No. 855,437. PATENTED MAY 28, 1907.

U. A. WOODBURY.

RAILWAY SWITCH.

APPLICATION FILED APR. 23, 1907.

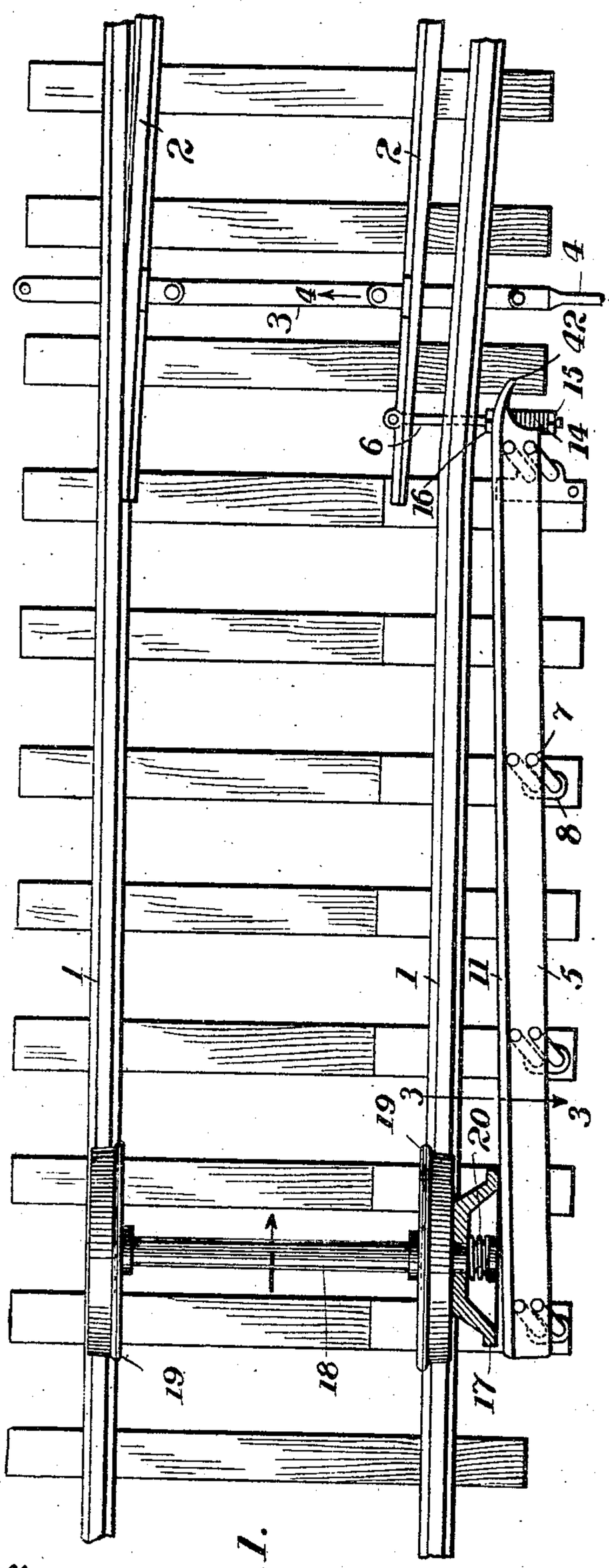

Fig. 1.

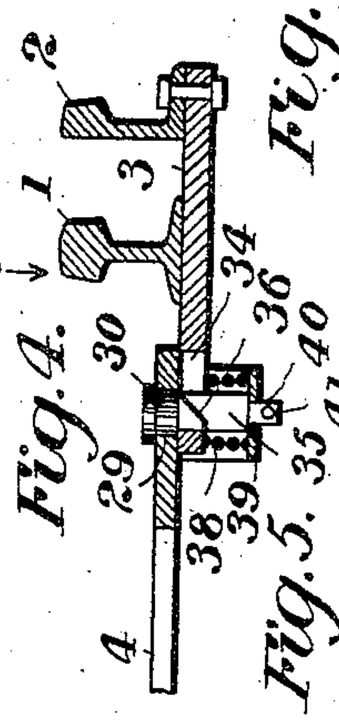

Fig. 4.

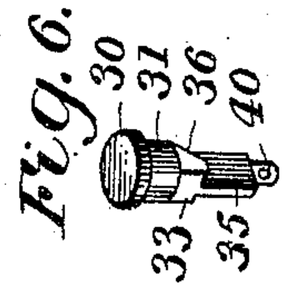

Fig. 6.

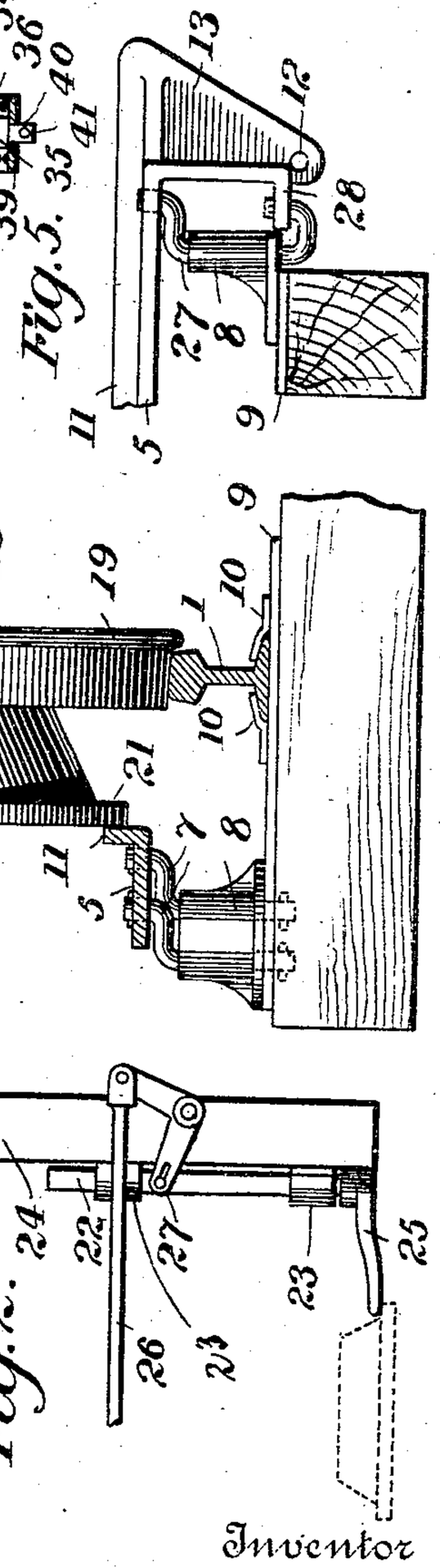

Fig. 5.

Fig. 3.

Fig. 2.

Witnesses

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RAILWAY-SWITCH.

No. 855,437. Specification of Letters Patent. Patented May 28, 1907.

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To all whom it may concern:

Be it known that I, URBAN A. WOODBURY, a citizen of the United States, residing at Burlington, in the county of Chittenden and State of Vermont, have invented certain new and useful Improvements in Railway-Switches, of which the following is a specification.

My invention relates to railway switches, and has for its object to provide a safety mechanism therefor, whereby, if the switch has been inadvertently left open, it will be automatically closed by a train running toward the same.

A further object of my invention is to provide a mechanism of the class described, which will be simple and inexpensive, which will operate with certainty and which will not interfere with the ordinary operation of switching.

Another object of my invention is to so construct and arrange the mechanism that the switch can yield as usual when it has been inadvertently set wrong and a train passes through it from the heel or rear side thereof.

Further objects and advantages of my invention will appear from the following detailed description, read in connection with the accompanying drawing, in which:—

Figure 1 is a plan view of a railway-switch, equipped with safety mechanism embodying my invention; Fig. 2 is a detail view, in plan, of a special mechanism which I employ on the locomotive for a purpose to be hereinafter explained; Fig. 3 is a cross-section on line 3—3 of Fig. 1, showing, partly broken away, one of the wheels of a locomotive, provided with special switch-closing mechanism; Fig. 4 is a cross-section on line 4—4 of Fig. 1; Fig. 5 is an end elevation of the switch-closing mechanism of Fig. 1, and Fig. 6 is a detail view of the end of the switch-rod and of the pin which connects said rod to the switch-stand rod.

The main-line or fixed rails of a railroad track are represented at 1, 1, and the switch or movable rails at 2, 2, the latter being attached to the switch-rod 3, by which they are moved.

The switch-rod 3 is connected to the switch-stand-rod 4, which is actuated in the usual manner from a switch-stand, not shown. The connection between said rods is normally a rigid one but is adapted to be "broken," as will be hereinafter explained.

The switch-rails 2 are adapted to be manually moved, by the means just described; they are also adapted to be automatically moved, from the "open" position, shown in Fig. 1, to the closed position by means which will now be described.

Mounted adjacent to the outside of one of the main-rails 1, is a long bar 5, connected by a rod or bolt 6 to one of the switch-rails 2 and adapted to be moved parallel to itself, away from said rail 1, by means carried by the locomotive, a distance sufficient to close the switch. For this purpose, said bar 5 is carried on a plurality of short, vertical crank shafts 7, preferably arranged in pairs on alternate ties, as shown. These vertical crank shafts are journaled in boxes 8, secured to the ties, there being preferably plates 9 interposed between the bases of said boxes and the ties and also running beneath the rail 1, which may be secured thereto by clamping-plates 10, see Fig. 3.

The bar 5, which is provided on its edge nearest the rail with a flange 11, does not run parallel to said rail, but at an angle thereto, as shown. Assuming that the movement of the switch-rails from the "open" to the "closed" position is four inches, then the bar 5, which may be about twelve feet long, will have the outside of its flange about eight inches from the outside of the rail-head at one end and three inches at the other end where the bolt 6 is connected thereto. Said bolt 6 passes through an aperture 12, formed in a flange 13 depending from the end of bar 5, and is surrounded by a strong, spiral spring 14 between the outside of said flange and the nuts 15 on the end of said bolt. A nut 16 on said bolt bears against the inside of said flange, said nuts enabling the compression of the spring to be adjusted as found useful.

The means carried by the locomotive, which coöperates with the bar 5 to close the switch, will now be described.

A special wheel 17 is mounted on an extension of the axle 18 of the front-truck-wheels 19, and is pressed against the outside face of the wheel 19, which runs on the rail adjacent to which the bar 5 is mounted, by a relatively light spring 20. The wheel 17 is provided with a flange 21, the outside face of which is substantially eight inches (under the conditions assumed above) from the outside of the rail-head, when the flange of its wheel 19 is in contact with the inside face of said rail-head. Means are provided on the loco-

motive whereby the engineer can move said wheel 17 outwardly against the pressure of said spring 20, so that the flange 21 of said wheel will pass outside of the flange 11 of the bar 5, and the latter be, therefore, not actuated by said wheel. This means consists of a square bar 22 mounted for reciprocation in boxes 23, secured to the front cross-beam 24 of the locomotive, and carrying at its end a downwardly projecting arm 25, adapted to engage the inside of the flange 21 of the special wheel. When it is desired to switch a locomotive, equipped with the special wheel 17, off of the main-line, the engineer pulls on the rod 26, which runs back to the cab, thereby swinging bell-crank lever 27, pivotally carried on beam 24, moving bar 22 outwardly and consequently also the wheel 17. The end of the arm 25 engages the flange 21 of the special wheel at a point approximately in the same horizontal plane as the center of said wheel, so that it will always be in position to engage said flange, notwithstanding any relative movement which may occur between the truck-wheels 19 and the beam 24. Upon releasing the rod 26, the special wheel 17 is, of course, returned by the spring 20 to its normal position, in which it is ready to actuate bar 5.

I will now describe the reason for the provision of spring 14 on bolt 6.

As assumed above, the requisite movement of the switch-rails and consequently of the bolt 6 and of the end of the bar 5 to which said bolt is connected is four inches, but, as stated above, the said end of the bar is only three inches away from the rail-head. The outside of the flange of the special wheel is normally, as stated also, eight inches from the rail-head, consequently the front end of the bar 5 will be moved five inches backwardly away from the rail, which is one inch more than the movement required to bring the adjacent switch rod 2 against the inner face of rail 1. But it does not always happen that the flange of the truck wheels 19 is in contact with the inner face of the rail-head; there is always a certain amount of play, and, for the purposes of illustration, I have assumed that the said flange may be as much as one inch away from the rail-head. It will be seen that, in such a case, the wheel 17 will project only seven inches outward from the rail, instead of eight inches, and therefore, in order to obtain the necessary four inches of movement of the switch-rails, the switch-end of bar 5 must be moved four inches, and consequently must be, to begin with, only three inches away from the rail. In the case just assumed, the spring 14 will not be compressed at all, although, as a matter of fact, it is advantageous to permit it to be compressed a little so as to hold the switch-rail 2 snugly against the rail 1. As has been stated, means are provided for adjusting the strength of said spring, which will be done to suit the particular conditions of each installation.

In order to more securely support the switch-end of the bar 5, at which the principal strain comes, the pair of crank-shafts 27, see Fig. 5, at that end are cranked at the bottom as well as at the top, engaging at the bottom with a flange 28, provided on the bar 5.

There remains to be described the "breakable" connection between the switch-rod 3 and switch-stand-rod 4. This is illustrated in Figs. 4 and 6. The latter has a circular aperture 29 formed near its end, in which fits the upper circular portion 31 of a headed pin 30. The end of the rod 3 has a square aperture 32, in which fits the intermediate square portion 33 of said pin, and a rectangular slot 34, running into said square aperture, said slot being of a width corresponding to the thickness of the lower, rectangular portion 35 of the pin 30. The sides of the square portion 33 of said pin are beveled off, as shown at 36, and corresponding inclines 37 are provided at the sides of the square aperture 32 of rod 3. These beveled surfaces are normally in contact, being pressed together by a strong spring 38, surrounding the pin 30 below bar 3 and supported by a stirrup 39 projecting downwardly from rod 4. The shank of pin 30 is reduced at 40 and passes through an aperture in the bottom of said stirrup, below which it is secured by a nut or pin 41. The position of the said parts is normally that shown in Fig. 4, the rods 3 and 4 being, in effect, rigidly connected together, whereby the ordinary operation of switching can be carried on as usual. When the switch is open, the bar 4 is, of course, rigidly held from movement by the switch-stand, which is then locked in the "open" position, and, in order that the switch may be automatically closed by the means hereinbefore described, the rod 3 must move relatively to the rod 4. This is rendered possible by the connection just described.

The operation is as follows: When the special wheel 17 strikes the flange 11 of bar 5, it moves said bar outward, thus pulling on bolt 6 and consequently forcing rod 3 toward the switch-stand. The inclined surfaces 37 then act as cams or wedges on the inclined surfaces 36 of the pin 30, to raise the latter, together with the end of rod 4, against the pressure of spring 38, until the top of rod 3 slides under the shoulders at the bottom of the square portion 33 of said pin, and the lower, rectangular portion 35 thereof slides in the slot 34 of rod 3. The rods are held securely in this position by friction, the spring 38 pressing them tightly together. In order to restore the connection to its normal position, it is only necessary to unlock the switch-stand and throw it to the "closed" position, rod 4 and pin 30 being thereby pulled back,

until the latter slips back into the aperture 32 of rod 3, as shown in Fig. 4.

The front end of bar 5 is curved, as shown at 42, so that the special wheel 17, when a locomotive equipped therewith is backing up on the main line, will be in no danger of striking on the end of the flange 11 of said bar.

Having thus described my invention what I claim is:

1. In an automatic railway switch, a bar mounted adjacent to the track for movement parallel to itself, in position to be acted upon by a locomotive, a direct connection between said bar and the switch-rails, a switch-rod and a switch-stand-rod and means normally connecting said rods rigidly together but permitting relative movement thereof, when said bar is actuated.

2. In an automatic railway switch, the combination of a switch-rod and a switch-stand-rod, means normally connecting said rods rigidly together but constructed and adapted to yield under pressure and permit a relative movement thereof and means directly connected to the switch-rails and located in position to be actuated by a locomotive to cause said switch-rod to move relatively to said switch-stand-rod to close the switch.

3. In an automatic switch, a bar angularly arranged adjacent to one of the main-line rails in position to be actuated upon by a locomotive, a direct connection from said bar to the switch-rails, a yielding element in said connection, a switch-rod and a switch-stand-rod, means normally rigidly connecting said rods but adapted to yield when said bar is actuated, and means to cause said bar to always maintain the same angle relatively to the main-line rails.

4. In an automatic railway-switch, the combination of a bar mounted on a plurality of vertical crank-shafts in position to be actuated by means carried by a locomotive, connections between said bar and the switch-rails constructed and adapted to yield within certain limits and a breakable connection between the switch-rod and switch-stand rod constructed and adapted to normally connect said rods rigidly together but to permit the former rod to be moved relatively to the latter rod by said bar.

5. In an automatic railway-switch, means located in position to be actuated by a locomotive, direct connections between said means and the switch-rails, a switch-stand rod having a circular aperture near its end, a switch-rod having a rectangular aperture near its end, provided with inclined cam surfaces at its sides, and a narrower slot extending back from said rectangular aperture, a pin connecting said rods having a circular portion to fit said circular aperture, a rectangular portion to fit said rectangular aperture and a narrower rectangular portion to fit said slot, the sides of said wider rectangular portion being beveled off to fit said cam surfaces, a spring surrounding the narrower portion of said pin, a stirrup depending from said switchstand-rod to support said spring, the lower reduced end of said pin being passed through said stirrup and secured below the same.

6. In an automatic railway-switch, means located in position to be actuated by a locomotive, direct connections between said means and the switch-rails, a switch-stand rod and a switch-rod, a pin normally securing said rods rigidly together, coöperating cam-surfaces on said pin and said switch-rod, whereby when said rod is forced toward said switch-stand rod by said means, the pin is raised into position to permit relative movement of said rods.

In testimony whereof I have affixed my signature, in presence of two witnesses.

URBAN A. WOODBURY.

Witnesses:

T. P. O'BRIEN,

T. W. GURNEY.