(No Model.) 2 Sheets—Sheet 1.

C. MODEREGGER.

APPARATUS FOR WORKING RAILWAY SWITCHES BY SCREW ACTION.

No. 513,520. Patented Jan. 30, 1894.

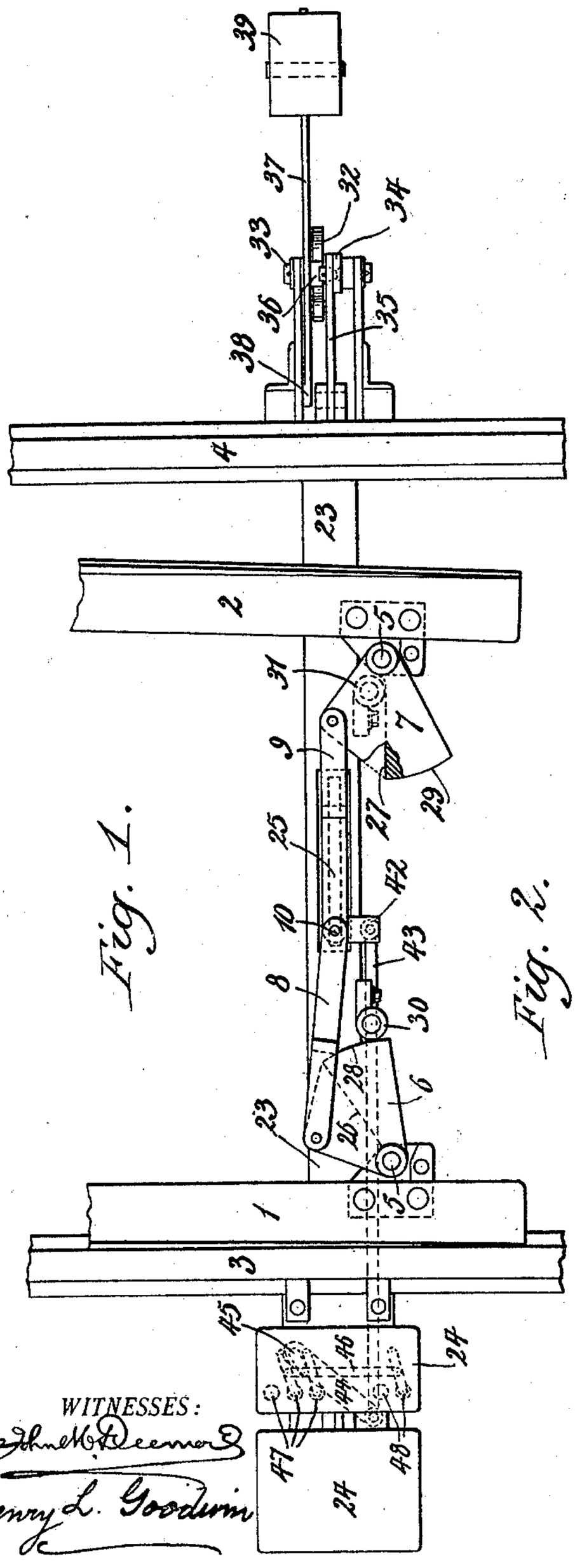

Fig. 1.

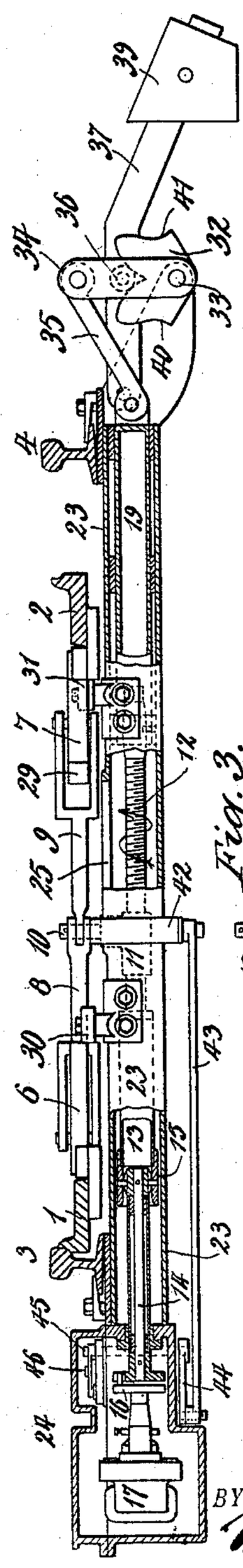

Fig. 2.

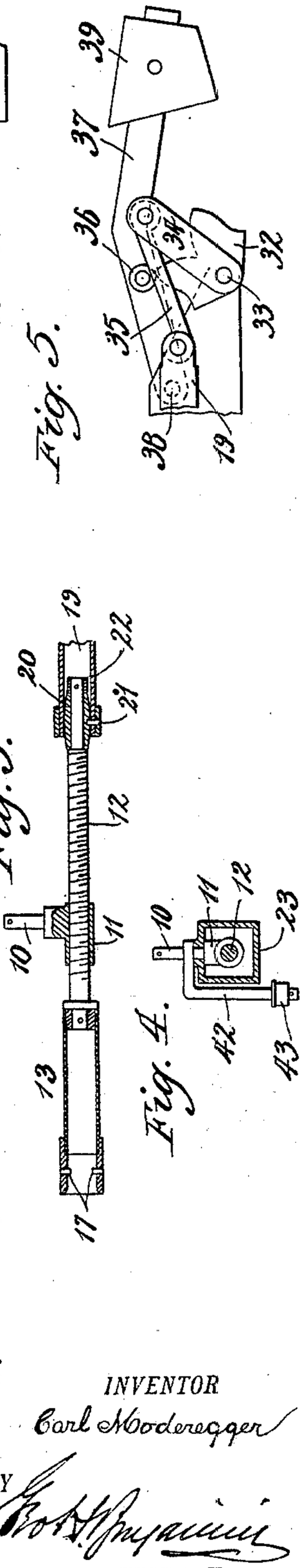

Fig. 5.

Fig. 3.

Fig. 4.

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(No Model.) 2 Sheets—Sheet 2.

C. MODEREGGER.

APPARATUS FOR WORKING RAILWAY SWITCHES BY SCREW ACTION.

No. 513,520. Patented Jan. 30, 1894.

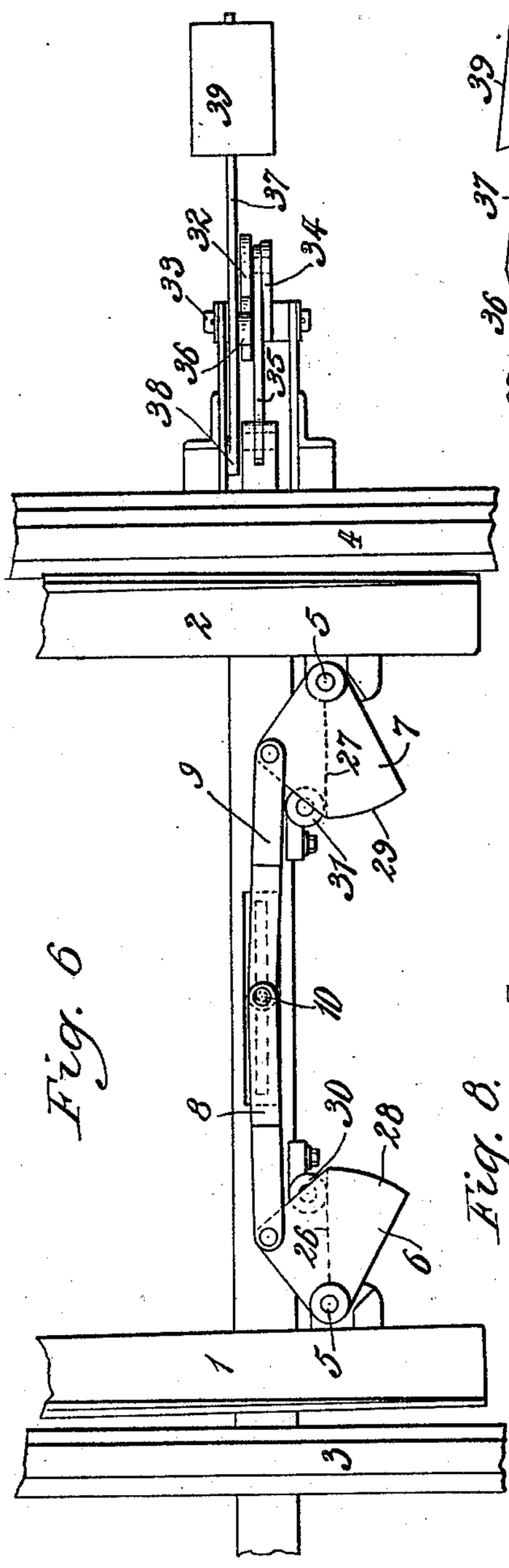

Fig. 6.

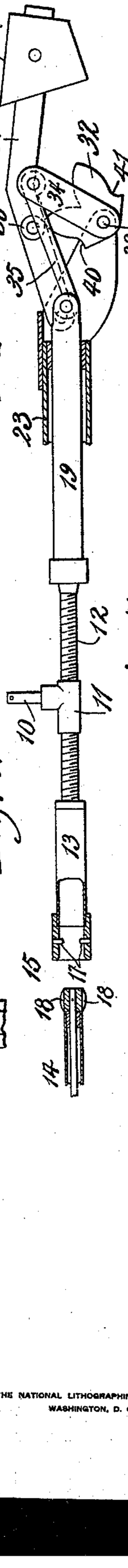

Fig. 8.

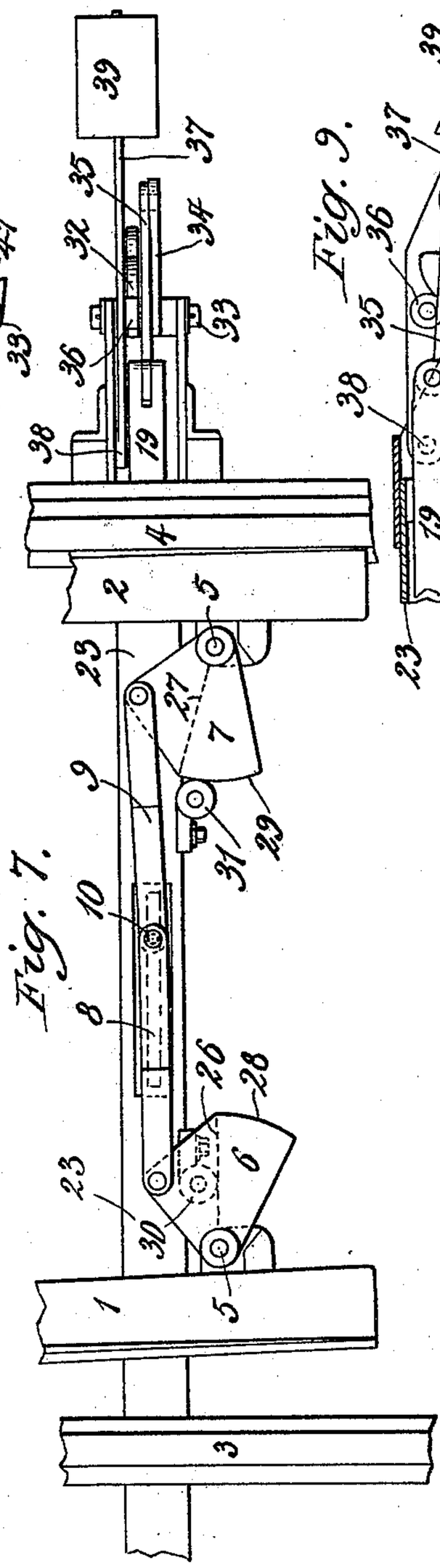

Fig. 7.

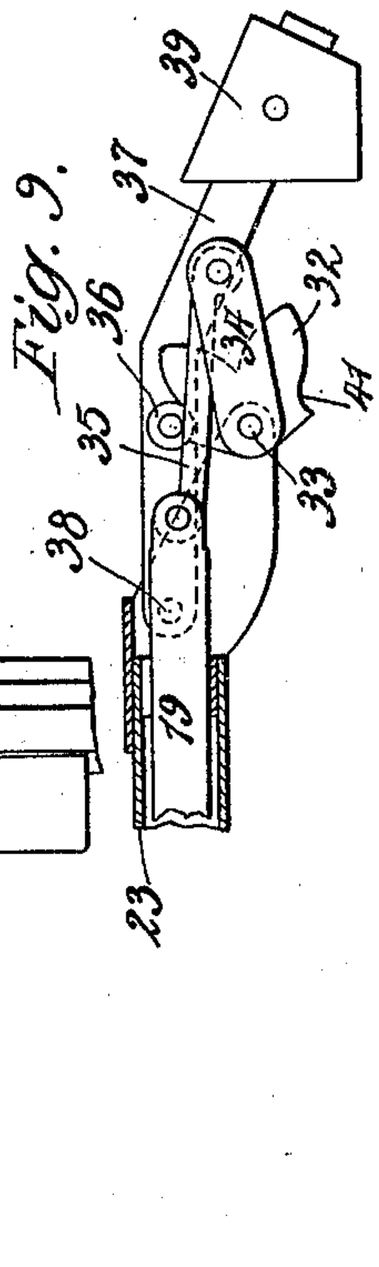

Fig. 9.

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APPARATUS FOR WORKING RAILWAY-SWITCHES BY SCREW ACTION.

SPECIFICATION forming part of Letters Patent No. 513,520, dated January 30, 1894.

Application filed May 18, 1893. Serial No. 474,640. (No model.) Patented in Germany September 6, 1891, No. 65,810.

To all whom it may concern:

Be it known that I, CARL MODEREGGER, a subject of the King of Bavaria, residing at Vienna, Austria-Hungary, have invented new and useful Improvements in Railway-Switch Setting and Locking Apparatus, (for which I have obtained Letters Patent in Germany, No. 65,810, dated September 6, 1891,) of which the following is a specification.

My present invention embodies additional improvements, over the electric railway switch setting and locking devices shown in my prior companion application, Serial No. 461,414, and has for its object to provide for normal operation and also for "forcing open" in either direction of the switch rails or points by mechanism which is more reliable and provides a more secure lock of the switch than is furnished by the mechanism shown in my prior application aforesaid.

The present invention consists generally in the combination with the electrically rotative and telescopic screw shaft and nut thereon, of connections between said nut and the switch rails comprising two rods and two peculiarly formed locking plates operating relatively to said rods and to stops or guides preferably having roller form, to impart both independent and simultaneous movements to both switch rails or points from the rotating screw shaft while normally setting the switch, and also to allow forcing open or running through the switch to either side without injury to the mechanism or without danger of leaving the switch partly open, thus avoiding dangerous obstruction to travel over the main line rails. Various novel details of construction contribute to the efficiency and safety of the entire apparatus.

The invention will first be described and then will be defined in claims hereinafter set forth.

Reference is to be had to the accompanying drawings, forming part of this specification, and in which like reference numerals indicate similar parts in the several views.

Figure 1 is a plan view showing the switch point closed to the left hand main rail and locked. Fig. 2 is a vertical sectional view with parts in similar positions. Fig. 3 is a detail longitudinal sectional elevation of portions of the screw shaft. Fig. 4 is a detail cross-sectional view through the screw and its casing. Fig. 5 is a detail side view with parts in positions taken as the switch is being "forced open" to the right hand. Figs. 6 and 7 are plan views showing different relative positions of parts. Fig. 8 is a detail longitudinal sectional view of the screw shaft and connected mechanism; and Fig. 9 is a sectional side view showing final adjustments of the cam and lever mechanism after the switch has been forced open.

The numerals 1, 2 represent the two switch points or rails, and 3, 4 indicate the main line rails to which they are adapted. To the points are pivoted at 5, 5, two metal locking plates 6, 7 having peculiar form presently described and pivotally coupled by suitable rods 8, 9 to an upwardly projecting pin or stem portion 10 of a nut 11, which is fitted on a screw 12 forming part of an endwise telescoping shaft. This shaft comprises said screw 12, a tubular portion 13, rigidly fastened to one end of the screw, a driving portion 14 connecting with the part 13 by a coupling 15, allowing the endwise telescoping movement while compelling both parts 13, 14 to turn together with the screw as rotation is given the part 14 by a crank disk connection at 16 with the shaft of a motor 17, which preferably is an electric motor. As will be understood from Figs. 2, 3 and 8 of the drawings, the coupling at 15 between the parts 13, 14 is effected by causing opposing pins 17 on the part 13 to enter longitudinal grooves 18 in the adjacent end of the part 14, which permits sufficient telescoping action of the shaft. The other end portion 19 of the shaft may have tubular form and is coupled to the screw 12 by a bearing 20, which is held rigidly to the part 19 by a pin 21 (see Fig. 3) and affords a journal bearing for the end of the screw which is shouldered next one end of the bearing and carries a fixed collar 22 at its other end. This construction allows the screw 12 to rotate in the part 19 without requiring the latter to rotate with the screw, but compelling 19 to move endwise bodily with the screw when the switch is "forced open" and as hereinafter more fully explained.

The shaft portion 19 is fitted suitably for endwise movement in a weatherproof metal casing 23, which ranges transversely beneath the main rails and switch points, and also covers and guards the other parts 12, 13, 14, 15 of the shaft. A suitable casing 24 covers and protects the electric motor 17 and the electrical switch devices hereinafter described. The stem 10 of the nut 11 passes upward through a slot 25 in the casing 23 and indicated by dotted lines in Figs. 1, 6 and 7 of the drawings.

The locking plates 6, 7 have substantially similar general form but are made right and left, each having a thinner web-like rear portion to which the corresponding screw nut connecting rod 8, 9 is pivoted, and each also having a thicker front portion; the increased thickness being all at one face, preferably the lower face, in order to provide radial guide shoulders 26, 27 along the plate 6, 7 respectively. The outer edges of these heavier front portions of the plates are curved in segments or arcs 28, 29, respectively, and from the centers of the pivots 5. The guide shoulders 26, 27 and the segmental faces 28, 29 of the plates 6, 7 operate relatively to or with stationary stops 30, 31, which preferably consist of anti-friction rollers journaled to lugs or supports fastened rigidly to the screw shaft casing 23 to guide the movements of the switch points 1, 2, and lock said points when adjusted to opposing main line rails, as hereinafter more fully explained.

The mechanism which assures full movement of a switch point over to a main line rail toward which the point had been started when forced open by the wheels of an engine or train, comprises a cam 32 fixed to a suitably journaled rock shaft 33, and having a rigid arm 34, the outer end of which is pivotally coupled by a rod 35 to the part 19 of the screw shaft above described. The cam 32 is substantially heart-shaped or has two upper side lobes or tooth-like projections having rounding opposite edges and between which lobes normally rests an anti-friction roller 36 journaled to a lever 37 fulcrumed at 38 to any suitable fixed support and carrying a counterweight 39 which has sufficient gravity to move the switch points after the roller 36 passes over the upper end or apex of either of the lobes or teeth of the cam, which at their bases or lower outer faces have depressions 40, 41 into either one of which the roller stops at completion of the switch point movement.

To the stem 10 of the screw shaft nut 11 is held the upper end of a bent or angular half-yoke 42, to the lower end of which is coupled one end of a connecting rod 43, the other end of which is coupled with a crank 44, whose shaft 45 projects upward into the motor casing 24 and is suitably attached to a switch 46 carrying three contact levers adapted to five electric line wire binding posts or contact plates 47, 48, and whereby as the nut 11 is moved endwise the electric circuits controlling operation of the motor 17 and suitable electric signal devices will be automatically adjusted.

The operation is as follows: It is to be remembered that when the switch points 1, 2 are normally operated by the travel of the nut 11 along the screw 12, when the shaft is rotated in opposite directions by the motor 17, the mechanism will maintain relative positions shown in Figs. 1 and 2 of the drawings, the lever roller 36 then being held in the middle recess of the cam 32, and the non-rotating part 19 of the shaft will not have endwise movement. I will first describe the normal operation of the switch by the screw and later explain the action of the mechanism permitting forcing open of the switch. Supposing the switch points 1, 2 are to be normally moved over to the right hand from the position shown in Figs. 1 and 2 of the drawings until the point 2 is locked against the main rail 4. The switch 46 now is adjusted to send the electric current through the motor and cause the screw 12 to rotate in direction of the arrow in Fig. 2, when the current is turned or switched through the motor by any suitable key or device at a central station which may be any distance from the switch or from a number of the switches all controllable from one place—say from a tower at the approaches to a railway station. When the shaft 12, 13, 14, 15 is thus rotated, the nut 11 will travel on the screw 12 toward the right hand and will carry with it the connecting rods 8, 9. At the first part of this movement the switch point 2 will be shifted along to the right hand by the rod 9, while the shoulder 27 of the locking plate 7 moves along the roller stop 31, and the other point 1 will not be moved away from the main line rail 3 until by draft of the rod 8 the locking plate 6 is turned sufficiently on its fulcrum 5 to carry its segment face 28, which had locked the point 1 against the rail 3, clear of the roller stop 30, thus unlocking the point. The rods 8, 9 now will be about in line and further movement of the nut 11 will carry both switch points 2, 1 together to the right hand, while the shoulders 27, 26 of the plates 7, 6 move along the respective stop rollers 31, 30, and this simultaneous movement of both switch points will continue until the point 2 seats itself snugly to final position against the right hand main line rail 4. At this time the shoulder 27 of locking plate 7 will have escaped the stop roller 31 and further movement of the nut 11 along the screw 12 will cause the rod 9 to swing the plate 7 around on its fulcrum 5 and carry its segmental face 29 behind the roller 31, thus locking the point 2 securely to the rail 4. After the point 2 touches the rail 4, and while the plate 7 is being swung or turned around to locking position, the moving nut 11 will cause the rod 8 to carry the switch point 1 alone farther to the right hand, until the current is at proper time cut out of the motor, and the parts 7, 6

then will have the same positions relatively to the stop rollers and the rails 4, 2, 1, as the parts 6, 7 have relatively to the rollers and the rails 3, 1, 2 in Fig. 1 of the drawings.

In resetting the parts to the positions shown in Fig. 1, the above operations will be performed in reverse order, and as the screw 12 is turned in reverse direction, the switch point 1 will first be alone moved to the left hand until the point 2 is unlocked; then both points will move to the left hand together, until point 1 strikes the rail 3, and while point 1 is being locked by the passage of face 28 of plate 6 behind the stop roller 30, the other point 2 will receive its final left hand movement, as will readily be understood.

It will be noticed that during the movements of the nut 11 along the shaft screw 12, the connections 42, 43, 44 and 45 will automatically actuate the electrical switch 46, and will thereby readjust the contacts to the posts or plates 47, 48, the former controlling reversal of electric current through the motor and the latter controlling any suitable signal devices. Hence a shifting of the switch points in one direction will automatically readjust the contacts in readiness to cause reverse operations of the setting mechanism the next time the current is passed through the motor, and will also give any suitably prearranged signals at the central station or switch controlling tower.

Supposing now, that the switch when set as in Fig. 1 of the drawings should be "forced open" to the right hand by a passing engine or train, the effect would be to forcibly and bodily move the non-rotating nut 11, screw 12 and shaft portions 13, 19 endwise to the right hand as the shaft lengthens telescopically at the coupling 15, thereby carrying the rod 35 outward and rocking the bar 36 and cam 32 on the fulcrum 33 until the roller 36 of the now raised lever 37 rides to and over the apex of the left hand lobe of the cam, or to adjust the parts to positions shown in Figs. 5, 6, and 8 of the drawings, whereupon the weighted lever, by carrying its roller 36 down the outer edge of the left hand lobe of the cam, will carry the endwise movable parts of the shaft, the nut 11, the rods 8, 9 and the switch points 1, 2 still farther over to the right hand, and as the point 2 strikes the main line rail 4, the lever roller 36 will reach and stop at the cam depression 40, and the mechanism, after thus carrying the switch point 2 entirely over against the main line rail 4 toward which it had been started by the engine or car wheel flanges, will have positions indicated in Fig. 9 of the drawings.

In Fig. 6 of the drawings, the switch points 2, 1 have positions relatively to the main line rails 4, 3 when the lever roller 36 has risen to and is about passing over the apex of the cam, as shown in Figs. 5 and 8, while in Fig. 7 the point 2 is closed to the rail 4 and is there locked by the stop roller 31 behind the segmental face 29 of the locking plate 7, while the rods 9, 8 are yet free to have further movement to the right hand until the fulcrum 5 of locking plate 6 approaches nearly to the other roller stop 30. The mechanism would operate in substantially similar manner were the switch when closed to the rail 4 forced open toward the left hand, and in this case the lever roller 36 would finally rest in the right hand depression 41 of the cam 32 and the shaft would be telescoped or contracted in length toward the left hand from normal operative condition. The locking plates 6, 7 act precisely the same in holding the switch points 1, 2 to the main rails 3, 4 respectively, when the switch is forced open to either side, as when the points are operated normally by travel of the nut 11 along the screw shaft rotated by the motor.

After the switch has been "forced open" to either side, the mechanism must be readjusted to normal operative positions by hand, such positions being shown in Figs. 1 and 2 of the drawings.

I claim as my invention—

1. In railway switch devices, the combination with main rails and switch points, of a screw shaft, a nut thereon, locking plates for the points having guide shoulders and locking faces, stops to which said shoulders and faces are adapted, and rods pivotally connecting the locking plates and screw nuts, substantially as described.

2. In railway switch devices, the combination with main rails and switch points, of a screw shaft having endwise telescoping action, a nut on the shaft, locking plates for the points having guide shoulders and locking faces, stops to which said shoulders and faces are adapted, rods pivotally connecting the locking plates and screw nut, a cam, a connection between said cam and the telescoping shaft, and a gravitating lever having a roller or part adapted to the cam, substantially as described.

3. In railway switch devices, the combination with main rails and switch points, of a screw shaft, an electric motor rotating the shaft, a nut on the shaft, locking plates for the points having guide shoulders and locking faces, stops to which said shoulders and faces are adapted and rods pivotally connecting the locking plates and screw nut, substantially as described.

4. In railway switch devices, the combination with main rails and switch points, of a screw shaft, an electric motor rotating the shaft, electric switch devices controlling electric currents to the motor, a nut on the shaft, locking plates at the points having guide shoulders and locking faces, stops to which said shoulders and faces are adapted, rods pivotally connecting the locking plates and screw nut, and connections between said nut and the switch devices of the electric motor, substantially as described.

5. In railway switch devices, the combination with main rails and switch points, of an

endwise telescoping screw shaft, an electric motor rotating said shaft, a nut on the shaft, locking plates for the points having guide shoulders and locking faces, stops to which said shoulders and faces are adapted, rods pivotally connecting the locking plates and screw nut, a cam, a connection between said cam and the telescoping shaft, and a gravitating lever having a roller or part adapted to the cam, substantially as described.

6. In railway switch devices, the combination with main rails and switch points, of an endwise telescoping screw shaft, an electric motor rotating the shaft, electric switch devices controlling electric currents to the motor, a nut on the shaft, locking plates at the points having guide shoulders and locking faces, stops to which said shoulders and faces are adapted, rods pivotally connecting the locking plates and screw nut, connections between said nut and the current switch devices of the electric motor, a cam, a connection between said cam and the telescoping shaft, and a gravitating lever having a roller or part adapted to the cam, substantially as described.

7. The combination with main rails 3, 4 and switch points 1, 2, of locking plates 6, 7 pivoted at 5, 5 to the points and having respective shoulders 26, 27 and faces 28, 29; fixed roller stops 30, 31, a laterally moving part 10, and rods 8, 9 connecting the parts 6, 7, 10, substantially as described.

8. The combination with main rails 3, 4 and switch points 1, 2, of locking plates 6, 7 pivoted at 5, 5 to the points and having respective shoulders 26, 27 and faces 28, 29; fixed roller stops 30, 31, a revoluble screw 12, a nut 11 thereon having a stem 10, and rods 8, 9 connecting the parts 6, 7, 10, substantially as described.

9. The combination with main rails 3, 4 and switch points 1, 2, of a telescopic screw shaft 12, 13, 14, 15, 19, a nut 11 on the screw 12 and having a stem 10, locking plates 6, 7 pivoted at 5, 5 to the points and having respective shoulders 26, 27 and faces 28, 29; fixed roller stops 30, 31, rods 8, 9 connecting the parts 6, 7, 10, a rocking cam 32 having an arm 34, a rod 35 connecting the parts 19, 34, and a lever 37 having a roller 36 engaging the cam, substantially as described.

10. The combination with main rails 3, 4 and switch points 1, 2, of a screw shaft, an electric motor 17 rotating the shaft, a nut 11 on the shaft having a stem 10, locking plates 6, 7, pivoted at 5, 5 to the points and having respective shoulders 26, 27 and segmental faces 28, 29; fixed roller stops 30, 31, and rods 8, 9 connecting the parts 6, 7, 10, substantially as described.

11. The combination with main rails 3, 4 and switch points 1, 2, of a screw shaft, an electric motor 17 rotating the shaft, electric switch devices 44, 45, 46 and contacts 47, 48, a nut 11 on the shaft having a stem 10, locking plates 6, 7 pivoted at 5, 5 to the points and having respective shoulders 26, 27 and faces 28, 29; fixed roller stops 30, 31, rods 8, 9 connecting the parts 6, 7, 10, and parts 42, 43 connecting the nut with the electric switch devices, substantially as described.

12. The combination with main rails 3, 4 and switch points 1, 2, of a telescoping screw shaft 12, 13, 14, 15, 19, an electric motor 17 rotating the shaft, a nut 11 on the shaft having a stem 10, locking plates 6, 7 pivoted at 5, 5 to the points and having respective shoulders 26, 27 and faces 28, 29; fixed roller stops 30, 31, rods 8, 9 connecting the parts 6, 7, 10, a rocking cam 32 having an arm 34, a rod 35 connecting the parts 19, 34, and a lever 37 having a roller 36 engaging the cam, substantially as described.

13. The combination with main rails 3, 4 and switch points 1, 2, of a screw shaft 12, 13, 14, 15, 19, an electric motor 17 rotating the shaft, electric switch devices 44, 45, 46 and contacts 47, 48, a nut 11 on the shaft having a stem 10, locking plates 6, 7, pivoted at 5, 5 to the points and having respective shoulders 26, 27 and faces 28, 29, fixed roller stops 30, 31, rods 8, 9 connecting the parts 6, 7, 10, parts 42, 43 connecting the nut with the electric switch devices, a rocking cam 32 having an arm 34, a rod 35 connecting the parts 19, 34, and a lever 37 having a roller 36 engaging the cam, substantially as described.

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

CARL MODEREGGER.

Witnesses:
F. GROSKASKER,
CARL MITTERMEYN.