(No Model.) 3 Sheets—Sheet 1.

J. H. WILLIAMS.

RAILWAY SWITCH.

No. 413,594. Patented Oct. 22, 1889.

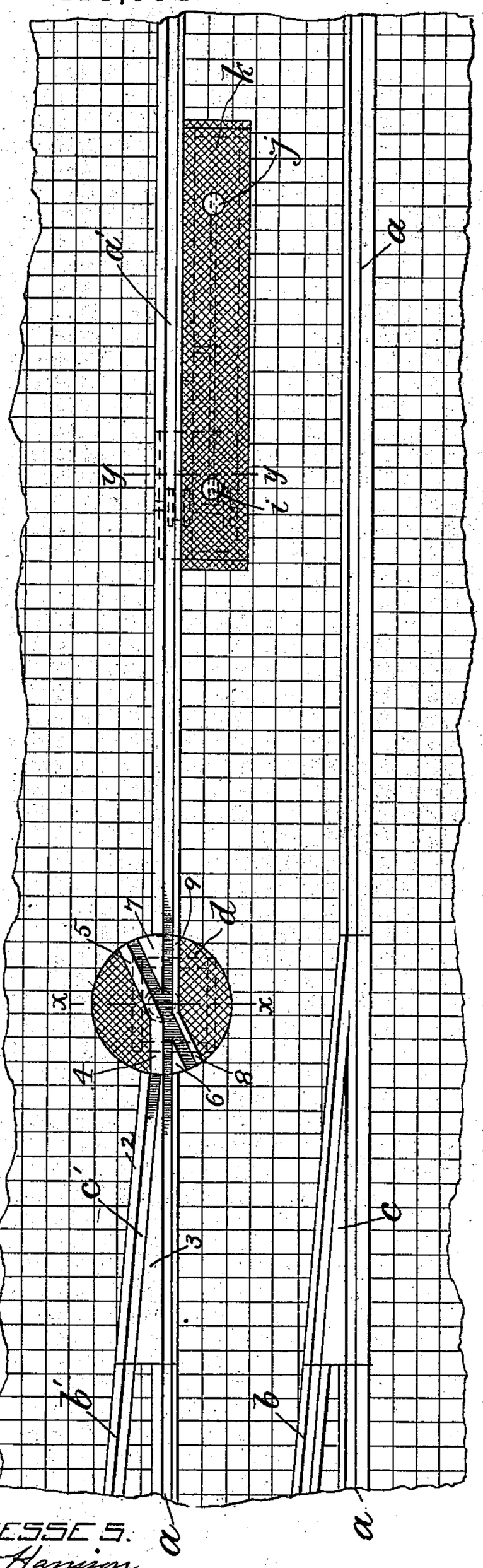

Fig. 1.

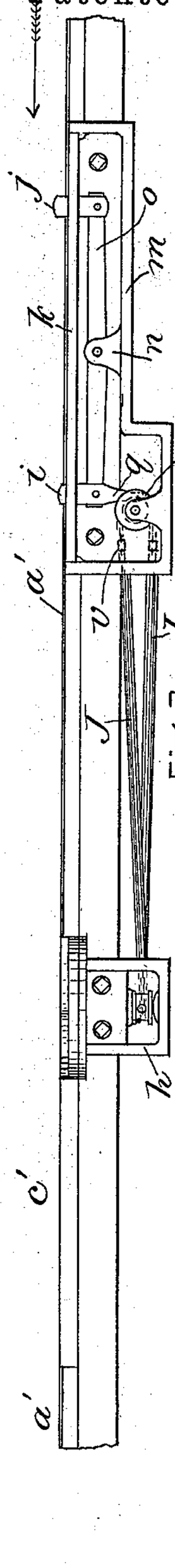

Fig. 2.

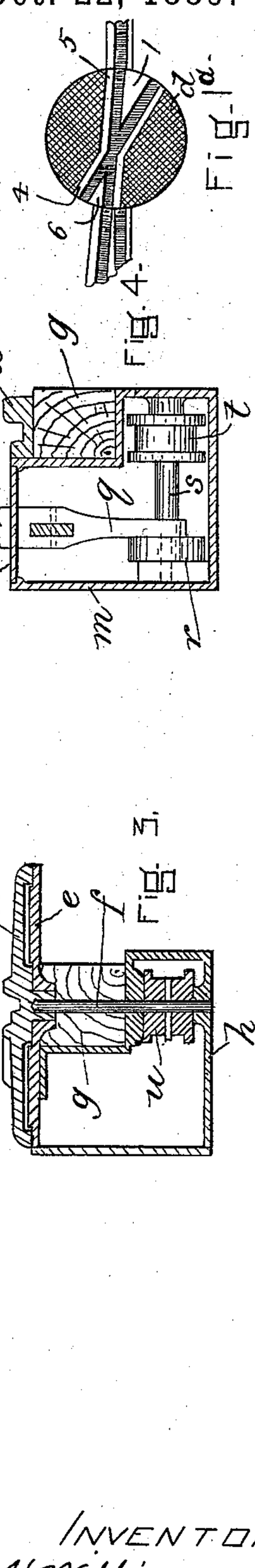

Fig. 3.

Fig. 4.

Fig. 5.

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(No Model.) 3 Sheets—Sheet 2.

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RAILWAY SWITCH.

No. 413,594. Patented Oct. 22, 1889.

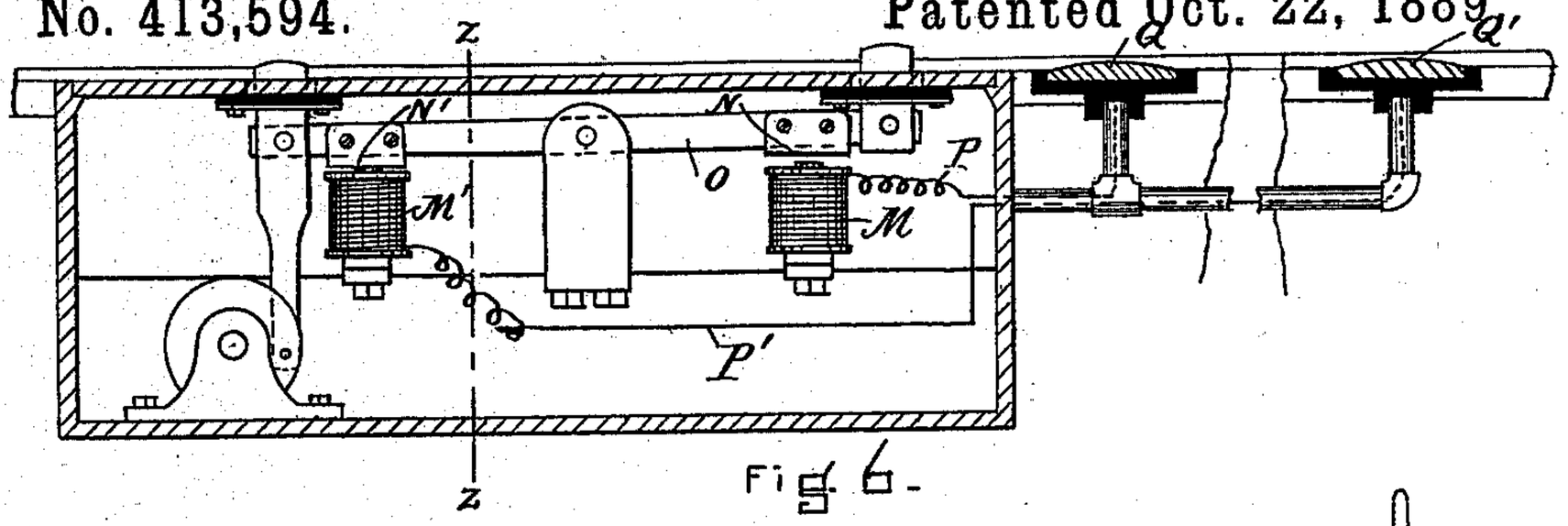

Fig. 6.

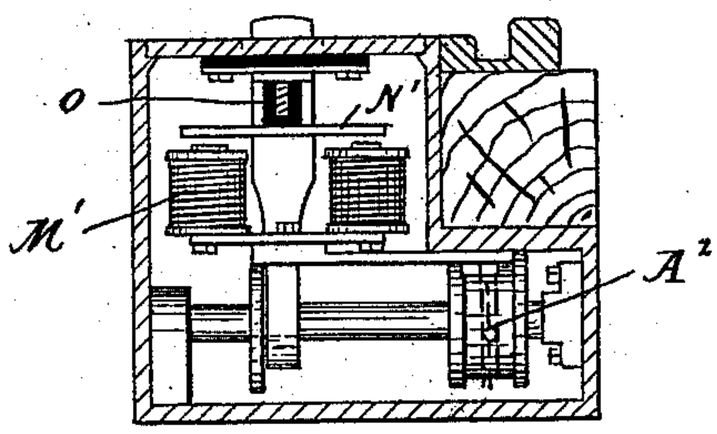

Fig. 7.

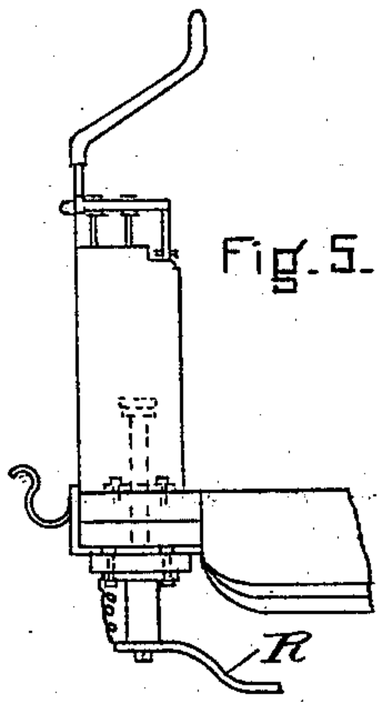

Fig. 5.

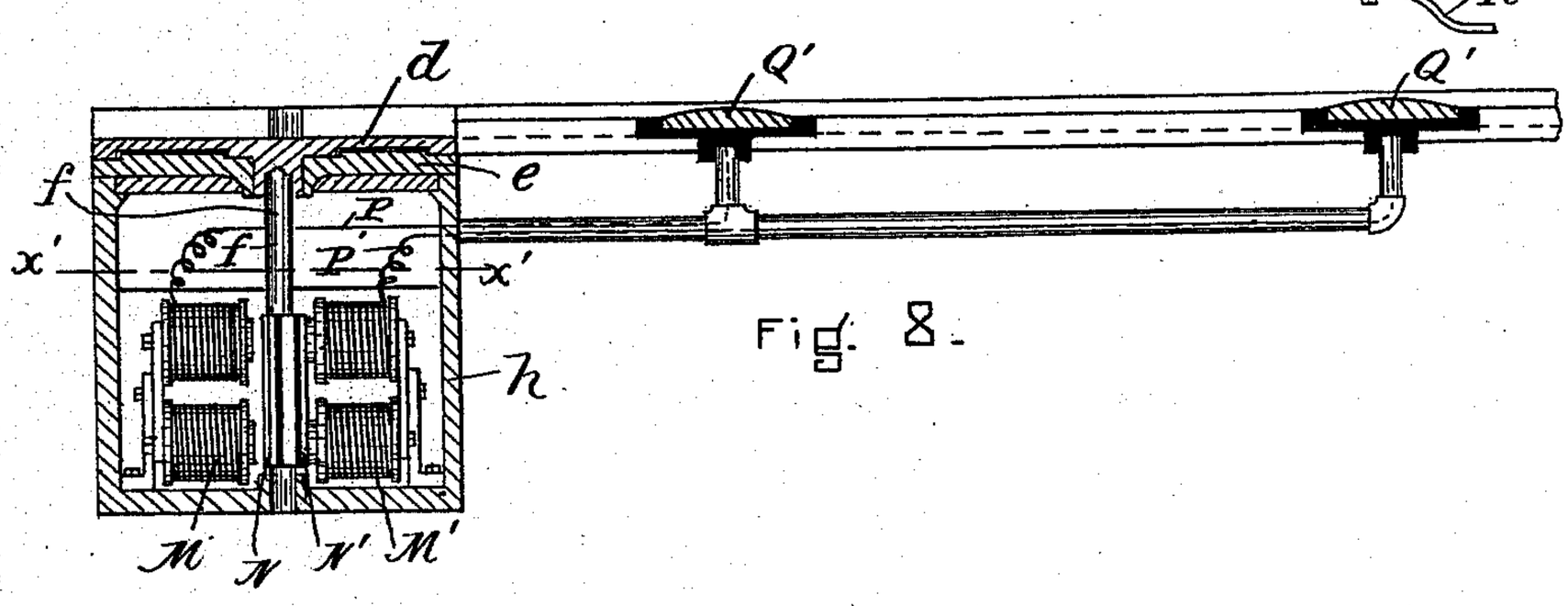

Fig. 8.

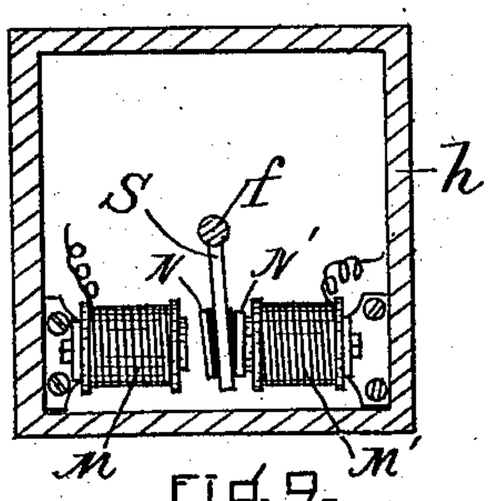

Fig. 9.

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RAILWAY SWITCH.

No. 413,594. Patented Oct. 22, 1889.

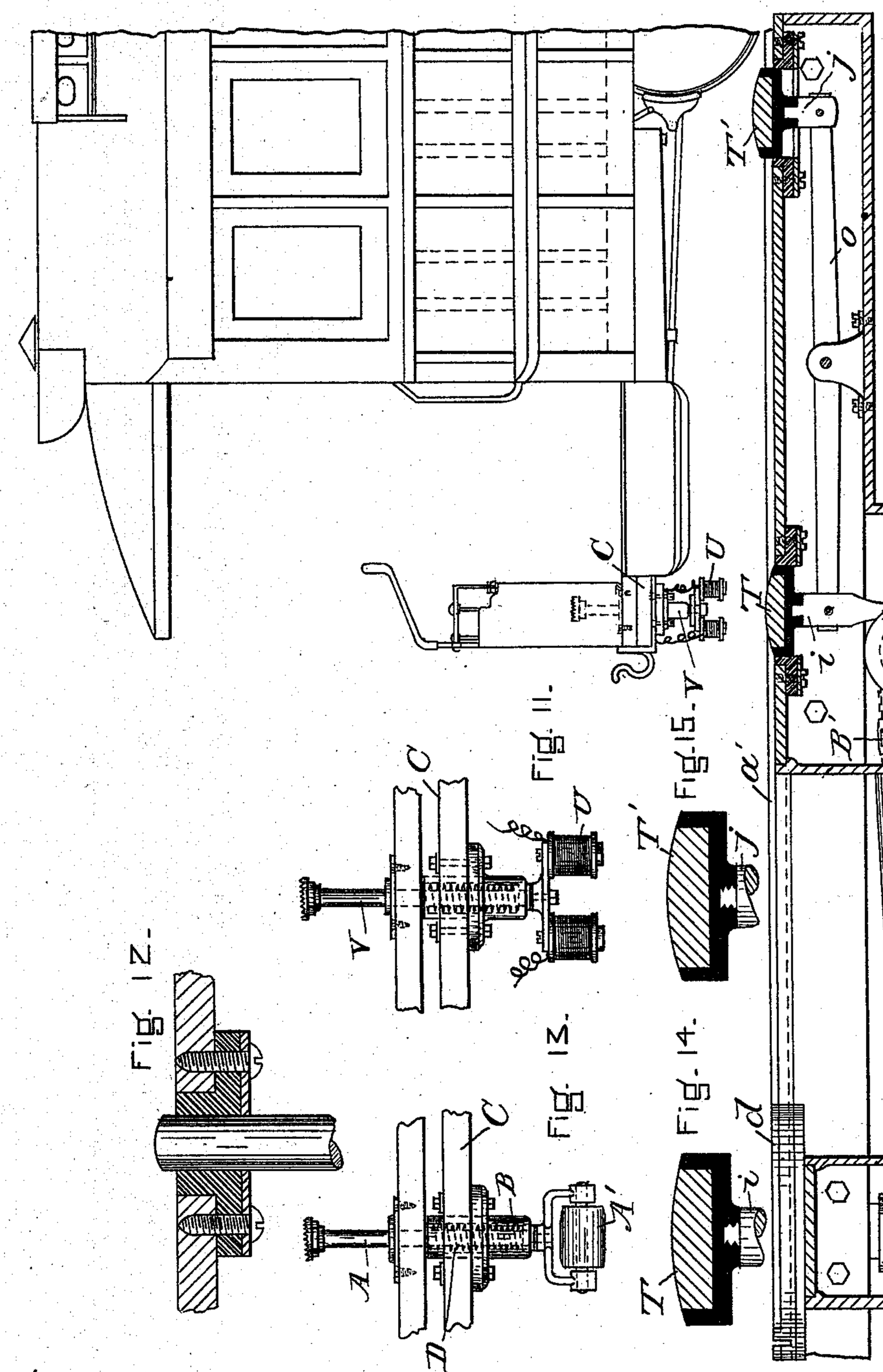

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 14.

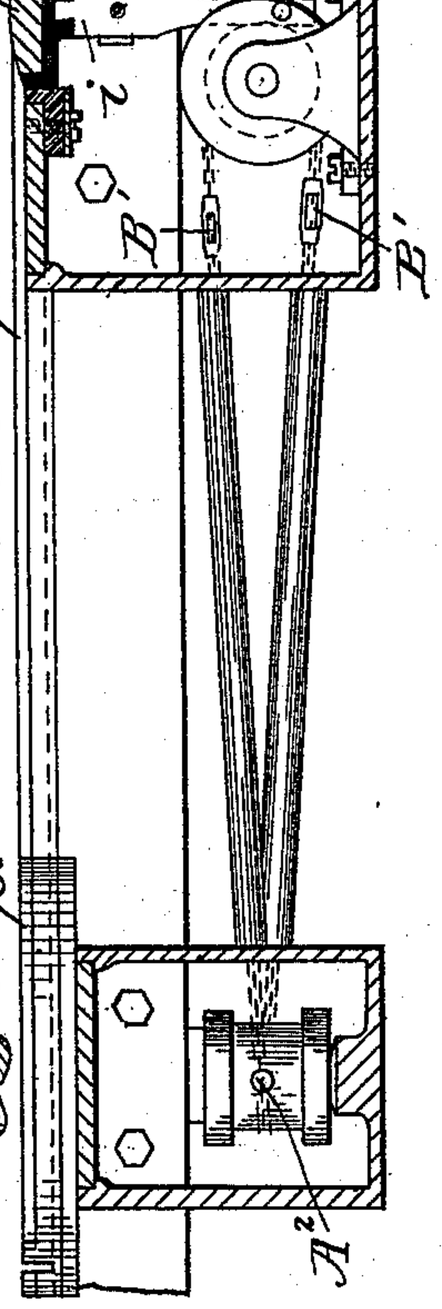

Fig. 15.

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UNITED STATES PATENT OFFICE.

JOHN H. WILLIAMS, OF BOSTON, ASSIGNOR OF TWO-THIRDS TO B. F. BARNARD, OF WAKEFIELD, MASSACHUSETTS.

RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 413,594, dated October 22, 1889.

Application filed July 13, 1889. Serial No. 317,455. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. WILLIAMS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Railway-Switches, of which the following is a specification.

This invention has for its object to provide a balanced switch for street-railroad tracks adapted to be set or adjusted by power communicated from a car on the main line approaching the switch, the construction of the switch being such that it can be operated either by the closing of an electric circuit by an approaching car or by mechanical means, the operation in either case being controllable by the driver or other attendant on the car.

The invention consists in the improved switch and operating devices therefor, which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a plan view of a part of a street-railway track having my improved switch. Fig. 1ª is a detail view of the turning table. Fig. 2 represents a side view of the switch and the preferred mechanical appliances for operating the same. Fig. 3 represents a section on line *x x*, Fig. 1. Fig. 4 represents a section on line *y y*, Fig. 1. Fig. 5 represents a side view of a portion of a car-platform. Fig. 6 represents a longitudinal section of a portion of an electrically-controlled apparatus for operating the switch. Fig. 7 represents a section on line *z z*, Fig. 6. Fig. 8 represents a modification. Fig. 9 represents a section on line *x' x'*, Fig. 8. Fig. 10 represents a side view of a switch and its mechanical operating mechanism shown in Fig. 2 and means for actuating said mechanism electrically. Figs. 11, 12, 13, 14, and 15 represent details.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a a'* represent rails of the main track, and *b b'* represent branch rails diverging therefrom. At the junction of the main rail *a* and branch rail *b* is a frog *c*, of the usual construction, and at the junction of the main rail *a'* and branch rail *b'* is a frog *c'*, which has the tread portion 2, forming a continuation of the tread of the branch rail *b'* and the tapered tread portion 3, one side of which is in line with and constitutes a continuation of the tread portion of the main rail *a'*.

d represents a circular table, which is fitted to rotate on a horizontal supporting-plate *e*, incorporated into the road-bed, said table filling a space which is left for it between the main rail *a'* and the frog *c'*, the periphery of said plate fitting the ends of the said rail and frog, as shown in Fig. 1. The table is secured to a vertical shaft *f*, which is fitted to rotate in suitable bearings formed for it under the track, said bearings being shown in Fig. 3 as formed in the beam or stringer *g* and in a metal chamber *h*, provided below the road-bed.

On the upper surface of the table *d* are the tread-sections 4 5, arranged at an obtuse angle with each other, and the two tapering tread-sections 6 7, arranged at opposite sides of the table. The said tread-sections are so arranged that when the table stands in the position shown in Fig. 1 the main rail *a'* is made continuous and the branch rail *b'* is disconnected therefrom, the section 7 constituting a continuation of the tread portion of the main rail *a'*, while the section 4 constitutes a continuation of the main-rail tread 3 of the frog *c'*. When the table is turned to the position shown in Fig. 1ª, the continuity of the main rail *a'* is broken and the branch rail *b'* is connected with the said main rail, the section 5 of the table constituting a continuation of the tread portion of the main rail *a'*, while the section 6 constitutes a continuation of the branch tread 2 of the frog *c'*. The table *d* is also provided with guard flange-sections 8 9, arranged at an obtuse angle with each other, the section 9 being continuous with the guard-flange of the main rail *a'* when the table is in the position shown in Fig. 1, while the section 8 is continuous with the tread portion 3 of the frog *c'* when the table is in the position shown in Fig. 1ª.

The tread-sections 6 7 of the table *d* act alternately as guard flange-sections, the section 6 being continuous with the guard-flange of the frog *c'* when the table is in the position shown in Fig. 1, while the section 7 is continuous with the guard-flange of the main rail *a'* when the table is in the position shown

in Fig. 1ª. It will be seen, therefore, that the switch-table furnishes two movable sets or series of tread-sections, one of which, composed of the sections 4 7, connects the main rail a' at one side of the table, through the frog c', with the main rail a' at the other side, while the other, composed of the sections 5 6, connects the main rail a' with the branch rail b', the change being made by a slight rotary movement of the table. It will also be seen that one tread-section of each set or series acts as a guard-flange when it is not in position to act as a tread-section. A safe reliable switch, balanced so that it can be operated by the minimum expenditure of power, is thus provided, so that the switch can be adjusted to either of the described positions by power communicated from a point at some distance from the switch through devices actuated by a car approaching the switch, as described hereinafter.

In Figs. 1, 2, 3, and 4 I have shown two movable plungers $i\,j$, which are fitted to move vertically in guides or sockets formed to receive them in a horizontal plate k, which is located between the rails $a\,a'$, and preferably close to the latter, as shown in Fig. 1, said plate being flush with the pavement and constituting the cover of a box or casing m, located below the pavement. To an ear n in said casing is pivoted a lever o, to the opposite ends of which the plungers $i\,j$ are pivotally connected, so that the depression of either plunger will move the lever o on its fulcrum and raise the other plunger. One end of the lever o is connected by a suitable link q, (here shown as an extension of the plunger i) to a disk r on a horizontal shaft s, which is journaled in bearings in the casing m. Said link is pivoted to the disk r at one side of the shaft s, so that when the end of the lever o, to which said link is connected, is raised or depressed, the shaft s will be partly rotated. To the shaft s is affixed a pulley t, on which is a chain or cable v, Fig. 2, connecting said pulley with a pulley u on the vertical shaft f, secured to the switch-table d.

The plungers $i\,j$ are adapted to be operated by an attachment on a car approaching the switch, said attachment being, for example, a vertically-movable rod A, Fig. 13, fitted to slide in a socket B, attached to the platform C of the car and adapted to be depressed by the driver's foot. At the lower end of said rod is a roller A′, which when the rod is depressed is in position to strike and depress the plunger i or the plunger j in passing over the same, and by depressing either plunger move the lever o so as to impart a rotary movement, through the described devices, to the switch-table. When the switch-table is set to make the main rail a' continuous, the plunger i is depressed and the plunger j raised, as shown in Fig. 2. If the driver of a car approaching in the direction indicated by the arrow in Fig. 2 desires to move the switch to the position shown in Fig. 1ª, he forces down the rod A so that it will strike and depress the plunger j, and thus effect the desired adjustment of the switch-table, the rod A being released and raised by its spring D, Fig. 13, before reaching the plunger i, which is now raised. If the next car is to remain on the main rail a', the driver depresses the rod A so as to depress the plunger i, and thus restore the switch-table to the position shown in Fig. 1. The parts of the cable or chain that extend between the casings $m\,h$ pass through tubular guides J J, attached to the casings at their ends, as shown in Fig. 2.

In Figs. 6 and 7 I have shown two electro-magnets M M′, arranged to move the lever o when energized by the closure of an electric circuit through either magnet, the lever o being provided with armatures N N′, arranged to be attracted by the magnets M M′. The magnet M is included in a circuit which also includes a wire P, connected with a metallic plate Q on the road-bed. The magnet M′ is included in another circuit, which includes a wire P′, connected with another metallic plate Q′ in the road-bed farther from the switch than the plate Q. Each circuit may be closed by contact of a movable contact-arm R, Fig. 5, on the platform of an approaching car with the plate Q or the plate Q′, and the closure of either circuit energizes the magnet of that circuit and causes it to attract the corresponding armature and give the lever o the same movement that is produced by the depression of one of the plungers, as above described.

Figs. 8 and 9 show arrangement in which the lever o, plungers $i\,j$, and the other power-transmitting devices above described are dispensed with, and the electro-magnets connected with the plates Q Q′, as above described with reference to Figs. 6 and 7, are located in the chamber h and are arranged to alternately attract armatures N N′ on an arm or lever S, attached to the switch-table shaft f. In this case the energizing of either magnet causes it to attract the corresponding armature and give the switch-table a partial rotation.

Fig. 10 shows the same mechanism that is shown in Figs. 1 and 2; but the plungers $i\,j$ are provided, respectively, with metal plates T T′, which act as armatures and are adapted to be attracted by an electro-magnet U, mounted on a vertically-movable rod V on the car-platform C, said magnet being included in a normally-closed electric circuit, so that when depressed to bring the plate T or the plate T′ within its magnetic field said plate and the plunger to which it is attached will be drawn upwardly by the attractive force of the magnet, the lever being thus moved and the switch-table turned, as described with reference to Figs. 1 and 2. The rod V and its electro-magnet U is shown in Fig. 11, and the hard-rubber socket in which said rod slides is shown in Fig. 12.

Figs. 14 and 15 show enlarged views of the plungers *i j* and the armature-plates T T′ thereon.

It is obvious that various other mechanical or electrical or electro-mechanical appliances may be adopted for rotating the switch-table, the even balance of said table enabling it to be easily rotated by any suitable means.

It will be seen that the construction shown in Fig. 6 can be operated either by mechanical means alone, like the application shown in Figs. 1 and 2, or by electro-mechanical means.

To prevent slipping of the cable or chain on the pulleys I attach the chain to said pulleys by bolts or other fastening devices A^2 A^2, and to adjust the tension of said chain I provide it with turn-buckles B′ B′.

I claim—

1. A circular switch-table provided with two sets or series of tread-sections, one section of each set or series being adapted to operate alternately as a tread-section and as a guard-flange section, as set forth.

2. A circular switch-table having two tread-sections arranged at an obtuse angle with each other and two tapered or wedge-shaped sections, each adapted to act alternately as a tread and as a guard-flange section, as set forth.

3. The combination of a main rail *a′*, a branch rail *b′*, a frog *c′*, having the tread-section 2 and the combined tread and guard section 3, and a circular switch-table having the tread-sections 4 5 and the combined tread and guard sections 6 7, as set forth.

4. The rotary switch-table having the tread-sections and the combined tread and guard sections, the vertical shaft attached to said table, and means for rocking or reversely rotating said shaft and table, all combined substantially as set forth.

5. The switch-table having the tread-sections and the combined tread and guard sections, the shaft *f*, attached to said table, a shaft *s*, located at a distant point, an endless cable connecting said shafts, a pivoted lever *o*, connected at one end with a disk on the shaft *s*, and means, substantially as described, for oscillating said lever *o*, all combined substantially as set forth.

6. The rotary balanced switch-table, combined with the shaft attached to said table and electrically-operated mechanism to partially rotate said shaft back and forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 10th day of July, A. D. 1889.

JOHN H. WILLIAMS.

Witnesses:
C. F. BROWN,
A. D. HARRISON.