

No. 756,864.

PATENTED APR. 12, 1904.

J. LIVINGSTON.
ELECTRIC LOCK.

APPLICATION FILED MAY 22, 1903.

NO MODEL.

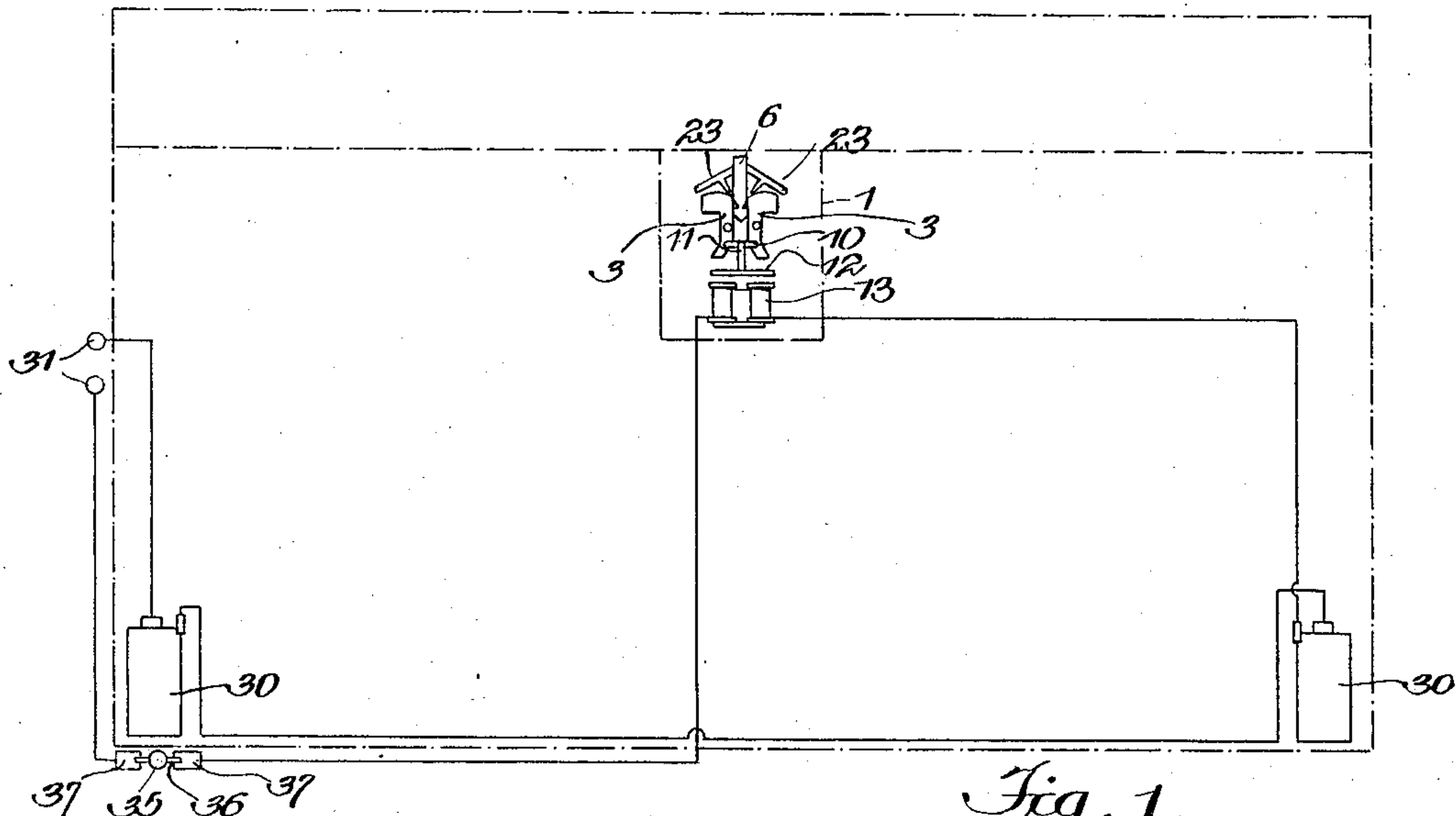


Fig. 1.

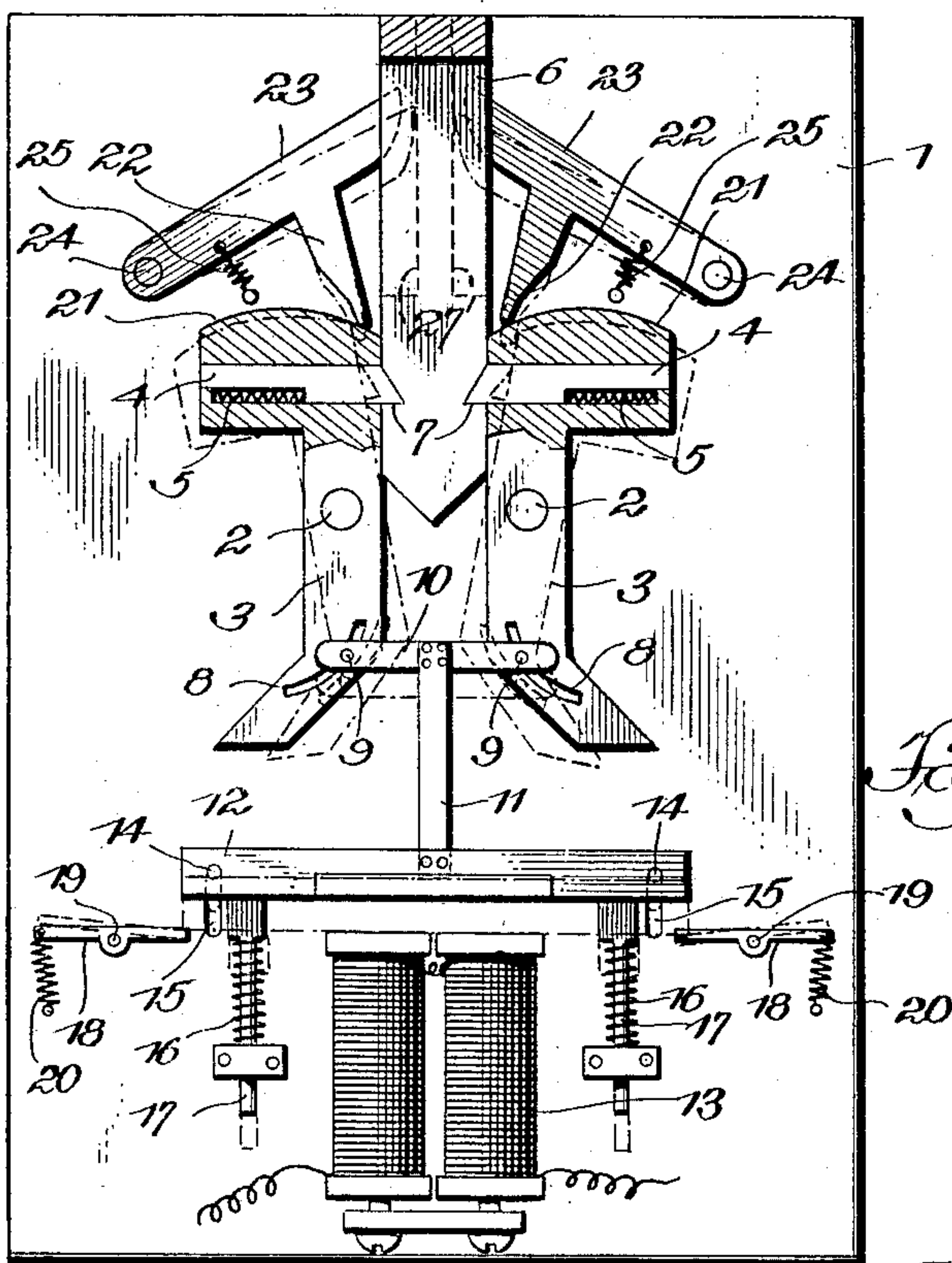


Fig. 2.

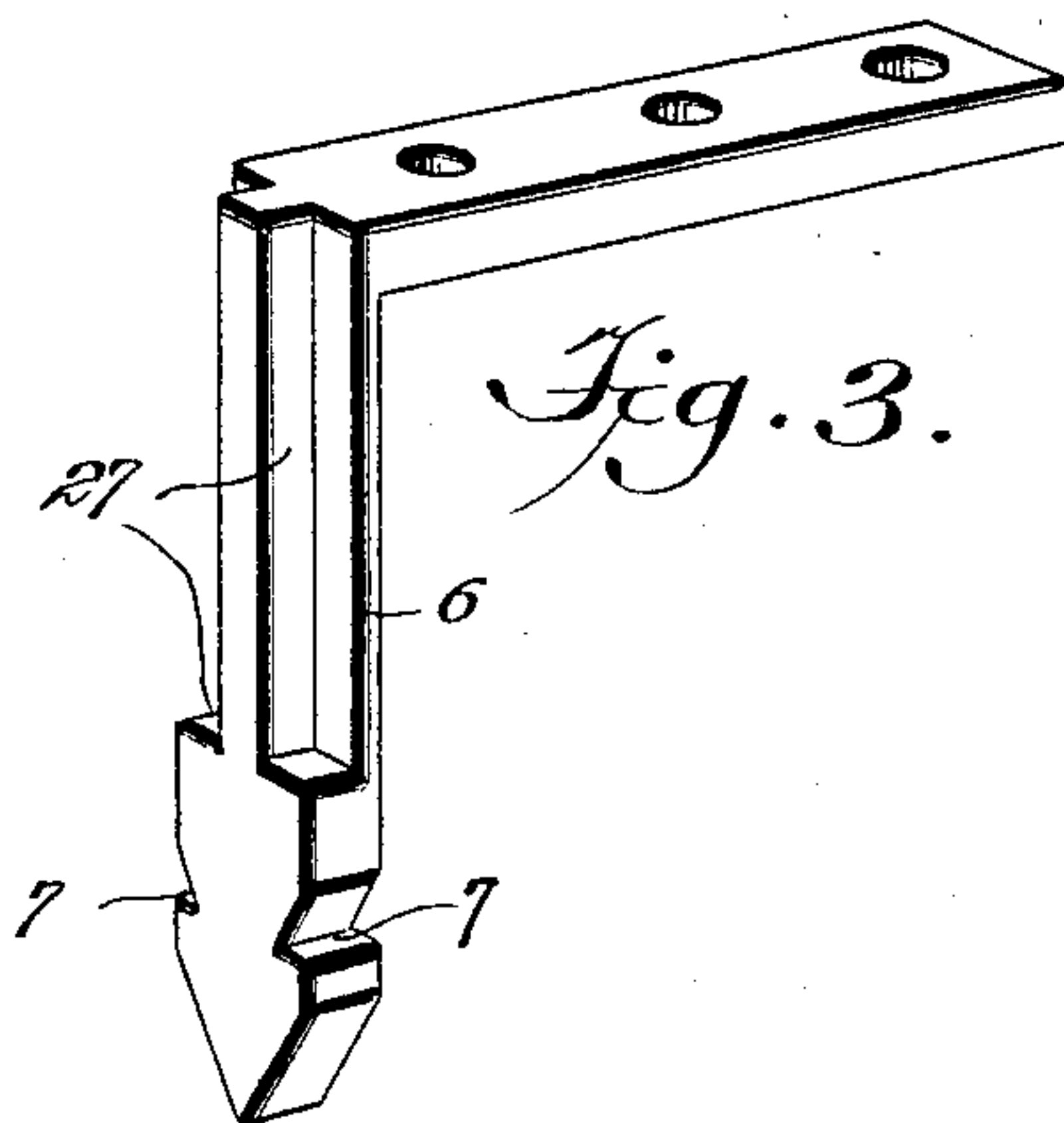


Fig. 3.

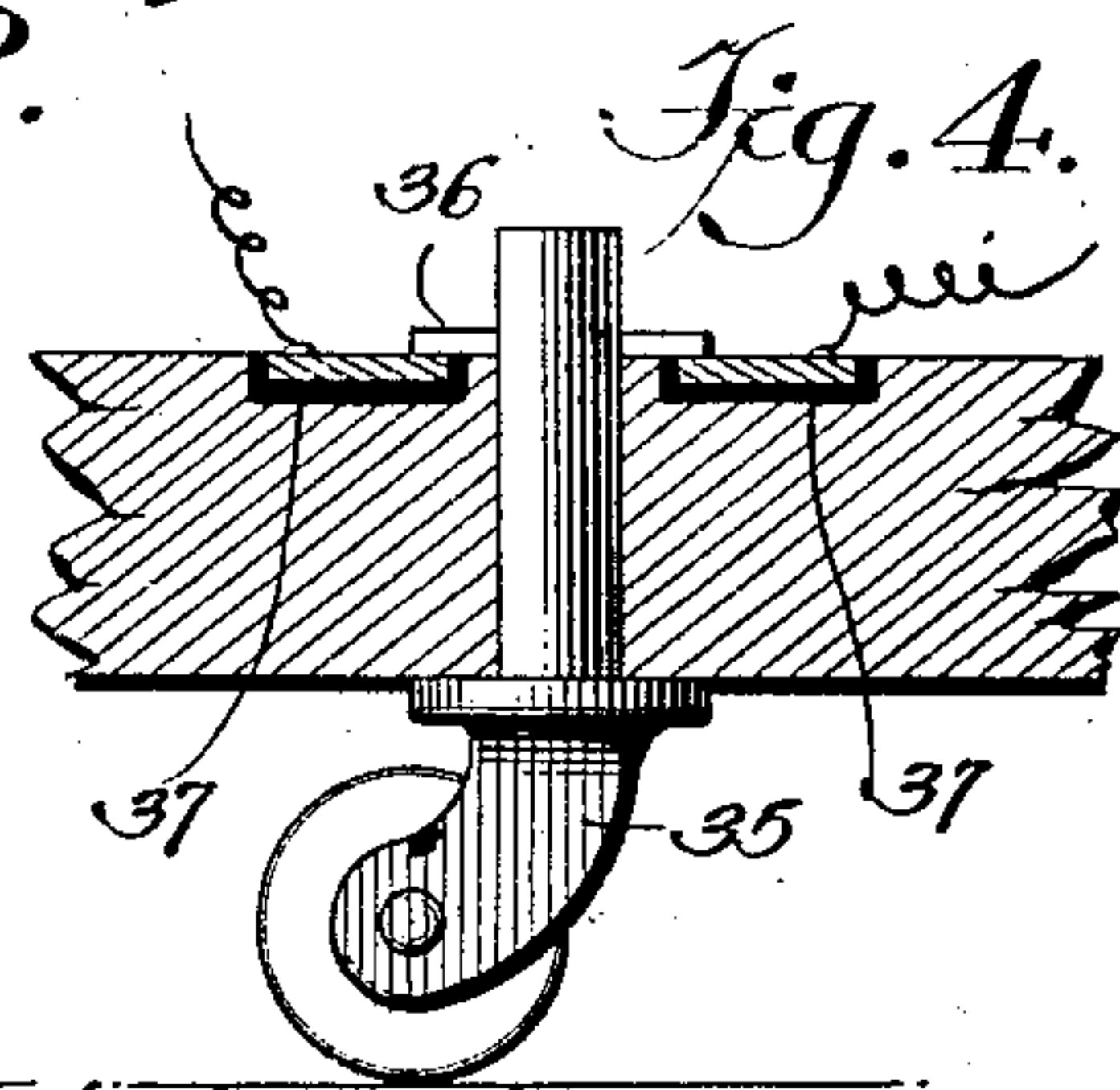


Fig. 4.

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UNITED STATES PATENT OFFICE.

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ELECTRIC LOCK.

SPECIFICATION forming part of Letters Patent No. 756,864, dated April 12, 1904.

Application filed May 22, 1903. Serial No. 158,360. (No model.)

To all whom it may concern:

Be it known that I, JAY LIVINGSTON, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented a new and useful Electromagnetic Lock, of which the following is a specification.

This invention relates to certain improvements in locks, and more particularly locks in which the opening or unlocking movement is accomplished through the medium of an electromagnet.

One of the principal objects of the invention is to provide a locking mechanism for use in connection with trunks, boxes, or the like in which the energizing-circuit of the magnet may be closed from the exterior of the trunk or box by means of any suitable conductor, as a coin, knife-blade, nail, or the like, although the structure is equally applicable to locks employed for any other purpose, as in the closing of desks, vaults, or the like.

A further object of the invention is to provide a device of this character in which the locking mechanism is so arranged that the electromagnet is energized and a circuit closed, unlocking the bolt. The latter will remain unlocked until the lid or door is opened without the necessity of maintaining the circuit closed during the opening operation, and, further, in this connection to permit of the automatic readjustment of the parts to locking position after the lid or door has been opened.

A still further object of the invention is to provide a device of this character in which the terminals of the magnet-circuit may be placed at any point known only to the owner, so that it will be extremely difficult for an unauthorized person to accomplish the unlocking movement.

A still further object of the invention is to provide a device of this character, more especially for use on trunks and the like, in which by slightly shifting the position of the trunk or other article the circuit may be broken at a point between the terminals and the magnet, and thus render it necessary for the article to be readjusted to proper position before the opening movement can be accomplished by the closing of the circuit at the terminals, thus providing an additional means of security.

With these and other objects in view the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a view of a trunk, illustrating the application thereto of a lock constructed in accordance with the invention. Fig. 2 is an elevation, on a larger scale, of the lock. Fig. 3 is a perspective view of the bolt. Fig. 4 is an elevation showing an auxiliary circuit-closer carried by one of the trunk-casters.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In the drawings, 1 designates a portion of a lock-casing, which may be of any suitable size and formed of any material, said casing being secured in place on the inner surface of the front wall of the trunk. Within this casing are two pivot-pins 2, on which are mounted rock-levers 3, the upper portions of which are provided with slots or recesses for the reception of longitudinally-movable dogs or catches 4, normally projected toward each other by small compression-springs 5 and serving to engage and hold a bolt 6, carried by the lid of the trunk, or in the case of a desk or vault by any suitable fixed member adjacent to the edge of the door, the latter serving as a support for the lock, or the position of the parts may be reversed, as desired. The lower portion of the bolt is pointed, and immediately above this pointed end are recesses 7 to receive the tapering or inclined ends of the catches 4, the latter being forced outwardly as the bolt moves down. When the bolt reaches its fullest in position, the catches are projected by means of the springs and engaged in the notches to hold the bolt in locked position.

In the lower portion of each of the rock-levers 3 is a curved cam-slot 8, into which extends a pin 9, carried by a transversely-disposed bar

10, which is secured by a bar 11 to the armature 12 of an electromagnet 13, so that when said magnet is energized the armature will be attracted and by drawing down the bar 10
 5 cause inward movement of the lower portions of the rock-levers 3 to an extent sufficient to withdraw the catches 4 from the recesses, and thus permit the withdrawal of the bolt.

The opposite ends of the armature are provided with projecting pins 14, adapted to vertically-disposed guiding grooves or recesses 15, formed in the wall of the casing, and said armature is normally held in proper position away from the poles of the magnet by coiled
 15 compression-springs 16, extending around small guided rods 17, depending from the armature, said springs being of sufficient strength to restore the armature and the rock-levers 3 to initial position when the magnet is
 20 deenergized.

Near the opposite edges of the casing at points adjacent to the ends of the armature are small levers 18, mounted on pivot-pins 19 and each having one end connected to a tension-spring 20. These levers are so arranged
 25 that the armature comes into contact therewith near the limit of its downward movement and when the effective force of the magnet is strongest. They serve to force the armature away from the poles of the magnet,
 30 and thus prevent the clinging of the armature to the poles from residual magnetism after the magnet is deenergized.

The upper ends of the rock-levers 3 are rounded or inclined, as indicated at 21, and on these rounded surfaces bear fingers 22, depending from levers 23, and are pivoted on pins 24, carried by the casing, said fingers being normally held in contact with the rounded
 40 surfaces by similar tension-springs 25, extending between the levers and fixed pins carried by the casing. The upper ends of the levers 23 are rounded and project into the path of movement of the bolt 6, these rounded end
 45 portions normally fitting in slots or recesses 27, formed in the opposite sides of the upper portion of the bolt, and the fingers resting loosely on the curved upper ends 21 of the rock-levers.

When the magnet is energized in the manner hereinafter described, the armature 12 is attracted and through the medium of the pins 9 and cam-slots 8 serves to withdraw the upper catch-bolts 4 from engagement with the
 55 slots 7 of the bolt. The fingers 22 then fall to a position between the upper ends of the levers 3 and the opposite sides of the bolt and serve to prevent return movement of the catches 4 after the magnet is deenergized,
 60 this movement being permitted by the slots or recesses 27 in the opposite sides of the bolt. The bolt being free, the lid may then be raised at any time; but as the bolt nears the limit of its outward movement the lower walls of the
 65 slots 27 come into contact with the rounded

inner ends of the levers 23 and return said levers to initial position, the fingers 22 being raised above the rock-levers 3 and permitting the latter to reassume their initial positions under influence of the springs 16. This read-
 70 justs all of the parts to position, so that when the bolt is again forced down it may be automatically locked.

In the trunk or other receptacle are placed one or more dry batteries 30, connected in series with the electromagnet 13 and the terminal wires of the circuit being connected to contacts 31 at points outside the trunk. As the majority of trunks are provided with fancy
 75 nails or the like, two adjacent or two widely-spaced nails may form the terminals of the circuit, and as these do not differ in appearance from the other nails on the trunk it will be a matter of considerable difficulty to ascertain
 80 which nails control the circuit. The circuit may be completed in the case of two adjacent terminals by means of a coin, nail, key, knife-blade, or any other suitable or convenient conductor, or in the case of widely-spaced terminals a piece of wire may be carried for the
 90 purpose.

It will be observed that the invention is not in any way limited to the location of the terminals or the character of such terminals, as they may be formed of conducting material
 95 of any kind—as, for instance, the metallic bands found in some trunks or the handle-attaching devices which are ordinarily used.

In order to provide for additional secrecy, the stem of one of the casters 35 is provided
 100 with a cross bar or plate 36, forming a conductor which when turned to proper position will bridge the two contact-plates 37, connected, respectively, to adjacent ends of one of the conducting-wires. When the caster is in
 105 proper position, the bar 36 bridges between the two contacts 37 and completes the circuit, so that when the terminals are connected the electromagnet will be energized. This arrangement permits the owner to open a trunk
 110 in the presence of another person by closing the contacts, the casters being assumed to be in proper position, after which the trunk may be slightly moved during the closing of the lid in order to shift the position of the caster,
 115 and thus break the circuit, so that a person observing the position of the terminals could not open the trunk by closing the circuit through said terminals.

Having thus described the invention, what
 120 is claimed is—

1. In an electromagnetic lock, a recessed bolt, a spring-catch for automatically engaging and locking the bolt, a lever carrying said catch, an electromagnet for operating the lever and withdrawing the catch, and means for holding the catch out of pawl-engaging position after the magnet has been deenergized.

2. In an electromagnetic lock, a recessed bolt, a catch for engaging said bolt, an elec-
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tromagnet for withdrawing the catch, and means for automatically holding the catch out of pawl-engaging position after the magnet has been deenergized.

5 3. In an electromagnetic lock, a bolt, a bolt engaging and locking means, an electromagnet controlling the movement of said bolt engaging and locking means, and an automatic mechanism for holding said engaging and
10 locking means out of pawl-engaging position when the magnet is deenergized.

4. In an electromagnetic lock, a recessed bolt, a catch for engaging and locking said bolt, a lever carrying said catch, an electro-
15 magnet for withdrawing the catch, and a spring-pressed lever adapted to enter between the side of the bolt and the catch when the latter is withdrawn to unlocking position.

5. In an electromagnetic lock, a slotted bolt,
20 a catch member for engaging and locking the bolt, a lever carrying the catch, an electromagnet for operating the lever, and a lever having a finger adapted to enter between the bolt and the catch-carrier, said lever extend-
25 ing within the slotted portion of the bolt and being moved to carrier-releasing position on the upward movement of said bolt.

6. In an electromagnetic lock, the combination with a bolt having a pair of slots and a
30 pair of catch-receiving recesses, of a pair of pivotally-mounted rock-levers, spring-pressed catches carried by said levers, pivotally-mounted finger-carrying levers for holding the rock-levers in unlocked position, said finger-
35 carrying levers projecting within slotted portions of the bolt, an electromagnet, an armature carried thereby, and a bar secured to the armature and having operative engagement with cam-slots formed in the slotted levers.

40 7. In an electromagnetic lock, the combination with a slotted and a recessed bolt, of a pair of pivoted rock-levers, catches carried by said levers, springs for projecting the catches, pivotally-mounted finger-carrying levers having
45 their upper ends entering the slotted portions of the bolt, the fingers of said levers being

adapted to maintain the rock-levers in unlocked position, an electromagnet, an armature arranged within the field of force of the magnet, and an operative connection between 50 the armature and the rock-levers.

8. In an electromagnetic lock, the combination with a bolt, of catches adapted to engage the bolt, rock-levers carrying said catches and provided with cam-slots, an electromagnet, an
55 armature arranged within the field of force of the magnet, means for guiding the armature, springs bearing against said armature and serving to maintain the same away from the poles of the magnet, a bar carried by the
60 armature and having pins entering said cam-slots, and spring-actuated levers adapted to engage the armature and serving to move said armature from contact with the poles of the magnet when the latter is deenergized, sub- 65 stantially as specified.

9. The combination with a receptacle, having external metallic fittings, of an electromagnetic lock including an electromagnet and a source of electrical energy, the terminals of
70 the circuit being formed by a pair of such spaced fittings, and an intervening circuit-breaking means disposed in the circuit and adjustable to operative or inoperative position from the exterior of said receptacle. 75

10. The combination with a trunk having external metallic fittings and casters, of an electromagnetic lock including an electromagnet and a source of electrical energy, the terminals of the circuit being formed by a plu-
80 rality of such spaced fittings, metallic contacts spaced from each other to break the circuit, and a contact-plate carried by one of the casters and movable therewith to open and close the circuit through said contacts. 85

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JAY LIVINGSTON.

Witnesses:

N. LIVINGSTON,
J. M. EPETENS.