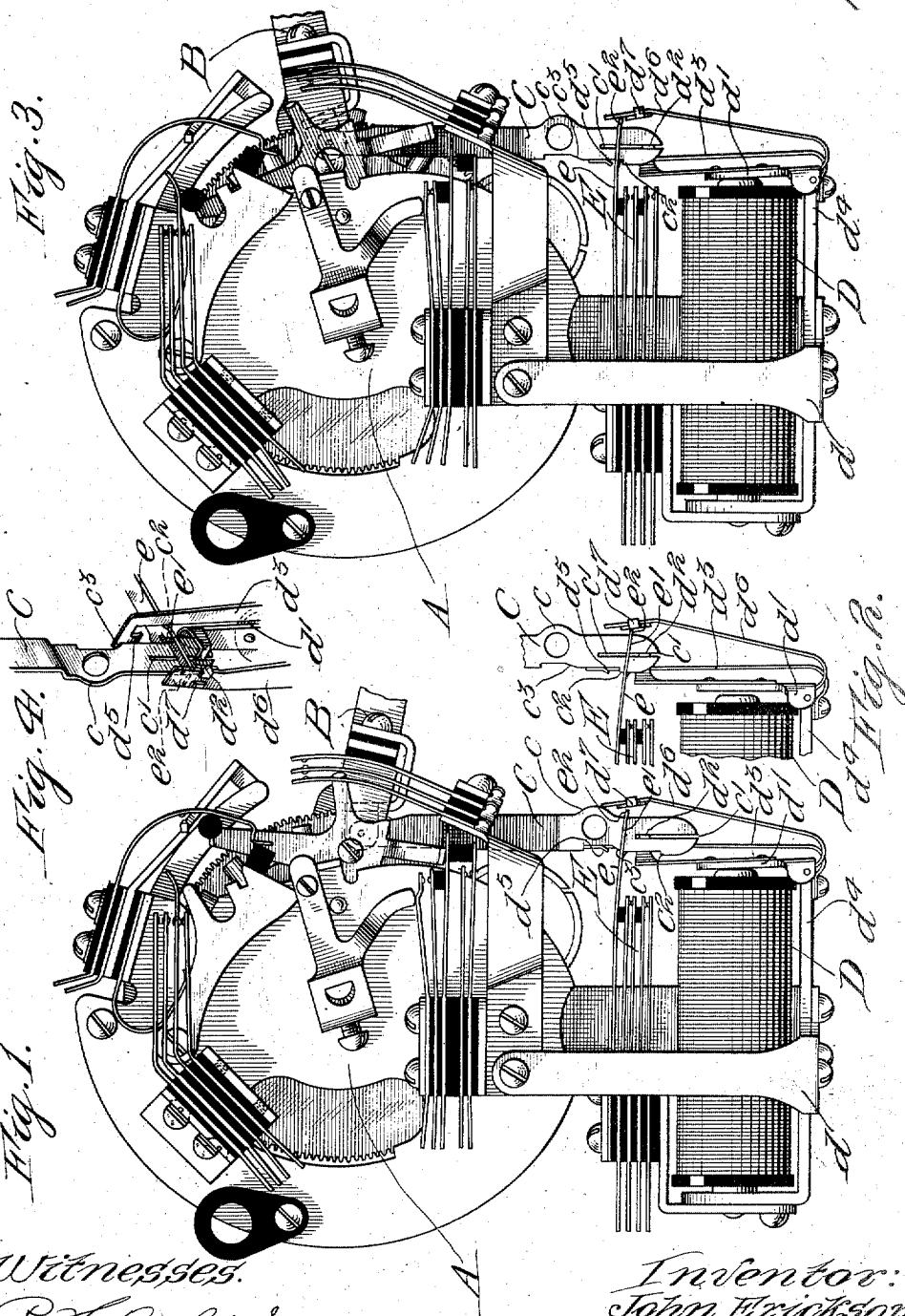


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 LOCK-OUT FOR PARTY LINE TELEPHONE SUBSCRIBERS' STATIONS.
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UNITED STATES PATENT OFFICE.

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FIRST TRUST AND SAVINGS BANK, TRUSTEE, OF CHICAGO, ILLINOIS.

LOCK-OUT FOR PARTY-LINE-TELEPHONE SUBSCRIBERS' STATIONS.

984,204.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN ERICKSON, a citizen of the United States of America, and resident of Chicago, Cook county, Illinois, have invented a certain new and useful Improvement in Lock-Outs for Party-Line-Telephone Subscribers' Stations, of which the following is a specification.

My invention relates to party-line telephone systems in general, but more particularly to systems in which automatic exchange apparatus is employed for enabling calling subscribers to connect their lines with those of the called subscribers, and especially to automatic telephone systems in which several subscribers' stations are located on a single line, and in which each subscriber is equipped with means for transmitting the electrical impulses necessary for operating the automatic exchange or switching machinery by which any calling subscriber obtains connection with the substation of any called subscriber, even though the calling and called subscribers are both located on the same line.

Generally stated, the object of my invention is the provision of improved means for preventing one subscriber from disturbing or interfering with the connections established by another subscriber already in possession of the same line.

Special objects of my invention are the provision of an improved construction and arrangement whereby certain circuits are controlled by the coöperation of an electro-magnet and the usual switch-hook or lever for supporting the telephone receiver; the provision of an improved construction and arrangement whereby a spring switch is not operated by the upward movement of the switch-hook except when the associated electro-magnet is energized; and the provision of certain details, features of improvement and combinations tending to increase the general efficiency and certainty of action of a device of this particular character.

To the foregoing and other useful ends, my invention consists in matters hereinafter set forth and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a subscriber's hook-switch and associated parts, showing a lock-out embodying the principles of my invention, the switch-hook being down. Fig. 2 is a detail showing the condition of the lock-

out when the switch-hook is up and the associated electro-magnet not energized. Fig. 3 is a view similar to Fig. 1, but showing the electro-magnet energized and switch hook up. Fig. 4 is a perspective of the engaging portions of the armature and the springs and the link carried by the switch-hook.

For the broader purposes of my invention the subscriber's switch mechanism A can be of any suitable, known or approved character. Preferably, however, it involves an up and down swinging switch-hook B adapted to control the circuits of the substation in any suitable or desired manner. This switch-hook or receiver-arm is provided with a depending link or arm C adapted to coöperate with the lock-out magnet D in controlling the circuit switch-springs E. For this purpose the said link or arm C is provided with an outer cam portion *c*, a lower vertical and longitudinal slot *c*¹, an inner shoulder *c*², and an inner cam portion *c*³. It will be observed that the cut-out magnet D is suitably supported by a frame *d*, and provided with a pivoted armature *d*¹. This armature has its upper end provided with a lug or finger *d*² adapted to engage and work up and down in the slot *c*¹—that is to say, the link or arm C moves up and down and thereby causes the relative movement between the said finger and slot. A spring *d*³ is secured to the frame *d*⁴ of the said magnet, and is provided at its upper end with a portion *d*⁵ adapted normally to engage the depression or notch immediately above the cam portion *c*³, as shown in Fig. 1. Another spring *d*⁶ has its lower end secured to the frame of said magnet, and its upper end provided with a shoulder *d*⁷. The upper end of the said spring *d*⁶ may normally bear against the cam portion *c*, as shown in Fig. 1. The upper spring *e* has its end portion provided with a longitudinally extending slot *e*¹ in which the lower end portion of the link or arm C works or moves up and down. It will also be seen that the upper spring *e* has an end portion *e*² adapted, under certain conditions, to be engaged and held up by the shoulder *d*⁷.

The mode of operation is as follows: In normal condition the parts are in the position shown in Fig. 1. When the switch-hook rises, and if the electro-magnet D is not energized, the parts assume the positions shown in Fig. 2. Under such conditions,

it will be seen that the switch-springs E remain closed, inasmuch as the shoulder c^2 was held out of engagement with the spring e , by the pressure of the spring d^3 . At this time, the flat inner face of the shoulder d^1 bears against the end portion e^2 of the spring e , and thus holds the switch-springs E in a closed condition. Suppose, however, that the magnet D were energized when the switch-hook rises. In such case, the armature d^1 would cause its finger d^2 to pull the link or arm C inwardly, thus causing the shoulder c^2 to engage the spring e at the inner end of the slot e^1 , the attractive force of said magnet being sufficient to overcome the pressure of the spring d^3 . This lifts the spring e into the position shown in Fig. 3, causing the springs E to separate, thus opening the circuits controlled thereby. In Fig. 3, when the switch-hook moves down, the movement permits the upper spring e to engage the shoulder d^1 , and as soon as the cam portion c engages the upper end of the spring d^3 , the spring e is thereby released from the shoulder d^1 , and the lower springs E thus permitted to close together. In this way, it will be seen that the electro-magnet and the switch-hook cooperate in controlling the switch-springs E. If the electro-magnet is energized, the raising of the switch-hook will inevitably open the said switch-springs. However, if the conditions are such that the said electro-magnet does not energize, then the circuits controlled by the said switch-springs remain closed, as the raising of the switch-hook does not disturb them.

For the broader purposes of my invention, the said switch-springs and the circuits controlled thereby can be of any suitable or desired character. Preferably, however, my improved device is employed as a lock-out for party-lines, and is in the nature of an improvement on the construction and arrangement. I do not, therefore, limit myself to the exact details shown and described.

The energizing circuit of the magnet D can, it will be understood, be controlled by the switch-hook itself, or by any other suitable means. Preferably, also, as shown, the electro-magnet D and the switch-springs E are removable as a unit. In fact, the entire lock-out device is, with the exception of the link or arm C, removable as a unit.

It will be seen that the link or arm C is employed for directly operating the switch or switch-springs E, the upper spring e constituting an operating member through the medium of which the said link or arm is adapted to open and close the said switch or switch-springs. It will also be seen that the armature d^1 normally engages the core or pole-piece of the electro-magnet, thus requiring but little current to operatively energize the electro-magnet. If the electro-magnet is energized, the parts simply remain in

the position shown in Fig. 3, the tension of the spring d^3 being incapable of pulling the armature away from the said core or pole-piece of the electro-magnet. Consequently, as explained, the armature remains in its normal position, and the switch or switch-springs E are opened by the upward movement of the switch-hook. Also, as previously explained, the switch-springs do not close together until the cam portion c engages the upper end of the spring d^3 , and thereby draws the shoulder d^1 out of engagement with the end e^2 of the spring e . One condition of the electro-magnet causes the operation of the switch or switch-springs, and the opposite electrical condition of said electro-magnet prevents the operation of the said switch or switch-springs. Preferably, however, the said armature of the electro-magnet is normally retained in its attracted position.

The paramagnetic member d^4 normally closes the magnetic circuit of the electro-magnet D.

The link C can, of course, be supported upon the switch-hook in any suitable manner consistent with the desired mode of operation and results. For example, it can have its upper end pivoted upon the switch-hook, whereby its lower end may swing without causing any movement of the switch-hook. It will be understood, however, that I do not limit myself to this particular construction.

What I claim as my invention is:—

1. In a device of the class specified, the combination of circuit-controlling switch-springs, a subscriber's switch-hook provided with means for directly operating said switch-springs, and an electro-magnet provided with an armature engaging said means to cooperate with said switch-hook in controlling said switch-springs, having provisions whereby said springs are not operable by the switch-hook except when the said magnet is energized.

2. In a device of the class specified, the combination of switch-springs, a subscriber's switch-hook, a link or arm depending from said switch-hook, adapted to directly operate said switch-springs, and an electro-magnet provided with an armature adapted to engage and cooperate with said link or arm in controlling said switch-springs.

3. In a device of the class specified, the combination of normally closed switch-springs, a subscriber's switch-hook, a connection carried by said switch-hook and adapted to operate said switch-springs, an electro-magnet provided with an armature adapted to engage said connection, and springs engaging said connection, whereby the switch-springs remain closed if the magnet is not energized.

4. In a device of the class specified, the combination of switch-springs, a subscriber's

switch-hook, a link or arm depending from said switch-hook, provided with a slot and a shoulder and a couple of cam portions, a member for operating said switch-springs, provided with a slot in which the said link or arm moves up and down, a spring adapted to engage one of said cam portions, provided with a shoulder for engaging and upholding the end of said member, a spring for engaging the other cam portion, adapted to hold said shoulder on the link out of engagement with said member, an electro-magnet, and an armature for said magnet, provided with a finger adapted to engage said slot in said link, said armature when attracted causing said shoulder on the link to engage and lift said member, whereby the upward movement of said switch-hook does not disturb or operate the switch-springs except when said magnet is energized.

5. In a device of the class specified, the combination of a circuit-controlling switch, a switch-hook, an electro-magnet, means by which the switch-hook directly operates the said switch, and means by which the energization of the magnet enables the switch-hook in rising to open said switch.

6. In a device of the class specified, the combination of a switch, a subscriber's switch-hook, a direct connection between the switch-hook and the switch, adapting the former in rising to operate the latter, an electro-magnet, means by which one condition of said magnet permits the opening of said switch, and means by which the opposite electrical condition of said magnet prevents the opening of said switch.

7. In a device of the class specified, the combination of switch-springs, a subscriber's switch-hook provided with means for directly operating said switch-springs, and an electro-magnet provided with an armature adapted to cooperate with said means in controlling said switch-springs, together with means by which the electro-magnet and switch-springs are removable as a unit.

8. In a device of the class specified, the combination of switch-springs, a subscriber's switch-hook, a link or arm depending from said switch-hook, adapted to directly operate said switch-springs, and an electro-magnet provided with an armature adapted to engage and cooperate with said link or arm in controlling said switch-springs, together with means by which the electro-magnet and switch-springs are removable as a unit.

9. In a device of the class specified, the combination of normally closed switch-springs, a subscriber's switch-hook, a connection carried by said switch-hook and adapted to operate said switch-springs, an electro-magnet provided with an armature adapted to engage said connection, and springs engaging said connection, whereby the switch-springs remain closed when the

switch-hook is up if the magnet is not energized, together with means by which the electro-magnet and switch-springs are removable as a unit.

10. In a device of the class specified, the combination of switch-springs, a subscriber's switch-hook, a link or arm depending from said switch-hook, provided with a slot and a shoulder and a couple of cam portions, a member for operating said switch-springs, provided with a slot in which the said link or arm moves up and down, a spring adapted to engage one of said cam portions, provided with a shoulder for engaging and upholding the end of said member, a spring for engaging the other cam portion, adapted to hold said shoulder on the link out of engagement with said member, an electro-magnet, and an armature for said magnet, provided with a finger adapted to engage said slot in said link, said armature when attracted causing said shoulder on the link to engage and lift said member, whereby the upward movement of said switch-hook does not disturb or operate the switch-springs except when said magnet is energized, together with means by which the electro-magnet and switch-springs are removable as a unit.

11. In a device of the class specified, the combination of a circuit-controlling switch, a switch-hook, an electro-magnet, means by which the switch-hook directly operates the said switch, and means by which the energization of the magnet enables the switch-hook to operate said switch, together with means by which the electro-magnet and switch are removable as a unit.

12. In a device of the class specified, the combination of a switch, a subscriber's switch-hook, a direct connection between the switch-hook and the switch, adapting the former to operate the latter, an electro-magnet, means by which one condition of said magnet permits the operation of said switch, and means by which the opposite electrical condition of said magnet prevents the operation of said switch, together with means by which the electro-magnet and switch are removable as a unit.

13. In a device of the class specified, the combination of switch-springs, a subscriber's switch-hook provided with means for directly operating said switch-springs, and an electro-magnet provided with an armature adapted to cooperate with said means in controlling said switch-springs, the armature of said magnet normally engaging the core or pole-piece of said magnet, having provisions whereby said springs are not operable by the switch-hook except when the said magnet is energized.

14. In a device of the class specified, the combination of switch-springs, a subscriber's switch-hook, a link or arm depending from said switch-hook, adapted to directly oper-

ate said switch-springs, and an electro-magnet provided with an armature adapted to engage and cooperate with said link or arm in controlling said switch-springs, the armature of said magnet normally engaging the core or pole-piece of said magnet.

15. In a device of the class specified, the combination of normally closed switch-springs, a subscriber's switch-hook, a connection carried by said switch-hook and adapted to operate said switch-springs, an electro-magnet provided with an armature adapted to engage said connection, and springs engaging said connection, whereby the switch-springs remain closed when the switch hook is up if the magnet is not energized, the armature of said magnet normally engaging the core or pole-piece of said magnet.

16. In a device of the class specified, the combination of switch-springs, a subscriber's switch-hook, a link or arm depending from said switch-hook, provided with a slot and a shoulder and a couple of cam portions, a member for operating said switch-springs, provided with a slot in which the said link or arm moves up and down, a spring adapted to engage one of said cam portions, provided with a shoulder for engaging and upholding the end of said member, a spring for engaging the other cam portion, adapted to hold said shoulder on the link out of engagement with said member, an electro-magnet, and an armature for said magnet, provided with a finger adapted to engage said slot in said link, said armature when attracted causing said shoulder on the link to engage and lift said member, whereby the upward movement of said switch-hook does not disturb or operate the switch-springs except when said magnet is energized, the armature of said magnet normally engaging the core or pole-piece of said magnet.

17. In a device of the class specified, the combination of a circuit-controlling switch, a switch-hook, an electro-magnet, means by which the switch-hook directly operates the said switch, and means by which the energization of the magnet enables the switch-hook to operate said switch, the armature of said magnet normally engaging the core or pole-piece of said magnet.

18. In a device of the class specified, the combination of a switch, a subscriber's switch-hook, a direct connection in the form of a depending link between the switch-hook and the switch, adapting the former to operate the latter, an electro-magnet, means by which one condition of said magnet causes the operation of said switch, and means by which the opposite electrical condition of said magnet prevents the operation of said switch, the armature of said magnet normally engaging the core or pole-piece of said magnet.

19. In a device of the class specified, the

combination of switch-springs, a subscriber's switch-hook provided with means for directly operating said switch-springs, and an electro-magnet provided with an armature adapted to cooperate with said means in controlling said switch-springs, having provisions whereby the switch-hook may rise without operating said springs, said armature normally engaging the core of the magnet, together with paramagnetic means for closing the magnetic circuit between the armature and the other end of said core.

20. In a device of the class specified, the combination of switch-springs, a subscriber's switch-hook, a link or arm depending from said switch-hook, adapted to directly operate said switch-springs, and an electro-magnet provided with an armature adapted to engage and cooperate with said link or arm in controlling said switch-springs, together with paramagnetic means for normally closing the magnetic circuit of said magnet.

21. In a device of the class specified, the combination of normally closed switch-springs, a subscriber's switch-hook, a connection carried by said switch-hook and adapted to operate said switch-springs, an electro-magnet provided with an armature adapted to engage said connection, and springs engaging said connection, whereby the switch-springs remain closed when the switch hook is up if the magnet is not energized, together with paramagnetic means for normally closing the magnetic circuit of said magnet.

22. In a device of the class specified, the combination of switch-springs, a subscriber's switch-hook, a link or arm depending from said switch-hook, provided with a slot and a shoulder and a couple of cam portions, a member for operating said switch-springs, provided with a slot in which the said link or arm moves up and down, a spring adapted to engage one of said cam portions, provided with a shoulder for engaging and upholding the end of said member, a spring for engaging the other cam portion, adapted to hold said shoulder on the link out of engagement with said member, an electro-magnet, and an armature for said magnet, provided with a finger adapted to engage said slot in said link, said armature when attracted causing said shoulder on the link to engage and lift said member, whereby the upward movement of said switch-hook does not disturb or operate the switch-springs except when said magnet is energized, together with paramagnetic means for normally closing the magnetic circuit of said magnet.

23. In a device of the class specified, the combination of a circuit-controlling switch, a switch-hook, an electro-magnet, an element by which the switch-hook directly operates the said switch, and means engaging

said element by which the energization of the magnet enables the switch-hook to operate said switch, normally closing the magnetic circuit of said magnet.

5 24. In a device of the class specified, the combination of a switch, a subscriber's switch-hook, a direct connection between the switch-hook and the switch, adapting the former to operate the latter, an electro-magnet, means engaging said connection by
10 which one condition of said magnet permits the operation of said switch, and means by which the opposite electrical condition of said magnet prevents the operation of said
15 switch, including paramagnetic means for normally closing the magnetic circuit of said magnet.

25. In a device of the class specified, an electro-magnet normally deenergized and
20 provided with an armature normally held in its attracted position, and switch-springs controlled by said armature, operative only when the magnet is energized.

26. In a device of the class specified, the
25 combination of switch-springs, a subscriber's switch-hook provided with means for directly operating said switch-springs, and a normally deenergized electro-magnet provided with an armature adapted to cooperate
30 with said means in controlling said switch-springs, having provisions permitting the switch-hook to rise without operating said springs, together with paramagnetic means for normally closing the magnetic
35 circuit of said magnet by the normal engagement of the armature and core thereof.

27. In a device of the class specified, the combination of switch-springs, a subscriber's
40 switch-hook, a link or arm depending from said switch-hook, adapted to directly operate said switch-springs, and a normally deenergized electromagnet provided with an armature adapted to engage
45 and cooperate with said link or arm in controlling said switch-springs, together with paramagnetic means for normally closing the magnetic circuit of said magnet by the normal engagement of the armature and
50 core thereof.

28. In a device of the class specified, the combination of normally closed switch-springs, a subscriber's switch-hook, a connection carried by said switch-hook and
55 adapted to operate said switch-springs, a normally deenergized electromagnet provided with an armature adapted to engage said connection, and springs engaging said connection, whereby the switch-springs remain closed when the switch hook is up if
60 the magnet is not energized, together with paramagnetic means for normally closing the magnetic circuit of said magnet.

29. In a device of the class specified, the

combination of switch-springs, a subscriber's
65 switch-hook, a link or arm depending from said switch-hook, provided with a slot and a shoulder and a couple of cam portions, a member for operating said switch-springs, provided with a slot in which the said link
70 or arm moves up and down, a spring adapted to engage one of said cam portions, provided with a shoulder for engaging and upholding the end of said member, a spring for engaging the other cam portion, adapted
75 to hold said shoulder on the link out of engagement with said member, a normally deenergized electromagnet, and an armature for said magnet, provided with a finger adapted to engage said slot, said armature
80 when attracted causing said shoulder on the link to engage and lift said member, whereby the upward movement of said switch-hook does not disturb or operate the switch-springs except when said magnet is energized,
85 together with paramagnetic means for normally closing the magnetic circuit of said magnet.

30. In a device of the class specified, the combination of a circuit-controlling switch,
90 a switch-hook, a normally deenergized electromagnet, means by which the switch-hook directly operates the said switch, and means by which the energization of the magnet enables the switch-hook to operate said switch,
95 together with paramagnetic means for normally closing the magnetic circuit of said magnet by the normal engagement of the armature and core thereof.

31. In a device of the class specified, the
100 combination of a switch, a subscriber's switch-hook, a direct connection between the switch-hook and the switch, adapting the former to operate the latter, a normally deenergized electromagnet, means by which
105 one condition of said magnet causes the operation of said switch, and means by which the opposite electrical condition of said magnet prevents the operation of said switch, when the switch-hook rises, together with
110 paramagnetic means for normally closing the magnetic circuit of said magnet by the normal engagement of the armature and core thereof.

32. In a telephone system, a switch-hook,
115 a link carried thereby, a spring switch, an electromagnet provided with means for holding the link in position to open the said spring switch, and means for holding the said switch open while the switch-hook
120 moves down.

33. In a telephone system, a switch-hook, a link carried thereby, a normally closed switch, an electromagnet provided with means for holding said link in position to
125 open said normally closed switch when the switch-hook moves up, means for holding the said switch open while the switch-hook

moves down, and means on said link for effecting the closure of said switch.

34. In a telephone system, a switch-hook, a normally closed switch, an electromagnet
5 provided with an armature, a link carried by the switch-hook and engaging said armature, and spring means whereby the armature, when the magnet is energized, holds the link in position to open said switch when
10 the switch-hook moves up.

35. In a telephone system, a switch-hook, a link depending therefrom, a cam on one side of said link, a cam and a shoulder on

the other side of said link, an electromagnet provided with an armature having a spring 15 contact engaging said first-mentioned cam, another spring cooperating with the second cam to change the position of the link, and a spring switch adapted to be opened by said shoulder if the magnet is energized.

Signed by me at Chicago, Cook county, Illinois, this 12th day of April, 1906.

JOHN ERICKSON.

Witnesses:

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