operated by a passing train for tripping the switch-point locking means so that they can return to normal position; substantially as described.

17. In a railway track structure, switch-points, a signal that is adapted to move independently of the switch-points, operating mechanism for the switch-points, operating mechanism for the signal, means for transmitting the movement of the switch-point operating mechanism to the signal-operating mechanism in one direction, and means for preventing the signal from returning to normal position when the switch-point operating mechanism moves in the other direction; substantially as described.

18. In a railway track structure, switch-points, a signal that can be moved independently of said switch-points, means for preventing an unauthorized person from mov-

ing either the switch-points or the signal, and means for causing the signal to move automatically into a different position when the switch-points are shifted in one direction; substantially as described.

19. In a railway track structure, switch-points, a signal that can be moved independently of the switch-points, mechanism for operating the switch-points, independent mechanism for operating the signal, means for causing said mechanisms to move simultaneously in one direction, and means for locking the signal-operating mechanism when the signal arrives in the position to which it has been moved, thus preventing the signal from being returned to its normal position when the switch-point operating mechanism is restored to its normal position; substantially as described.

20. In a railway track structure, an automatic switch, a signal, means for causing the signal to move into one position when the switch-points are shifted and then remain in this position when the switch-points return to normal position, and means for preventing said signal from being returned to its normal position in case the switch-points have not moved clear back to their normal position; substantially as described.

21. In a railway track structure, an automatic switch, a signal, means for changing the position of the signal when the switch-points move in one direction, means for preventing the signal from moving when the switch-points return to normal position, and means controlled by the switch-points for preventing the signal from being returned to normal position in case the switch-points are misplaced; substantially as described.

22. In a railway track structure, switch-points, a signal, mechanism for causing the signal to be shifted automatically into a different position when the switch-points move in one direction, said mechanism being so constructed that the switch-points can return to normal position without affecting the signal, an operating device for the signal, and means controlled by the switch-points for locking said operating device so as to prevent the signal from being shifted back to normal position when the switch-points are misplaced; substantially as described.

23. In a railway track structure, switch-points, means for normally holding the switch-points in position to close the siding, a signal that normally occupies a position indicating that the siding is closed, mechanism for moving the switch-points into position to open the siding and for moving the signal into such an indicating position, means for causing the switch-points to automatically return to normal position without affecting the position of the signal when the train passes through the switch, and means for preventing the signal from being moved back to normal position in case the switch-points fail to move clear back to their normal position; substantially as described.

24. In a railway track structure, switch-points, means for normally holding the switch-points in position to close the siding, a signal that normally occupies a position indicating that the siding is closed, mechanism for moving the switch-points into position to open the siding and for automatically moving the signal into such an indicating position, means for causing the switch-points to return to normal position without affecting the position of the signal when the train passes through the switch, and means controlled by the switch-points for preventing the signal from being restored to normal position in case the switch-points are misplaced; substantially as described.

25. In a railway track structure, switch-points, a signal, means for causing the signal to move automatically into a different position when the switch-points are shifted, means for returning the switch-points to normal position without affecting the signal, an operating device for returning the signal to normal position, a stop for arresting the movement of said device in one direction, and a connection between said stop and the switch-points; substantially as described.

26. In a railway track structure, switch-points, a signal, means for causing the signal to move into a different position when the switch-points are shifted, means for returning the switch-points to normal position without affecting the signal, an operating device for returning the signal to normal position, a yieldingly mounted stop for arresting the movement of the signal-operating device in one direction, and a connection between said stop and one of the switch-points; substantially as described.

27. In a railway track structure, switch-points, a signal, means for causing the signal to move into a different position when the switch-points are shifted, means for returning the switch-points to normal position without affecting the signal, a manually-operated device for returning the signal to normal position, and means controlled by the switch-points for locking said device; substantially as described.

28. In a railway track structure, switch-points, a signal that can move independently of the switch-points, and a device arranged in the path of one of the switch-points and connected to the signal so as to prevent the signal from being shifted in case the switch-points are misplaced, said device being so arranged that it will engage one of the switch-points if the operator attempts to move the signal when the switch-points are misplaced and thus prevent the signal from being turned; substantially as described.

29. In a railway track structure, an auto-

matic switch, a locking device that automatically locks the switch-points when they are shifted into one position, a tripping member coöperating with said locking device for releasing the switch-points, a spring and a weight for moving said tripping member into engagement with said locking device, and means adapted to be operated by a passing train for storing up energy in said spring and raising said weight; substantially as described.

30. In a railway track structure, an automatic switch comprising switch-points, means for locking said switch-points when they are shifted into a certain position, a tripping member coöperating with said locking device to release the switch-points, a weight arranged in a vertically disposed cylinder and secured to a cable that is connected to said tripping member, and means operated by a passing train for moving said tripping member into an operative position and thus raise said weight; substantially as described.

31. In an automatic switch, a locking device for holding the switch-points in a certain position, a tripping member coöperating with said device to release the switch-points, a weight connected by a flexible device to said tripping member for moving it in one direction, a vertically disposed cylinder inside of which said weight is arranged, and a removable top for said cylinder provided with a sheave over which said flexible device passes; substantially as described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this thirtieth day of October 1908.

HARRY F. ROACH.

Witnesses:

WELLS L. CHURCH,

GEORGE BAKEWELL.