

No. 673,637.

Patented May 7, 1901.

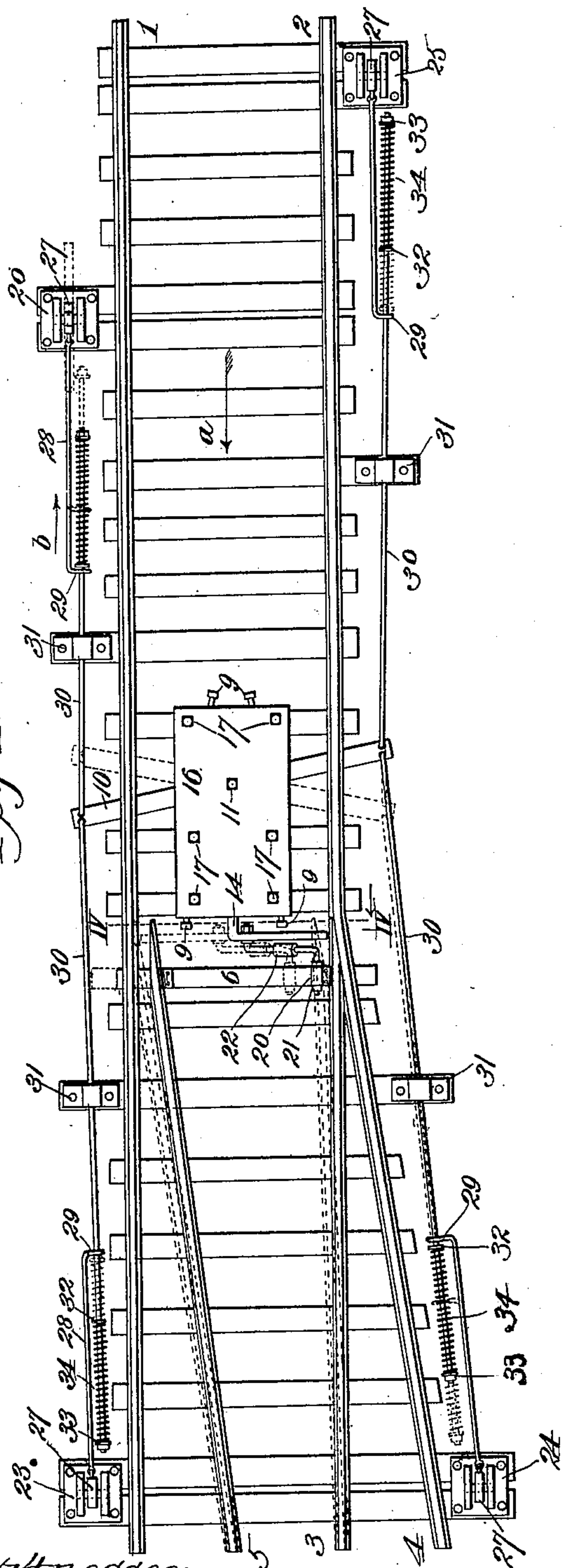
D. H. CLEVELAND.
RAILWAY SWITCH.

(Application filed Feb. 16, 1901.)

(No Model.)

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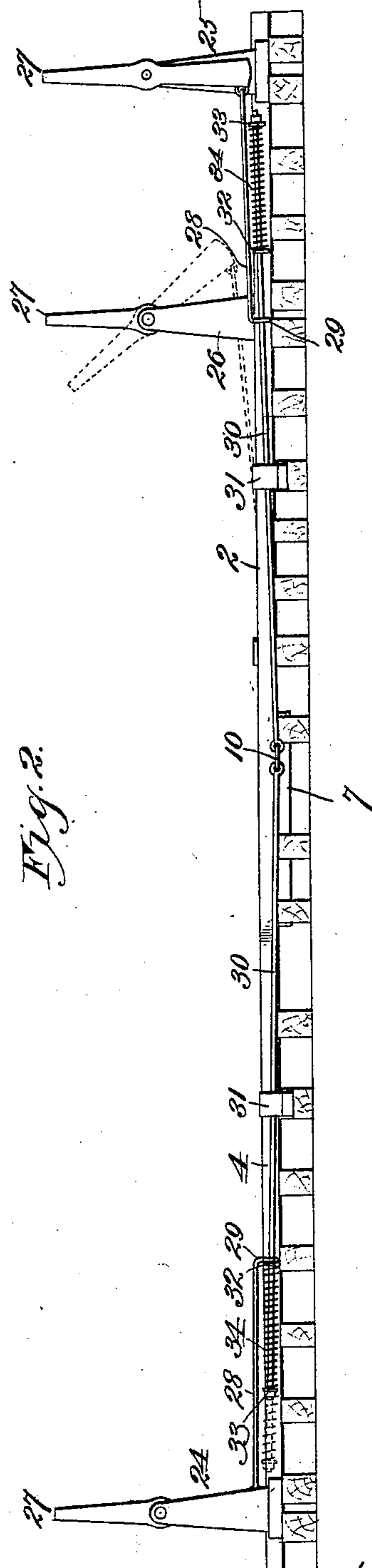
Fig. 1.



Witnesses:

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Arthur M. Arthur

Fig. 2.



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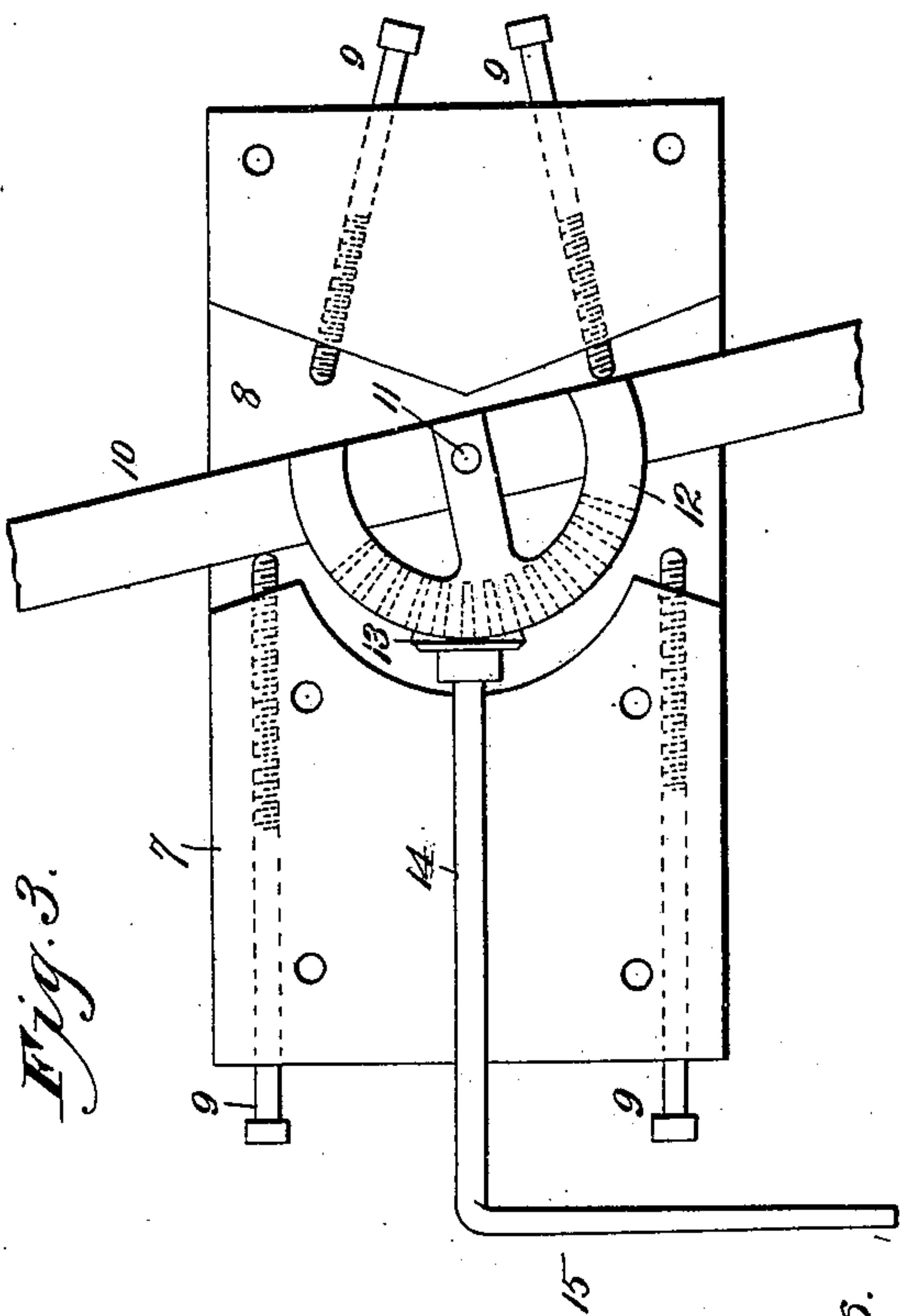


Fig. 3.

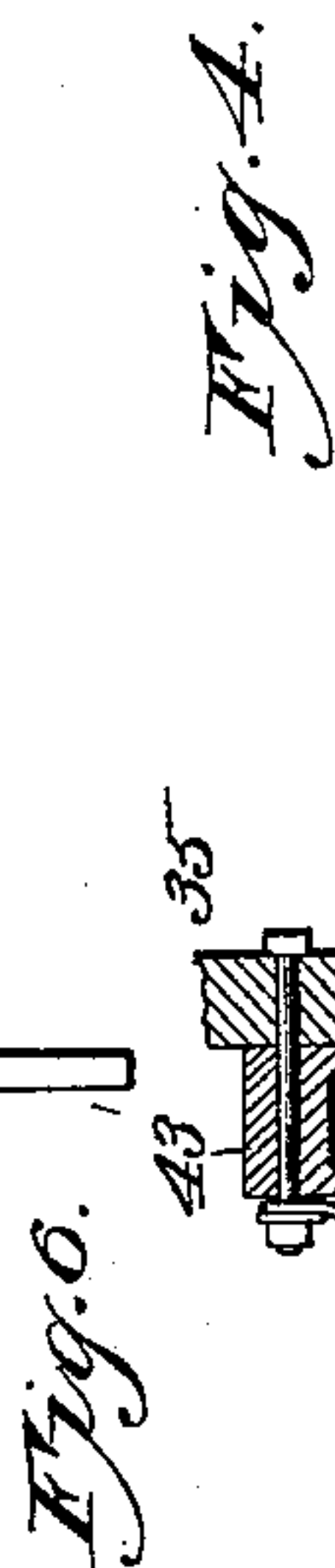


Fig. 4.

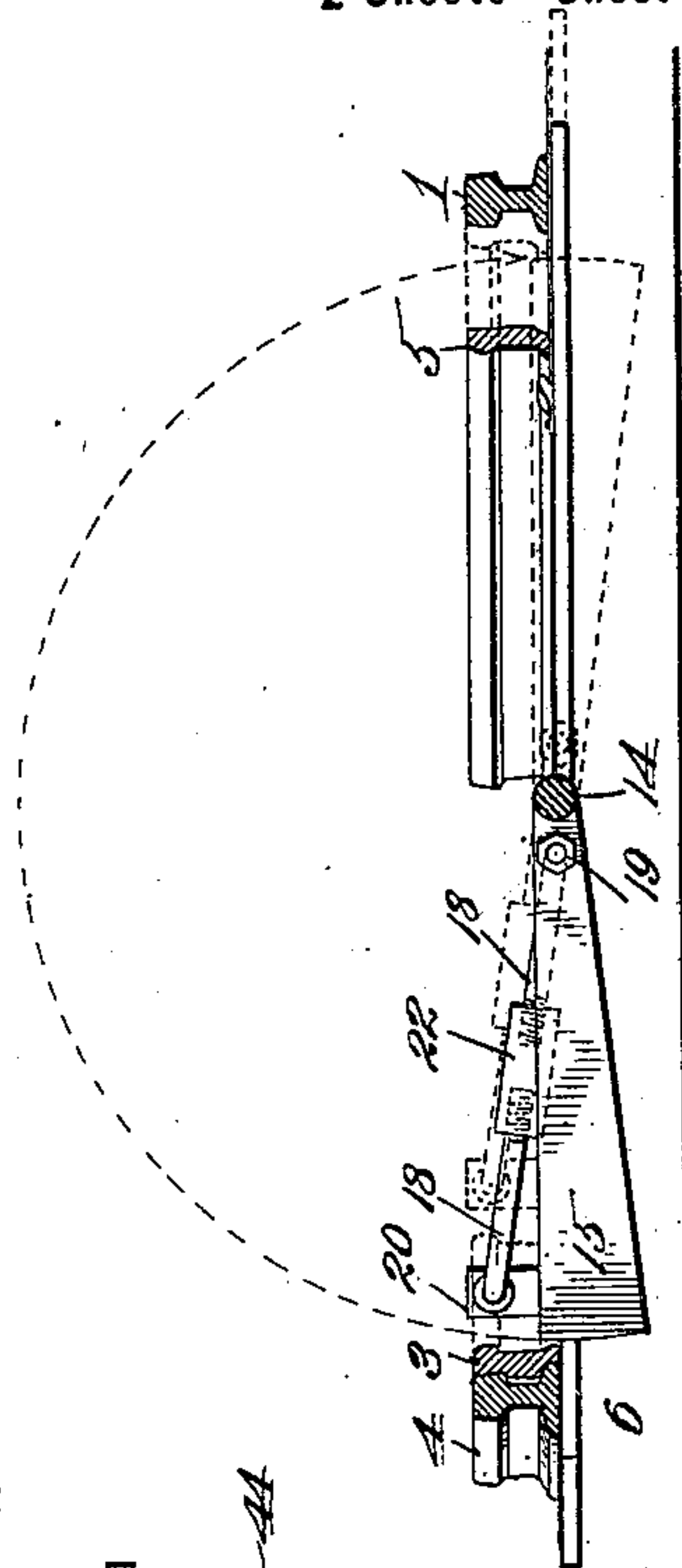


Fig. 5.

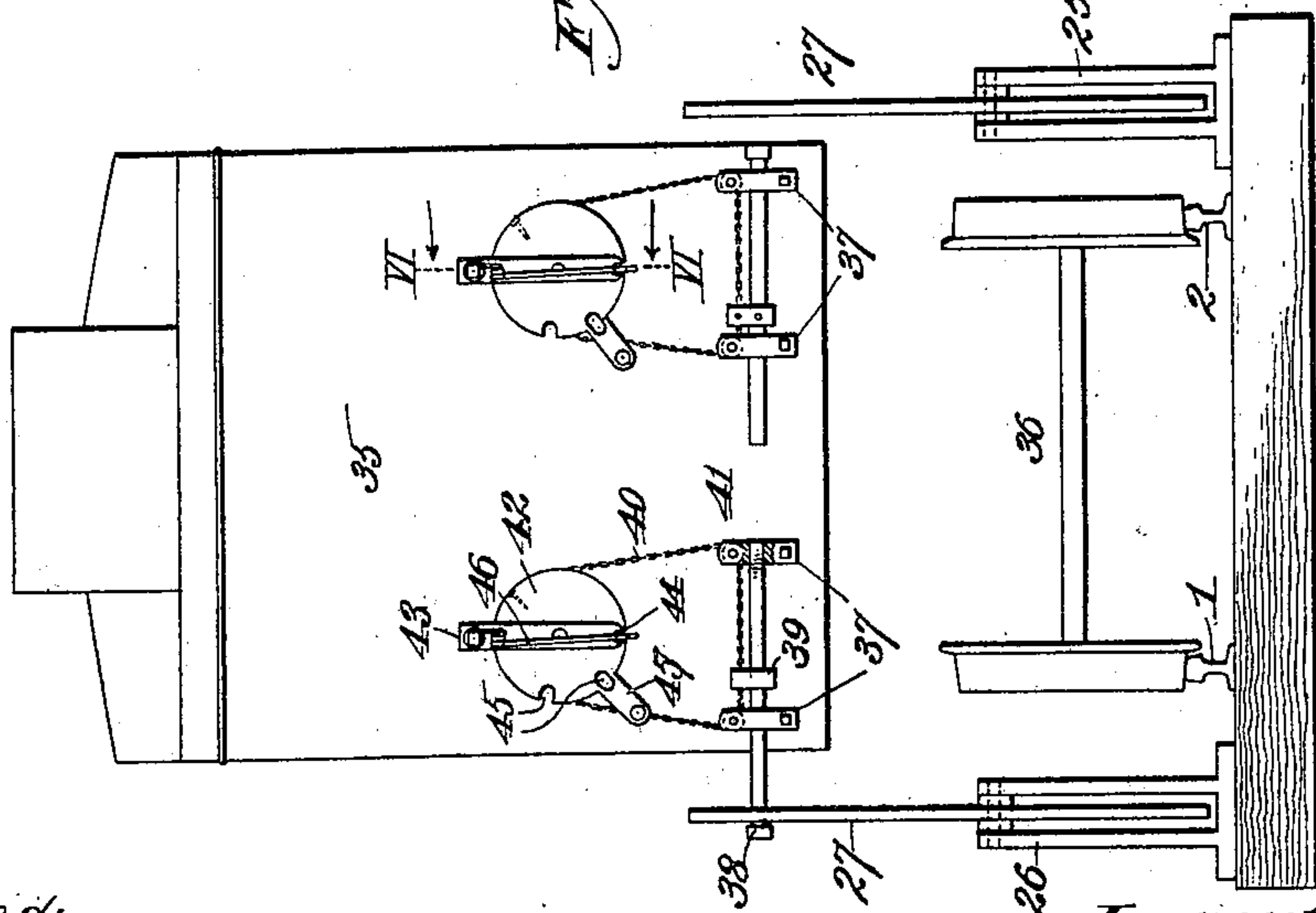


Fig. 6.

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UNITED STATES PATENT OFFICE.

DAVID H. CLEVELAND, OF KANSAS CITY, KANSAS.

RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 673,637, dated May 7, 1901.

Application filed February 16, 1901. Serial No. 47,559. (No model.)

To all whom it may concern:

Be it known that I, DAVID H. CLEVELAND, a citizen of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented a new and useful Railway-Switch, of which the following is a specification.

My invention relates to railway-switches of that class adapted to be operated by a passing train, my object being to produce an automatic switch which is efficient and thoroughly reliable in operation and which embodies the desirable features of simplicity, strength, and durability.

With this object in view the invention consists in certain novel and peculiar features of construction and combinations of parts, as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which—

Figure 1 represents a top plan view of a railway-switch embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a top plan view of the boxing on which the switch-bar is pivoted, the top plate being omitted. Fig. 4 is an enlarged cross-section taken on the line IV IV of Fig. 1. Fig. 5 is an end view of a car provided with adjustable throw-bars for effecting the opening or closing of the switch. Fig. 6 is an enlarged vertical section taken on the line VI VI of Fig. 5.

Referring now to the drawings in detail, where like reference characters designate corresponding parts, 1 designates the straight or unbroken rail, and 2 3 the broken rail, of the main line, rail 3, which constitutes a continuation of rail 2, forming a part of the switch.

4 designates the outer rail of the side track, said rail united or formed integral with the main-track rail 2 at the junction therewith of switch-rail 3.

5 designates the inner side-track rail, the same being movable and forming a part of the switch, said switch-rails 3 and 5 being connected by a transverse tie-bar 6 underlying the rails 1 and 4, so as to hold the points of the switch-rails down to their proper position and throw the same to one position or the other when necessary.

A boxing located centrally between the main-track rails at the free end of the switch embodies the base portion 7, having a recess 8, and extending through said base and projecting into said recess are adjustable stops or set-screws 9 to limit the pivotal action of the horizontal switch-bar 10, fulcrumed at its center on pivot 11 in the recess 8 and underlying the main-track rails. Said switch-bar is formed integrally with or otherwise provided with a cog-segment 12, meshing with a small cog-wheel 13 within the recess and mounted rigidly on the inner end of a longitudinal shaft 14, provided at its opposite end, beyond the end of the boxing, with a laterally-projecting crank-arm 15, which forms a guard to lock the switch in its open or closed position, as hereinafter appears.

The parts referred to as mounted in the base are maintained reliably in such position by means of the top plate 16, which is secured upon the base by means of bolts 17, as shown, the pivot 11, hereinbefore referred to, being also preferably in the form of a bolt, as appears in Fig. 1.

To impart movement to the switch through the medium of shaft 14, a link is employed to pivotally connect the crank-arm guard 15 with the tie-bar 6, said link being composed of two angle-rods 18, one journaled in the crank-arm guard and secured thereto by a nut 19 and the other journaled in a lug or bracket 20 of the tie-bar and secured thereto by a nut 21, the adjacent or threaded ends of said rods being connected by a turnbuckle 22, whereby any wear in the journals may be taken up, so that the position of the crank-arm guard may always be positively predetermined; it being necessary that said guard shall press outwardly against switch-rail 3 to hold the switch closed or against switch-rail 5 to hold the switch locked reliably open and in each case to bear against the base-flange of said rail, as shown clearly in full and dotted lines, Fig. 4, so as to avoid occupying the path of the flanges of the car-wheels passing over the rails, and in this connection it may be stated that set-screws 9 by adjustment coact with the adjustable link just described in determining the throw of the crank-arm guard.

23, 24, 25, and 26 designate similar stands, the first and last named occupying positions

at the same side of the main track, but at opposite sides of the junction of the switch with the main track, it being necessary that the last-named stand, for a purpose which hereinafter appears, shall be located a greater distance from the adjacent rail than any of the other switch-stands. Each stand is vertically slotted and carries pivotally in its upper end a lever 27, which operates through the slot in a plane parallel with the direction of movement of the track and has its lower end of greater weight than its upper end, so as to insure its automatic return to a vertical position.

Pivoted to the lower end of each lever 27 is a rod 28, terminating in an inwardly and downwardly disposed eye or loop 29, fitting loosely upon a pull-rod 30, the inner ends of said pull-rods being pivotally connected to the outer ends of the horizontally-operative switch-bar 10, said pull-rods being mounted in guides 31.

Mounted slidingly upon each rod 30 outward of the engaging eye or loop 29 is a collar 32, and upon the end of the rod is an adjustable collar or nut 33, and between said collars and spirally encircling the rod is an expansion-spring 34, sufficiently powerful to unyieldingly resist the usual pressure brought to bear upon it in throwing the switch.

Referring now to the means for operating the switch automatically from the car, 35 designates the car, and 36 the truck thereof, this portion of the car being shown only to locate these parts relatively, and by reference to Fig. 5 it will be seen that the switch-lever of switch-stand 26 is approximately twice as far from the contiguous side of the car as is the lever of the opposite stand.

While the mechanism for throwing the switch hereinafter described is applicable to freight, passenger, and other cars and may be located on the ends thereof or beneath them, it is to be understood that in the latter case corresponding changes must be made in the relative positions and proportions of the switch stands and levers. In other words, while the form and arrangement herein shown and described is my preferred construction it is to be understood that I reserve the right to make such changes in the form, detail construction, and arrangement of the parts as properly fall within the spirit and scope of the invention.

The arrangement illustrated and described is designed chiefly for passenger trains or cars, which have an end platform or support where the brakeman is enabled to conveniently stand in adjusting the switch-operating mechanism.

37 designates guides bolted or otherwise secured to the end of the car in a plane below the top of the switch-levers, and 38 a reciprocatory throw-bar mounted in said guides and provided with a lug 39, to which are attached the opposite ends of a chain 40, guided around pulleys 41, mounted in guides 37, and

around a grooved wheel 42, journaled in a bracket 43, bolted to the end of the car, the lower end of said bracket being provided with notches 44, adapted to register with one or another of the peripheral notches 45 in wheel 42 in order that the spring-catch 46, secured to the bracket, may by engagement with said registering notches lock the wheel, and consequently the reciprocatory throw-bar, at the desired point of adjustment—that is, may lock the bar as totally withdrawn inward its full distance, as projected outward its full distance, and therefore in position to engage the switch-lever of stand 26, or as projected half-way between the limits of movement indicated, and therefore in position to engage the switch-levers of the other stands and to pass inoperatively by the lever of stand 26; and in order that this wheel may be conveniently operated it is provided with a handle 47, the spring-catch being first grasped and withdrawn from the notches, as will be readily understood. Of course there will be a pair of these throw-bars at each end of the train or car, as shown in Fig. 5, one to open the switch if closed and the other to close the switch if open.

Assuming now that the switch is closed, with the parts arranged relatively as indicated by full lines in Fig. 1, a train traveling in the direction indicated by the arrow *a* is switched onto the side track by having the right-hand throw-bar moved outward its full distance, as indicated in Fig. 5, so that as it passes it will strike switch-lever of stand 26 and move the same to approximately the position shown in dotted lines, Fig. 2. This action of course moves its respective rod 28 in the direction indicated by arrow *b*, Fig. 1, and through the medium of the unyielding spring 34 moves its respective pull-rod 30 in the same direction, and consequently throws the pivoted switch-bar 10 to the position indicated by dotted lines, Fig. 1, this action, through the medium of intermeshing segment 12 and cog-wheel 13, operating shaft 14 and opening the switch and locking it reliably opened by causing the crank-arm guard 15 to hold the point of rail 5 against main rail 1, as indicated in dotted lines, Figs. 1 and 4. Assuming now that another train follows the first in the same direction, but the person in charge desires to continue on the main track, he throws the left-hand bar outward to its intermediate position, where it is in position to strike and operate the switch-lever of stand 25, the throw-bar at the opposite side of the car preferably being withdrawn. At this time the pull-rod contiguous to stand 25 of course occupies the position shown in dotted lines, Fig. 1, with its sliding collar adjacent to the eye or loop of its respective rod 28, so that as said throw-bar strikes and operates said switch-lever the unyielding spring which sustains the pressure causes switch-bar 10 to swing back to the position shown in full lines and the switch

to be closed, the crank-arm guard at the same time swinging back to its original position and locking the switch-rail 3 reliably in alignment with main-track rail 2, as will be readily understood. In case a train is approaching the main track from the side track while the switch is closed, it is obvious that the right-hand throw-bar must be projected so as to strike lever 27 of switch-stand 24, the result being, of course, the opening of the switch, so that the train may pass upon the main track. On the other hand, assuming that a train is traveling on the main track toward the switch, but in the direction opposite to that indicated by arrow *a*, with the switch closed, the left-hand throw-bar must be projected in order that it may strike the lever 27 of switch-stand 23 and close the switch, so as to permit the train to pass.

Owing to the fact that the loads carried by trains of cars vary, it is clear that the throw-bars of those most heavily loaded will strike the switch-levers in a lower plane than the others and as a result impart to them a range of movement greater than that of which the pivoted switch-bar is capable. It is therefore necessary, to avoid the destruction of or injury to the mechanism, to provide for a variable movement between the switch-stand levers and said pivoted switch-bar. The links of the pull-rods and the springs on the latter normally forming to all intents and purposes a rigid part thereof afford this variable movement by yielding a distance equal to the excess of movement of the switch-levers over the pivoted switch-bar—that is to say, as the switch-bar is stopped by the set-screws before the movement of the operating switch-lever is completed the spring interposed between said lever and the switch-bar is compressed, instantly resuming its original position as the throw-bar releases the switch-lever, the latter of course gravitating back to its vertical position and sliding its link 28 inward upon its pull-rod, so that, assuming that one train has closed the switch and continued on the main track, and that the engineer of the next train wishes to continue on the main track, but does not know that the preceding train has followed that course, and that the switch is in the proper position, when the left-hand throw-bar is moved outward it will then strike the lever of switch-stand 25 and will simply cause it to swing inoperatively to the position shown in dotted lines, the link 28 sliding inoperatively upon pull-rod 30 because the latter was compressed and is beyond its range of movement, the switch-lever gravitating back to its vertical position again in the manner already described. It will thus be seen that a train can pass one or any desired number of switches without the necessity of the train crew paying any attention to the latter, provided the right-hand throw-bar does not project its full distance outward, and the fact that the left-hand throw-bar occupies a position to operate

the lever of the switch-stands 25 of each switch it passes makes no change in the position of the switch, because the corresponding link 28 slides inoperatively on its pull-rod, as already explained. Should a switch happen to be open, the left-hand throw-bar will strike the lever of stand 25 and close it properly without attention on the part of the train crew, who are enabled to travel in the direction indicated by arrow *a* from one end of the line to the other by taking the precaution to have the left-hand throw-bar properly positioned and the right-hand throw-bar withdrawn to at least its intermediate or half-way position. In traveling from the side track to the main track it is necessary only to have the right-hand throw-bar occupying its intermediate position to insure that the switches shall be opened to enable the train to pass onto the main track.

From the above description it will be apparent that I have produced an automatic switch mechanism which provides for all contingencies and for the passage of a train or car in any direction, and while the description implies its use with large railway systems it is to be understood that it may be used in connection with street-railways as well.

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

1. In an automatic railway-switch, a pivoted switch-bar, a crank-shaft geared thereto and connected to open or close the switch, the crank-shaft being adapted to lock the switch open or closed, a switch-lever, a pull-rod connected to the switch-bar, a fixed and a sliding collar on said pull-rod, an expansive spring interposed between said fixed and sliding collars, and a link connected to the switch-lever, and fitting slidingly on the pull-rod inward of said sliding collar, substantially as described.

2. In an automatic railway-switch, a pivoted switch-bar, a crank-shaft geared thereto and connected to open or close the switch, the crank-shaft being adapted to lock the switch open or closed, a switch-lever weighted to assume a perpendicular position, a pull-rod connected to the switch-bar, a fixed and a sliding collar on said pull-rod, an expansive spring interposed between said fixed and sliding collars, and a link connected to the switch-lever, and fitting slidingly on the pull-rod inward of the sliding collar, substantially as described.

3. In an automatic railway-switch, a boxing, a switch-bar pivoted therein and projecting beyond the rails and occupying a position below the same, a crank-shaft journaled in the boxing and geared to the switch-bar and having its crank-arm arranged to hold the switch open or closed, a link pivotally connecting the crank-arm with the switch, a plurality of stands, switch-levers mounted therein, pull-rods pivoted at their inner ends to the switch-bar and suitably guided, collars upon the ends of said rods, sliding collars

upon the rods, expansive springs interposed between said first-named or fixed collars and the sliding collars, and links pivoted to the lower ends of the switch-levers and fitting
5 slidingly upon the pull-rods inward of said sliding collars, substantially as described.

4. In an automatic railway-switch, a boxing, a switch-bar pivoted therein and projecting beyond the rails and occupying a position
10 below the same, a crank-shaft journaled in the boxing and geared to the switch-bar and having its crank-arm arranged to hold the switch open or closed, a link pivotally connecting the crank-arm and the switch, a plu-
15 rality of stands, switch-levers mounted therein, pull-rods pivoted at their inner ends to the switch-bar and suitably guided, collars upon the ends of said rods, sliding collars upon the rods, expansive springs interposed
20 between said collars, links pivoted to the lower ends of the switch-levers and fitting slidingly upon the pull-rods inward of said sliding collars, and reciprocatory throw-bars mounted on a train or car adapted to strike
25 and operate one of said switch-levers, substantially as described.

5. In an automatic railway-switch, a boxing, a switch-bar pivoted therein and projecting beyond the rails and occupying a position
30 below the same, a crank-shaft journaled in the boxing and geared to the switch-bar and having its crank-arm arranged to hold the switch open or closed, a link pivotally connecting the crank-arm and the switch, a plu-
35 rality of stands, switch-levers mounted therein, pull-rods pivoted at their inner ends to the switch-bar and suitably guided, collars upon the ends of said rods, sliding collars upon the rods, expansive springs interposed

between said collars, links pivoted to the 40 lower ends of the switch-levers and fitting slidingly upon the pull-rods inward of said sliding collars, reciprocatory throw-bars carried by the train or car, and means for moving said bars outward their full distance to 45 operate one of said switch-levers, or half the distance to operate the remaining switch-levers, substantially as and for the purpose described.

6. In an automatic railway-switch, a box- 50 ing, a switch-bar pivoted therein and projecting beyond the rails and occupying a position below the same, a crank-shaft journaled in the boxing and geared to the switch-bar and having its crank-arm arranged to hold the 55 switch open or closed, a link pivotally connecting the crank-arm and the switch, a plurality of stands, switch-levers mounted therein, pull-rods pivoted at their inner ends to the switch-bar and suitably guided, collars 60 upon the ends of said rods, sliding collars upon the rods, expansive springs interposed between said collars and fitting slidingly upon the pull-rods inward of said sliding collars, reciprocatory throw-bars carried by a train 65 or car, means for moving said bars outward their full distance to operate one of said switch-levers, or half the distance to operate the remaining switch-levers, and means for locking the throw-bars in the position to 70 which they are adjusted, substantially as and for the purpose set forth.

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

DAVID H. CLEVELAND.

Witnesses:

C. McCaffrey,
E. L. Hall.