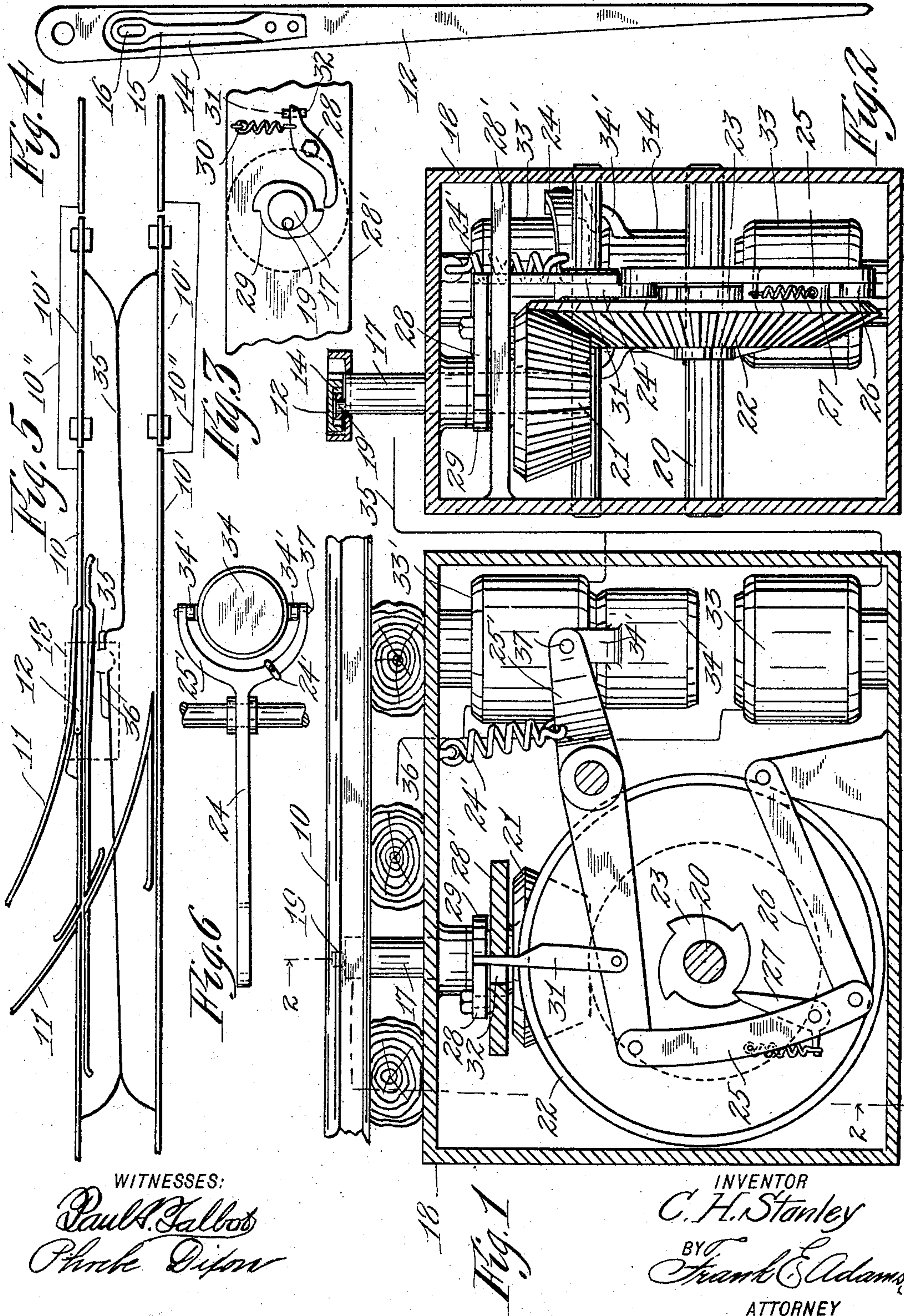


No. 772,066.

PATENTED OCT. 11, 1904.

C. H. STANLEY.
AUTOMATIC SWITCH.
APPLICATION FILED APR. 16, 1904.

NO MODEL.



WITNESSES:

Paul H. Talbot
Phoebe Dixon

INVENTOR

C. H. Stanley

BY

Frank E. Adams

ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLEY HAMON STANLEY, OF RORRER, VIRGINIA, ASSIGNOR OF FOUR-FIFTHS TO S. P. BRAUTIGAM, OF SEATTLE, WASHINGTON, AND JOSEPH M. COMER, OF SPOKANE, WASHINGTON.

AUTOMATIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 772,066, dated October 11, 1904.

Application filed April 16, 1904. Serial No. 203,525. (No model.)

To all whom it may concern:

Be it known that I, CHARLEY HAMON STANLEY, a citizen of the United States of America, and a resident of the city of Rorrer, in the
5 county of Carroll, in the State of Virginia, have invented certain new and useful Improvements in Automatic Switches, of which the following is a specification.

My invention relates to improvements in
10 means for operating the tongue of a railway-track switch, and has special reference to electrically-operative apparatus of this nature which is especially adapted for use on electric lines.

15 The object of this invention is to provide simplified and inexpensive switch-operating mechanism embodying essential features of adaptability, utility, and general efficiency which permits of compact association of the
20 parts and insures positive operation of the apparatus to adjust the switch.

The above-mentioned and other desirable objects are attained by the constructions, combinations, and arrangement of parts, as disclosed on the drawings set forth in this specification, and succinctly pointed out in the appended claims.

With reference to the drawings filed herewith and bearing like reference characters
30 for corresponding parts throughout, Figure 1 is a view in vertical longitudinal section of a portion of a track-bed taken at a switch and shows my improved switch-operating mechanism in relative position and the casing therefor
35 in like section. Fig. 2 is a vertical transverse section of the casing, taken on line 2-2 of Fig. 1, showing the contained mechanism and also shows a portion of the track. Fig. 3 is a plan view of a portion of the apparatus. Fig. 4
40 is a view of the switch-tongue removed and viewed from the under side. Fig. 5 is a plan view showing a portion of a track and the improved switch-throwing apparatus in place, and Fig. 6 is a plan view of the operating-lever and armature removed.

Referring to the drawings, reference character 10 indicates the main rails of an electric line, 11 branch rails, and 12 the switch-tongue,

the latter being mounted for pivotal movement in any suitable manner. This tongue is
50 preferably formed with a longitudinally-extending recess, as 14, arranged in the under side surface adjacent the center of movement and adapted as the seat for a spring-bar, as
55 15, which acts as a yielding connection between the tongue and operating mechanism. One end portion of the spring-bar is suitably formed to fit snugly in said recess at the outer end and is fastened to the tongue at this point in any suitable manner, and the remaining
60 portion of the spring-bar is made of suitable width to fit freely between the side wall of the recess, so that it will be free to spring toward either side of the recess, and a longitudinally-extending slot 16 is formed in this
65 portion of the spring-bar adjacent its free end of suitable width to receive freely the pin of the operating-crank and conforming in length to the throw thereof.

The mechanism for operating the switch-
70 tongue includes a vertically-disposed crank-shaft 17, which is rotatably supported in a suitable box or casing 18, mounted beneath the switch, and this shaft is provided with a crank-pin 19 on the upper end, engaging di-
75 rectly with the spring-bar 15 in the slot 16, so should any obstruction accumulate between either side of the switch-tongue and adjacent rail and block the switch the crank-shaft can be operated against spring action, and this
80 pin is arranged at a suitable radius to throw the switch-tongue each time the crank-shaft is turned one-half of a complete revolution. Operatively connected with crank-shaft 17 is a horizontally-disposed driving-shaft 20, ro-
85 tatably supported in the box or casing 18 and coupled to the crank-shaft by differential gearing consisting of a bevel-pinion 21, fixedly mounted on the crank-shaft, and a bevel-wheel 22, secured to the driving-shaft in mesh
90 with the pinion. This driving-shaft is operated by pawl-and-ratchet mechanism including a ratchet-wheel 23, fixedly mounted thereon; a lever 24, retracted by a spring 24' and disposed above said shaft and pivotally sup-
95 ported intermediate its ends, with one end ly-

ing adjacent the ratchet-wheel; a pendent pawl-carrier 25, consisting of a bar pivotally connected at one end with said end of the lever; a link 26, pivotally connected at one end with the lower end of the carrier and pivotally supported at the opposite end beneath the fulcrum of said lever, and a spring-pressed pawl 27, pivotally supported on said carrier and related to said ratchet-wheel. Related to the crank-shaft 17 is a spring-retracted stop-pawl 28, which is pivotally supported on a cross-bar 28' in casing 18, so as to coact with a ratchet-wheel 29, which is fixedly mounted on said shaft and formed with opposite teeth for engagement with the stop-pawl at each half-revolution of the shaft. This stop-pawl is normally held in retracted position by a spring 30 and is advanced to engage one of said teeth during the latter part of the movement of the crank-shaft by means of a push-bar 31, pivotally connected with lever 24 and fitting freely in a suitable slot 32 in said cross-bar, with one side edge slidably engaging the tail end of said pawl and having a suitable incline on the opposite side edge to advance the pawl against spring action as said lever is advancing, and this incline rides the wall of said slot.

In the present embodiment this switch-throwing mechanism is arranged for operation by electricity, which is applied through the medium of an attracting-electromagnet 33 and a repelling-electromagnet 33', disposed at opposite sides of the free end of lever 24 relatively to an armature 34, mounted thereon. These electromagnets are electrically connected with the rails of the track when the device is employed on electric railways, so that the current which drives the cars can be utilized to energize the magnets, and as now considered a suitable section of the track, as opposite rails 10', lying forward of the switch, is insulated, and electric conductors, as wires 35, are connected to the rail-sections and to the electromagnets, and electric conductors, as wires 36, are connected to the rails of the track beyond the switch and to the electromagnets, while bond-wires, as 10'', serve to electrically connect the rails of the track lying at each end of the insulated rails. The armature 34 is preferably swingably mounted on lever 24 and hangs pendent therefrom, so that the armature will retain a vertical position, and thereby insure a more perfect meeting of the faces of the armature with the faces of the electromagnets. This is conveniently accomplished by providing opposite ears 34' on the armature adjacent one end and bifurcating the lever at the free end to provide opposite arms 25', which embrace the armature and are connected with said ears by suitable pivot-pins, as 37, engaged in corresponding apertures in the ears and arms.

Granted installation of this device in connection with an electric railroad. An operation

thereof to throw the switch would occur substantially as follows: As the electric car is approaching the switch from the right of Fig. 5 and it is desired to throw the switch, the motorman allows the car to pass over the rails 10' with the electric current turned on, and the attracting and repelling electromagnets are thereby energized by the current passing from the car through these rails and the wires 35 and act simultaneously to attract and repel the armature on lever 24, and thereby insure a quick powerful action of the lever, which raises pawl-carrier 25, causing pawl 27 to rotate driving-shaft 20 a predetermined part of a revolution through the medium of ratchet-wheel 23, and thereby rotating crank-shaft 17 by means of bevel-gears 21 and 22 and advancing push-bar 31 to bring stop-pawl 28 to engage one of the teeth on ratchet-wheel 29 as the crank-shaft reaches one limit of its throw. When the car leaves the insulated rail-sections, the electric current will be cut off from the electromagnets, and spring 24' will then act to return the lever 24 to normal position and with it the pawl-carrier and push-bar, allowing spring 30 to retract the stop-pawl and leaving the driving-shaft, crank-shaft, and switch-tongue at rest until again operated by a following action of the lever.

By mounting the spring-bar on the switch-tongue and arranging same in a recess in the under surface a simplified yielding connection with the operating-crank is obtained which is not likely to become clogged with dirt, while the pawl-and-ratchet mechanism disclosed for operating the crank-shaft is positive in operation and consists of but few parts, and by using the repelling-magnet in combination with the attracting-magnet a quick positive action of the operating-lever is insured.

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

1. In a switch-operating device of the nature indicated; the combination with a swingingly-mounted switch-tongue, and reciprocal tongue-operating mechanism, of a spring-bar secured at one end to said tongue and connected at the free end with said mechanism.

2. In a switch-operating device of the nature indicated; the combination with a swingingly-mounted switch-tongue, and a rotatably-mounted crank, of a spring-bar secured at one end to said tongue and engaged at the free end with the pin of said crank.

3. In a switch-operating device of the nature indicated; the combination with a swingingly-mounted switch-tongue, and a rotatably-mounted crank disposed beneath said tongue, of a longitudinally-disposed spring-bar secured at one end to said tongue and having an elongated slot adjacent the free end engaging the pin of said crank.

4. In a switch-operating device of the nature indicated; the combination with a swingingly-

mounted switch-tongue having a longitudinal recess in the under surface, and a rotatably-mounted crank beneath said tongue, of a spring-bar in said recess secured at one end to said tongue and having an elongated slot adjacent the free end engaging the pin of said crank.

5. In a switch-operating device of the nature indicated; the combination with a swingingly-mounted switch-tongue, a driving-shaft operatively connected therewith, and a ratchet-wheel fixedly mounted on said shaft, of a reciprocally-mounted lever, a pivotally-mounted link, a pawl-carrier pivoted to said lever and link, and a pawl on said carrier related to said wheel.

6. In a switch-operating device of the nature indicated; the combination with a swingingly-mounted switch-tongue, a driving-shaft operatively connected therewith, and a ratchet-wheel fixedly mounted on said shaft, of a spring-retracted lever pivotally mounted at one side of said shaft with one end extending to the opposite side thereof, a link pivotally supported substantially opposite to the fulcrum of said lever, a pawl-carrier pivoted to said lever and link, and a pawl on said carrier related to said wheel.

7. In a switch-operating device of the nature indicated; the combination with a swingingly-mounted switch-tongue, a crank-shaft operatively connected therewith, a driving-shaft connected with said crank-shaft, and a ratchet-wheel fixedly mounted on the driving-shaft, of a second ratchet-wheel fixedly mounted on the crank-shaft, a stop-pawl related to said second wheel, a reciprocally-mounted lever, a pivotally-mounted link, a pawl-carrier pivoted to said lever and link, a pawl on said carrier related to said first wheel, and a push-bar mounted on said lever and related to said stop-pawl.

8. In a switch-operating device of the nature indicated; the combination with a swingingly-mounted switch-tongue, a crank-shaft operatively connected therewith, a drive-shaft connected with the crank-shaft, and pawl-and-ratchet mechanism connected with the drive-shaft, of a ratchet-wheel fixedly mounted on said crank-shaft and having opposite teeth, a stop-pawl related to said ratchet, and a push-bar related to said stop-pawl and operatively connected with said mechanism.

9. In a switch-operating device of the nature indicated; the combination with a swingingly-mounted switch-tongue, a crank-shaft operatively connected therewith, a drive-shaft connected with the crank-shaft, and a ratchet-wheel fixedly mounted on the drive-shaft, of a ratchet-wheel fixedly mounted on said crank-shaft, a spring-retracted stop-pawl related to said second wheel, a reciprocally-mounted lever, a pivotally-mounted link, a pawl-carrier pivoted to said lever and link, a

pawl on said carrier related to said wheel, and a push-bar mounted on said lever and engaging with said stop-pawl.

10. In a switch-operating device of the nature indicated; the combination with a spring-retracted switch-tongue-operating mechanism, including a reciprocally-mounted lever, and an electromagnet, of an armature related to said magnet and swingingly mounted on said lever.

11. In a switch-operating device of the nature indicated; the combination with spring-retracted switch-tongue-operating mechanism, including a reciprocally-mounted lever, and an attracting-electromagnet at one side of said lever, of an armature related to said magnet and swingingly mounted on said lever, and a repelling-electromagnet at the opposite side of said lever.

12. In a switch-operating device of the nature indicated the combination with spring-retracted switch-tongue-operating mechanism, including a substantially horizontally disposed reciprocally-mounted lever having opposite arms, and an attracting-electromagnet at one side of said lever, of an armature related to said magnet and having opposite ears adjacent the upper end pivotally connected with said arms, and a repelling-electromagnet at the opposite side of said lever.

13. In a switch-operating device of the nature indicated the combination with spring-retracted switch-tongue-operating mechanism, including a substantially horizontally disposed lever, and an electromagnet, of an armature related to said magnet and pending from said lever and swingingly mounted thereon.

14. In a switch-operating device of the nature indicated the combination with spring-retracted switch-tongue-operating mechanism, including a reciprocally-mounted lever, an armature on said lever, and an attracting-electromagnet at one side of said lever, of a repelling-electromagnet at the opposite side of said lever.

15. In an electric railway, the combination with spring-retracted switch-tongue-operating mechanism, including a lever, an armature on said lever, an attracting-electromagnet, insulated rail-sections placed in advance of the switch, electric conductors leading from said sections to the magnet and from said magnet to rail-sections beyond the switch, of a repelling electromagnet at the opposite side of said lever and connected with said conductors.

16. In an electric railway, the combination with a swingingly-mounted switch-tongue, a driving-shaft operatively connected therewith, and a ratchet-wheel fixedly mounted on said shaft, of a reciprocally-mounted spring-retracted lever, a pivotally-mounted link, a pawl-carrier pivoted to said lever and link, a pawl on said carrier related to said wheel, an armature on said lever, an attracting-electro-

magnet at one side of said lever, a repelling-
electromagnet at the opposite side of said le-
ver, insulated rail-sections placed in advance
of the switch, and electric conductors leading
5 from said section to said magnets and from
said magnets to rail-sections beyond the
switch.

Signed at Laurelfork, Virginia, this 25th
day of March, 1904.

CHARLEY HAMON STANLEY.

Witnesses:

F. P. BRANSCOME,
S. EDGAR MARSHALL.