J. P. BLACKWOOD.

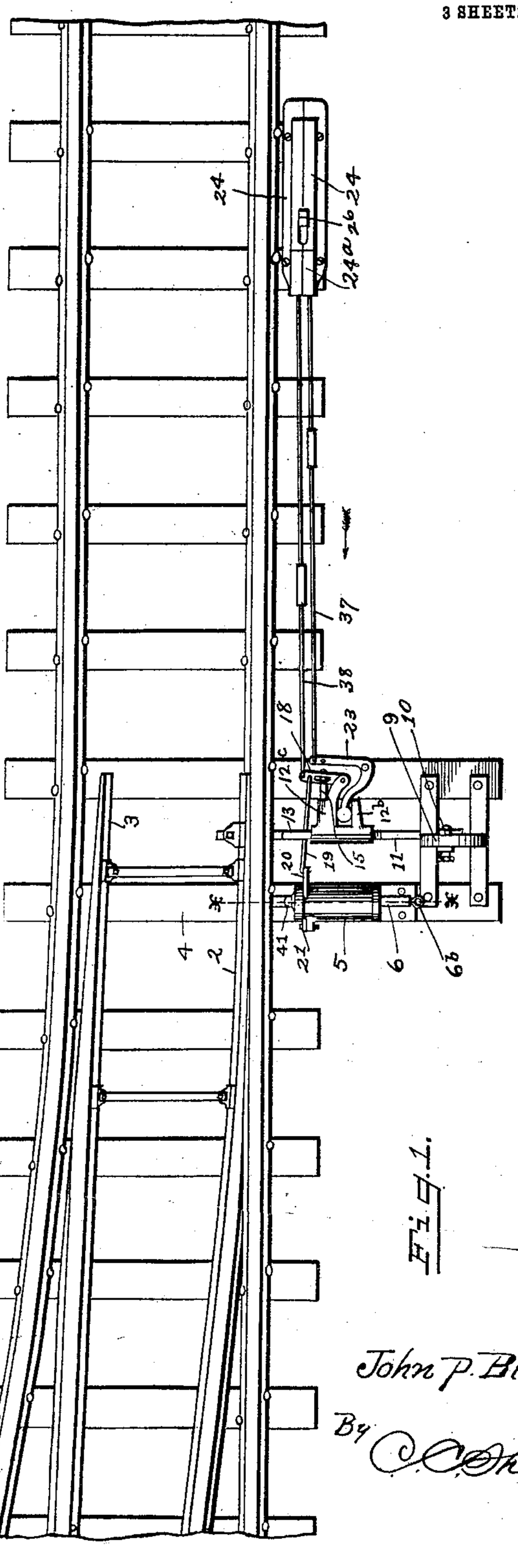
RAILWAY SWITCH OPERATING MECHANISM.

APPLICATION FILED JUNE 16, 1908.

923,802.

Patented June 8, 1909.

3 SHEETS—SHEET 1.



Witnesses

Carl Stoughton

A. L. Phelps

Inventor

John P. Blackwood

By C. C. Shepherd

Attorney

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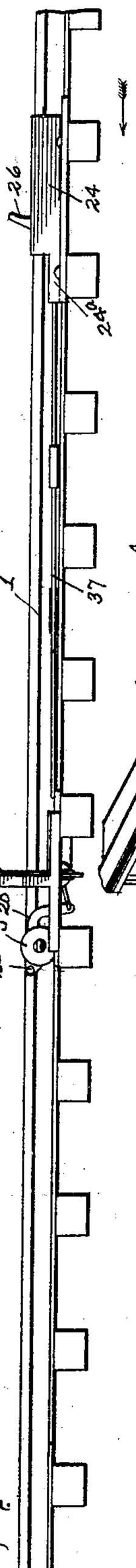

FIG. 2.

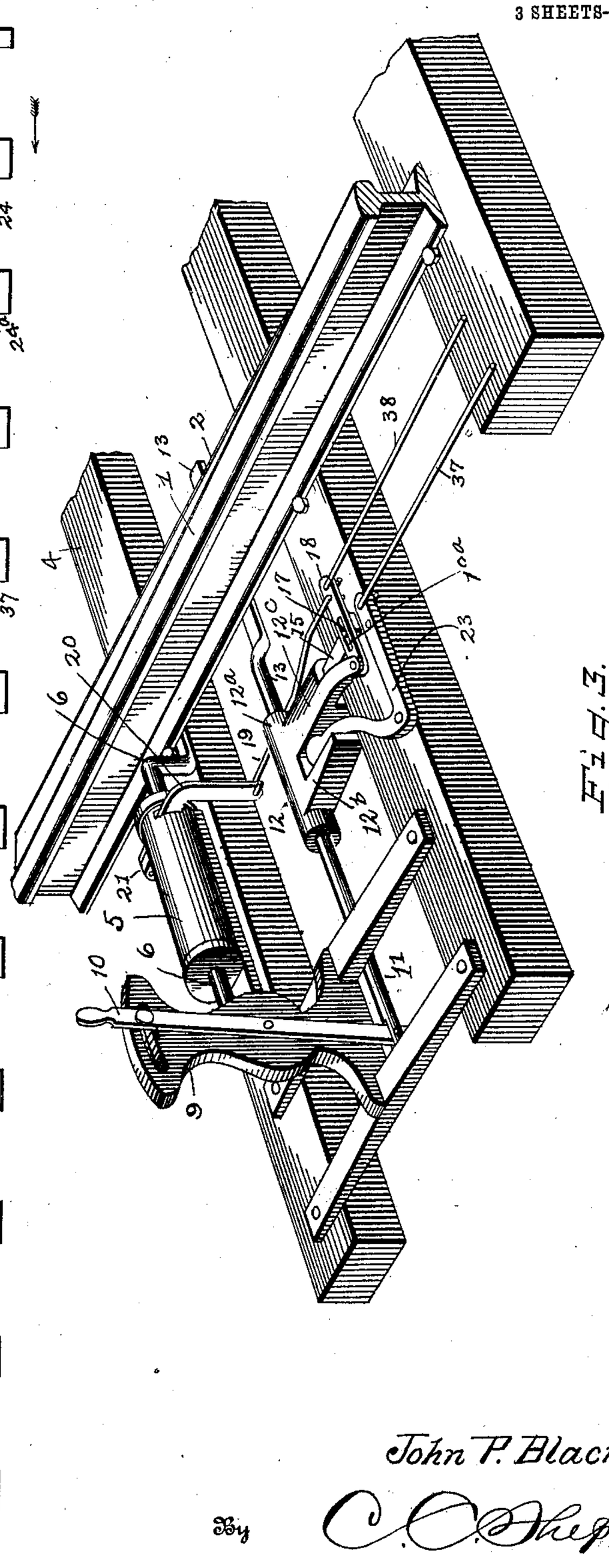

FIG. 3.

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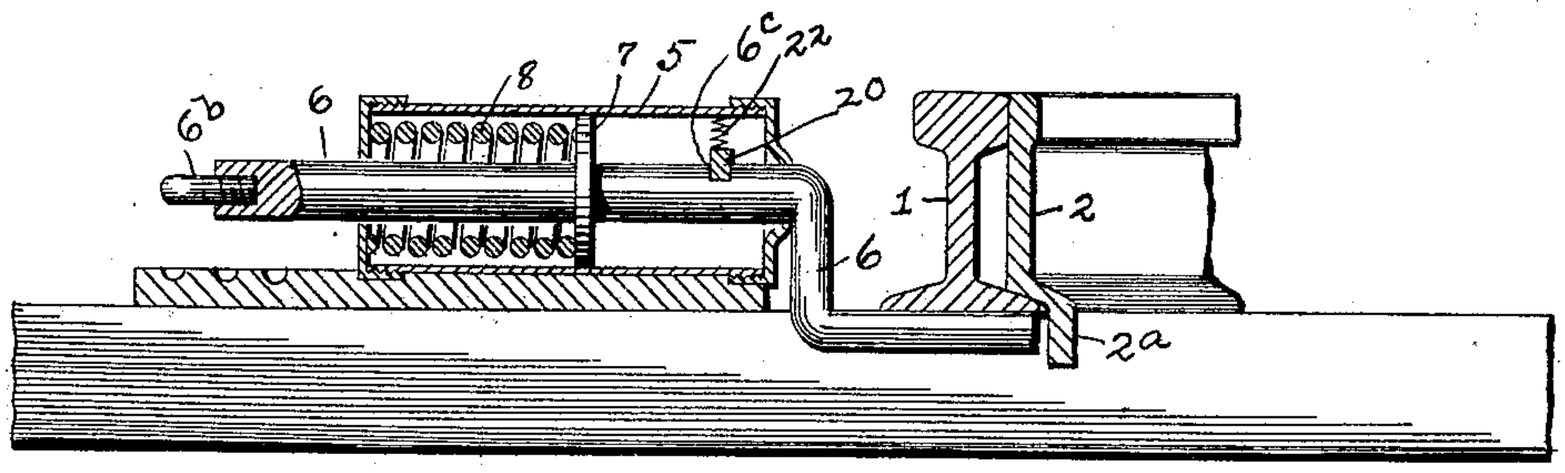

Fig. 4.

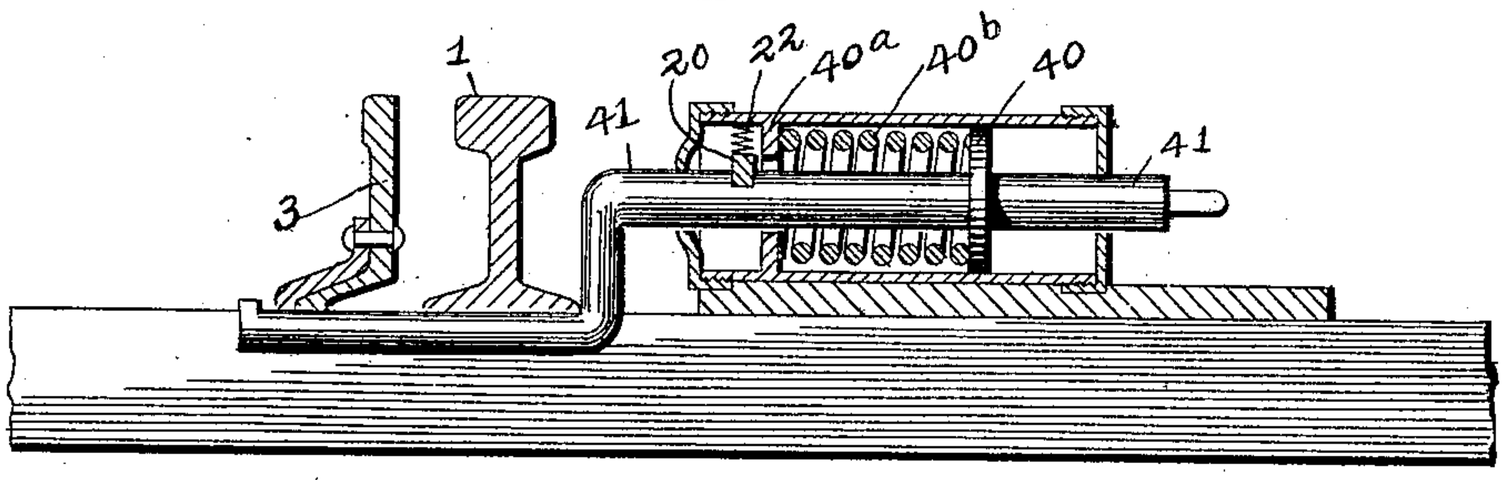

Fig. 5.

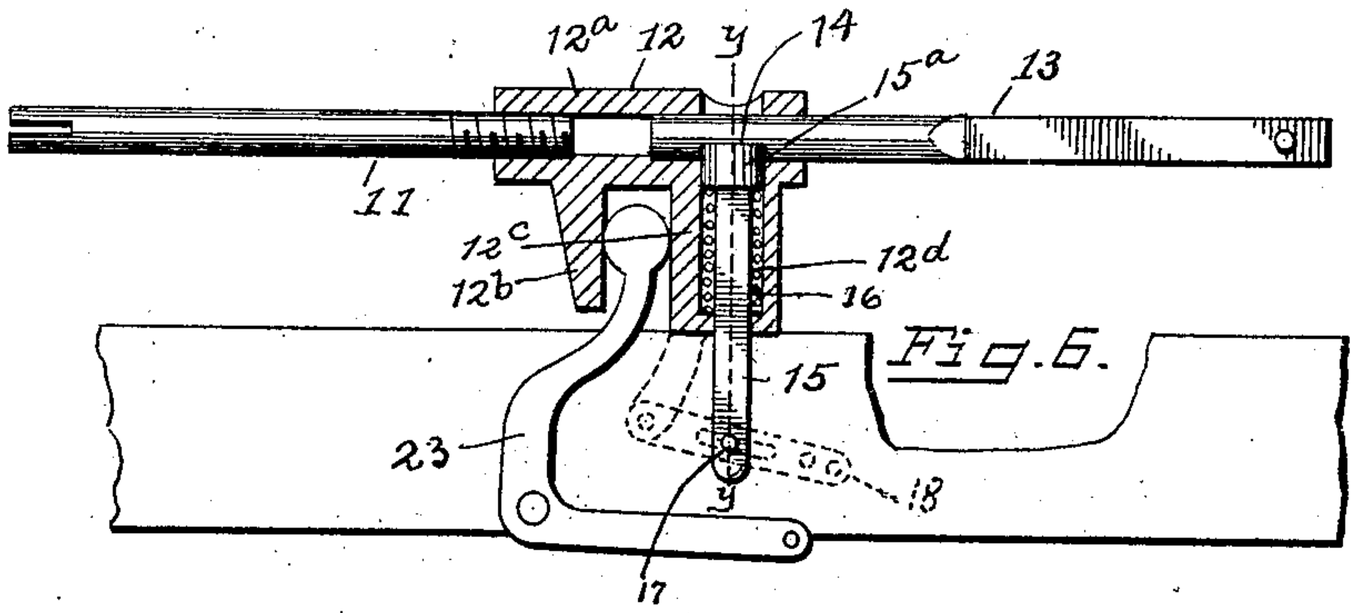

Fig. 6.

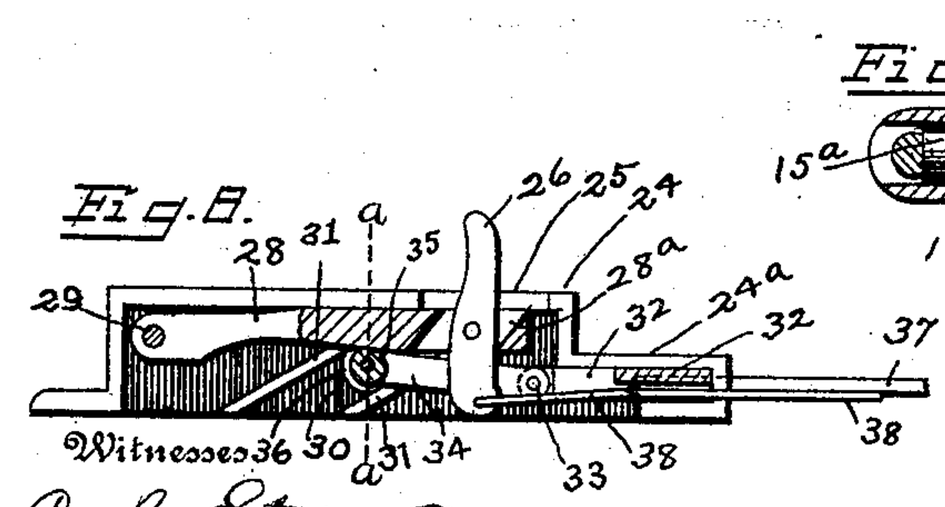

Fig. 8.

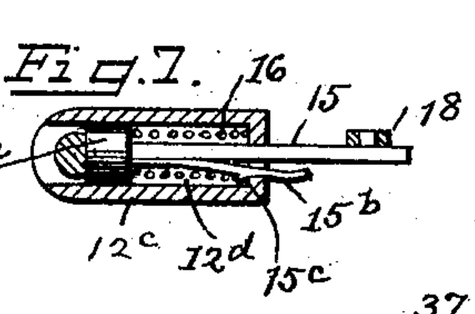

Fig. 7.

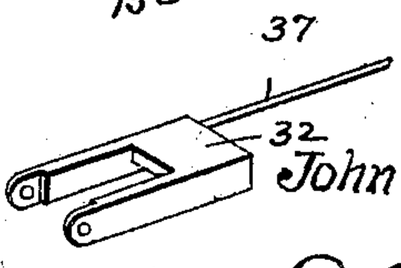

Fig. 10.

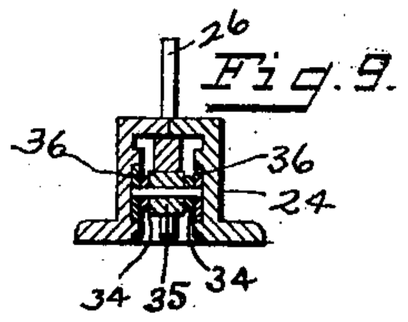

Fig. 9.

Inventor

John P. Blackwood.

By C. C. Shepherd

Attorney

Witnesses

Carl Stoughton

A. L. Phelps

UNITED STATES PATENT OFFICE.

JOHN P. BLACKWOOD, OF ATHENS, OHIO, ASSIGNOR OF ONE-HALF TO FRANK S. HOOKER, OF LANCASTER, OHIO.

RAILWAY-SWITCH-OPERATING MECHANISM.

No. 923,802. Specification of Letters Patent. Patented June 8, 1909.

Application filed June 16, 1908. Serial No. 438,705.

To all whom it may concern:

Be it known that I, JOHN P. BLACKWOOD, a citizen of the United States, residing at Athens, in the county of Athens and State of Ohio, have invented certain new and useful Improvements in Railway-Switch-Operating Mechanism, of which the following is a specification.

My invention relates to railway switch operating mechanism, and the objects of my invention are to provide improved means for automatically closing an open switch on the approach of a train; to so construct my improved switch operating mechanism as to insure a positive movement of the switch rail through contact with a trip located adjacent to the rail; to so construct my improved mechanism as to adapt it for use on either side of the track and to produce various improvements, the details of construction and arrangement of parts of which will be more fully pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of a section of railway track and switch, showing my improved operating mechanism on one side thereof, Fig. 2 is a side elevation of the same, Fig. 3 is a detail view in perspective of the switch rail operating mechanism, Fig. 4 is an enlarged sectional view on line *x*—*x* of Fig. 1, Fig. 5 is a similar sectional view of the switch controlling means as used on the right or opposite side of the track from that shown in Fig. 1, Fig. 6 is an enlarged horizontal section of the switch rod operating mechanism, Fig. 7 is a sectional view on line *y*—*y* of Fig. 6, Fig. 8 is a central vertical longitudinal section of the trip device, Fig. 9 is a transverse section of said trip device on line *a*—*a* of Fig. 8, and, Fig. 10 is a detail view in perspective of a yoke which I employ in connection with said trip device in the manner hereinafter described.

Similar numerals refer to similar parts throughout the several views.

The mechanism which I employ for moving the switch rails is substantially the same on both sides of the track, but I will first describe the mechanism as employed on the left hand side of the track, assuming that the train is moving toward the switch in the direction of the arrow in Fig. 1.

1 represents the main track rails of a railway and 2 and 3 the movable switch rails. Upon an extension of one of the railway ties 4 or upon any suitable support at the side of the track and opposite the end portions of the switch rails, I provide a suitable form of horizontal cylinder 5 which extends at right angles with the length of the track. Passing longitudinally through the cylinder 5 and through openings in the ends thereof is a switch operating plunger rod 6, the inner end portion of this rod being so formed as to permit of its extending beneath the adjacent track rail 1, the end of such extended portion being adapted to abut against a downward extension 2^a of the switch rail 2. Within the cylinder, the plunger rod carries a disk 7 between which and the outer end of said cylinder is provided a coiled spring 8, the latter surrounding the plunger rod. The plunger rod is provided at its outer end with an extension 6^b having an opening therein, as shown.

9 represents a switch stand which is located beyond and at one side of the cylinder 5, said switch stand being of any well known or desired construction and comprising a pivoted switch rod operating lever 10 and means for locking said lever in the desired position on said stand. With the lower end of the switch operating lever 10 is pivotally connected the outer end of a switch rod section 11, the remaining end of which is connected with one end of a coupling body 12, which comprises a cylindrical portion 12^a from which projects laterally a yoke, comprising arms 12^b and 12^c. A lateral extension of the yoke arm 12^c has formed therethrough a suitable passage 12^d.

13 represents a second or inner switch rod section, one end of which is detachably inserted in the tubular portion 12^a of the coupling body 12 and the outer portion of which is designed, as shown, to extend under the rails 1 and 2, said switch rod being connected with said switch rail 2. Within the tubular portion 12^a of the coupling, the rod 13 is formed with a side recess or notch 14, with which is adapted to engage the enlarged head 15^a of a horizontal latch bar 15 which extends through the passage 12^d. The latch bar head is normally held in engagement with the rod section notch 14 by a coiled spring 16 which bears between the head 15^a and an outer end shoulder of the passage 12^d.

As shown more clearly in Fig. 7 of the drawing, I secure to the underside of the inner end portion of the bar 15, a spring catch 15^b which extending outwardly through the mouth of the passage 12^d is provided with an underside catch projection or lug 15^c, which is adapted when said bar 15 is pulled outward to engage the outer portion of the arm 12^c of the coupling body and latch the bar 15 against voluntary return through pressure of the spring 16. The outer end portion of the bar 15 is provided with an upwardly projecting pin 17 which extends loosely through the central slotted opening 18^a of a lever bar 18. One end of this bar 18 is pivoted to the extended outer end portion of the yoke arm 12^c. The remaining end of the bar 18 is connected by a wire or link rod 19 with the lower end of one arm of a bell crank lever 20, the upper arm of which extends transversely through the upper and inner end portion of the cylinder 5 and has its terminal portion pivoted to a lug 21 on the outer side of said cylinder. This upper and substantially horizontal arm of the bell crank 20 is adapted to engage an upper side notch 6^c in the plunger rod 6 and to be normally held in such engagement through the medium of a spring 22 which bears between the upper side of said bell crank arm and the underside of the cylinder 5. Pivoted at its angle to the upper side of a tie adjacent to the yoke portion of the coupling body 12 is a bell crank lever 23, one arm of the latter extending between the arms 12^b and 12^c of said coupling.

At a suitable distance from the switch controlling mechanism heretofore described and at one side of and adjacent to the main track, I provide a trip mechanism which is constructed substantially as follows: Extending parallel to the main track rail and adjacent thereto, is an oblong housing which I preferably form of two united sections 24. That end of the housing which is toward the switch controlling mechanism, is reduced in height as indicated at 24^a. In the upper side of the housing in its forward end portion, I provide a longitudinal slot 25 through which projects the upper end portion of a trip lever 26, the latter being pivoted within the housing as indicated at 27. This trip lever extends through an inclined opening 28^a which is in the forward end portion of a substantially horizontal lever 28, the rear end of which is pivoted as indicated at 29 between the side walls of the housing 24. In constructing these housing side walls, I form therein opposing downwardly and rearwardly inclined channels or ways 30, these ways being produced by the formation in said housing walls of parallel inclined ribs 31. 32 represents a yoke shaped body which is slidably mounted in the reduced forward portion 24^a of the housing 24, said yoke-shaped body having its rearwardly extending arms pivotally connected at 33 with the parallel side members of a link 34 through which the lower portion of the lever 26 passes, as shown. The arms or members of the link 34 have journaled between them a roller 35, upon which the underside of the lever 28 bears. The journal pin of the roller 35 carries on each of its outer ends a guide wheel 36 (see Figs. 8 and 9) which guide wheels run in the inclined ways 30 above described.

37 represents a wire or rod which has one end connected with the forward end of the yoke 32, said wire or rod extending outward through the end of the housing extension 24^a and having its remaining end pivotally engaged with the outer end of the bell crank lever 23. 38 represents a second rod or wire which has one end connected with the lower end of the trip lever or trigger 26 from which point said rod or wire 38 extends outward through the end of the casing and is pivotally connected with that end of the lever bar 18 with which the wire or rod 19 is connected.

For the purpose of describing the operation of my device, we will assume, first, that the switch rail 2 is in contact with the adjacent track rail 1 in which position it is held by the engagement with the switch rod section 13 and the head of the bar 15; second, that the spring actuated plunger 6 is in its outermost position, where it is held by engagement with the bell crank latch 20, and third, that a train is approaching the switch in the direction of the arrow in Figs. 1 and 2 of the drawing. The switch rail 2 being in the position described, it is obvious that the rail 3 will be out of contact with the adjacent rail 1, the switch thus being in an open position which will carry the train on to a side track. When the train reaches the projecting trip lever or trigger 26, said lever is engaged and thrown forward by contact with a suitable projection on the locomotive and this forward and downward movement of the upper portion of the lever, results in a rearward pulling action on the wire 38 which operates, first, through the movement of the bar 18 and connection 19, to raise the bell crank latch 20 out of engagement with the plunger rod 6, and second, to pull the latch bar 15 out of engagement with the switch rod section 13. The switch rod section 13 being thus released and the spring 8 being free to act through the release of the plunger 6, the pressure exerted by said plunger upon the downward extension 2^a of the switch rail 2, will result in forcing said switch rail out of contact with the main track rail and in forcing the opposite switch rail 3 into contact with the opposite main track rail, thus closing the switch and providing a continuous main track-way for the train. The oper-

ation of again opening the switch and returning the parts to the first described position, consists first, in inserting a bar or other implement through the opening in the end of the plunger extension 6^b and forcing said plunger back until the catch lever 20 again engages the notch thereof; second, in moving the switch stand lever 10 to force the coupling body 12 toward the track rail until the spring actuated latch bar is again in position to engage the recess 14 of the rod 13 (the spring catch 15^b having first been disengaged from the outer end of the member 12^c), which being accomplished, the switch lever 10 is so thrown as to move the switch rods 11 and 13 outward until the switch rail 2 is again in contact with the adjoining main track rail.

In opening the switch by hand, the switch rod sections 11 and 13 and the coupling body 12 are moved inward toward the track, with the result that a swinging movement is imparted to the bell crank 23, which through the rearward movement of the rod 37, the yoke 32 and link 34 results in a downward traveling movement of the wheels 36 in the ways 30 of the housing side walls. The downward movement thus imparted to the roller 35 permits a downward movement of the lever arm 38 and trigger 26, thereby depressing said trigger to such position as to prevent its contact with a train. In opening the switch to direct the cars on to the side track and in the consequent outward movement of the coupling body 12, it is obvious that the movement of the rod 37, will cause an upward traveling movement of the wheels 36 and roller 35 which will lift the lever bar 28 and trigger 26 to the position indicated in Fig. 8 of the drawing. In operating the switch by hand, it is obvious that the spring actuated plunger 6 may be retained in its locked position.

The mechanism and operation which I have described, relates as hereinbefore mentioned to the switch operating means which I employ on the left-hand side of the track and in Fig. 5 of the drawing, I have shown a slightly modified construction of spring actuated plunger for use on the opposite side of the track, in which case as will readily be understood the plunger is utilized to pull the switch rail outward instead of pushing the same inward as on the left-hand side. The mechanism shown in Fig. 5 consists of a cylinder 40 corresponding in external appearance and arrangement with the cylinder 5. This cylinder, however, has formed in its inner end portion an internal shoulder 40^a against which bears the inner end of a coiled spring 40^b, the outer end of which abuts against a fixed collar or shoulder 40^c on the plunger rod 41. The rod 41 instead of abutting against the switch rail, is adapted to engage the inner side of the same.

In the previously described construction and operation, the latch lever 20 was employed to hold the plunger rod 6 in its outermost position, but as will readily be understood by reference to the drawing, in the construction illustrated in Fig. 4, the latch lever by engagement with a notch of the plunger 41, locks said plunger in such position as to hold the switch rail out of contact with the main track rail and in its innermost position. When the latch 20 is released, it is obvious that the spring 40^b will operate to move the plunger 41 outward and throw the switch rail 3 into contact with the main track rail. It will thus be seen that while the movement of the plunger on the right-hand side of the track is the reverse of that on the left-hand side, the means for operating and controlling the plunger are substantially the same.

From the construction and operation of the mechanism herein described, it will readily be understood that a switch which has been carelessly left open, will be closed automatically and a clear main track provided for an approaching train.

What I claim, is:

1. In a switch operating mechanism, the combination with a railway track and switch rails, of means for actuating said switch rails, a trip adapted to be engaged by a train, and mechanism adapted to bodily lower said trip out of the path of the train.

2. In a switch operating mechanism, the combination with a railway track and switch rails, of means for actuating said switch rails, a trip adapted to be engaged by a train, mechanism adapted to bodily lower said trip out of the path of the train, a locking mechanism connected to said switch rails and a connection between the trip and said locking mechanism.

3. In a switch operating mechanism, the combination with a railway track and switch rails, of means for actuating said switch rails, a trip adapted to be engaged by a train, mechanism adapted to bodily lower said trip out of the path of the train, a locking mechanism connected to said switch rails and a connection between the trip and said locking mechanism, said trip serving to release said locking mechanism prior to the release of the switch operating mechanism.

4. In a device of the character described, the combination with a railway track and switch rails, of a casing a spring actuated member located within said casing and engaging said switch rails, a latch for holding said spring actuated member in retracted position, a manually operable rod, a locking rod, a locking mechanism adapted to lock the manually operable rod and the locking rod together, a trip, and connections between said trip and both the locking mechanism and the latch.

5. In a device of the character described, the combination with a railway track and switch rails, of a casing, a spring actuated member located within said casing and engaging said switch rails, a latch for holding said spring actuated member in retracted position, a manually operable rod, a locking rod, a locking mechanism adapted to lock the manually operable rod and the locking rod together, a trip, connections between said trip and both the locking mechanism and the latch, and means for pivotally moving the trip out of the path of movement of the train.

6. In a device of the character described, the combination with a railway track and switch rails, of a casing, a spring actuated member located within said casing and engaging said switch rails, a latch for holding said spring adapted member in retracted position, a manually operable rod, a locking rod, a locking mechanism adapted to lockthe manually operable rod and the locking rod together, a trip, connections between said trip and both the locking mechanism and the latch, and means for pivotally moving the trip out of the path of movement of the train, said locking mechanism comprising a spring pressed plunger which is adapted to engage a notched portion of the locking rod.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN P. BLACKWOOD.

Witnesses:

E. B. CLARKE,

R. L. WOODWORTH.