

(No Model.)

3 Sheets—Sheet 1.

L. A. OSBORNE.  
RAILWAY SWITCH.

No. 557,338.

Patented Mar. 31, 1896.

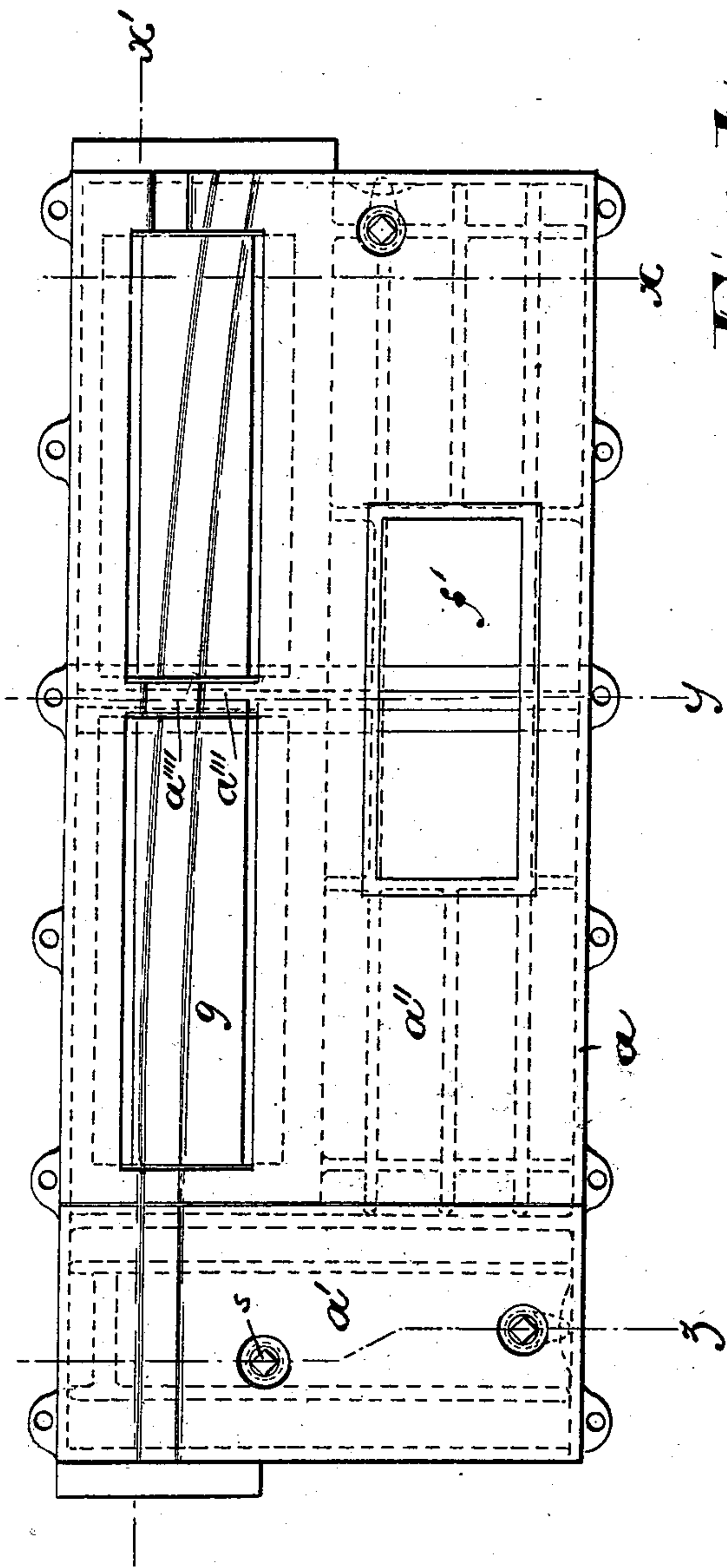


Fig. 1.

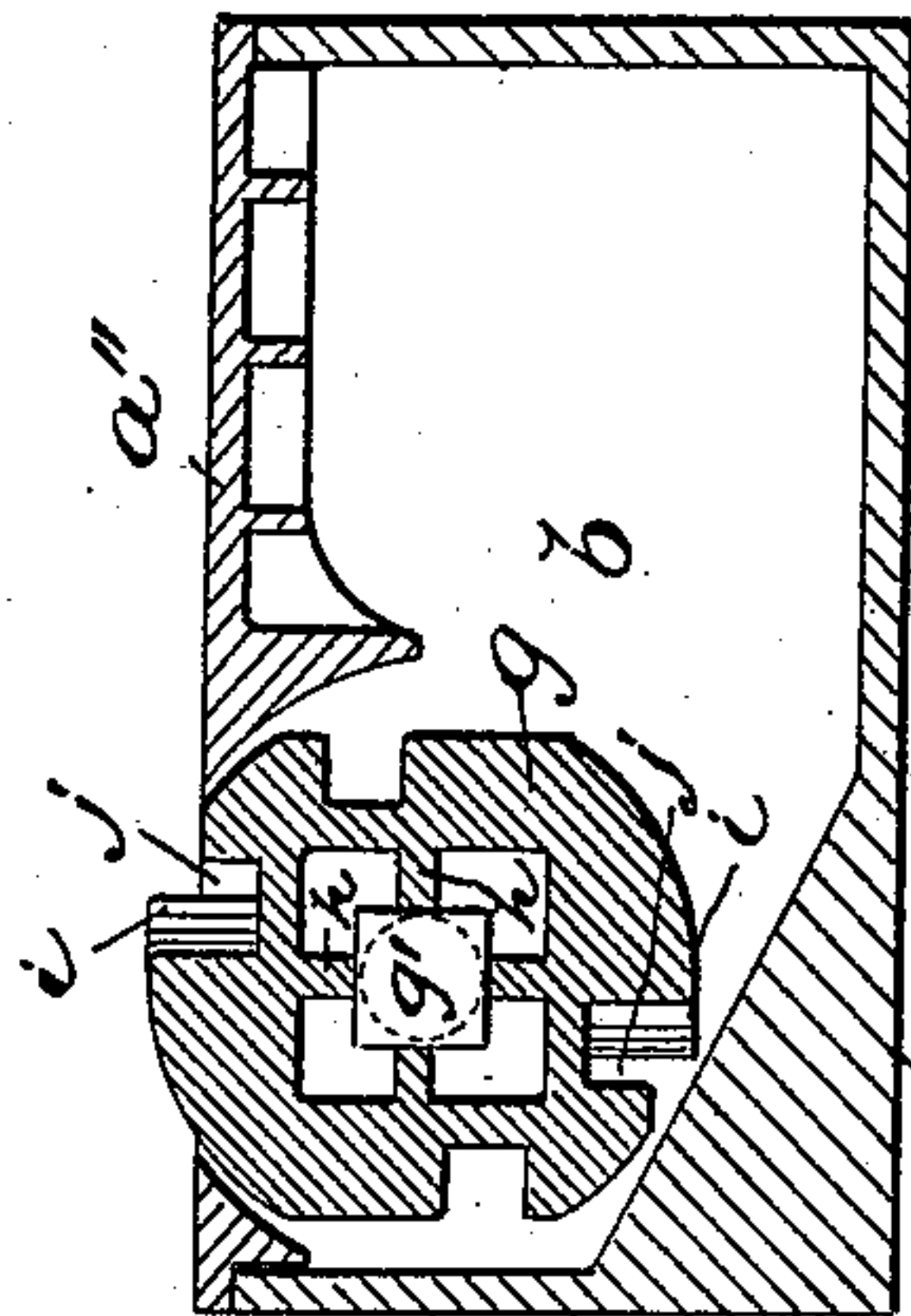


Fig. 2.

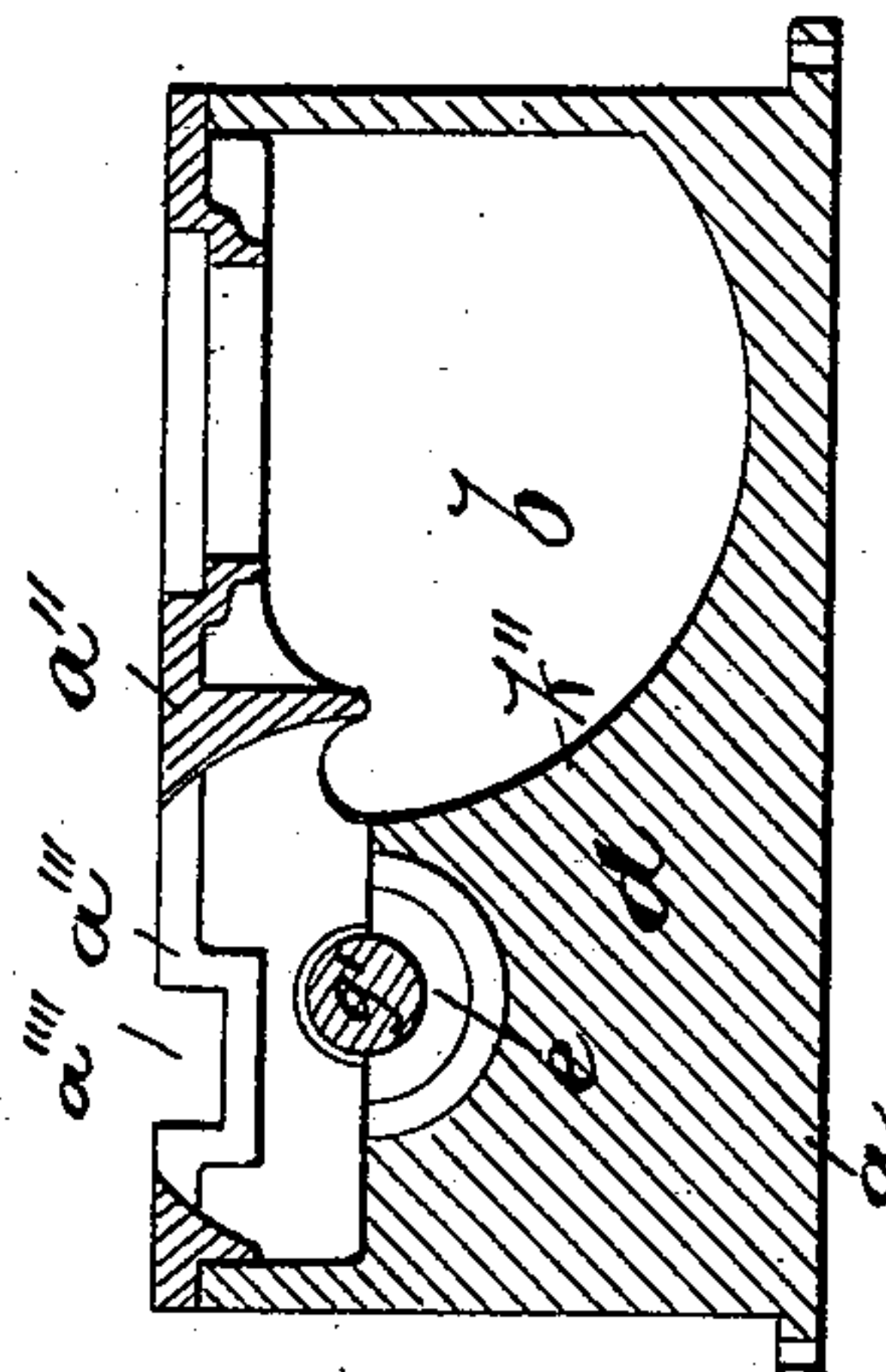


Fig. 3.

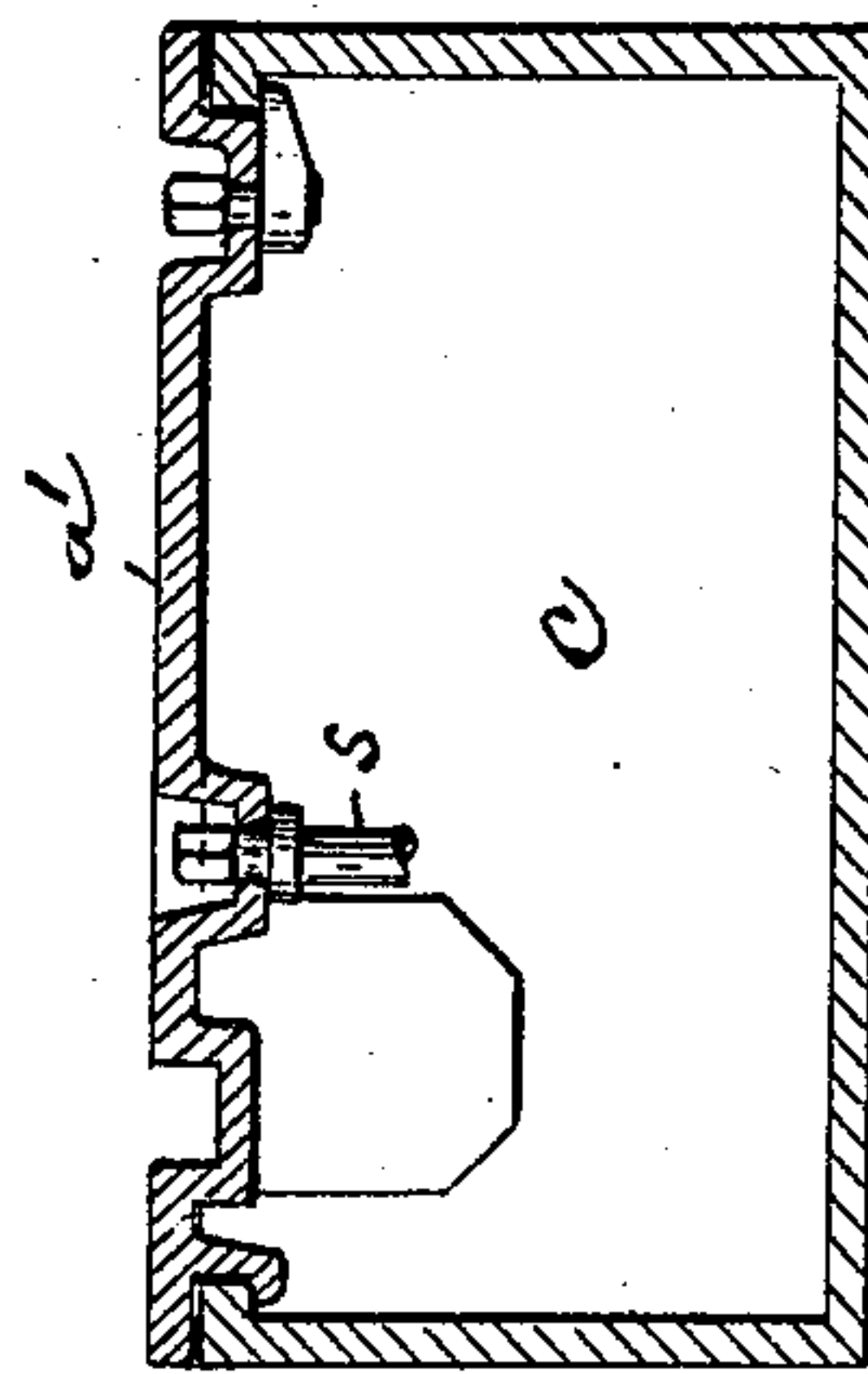


Fig. 4.

Witnesses

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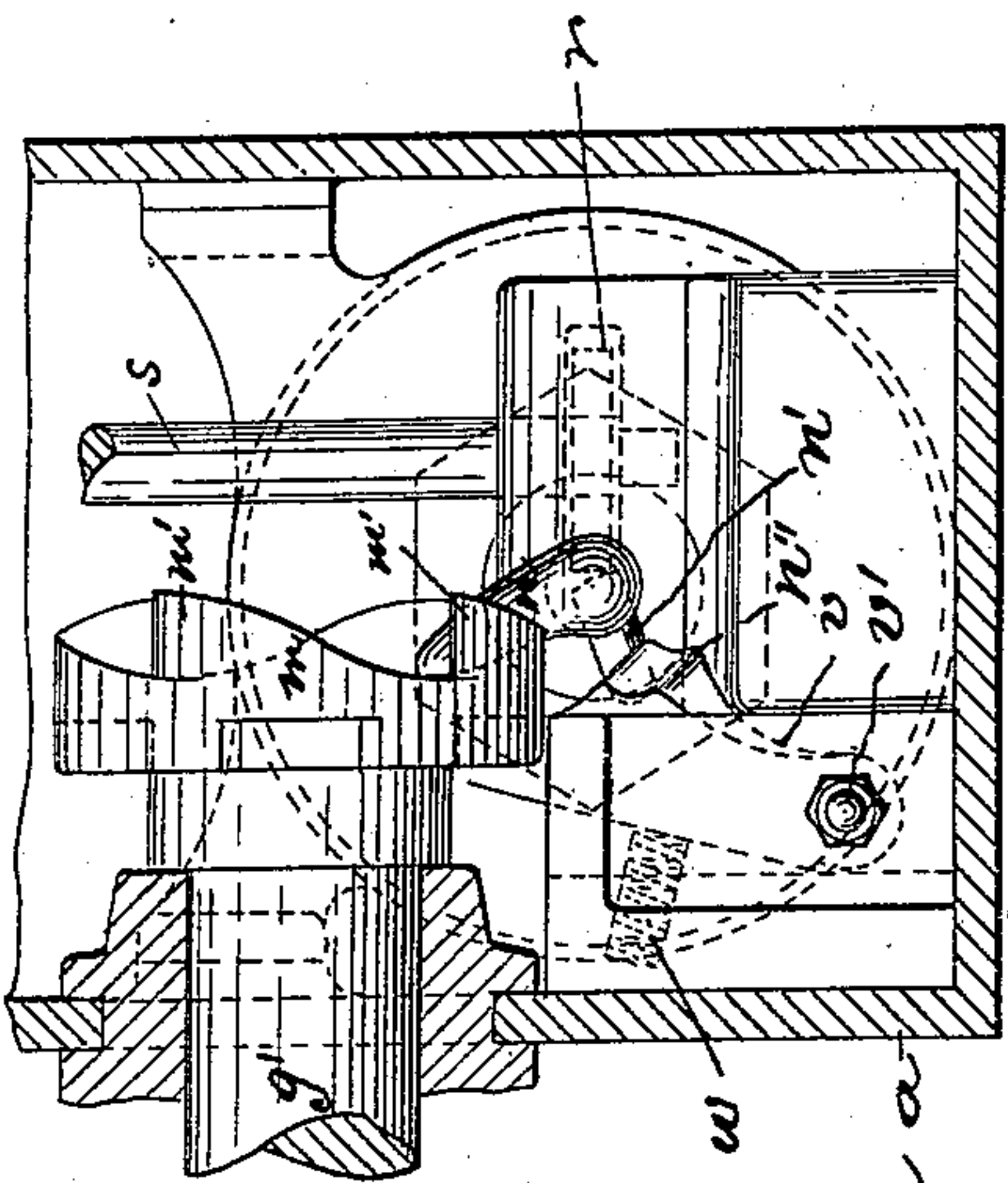


Fig. 7.

Fig. 6.

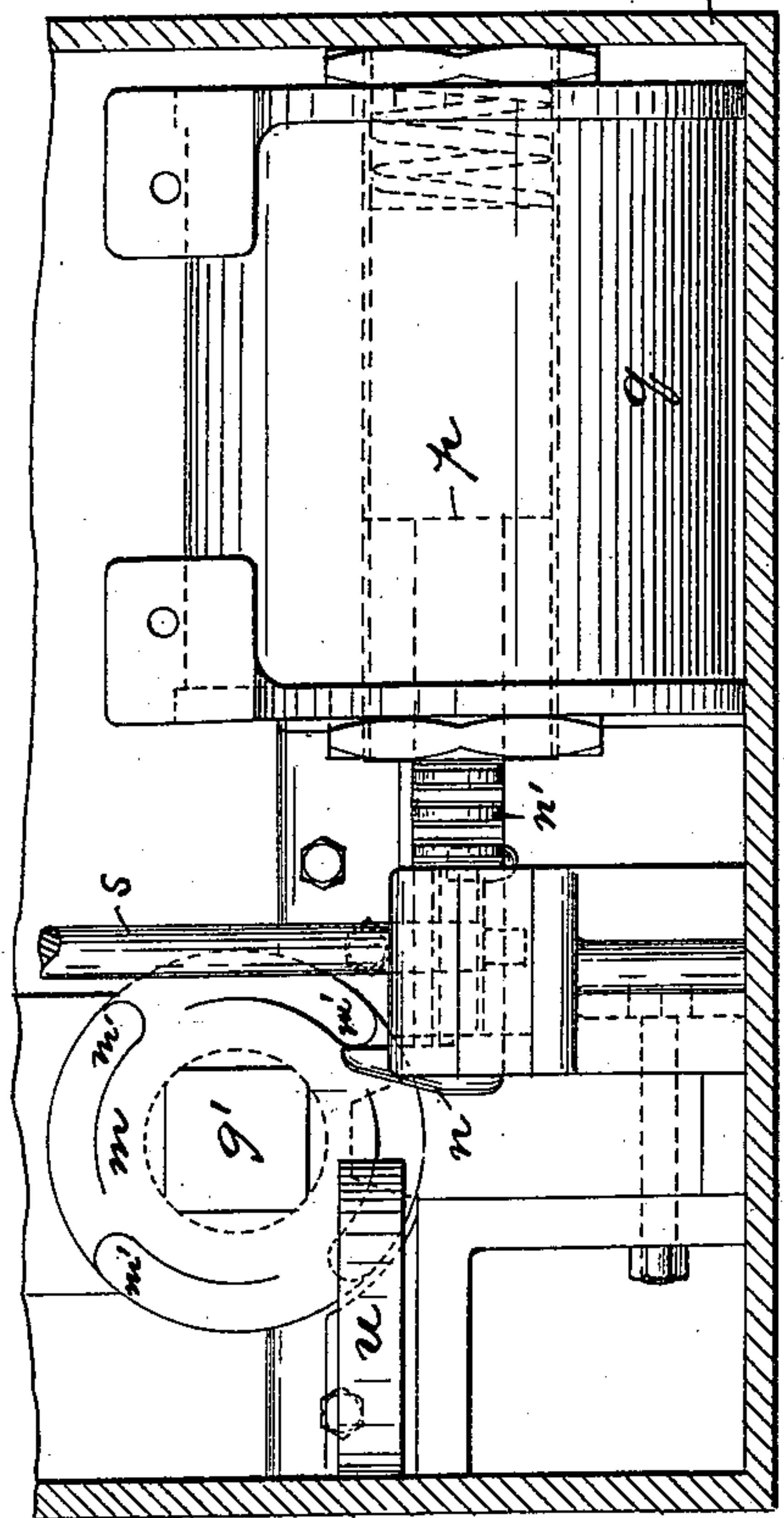
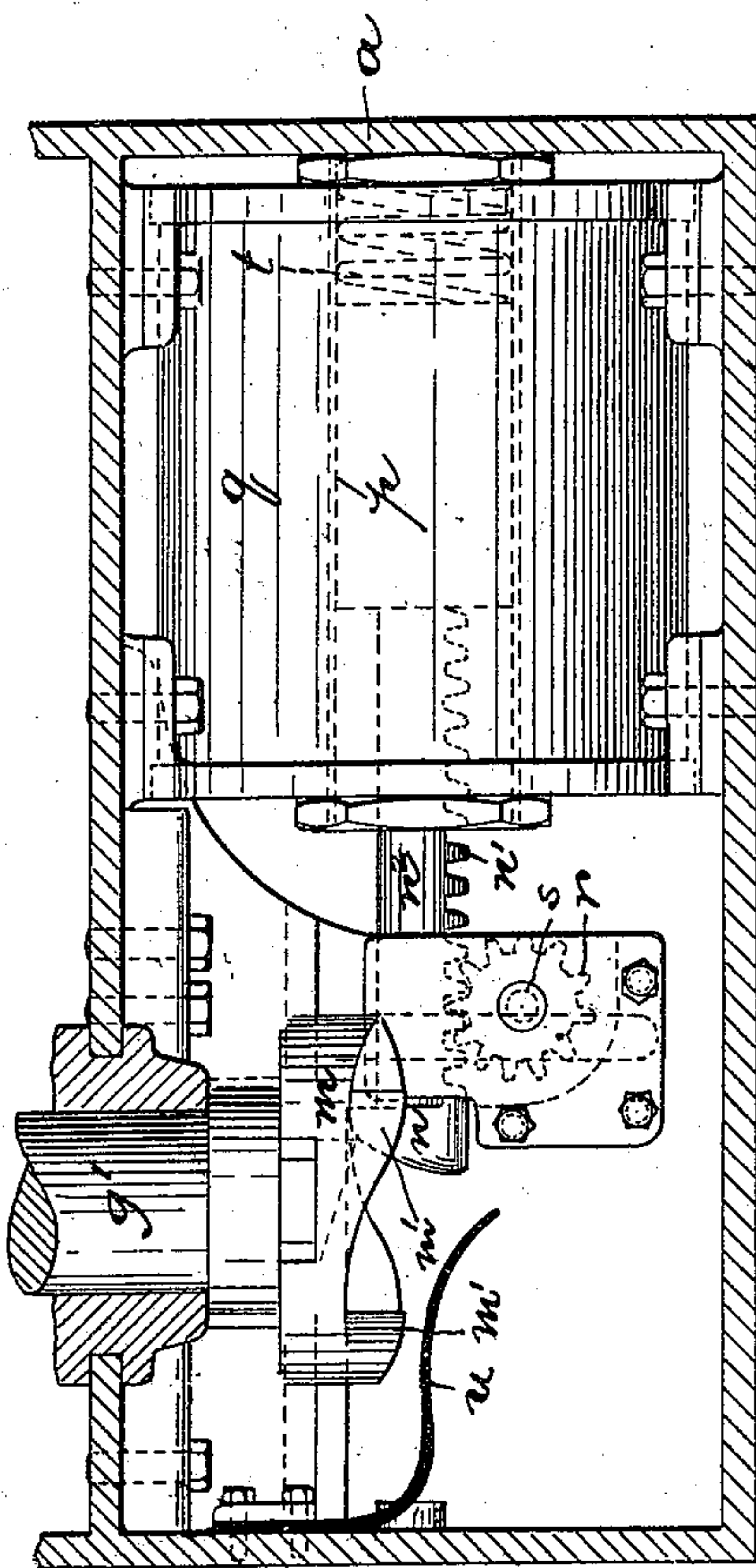


Fig. 5.



Witnesses

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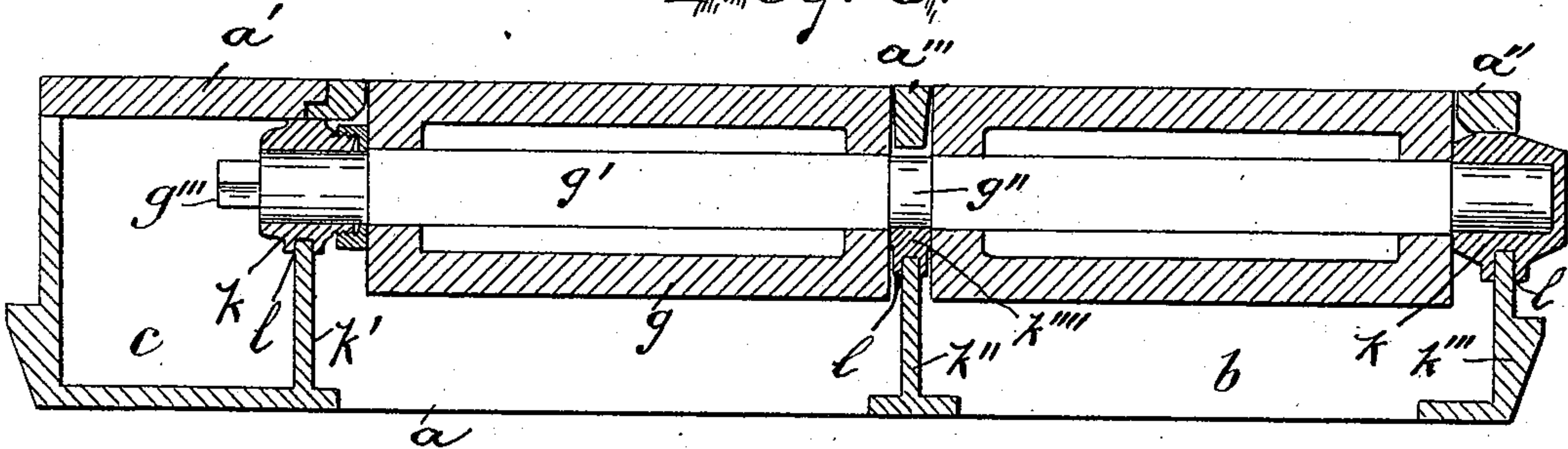
3 Sheets—Sheet 3.

L. A. OSBORNE.  
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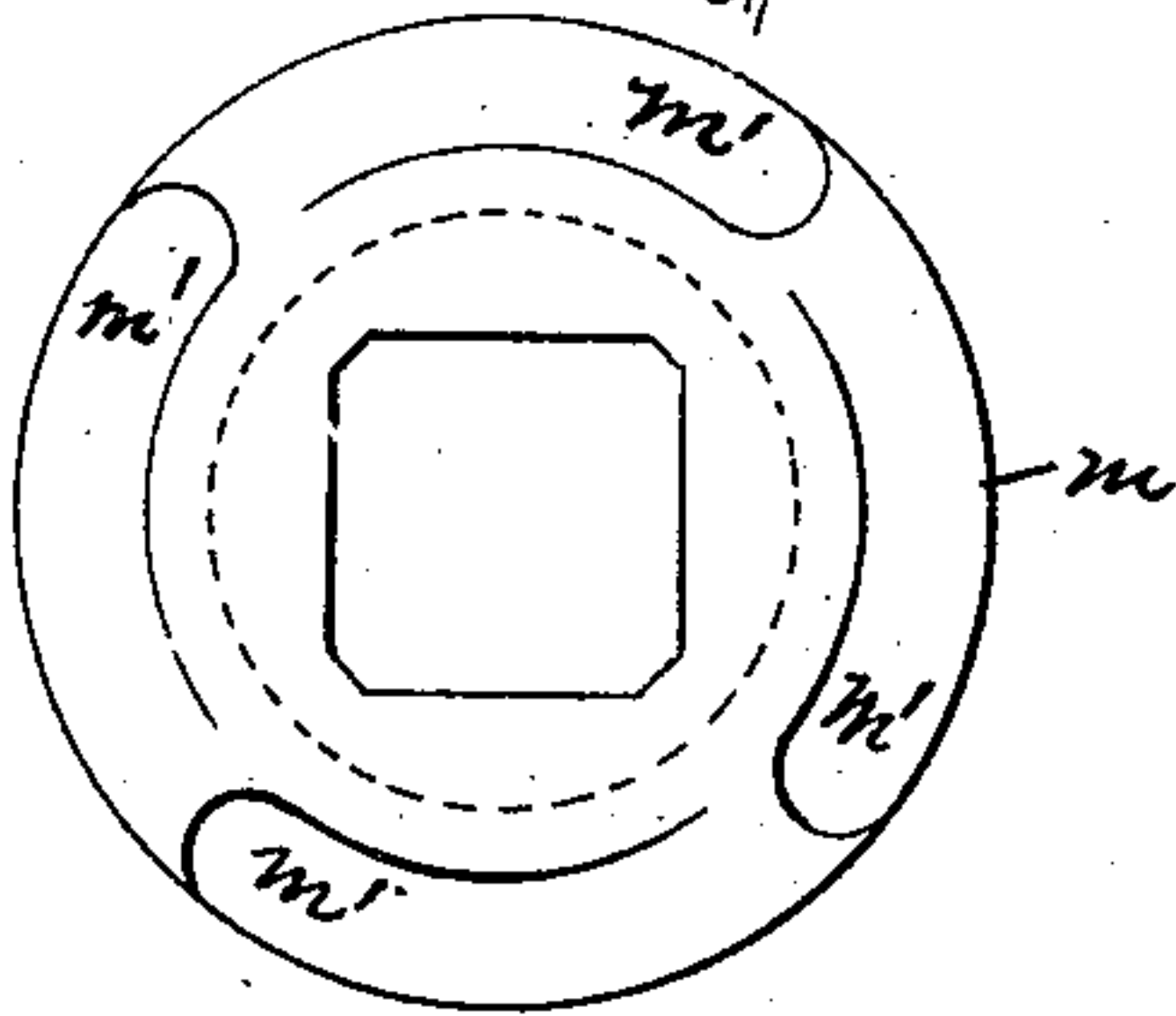
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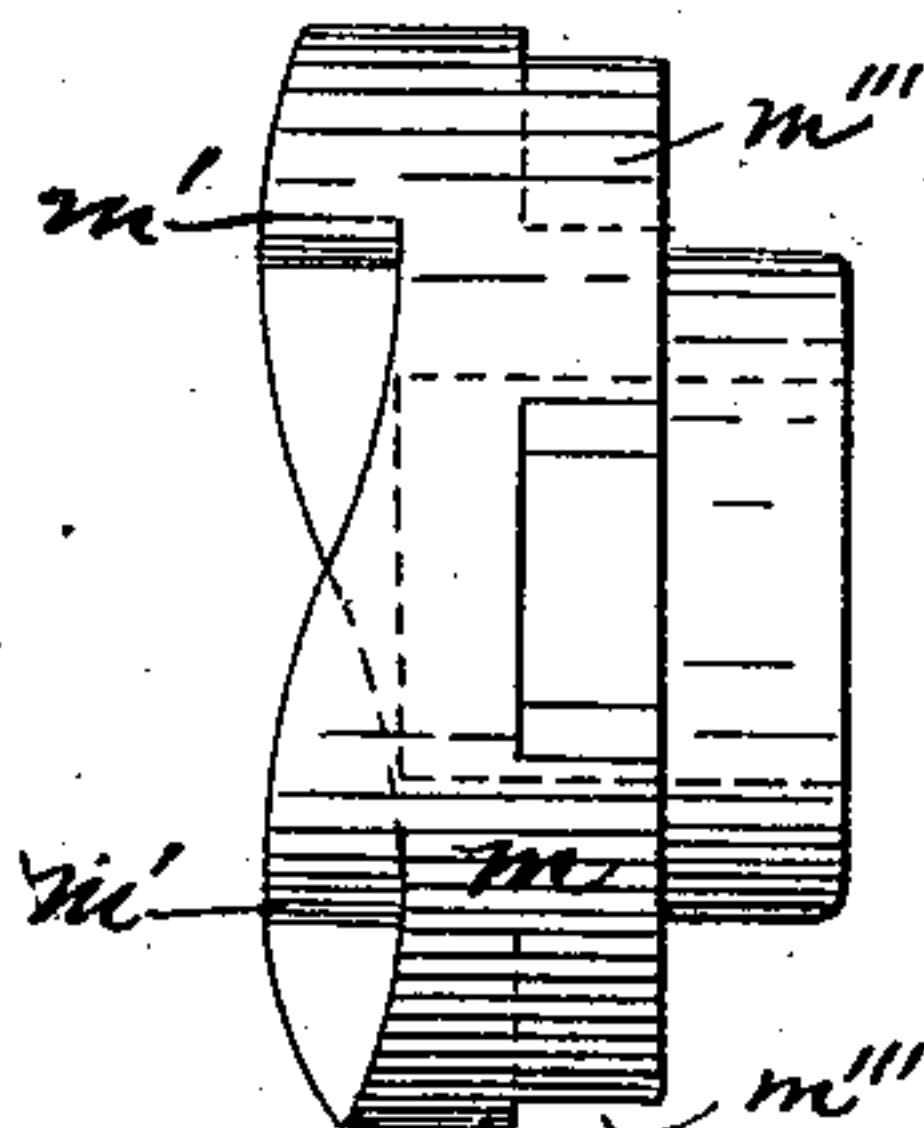
**Fig. 8.**



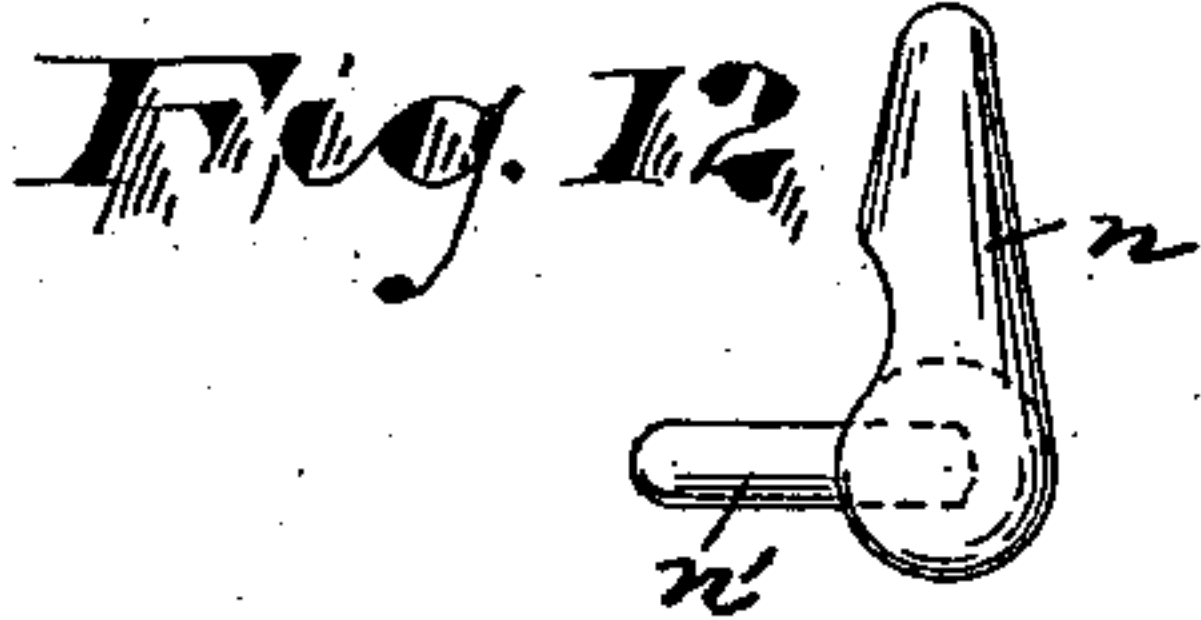
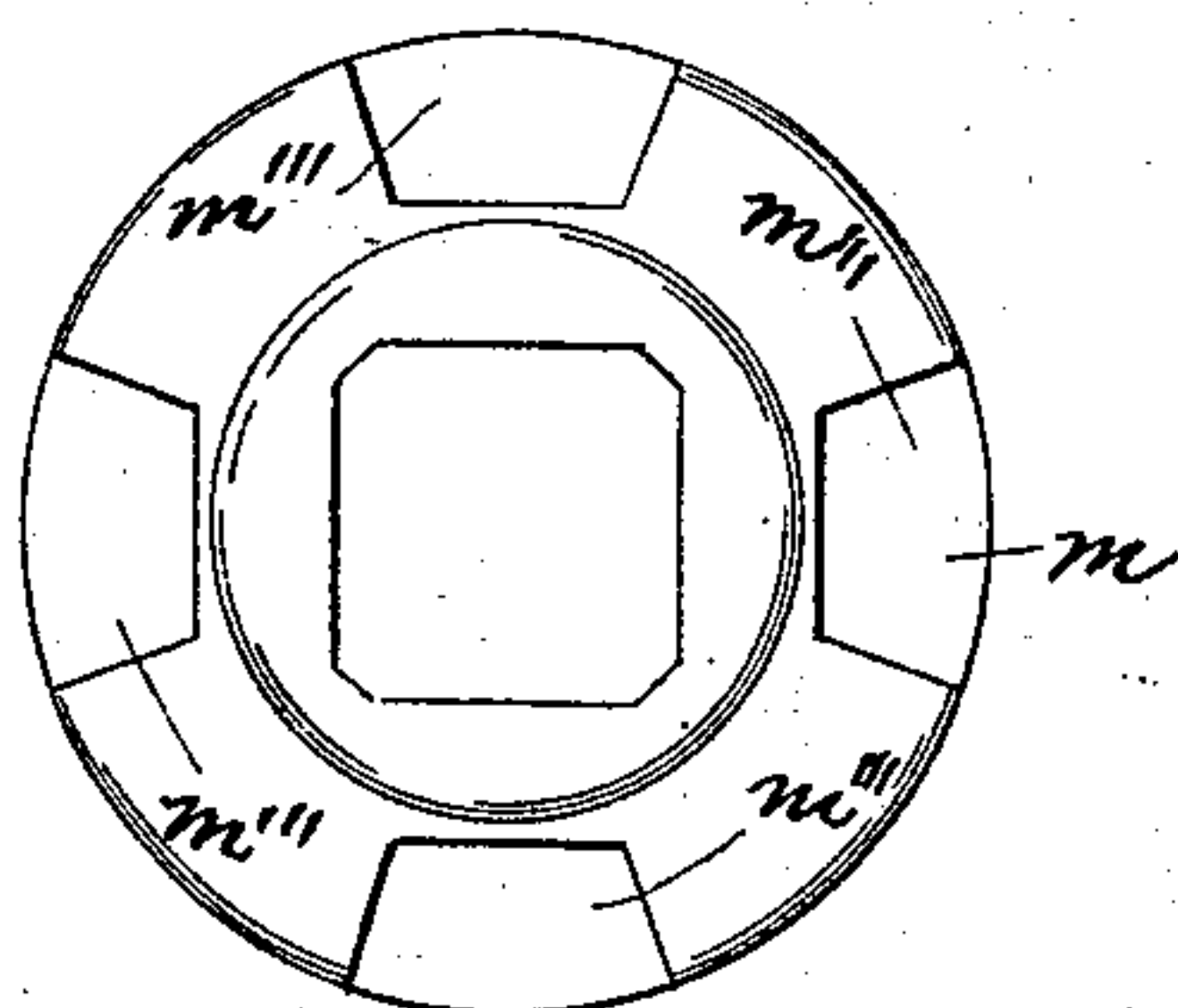
**Fig. 9.**



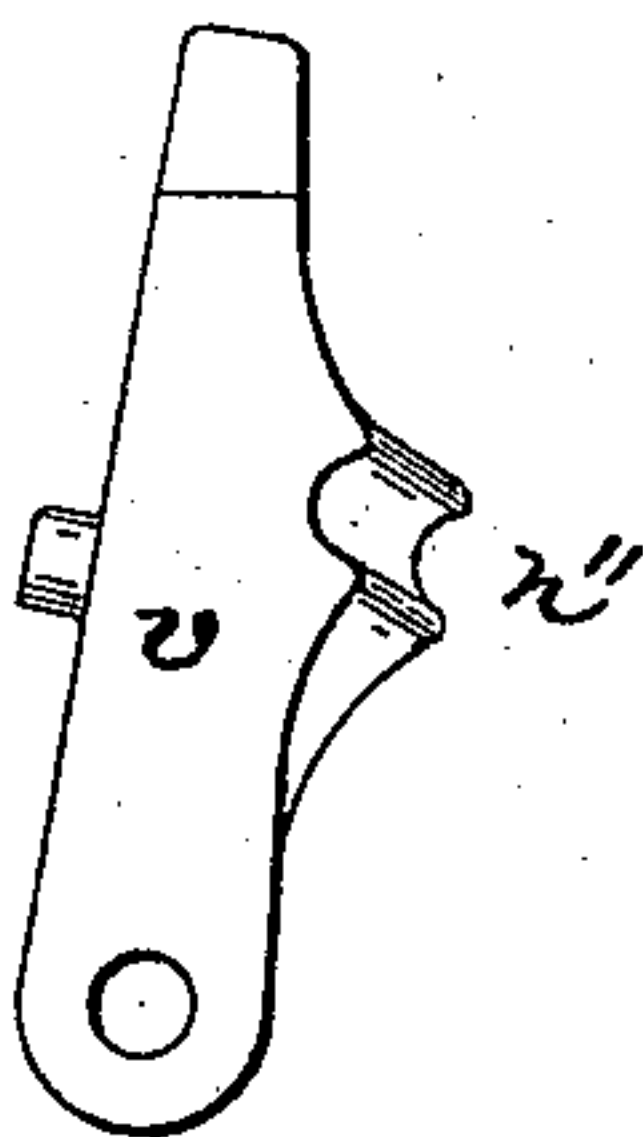
**Fig. 10.**



**Fig. 11.**



**Fig. 14.**



**Fig. 15.**

Witnesses

Inventor:

Robert Sollberger  
Louisa Browne.

Loyall A. Osborne,  
By *Chas. F. Dams* Atty.



# UNITED STATES PATENT OFFICE.

LOYALL A. OSBORNE, OF NEWARK, NEW JERSEY.

## RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 557,338, dated March 31, 1896.

Application filed November 26, 1894. Serial No. 530,063. (No model.)

*To all whom it may concern:*

Be it known that I, LOYALL A. OSBORNE, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented new and useful Improvements in Railway-Switches, of which the following description, taken in connection with the drawings herewith accompanying, is a specification.

10 This invention relates more particularly to certain improvements in that class of switching apparatus shown in my contemporaneous application, filed March 5, 1894, Serial No. 502,330, and has for its objects, first, to facilitate the passage of the car over the switch by reducing the friction of the car-wheels on the treads of the switch; second, to automatically lock the switch from movement after being operated or moved and release the same preliminary to another movement, and, thirdly, to simplify and cheapen the construction and otherwise provide for greater efficiency and practicability. These objects I secure by means of the construction and combination of parts hereinafter set forth in detail, and pointed out in the claims.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the figures, Figure 1 is a plan view of the device; Figs. 2, 3, and 4, sectional views through lines  $x x$ ,  $y y$ , and  $z z$ , respectively, of Fig. 1, showing the construction of the switching device and the case or chamber in which said device and its operating mechanism are supported, the working parts being largely omitted. Figs. 5, 6, and 7 show an end plan and side view, respectively, of the switch-operating mechanism and the connecting end of the switching device with the inclosing case or wall in section to clearly show said parts. Fig. 8 is a sectional view through line  $x' x'$ , Fig. 1, the switch-operating mechanism being removed from its chamber. Figs. 9, 10, and 11 are details of a certain ratchet-head removed from connection with the switch. Figs. 12 and 13 show an end and side view, respectively, of a pawl adapted to operate in connection with a solenoid-core; and Figs. 14 and 15 are details of a locking-pawl for said ratchet-head.

To explain in detail,  $a$  indicates the wall of the box or chamber in which the several parts forming the switch and its operating-mechanism

are supported, which said box or chamber is interiorly partitioned to form the switch-chamber  $b$  and the switch-operating mechanism chamber  $c$  and is otherwise of a construction similar to that shown in my said prior application, excepting in certain details, as will be hereinafter described. The said box or chamber is provided with covering-plates  $a'$  and  $a''$ , the latter, which covers the switch-chamber, being provided with a suitable opening therein to allow for the ready removal of the dirt or other foreign accumulation from said chamber. A suitable lid or cover  $f'$  is provided for such opening, which may be supported within the latter in any suitable manner.

$g$  represents the rotary switch, provided with longitudinal treads for the wheels of the car, which are alternately straight and curved to correspond with the treads or rail of the main or branch track, as in my said prior application; but in the present case the treads are formed in or integral with the switch-body, whereby increased lightness is obtained.

In my said prior application I employed a switch-body of a given length, which had an uninterrupted tread-surface. It was made comparatively short, and thus compelled a more or less abrupt curve in the track, which construction produces more or less binding or friction between the flange of the wheels and the rails or treads, as well understood, and in order to reduce such friction and secure a more easy curve I have increased the length of the switch. In order to provide for the support of such increased length, I have provided the switch with a central journal or bearing, which is formed in the present instance shown by making the switch in two parts or sections, which are disposed on a supporting or axle shaft  $g'$ , with a space between them, as shown, to provide said bearing and also allow space for the reception of a journal-box  $k'''$  for the latter. Such intermediate bearing is protected from dirt, &c., by a portion  $a'''$  of the covering-plate  $a''$ , which extends between the parts or sections of the switch, as shown.

In the present instance shown and in order to reduce the weight of the switch occasioned by its increased length I have constructed the same, as more clearly shown in Figs. 2 and 8, by casting each part in one integral piece



with a hollow center around a square or angular center bar  $g'$ , which latter serves, at its center and ends, as the axle or journals of the switch. To secure the desired strength and at the same time obtain a strong and durable attachment or fastening of the body of the switch to its center shaft  $g'$ , I have formed on the sides of the hollow interior of said body inwardly-projecting ribs  $h$ , which engage the sides of the said shaft  $g'$ , as clearly shown in Fig. 2.

To prevent displacement of the wheels of the car from the switch when passing over the curved branch treads, I have raised one side of the wheel-flange groove  $j$  to form a guard, as shown at  $i$  in Fig. 2, on the side opposite the wheel-tread.

The journal-boxes  $k$   $k$  and  $k'''$  for the switch-bearings are supported in suitable seats in the walls or partitions  $k'$ ,  $k''$ , and  $k'''$  of the box or chamber  $a$  in a manner to be capable of an easy upward withdrawal of the same to allow for the ready insertion or removal of the switch to and from position in its case or chamber.

The shaft  $g'$  at one end extends into the operating-mechanism chamber  $c$ , and in the present instance shown is provided with an angular head  $g'''$ , on which a ratchet-head  $m$  (shown in detail in Figs. 9, 10, and 11) is detachably supported. Said head or part  $m$  is provided with ratchet-teeth  $m'$  on one side thereof adapted for the engagement therewith of an operating-pawl  $n$ , by which said head and connecting-switch are given an intermittently rotary movement, and on its opposite side said head is provided with grooves or detents  $m'''$  to receive a locking device or pawl  $v$ , in a manner and for the purpose to be hereinafter described. The said operating pawl or device  $n$  is carried by a rod  $n^2$ , which has connection with the core  $p$  of an electric solenoid  $q$  in a manner to be reciprocated therewith under the motive power of said solenoid when the latter is in closed circuit with a suitable source of electric power. The rod  $n^2$  in the present instance shown is constructed for screw connection with the core  $p$ , although it is obvious that any form of connection may be employed.

The operative movement of the pawl  $n$ , in which it engages one of the ratchet-teeth  $m'$  and effects a partial rotation of the head  $m$  and connecting-switch, is secured by the attractive power of the solenoid  $q$  on the core  $p$ , which moves the latter and connecting-rod  $n^2$  in one direction to move the switch, and by a spring  $t$  disposed in the solenoid behind the core, as shown in Figs. 5 and 6, which produces a return movement of the pawl to a position for engaging the preceding tooth on the ratchet-head preliminary to another movement of the latter.

The pawl-carrying rod  $n^2$  has an oscillating movement in its bearings to allow the pawl in its said return movement to move or slide back over an inclined surface of said teeth in

order to engage the next preceding tooth, as will be readily understood. A spring  $u$ , Fig. 6, is employed to engage with the said pawl and hold the same in engagement with or operative relation to the ratchet-head  $m$ .

To lock the ratchet-head  $m$  and connecting-switch  $g$  from movement after each partial rotation or movement of the same, I have provided a suitable locking device or catch for engaging with the head  $m$  within the grooves or detents  $m'''$  therein, which said locking device in the present instance shown consists of a pawl  $v$ , which is pivoted, as at  $v'$ , at a point below the ratchet-head and arranged with its end in position for entering the grooves or detents in said head or part  $m$ , as described. A spring  $w$ , Fig. 7, is arranged to give said locking-pawl its movement toward and into the detents  $m'''$ , which movement takes place immediately after the ratchet-head has been given a partial rotation by the pawl  $n$ . To unlock said head  $m$  preliminary to another movement of the same, I have provided the rod  $n^2$  or part thereof with an arm or finger  $n'$ , Figs. 7 and 12, which, when the pawl-carrying rod  $n^2$  is moved forward to operate the head  $m$  and before said pawl has engaged the latter, engages with the under inclined surface of a projecting rib  $n''$ , which is arranged at an angle across the face of the pawl  $v$ , as shown in Fig. 15, and throws the pawl from locking engagement with the head  $m$ . At this time in the movement of the rod  $n^2$  the pawl  $n$  carried thereby engages with the adjacent tooth  $m'$  of the ratchet-head to give the latter and the connecting-switch its partial turn.

On the return movement or throw of the rod  $n^2$  the arm or finger  $n'$  is turned upward and carried above or over the rib  $n''$ , as shown in Fig. 7, by reason of the pawl  $n$  riding over the inclined surface of the ratchet-teeth  $m'$ , as before described. When the pawl has been moved beyond the inclined surface of the tooth and into position for engaging with the preceding tooth, said finger  $n'$  is also thrown into position to engage the lower face of the rib  $n''$  on the next forward movement of the rod  $n^2$ .

The pawl-carrying rod or shaft  $n^2$  in the instance shown is provided with a series of teeth  $n^3$  on one side thereof, forming a rack adapted for the engagement therewith of a cog-wheel  $r$ , which latter is carried by a key-shaft  $s$ , supported in suitable bearings with one end extending to a position where it may be readily operated by a suitable key or other means and the switch be thereby operated locally and mechanically.

Having thus set forth my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination with a horizontally-journaled rotary switch provided with a head or part constructed for the engagement therewith of operating and locking means, and means for operating said switch and auto-



atically locking and releasing the same, substantially as described and for the purpose set forth.

2. The combination with a horizontally-journaled rotary switch provided with a head or part constructed for the engagement therewith of a locking device, a locking device, and an electrically-controlled sliding shaft provided with means for moving said device from locking engagement preliminary to moving the switch, and operating the latter, substantially as described and for the purpose set forth.

3. The combination with a horizontally-journaled rotary switch provided with a head or part constructed for the engagement therewith of a locking device, a locking device, a solenoid and its core, and means operated by said core for moving said device from locking engagement, substantially as described and for the purpose set forth.

4. The combination with a rotary switch provided with a head or part constructed for the engagement therewith of a locking device, a locking device movably supported or held in a normal position in locking engagement with said head or part, and a reciprocating oscillating shaft having an arm or finger for engaging with said locking device to move the same from locking engagement, substantially as described and for the purpose set forth.

5. The combination with a switch, provided with a ratchet head or part having inclined teeth on one side, and locking-detents on the other, a locking-pawl, and an operating-pawl engaging the inclined teeth and having a finger engaging the locking-pawl to throw the same from locking engagement, substantially as set forth.

6. The combination with a switch connected with a ratchet head or part having inclined teeth on one side to receive an operating-pawl and locking-detents on the other, a locking-pawl having an inclined surface, and an operating-pawl engaging the inclined teeth and having a finger for engaging the locking-pawl to throw the same from locking engagement with said head or part preliminary to moving the latter, substantially as set forth.

7. An improved switch, in which is combined, a horizontally-journaled rotary switch formed in two sections and constructed with an intermediate bearing, and means for rotating said switch, substantially as set forth.

8. An improved switch, in which is combined with a suitable box or chamber, a horizontally-journaled intermittently-rotating switch operating in one direction only, and having on its outer sides longitudinal treads adapted to be brought alternately into coincidence with the main and branch rails of the road, and constructed with an intermediate bearing, and means for intermittently rotating said switch in one direction, substantially as set forth.

9. An improved switch, in which is com-

bined with a box having bearings or supports, a horizontally-arranged shaft or bar having a switch-carrier arranged thereon in sections, and supported in said bearings at its ends and between said sections, and means for operating the switch, substantially as set forth.

10. In combination with an angular bar or shaft, hollow switch-bodies having inwardly-projecting ribs engaging said bar or shaft, substantially as set forth.

11. In combination with a shaft or bar, a hollow switch-body constructed in parts and secured to said shaft, the said shaft being round in cross-section between said parts and supported in bearings thereat, substantially as set forth.

12. The combination with the box or chamber having a central and end walls or partitions constructed to receive removable journal-boxes, of said removable journal-boxes, and a switch-body having longitudinal treads on the outer sides, and provided with bearings journaled in said boxes, substantially as set forth.

13. An improved railroad-switch, comprising a horizontally-journaled rotary switch provided at one end with a ratchet-head, a rod or shaft carrying a pawl for engaging said head, connected with a solenoid-core, and a solenoid and its core and electrical connections, substantially as set forth.

14. An improved railway-switch, in which is combined, an intermittently-rotative switch having connection with a ratchet-head, a solenoid and its core, a rod secured to the core of said solenoid and having a pawl or projection engaging said ratchet-head, and means for holding said pawl or projection in operative position for engagement with the said ratchet-head, substantially as set forth.

15. The combination with a box or chamber having walls or partitions recessed at their upper edges, of journal-boxes seated in said recesses and having grooves to receive said partitions, a bar or shaft arranged in said journal-boxes and removable from the box or chamber, carrying a switch, the longitudinal treads of which are adapted to coincide with the branch and main rails alternately, substantially as set forth.

16. The combination with a horizontally-journaled rotary switch, a ratchet-head having locking-detents therein, a locking-pawl, an operating-pawl, means for holding said pawls in operative engagement with said ratchet-head, a solenoid actuating said operating-pawl, and means for giving return movement to the solenoid-core and its attachments when the electric circuit in which the said solenoid is connected, is broken, substantially as set forth.

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Witnesses:

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