No. 750,068. PATENTED JAN. 19, 1904.

M. SPINRAD & H. BUECHTING.

ELECTRICALLY OPERATED RAILWAY GATE.

APPLICATION FILED JUNE 16, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

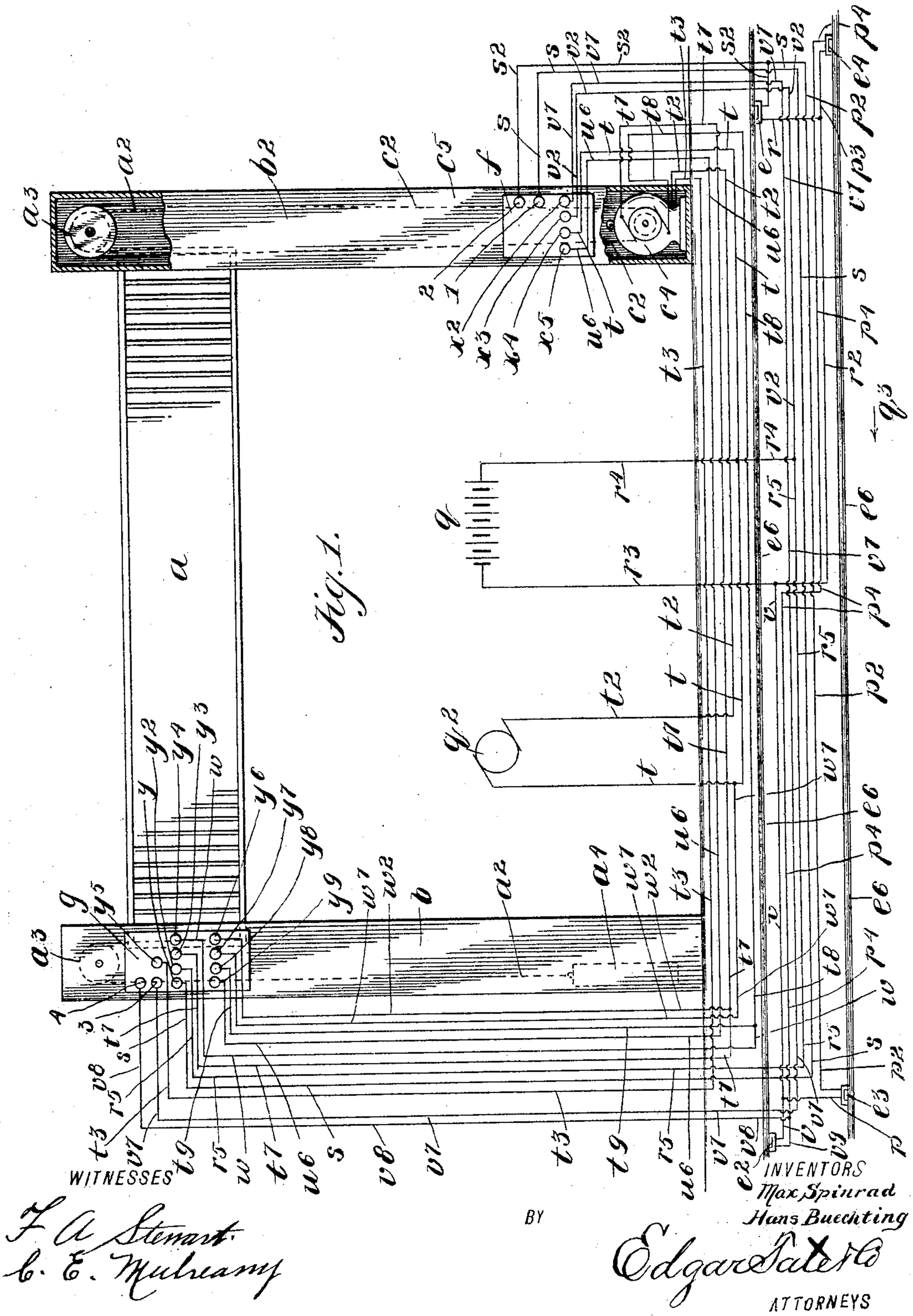

Fig. 1.

WITNESSES

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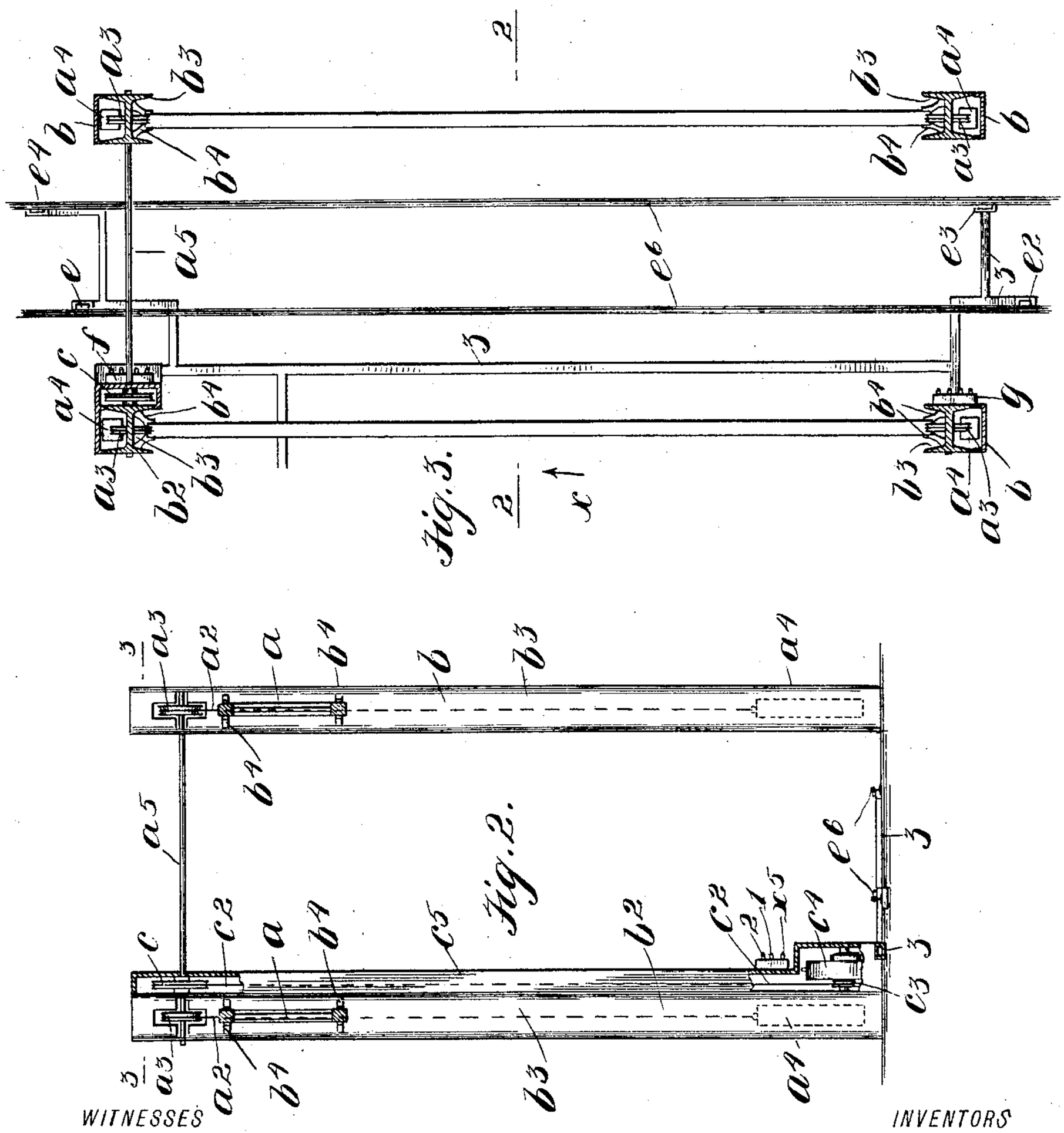

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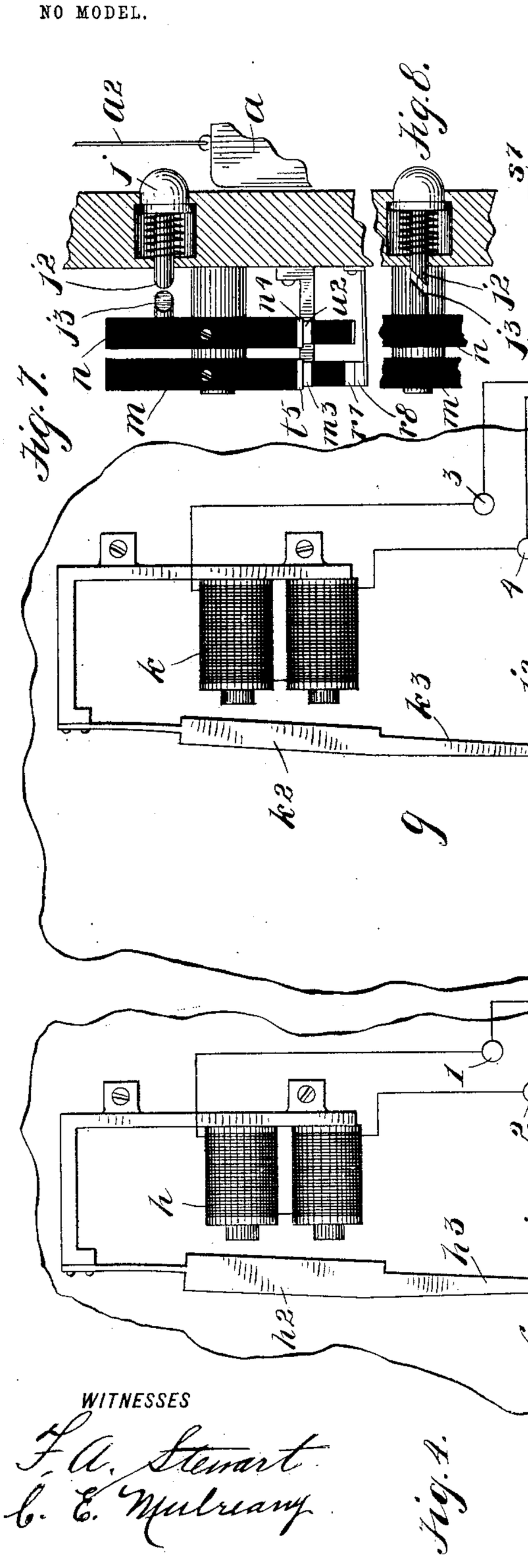

Fig. 7.

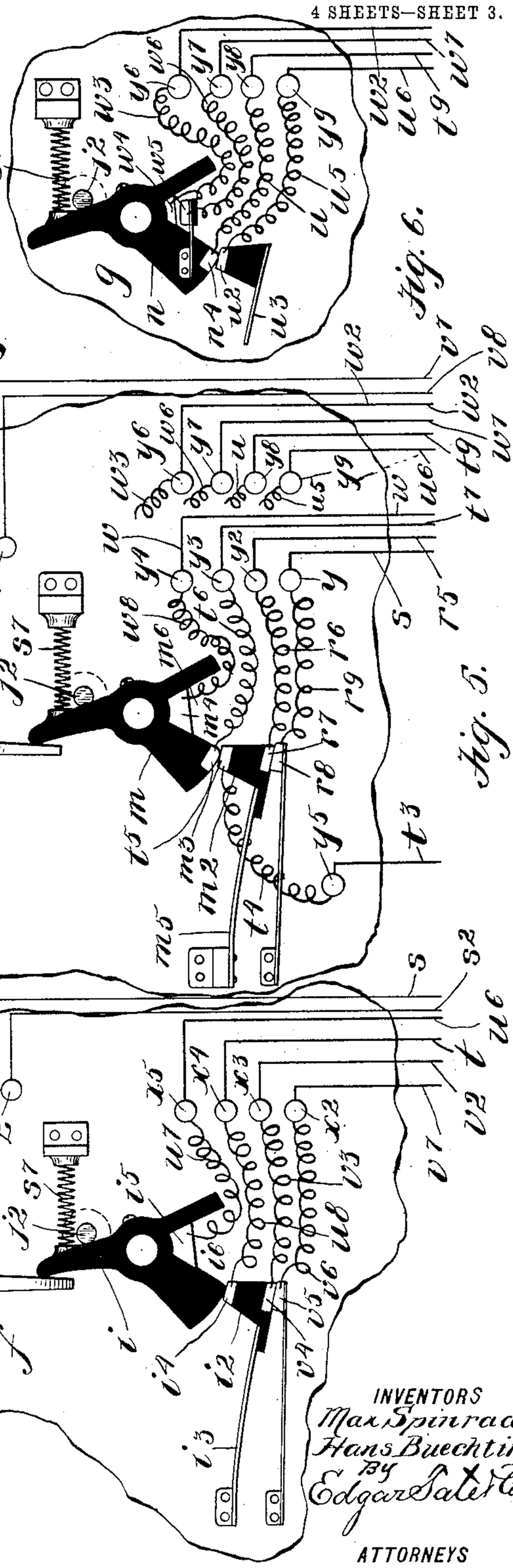

Fig. 6.

Fig. 5.

Fig. 4.

WITNESSES

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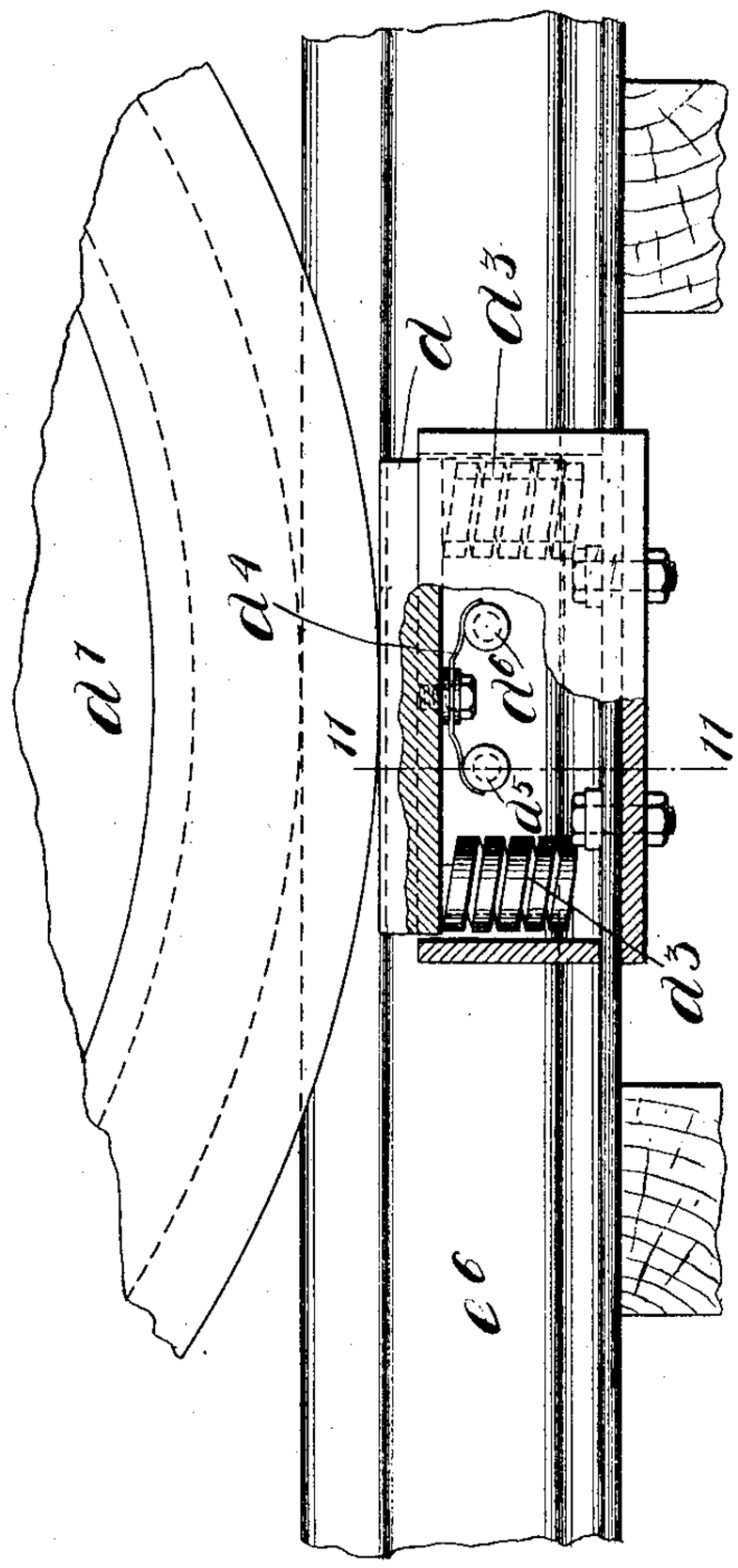

Fig. 9.

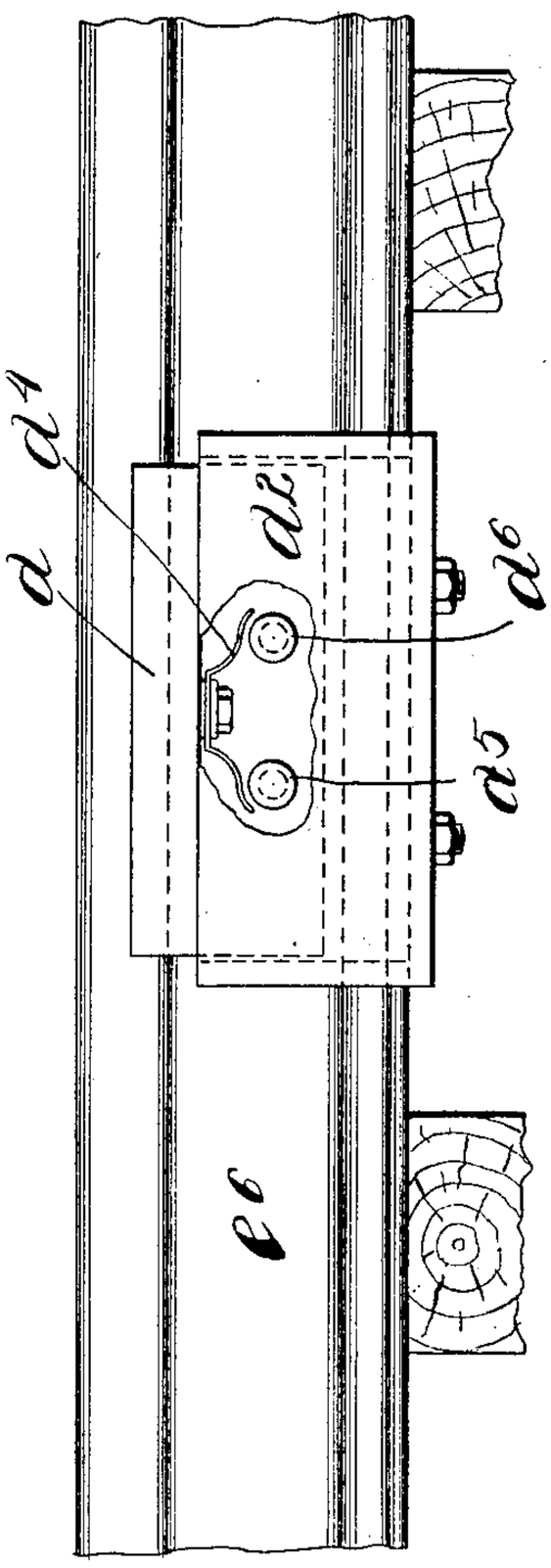

Fig. 10.

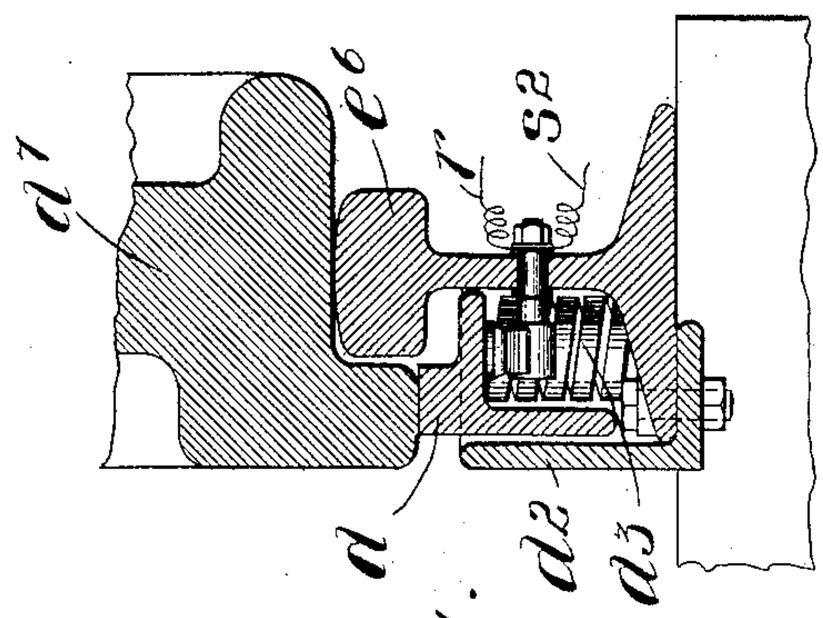

Fig. 11.

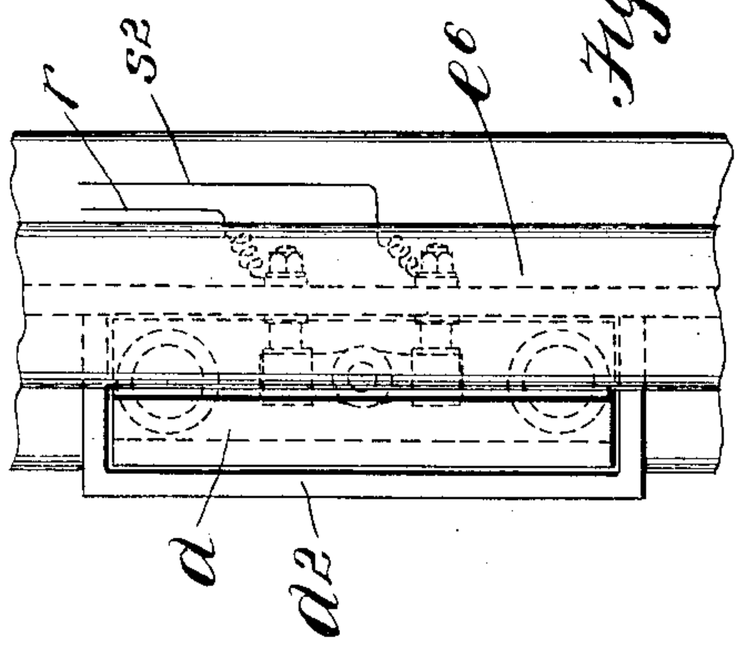

Fig. 12.

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No. 750,068. Patented January 19, 1904.

UNITED STATES PATENT OFFICE.

MAX SPINRAD AND HANS BUECHTING, OF NEW YORK, N. Y.

ELECTRICALLY-OPERATED RAILWAY-GATE.

SPECIFICATION forming part of Letters Patent No. 750,068, dated January 19, 1904.

Application filed June 16, 1903. Serial No. 161,728. (No model.)

To all whom it may concern:

Be it known that we, MAX SPINRAD and HANS BUECHTING, citizens of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electrically-Operated Railway-Gates, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in electrically operated and controlled gates or barriers for railway or similar crossings, and has reference to that class of devices which are automatic in operation.

The object of our invention is to provide a device of the character described which will normally hold the gate or barrier in its raised or open position until the approach of a train, when it will by the action of suitable contact or circuit-closing blocks located at predetermined distances from the gate and engaging with the wheels of the locomotive or car descend and guard or block the crossing until the train has passed and which will be raised again when the train has passed by the action of a second contact or circuit-closing block located at predetermined distances from the barrier.

We accomplish our object by the mechanism illustrated in the accompanying drawings, in which similar letters refer to similar parts, and in which—

Figure 1 is a side elevation of a gate, showing one of the uprights or supports partly in section and showing a plan of the track with the circuit-closing blocks located therein. In this view we also show diagrammatically the electrical wiring and connections. Fig. 2 is an elevation of the end supports, showing the gates in section, taken through the line 2 2 of Fig. 3 looking in the direction indicated by the arrow, and shows the casing of one of the supports partly in section. Fig. 3 is a plan view of the track, the upper portion, of the uprights being shown in section taken on the line 3 3 of Fig. 2. Figs. 4, 5, and 6 are views of the electrical switches and contacts, which will be hereinafter fully explained. Fig. 7 is a view in elevation showing mechanism for throwing the switches and contacts out of engagement. Fig. 8 is a plan view of same. Fig. 9 is a side elevation, partly in section, of the contact or circuit-closing block and shows the wheel of the car engaging same. Fig. 10 is an exterior elevation of same, showing the casing partly broken away. Fig. 11 is a cross-section taken on the line 11 11 of Fig. 9, and Fig. 12 is a plan view thereof.

Our invention comprises the gate or barrier a, supported by and operating between the uprights or supports b and b^2 and is lowered or raised by means of the chain or rope a^2, moving over a pulley a^3 and carrying a counterbalance or weight a^4. The supports b and b^2 are preferably constructed of ordinary **I**-beams, but any other approved form may be used; but when an **I**-beam support is used the inner channel formation b^3 acts as a way for the moving gate a, which may be provided with the guide-arms b^4 to give the gate an even movement. The ends of the arms b^4 may, if so desired, be provided with roller-contacts; but as these rollers are not essential we have not shown them in the drawings.

The pulleys a^3 in the opposite supports at one end of the gate, as those in the supports b and b^2, are connected by means of the shaft a^5 and fastened to this shaft is a driving-pulley c, which is connected, by means of a belt c^2, to the driving-pulley c^3 of the motor c^4. The said motor and connecting belt and pulley are inclosed within a casing.

The motor c^4 operates to lower and raise the gate a and is automatically started and stopped by the action of the contact or circuit-closing blocks e, e^2, e^3, and e^4, all of which are of the same construction and one of which is shown in Figs. 9, 10, 11, and 12, and which are interposed in the circuit supplying electrical current to the motor and are connected directly with electromagnets operating electric switches located within boxes f and g, which are secured to the supports.

In the drawings to better illustrate our invention we have shown the boxes f and g upon different posts; but it will be obvious after further description that we may secure both boxes to the same support, the one point to be observed being that the box f must be

placed near the lower end of the support and the box g near the upper end.

The contact-block e or e^3 is acted upon by the wheel of the locomotive or car, as shown in Fig. 9, and closes the circuit acting directly upon the magnet h, located in the box f. The electric current passing through the said magnet h influences the same to attract the armature h^2, the prolonged end h^3 of which engages the projecting end of the electric switch i and acts to throw the same, so that the block i^2, attached to the end of the spring i^3, enters the recess i^6, thereby bringing together the contacts i^4 and i^5 and closing the circuit which supplies the electric current to operate the motor when lowering the gate. The said operation of the motor continues until the circuit formed by the contacts i^4 and i^5 is broken by means of the action of the end of the gate a upon a button which is mounted in the support and passes through it. The button is similar to that shown at j in Fig. 7, and the end of the button is wedge-shaped, as at j^2, and is adapted to engage a similar formation j^3 upon the switch. The gate a in passing the button depresses it and throws the switch to its normal position. Figs. 7 and 8 show the button in juxtaposition to the switch in box g; but the same construction is applicable to the switch in box f.

When the gate or barrier a is in its lowered position and the contact-block e^2 or e^4 is acted upon by the locomotive or car wheel, it will close a circuit which acts directly upon the magnet k, which will attract the armature k^2, whose prolonged end k^3 engages the upper arms of the switches m and n, which are both mounted upon the same shaft in the box g.

When the switch m is moved by the armature k^2 and the arm k^3, it causes the block m^2 upon the spring m^5 to enter the recess m^6, thereby bringing into engagement the contacts m^3 and m^4, which close an electric circuit which supplies the motor and operates the same to raise the gate until the switch is thrown by means of the aforementioned button j.

The electrical current for the magnets is supplied by a battery or other suitable means, while the power for operating the motor is taken from any local power-house or dynamo.

The wires connecting the various parts are run in conduits and within the casing of the supports; but for the purpose of better illustion we have shown the terminals or connecting parts for the switches located upon the outside of the box; but in practice they will be placed within said boxes.

The functions of the secondary contacts, which we have not yet described, will be best understood when explained in conjunction with the diagram of wiring shown in Fig. 1 and considered in connection with Figs. 4, 5, and 6.

Assuming that the gate a is in its normal or raised position when the contact e is closed, an electrical current is established which flows through the wire r along the wires r^2 and r^3 to the battery q, out through the wires r^4 and r^5 to the binding-post y^2 upon the box g. The current then passes from the binding-post y^2 (see Fig. 5) through the flexible connection r^6 to the contact-block r^7, from whence it passes through the engaging contact-block r^8 and the flexible connection r^9 to the binding-post y. From the binding-post y it passes along the wire s and to the binding-post 1 through the magnet h in box f and out to the binding-post 2. From the binding-post 2 it runs through the wire s^2 to the contact e, completing the circuit and operating the armature, thereby throwing the switch i. This action establishes a second circuit which operates the motor c^4 and which flows as follows: Beginning at the binding-post k^4 the current flows along the wire t to the dynamo q^2 or the source of supply. From the dynamo it runs through the wire t^2 to the field of the motor, from whence it passes through the wire t^3 to the binding-post y^5. From the binding-post y^5 it passes (see Fig. 5) by means of a flexible connection t^4 to the contact m^3, from whence it passes to the contact t^5 and through the flexible connection t^6 to the binding-post y^3 along the wire t^7 to the armature of the motor. From the armature of the motor it passes through the wires t^8 and t^9 to the binding-post y^8. From the binding-post y^8 (see Fig. 6) the current flows by means of a flexible connection u to the contact u^4. From the contact u^4 the electric current passes to the contact u^2, which is secured upon the end of the spring-arm u^3, fastenened within the box g and through the flexible connection u^5 to the binding-post y^9. From this binding-post it passes through the wires u^6 to the binding-post x^5 through the flexible connection u^7 to the contacts i^5 and i^4, which at this point of operation are in engagement. From i^4 it passes through the flexible connection u^8 to the binding-post x^4, completing the circuit and operating the motor to lower the gate until the aforesaid button j, acted upon by the gate, breaks the circuit.

When the gate is in its lowered or closed position and the contact-block e^2 is acted upon by a passing train, an electric circuit is established, which flows from the contact-block through the wires v and r^3 to the battery q, from the battery through the wires r^4 and v^2 to the binding-post x^3. From the said binding-post the current passes through the flexible connection v^3 to the contacts v^4 and v^5. From v^5 it flows through the flexible connection v^6 to the binding-post x^2, from whence it passes through the wire v^7 to the binding-post 3, through the magnet k in the box g to the binding-post 4. From said post it flows through the wires v^8 and v^9 to the block e^2, completing the circuit and actuating the magnet, thereby throwing the switches m and n and closing the circuit

which operates the motor c^4 to raise the gate. The motor-circuit thus established flows (starting at the binding-post y^4) through the wires w and t^8 to the armature of the motor c^4, and from the armature it travels through the wires t^7 and w^2 to the binding-post y^6. From the binding-post y^6 (see Fig. 6) it flows through the flexible connection w^3 to the contacts w^4 and w^5, which the latter contact is mounted upon a spring-arm secured to the switch n and is at this point of operation in engagement with the first-mentioned contact w^4. From w^5 the current runs through the flexible connection w^6 to the binding-post y^7, from which it runs through the wires w^7 and t to the dynamo q^2 or source of electric supply. From the dynamo it runs through the wire t^2 to the field of the motor c^4, and from the field it passes through the wires t^3 to the binding-post y^5. From this binding-post it flows through the flexible connection t^4 to the contacts m^3 and m^4, which at this point of the operation are in engagement, and from the contact m^4 it flows through the flexible connection w^8 to the binding-post y^4, completing the electric circuit which flows through the motor in a direction opposite to that in which the electricity flows in the first-described operation for lowering the gate. The flow of electricity will continue until the gate is raised to the desired height and the circuit is broken by means of the button j, hereinbefore mentioned.

The operations just described are those which would take place when a train or car passes over the tracks e^6 in a direction indicated by the arrow q^3. A train passing upon the tracks in the opposite direction engages the block e^3 to close the circuits which operate the motor to lower the gate and the block e^4 to close the circuits which operate the motor to raise the gate. The contact-block e^3 is connected by means of the wire p to the wire v, which leads to the battery, and by means of the wire p^2 to the wire s^2, which leads to the magnet h, cutting out the contact e and closing the circuit when the contact-block e^3 is depressed.

The contact-block e^4 is connected to the wire r^2 by means of the wire p^3, thereby establishing a connection with the battery, and by means of the wire p^4 to the wire v^8, which leads to the magnet k, cutting out the contact-block e^2 and closing the circuit when the block e^4 is depressed.

To counteract the pressure of the spring of the armatures h^2 and k^2, I may provide a spring s^7; but it is obvious that this spring is not essential and may be omitted without impairing the operation of the parts.

In Figs. 9 to 12, inclusive, we show a form of contact-block wired to correspond to the wiring of the block e in Fig. 1 and which comprises a vertically-movable L-shaped plate d, partly inclosed within the casing d^2, which is securely attached to the inner side of the rail e^6. The plate d is normally kept in a raised position by means of the springs a^3, and has fastened to it on its under side a yoke d^4, constructed of spring metal and adapted to engage the metal terminals d^5 and d^6, which are insulated from the track and to which the wires r and s^2 are connected. D^7 designates the locomotive or car wheel which engages the contact-block and depresses same to connect the two terminals d^5 and d^6 by means of the yoke d^4, thereby closing the circuit. The contact-blocks may all be of similar construction and located and connected as shown in Figs. 1, 2, and 3.

In Fig. 1 we have shown a single-track road in which the wiring and connections are similar to the wiring and connections employed in a road having two or more tracks, the only difference being in the location of the contact-blocks. Instead of having four blocks in the one track we would have but two in each track, except where a track may be used for trains moving in both directions, in which case four contact-blocks in the track are necessary.

When the motor-switch i is thrown, closing the circuit at i^4 and i^5 to lower the gate, the magnetic circuit for the magnet k cannot be closed by its connected contact-block for the reason that the said circuit is broken by the separation of the contacts v^4 and v^5, thereby preventing the closing of the circuit, which sends a reverse-current through the motor and acts to raise the gate, or where the switches m and n are thrown, closing the circuit which sends the reversed current through the motor, the circuit operating the magnet h cannot be closed by means of its connected contact-block, owing to the fact that the said circuit is broken by the separation of the contacts r^7 and r^8, thereby preventing the closing of the circuit which operates the motor to lower the gate.

While the circuit for operating the motor to lower the gate is closed and sending a current through the motor, the circuit for reversing the current is broken by means of the separation of the contacts m^3 and m^4 of the switch m and the contacts w^4 and w^5 of the switch n, and when the circuit for sending the said reverse-current through the motor is closed and operating the motor to raise the gate the first-mentioned circuit for lowering the gate is broken by means of the separation of the contacts i^4 and i^5 of the switch i, the contacts m^3 and m^4 of the switch m, and the contacts n^2 and n^3 of switch n.

In the drawings, Figs. 1, 2, and 3, we have shown a gate or barrier adapted to move vertically between and supported upon uprights or supports; but it is obvious that we may apply our invention to a pivoted barrier arm or gate which may be adapted to swing vertically up or down to close or open the passage across the road, or any other movable obstruction may be employed in conjunction

with our mechanism. We do not therefore wish to be understood as limiting ourselves to the particular construction shown. It is also obvious that instead of placing the contact-blocks in the ground within the tracks we may provide any other suitable circuit-closing device, which may be located in any position near the track, either on the ground or above it, and be operated or brought in contact with any particular part of the locomotive or car or arm or projection secured upon same.

In the drawings we have shown but one motor and have connected two pulley-wheels a^3 by means of a shaft a^5; but it is obvious that we may employ two motors, placing one on each side of the track and dispensing with the shaft a^5.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for operating railway-gates, plates formed of insulating material and pivotally connected with the gate-supports, contact-points connected with said plates and with a source of electric supply, spring-arms attached to said supports and provided with contact-points which are adapted to engage with the said points upon the said plates and which are also connected with the source of electric supply, magnets secured to said supports and connected with the source of electric supply, armatures connected with the frame of the said magnets and having projecting fingers which are adapted to engage with the said plates, said armatures being operated by the aforesaid magnets and adapted to throw into and out of contact the various points to break and close the various circuits, and devices connected with one of the rails of the track and adapted to be operated by the wheels of a car for moving the said plates to throw into and out of contact the various contact-points and to reverse the current which operates the motor, substantially as shown and described.

2. In an apparatus for operating railway-gates, plates formed of insulating material and pivotally connected with the gate-supports, contact-points connected with said plates and with a source of electric supply, spring-arms attached to said supports and provided with contact-points which are adapted to engage with the said points upon the said plates and which are also connected with the source of electric supply, magnets secured to said supports and connected with the source of electric supply, armatures connected with the frame of the said magnets and having projecting fingers which are adapted to engage with the said plates, said armatures being operated by the aforesaid magnets and adapted to throw into and out of contact the various points to break and close the various circuits, and devices connected with one of the rails of the track and adapted to be operated by the wheels of a car for moving the said plates to throw into and out of contact the various contact-points and to reverse the current which operates the motor, said supports being also provided with press-buttons adapted to engage with the said gate to operate the said plates to break the circuit, substantially as shown and described.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of the subscribing witnesses, this 13th day of June, 1903.

MAX SPINRAD.
HANS BUECHTING.

Witnesses:
F. A. STEWART,
C. E. MULREANY.