

No. 768,204.

PATENTED AUG. 23, 1904.

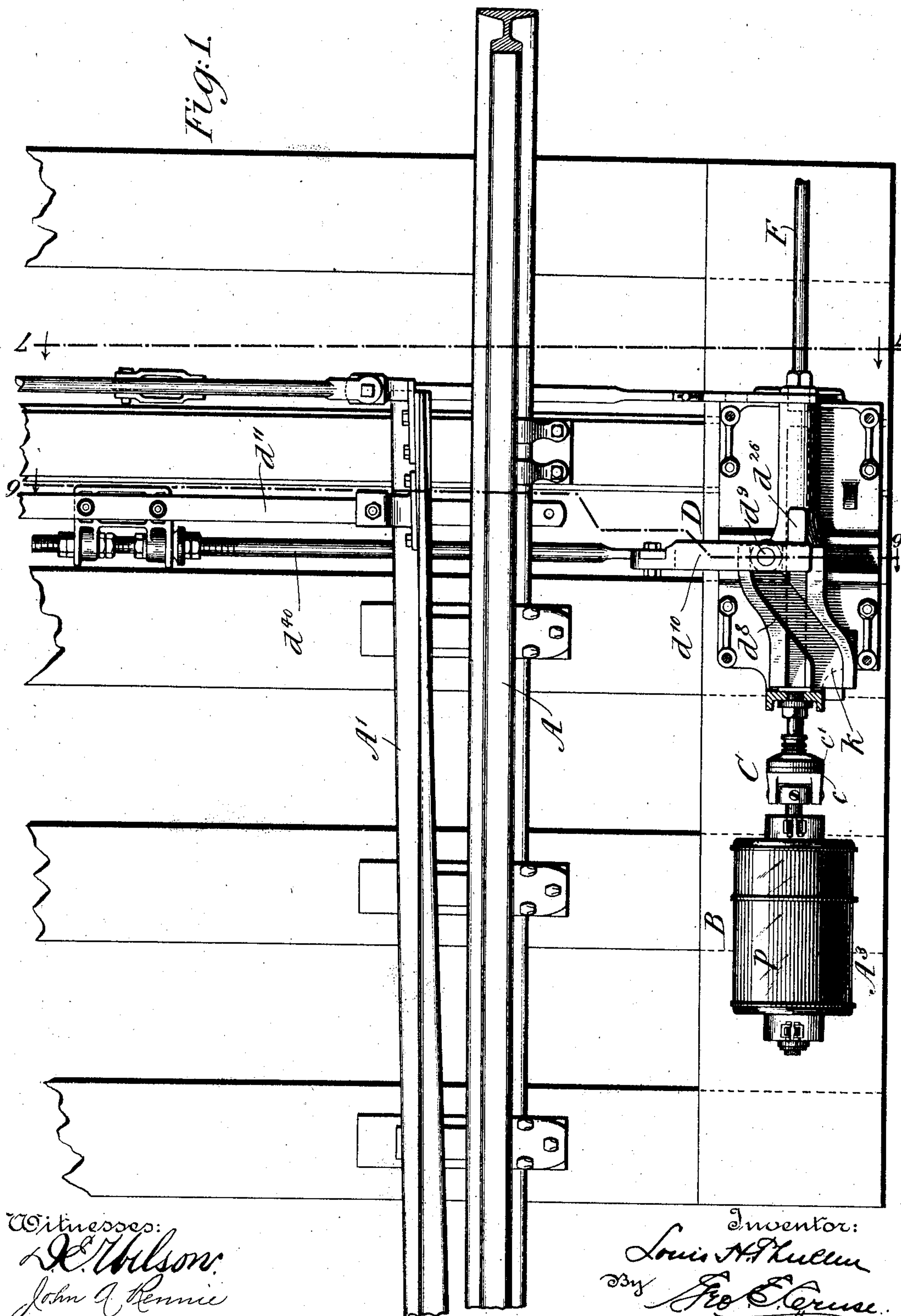
L. H. THULLEN.

APPARATUS FOR MOVING OR SHIFTING RAILWAY SWITCHES.

APPLICATION FILED OCT. 7, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:
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John A. Rennie

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Louis H. Thullen
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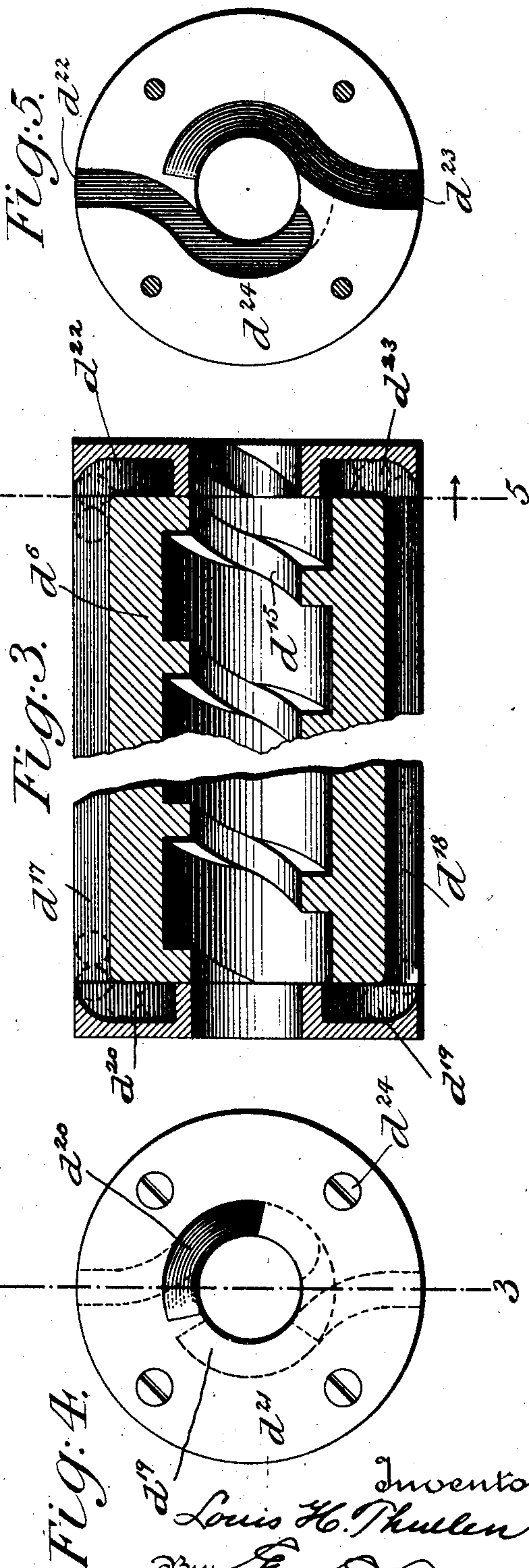
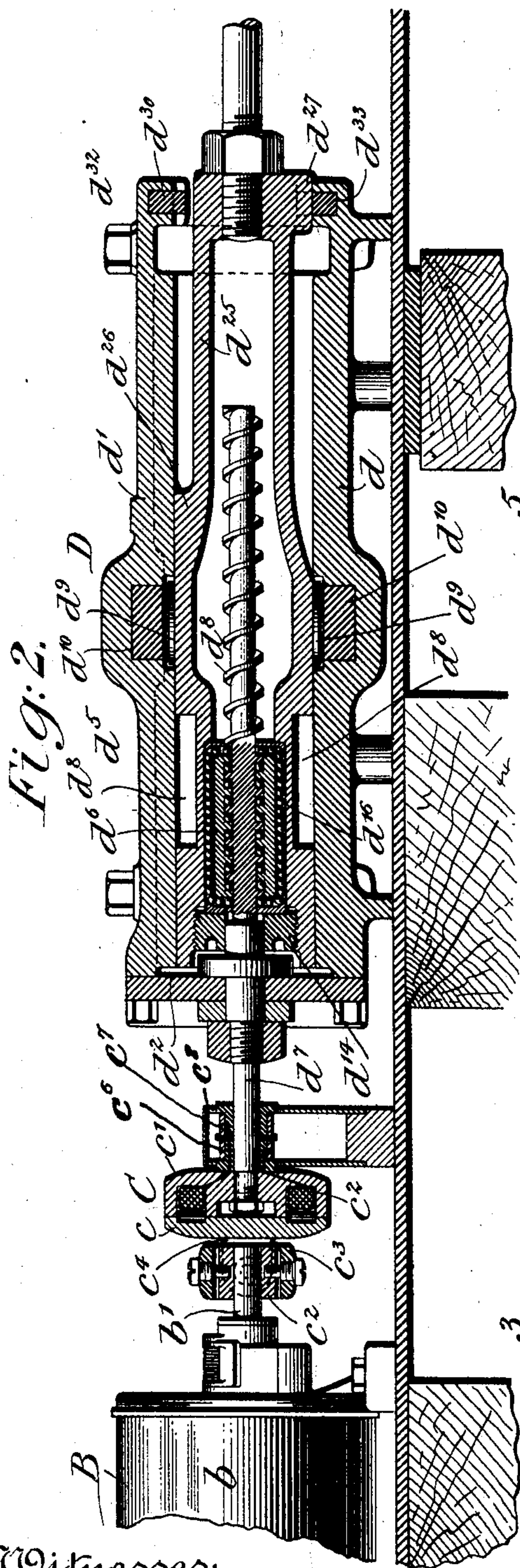
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NO MODEL.

3 SHEETS--SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 6.

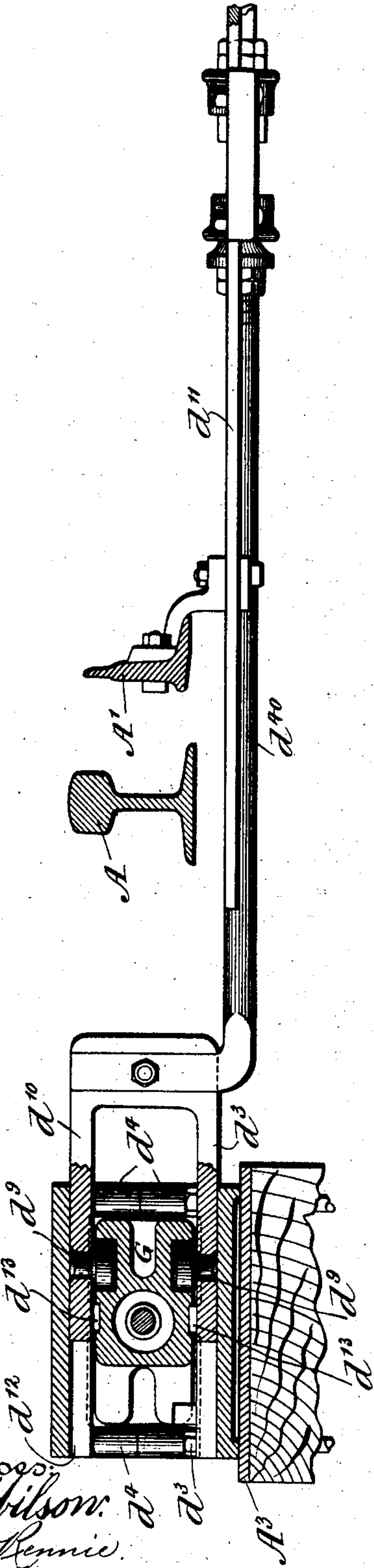
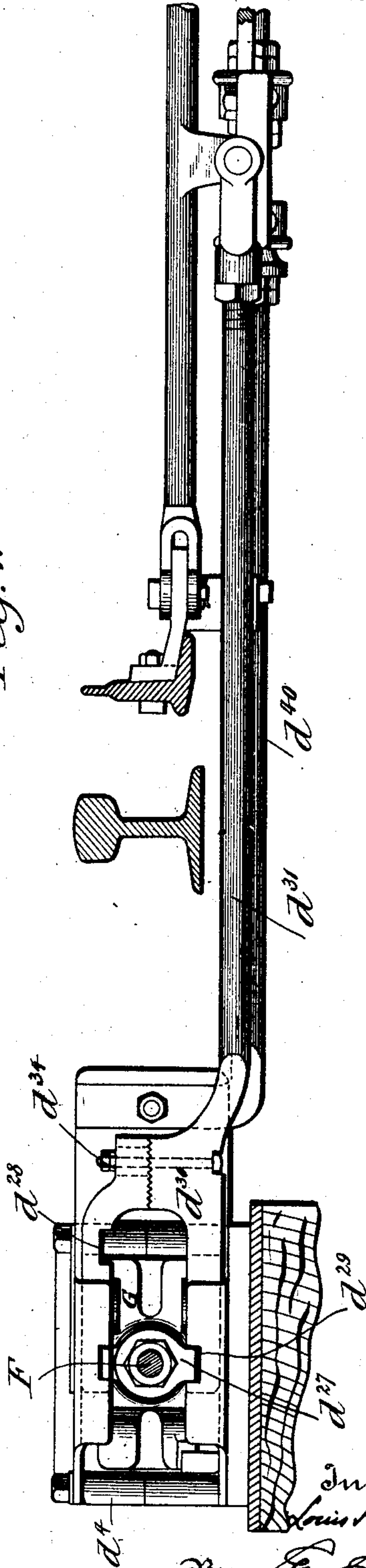


Fig. 7.



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UNITED STATES PATENT OFFICE.

LOUIS H. THULLEN, OF EDGEWOOD, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH AND SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

APPARATUS FOR MOVING OR SHIFTING RAILWAY-SWITCHES.

SPECIFICATION forming part of Letters Patent No. 768,204, dated August 23, 1904.

Application filed October 7, 1903. Serial No. 176,085. (No model.)

To all whom it may concern:

Be it known that I, LOUIS H. THULLEN, a citizen of the United States, and a resident of Edgewood, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Moving or Shifting Railway-Switches, of which the following is a specification.

My invention relates to apparatus for moving or shifting from one position to another a part or parts or an appliance adjacent a railroad—for example, switch rails or points of a railroad—and for operating the usual parts, devices, or mechanism employed in connection with railway-switches—for example, a detector bar or bars and locks.

I will describe an apparatus embodying my invention and then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a view, partly in top plan and partly in horizontal section, of an apparatus embodying my invention and showing it connected with one of the two usual switch rails or points. A top plate forming part of a casing is removed for the sake of clearness in illustration. Fig. 2 is a view, partly in elevation and partly in vertical longitudinal section, of the apparatus shown in Fig. 1. Fig. 3 is a detail longitudinal sectional view of a part comprised in the apparatus, the section being taken on the line 3 3 of Fig. 4. Fig. 4 is an end elevation of the part shown in Fig. 3. Fig. 5 is a detail sectional view, the section being taken on the line 5 5 of Fig. 3. Fig. 6 is a vertical and transverse sectional view taken on the line 6 6 of Fig. 1. Fig. 7 is a vertical and transverse sectional view taken on the line 7 7 of Fig. 1.

Similar letters of reference designate corresponding parts in all of the figures.

Referring to the drawings, A designates one of the two lines of rails of a railroad, and A' one of the two usual switch rails or points provided at points along a railroad.

The apparatus for moving or shifting the switch-rails from one position to another comprises a motor B, a mechanism D for

shifting or moving the switch-rails, and a clutch C, provided between the motor B and the mechanism D. The motor B is preferably an electric motor, and it may be of any desired type or construction so long as its armature is capable of rotation in reverse directions. The motor is inclosed in a suitable casing *b*, suitably secured to a bed or base plate A³, and the shaft *b'* of the armature is suitably journaled in the end walls of the casing *b*. The mechanism D is inclosed in a suitable form of casing comprising a bottom plate *d*, a top plate *d'*, and an end plate *d''*. The casing is suitably secured to the bed-plate A³ by bolts *d³*, and the top and bottom plates are spaced apart by bushings *d⁴*. The mechanism comprises a motion-plate *d⁵*, a nut *d⁶*, by means of which the motion-plate is moved, and a shaft *d⁷*, having a screw-threaded part *d⁸*, on which the nut *d⁶* works. The shaft *d⁷* is suitably journaled in the end plate *d''*, and the ball-bearing nut *d⁶* also serves as a traveling journal for the screw-threaded part of the shaft. The shaft is also suitably held in the end plate *d''* in such manner as to prevent longitudinal movement of the shaft. The motion-plate is in the form of a hollow casting, it being provided on opposite faces with slots or grooves *d⁸*, which receive rollers *d⁹*, carried in a yoke *d¹⁰*, connected with a rod *d¹⁰*, which rod in turn is suitably connected with a rod or bar *d¹¹*, joined to both switch-rails. The yoke moves in guides *d¹²*, provided for it in the top and bottom plates *d* and *d'*, and its movement is transverse to the movement of the motion-plate, the slots *d⁸* being so arranged as to permit of this. The slots *d⁸* are provided with straight portions at the ends of its inclined portions, these being provided in order that the motion-plate *d⁵* have no effect on the yoke at the beginning and end of the movement of the motion-plate, at which times the switch-rails are unlocked and locked. The motion-plate is also provided with grooves *d¹³*, extending longitudinally thereof to receive lugs or projections provided on the top and bottom plates of the casing. This arrangement is provided

in order that the motion-plate have a straight movement in the longitudinal plane of the shaft d^7 . The end of the motion-plate is suitably connected with a rod F, which in turn is
5 connected by bell-crank or other levers with the usual detector bar or bars provided at the switch-rails.

The ball-nut d^6 is seated in a recess or pocket provided for it in the motion-plate d^5 , and it
10 is held in the recess or pocket by a nut d^{14} . The nut is preferably a ball-bearing one. As shown, it is provided with an interior screw-threaded recess d^{15} , which receives the screw-threaded portion d^8 of the shaft d^7 . Balls d^{16}
15 are provided between the threads of the nut d^6 and the shaft d^7 , and a raceway is provided for the balls in the nut, the raceway being formed by longitudinal grooves or recesses d^{17} d^{18} and curved grooves d^{19} d^{20} in one end,
20 d^{21} , of the nut and by curved grooves d^{22} d^{23} in the other end, d^{24} , of the nut. The ends d^{21} and d^{24} are secured to the ends of the nut d^6 by bolts d^{24} .

The locking of the switch-rails is secured
25 through the motion-plate, it being provided with a cylindrical portion d^{25} , having oppositely-arranged projections d^{26} d^{27} , which alternately engage recesses d^{28} d^{29} , provided on a yoke d^{30} , connected with the locking-rod
30 d^{31} , which in turn is connected with both switch-rails A'. The yoke moves transversely of the motion-plate in guides d^{32} d^{33} , provided for it in the top and bottom plates, (see Fig. 2,) and it is preferably formed in two parts,
35 which are connected by a bolt or bolts d^{34} . The adjacent faces of the two parts are toothed or serrated in order that adjustment may be secured in the locking means to meet different throws of switch-rails.

40 The clutch C is of the friction type and is preferably an electric clutch. It comprises two parts c c' , one of which, c' , carries an energizing-coil c^2 , and the other of which, c , serves as an armature for the coil c^2 . The
45 part c is connected with the shaft b' by a suitable form of universal coupling, the purpose of which is to permit of the transmission of power and motion from the armature-shaft to the shaft d^7 , though both be not in line. As
50 shown, the universal coupling comprises a collar c^3 , fast on the shaft b' , a collar c^4 , pivoted to the collar c^3 , and lugs or ears c^5 , carried by the part c , which are pivoted to the collar c^4 . The part c moves on its pivots in a
55 plane at right angles to the plane of movement of the collar c^3 on its pivots. The ends of the coil c^2 are joined to contact-rings c^6 c^7 , carried on a collar c^8 , of insulating material, which is fixed on the shaft d^7 . A suitable
60 casing c^8 is provided for the contact-rings. The tractive power of the clutch is nearly proportional up to near the saturation-point to the current traversing the energizing or magnetizing coil c^2 , which is in series with

the motor, and the current is of such strength 65 as to keep the armature c in contact with the part c and from slipping under normal conditions. It is desirable that the desired slipping-point of the clutch be at about the saturation-point of the iron composing the mag- 70 netic circuit of said clutch, so that any additional current above the predetermined point taken by the motor will but slightly increase the holding power of the clutch. Should ab-
75 normal conditions exist, such, for instance, as a train on or over the detector-bar or any obstruction between a switch-rail and a stock-rail A', which would prevent the switch being fully or completely moved, and thereby throw
80 an overload on the motor or an unusual strain on any of the parts of the mechanism D or the detector-bar, the part c will slip on the part c' and continue to slip on the part c' until the overload or obstruction was removed or
85 the circuit of the motor opened.

Any system of control for the motor or clutch, or both, may be employed. Also any system for obtaining an indication of the complete movement and locking of the switch-
90 rails may be employed.

The operation of the apparatus, briefly stated, is as follows: When the switch-rails are to be moved from one position to another, current is supplied the motor and clutch. The rotary motion of the armature will be 95 transmitted to the shaft d^7 by the clutch C. The ball-bearing nut will be made to travel on the screw and carry with it the motion-plate. The initial movement of the motion-plate unlocks the switch-rails by having either 100 of the projections d^{26} d^{27} move out of the recesses d^{28} d^{29} , as the case may be. After the switch-rails have been unlocked the motion-plate operates the yoke d^{30} to move the switch-
105 rails, and the final movement of the motion-plate locks the rails in the position to which they have been moved. During the unlocking and the movement of the switch-rails the detector-bar is raised above and lowered below the head of the rail, as is well understood 110 in the art. The raceway of the nut d^6 for the balls is so arranged as to have the balls travel as the nut moves along the screw. In direction of movement of the nut the balls will travel in the raceway in one direction, and 115 in the other direction of movement of the nut the balls will travel in the opposite direction. The switch-rails are moved in one direction by the armature rotating in one direction and operating the mechanism D and in the opposite 120 direction by the armature rotating in the reverse direction. In one position of the switch-rails (see Fig. 1) the nut d^6 will be at one end of the shaft d^7 , (see Fig. 2,) and in the other position of the switch-rails the nut will be at 125 the other end of the shaft.

By varying the relation of the parts the apparatus herein described may be used for op-

erating a signal. Various other changes may be made without departing from the spirit of my invention.

Having thus described my invention, what I claim is—

1. In an apparatus for moving switch rails or points from one position to another, the combination of a motor, a ball-bearing nut operatively connected with the switch-rails, and an electric clutch intermediate the motor and ball-bearing nut.

2. In an apparatus for moving switch rails or points from one position to another, the combination of a motor, a ball-bearing nut operatively connected with the switch-rails and an electric clutch intermediate the motor and nut.

3. In an apparatus for moving switch-rails, the combination of a motor, and a mechanism connected with the switch-rails and operated thereby, said mechanism comprising an electric clutch.

4. In an apparatus for moving switch-rails from one position to another, the combination of a motor, a mechanism operatively connected with the switch-rails, and an electric clutch, said clutch comprising a part having a universal connection with a rotating part.

5. In an apparatus for moving switch-rails from one position to another, the combination of a motor, a ball-bearing nut, a clutch-coupling intermediate the ball-bearing nut and the motor, a motion-plate movable with said nut and a part connected with the switch-rails operated by said motion-plate.

6. In an apparatus for moving switch-rails from one position to another, the combination of a motor, a ball-bearing nut, a clutch-

coupling intermediate the motor and nut, a motion-plate movable with the nut, and a yoke connected with the switch-rails and operated from said motion-plate.

7. In an apparatus for moving switch-rails from one position to another, the combination of a motor, a ball-bearing nut, a connection between the motor and nut and a connection intermediate the nut and switch-rails, and a lock for the switch-rails operated from said nut.

8. In an apparatus for moving switch-rails from one position to another, the combination of a motor, a ball-bearing nut, a connection intermediate the motor and nut and the nut and switch-rails, and a lock for the switch-rails operated by said nut, said lock comprising a yoke connected with the switch-rails which is engaged by a part operated from the nut.

9. The combination with an electric motor, a nut movable on a screw-threaded shaft and an electric coupling between the shaft and armature of the motor.

10. The combination with an electric motor, a screw-threaded shaft, a friction-clutch electrically controlled for coupling the armature of the motor with the shaft, a nut for the screw-threaded portion of the shaft and a part moved by said nut.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOUIS H. THULLEN.

Witnesses:

W. L. McDANIEL,
GEO. E. CRUSE.