

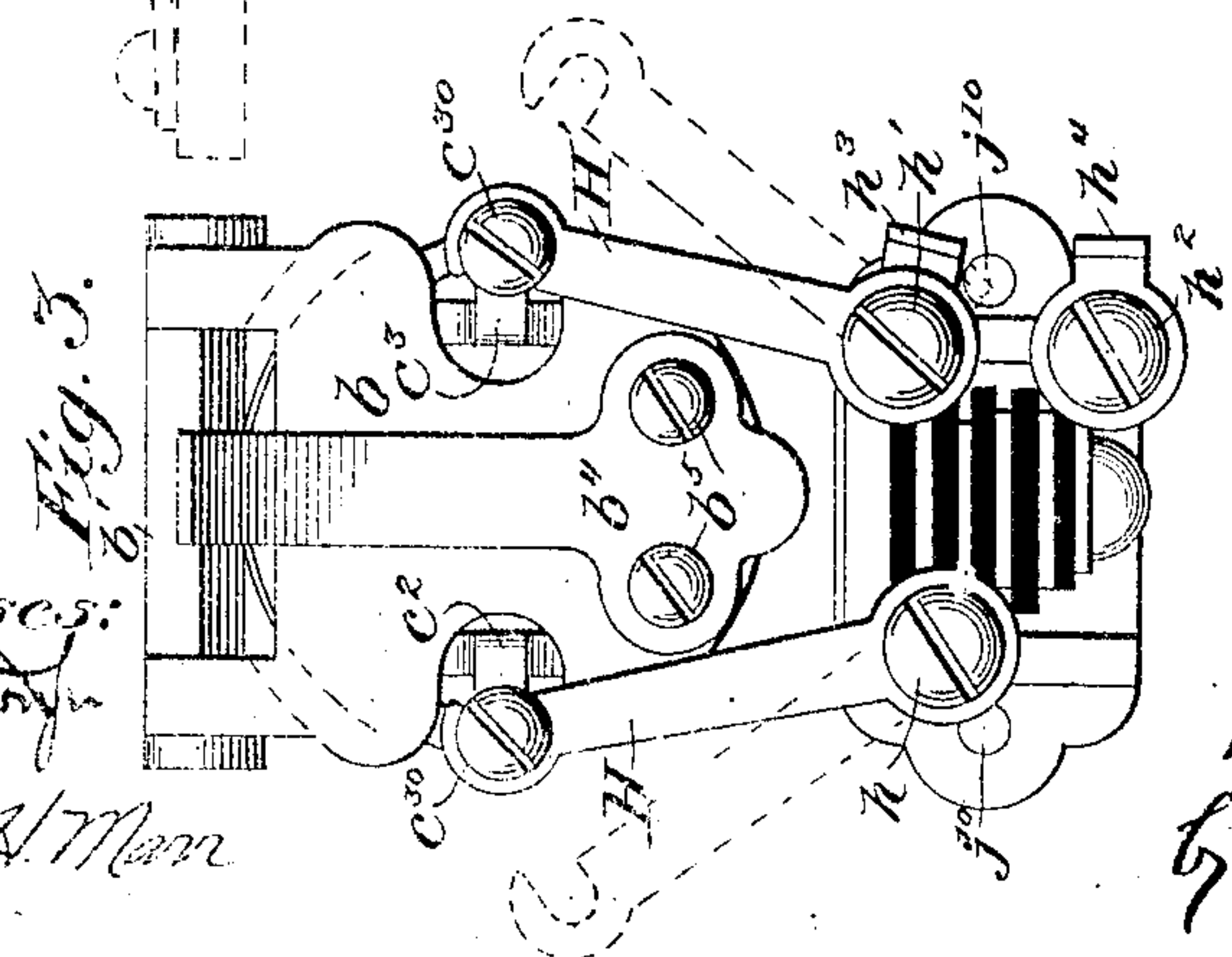
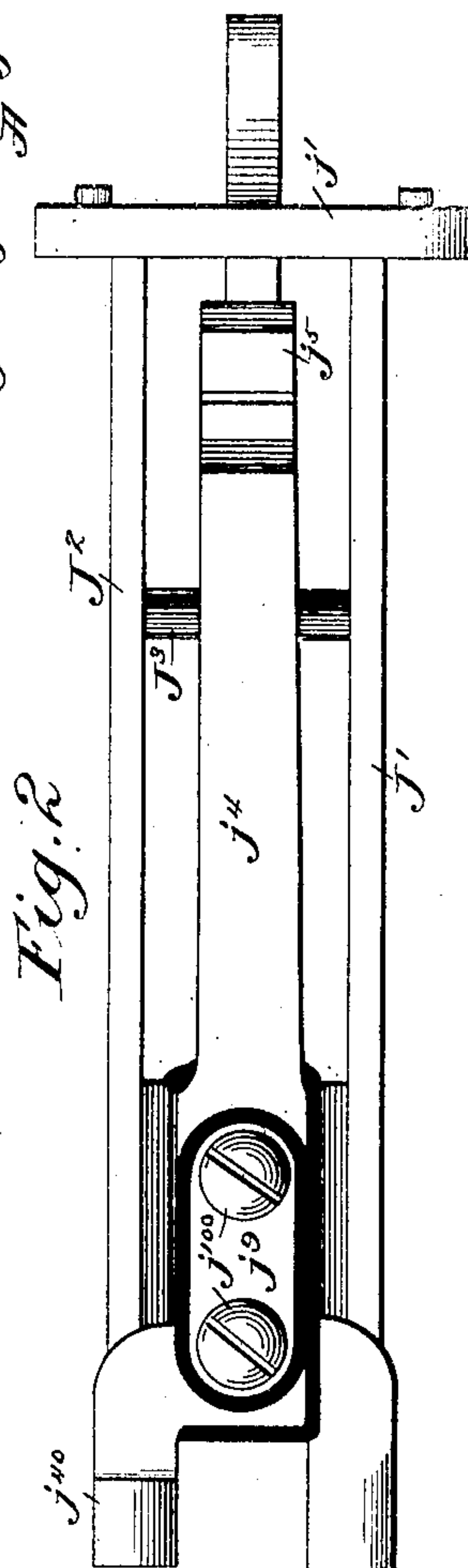
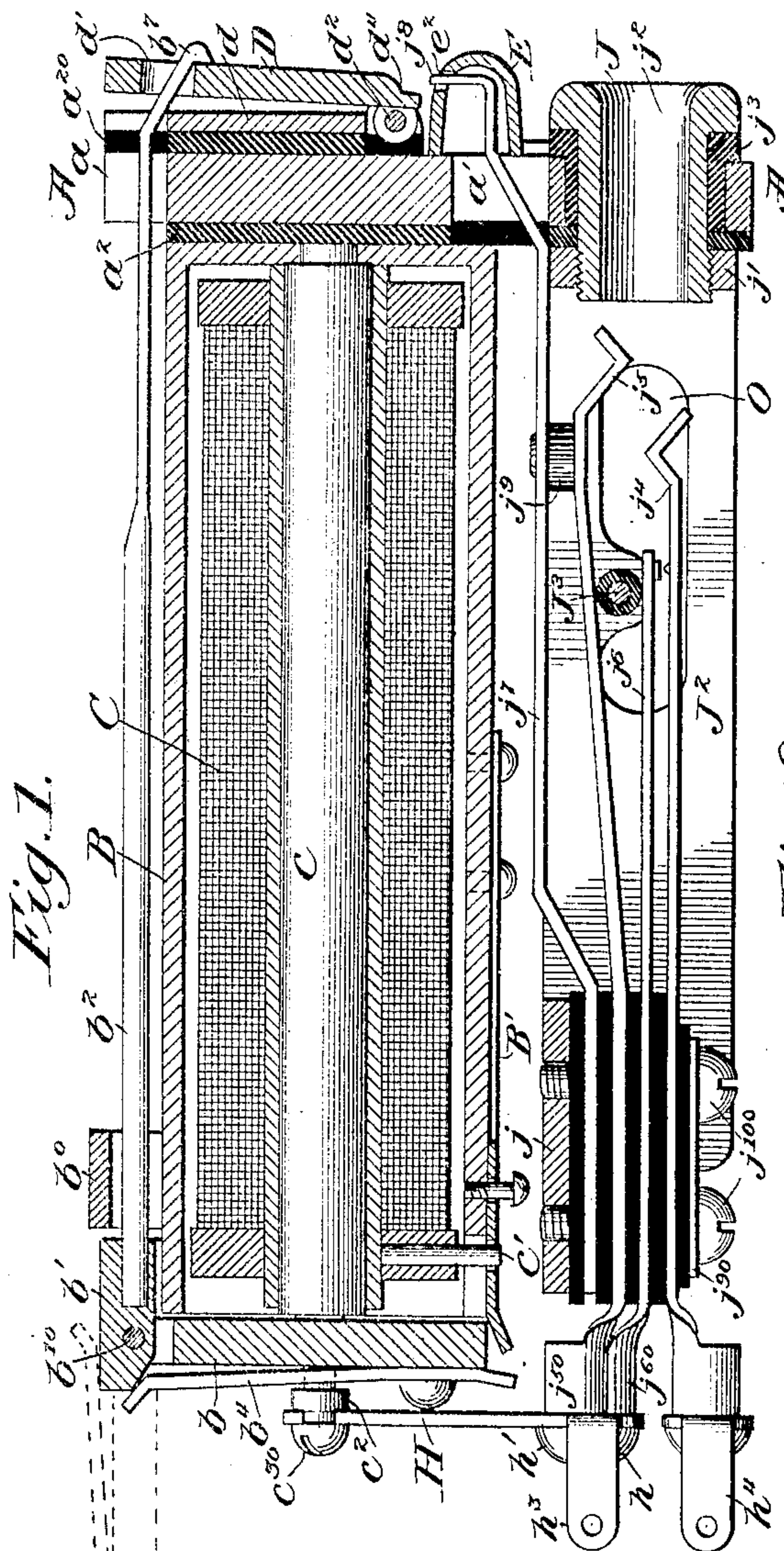
No. 878,465.

PATENTED FEB. 4, 1908.

R. H. MANSON.

ELECTRICAL SIGNALING AND SWITCHING APPARATUS.

APPLICATION FILED MAY 29, 1907.



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# UNITED STATES PATENT OFFICE.

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## ELECTRICAL SIGNALING AND SWITCHING APPARATUS.

No. 878,465.

Specification of Letters Patent.

Patented Feb. 4, 1908.

Original application filed September 10, 1906, Serial No. 334,008. Divided and this application filed May 29, 1907. Serial No. 376,423.

*To all whom it may concern:*

Be it known that I, RAY H. MANSON, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Electrical Signaling and Switching Apparatus, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to spring jacks for telephone switchboards and has for its object the improvement of such apparatus in certain particulars which will hereinafter appear.

The present application is a division of my prior application, Serial No. 334,008, filed September 10, 1906, in which I have illustrated, described and in part claimed a complete assemblage consisting of a combined annunciator drop and spring jack in which the insertion of a plug in a jack acts to cut out the magnet of the drop and at the same time mechanically restores the shutter. My present type of spring jack is particularly adapted for use in such a combination structure, but is not limited thereto.

Briefly stated, the present invention comprises a front plate, a pair of side frames connected by a front yoke, contact springs supported between the side frames, and a thimble passing through the front plate and securing the yoke thereto. The jack is thus made and assembled as a unit without regard to the rest of the structure, and may be readily detached therefrom. In order to permit of easy inspection, I make openings in my side plate through which the spring contacts may be inspected and adjusted.

The novel features of my invention will be specifically pointed out in the following detailed description and in the claims appended thereto.

The invention is illustrated in the accompanying drawings wherein.

Figure 1 is a vertical longitudinal section through a combined drop and jack structure in part embodying the present invention. Fig. 2 is a bottom plan view showing the jack when removed from the rest of the structure.

Fig. 3 is a rear end elevation of Fig. 1.

In the drawings A is the front plate upon which all the parts are mounted. This carries insulation  $a^2$  and  $a^{20}$  and to it are attached the iron-clad tubular drop magnet B

having a core  $c$  and winding C, with the armature  $b$  carrying the detent rod  $b^2$ , whose block  $b'$  is pivoted at  $b^{10}$  and held by a spring  $b^4$ , with an overlying saddle  $b^0$ ; also the drop shutter D having an opening  $d'$  receiving the end  $b^7$  of the armature lever and pivoted at  $d^2$  on the plate  $d$ . This shutter is adapted to be restored by a long spring  $j^7$ , the outer end of which passes through an opening  $a'$  in the front plate, and lies within a housing E. The tip  $j^8$  extends through an opening  $e^2$  in the housing and when the spring is raised it engages the cam surface  $d^4$  on the shutter.

Below the housing E lies the jack J, the working parts of which are supported in a frame composed of two longitudinal side strips  $J'$ ,  $J^2$ , joined at their front ends by a yoke piece  $j'$  and at their rear ends by a horizontal yoke-plate  $j$  upon which and between the side plates are mounted the various operating springs. The jack frame is secured to the front plate A by the bushed thimble  $j^2$ , the insulating plate  $a^2$  extending down between the frame and the front plate and being pierced for the passage of the thimble shank, while the latter is surrounded by the insulating bushing  $j^3$ , whereby the jack frame and connecting parts are entirely insulated from the front plate. This is desirable for several reasons one being the prevention of possible crosses or short-circuits between or on the different lines whose units are carried on the same plate, or whose plates are secured on the same metal switchboard frame. This is particularly necessary, also, because one of the night alarm contacts is grounded on the frame, the other being insulated in each case.

The jack springs are four in number, comprising the two contact springs  $j^4$  and  $j^5$ , the anvil spring  $j^6$  upon which the spring  $j^4$  normally rests, and the restoring spring  $j^7$ , whose forward end  $j^8$  extends out through the opening  $a'$  in the front plate, into the box or housing E and is there turned up as shown in Fig. 1, lying below the end of the tongue  $d^4$  on the drop shutter. Intermediate of its ends the spring  $j^7$  rests upon an insulating stud  $j^9$  which is preferably shouldered and has its neck lying in an opening in the spring to prevent lateral displacement. The spring  $j^5$  in the idle condition of the apparatus lies upon a bridge piece or stud  $J^3$ , extending from side to side of the jack frame and comprising an outer insulating sleeve and an inner metal



stud having its ends riveted into the two frame plates. This stud also receives on its under face the thrust of the anvil spring  $j^6$ , with which the tip spring  $j^4$  makes strong contact while idle. The adjustment of the parts is such that they will lie in the position shown in Fig. 1 when the apparatus is in disuse, and a careful examination of this figure will show that with my arrangement it is possible to secure both easy assembling and perfect adjustment of the jack before the latter is applied to the front plate at all. When the complete apparatus is finally assembled all together, the steady-pins  $j^{10}$  lie in corresponding openings in the rear face of the insulated plate  $a^2$ , the jack structure being thus prevented from turning, which it might do if secured by the thimble  $j^2$  only, since this latter is tapped into the yoke  $j'$  and unless riveted might in practice slacken up enough to permit the jack to have some slight play, thereby spoiling the adjustment of the springs and particularly the restoring spring.

The jack springs are secured at their rear ends by being piled up with interposed slips of insulating material upon the cross-yoke  $j$ , and held in such position by the clamping plate  $j^{90}$  and the screws  $j^{100}$ , the latter being pushed if required and topped directly into the yoke-plate. In order to permit of inspection and adjustment after assembling the jack-springs, I cut out the side plates  $J'$  and  $J^2$  to form openings  $O$ , as shown in Fig. 1.

In order to make electrical connection between the coil and the jack terminals, I provide the solid pivoted hasps  $H$ ,  $H'$  secured at their lower ends to the proper terminals on the jack frame, and at their upper ends engaging the terminals  $c^2$ ,  $c^3$  secured to the head of the spool. The hasp  $H$  is pivoted on a screw  $h$  tapped into the sleeve  $j^{60}$  formed upon the rear end of the anvil spring  $j^6$ ; while the hasp  $H'$  is pivoted on the spool  $h'$  tapped into the sleeve  $j^{50}$  formed up on the rear end of the contact spring  $j^5$ . The contact spring  $j^4$  also has a sleeve  $j^{40}$ , which takes a screw  $h^2$ , but there is no hasp connection, the only purpose in this case being to provide a solid terminal for attachment of the circuit wires. For this purpose I secure by means of the screw  $h^2$  a tailed washer  $h^4$ , having its outer end perforated for the attachment by solder of the line-wire. The other side of the line is attached to a similar perforated tail formed on the hasp  $H'$ . It will thus be observed that when the hasps  $H$  and  $H'$  are turned up to engage the two terminals  $c^2$ ,  $c^3$  and the screws  $c^{30}$  are tightened upon them, that the magnet winding is bridged across the two springs,  $j^5$ ,  $j^6$ , and as the latter is normally in contact with the spring  $j^4$  and as the springs  $j^5$  and  $j^4$  are the line terminals, it follows that

the magnet is normally bridged across the line and is cut out when the plug is inserted.

The operation of my improved combination apparatus is as follows: The parts all being in the position shown in Fig. 1, when signaling current comes over the subscriber's line it passes in by way of the terminal  $h^3$  and hasp  $H'$ , through the coil  $C$ , back through hasp  $H$  to the spring  $j^6$ , thence to the spring  $j^4$ , and back to line by way of the terminal  $h^4$ . The armature  $b$  being attracted, the rod  $b^2$  is lifted, the hook  $b^7$  detached from the shutter, and the latter falls. When the plug is inserted in response to the call it spreads apart the springs  $j^4$  and  $j^5$ , the former lifting off the contact  $j^6$  and thereby cutting out the drop, while the other lifts the stud  $j^9$  and the restoring spring  $j^7$ , the outer end of which passes up through the slot  $e^2$  in the box  $E$  and lifts the shutter  $D$  until it again engages and is retained by the hook  $b^7$ .

I am aware that many changes may be made in matters of shape or in non-essential details of construction without departing from the spirit of my invention, and I wish it understood that I include all such within the scope and purview thereof.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A spring jack comprising a front supporting plate, a pair of side frames cross-connected by a front yoke, contact springs supported between the side frames, and a thimble passing through the front plate and secured in the front yoke of the frame, whereby the jack is separately assembled and attached to its front plate by the thimble only, substantially as described.

2. A spring jack comprising side plates connected by transverse bridges or yokes, contact springs mounted upon one of the bridges and lying between the side plates, one of said side plates being provided with a sight opening opposite to and permitting inspection of the contacts, substantially as described.

3. A spring jack comprising a pair of side plates connected by a front yoke perforated for the passage of the plug, and a rear yoke for receiving the springs, a raised stud or anvil supported between and across the side plates, and contact springs secured upon said rear yoke or bridged and resting upon said stud, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

RAY H. MANSON.

Witnesses:

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W. C. STRONG.