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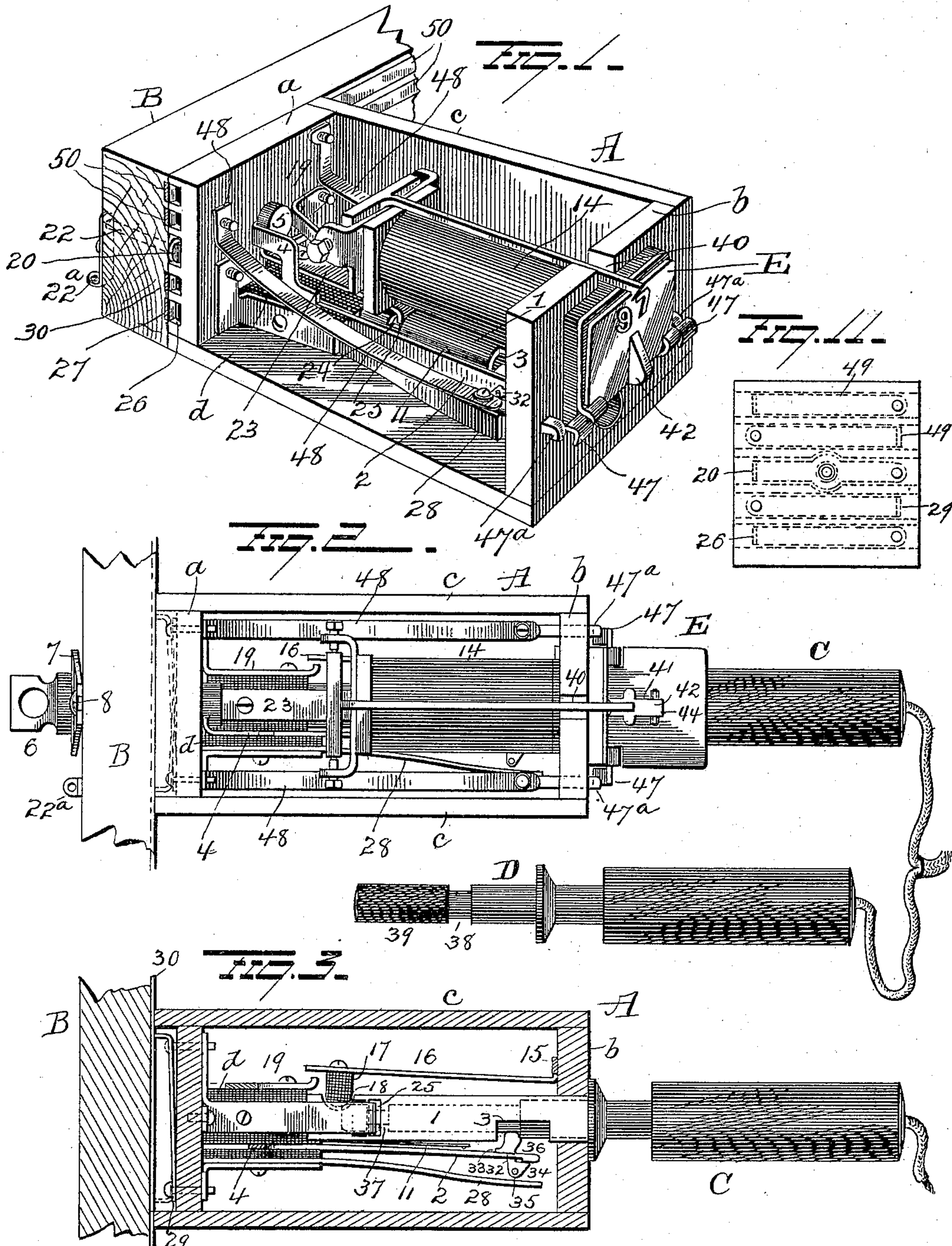
Patented May 30, 1899.

J. M. OVERSHINER.
TELEPHONE SWITCHBOARD.

(Application filed Mar. 1, 1899.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES
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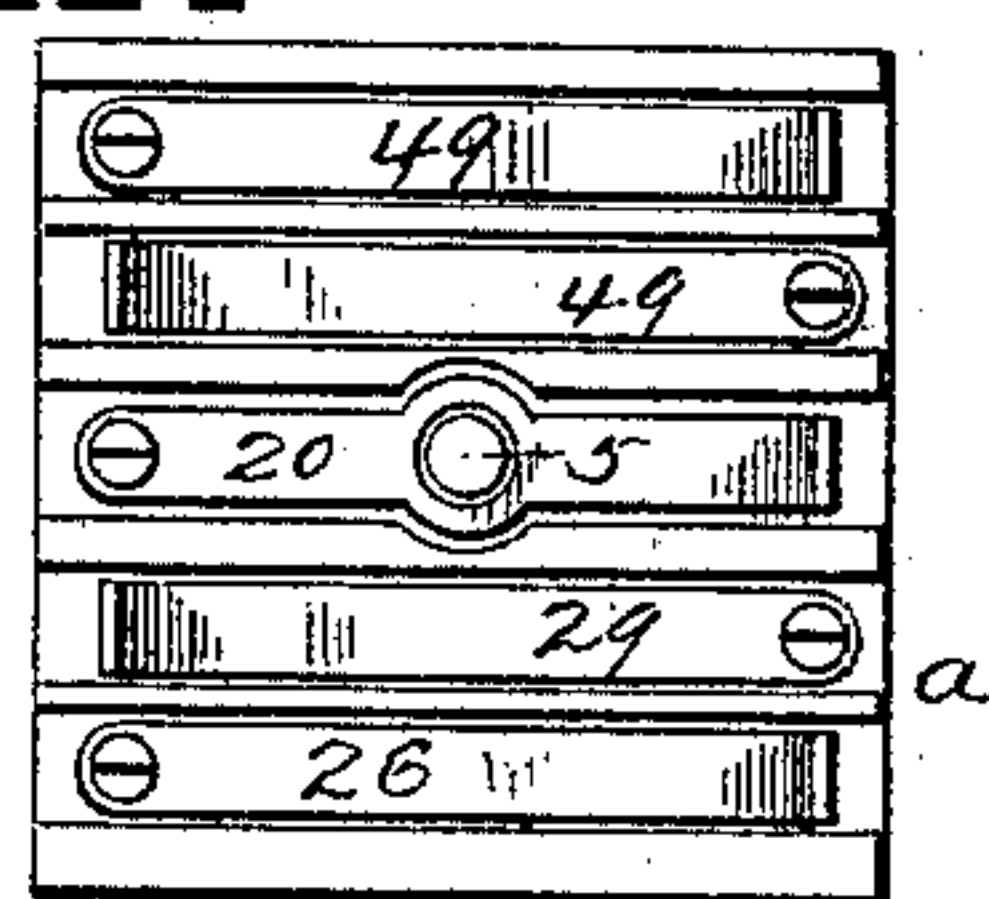
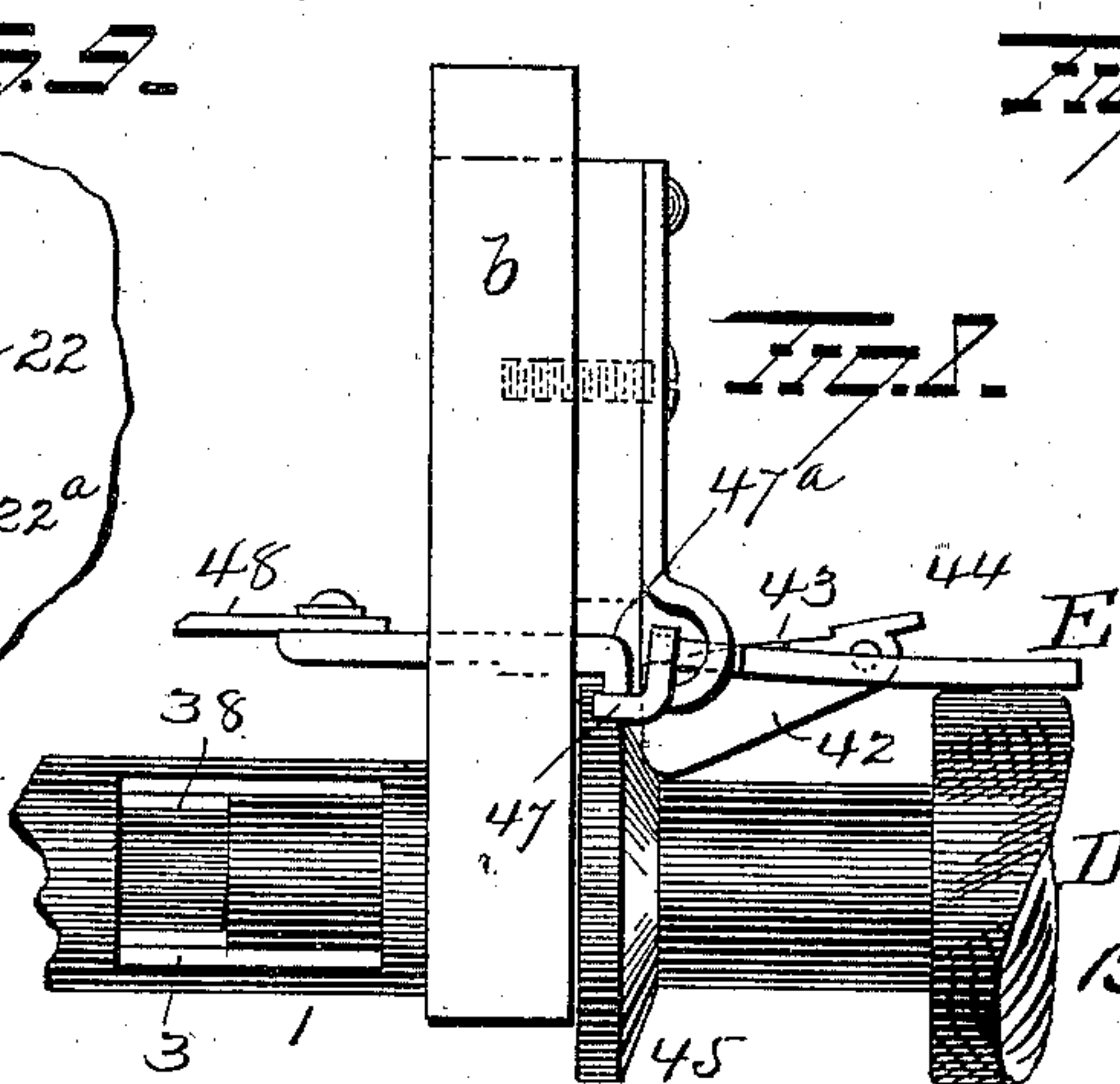
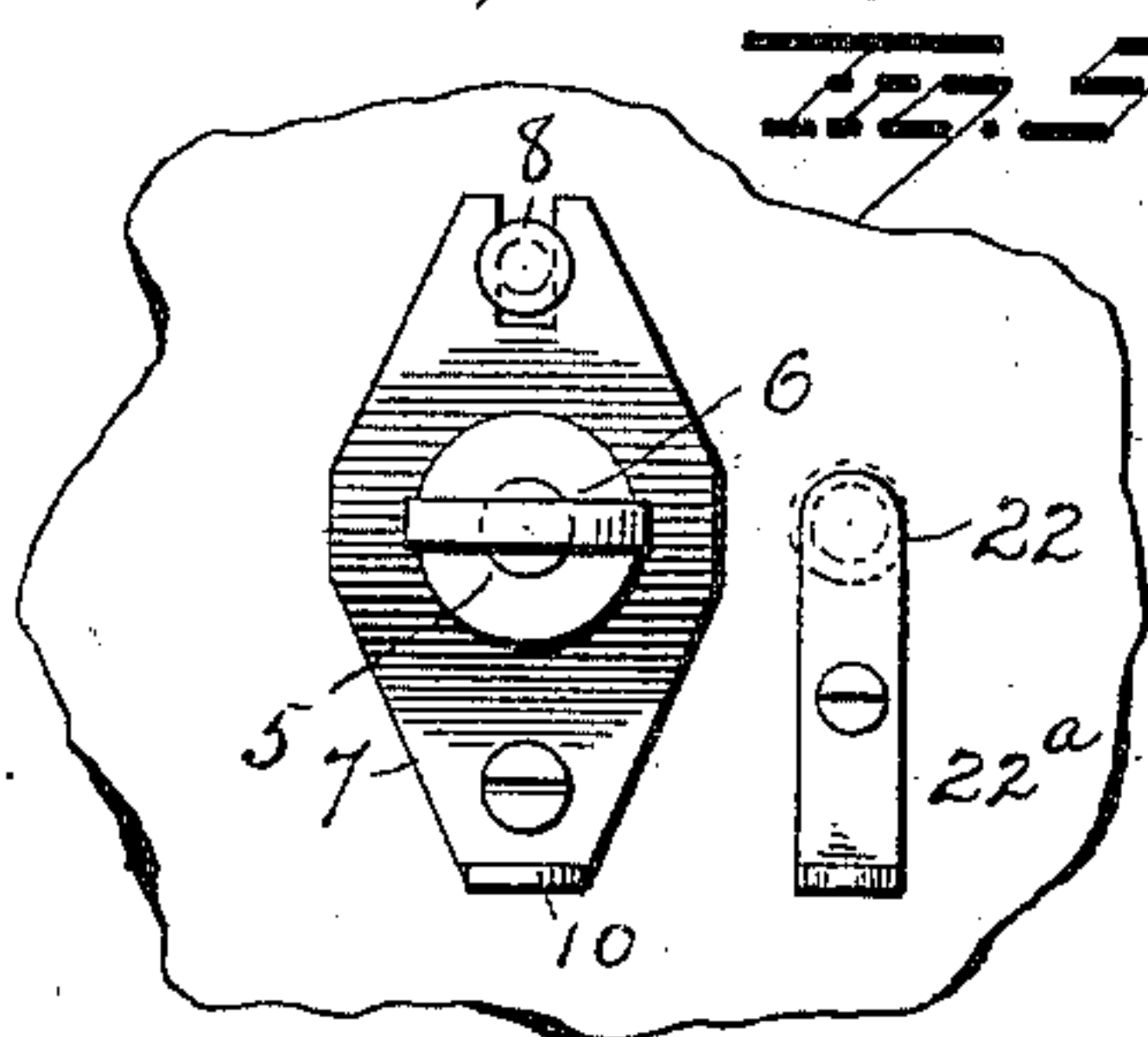
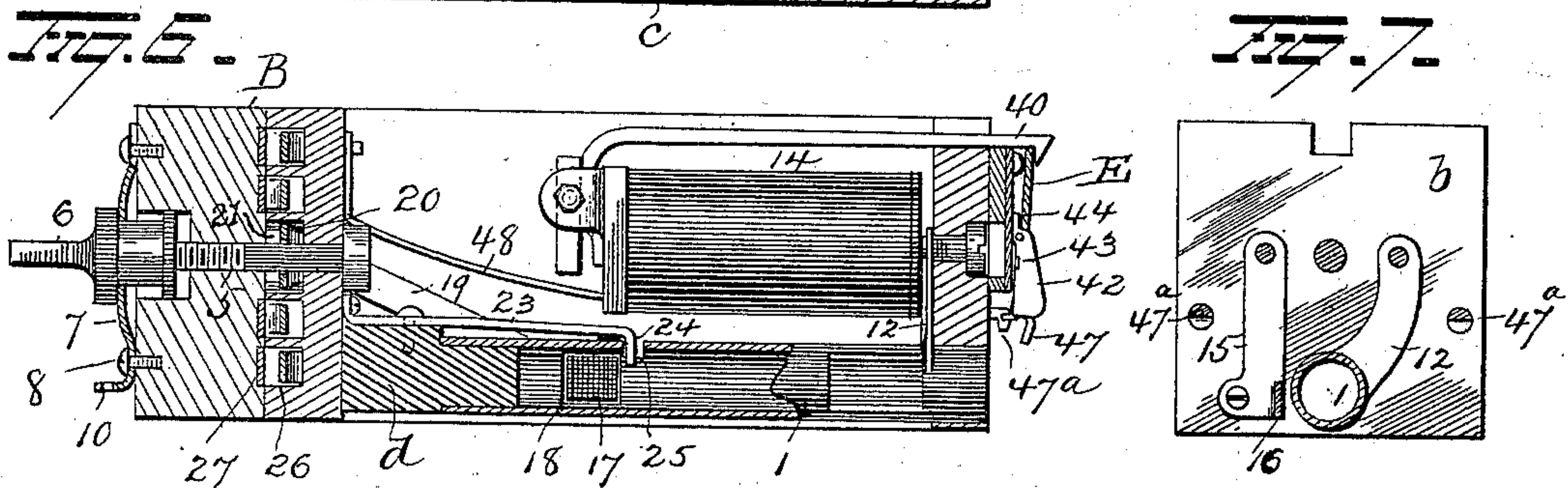
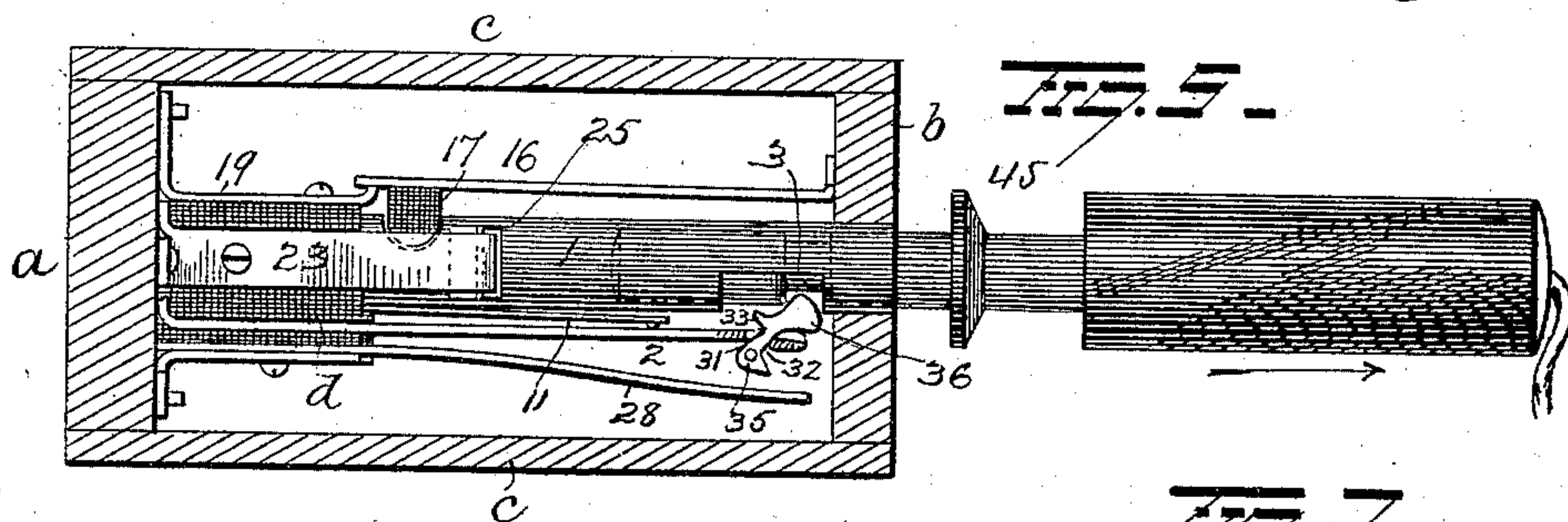
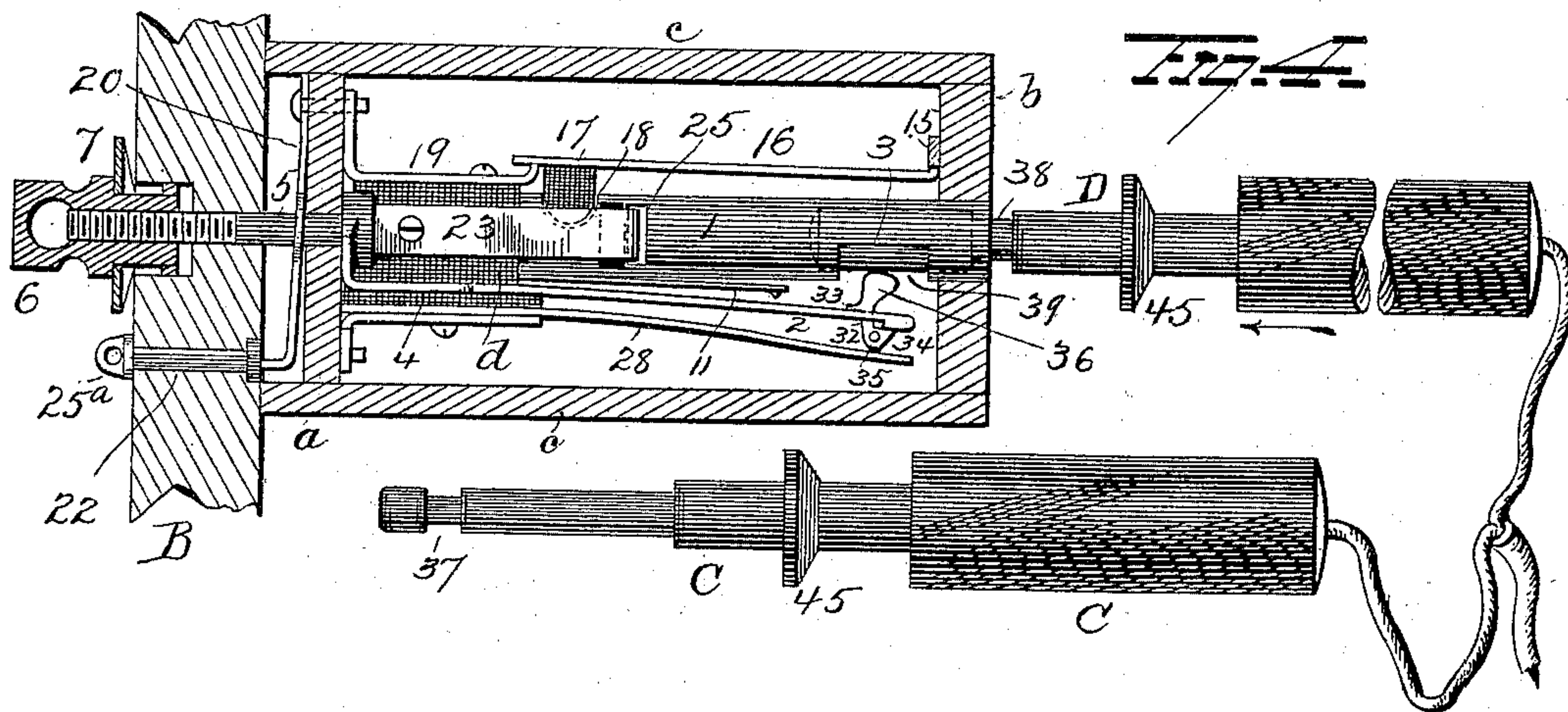
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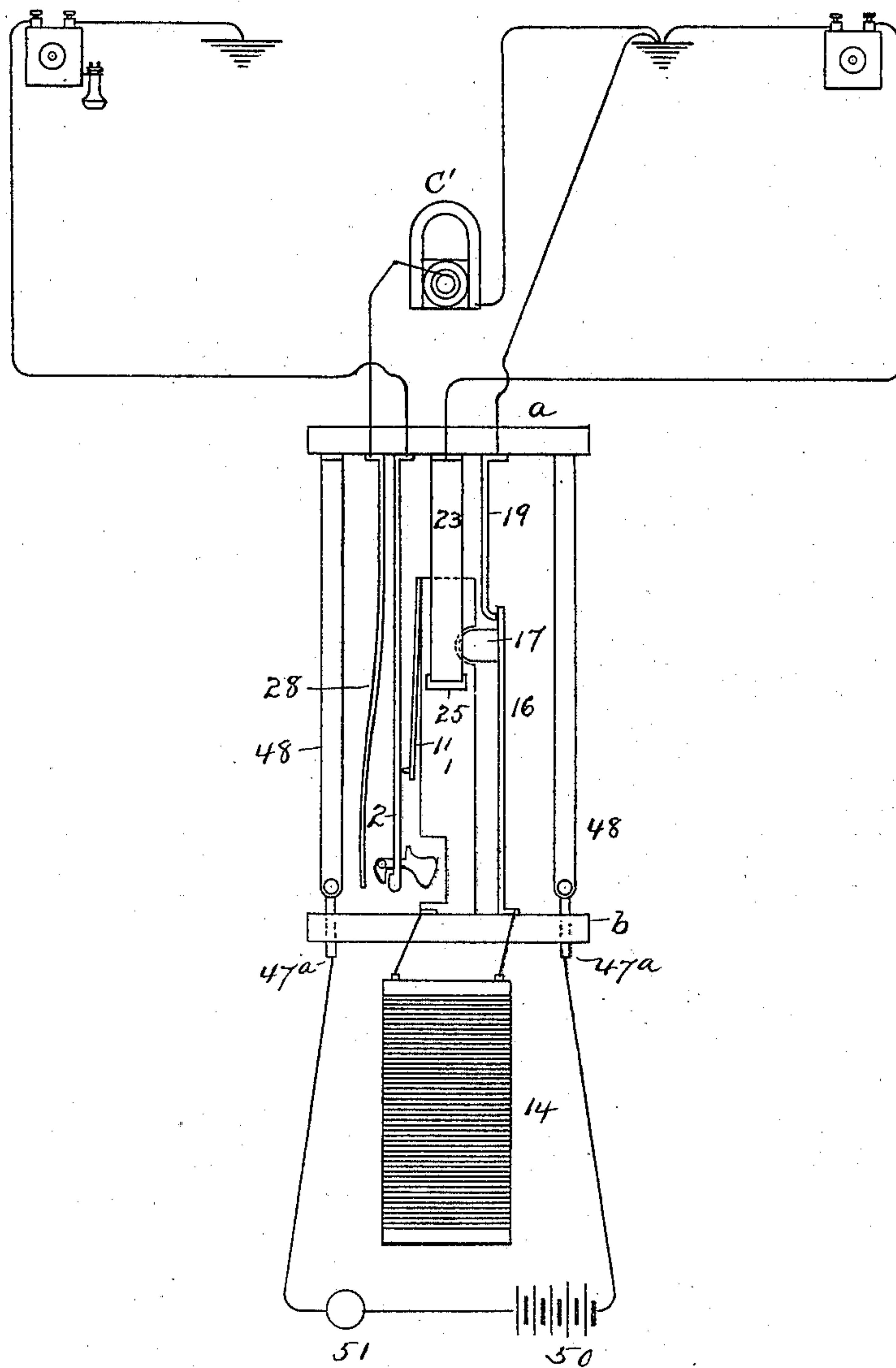
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Fig. 12.



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UNITED STATES PATENT OFFICE.

JAMES M. OVERSHINER, OF ELWOOD, INDIANA.

TELEPHONE-SWITCHBOARD.

SPECIFICATION forming part of Letters Patent No. 625,797, dated May 30, 1899.

Application filed March 1, 1899. Serial No. 707,366. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. OVERSHINER, of Elwood, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Telephone-Switchboards; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in telephone-switchboards, and more particularly to combined jack and drop devices.

One object of the invention is to provide simple means whereby to automatically restore the drop only when the plug is withdrawn from the jack-socket.

A further object is to provide a simple construction and arrangement of parts which will cooperate with the plugs to maintain one of the drop-magnets of two connected lines open-circuited, to automatically open-circuit the drop-magnet of the called subscriber and simultaneously close the signaling apparatus to the called-subscriber's line, and to effectually perform all the functions of receiving and answering calls, signaling subscribers, and connecting subscribers' lines.

A further object is to provide simple, ready, and efficient means for connecting a subscriber's line with its jack and cooperating circuits and devices.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view illustrating my invention. Fig. 2 is a plan view. Figs. 3, 4, and 5 are horizontal sectional views showing various positions of the switch device. Fig. 6 is a vertical longitudinal section. Fig. 7 is a detail view of the devices for connecting the magnet-coil in circuit. Fig. 8 is an enlarged detail view illustrating the drop-restoring device. Fig. 9 is a detail view showing connecting devices on the rear face of the back of the switchboard. Fig. 10 is a rear view of one of the individual structures, showing the spring contact-arms. Fig. 11 is a rear view of a portion of a switchboard, showing the

spring contact-arms of an individual structure. Fig. 12 is a diagram illustrating the circuits.

A represents the frame for containing and supporting the jack and drop devices and cooperating contact for a subscriber's line, said frame comprising front and rear end pieces *a b* and connecting-plates *c*, all of which parts are preferably made of non-conducting material.

A block *d*, of insulating material, is secured to the rear end piece *a* of the frame, and has secured to it the rear end of the jack-socket 1, the forward end of the latter being mounted in the front end piece *b*, so as to communicate with a hole therein for the reception of a plug. Adjacent to the jack-socket and preferably to one side thereof a jack-arm 2 is secured to the block *d* and terminates at its free end alongside a hole or recess 3 in one side of the jack-socket 1. The leading-in wire of a subscriber's line is electrically connected with the jack-arm 2 through the medium of a fixed arm 4 and a screw-threaded shank 5, which projects through the back B of the board. The rear end of the shank 5 enters a thumb-nut 6, swiveled to the rear face of the back B, so that a frame A, containing the various drop and switch devices of a subscriber's line, can be readily removed from the back B without removing the nut which secures said frame or structure to the back. In swiveling the thumb-nut to the back B, I prefer to employ a spring-plate 7, to which the thumb-nut is swiveled. The plate 7 is slightly bowed outwardly and secured at one end to the back B, its other end being free to slide thereon, but is guided by means of a pin 8, projecting through a slot in the plate. The thumb-nut is adapted to have a longitudinal movement through the spring-plate, and when a structure A is placed in position against the back B the threaded shank 5, passing through the hole in the back, will engage the nut ready to enter the same and force it outwardly. Then by turning the nut on the threaded shank the structure A will be drawn close to the back B, and the cooperating contact devices (hereinafter described) on the structure A and back B will be pressed intimately together.

One end of the spring-plate 7 is provided

with an ear 10 for the permanent attachment of the subscriber's line-wire. By thus connecting the subscriber's line-wire with the structure containing the jack and drop devices and the latter with the back said structure can be readily removed and replaced, and the spring-plate 7 will serve to maintain a good electrical connection between the line-wire and the thumb-nut, should the latter become loose.

A small spring-arm 11 is secured at one end to the jack-socket 1 and makes contact at its other end with the jack-arm 2, so as to normally close the circuit from the latter to the former. To the front end of the jack-socket an arm or plate 12 is electrically connected, said arm or plate being also electrically connected with one terminal of the coil of the drop-magnet 14. The other end of said coil is electrically connected with a plate 15, secured to the front end piece of the frame or structure A, and to said plate 15 a spring-arm 16 is electrically connected. The spring-arm 16 carries near its free end a block 17, of non-conducting material, adapted to project into the rear portion of the jack-socket through a hole 18. The spring-arm 16 is normally in electrical contact with an arm 19, secured to the insulating-block *d*, and the arm 19 is electrically connected with a spring contact-arm 20, disposed in a groove in the rear face of the rear end piece *b* of the frame. The contact-arm 20 bears against a conductor 21, secured to the back B, and said conductor is connected with the ground. The ground conductor may be common to all the jack and drop structures of a series on the board; but in case of lines operated on metallic circuits the conductor 21 will be made in the form of a pin 22, (instead of a continuous conductor,) one for each line, and said pin connected with a plate or arm 22^a, to which one of the line-wires will be connected. Assuming, however, that the subscriber's line is operated on a grounded circuit, it will be seen that the normal circuit will be from the subscriber's phone over the line-wire to the spring-plate 7, to the threaded shank 5, to arm 4, to jack-arm 2, thence by the spring 11 to the jack-socket 2, thence through coil of drop-magnet to spring-arm 16, thence through arm 19 to conductor 21, and thence to ground.

A spring-arm 23 is secured at one end to the insulating-block *a* and provided at its other end with a lip 24, which projects through a hole 25 in the jack-socket and terminates in the path of a plug inserted into said socket. The arm 23 is electrically connected with a spring contact-arm 26, secured in a groove in the rear end piece of the frame, and adapted to make contact with a conductor 27, secured to the back B and electrically connected through an operator's phone to the ground, thus forming a listening-circuit.

A spring-arm 28 is disposed in proximity to the jack-spring 1 and is electrically connected with a contact-spring 29, secured in a groove

in the rear end piece of the frame. The spring 29 makes contact with a conductor 30, secured to the back B and electrically connected through a signaling-generator C' to the ground.

The jack-spring is provided near its free end with a transverse slot 31, in which a horizontally-disposed dog 32 is loosely mounted. One end of the dog 32 is made with a shoulder 33 and the other end is provided with a shoulder 34, and these shoulders (under certain conditions) bear, respectively, against the respective faces of the jack-spring and maintain the dog at right angles to and rigid with the jack-spring when pressure is applied in one direction to one of the ends of said dog. The dog is free to move in the other direction (toward the inlet end of the jack-socket) and is prevented from escape from the jack-arm by means of pins 35. The inner end of the dog projects into the jack-socket and is preferably rounded or beveled, as at 36, for engagement by a plug inserted into the jack-socket.

In connection with my improved jack and switch devices I prefer to employ two plugs at each end of the usual conducting-cord. One of these plugs C is of considerable length as compared with the other plug D and is provided near its forward end with an annular groove or recess 37. The plug D is provided at a point approximately central between its ends with an annular groove 38, and the portion 39 beyond the groove is insulated.

When a subscriber calls central office, the annunciator-drop (the details of which will be hereinafter explained) will fall. The operator will then insert the plug C into the jack-socket until the forward end makes contact with the spring-arm 23 of the listening-circuit and abuts against the insulating-block 17, carried by the spring-arm 16. The plug will also make contact with the dog 32 on jack-arm 2, and thus switch the operator's phone into the subscriber's line-circuit. When the operator shall have ascertained the number of the subscriber's line wanted, she will push the plug farther into the jack-socket, so as to cause the spring-arm 16 to be moved away from the arm 19, and thus open-circuit the drop-magnet of the calling subscriber's line and avoid the necessity of including said magnet in the talking-circuit, as well as reduce the resistance on two connected lines. When the plug C is thus moved to open-circuit the magnet, the spring of the listening-circuit will enter the groove in the plug, and thus cut out the operator's phone. The operator will then insert a plug D at the other end of the conducting-cord into the jack-socket of the subscriber's line wanted. The insulated end of the plug D will engage the beveled or rounded end 36 of the dog 32 and move the latter to its fixed horizontal position and also move the jack-spring sufficiently to cause it to leave the spring 11 (thus opening the magnet-circuit of the called subscriber's line) and to cause the other end of the dog

to make contact with the arm 28, and thus close the signaling device to line of the subscriber to be called without energizing the drop-magnet of said line. The plug C being of smaller diameter than that of plug D cannot operate the signaling devices. When the subscribers have been called, the operator will push the plug D farther into the jack-socket, until the dog drops into the groove 38. The effect of this will be to open the signaling-circuit and close the circuit through the two subscribers' lines.

The drop of the calling subscriber's line was not restored by the insertion of the plug C into the jack-socket and nothing has occurred to cause the drop of the called subscriber's line to fall. The drop-magnet of the calling subscriber's line remains open-circuited while the two lines are connected, and the result caused by the ringing off on either line will be to release the drop of the called subscriber's line. Thus when both drops are down the lines are idle. There is no occasion for restoring a drop by the insertion of a plug; but the restoration of the drops by the withdrawal of the plugs is important, and there I provide simple means, which will now be described, for restoring the drops only when the plugs are withdrawn from and not when they are inserted into the jack-sockets.

The annunciator-drop E is hinged at its lower edge above the entrance of the jack-socket and is normally retained in its vertical or closed position by a latch 40, connected with the armature of the drop-magnet. The annunciator-drop is made with a slot 41, in which a cam or arm 42 is disposed, and pivotally connected at its upper end to the drop. The cam or arm 42 is adapted to project beyond the outer face of the drop, but is prevented from moving too far or dropping to a vertical position when the drop falls to a horizontal position by means of lugs or ears 43, adapted to bear against the rear face of the drop. The cam or arm 42 is also provided with a lug 44, adapted to engage the rear face of the drop and prevent said cam or arm from being moved too far upwardly by the plug when the drop is in a horizontal position.

Each plug C D is provided with an annular flange or collar 45, at the forward end of the handle, and the handle of each plug is made with an annular groove 46 in rear of said flange or collar.

By the construction and arrangement of parts above described it will be seen that when a plug is inserted into a jack-socket (assuming the drop to be down) the flange or collar 45 will engage the movable cam or arm 42 and raise it without raising the drop. As soon as the flange or collar 45 shall have passed the cam or arm 42 the latter will drop into the groove 46 behind said flange or collar, so that when the plug is withdrawn from the jack-socket the engagement of the flange or collar 45 with the end of the cam or arm 42 will cause the drop to be raised and re-

stored to the latch 40. Thus it is evident that when a subscriber rings off the drop of the called subscriber's line will fall, the drop of the calling subscriber's line being already down, and then the withdrawal of the two plugs will result in the restoration of both drops. When the operator withdraws the plug D, the dog 32 will turn and assume the position shown in Fig. 5, so that the withdrawal of the plug cannot effect a movement of the jack-arm sufficient to close the signaling-circuit.

Each drop is provided with two lugs 47, which when the drop falls will engage the pins 47^a, projecting from the front end piece of the frame A, and thus close an alarm-circuit, said pins being connected by conductors 48 with contact-springs 49 and the latter being in contact with conductors 50 on the back B. The conductors 50 are included in a local circuit with a battery 50 and a bell 51.

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

1. The combination of a jack, a drop having an independently-movable part and a plug constructed and adapted to enter the jack and to engage the movable part on the drop so as to restore the latter only when the plug is withdrawn.

2. The combination of a jack, a hinged drop having an independently-movable part and a plug having a shoulder adapted to raise the movable part when said plug is inserted into the jack and engage said movable part of the drop and restore the latter when the plug is withdrawn from the jack.

3. The combination of a jack, a hinged drop, a cam or arm pivoted to the drop, and a plug adapted to enter the jack and having a shoulder adapted to pass said pivoted cam or arm when the plug is inserted into the jack and to engage the free end of said cam or arm and restore the drop when the plug is withdrawn from the jack.

4. The combination with a jack and a hinged drop having a slot therein, of a cam or arm pivoted at its upper end in said slot, lugs projecting from said cam or arm and adapted to rest on the rear face of the drop, and a plug adapted to enter the jack and having a flange to cooperate with said cam or arm to restore the drop when the said plug is withdrawn from the jack.

5. The combination with a jack and a drop having a slot therein, of a cam or arm pivoted in the slot in the drop, lugs projecting laterally from the cam or arm and bearing against the drop, a lug projecting from the pivoted upper end of the cam or arm and adapted to engage the rear face of the drop and a plug adapted to enter the drop and cooperate with the cam or arm when said plug is withdrawn to restore the drop.

6. The combination with a jack-socket, a jack-arm, an arm adapted to be included in a signaling-circuit and a plug for moving one

of said arms toward the other, of a movable device carried by one of said arms for causing a circuit to be closed through said jack and signal-arms when the plug is inserted into the jack-socket without closing said circuit when the plug is withdrawn from the jack.

7. The combination with a jack-socket, of a jack-spring, a dog pivotally mounted in said jack-spring, an arm adapted to be included in a signaling-circuit, and a plug constructed and adapted to enter the jack-socket and move the dog into contact with the signal-arm when the plug is inserted into the jack-socket without moving said dog into contact with the said signal-spring when the plug is withdrawn from the jack-socket.

8. The combination with a jack-socket, a jack-arm, and a plug, of a spring secured to the jack-socket and adapted to make contact with the jack-spring, a signal-arm and a dog pivotally attached to the jack-spring and adapted to be forced against the signal-arm by the plug.

9. The combination with a jack-socket, a plug and a signal-arm, of a jack-arm disposed between the jack-socket and signal-arm, and a dog pivotally attached to the jack-arm and adapted to be engaged by the plug, said dog having a shoulder to engage the jack-arm, to limit the movement of said dog in one direction.

10. The combination with a jack-socket, a plug, and a signal-arm, of a jack-arm disposed between the jack-socket and signal-arm and having a slot therein, of a dog loosely mounted in said slot, said dog having shoulders projecting in opposite directions and adapted to bear respectively, against the respective sides of the jack-spring when the plug is inserted into the jack-socket.

11. The combination with a back or support and a jack, of a thumb-nut swiveled to

the back or support, a threaded shank connected with the jack and adapted to pass through the back and enter said swiveled thumb-nut, and means for connecting a leading-in terminal with said thumb-nut.

12. The combination with a back or support and a jack provided with a threaded shank adapted to pass through said back or support, a thumb-nut having a permanent connection with the back or support and adapted to receive said threaded shank and a spring-plate disposed between a part of said thumb-nut and the back or support and adapted for the permanent attachment thereto of a line-wire terminal.

13. The combination with a jack-socket, a spring jack-arm, a signaling-arm, spring-arm for the listening-circuit, a drop, a magnet and latch therefor and a circuit-breaker in the magnet-circuit, of two plugs, each having an annular groove, one of said plugs longer than the other and adapted to engage the spring-arm of the listening-circuit and open said circuit-breaker without moving the jack-arm into electrical contact with the signaling-arm, the shorter plug having greater diameter than the longer plug and adapted to move the jack-arm into electrical connection with the signaling-arm without making contact with the arm of the listening-circuit and the said circuit-breaker, and a second circuit-breaker in the magnet-circuit and operated to open said magnet-circuit when said shorter plug is inserted into the jack-socket.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JAMES M. OVERSHINER.

Witnesses:

M. A. MITCHELL,
MINNIE SMITH.