

(No Model.)

D. DAVIS, Jr., & G. F. GALE.

SIGNAL OR CALL BOX.

No. 337,356.

Patented Mar. 2, 1886.

Fig:3.

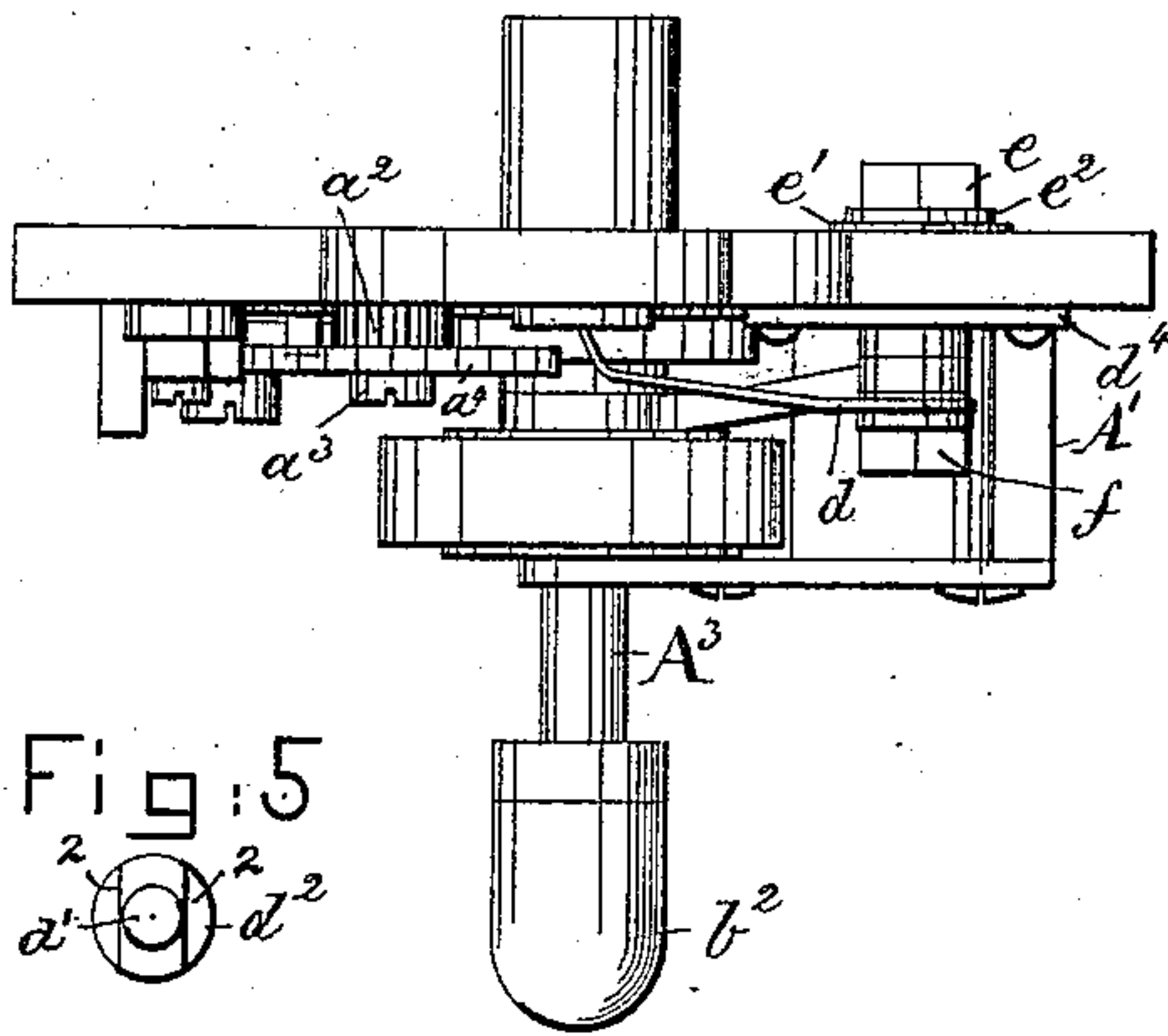


Fig:5

Fig:4.

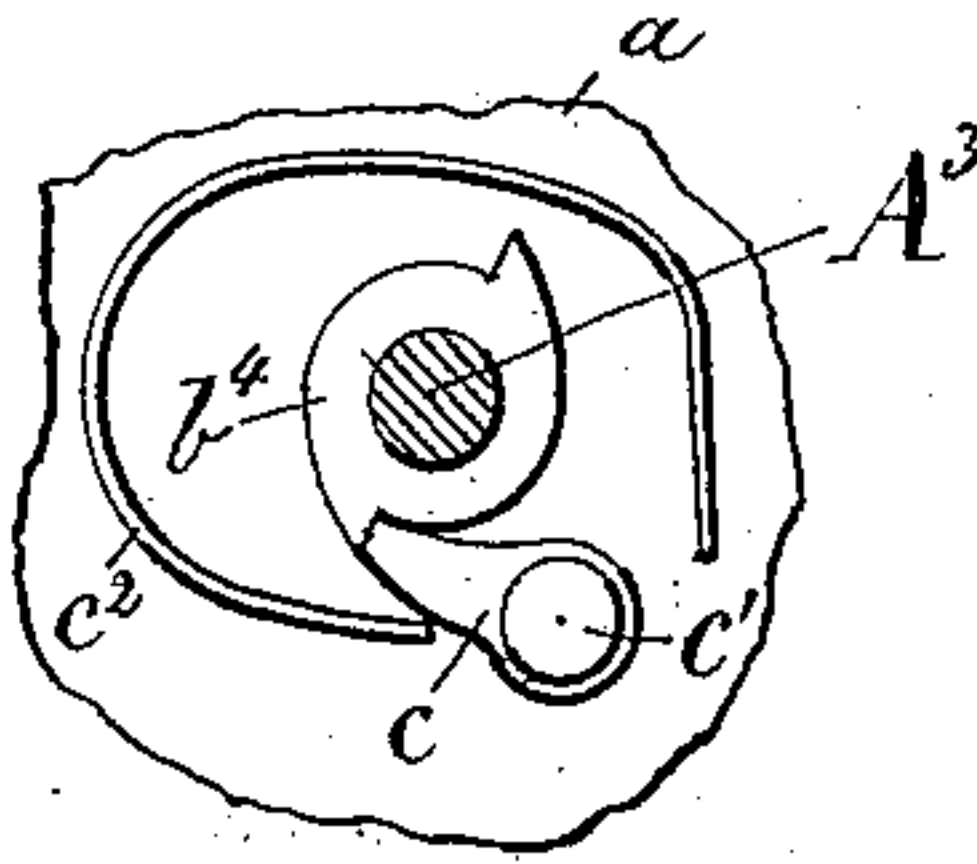


Fig:1.

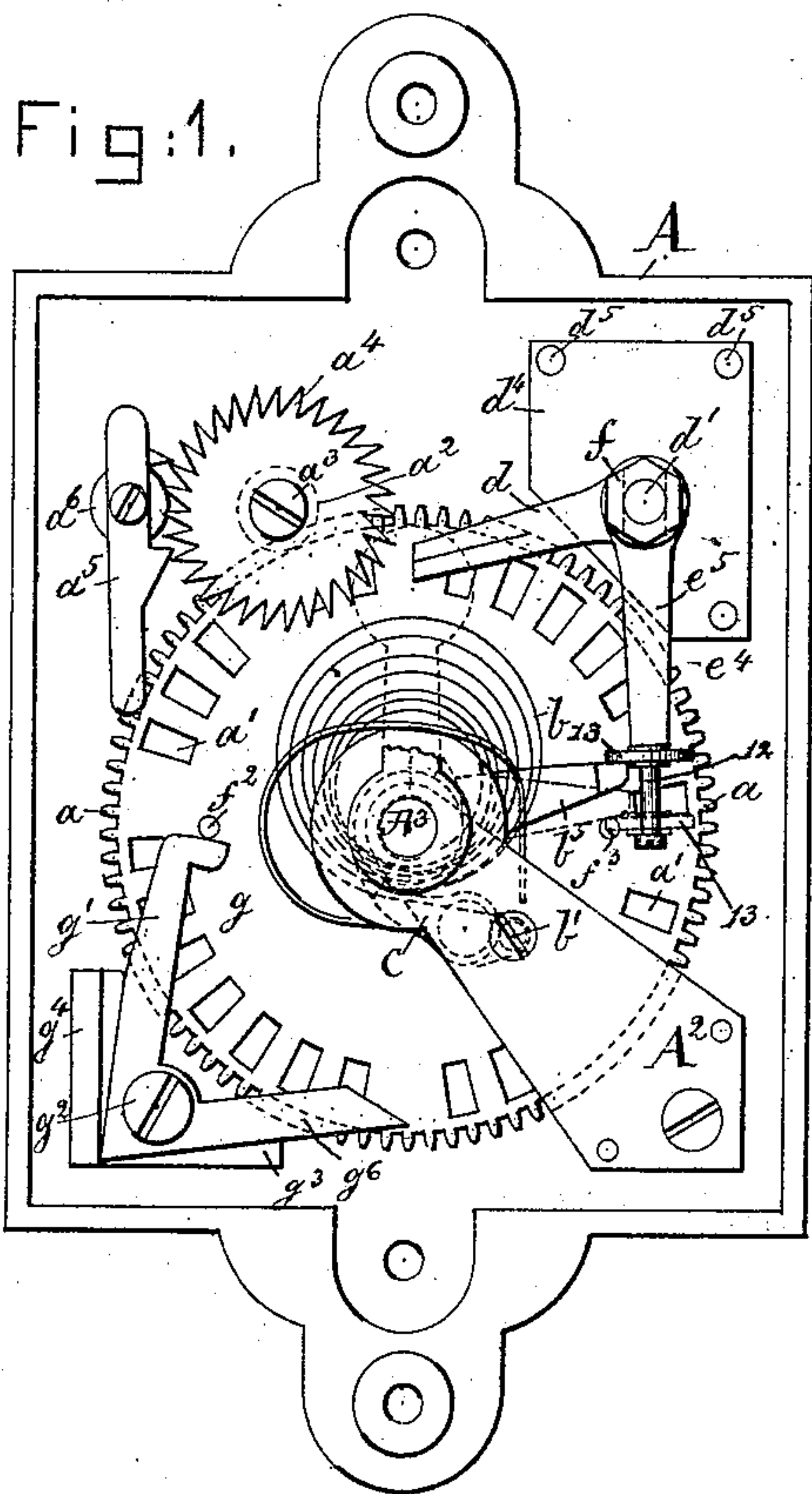
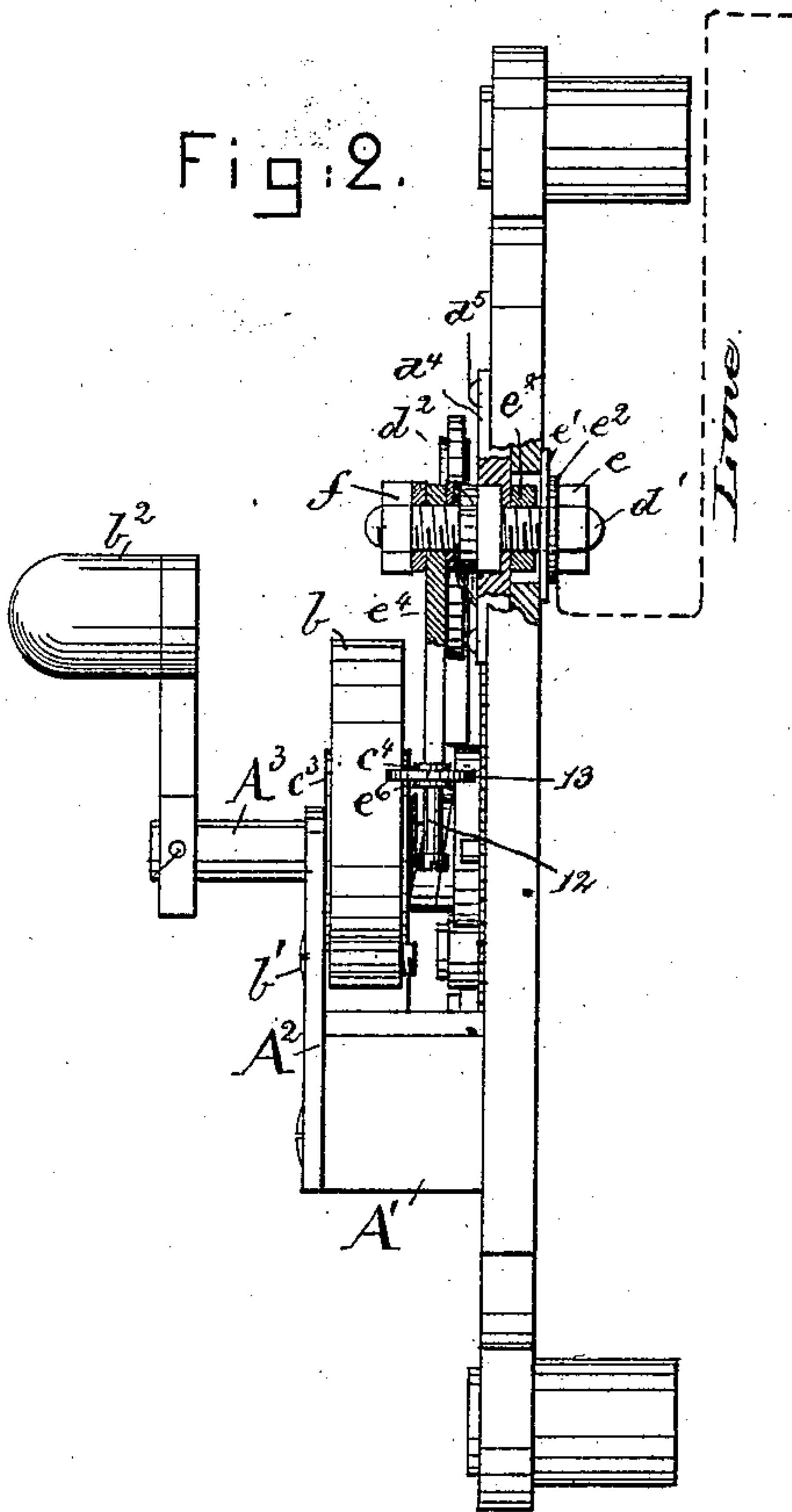


Fig:2.





# UNITED STATES PATENT OFFICE.

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## SIGNAL OR CALL BOX.

SPECIFICATION forming part of Letters Patent No. 337,356, dated March 2, 1886.

Application filed September 18, 1885. Serial No. 177,496. (No model.)

*To all whom it may concern:*

Be it known that we, DANIEL DAVIS, Jr., of Auburndale, in the county of Middlesex, and GEORGE F. GALE, of Revere, county of Suffolk, and State of Massachusetts, have invented an Improvement in Signal or Call Boxes, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to signaling apparatus, and is shown as embodied in a multiple call-box designed to be used in connection with a district signal or telegraph system wherein a series of signals may be sent from a distant or outlying station to a main or central office when messenger, police, or other similar service is desired.

In apparatus as heretofore constructed the usual break-wheel, provided with notches or breaks in its periphery corresponding in number to the number of the box or station, has been rotated by means of a train of gears which is actuated by a spring wound by turning the usual handle on the outside of the box while a pawl on the main gear engages a toothed hub on a shaft to which the said handle is fastened. The brush co-operating with the periphery of the break-wheel referred to is secured to an insulating-block fastened to the frame of the clock-work, and is connected by one wire to a bolt to which one of the line-wires is secured and by a second wire to one member of a cut-out or shunt for the said brush supported by, but insulated from, the frame of the clock, the other member of the said cut-out being secured to and moved out of contact with the first-mentioned member by the shaft of the main gear referred to. The apparatus above described is objectionable, inasmuch as the wires connecting the cut-out and the contact-brush with the bolt to which one of the line-wires is fastened, are frequently broken by the turning of the said bolt when the operator connects the said line-wire thereto, and also on account of the large number of parts comprising such apparatus.

Our invention consists in a call or signal box containing a large gear provided at its side, and preferably near its periphery, with

one or more repetitions of a series of slots, each series indicating the number of the box, and an arm beveled at its end and moved in unison with the said gear, combined with a brush adapted to bear upon the side of the said gear and with a stationary arm provided with a movable collar to co-operate with the arm referred to and form a cut-out or shunt, the said gear being rotated in one direction by a spring, the movable collar allowing the movable arm or cut-out member to be turned a little more than a full rotation, sufficiently to permit the usual pawl to engage an additional tooth of the ratchet, to send in a repetition of the signal, the said collar also serving as a stop for the said arm. The contact spring or brush which engages the surface of the gear referred to and the said stationary arm and its movable collar forming one member of the said cut-out are secured to a bolt provided with a collar of other than round shape, or a collar having part of its periphery cut away to fit into a slot in an insulating-block secured to the frame of the box, the said bolt being extended through the frame of the box and having one of the line-wires secured to it.

Our invention also consists in a gear having slots or openings, as will be described, pins or projections on it, and a shaft having an arm or member secured to it, combined with a safety-locking device, herein shown as composed of an elbow-lever, the latter normally engaging a pin or projection to hold the gear in place, the arm referred to acting upon and releasing the locking device at the desired time.

Figure 1 is a front elevation of a signaling box or apparatus embodying our invention, the cover of the box being removed; Fig. 2, a side elevation of Fig. 1, partially broken out; Fig. 3, a top view of Fig. 1; Figs. 4 and 5, details to be referred to.

The plate A forming the back of the box is provided with a lug, A', to which is secured a plate, A<sup>2</sup>, extended to near the center of the box, the plates A and A<sup>2</sup> forming bearings for a main shaft, A<sup>3</sup>.

The shaft A<sup>3</sup> has mounted upon it loosely a large gear, a, provided with groups of notches or slots a', located preferably near its circumference and corresponding in number to the



number of the box, the number herein shown being 732. The said gear is engaged by a pinion,  $a^2$ , loose on a stud,  $a^3$ , the pinion having connected with it an escape-wheel,  $a^4$ , with which co-operates the escapement-pallet  $a^5$ , pivoted on a stud,  $a^6$ , screwed into the plate A.

The gear  $a$ , at one side, is provided with a pawl,  $c$ , acted upon by a spring,  $c^2$ , which latter normally keeps the pawl in engagement with the toothed hub  $b^4$  fast on the shaft  $A^3$ . The gear  $a$  is also shown as having two pins or projections,  $f^2 f^3$ , to co-operate with a locking device to be described.

The shaft  $A^3$  is rotated by means of a main spring,  $b$ , one end of which is secured to the said shaft, while the other end of the said spring is secured to a pin,  $b'$ , supported by the plate  $A^2$ , the said spring being partially wound up by turning the shaft in one direction and being then released to enable the spring to rotate the said gear in usual manner. The shaft  $A^3$ , turned by the handle  $b^2$  secured to it, has on it annular disks  $c^3 c^4$ , to receive between them the spring  $b$ . The shaft  $A^3$  has fastened to it a toothed hub,  $b^4$ , and one arm or member,  $b^5$ , of a cut-out, to be described, the said toothed hub and cut-out member being preferably cast in one piece.

The contact brush or spring  $d$ , resting upon one side of the wheel or gear  $a$ , and which, by its action, is to control the signal on the line-wire while the gear  $a$  is being rotated by the spring  $b$ , is secured to one end of a bolt or screw,  $d$ , provided at or near its center with a collar,  $d^2$ , herein shown as made integral with the bolt and having its sides cut away, as at 2 2, as shown in Fig. 5, to enter a slot of the same shape in an insulating-block,  $d^1$ , secured by screws  $d^5$  to the plate A, the irregular or other than round shape given to the said collar preventing rotation of the bolt.

The bolt  $d'$  is herein shown as screw-threaded at both ends, one end of the bolt being extended through the frame A and having the line-wire secured to it by means of a nut,  $e$ , (see Fig. 2,) a bushing of insulating material,  $e'$ , separating the usual washer,  $e^2$ , from the plate A, a second nut,  $e^3$ , preventing longitudinal movement of the said bolt. The end of the bolt which has secured to it the contact-brush  $d$  has also secured to it the arm  $e^4$ , provided with the rod 12, having upon it a movable collar, 13, engaged by the movable cut-out arm or member  $b^5$ , the said collar and arm forming the second or stationary member of the cut-out or shunt, to be described, the said contact-brush and cut-out arm or member being securely held in their adjusted positions by the nut  $f$ .

Diametrically opposite on the gear  $a$  are two pins or studs,  $f^2 f^3$ , which are so located on the said gear that one of them will be engaged by a shoulder,  $g$ , of an arm,  $g'$ , of an elbow-lever pivoted at  $g^2$  to a stud or plate,  $g^3$ , also provided with a shoulder,  $g^4$ , against which the apex of the elbow-lever strikes to limit the forward movement of the arm  $g'$  and shoulder  $g$ .

This lever constitutes what we shall call a "safety-locking device." The shoulder  $g$  of the arm  $g'$ , shown as beveled at its end, is disengaged from the pin  $f^2$  by the cut-out arm or member  $b^5$ , also beveled at its end, which is rotated with the shaft  $A^3$  when the operator turns the handle  $b^2$  to set the apparatus in operation, the beveled shoulder  $g$  allowing the arm  $b^5$  to be moved one complete revolution and into the position shown in dotted lines in Fig. 1. Upon the operator releasing the handle  $b^2$  the spring  $b$  rotates the shaft  $A^3$ , cut-out arm or member  $b^5$ , and gear  $a$ , the said cut-out member  $b^5$  in its backward movement engaging the arm  $g'$  of the elbow-lever, moving the said lever so as to place the shoulder  $g$  again in the path of revolution of the pins  $f^2 f^3$ , the said shoulder being engaged by a pin immediately after the required signal has been transmitted to the central station, as will be described, thus forming a locking device or safety-stop and stopping further rotation of the gear, and the locking device or safety-stop preventing the wheel  $a$  from turning until the arm  $b^5$  and hub  $b^4$  have engaged the pawl  $c$  with the ratchet on the hub  $b^4$ , thus preventing a false registration, which might otherwise take place in consequence of friction between the shaft  $A^3$  and the wheel  $a$ . The movable collar 13, being moved into the dotted-line position, allows the pawl  $c$  to engage a second tooth of the hub  $b^4$ , to transmit the box-number twice in succession, which might indicate at the central office that a policeman was wanted at the box sending in the said signal.

It becomes obvious that the number of signals that can be given by each box is only limited by the number it is found practical to place on the gear  $a$ , and when the said gear is provided with more than two signals or calls, the cover of the box on the outside will have suitable marks to which the handle will be turned before releasing it, the said marks corresponding to known signals, as fire, &c.

The series of notches and the distances between them are of uniform size, and in order to utilize the whole surface of the wheel, to thereby obtain the greatest number of signals in said wheel, the collar 13 is made movable on the rod 12 to permit the wheel to be rotated a complete revolution.

Herein it will be observed that the wheel  $a$  for controlling the signal is not rotated with the shaft  $A^3$  when turned by the operator, and herein the said wheel is rotated intermittently in but one direction.

When the box is not being operated, the current which is led into it by a line-wire connected, as usual, with a screw secured to the back of the plate A, and not herein shown, has two return-paths to the other line-wire secured to the bolt  $d'$ , as described, one of the said paths being through the gear  $a$  and contact-brush  $d$ , which is the only path for the current, as soon as the operator commences to turn the handle to send a call, the breaks in the said circuit, caused by the slots  $a'$  passing un-



der the brush  $d$ , producing at the central office a signal characteristic of the box, all in well-known manner. The other circuit or path is through the shaft  $A^3$ , cut-out arm or member  $b^5$ , collar 13, and cut-out member  $e^4$ , co-operating with the member  $b^5$ , the latter circuit or path being a shunt or cut-out circuit for the brush  $d$ , and being in operation only while the box is not being used to transmit a call.

10 The turning of the shaft  $A^3$  by the operator to send a signal breaks this last-mentioned circuit by moving the member  $b^5$  from the collar 13, as described.

By connecting the contact-brush  $d$  and cut-out member  $e^4$  directly to the bolt or screw  $d'$ , to which the line-wire is attached outside the box, all danger is obviated of destroying the circuit of the said contact-brush by breaking the wire which joins the said brush to the bolt, to which the line-wire is secured in call-boxes as now constructed, the said accident frequently occurring when the line-wire is being attached to the said bolt.

In practice the outside of the box will be provided with suitable marks indicating the different wants—such as messenger, police, fire, &c., and to one of which marks the operator will turn the handle and then release it, as now practiced with the ordinary call-box to transmit to the central office the signal indicating the special want.

We do not desire to limit our invention to the exact form of movable collar or stop herein shown, whereby the toothed hub might be turned to place a tooth in position to be engaged by the pawl  $c$ , and for a box having but one call the collar may be omitted.

We claim—

1. In a signal-transmitter, a gear provided at its side with slots  $a'$ , and a contact-brush,  $d$ , and the shaft  $A^3$ , and arm  $b^5$ , combined with the arm  $e^4$ , the brush referred to bearing upon the side of the gear, substantially as described.

2. In a signal-transmitter, a gear provided at its side with slots  $a'$ , and a contact-brush,  $d$ , and the shaft  $A^3$ , and arm  $b^5$ , combined with the arm  $e^4$  and its movable collar to allow the handle to be turned as described, the combination being and operating substantially as described.

3. In a signal-transmitter, a gear provided at its side with slots  $a'$ , and having one or more pins or projections, and a contact-brush,  $d$ , and the shaft  $A^3$ , and arm  $b^5$ , combined with a safety-locking device to be operated by the

arm  $b^5$ , and to co-operate with the said pins or projections, substantially as described.

4. The gear  $a$ , provided with slots  $a'$  and having one or more pins or projections, and a contact-brush,  $d$ , and the shaft  $A^3$  and arm  $b^5$ , combined with a safety-locking device to be operated by the arm  $b^5$  and to co-operate with the said pins or projections, and means, substantially as described, to move the said locking device into position to engage the said pins or projections when the box is set in operation, substantially as and for the purpose set forth.

5. In a signal-transmitter, a contact-brush and a stationary arm forming one member of a cut-out or shunt and a bolt screw-threaded at both ends and provided with an irregular or other than round collar, combined with an insulating-block having an opening to receive the said collar, and with means, substantially as described, to hold the said bolt in place and to connect the said brush and arm, and also the line-wire with the said bolt, substantially as set forth.

6. The gear  $a$ , provided with slots  $a'$ , and having one or more pins or projections, and a contact-brush,  $d$ , and the shaft  $A^3$ , arm  $b^5$ , and arm  $e^4$ , and movable collar 13, combined with the bolt  $d'$ , provided with an irregular or other than round collar,  $d^2$ , and means, substantially as described, to secure the said arm and brush to the said bolt, and the insulating-plate  $d^1$ , provided with an opening to correspond with and receive the said collar and prevent movement of the bolt, substantially as described.

7. In a signal-transmitter, a shaft, a toothed hub thereon, a spring to rotate the said shaft, a toothed gear provided with slots  $a'$ , an arm,  $b^5$ , connected with the said shaft, and a spring to hold the said pawl in engagement with a tooth of the said hub, combined with a brush and an arm,  $e^4$ , and collar 13, to co-operate with the arm  $b^5$  and form a stop and cut-out or shunt, and with a pinion, ratchet, and detent, the pinion being engaged by the teeth of the said wheel, to operate substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

DANIEL DAVIS, JR.  
GEO. F. GALE.

Witnesses:

B. J. NOYES,  
F. CUTTER.