No. 685,571. Patented Oct. 29, 1901.

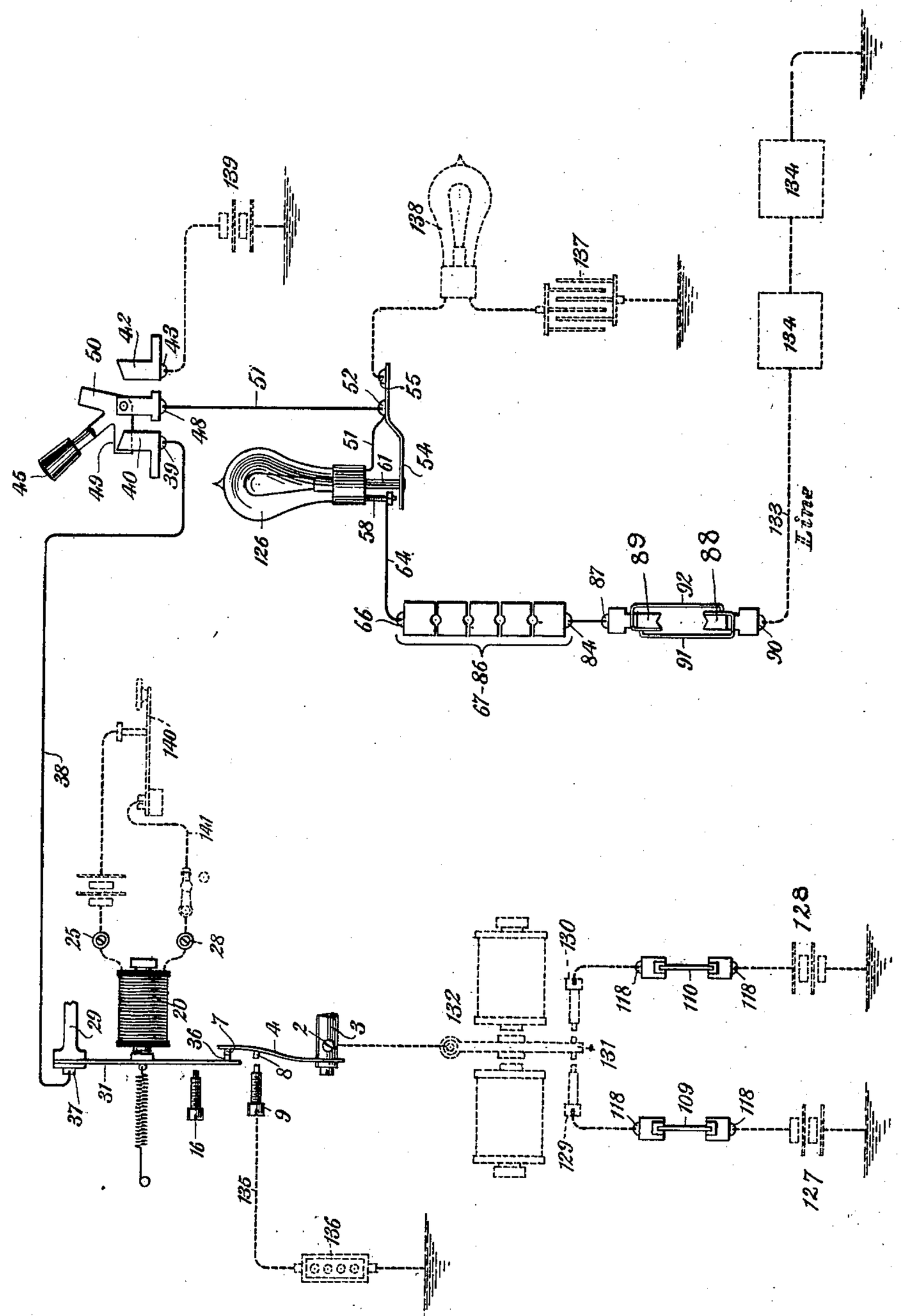
J. BURRY.

TELEGRAPH OR OTHER SYSTEM.

(Application filed Oct. 23, 1899.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

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Frank Ryall

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(No Model.) 4 Sheets—Sheet 2.

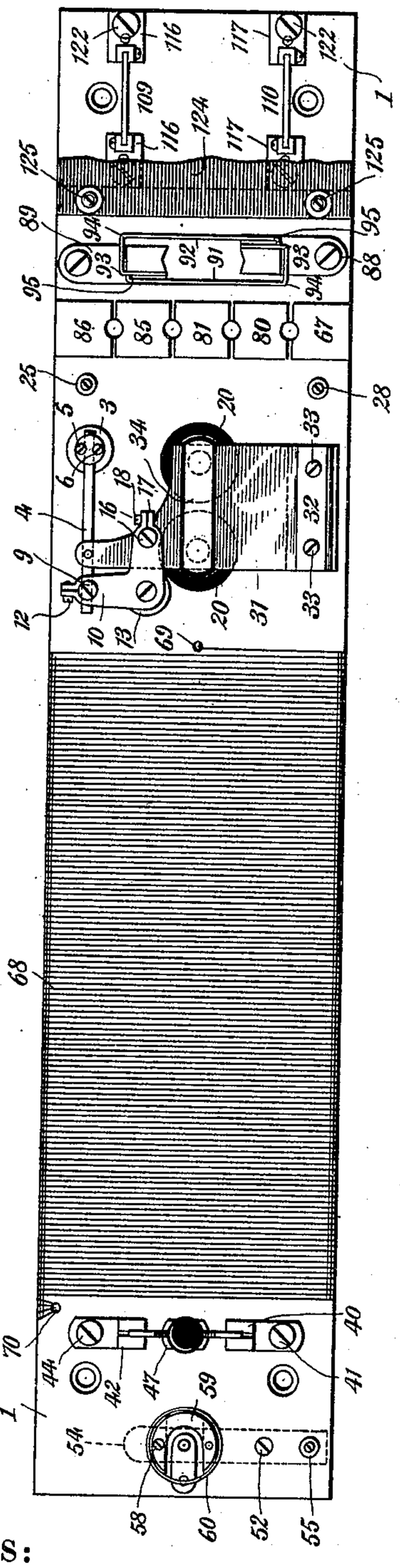

Fig. 2.

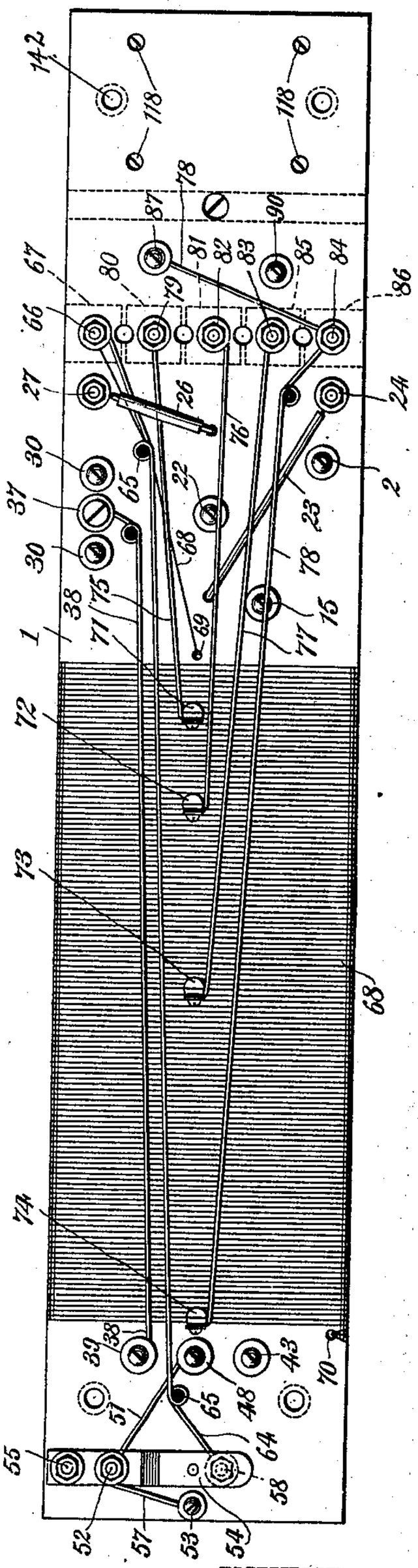

Fig. 3.

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(No Model.) 4 Sheets—Sheet 3.

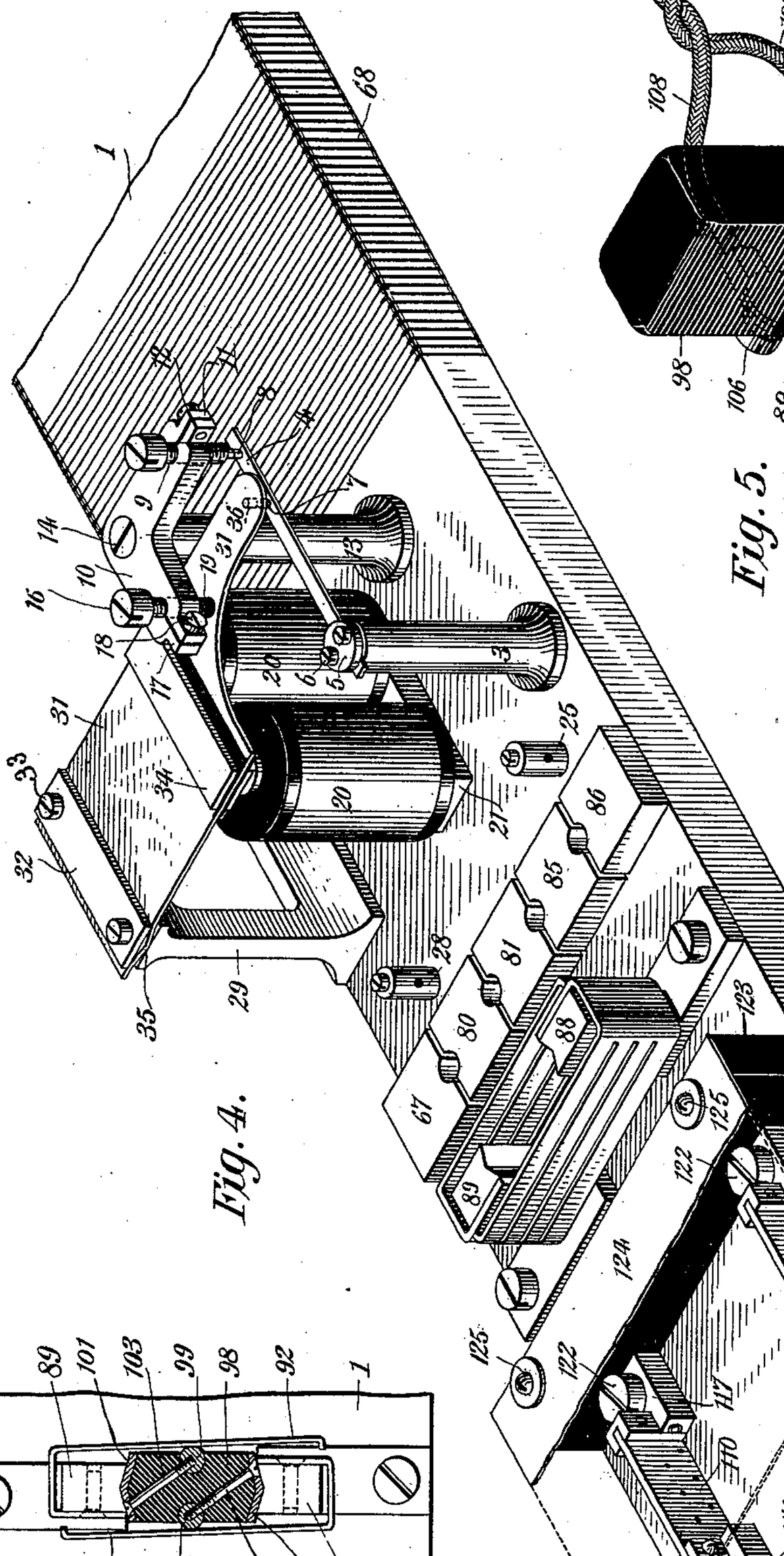

Fig. 4.

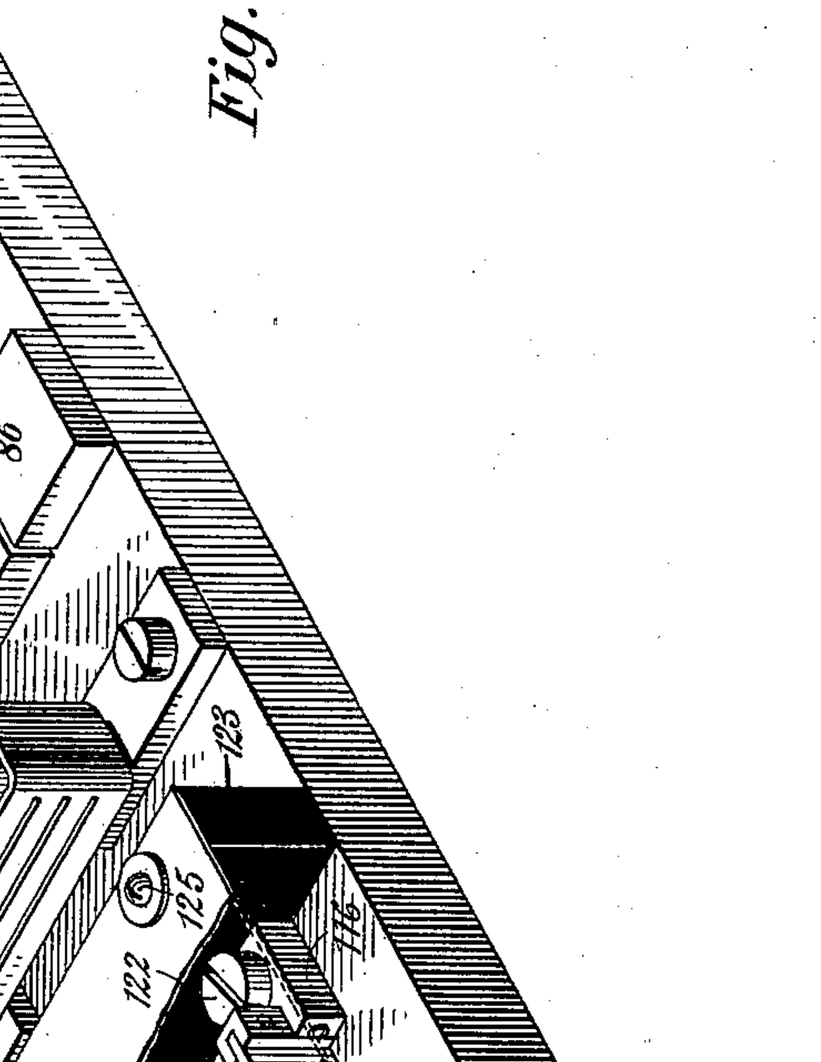

Fig. 5.

Fig. 6.

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(No Model.) 4 Sheets—Sheet 4.

Fig. 7.

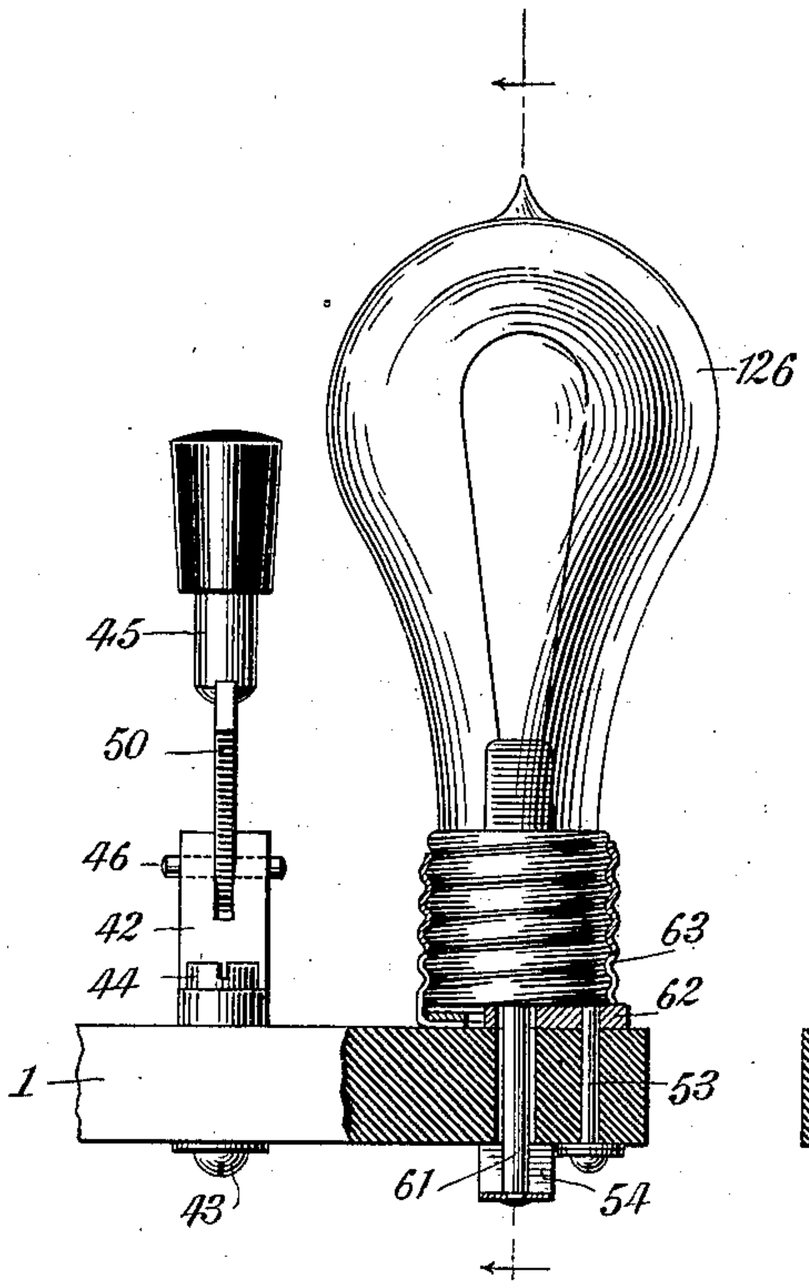


Fig. 8.

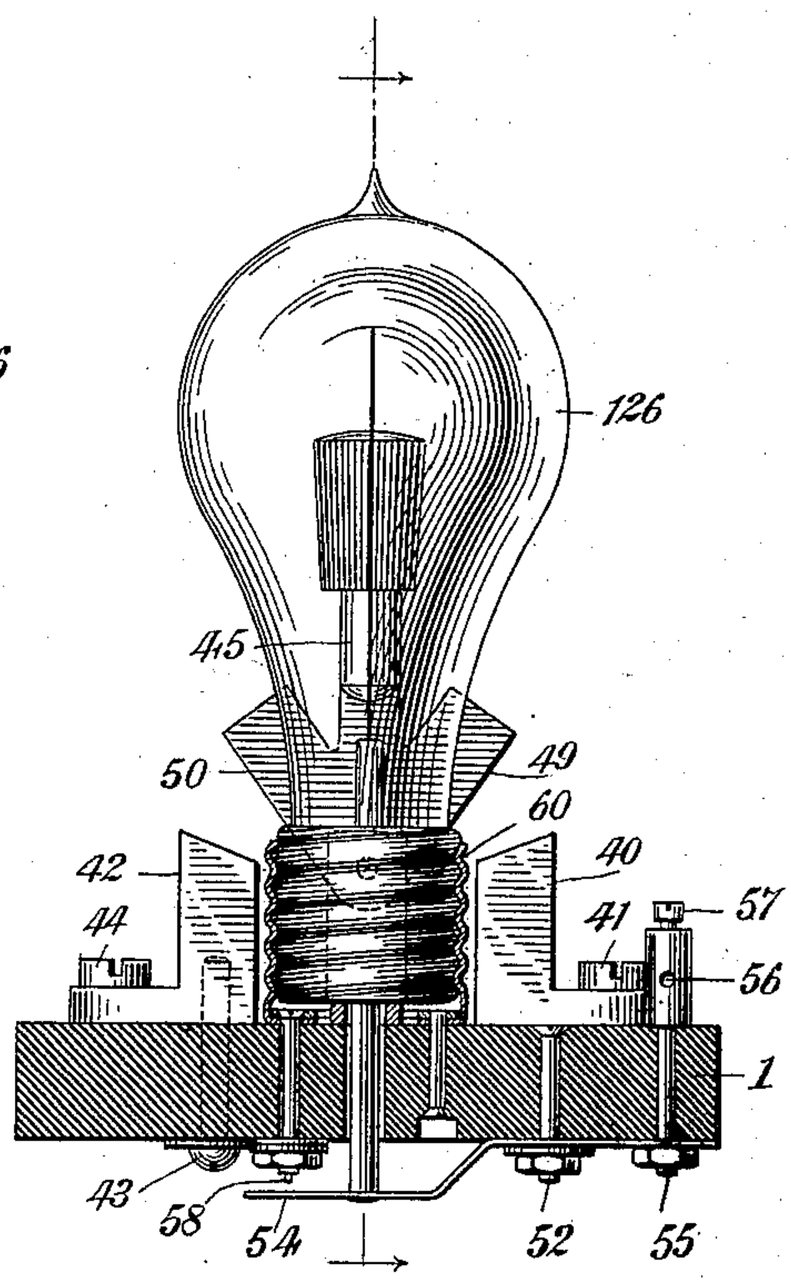


Fig. 9.

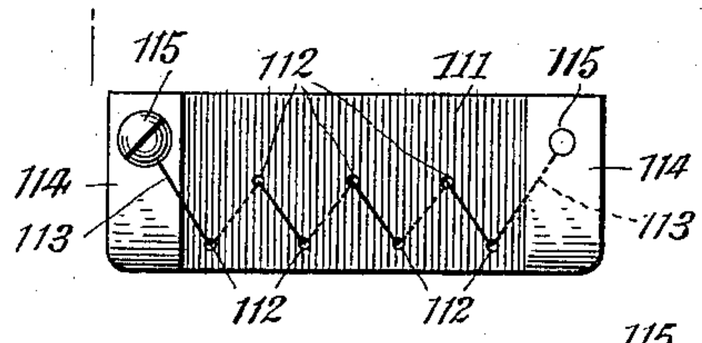


Fig. 10.

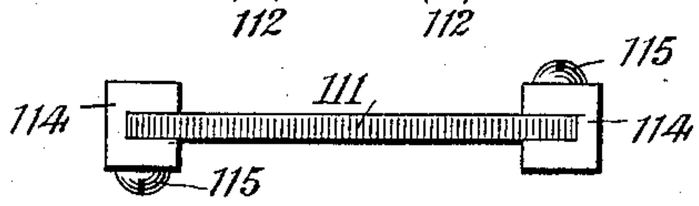
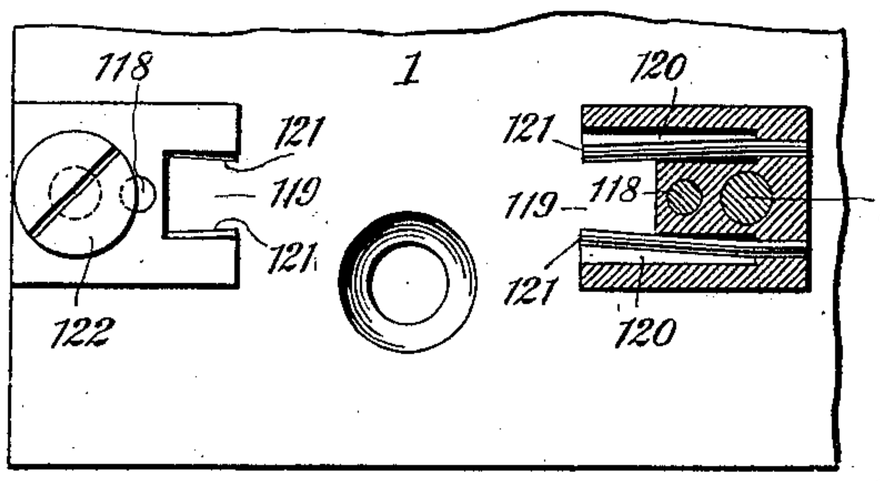


Fig. 11.



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UNITED STATES PATENT OFFICE.

JOHN BURRY, OF FORT LEE, NEW JERSEY.

TELEGRAPH OR OTHER SYSTEM.

SPECIFICATION forming part of Letters Patent No. 685,571, dated October 29, 1901.

Application filed October 23, 1899. Serial No. 734,440. (No model.)

To all whom it may concern:

Be it known that I, JOHN BURRY, a citizen of the United States, and a resident of Fort Lee, in the county of Bergen and State of New Jersey, have invented a certain new and useful Improvement in Telegraph or other Systems, of which the following is a specification.

The present invention relates to circuit-controlling apparatus for use in connection with electric circuits, as telegraph-circuits, and more especially for use in connection with printing-telegraph circuits.

The main object of the invention is to improve the working of such circuits. Another object is to provide conveniences within a small space for the testing, regulating, control, and manipulation of such circuits. Other objects will appear hereinafter.

To these ends the invention consists of features of construction and combinations of devices hereinafter described, and more particularly pointed out in the appended claims.

The invention is more conveniently described and perhaps will be more easily understood if described in connection with a particular arrangement of apparatus with which it has been used in practice, it being understood that its use is not limited to such apparatus or arrangement.

Generally speaking, the printing-telegraph system with which the present invention has been employed comprises a relay for reversing the polarity of the line-circuit, (a suitable relay for this purpose being that described in United States Letters Patent dated December 5, 1893, and numbered 510,156,) a transmitter for controlling the motions of the armature of the relay, (as in Letters Patent of the United States dated the 18th day of June, 1895, and bearing number 541,149,) a keyboard whence the transmitter is stopped and released, (the keys being commonly referred to as the "transmitter-keys,") a switch for diverting the line-current to ground at the time a "repeat-key" is closed, said switch preferably being of the type of that shown in Letters Patent of the United States dated April 5, 1898, and numbered 601,768, and a receiver of any suitable form—such, for example, as that shown in Letters Patent numbered 581,411, dated April 27, 1897. The trailer of the transmitter moves rapidly over the segments with the line, and the transmitter also switches the current from one to the other of the electromagnets of the relay to cause the armature thereof to vibrate rapidly in unison with the passage of the trailer from one to another of the sunflower-segments, thus reversing the polarity of the line-current with each motion of the armature and the passage of the trailer from one to another of the sunflower-segments. The type-controller of each receiver is moved or is permitted to move at each reversal of the polarity of the line-current, and the receiver imprints a character whenever the corresponding key at the transmitter is depressed and the trailer arrested on the corresponding segment of the sunflower.

From the foregoing it will be understood that hitherto the present invention has been used in conjunction with a telegraph-circuit operated substantially as in Letters Patent No. 601,768 aforesaid, and it will also be understood that certain features of the invention may be used in connections other than those hereinbefore outlined.

The preferred form of the invention is illustrated in the accompanying drawings, forming part hereof, in which—

Figure 1 is a diagrammatic view showing an arrangement of circuits and apparatuses. Fig. 2 is a front view, and Fig. 3 is a rear view, of a support, the devices thereon, and connections. Fig. 4 is a perspective view of part of the devices shown in Fig. 2. Fig. 5 is a perspective view of a switch shown in Fig. 2 and a plug therefor. Fig. 6 is a sectional view of the switch and plug shown in Fig. 5 and showing the connections. Figs. 7 and 8 are respectively side and end elevations, partly in section, of one end of the switch-board shown in Fig. 2 with the parts mounted thereon; and Figs. 9, 10, and 11 are detail views of parts shown in Fig. 2.

The same reference character will be used to designate the same part in the various views.

The reference-numeral 1 indicates an oblong rectangular slab of insulating material, as slate, upon which certain devices are mounted.

2 is a binding-screw which passes through the support 1 and engages with a threaded

hole in the base of a post 3 at the front of the support; 4, a spring contact-piece adjustably attached to the top of post 3 by a plate 5 and screws 6; 7 and 8, contact-points carried by spring 4.

9 is a contact-screw for coaction with contact-point 8 aforesaid, and 10 is a plate through which the screw 9 passes, engaging with threads therein and locked against movement by being clamped by the jaws 11 and screw 12. The plate 10 is carried by a post 13, being attached thereto by a screw 14, which passes through the plate 10 and engages with a threaded hole in the top of post 13, thus permitting of the adjustment of the plate 10 in a plane at right angles to the post. The post 13 is secured to support 1 by a screw 15. The plate 10 is in the form of two arms at right angles to each other, the screw 9 being near the extremity of one arm and a second screw 16 being near the end of the other arm and being held against accidental displacement by the split end or jaws 17 of the second arm and a binding-screw 18. The lower end of screw 16 is provided with insulation 19 for a purpose presently to appear. Two electromagnets 20 are supported by a cross-head 21, which is secured to the support 1 by a screw 22. One terminal 23 of said electromagnets 20 is connected with a screw 24, which also forms the attaching means for a binding-post 25 at the front of the support 1, and the other terminal 26 of said magnets 20 is secured to a screw 27, which also forms the attaching means for a binding-post 28, also at the front of plate 1.

29 is a U-shaped support, of metal, which is connected with plate 1 by screws 30. A spring-plate 31 is clamped between the tops of the legs of the U of support 29 and a plate 32, screws 33 being used to connect parts 29 and 32, said screws passing through holes in the plate 32 and spring 31 and engaging with threaded holes in the ends of the legs of the U-shaped part 29. The spring 31 overlies the magnets 20 and is provided with the armature 34 of the said magnets. By preference the spring-plate 31 is of German silver, and the armature 34 is in two pieces, one at each side of plate 31, and is insulated from the spring 31. The end of spring-plate 31, which is clamped between the bar 32 and the bracket-support 29, is by preference formed with a V-like channel 35, so that by tightening up the screws 33 the armature 34 is made to approach and by loosening said screws the armature 34 is allowed to recede from the cores of said electromagnets 20. One side of the spring-plate 31 is extended beyond the armature 34 and passes under the screw 16 and over the spring 4 and is provided with a contact-point 36 for coaction with the contact-point 7 on said spring 4. The insulated portion 19 of screw 16 forms a back-stop for the spring-plate 31. It will now be seen that the adjustability of the spring 4 and the arm or plate 10 provides for bringing the contact-points 7 and 36 and also the contact-points 8 and 9 into proper relation with each other by moving the spring 4 endwise and also sidewise under cap 5 and by swinging the plate 10 about the screw 14. The adjustability of the screws 9 and 16 provides for the proper play of the parts, as will hereinafter appear.

The bracket 29 is provided with a binding-screw 37, from which a conductor 38 leads to a binding-post or screw 39, which also secures a split post or switch-jaws 40 to support 1, or the conductor 38 may go to the steadying-screw 41 on said jaws 40, said screw 41 entering a hole in support 1. Opposite the jaws 40 is post 42, which is provided with a screw 43 to fasten it to support 1 and also with a steadying-screw 44. Between the jaws 40 42 is a switch-lever 45, which is pivoted at 46 to the jaws of a post 47, which is secured to support 1 by a screw 48. The lever 45 is provided with wings or arms 49 50, respectively, for coaction with the jaws 40 and 42 aforesaid. A conductor 51 leads from screw 48 to a binding-screw 52 and thence to another binding-screw 53, thus putting screws or posts 48, 52, and 53 in electrical connection with each other. A spring 54 is clamped between the nut of post 52 and support 1 and also between the nut of a binding-post 55 and said support 1. The post 55 is provided with a hole 56 and a screw 57 for securing a wire thereto. The spring 54 is tensioned to cause it to bear against the end of a binding-post 58, which extends through the slab or support 1 and engages with a plate 59, forming a terminal of a lamp-socket 60, which is secured to the slab 1 aforesaid. The circuit-closing spring 54 has riveted thereto a pin 61, which passes loosely through a hole in slab 1 and extends (normally) beyond the face of a plate 62, which forms the other terminal of the lamp-socket aforesaid, the screw portion of part 60 thereof being cut out at 63, so as not to touch the plate 62. The binding-screw 53 is in electrical contact with the plate 62 also.

An electrical conductor 64 of high resistance, or that suitable for the purposes of a rheostat, leads from the binder 58 around insulating-posts 65 to a binding-post or screw 66, which also secures a rheostat-segment 67 in place on slab 1. A fine wire 68 leads from binder 56 to and through a hole 69 in the slab 1 and is then wound around the slab 1 spirally, so that one part shall not touch another, the slab 1 being provided with slits in its corners for the reception of the wire 68. The outer end of the wire 68 is secured to slab 1 by means of the hole 70 near one edge thereof. At suitable intervals the slab 1 has posts 71 72 73 74 attached thereto, and the wire 68 passes through slits in said posts and is clamped therein by means of screws which draw the jaws of the slits together and also clamp the ends of wires 75 76 77 78, respec-

tively, to said posts 71 72 73 74. (Said screws are shown, but are not numbered.) The wire 68, except that part which is clamped, is insulated from the posts 71 72 73 74 aforesaid. The conductor 75 connects post 71 with a binding-screw 79, which also secures a rheostat-segment 80 in place upon the slab 1. The conductor 76 connects the post 72 with another rheostat-segment 81 through the medium of a binding-screw 82. In like manner the conductors 77 78 connect posts 73 74 with binding-screws 83 84 and rheostat-segments 85 86. The conductor 78 is continued beyond the post or screw 84 to another binding-post or screw 87, which also serves to secure a metal angle or bracket 88 to the slab 1. Opposite the bracket 88 is a similar bracket 89, which is secured to the slab 1 by a post and screw 90. One arm of each bracket 88 89 stands out from the slab 1 and has secured to it one end of a plate-spring, the plate-spring on arm 88 being marked 91 and that on arm 89 being marked 92. The springs 91 92 are similar and are secured at one end to the corresponding upstanding arm, are then bent twice, as at 93 94, and brought into parallelism with each other, and their free ends are again bent, as at 95, so that the tip of each normally bears against that end of the other which is secured to an upstanding arm, as aforesaid. By preference the spring-plates 91 92 are provided with one or more longitudinally-extending slits 96 for a purpose hereinafter described. The spring-plates 91 92 connect the brackets 88 89 electrically, as will be understood. The line-wire 97 is connected with the binding-screw 90.

The springs 91 92 afford a convenient means for cutting in a testing instrument—as a voltmeter, ammeter, or other desired instrument. In Figs. 5 and 6 is shown an improved cutting-in plug, which comprises a block of insulating material 98, having partially-exposed metal rods 99 100 extending lengthwise of its opposite sides and angular metal strips 101 102 extending along its narrower sides, with electrical connections 104 103 between the rod 99 and strip 101 and rod 100 and strip 102, respectively, and binding-screws 105 106 for connecting wires 107 108 with the strips 101 102. The wires 107 108 connect with the voltmeter or other instrument. The brackets 88 89 have their inside faces channeled to fit the outer faces of the angular strips 101 102. Obviously other convexities and concavities of these opposing faces may be used. The uncovered ends of the rods 99 100 are beveled, as indicated in Fig. 5, for the purpose of insuring that the spring-fingers into which the open-ended slits 96 divide the springs 91 92 may be wedged off one by one by the rods 99 100, thus diverting the current fractionally and ultimately completely from the springs 91 92 through the instrument connected with wires 107 108. In this way the current attains its maximum through the instrument so cut in by the plug 97 in a step-by-step manner, as it were.

Near one end of the slab 1 are two fuses, respectively marked 109 110 in the drawings. These fuses are preferably duplicates of each other and consist each of a strip 111 of insulating material, having a series of staggered holes 112 therethrough, a fuse-wire 113, passed through said holes alternately from opposite sides of the strip 111, and metal end pieces 114, to which the strip 111 and wire 113 are fastened by screws 115, the screws 115 being shown at opposite sides of the strip 111. Two sets 116 117 of metal arms or brackets are attached to the slab 1 by screws 118, the brackets being slotted, as at 119, and recessed, as at 120, and being provided with spring-arms 121, fast thereto and extending along recesses 120 and bent toward each other in slots 119. The ends 114 are adapted to pass between the springs 121, forcing them apart, and being held thereby in place. The brackets 116 117 are provided with binding-screws 122, by means of which wires may be connected with said brackets. The described arrangement of the fuse-wire 113, with sections alternately at opposite sides of the strip 111, secures that an arc shall not be established, except under extraordinary circumstances when a fuse blows out.

There is a rib 123 extending across the slab 1 adjacent the fuses 109 110, said rib preferably being of insulating material, and a sheet of mica 124 or the like is attached to said rib 123 by screws 125, which pass through slots in the protective sheet 124 and engage with threaded holes in the said rib.

In order to provide a convenient sign that the line-circuit is in working order, a lamp 126 is introduced into the socket 60 and screwed down to bring one terminal thereof into contact with the plate 62, which causes the pin 61 to be pressed down or back, and so moves spring 54 out of contact with the post 58. This causes the circuit to pass through the filament of the lamp from plate 62 and pin 61 to the socket 60 and contact or post 58, or vice versa, according to the direction of the current at the time. The pin 61 provides for contact in case the lamp should not from any cause be screwed in far enough to bring it into contact with the plate 62, and the spring 54 provides for the breaking of the circuit via contact 58 at such times as the lamp presses on pin 61 and the closing of the circuit whenever the lamp is unscrewed from the socket sufficiently far to break the circuit through the filament thereof.

The diagram Fig. 1 shows the connections and use of the various devices hereinbefore described in the system in which I have thus far used them. The fuses 109 110 are connected with batteries 127 128 by suitable wires and with contacts 129 130, between which the armature 131 of a relay 132 vibrates and so reverses the polarity of the line-circuit

which passes from the armature 131 to the binder 2, post 3, spring 4, contacts 8 9, spring 31, bracket 29, screw 37, conductor 38, binder 39, jaws 40, arm 49, (when the last is in between the jaws 40,) binder 48, conductor 51, binder 52, spring 54, contact 58, conductor 64 to the resistance box or rheostat 66 86, binder 87, bracket 88, spring-fingers 91 92, bracket 89, binder 90, and to the line 133 and one or more receivers 134. The contact 9 connects with a "ground" 135 through a non-inductive resistance 136, whose function is fully set forth in said Letters Patent numbered 601,768, dated April 5, 1898, to which reference is made for a more complete explanation. The post or binder 55 has a condenser 137 and a resistance 138, as a lamp, connected therewith to aid in the quick discharge of the line-circuit at each reversal of the polarity thereof. The switch-jaws 42 and the switch-arm 50 provide means whereby a quick cutting in of a test-battery 139 may be had, the switch at 40 and 49 being opened just before the battery 139 is cut in. The binding-posts 25 and 28 provide for the connection of a "repeat-key" 140 and its circuit and battery 141 with the electromagnets 20.

The operation of several of the devices hereinbefore described is clear from the description thereof, and the description of these operations need not be repeated.

The operation of the system illustrated in Fig. 1 is as follows: The armature 131 is automatically operated in any suitable way—for example, as in said Patent No. 510,157—thus putting the batteries 127 128 alternately in circuit with the line. Whenever a key in the keyboard (except key 140) is depressed, the motion of armature 131 is arrested, and said armature is held in contact with one or other of contacts 129 130 until said key is released and a prolonged or printing impulse is sent over the line. If a letter is to be repeated alongside itself, the key 140, while the key representing the said letter is still depressed, is also depressed once, (or more times if the letter or character is to be repeated more than once,) and then both depressed keys are released. The operation of the circuit when key 140 is used is fully set out in said Letters Patent No. 601,768, to which reference is therefore made for a full explanation. If trouble should develop in the line and it should be desired to test the line with a steady battery or one of known strength, the switch-lever 45 is used to cut in the battery 139 and to cut out the transmitting instruments and batteries and the plug 97 is used to cut in a testing instrument at the spring-fingers 91 92. The lamp 126 may be removed or not, as may be desired, at such time.

The references 142 indicate holes through the slab 1 for wood-screws or the like by means of which the slab 1 and parts mounted thereon may be secured to a wall or the like, suitable spacers behind the slab being used.

The conductors or wires on the slab 1 are insulated, as desired or needed, in order to prevent short circuits.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A current breaker and connector including two metal terminals and a series of springs each fast to one of said terminals and normally bearing against the other terminal, whereby the circuit through said breaker may be broken by forcing said springs one after the other away from the terminal each bears against and may be made in the reverse manner, substantially as described.

2. In telegraph and other systems, the combination of a line-circuit, a pair of flat or leaf springs separated from each other through at least a part of their length and forming part of said line-circuit, each of said springs being split longitudinally to form a plurality of fingers, and a cutting-in plug having beveled or wedge-ended conductors for insertion between said springs and moving the fingers of each out of contact one by one, substantially as described.

3. In telegraph and other systems, the combination of a line-circuit, a pair of parallel split springs and supports therefor forming part of said line, each spring being tensioned to move toward the support for the other, and a plug of insulating material provided with beveled or wedge-ended conductors for insertion between said springs and moving the fingers thereof one by one out of circuit-closing contact, substantially as described.

4. In telegraph and other systems, the combination of a line-circuit, a pair of parallel split springs forming part of said line, supports for said springs, each spring being tensioned to move toward the support for the other, a test-instrument-cutting-in plug of insulating material provided with beveled or wedge-ended conductors for insertion between said springs and moving the fingers thereof one by one out of circuit-closing contact, a test-battery, and a switch for cutting in said battery, with transmitting instruments cut out by said switch when it cuts said battery into the line, substantially as described.

5. In telegraph and other systems, the combination of a line-circuit, a pair of split springs forming part of said line, metal supports for said springs facing each other, and said springs being tensioned to move each toward the support of the other, a cutting-in plug of insulating material, beveled or wedge-ended conductors on said plug for coaction with said springs, and metal plates on said plug for coaction with said supports and connected electrically with said beveled conductors, substantially as described.

6. In telegraph and other systems, the combination of a line-circuit, two parallel metal arms having channeled opposing faces and forming part of said line, a cutting-in plug of insulating material having metal faces

shaped to coact with said channeled faces, conductors connected with said plug-faces, split springs parallel with each other and attached to said arms and adapted to form part of or to close said line-circuit between said arms, and wedge-ended rods on said plug adapted to coact with said springs to open said line-circuit between said arms and electrically connected with said metal plug-faces, substantially as described.

7. In telegraph and other systems, the combination of a line-circuit, a slab of insulating material, two fuses mounted on said slab, an electromagnet and its armature also mounted on said slab, said armature forming part of said line-circuit, a spring-switch on said slab and operated by said armature and magnet, a ground connection on said slab and coacting with said switch, a steady-battery terminal on said slab, a second switch on said slab for connecting said steady-battery terminal with the line and for disconnecting that part of the line containing said armature, a lamp-socket and a circuit-closer arranged in multiple in said line and on said slab, a resistance in said line formed by wire wrapped around said slab, rheostat-segments on said slab and connected with said wire, a pair of parallel springs on said slab and forming part of the said line, and a binding-post on said slab for a connection to a condenser, substantially as described.

8. In a telegraph system, the combination of a line-circuit, a current-reverser in said line, a slab of insulating material, two fuses mounted on said slab and forming part of said line, an electromagnet on said slab, a battery, a key and connections for controlling said magnet, an armature for said magnet forming part of said line, a spring-switch controlled by said armature and carried by said slab, a ground through non-inductive resistance having its terminal on said slab adjacent said spring-switch and coacting therewith, a steady battery having one terminal on said slab, a switch for disconnecting said fuses, current-reverser, and magnet-armature and connecting said steady battery, a circuit-closer on said slab, a lamp-socket on said slab connected with said line in multiple with said closer, a lamp movable in said socket, connections whereby said lamp operates said closer, a resistance in said line formed by a wire coiled about said slab, segments with which said wire is connected to form a rheostat, a pair of parallel split springs mounted on said slab and forming part of said line, a condenser connected with said line intermediate said switch for throwing off and on said steady battery and said receiver, substantially as described.

Signed at New York, in the county of New York and State of New York, this 19th day of October, A. D. 1899.

JOHN BURRY.

Witnesses:
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CHAS. A. BRODEK.