

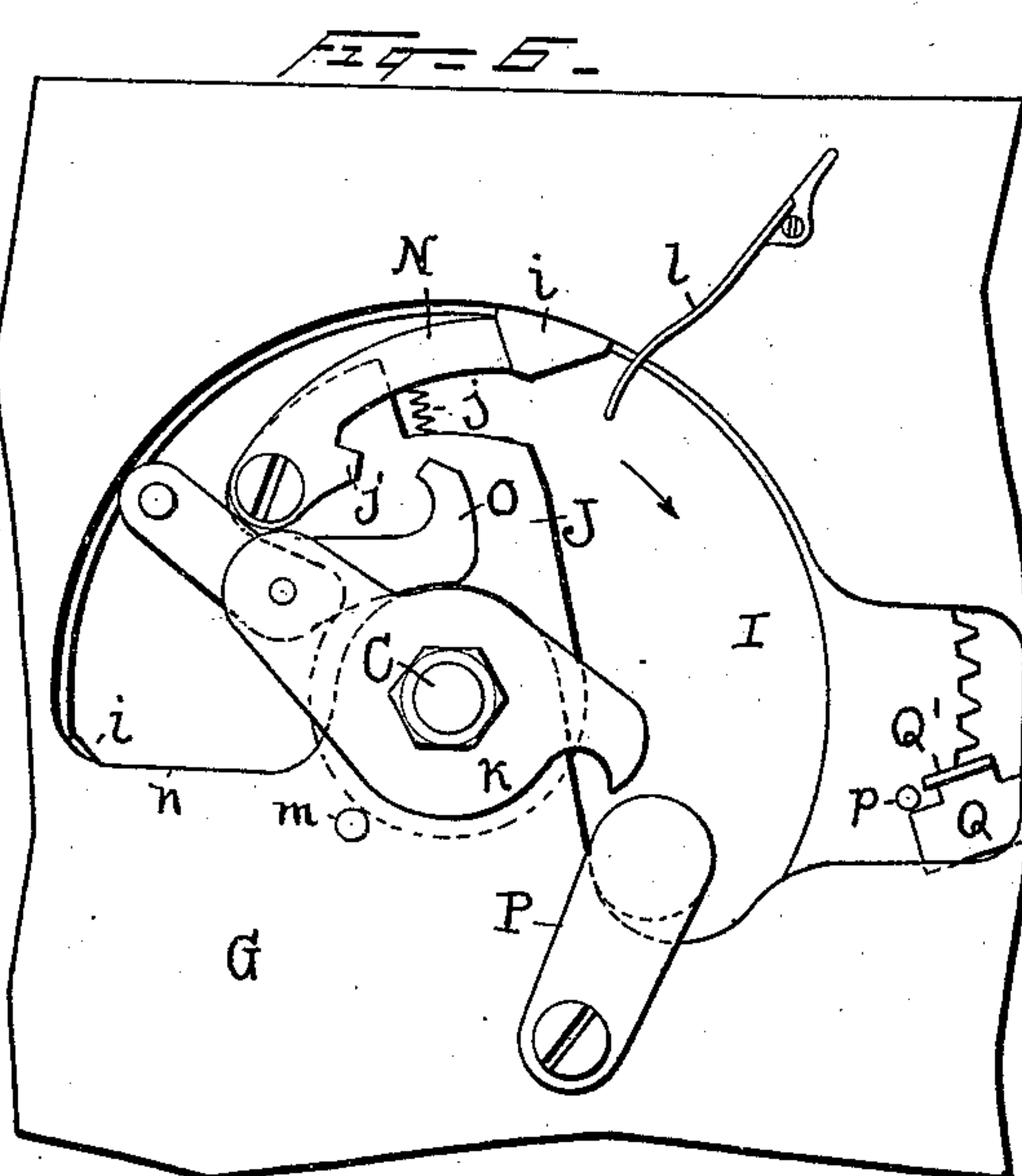
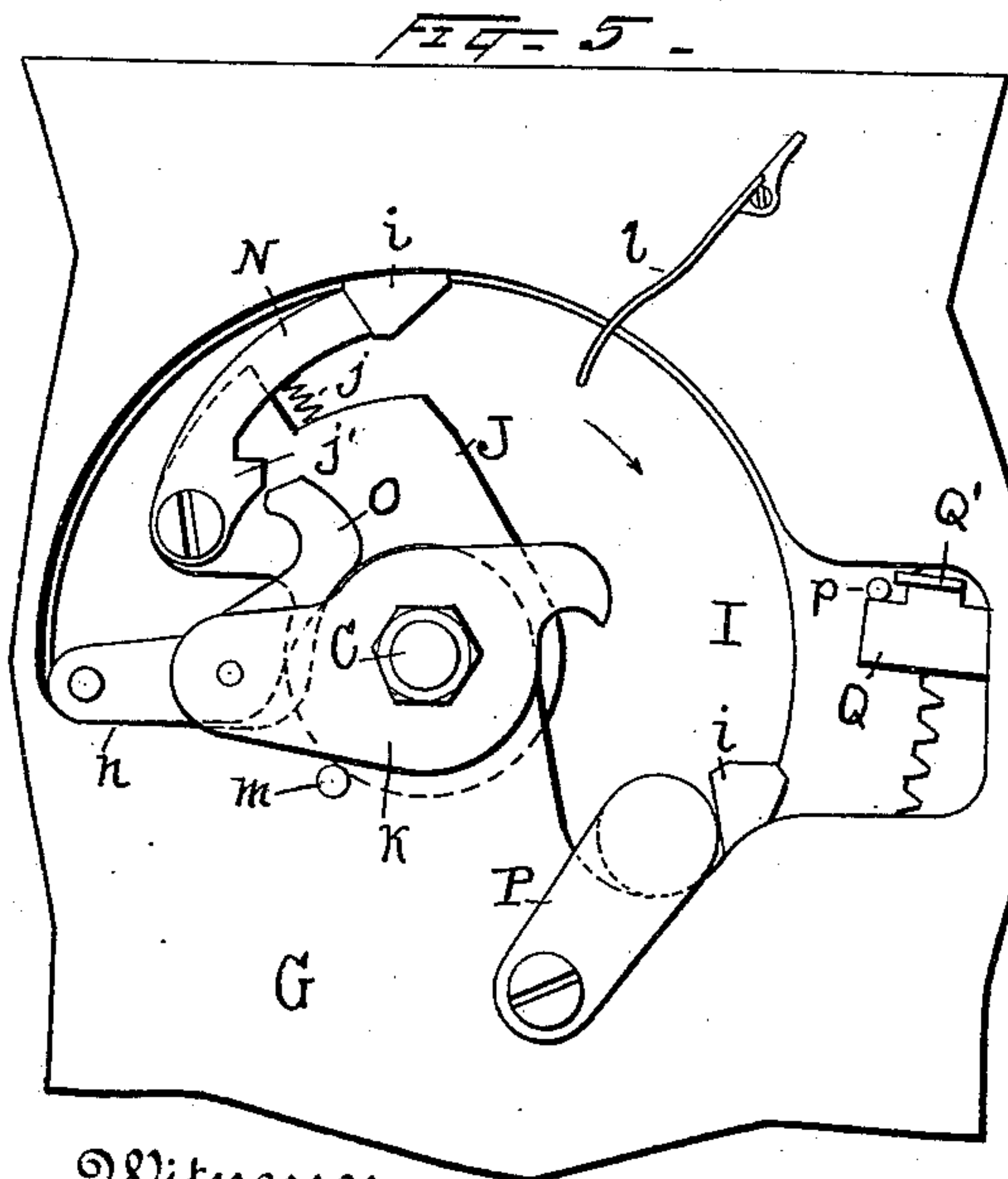
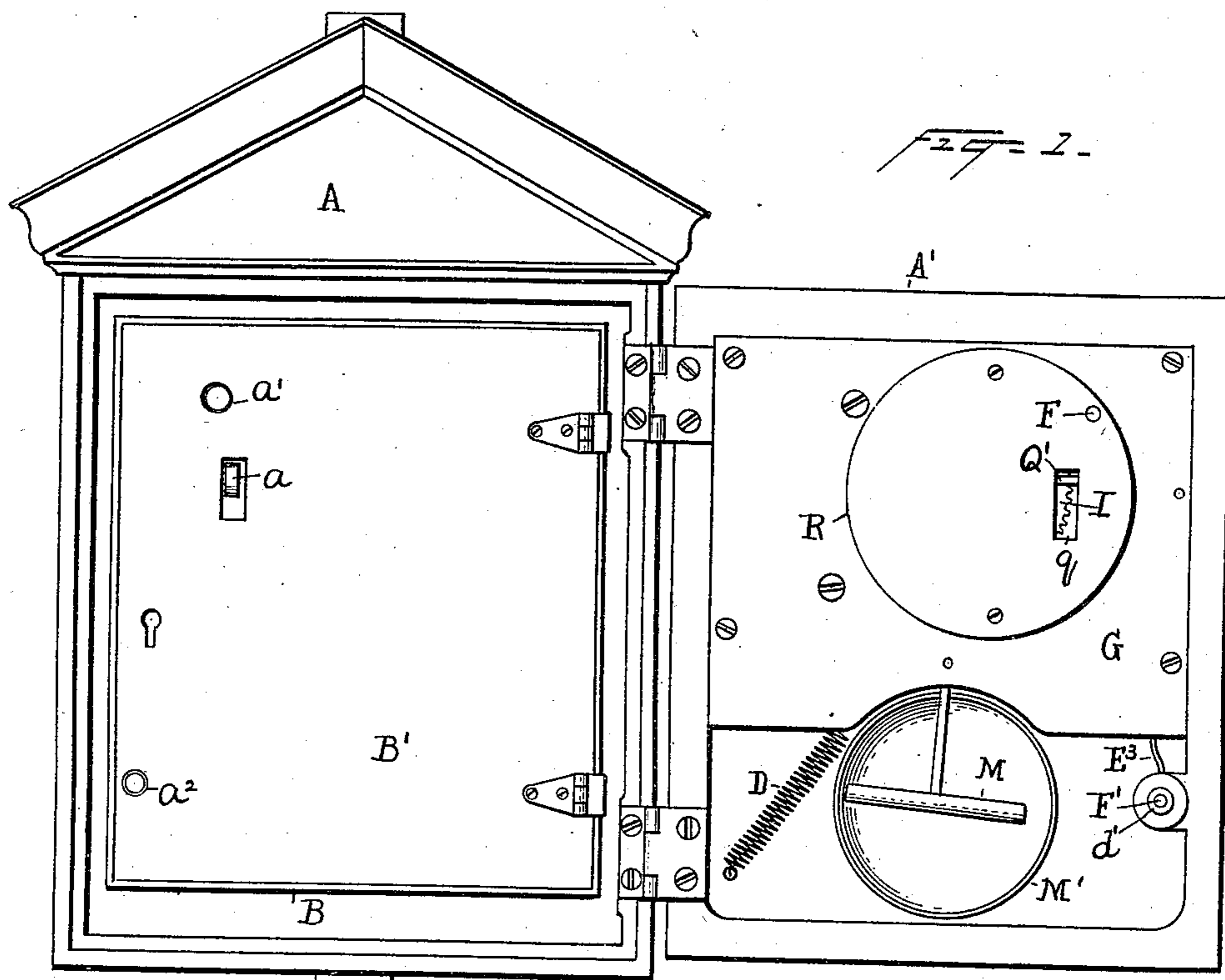
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4 Sheets—Sheet 1.

N. H. SUREN.
KEYLESS FIRE ALARM TELEGRAPH BOX.

No. 552,153.

Patented Dec. 31, 1895.



Witnesses
Morris A. Clark.
John R. Taylor.

Inventor
Nathan H. Suren
By his Attorneys Syer & Seely

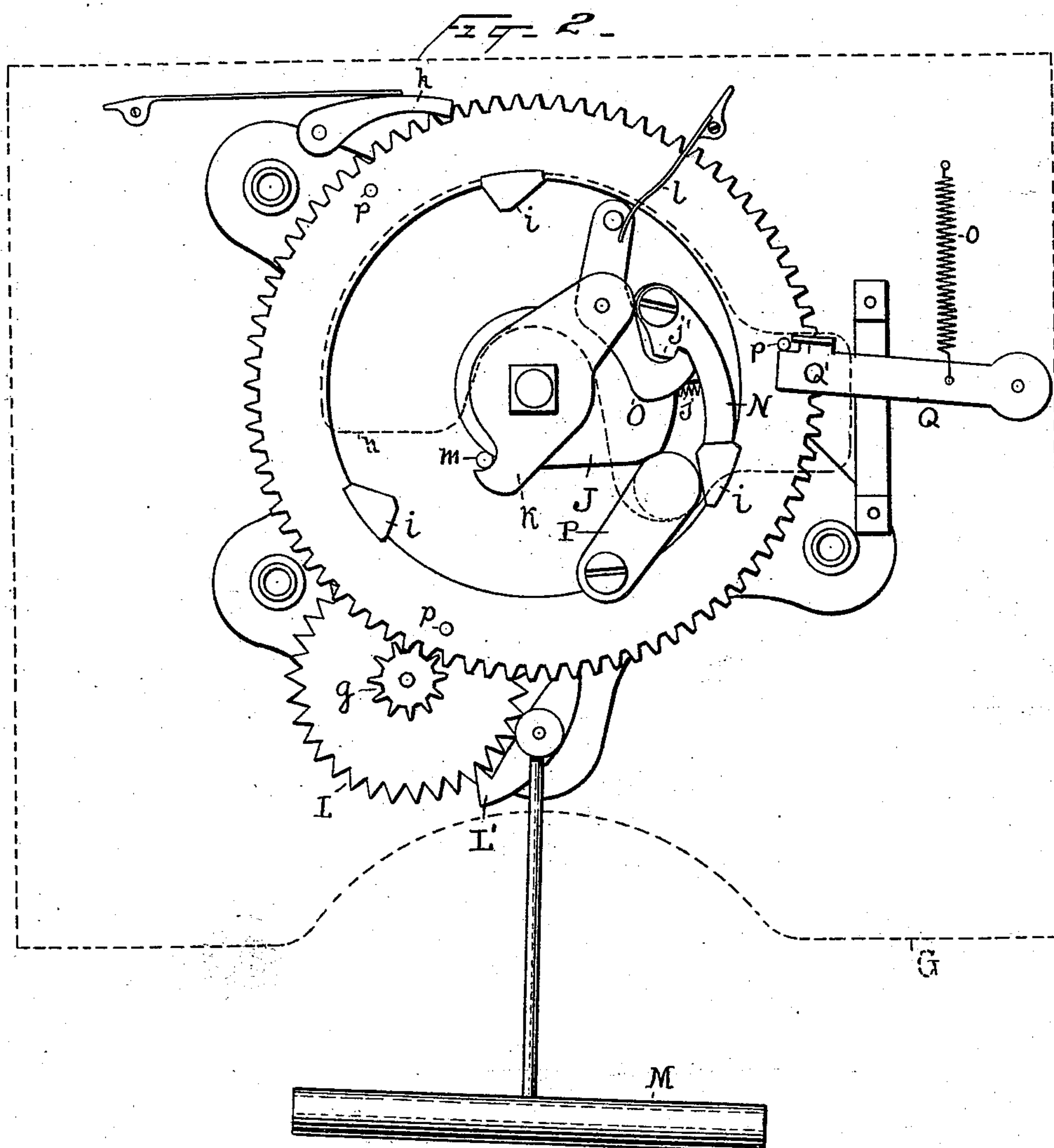
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John R. Taylor.

Inventor
Katham H. Suren.
By his Attorneys
Dyer & Kelly

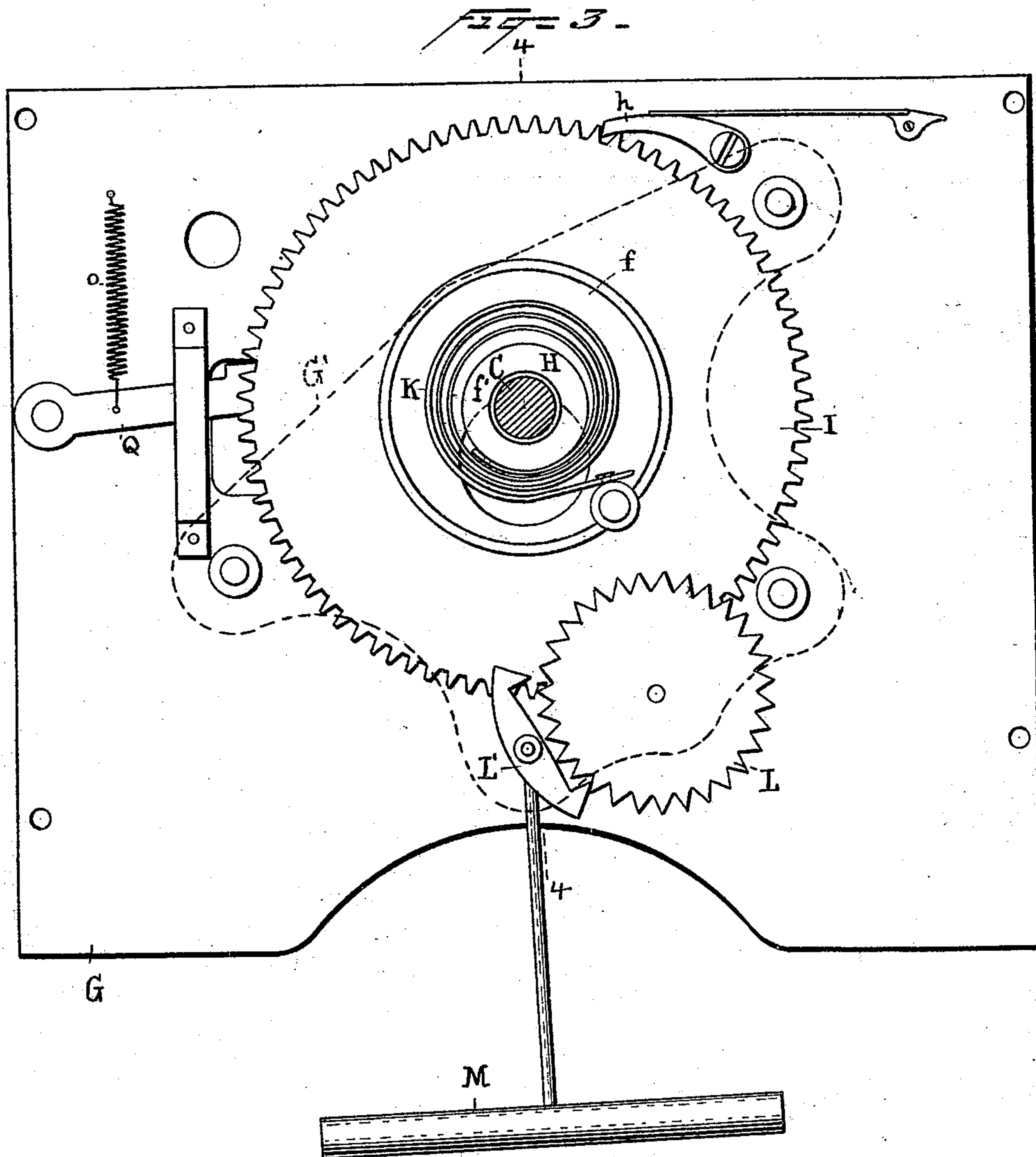
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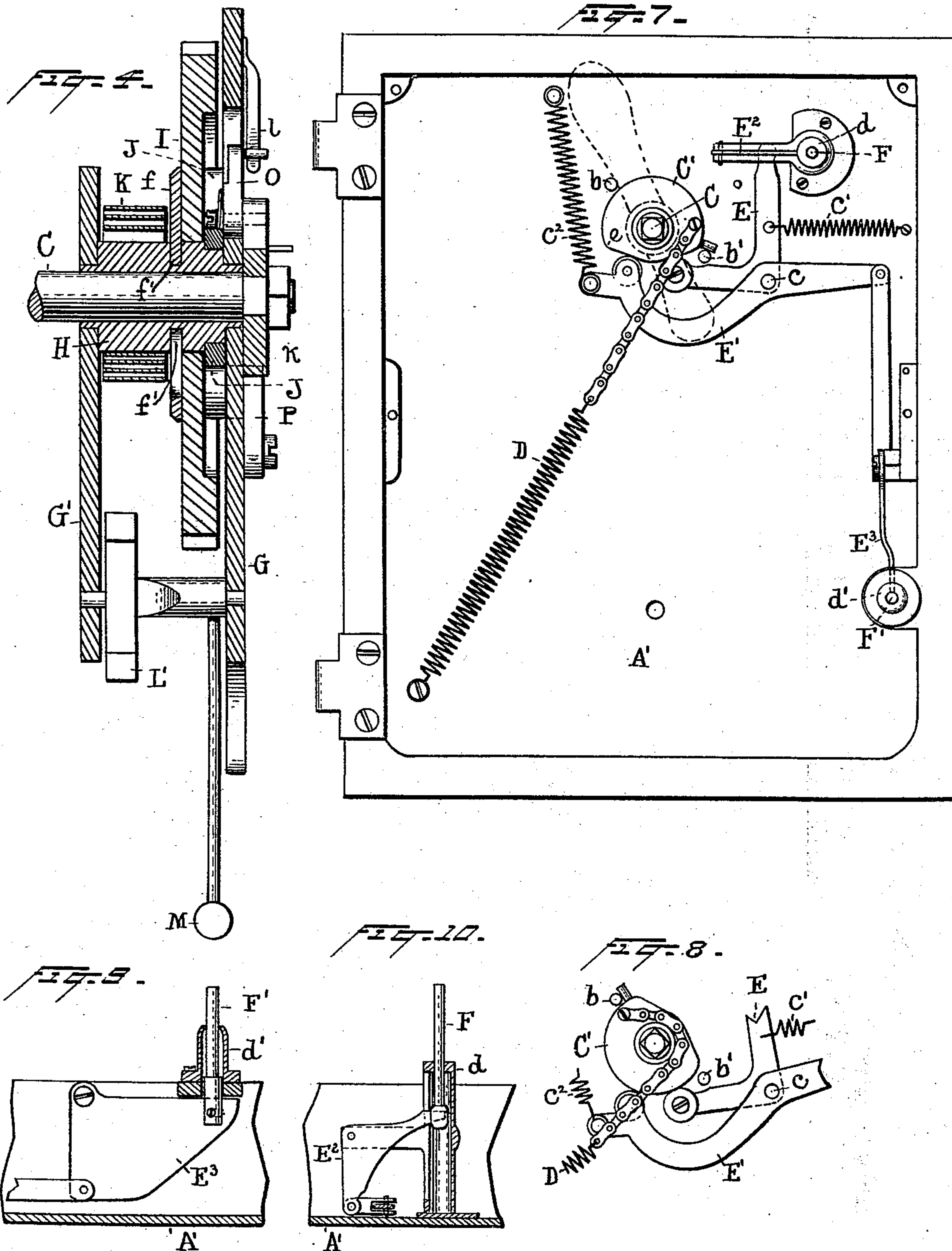
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By his Attorneys
Dyer & Seely

UNITED STATES PATENT OFFICE.

NATHAN H. SUREN, OF NEW YORK, N. Y., ASSIGNOR TO THE GAMEWELL
FIRE-ALARM TELEGRAPH COMPANY, OF SAME PLACE.

KEYLESS FIRE-ALARM-TELEGRAPH BOX.

SPECIFICATION forming part of Letters Patent No. 552,153, dated December 31, 1895.

Application filed March 8, 1895. Serial No. 540,945. (No model.)

To all whom it may concern:

Be it known that I, NATHAN H. SUREN, a citizen of the United States, residing at New York city, in the county and State of New York, have invented a certain new and useful Improvement in Keyless Fire-Alarm-Telegraph Boxes, of which the following is a specification.

Heretofore keyless fire-alarm-telegraph boxes have been constructed in which the turning of the handle mechanically operates an alarm-bell at the box, attracting attention to the fact that the box is being operated, and at the same time unlocks the door of the box so that the box can be pulled by the operator. Keyless boxes have also been constructed in which the turning of the handle, instead of unlocking the door, pulls the hook of the box and also mechanically operates an alarm at the box, attracting attention. The latter boxes have also been provided with a device operated by the handle which withdraws the stud holding the armature of the non-interfering magnet in the field of the magnet, this withdrawal of the stud releasing the armature a sufficient length of time in advance of the pulling of the hook to make it certain that the box will be disabled by the breaking of the circuit by another box already in operation. In both classes of boxes referred to the alarm-bell operates continuously during the turning of the handle, the pallet-wheel which works the bell-hammer being turned in one direction by the operator against the tension of a spring which turns both the handle and the pallet-wheel backward to the position of rest. Thus the alarm-bell begins to ring the minute the handle is moved. These boxes have been objectionable for the reason that the operator frequently fails to turn the handle far enough to open the door or pull the hook of the box, thinking when he hears the box-alarm sound that the box has been set in operation.

The object of my invention is to improve boxes of this character by so constructing the mechanism that the local or box alarm will not sound until the handle has been turned far enough to trip the mechanism and set it in operation beyond the further control of the operator.

A further object is to provide a mechanism which will be simple in construction and absolutely certain in operation.

A still further object is to provide boxes of this character with means for operating the cut-out switch by the handle mechanism, as well as for operating the non-interference devices, and to do this in a proper sequence so that the cut-out switch will be shifted, turning current into the box and energizing the non-interference magnet before the armature of that magnet is released.

The invention consists in the several devices and combinations of parts hereinafter described, and more particularly set forth in the claims.

In the accompanying drawings, forming a part hereof, Figure 1 is a view of the box with the door open, showing the inside of the outer door which carries the mechanism operated by the handle. Fig. 2 is a view of the handle-operated mechanism from the inner side of the door with the face-plate shown in dotted lines to disclose the mechanism. Fig. 3 is a view from the other side of the mechanism—i. e., the side toward the front of the box—with the retaining-plate shown in dotted lines and the handle-shaft in section. Fig. 4 is a section on line 4 4 of Fig. 3. Figs. 5 and 6 are plan views showing other positions of the operating-dogs. Fig. 7 is a view of the inside of the outer door of the box with the spring mechanism and bell removed, showing the cam and levers for operating the non-interfering and switch studs. Fig. 8 is a view showing the cam which operates the non-interfering and switch studs moved to withdraw such studs; and Figs. 9 and 10 are sections disclosing the bell-crank levers which are directly connected with the switch and non-interfering studs, respectively.

A is the outer box, having a door A', which is made as a shell of some depth to receive the mechanism operated by the handle and is locked by a key in the manner common with keyless boxes which pull the hook by the movement of the handle. The inner box B is closed by a door B' and contains the usual apparatus. The hook *a*, by pulling which the box is set in operation to transmit an alarm to the central office, projects through

the door B' of the inner box. Openings $a' a^2$ in the door B' give access to studs which control the non-interference armature and the cut-out switch, as will be well understood. 5 These devices are ordinarily operated by studs on the inner side of the door of the outer box, which studs, by the closing of the door, enter the holes $a' a^2$ and push inwardly the plungers within the inner box, and by 10 the opening of the door release the plungers within the inner box. These devices require no further description, because they are of the ordinary construction which is employed in what are known as the standard "Gardiner" 15 boxes manufactured and sold by the Gamewell Fire-Alarm Telegraph Company. It is only necessary to mention them because the mechanism which embodies my invention is provided with a latch which operates the 20 pull-hook a and with studs which are projected into and withdrawn from the openings $a' a^2$ to operate the non-interfering and cut-out devices without opening the door of the box and simulating in their movement the 25 studs upon the outer door of the standard key-boxes, which door has to be opened before the box can be pulled.

I will first describe the devices for operating the non-interfering and switch studs with 30 reference particularly to Figs. 7, 8, 9 and 10. The handle (shown in dotted lines in Fig. 7) is secured to the end of a shaft C, which projects through the outer door A'. Upon this shaft on the inner side of the door A' and 35 close to the shell of the door is fixed a cam C' whose movement is limited by stops $b b'$. A spring D is connected by a chain with a pin on the cam near its periphery and returns the cam, together with the shaft and the handle, 40 to the position of rest shown in Fig. 7. The other position of the parts is shown in Fig. 8, this being the position which the parts assume when the handle is turned by the operator one-third of a revolution, which is permitted by the stops $b b'$. 45

E E' are levers which are pivoted at the point c , and have at their inner ends rollers resting against the periphery of the cam C'. These levers are returned to their normal position by springs $c' c^2$. The outer ends of the 50 levers are connected by links with bell-cranks $E^2 E^3$, which are connected at their other ends with the non-interfering and switch studs F F', which move back and forth in suitable guiding-sleeves $d d'$. It will be seen that the lever E' bears upon the cam C' in advance of the lever E so that in the forward turning movement of the cam the lever E' will first ride over the point e of the cam and the switch-stud F' will be drawn inwardly before the 60 lever E, which moves the non-interference stud F, comes in contact with the forcing surface of the cam. By this means it is made certain that the switch-stud will first be withdrawn, shifting the cut-out switch and throwing the non-interfering magnet into circuit 65 before the armature of the non-interfering

magnet is released by the withdrawing of the non-interfering stud.

The bell-ringing and hook-operating mechanism is confined between a face-plate G and 70 back plate G', and is placed in the cover A' from the inner side, covering the cam and levers which have been described and which lie close to the shell of the cover.

H is a sleeve set between the plates G G' 75 and having reduced ends which pass through such plates. The handle-shaft C passes through this sleeve and is free to rotate therein. Upon the sleeve H is mounted a cog-wheel I, which is loose upon the sleeve and 80 is retained in position thereon by a retaining-plate f engaging with a groove f' in the sleeve H. Between the face of the cog-wheel I and the plate G is an arm J, which is rigidly secured to the sleeve H. The main spring K is 85 located between the cog-wheel I and the back plate G'. This spring is secured at its inner end to the sleeve H and at its outer end to a stud projecting inwardly from the back plate 90 G'. The spring K is placed under a strong initial tension. The pallet-wheel L is geared by a pinion g with the cog-wheel I and operates a pallet L', which carries the bell-hammer M acting, when oscillated, to strike the 95 bell M'. A pawl h engages the teeth of the cog-wheel I and permits the movement of that wheel only in one direction—i. e., in the direction in which it is driven by the main spring K—as will be presently explained. The 100 cog-wheel I is provided with three ratchet-shoulders i on its face which are formed of steel pins passing through the cog-wheel.

N is a square-end pawl carried by the arm J and engaging the ratchet-shoulders i . This 105 pawl is thrown outwardly by a light spring j and is provided with a tailpiece j' for a purpose to be presently explained.

The end of the handle-shaft C where it projects beyond the face-plate G is squared and 110 is provided with an arm k which turns with the handle-shaft. Upon the under side of this arm is pivoted a dog O having a hook-shaped end engaging the tailpiece j' of the pawl N, and also provided with an extension 115 on the other side of its pivot which strikes against a spring l in the position of rest of the parts. A pin m on the face-plate G limits the movement of the arm k which carries the dog O. 120

P is a stop which is pivoted to the face-plate G and carries at its free end a rounded hub extending inwardly close to the face of the cog-wheel I and engaging with the ratchet-shoulders i on said cog-wheel, holding the same in 125 the position of rest of the parts. The arm J also strikes the stop P and is arrested by said stop, limiting the movement of the arm in the direction in which it is driven by the main spring. The normal position of the parts is 130 that shown in Fig. 2, the dog O being locked to the pawl N, and the stop P being jammed between the arm J and one of the ratchet-shoulders i . The initial tension of the main

spring K being exerted upon the arm J and pawl N, both the arm J and the ratchet-shoulder *i*, with which the pawl N is in engagement, are pressed firmly against the rounded end of the stop P. The turning of the handle by the operator throws the arm *k* carrying the dog O around to the left. The dog O being locked to the pawl N, the dog O carries the pawl N with it around to the left, thereby winding up the main spring K through the arm J and the sleeve H to which the arm J is rigidly secured. When this movement is about completed, the tailpiece of the dog O strikes the shoulder *n* on the face-plate G, tripping the dog and withdrawing it from engagement with the pawl N, which pawl springs outwardly back of one of the ratchet-shoulders *i* of the cog-wheel I, as shown in Fig. 5. The pawl N being released from the dog O is now entirely beyond the control of the operator and is under the control of the main spring K, which, through the sleeve H, arm J and pawl N, turns the cog-wheel I in the direction in which the hands of a clock move, looking at the cog-wheel from the inner side of the door A, as shown in Fig. 5. The handle being released by the operator, the handle-shaft is turned backward by the spring D, causing the dog O to strike against and follow the pawl N, as shown in Fig. 6. This movement continues until the ratchet-shoulder *i* and the arm J both engage with the stop P, and the tail of dog O engages the spring *l* when the parts come to rest, as shown in Fig. 2. The handle when released is not allowed to at once resume its normal position, but the dog O strikes the pawl N and arrests the return movement of the handle, permitting the cut-out switch to be locked by the box mechanism, as will be understood, before the stud F' is again thrown forward. The rotation of the cog-wheel I operates the bell-hammer and sounds an alarm. It will be seen that the cog-wheel I has a movement only in one direction, and that it does not begin to move until after the mechanism which is wound up by turning the handle is tripped and released from the handle so as to be beyond the control of the operator working the handle. When the dog O releases the pawl N by engagement with the shoulder *n*, the point of the pawl N has passed a short distance beyond the ratchet-shoulder *i*, and when released springs forward and strikes the ratchet-shoulder. In doing this, the tailpiece *j'* of the pawl N passes the point of the dog O, and forces the pawl outwardly with a positive movement, so that if the spring *j* should not be effective the parts will still operate.

Q is a lever pivoted on the rear side of the face-plate G and drawn upwardly by a spring *o*. The lever Q has a finger Q', projecting through the face-plate G and engaging with the pull-hook *a* of the box. Three pins *p* on the cog-wheel I strike the free end of the lever Q and force it downwardly until the pin clears

the end of the lever, when the lever is drawn upwardly again by its spring. The movement of the finger Q' which is thus produced operates the pull-hook of the box. In the position of rest of the parts the finger Q' is in its elevated position, and one of the pins *p* is in contact with the end of the lever Q, as shown in Figs. 2, 3, and 5. The depressed position of the lever is shown in Fig. 6.

The cover R, Fig. 1, may be used to cover the exposed parts of the mechanism. This cover is provided with a slot *q*, through which the pull-hook *a* projects to engage with the finger Q'.

The operation of the parts will be understood from the description already given.

The sequence of operations is as follows: The operator turns the handle as far as the limiting-stops permit, which is one-third of a revolution. In doing this the switch-stud F' is first withdrawn and afterward the non-interfering stud F. At the same time the dog O carries the pawl N around, winding up the main spring K until the dog O is tripped, releasing the pawl N. The parts operated by the main spring have now been released from the control of the operating-handle, and returning to their normal position they serve to ring the bell through the rotation of the cog-wheel I and the pallet-wheel L, and to pull the hook through the movement of the pull-finger Q'. The handle being released by the operator, the non-interfering and switch studs are projected forward again in the order named and the dog O again engages with the pawl N.

What I claim is—

1. In a keyless fire alarm signal box, the combination with the operating handle of a spring mechanism which is wound up by the movement of the handle, a trip releasing said spring mechanism from the handle after a definite movement of the handle, and an alarm bell operated by the spring movement after it is released from the operating handle, substantially as set forth.

2. In a keyless fire alarm signal box, the combination with the operating handle of a spring mechanism which is wound by the movement of the handle, a trip releasing said spring mechanism from the handle after a definite movement of the handle, and a device for operating the signal mechanism which is moved by said spring mechanism after it is released from the operating handle, substantially as set forth.

3. In a keyless fire alarm signal box, the combination with the operating handle of a spring mechanism which is wound by the movement of the handle, a trip releasing said spring mechanism from the handle after a definite movement of the handle, an alarm bell at the box, and a device for operating the signal mechanism, both said alarm bell and said signal operating device being worked by the spring mechanism after it is released from

the operating handle, substantially as set forth.

4. In a keyless fire alarm signal box, the combination with the operating handle, of a
5 pawl driven in one direction by a main-spring, a dog engaging said pawl and moved by the operating handle for retracting the pawl and winding up the main spring, a tripping shoulder disengaging the pawl and dog at the end
10 of a definite movement of the operating handle, and a wheel having ratchet shoulders with which said pawl engages, the movement of said wheel serving to operate the alarm bell and the pull-hook, substantially as set
15 forth.

5. In a keyless fire alarm signal box, the combination with the operating handle of a sleeve on said handle, the main-wheel turning on said sleeve, the main-spring connected
20 with said sleeve, a pawl operating the main-wheel carried by said sleeve, and the catching and releasing dog operated by said handle, substantially as set forth.

6. In a keyless fire alarm signal box, the
25 combination with the main-wheel I, having ratchet shoulders *i*, of the arm J, the main-spring connected with said arm, the arm *k* moved by the handle, the pawl N, dog O, and stop P, substantially as set forth.

30 7. In a keyless fire alarm signal box, the combination with the main-wheel I, having a movement in one direction, of the spring lever Q and finger Q' for pulling the hook of the signaling mechanism, said lever and fin-
35 ger being operated by pins on the main-wheel, substantially as set forth.

8. In a keyless fire alarm signal box, the combination with the handle shaft C of the sleeve H, cog-wheel I, arm J, main-spring K,
40 pallet wheel and bell-hammer pallet L L', arm

k, pawl N, dog O and stop P, substantially as set forth.

9. In a keyless fire alarm signal box, the combination with the cutout switch of the box, of the operating handle, and a stud with-
45 drawn by the movement of the operating handle and co-operating with the cutout switch, substantially as set forth.

10. In a keyless fire alarm signal box, the combination with the operating handle of
50 studs operating the cut-out switch and non-interfering devices of the box, said studs being withdrawn successively by the movement of the operating handle, substantially as set forth.

11. In a keyless fire alarm signal box, the combination with the operating handle and its shaft moved in one direction by a spring, of a cam upon said shaft, levers engaging said
60 cam in succession, and switch and non-interfering studs worked by said levers, substantially as set forth.

12. In a keyless fire alarm signal box, the combination with the operating handle of a
65 spring mechanism which is wound and tripped by the movement of said handle, a device operating the signaling mechanism and an alarm bell worked by said spring mechanism after being released from the handle, and switch
70 and non-interfering studs which are withdrawn by the movement of the handle before said spring mechanism is released, substantially as set forth.

This specification signed and witnessed this 6th day of March, 1895.

NATHAN H. SUREN.

Witnesses:

W. PELZER,
EUGENE CONRAN.