

No. 898,095.

PATENTED SEPT. 8, 1908.

F. W. COLE.
SIGNAL BOX.

APPLICATION FILED JULY 10, 1906.

3 SHEETS—SHEET 1.

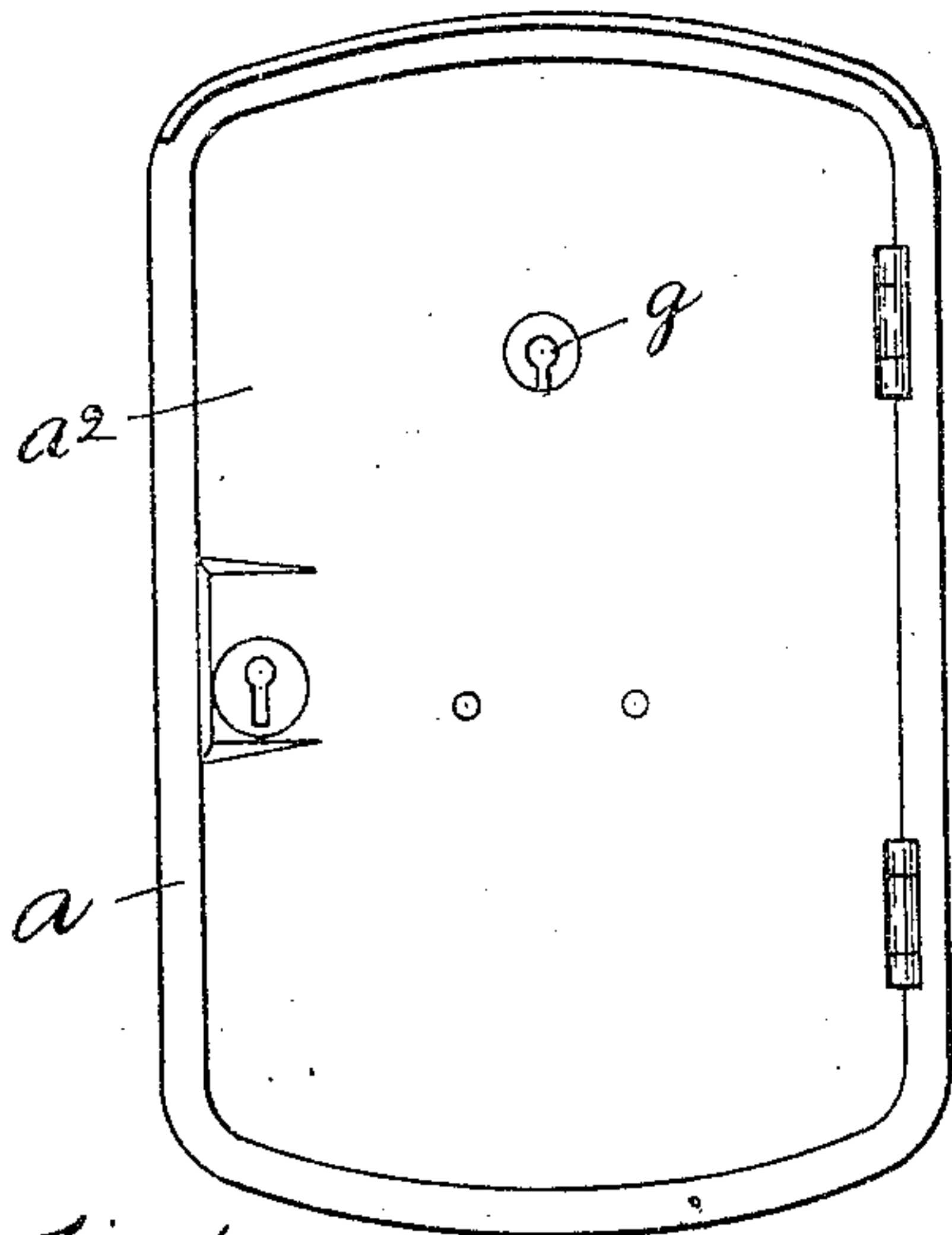


Fig. 1.

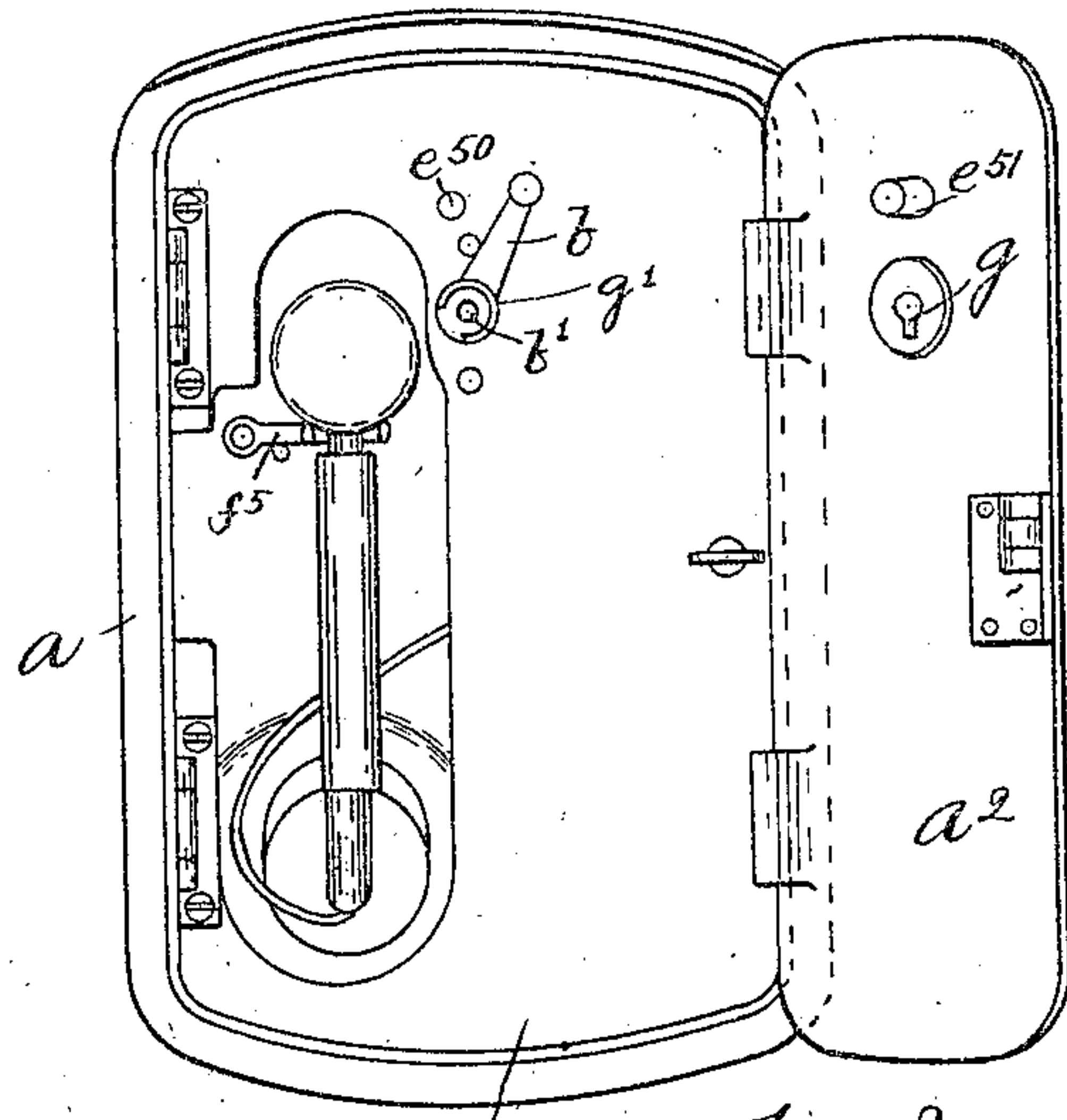


Fig. 2.

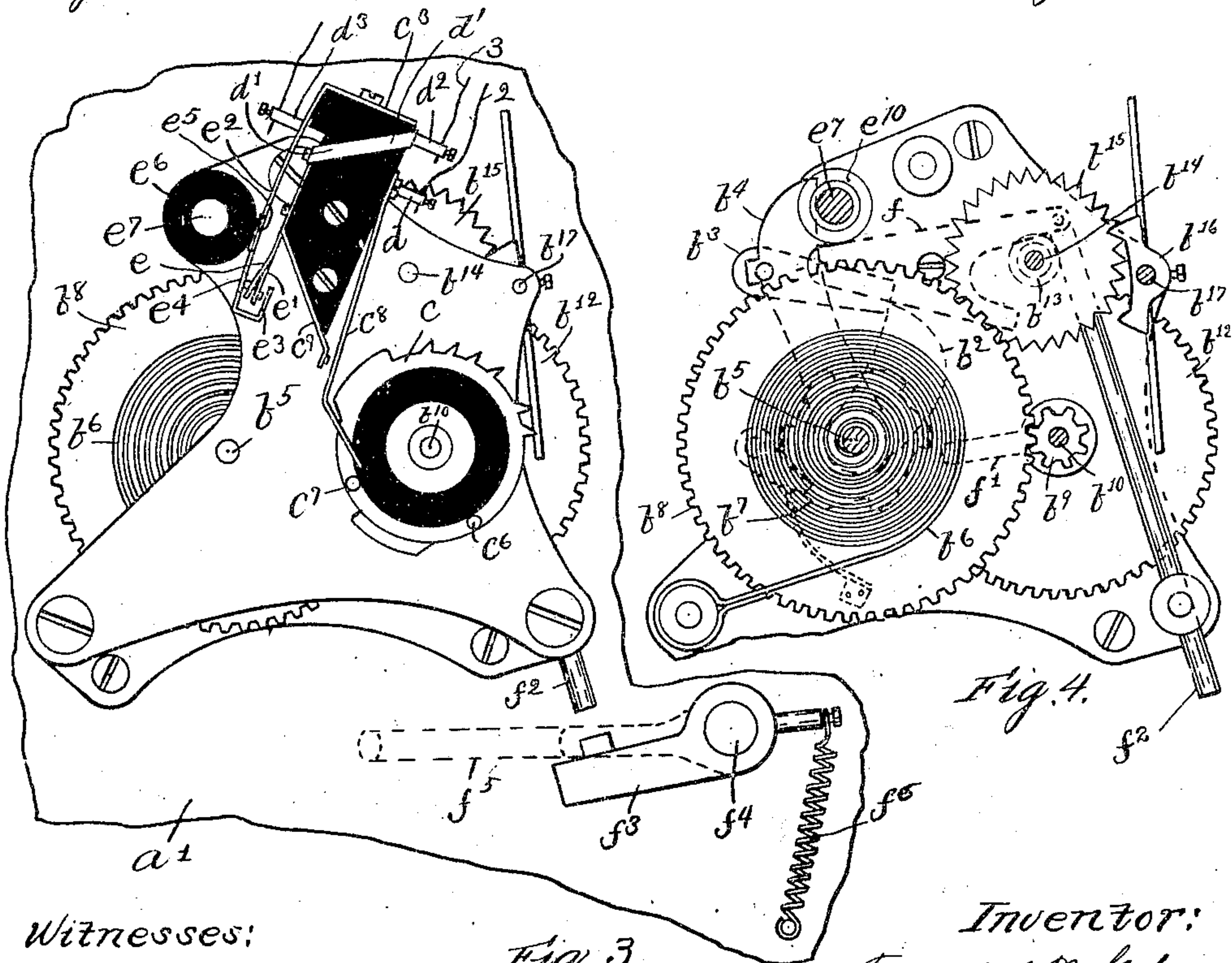


Fig. 3.

Fig. 4.

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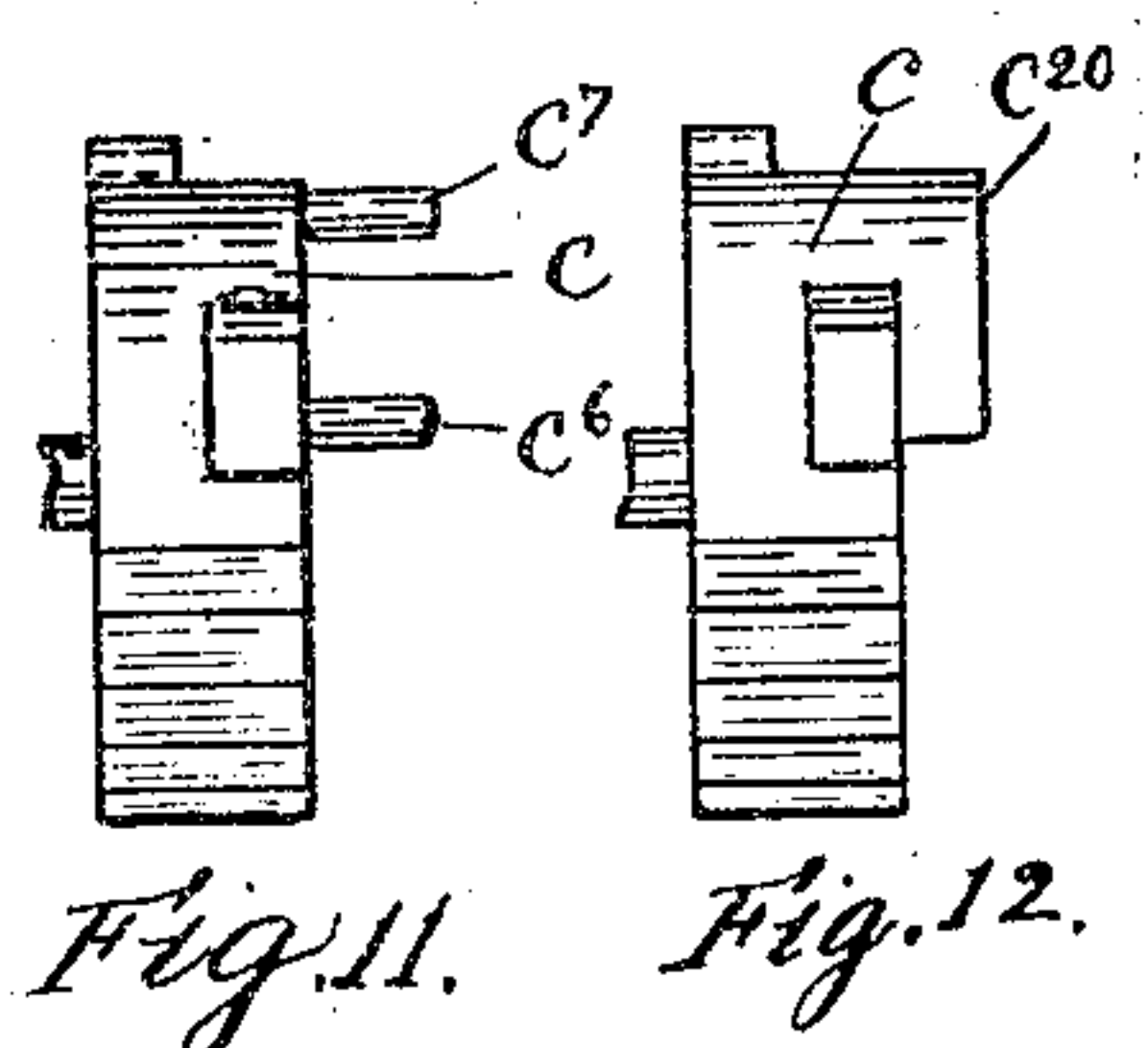
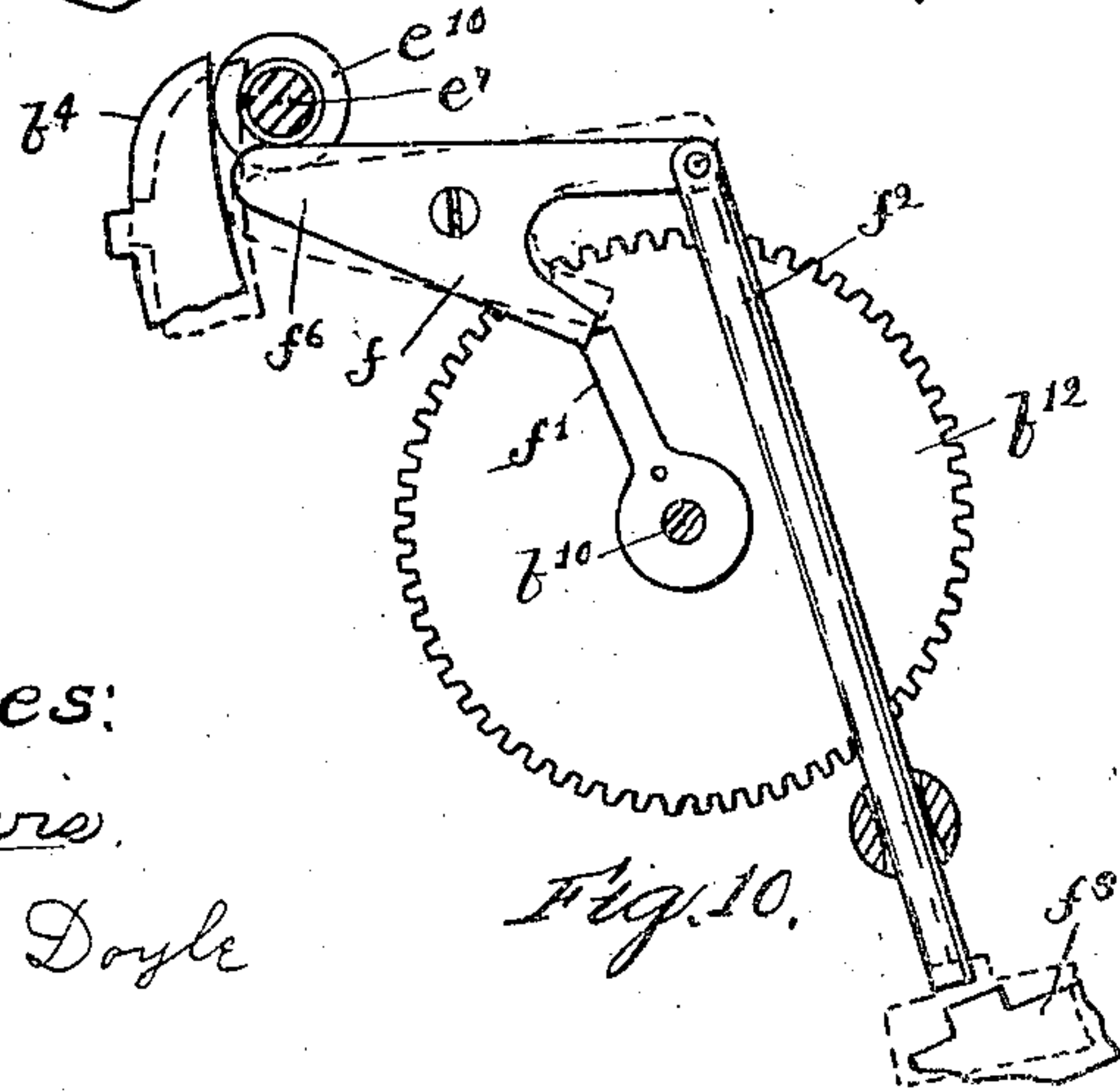
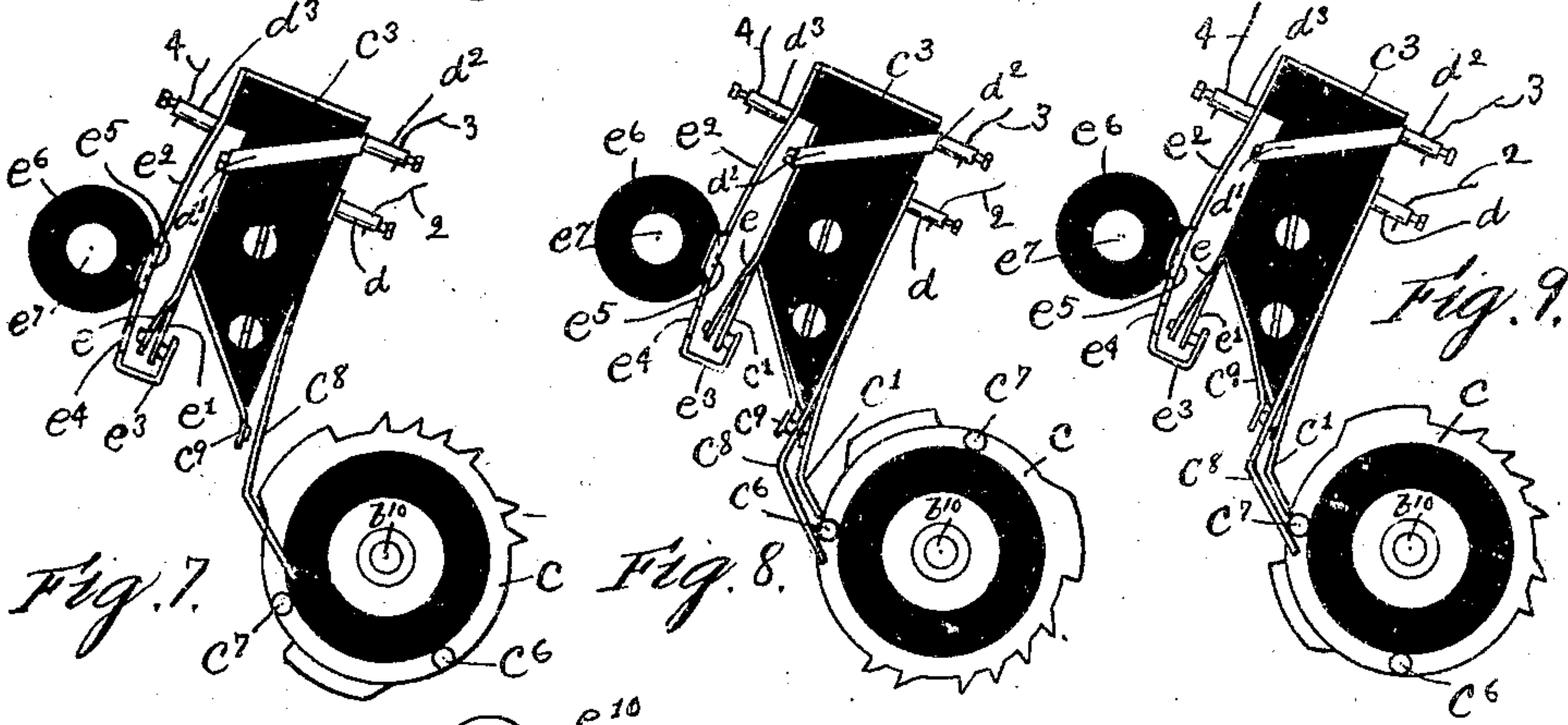
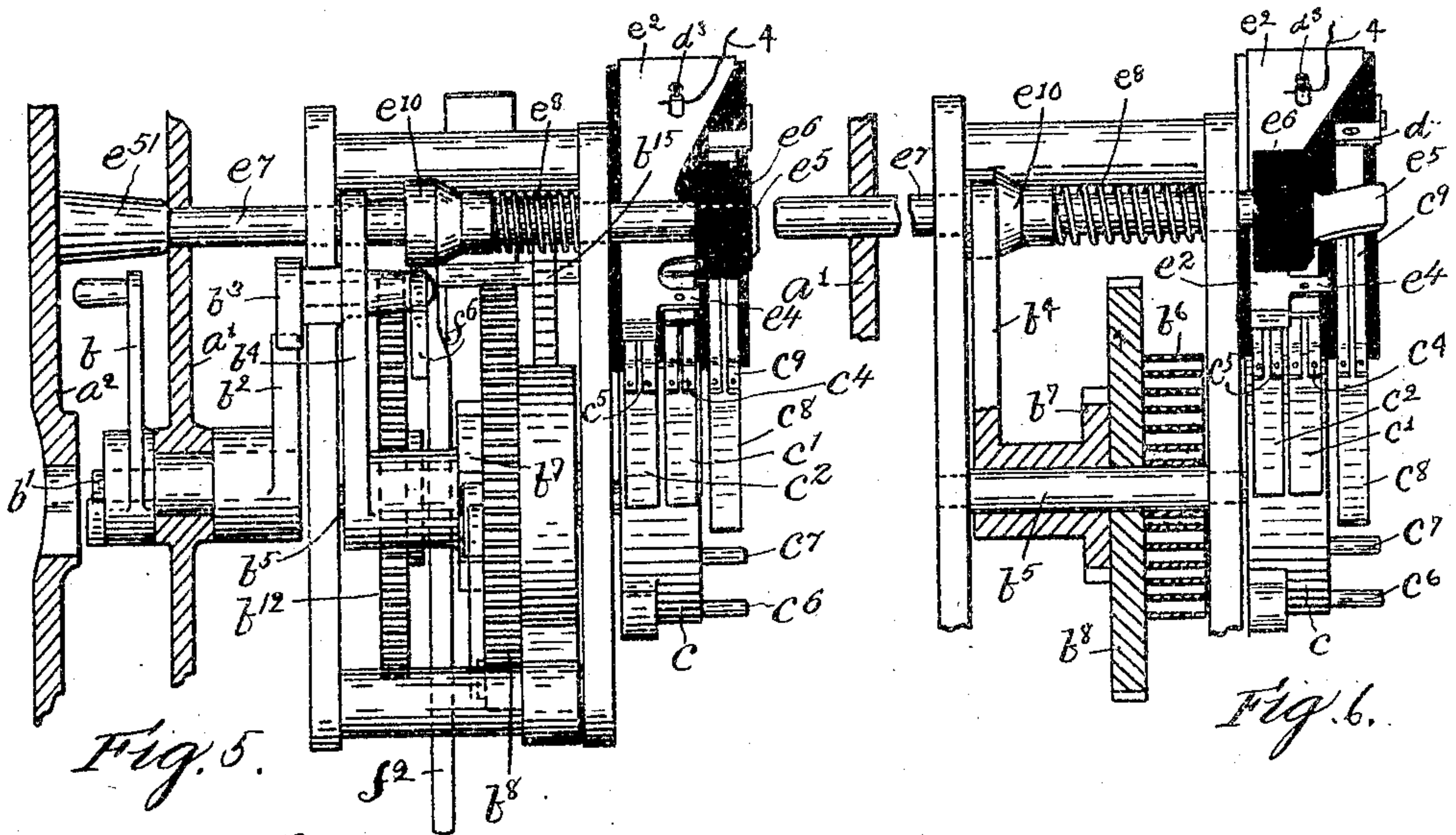
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F. W. COLE.
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APPLICATION FILED JULY 10, 1906.

3 SHEETS—SHEET 2.



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SIGNAL BOX.

PATENTED SEPT. 8, 1908.

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3 SHEETS—SHEET 3.

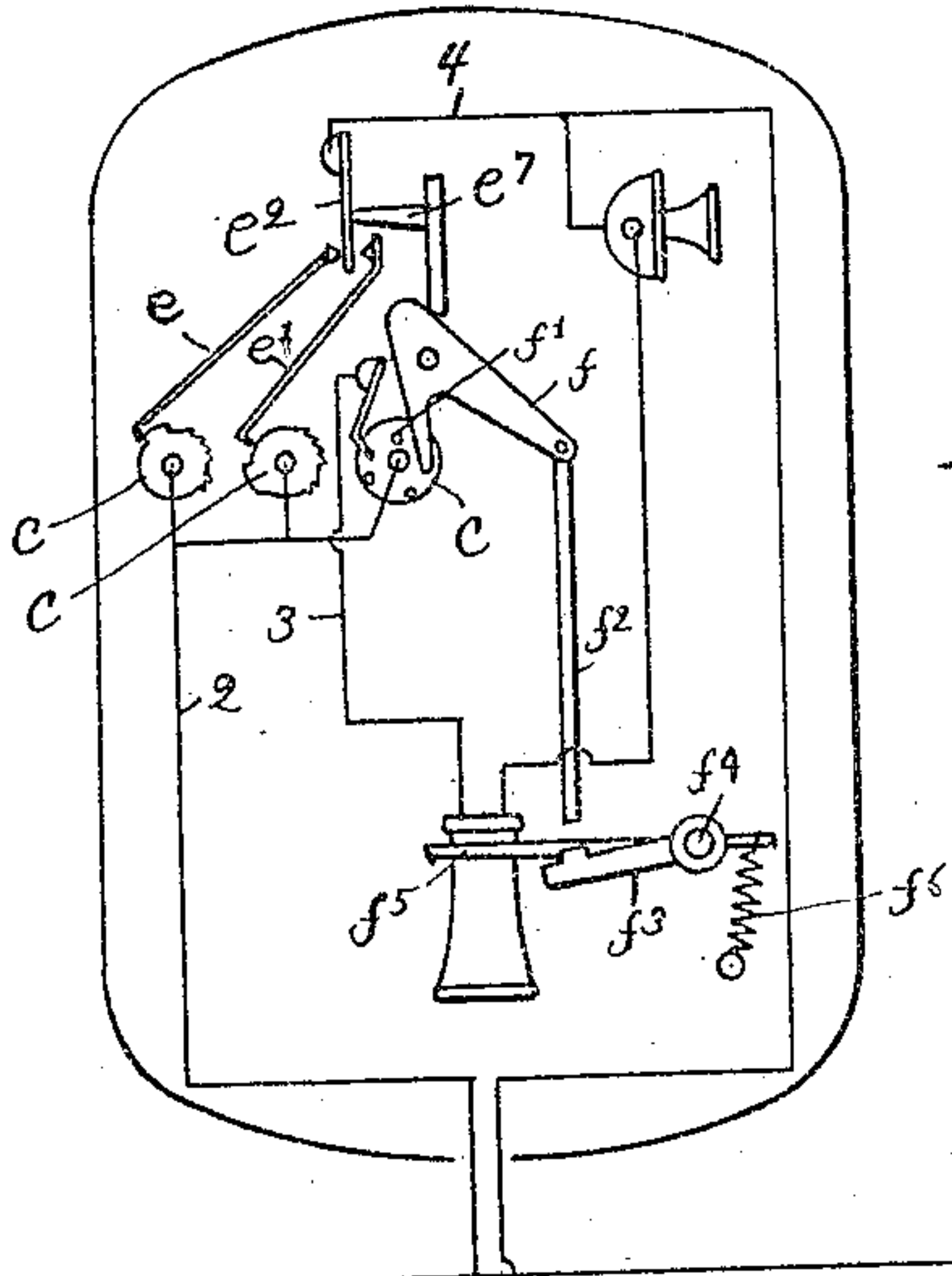


Fig. 13.

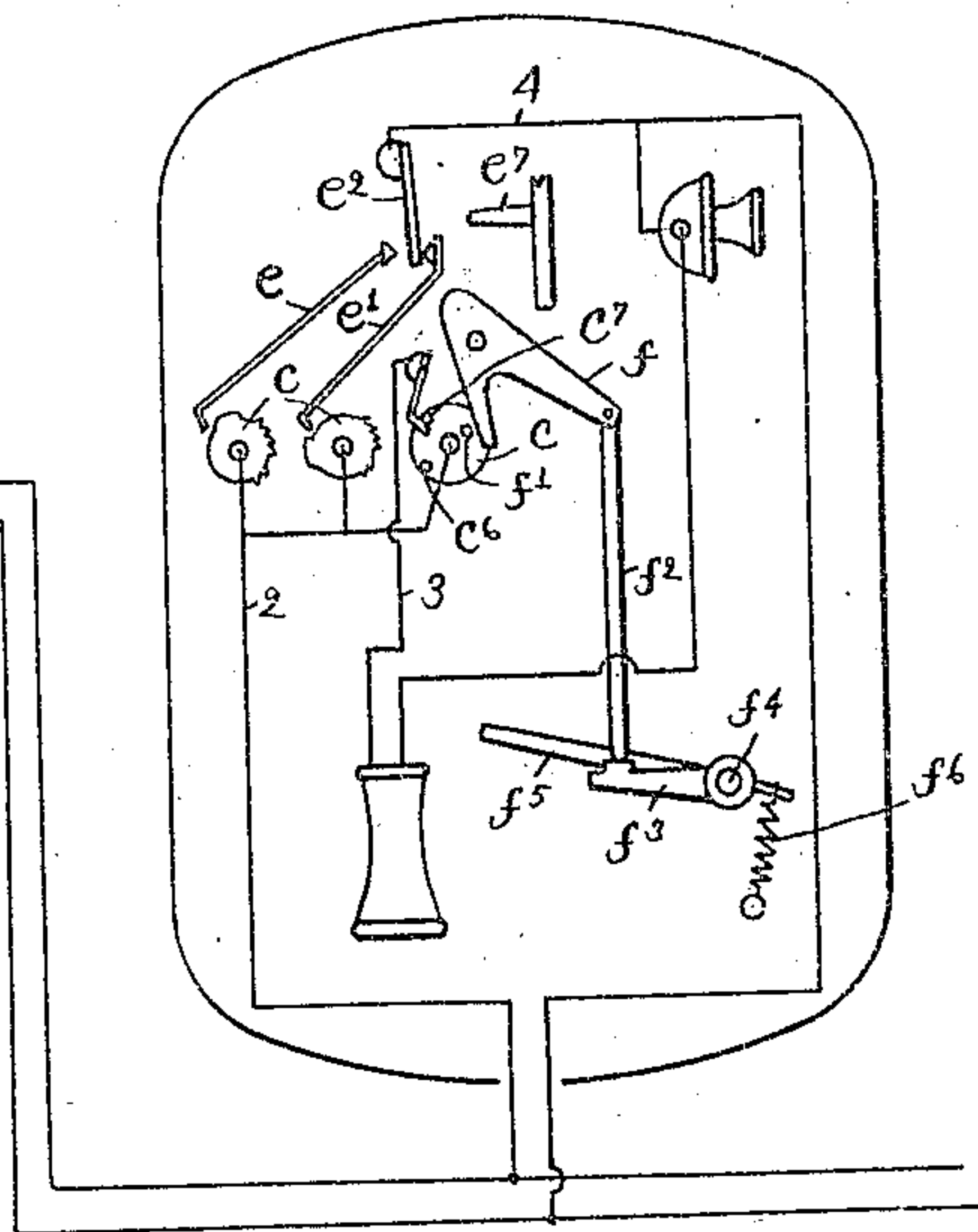


Fig. 15.

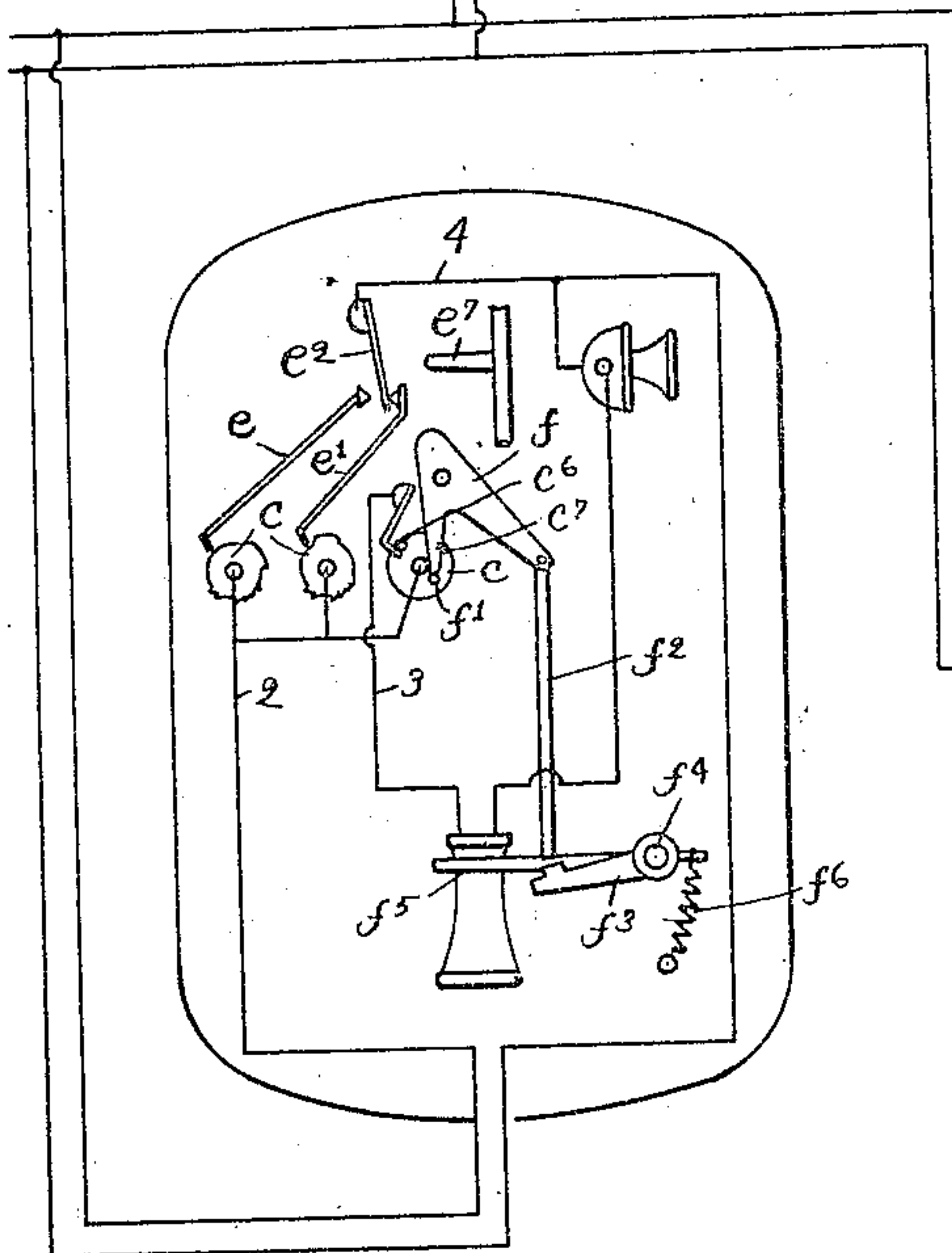


Fig. 14

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UNITED STATES PATENT OFFICE.

FREDERICK W. COLE, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO THE GAMEWELL FIRE-ALARM TELEGRAPH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SIGNAL-BOX.

No. 898,095.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed July 10, 1906. Serial No. 325,443.

To all whom it may concern:

Be it known that I, FREDERICK W. COLE, of Newton, county of Middlesex, State of Massachusetts, have invented an Improvement in Signal-Boxes, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to signal boxes especially adapted for use in police signal systems.

The object of the invention is to simplify the construction of a box having a multiple signal transmitter adapted to transmit the calls which are ordinarily required for use in a police signal system, as for instance, the wagon call, report call and telephone call; and to equip the box with a telephone; and to so construct and arrange the parts that the wagon call may be transmitted by a key inserted from the outside of the box; and the report call may be transmitted by an actuating lever accessible when the box door is open, and the telephone call may be transmitted by said actuating lever when the box door is open and the telephone is removed from its support. The several calls are properly distinguished, as for instance, the wagon call and the telephone call each consist of a box-number accompanied by a long dash, which serves as the differentiating impulse, and which is employed for operating certain devices at the central station by which an alarm is sounded, the dash preceding the box-number in the wagon call, and following the box-number in the telephone call; and the report call consists of the box-number only.

The invention also has for its object to provide means, operated by the signaling train, for including the telephone in circuit when transmitting the report call and also the telephone call and for subsequently excluding it; also to provide means for arresting the signaling train while the telephone is included in circuit and for subsequently releasing it, permitting it to resume its operation and to exclude the telephone before or as it ceases to operate; also to provide means controlled by the closing of the box door for controlling the resumption of operation of the signaling train. The telephone is included in circuit when transmitting the report call in order that it may respond to a signal transmitted from the central station, in a well known manner, which causes the receiver to produce a humming sound, such signal being em-

ployed for the purpose of notifying the officer to communicate with the central station by telephone, or for any other purpose.

Figure 1 shows in front elevation, a signal box embodying this invention. Fig. 2 is a similar view of the signal box, showing the box door open. Fig. 3 is a rear elevation of the multiple signal transmitter removed from the box, together with a portion of the inner door of the box upon which it is supported, the parts being in their normal position of rest, as for instance when the box door is closed. Fig. 4 is a similar view of the multiple signal transmitter, the signal wheel and back plate being removed. Fig. 5 is a left hand side elevation of the transmitter shown in Fig. 3, the supporting-plate and outer door being shown in section, said door being closed. Fig. 6 is a vertical sectional detail of the transmitter, with the parts in the position they will occupy when the box door is open. Fig. 7 is a detail of the signal-wheel and circuit operating devices adapted to be operated by it, and circuit controlling devices adapted to be operated by a plunger controlled by the box door, the parts being at rest, but in the position they will occupy when the box door is open, as for instance, when transmitting the report call or telephone call. Fig. 8 is a similar detail showing the signal wheel as having turned sufficiently to transmit the report call and the telephone as having been included in the circuit. Fig. 9 is a similar detail showing the signal wheel as having been turned sufficiently to transmit the telephone call, and the telephone still included in the circuit. Fig. 10 is a detail showing the intermediary locking device for the signaling-train. Fig. 11 is an edge view of the signal wheel. Fig. 12 is a modified form of signal wheel which may be employed. Figs. 13, 14 and 15 are circuit diagrams of the box, the parts thereof being in different positions for the transmission of the different calls.

a represents the shell of the box, or case, which is of any suitable size and shape, and *a'* is the inner door, which serves as a supporting plate for the operating parts, and *a''* is the outer door. On the back side of the inner door *a'*, the multiple signal transmitter is supported.

b represents the actuating lever of the transmitter, which is located at the front of the inner door, so as to be accessible when the outer door is open, and said lever is se-

cured to a pivot-shaft b' extending through the door. To the inner end of said pivot-shaft b' , a short arm b^2 , (see Figs. 4 and 5) is secured, which is arranged to engage a lug b^3 , pivotally connected to the winding arm b^4 of the transmitter. The winding arm b^4 is secured to a shaft b^5 , to which the inner end of the actuating-spring b^6 is attached, and a ratchet wheel b^7 is secured to the hub of said winding arm, or it may be to said shaft, which is adapted to engage a spring pressed pawl (see dotted lines Fig. 4) pivotally connected to one side or face of a gear wheel b^8 , which is mounted to revolve on said shaft b^5 , and to be turned by the spring actuated winding arm in a manner quite common in signal transmitters. The gear wheel b^8 engages a pinion b^9 secured to a shaft b^{10} , to which is secured a gear wheel b^{12} which engages a pinion b^{13} see dotted lines Fig. 4, secured to a shaft b^{14} , to which the escape-wheel b^{15} is secured, which is engaged by a suitable pallet b^{16} secured to a pivot-shaft b^{17} .

A signal wheel c is secured to the shaft b^{11} , and the mechanism of the train is arranged to turn said shaft one complete revolution each time the winding arm is operated by the actuating lever, so that the signal wheel will make one round. The signal wheel c is made wide enough to comprehend two signal portions, see Figs. 11 and 12, arranged side by side, and adapted to be engaged by two pens c^1 , c^2 , likewise arranged side by side, see Figs. 5 and 6, and said pens are attached to a block c^3 of insulating material, and when lifted will respectively engage contact pens c^4 , c^5 , also attached to said block c^3 , to thereby close the circuit. The signal portions of the signal wheel c are each arranged to transmit the box number and also a differentiating impulse, which latter in the present instance, consists of a long dash; one of the signal portions having the dash arranged to precede the box number, and the other having the dash arranged to follow the box number. The signal wheel c also has projecting laterally from it two pins c^6 and c^7 , adapted to successively engage a pen c^8 , also attached to said block c^3 , and to lift said pen into engagement with the contact pen c^9 attached to the block to close the circuit; or in lieu of said pins c^6 and c^7 , a single segmental portion may be provided, as shown at c^{10} , Fig. 12. The three pens c^1 , c^2 and c^8 are connected together and to a binding post d , to which one of the circuit wires, as 2, is connected, but the three contact pens c^4 , c^5 and c^9 , which they respectively engage, are separated, and being attached to the block c^3 of insulating material, are thereby insulated from each other; and one of said contact pens, as c^9 , is connected by a metallic strip d' with a binding post d^2 , to which one of the circuit wires, as 3, is connected; and the other two contact pens are alternately

connected through a plunger switch mechanism by means of which either will be included in circuit to the exclusion of the other.

To simplify illustrating the circuits in the diagrams (Figs. 13, 14 and 15), the circuit wire 2 leads to the signal wheel. To each signal wheel contact pen c^4 and c^5 , a switch contact pen is connected, represented at e and e' , which are arranged side by side above the contact pens c^4 , c^5 , to which they are respectively connected. The outer ends of said pens e , e' , occupy different planes, one above the other, and a switch member e^2 , consisting of a suitably shaped plate, is attached to the block c^3 , in a plane above the contact pens e , e' , having its outer end bent to form a hook, as e^3 , which extends beneath the contact pen e' , and having a lateral extension e^4 , which extends over the contact pen e . Movement of said plate back and forth causes it to engage one or the other contact pen e or e' , to thereby connect one or the other contact pen c^4 or c^5 to the circuit which remains normally open.

The switch member e^2 is connected with a binding post d^3 , to which one of the circuit wires, as 4, is connected. The switch member e^2 also has a lateral extension e^5 , which extends upward in a diagonal direction and which is adapted to be engaged by a collar e^6 , preferably insulated, which is secured to the inner end of a plunger rod e^7 . The plunger rod e^7 is made long enough to extend outward through a hole e^{10} in the inner door so as to be struck by a boss e^{11} located on the inside of the box door, when the latter is closed. A spring e^8 encircles said plunger rod, which serves to thrust it outward, when the door is opened and the spring thereby permitted to act. When the box door is closed, the plunger rod will be pushed inward, and the collar e^6 engaging the upward extension e^5 on the plate e^2 will depress said plate and cause the switch contacts e^4 , e , to close, connecting contact pen c^4 with the circuit, and when the box door is opened, the plunger rod will be moved outward by the spring e^8 , and the plate e^2 permitted to rise and cause the switch contacts e^3 , e' to close, connecting contact pen c^5 with the circuit.

The winding arm b^4 is extended and arranged to strike against the plunger rod e^7 for the purpose of stopping the signaling train at the end of a round of the signal wheel. The plunger rod has an enlarged conical portion e^{10} formed on it, which, when the rod occupies its normal or innermost position, the box door being closed, will occupy a position back of the winding arm, as shown in Figs. 4 and 5, and when the plunger rod occupies its outermost position, as shown in Fig. 6, the box door being open, will be brought into position to be struck by the winding arm, to thereby arrest the signaling

train before it has completed its round, for purposes to be explained, but when the plunger rod is subsequently pressed inward, said conical portion will be removed from beneath the winding arm and the signaling train thereby permitted to resume its movement until the winding arm strikes the plunger rod at a point in front of said conical portion and thereby stops the train at the completion of the round. A locking-device is also provided for the train, which is adapted to arrest it at an intermediate part of its operation, and as herein shown, said locking-device consists of a pivoted detent f , see Figs. 4 and 10, arranged to engage a projection f' on one of the wheels of the train, as for instance, on the gear wheel b^{12} .

The detent f is free to turn on its pivot and to be moved into and out of position to engage said projection f' . It is adapted to be moved into locking position, that is to say into position to engage said projection by gravity, when permitted to act, and for the purpose of moving it out of such position or into its unlocking position, a sliding bar f^2 is loosely or pivotally connected at its upper end to it, the lower end of which extends downward, below the signaling train, see Fig. 3, far enough to be struck by a short arm f^3 secured to a pivot-shaft f^4 , to which the telephone hook f^5 is secured. When the telephone is supported on the hook, the arm f^3 will be depressed and disengaged from the lower end of the sliding bar f^2 , but when removed therefrom said arm f^3 will be lifted by means of a spring f^6 , which is attached to it, sufficiently to engage the lower end of the sliding bar and lift said bar high enough to remove the detent f from the path of movement of the projection f' , thereby moving it into its unlocking position.

While the telephone remains on the hook, the detent f will occupy a position to engage the projection f' and arrest the train before the round has been completed. Hence the locking-device thus provided is herein referred to as an intermediary locking-device. The detent f has an extension f^0 , which is made long enough to extend beneath the plunger-rod e^7 and said detent is so located with respect to said plunger rod that the extension f^0 will engage the conical portion e^{10} , or will engage the plunger rod back of said portion, according to the position of the plunger rod, as for instance, when the box door is closed and the plunger rod pressed inward, as shown in Fig. 5, said extension will rest against the conical portion, see dotted lines Fig. 10, and when in such position the detent f will be held above and out of the path of movement of the projection f' , that is to say, will be held in its unlocking position, so that if the box is pulled at such time, as it can be by means of an outside

key, the signaling train will be operated and will not be arrested by said detent, but will make its complete round, the winding arm finally returning to its normal position in engagement with the plunger rod. But if the box door is open and the plunger rod thereby thrust outward, as shown in Fig. 6, the conical portion thereof will be moved out of the path of engagement of the extension f^0 and the detent f , will be permitted to fall by gravity or otherwise, into the path of movement of the projection f' , see full lines Fig. 10, and if the box is pulled at such time, as it may be by the actuating lever b , the signaling train will be operated but will be arrested during its progress by this intermediary locking-device, and when the box door is subsequently closed and the plunger rod pressed inward, the conical portion will return to its normal position and in so doing will engage the extension f^0 and thereby lift the detent free from the projection f' and permit the train to resume and complete its operation. Again, if the box door is open and the plunger rod thrust outward, carrying the conical portion forward beyond the extension f^0 so that the detent falls into the path of movement of the projection f' , and the box is pulled by the actuating lever b , the signaling train will be operated, but will be arrested during its progress by this intermediary locking device, and when the telephone is removed from the hook, said locking-device will be operated to disengage the projection f' , and the train will be thereby released and permitted to resume its operation until the winding arm strikes the conical portion on the plunger rod, when it is again arrested, and then when the door is closed and the plunger rod pressed inward, said conical portion will be moved far enough to disengage the winding arm, and the train thereby permitted to again resume its operation, and continue until the winding arm engages the plunger-rod in front of said conical portion or runs down.

The circuit wire 4 leading into the box is connected to the binding post d^3 , and it has a branch wire 3 leading from it, which includes the telephone and is connected to the binding post d^2 , and the circuit wire 2 leading into the box is connected to the binding post d . The pin c^6 is so disposed on the signal wheel that when the train is arrested by the detent f , it will have engaged the pen c^8 and lifted it into engagement with the pen c^9 to close the circuit including the telephone; also the pin c^7 is so disposed on the signal wheel that when the train is arrested by the winding arm engaging the conical portion on the plunger rod, it will have engaged the pen c^8 and lifted it into engagement with the pen c^9 , to likewise close the circuit including the telephone.

The operation of the box is as follows:—

When the box door is closed, see Figs. 3, 5 and 13, the wagon call may be transmitted by means of a key inserted through a key-hole g in the box door, said key having a socket which fits upon a pintle formed upon the end of the pivot shaft b' , and having a wad which enters a recess formed in a circular flange g' round said pintle. As the key is turned, the end of the flange will be engaged and the pivot shaft bearing the actuating lever b will be turned and the winding arm b^4 operated to wind the signaling train. The plunger rod being at such time pressed inward by the box door, the intermediary locking-device f is held by the conical portion e^{10} in its unlocking position or out of the path of engagement with f' , and said conical portion at such time occupies a position remote from the winding arm b^4 , so that it will not arrest the winding arm at an intermediate position on its return hence the signaling train once started will continue to run and complete its operation, the signal wheel making a complete revolution. The plunger rod being pressed inward, the insulated collar e^6 thereon engages the extension e^5 on the switch member, as shown in Figs. 3 and 5, and the circuit contacts e, e^4 , are closed and the circuit closer e', e^4 , is thereby effective, and the long dash followed by the box number will be transmitted. At the completion of the round, the winding arm b^4 strikes the plunger rod in front of the portion e^{10} and thereby stops the train. During the transmission of this signal, the pens e^2 and e^8 are also engaged and lifted by the signal wheel, but the circuit closer e^2, e^5 , is not effective for the reason that the contacts e', e^3 , are open, and the circuit closer e^8, e^9 , while temporarily effective performs no useful function, as the telephone transmitter and receiver are made of sufficiently high resistance so that the small amount of current that can pass through them at such times will not affect the receiving relay or other receiving apparatus in the circuit at central.

When the box door is open, the report call and the telephone call may be transmitted. Referring first to the transmission of the report call, the box door is opened and the plunger rod moves outward until the conical portion e^{10} thereof bears against the side of the winding arm b^4 , being thereby arrested. The actuating lever is then operated and the winding arm operated by it to wind the signaling train. As the winding arm is moved to wind the actuating spring of the train, it moves out of engagement with the side of the conical portion e^{10} , thereby permitting the plunger rod to continue and complete its outward movement. The outward movement of the plunger rod is sufficient for the conical portion e^{10} to disengage the extension f^6 of the intermediary locking-device, thereby permitting the detent f to fall into the path of

movement of the projection f' . The outward movement of the plunger rod is also sufficient for the collar e^6 thereon to move out of engagement with the extension e^5 on the switch member, permitting the contacts e', e^3 , to close see Figs. 7, 8 and 9 and include the circuit closer e^2, e^5 and open the switch contacts e and e^4 , so that contacts e', e^4 , can not then operate the circuit to cause the dash before the box number. The signal wheel then revolves until the projection f' engages the detent f , then stops, and during such movement the box number only is transmitted. At the moment the signal wheel is thus arrested, the pin e^6 thereon engages the pen e^8 , see Figs. 8 and 14, and moves it against the contact e^9 , thereby closing the circuit including the telephone. The telephone having thus been included in the circuit is ready to respond to a signal from the central station, which may be transmitted in any well known manner, causing the telephone receiver to produce a humming sound. Such a signal on the receiver may be employed to notify the officer to use the telephone at once, or it may be employed for any other purpose. If no signal is received on the telephone receiver as soon as the report call has been transmitted, the door is closed. Closing the door thrusts the plunger rod inward, the collar e^6 thereon again moving into engagement with the extension e^5 on the switch member, opening the switch contacts e', e^3 to thereby disconnect the circuit so that the dash cannot be sent after the box number, and the conical portion e^{10} also engages the extension f^6 on the detent and lifts said detent free from the projection f' , and the signaling train then again starts and runs until it completes its operation, the winding arm engaging the plunger rod and thereby stopping the train at the end of the round, the train being run completely down. The report call thus transmitted comprises only the box number, but it will be observed that the telephone is included in the circuit temporarily, in order that there may be an opportunity before the door is shut to receive orders or a call from the central station.

Referring now to the transmission of the telephone call, the box door is opened, the plunger rod moves outward as before until the conical portion e^{10} strikes the winding arm b^4 , being thereby arrested. The actuating lever is then operated and the winding arm operated by it to wind the signaling train. As the winding arm is moved to wind the actuating spring of the train, it moves out of engagement with the side of the conical portion e^{10} , thereby permitting the plunger rod to continue and complete its outward movement. The outward movement of the plunger rod is sufficient to disengage the extension f^6 of the intermediary locking device, thereby permitting the detent f to fall into

the path of progress of the projection f' , and is also sufficient for the collar thereon to move out of engagement with the extension e^5 on the switch member, permitting the contacts e' , e^3 , to close, and include the circuit closer c^2 , c^5 . Then the telephone receiver is removed from the hook preparatory to using it, and the arm f^3 which is connected with said hook rises and engages the sliding bar f^2 , and moves the intermediary locking device out of the path of movement of the projection f' . The signal wheel revolves and the box number is first transmitted, then the circuit closer c^8 , c^9 , is temporarily operated by the pin c^6 , but without operating the receiving relays at central on account of the high resistance of the telephone receiver and transmitter, then the dash is transmitted, then the circuit closer c^8 , c^9 , is again operated by the pin c^7 ; see Figs. 9 and 15, and just at this time the winding arm b^4 has returned so as to engage the conical portion e^{10} of the plunger rod to thereby arrest the train. The telephone call comprising the box number followed by a dash is thus transmitted, and the train arrested while the telephone is included in the circuit by the circuit closer c^8 , c^9 . The officer after using the telephone, replaces it on the hook and closes the door. Closing the door thrusts inward the plunger rod, causing the conical portion e^{10} to disengage the winding arm b^4 , thereby releasing said winding arm, permitting the train to again start and run until the winding arm engages the plunger rod in front of said conical portion, and during this subsequent or final operation of the train the telephone contacts c^8 , c^9 , are opened as soon as the pin c^7 disengages the pen c^8 .

In the transmission of the telephone call, the telephone may be removed from the hook at any time but if the telephone is not removed from the hook at once the signal wheel will be arrested by the intermediary locking-device and will then be subsequently released by the removal of the telephone from the hook, so that in any event, the full call will be transmitted and the parts come to rest with the telephone included in the circuit, ready for use. While the detent f serves as an intermediary locking device for the signaling train, it will also be seen that the winding arm engaging the conical portion e^{10} of the plunger rod also arrests the signaling train prior to the completion of its round. The intermediary locking device is provided particularly for the purpose of temporarily arresting the train to prevent the dash for telephone call being sent unless desired, and to produce the three necessary distinctive police calls by the simplest and most natural acts of a person desiring to use a box and without the necessity of using selecting devices such as a pointer; it also provides for temporarily including the telephone in cir-

cuit for the purpose of receiving signals from the central station, and for using a normally open circuit and central energy telephone system and without the use of a condenser at the box.

The winding arm is arranged to arrest the train just before the completion of the round to allow the telephone dash to be sent and also to include the telephone in circuit, for the purpose of using the telephone for talking purposes before the line is restored to normal condition, and so that the final movement of the train may be utilized as a means of completely disconnecting the telephone, not only as a protection against injury from heavy currents over the circuit, but also to insure a private telephone service, so that no third party can listen to conversation over the circuit unless he has identified his location by first pulling his box, which will thereupon send its number before it makes the telephone connection.

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

1. In a signal box, a multiple signal transmitter, means for setting it to transmit different signals, means for operating it, an intermediary locking-device for the transmitter, controlled by said signal-setting means, which, when in unlocking position permits the transmitter to operate and transmit one of its signals and when in locking position stops the transmitter at an intermediate part of its operation, when a different signal has been transmitted, substantially as described.

2. In a signal box, a multiple signal transmitter, means for setting it to transmit different signals, means for operating it, an intermediary locking-device for locking the transmitter at an intermediate part of its operation, when one of its signals has been transmitted, and means for moving said locking-device into its unlocking position to enable the transmitter to operate and transmit a different signal, substantially as described.

3. In a signal box, a multiple signal transmitter, means for setting it to transmit different signals, means for operating it, an intermediary locking-device for the transmitter, controlled by the signal-setting means and movable into its locking position to stop the transmitter at an intermediate part of its operation, when one of its signals has been transmitted, and adapted to be subsequently moved by the signal setting means into its unlocking position to release the transmitter and permit it to resume and complete its operation, substantially as described.

4. In a signal box, a multiple signal transmitter, means for setting it to transmit different signals, means for operating it, an intermediary locking-device for the transmitter, controlled by the signal-setting means and movable into its locking position to stop

the transmitter at an intermediate part of its operation, when one of its signals has been transmitted, and adapted to be subsequently moved into its unlocking position by the closing of the box-door, to release the transmitter and permit it to resume and complete its operation, substantially as described.

5. In a signal box having a telephone and a supporting-hook for the telephone, a multiple signal transmitter, means for setting it to transmit different signals, an intermediary locking device for arresting the transmitter at an intermediate part of its operation, when one of its signals has been transmitted, and means, connected with the telephone hook, for moving said locking-device into its unlocking position, when the telephone is removed from the hook, to permit the transmitter to operate and transmit a different signal, substantially as described.

6. In a signal box having a telephone and a supporting hook for the telephone, a multiple signal transmitter, means for setting it to transmit different signals, a locking-device for arresting the transmitter at an intermediate part of its operation, and means connected with the telephone hook for operating said locking-device to release the transmitter, permitting it to resume its operation when the telephone is removed from the hook, substantially as described.

7. In a signal box, a multiple signal transmitter, means for operating it, a locking device for arresting the transmitter at an intermediate part of its operation, a plunger controlled by the box door for setting the transmitter to transmit different signals, and means operated by said plunger for operating said locking device to release the transmitter, permitting it to resume its operation, substantially as described.

8. In a signal box, a multiple signal transmitter, a plunger controlled by the box door for setting the transmitter to transmit different signals, means for operating the transmitter, and an intermediary locking-device for said transmitter controlled by said plunger, substantially as described.

9. In a signal box, a multiple signal transmitter, means for operating it, means for setting the transmitter to transmit different signals, which is controlled by the opening and closing of the box-door, and an intermediary locking-device for said transmitter, which is moved into its unlocking position by the closing of the box-door, substantially as described.

10. In a signal box having a telephone and a supporting hook for the telephone, a multiple signal transmitter, a plunger controlled by the box door for setting the transmitter to transmit different signals, means for operating the transmitter, and an intermediary locking-device for said transmitter which is moved into its unlocking position by means

connected with the telephone hook, when the telephone is removed therefrom, substantially as described.

11. In a signal box having a telephone and a supporting hook for the telephone, a multiple signal transmitter, a plunger controlled by the box door for setting the transmitter to transmit different signals, means for operating the transmitter, and an intermediary locking-device for said transmitter, the operation of which is controlled by the telephone hook, and also by said plunger, substantially as described.

12. In a signal box having a telephone and a supporting hook for the telephone, a multiple signal transmitter, means for setting the transmitter to transmit different signals, means for operating the transmitter, and an intermediary locking-device for said transmitter, the operation of which is controlled by the telephone-hook and also by the signal-setting means, substantially as described.

13. In a signal box having a telephone, a multiple signal transmitter, a plunger controlled by the box door for setting the transmitter to transmit different signals, an intermediary locking-device for said transmitter which is normally held disengaged from the transmitter by said plunger, when the door is closed, and which is released and permitted to move into position to engage and arrest the transmitter when the door is open and which is subsequently operated to release the transmitter when the door is closed, substantially as described.

14. In a signal box having a telephone and a supporting hook for the telephone, a multiple transmitter, a plunger controlled by the box door for setting the transmitter to transmit different signals, an intermediary locking device for said transmitter which is normally held disengaged from the transmitter by said plunger when the door is closed, but which is released and permitted to move into position to engage and arrest the transmitter when the door is open, and means connected with the telephone hook for operating said locking-device to release the transmitter when the telephone is removed from the hook, permitting it to resume its operation, substantially as described.

15. In a signal box having a telephone and a supporting-hook for the telephone, a multiple signal transmitter, a plunger controlled by the box-door for setting the transmitter to transmit different signals, an intermediary locking-device for said transmitter, which is normally held disengaged from the transmitter by said plunger, when the door is closed, to enable one of its signals to be transmitted, but which is released and permitted to move into position to engage and arrest the transmitter when the door is open, and means, connected with the telephone-hook for moving said locking-device into unlock-

ing position, to permit the transmitter to operate and transmit a different signal, substantially as described.

16. In a signal box, a multiple signal transmitter, means for operating it, a plunger controlled by the box door for setting the transmitter to transmit different signals, an intermediary locking-device for the transmitter and two independent actuating devices for operating said locking-device to release the transmitter and permit it to resume its operation, substantially as described.

17. In a signal box, a multiple signal transmitter, means for operating it, a plunger controlled by the box door for setting the transmitter to transmit different signals, an intermediary locking-device for the transmitter and two independent actuating means for operating said locking-device to release the transmitter, permitting it to resume its operation, one of which is connected with the plunger, substantially as described.

18. In a signal box, a multiple signal transmitter, means for operating it, means for setting it to transmit different signals, an intermediary locking-device for the transmitter, and two independent actuating-devices for moving said locking-device into its unlocking position, to permit the transmitter to operate and transmit two different signals according to the position of the signal-setting means, substantially as described.

19. In a signal box having a telephone and a supporting-hook for the telephone, a multiple signal transmitter, means for setting it to transmit different signals, means for operating it, an intermediary locking-device for the transmitter, and two independent actuating-devices for moving said locking-device into its unlocking position to permit the transmitter to operate and transmit two different signals, one of which is connected with the signal-setting means, and the other with the telephone-hook, substantially as described.

20. In a signal box having a telephone and a supporting-hook for the telephone, a multiple signal transmitter, and plunger controlled by the box-door for setting the transmitter to transmit different signals, an intermediary locking-device for arresting the transmitter at an intermediate part of its operation, the position of which is controlled by said plunger and by means connected with the telephone-hook, an outside key for operating the transmitter when the box-door is closed and the locking-device is in its unlocking position, to transmit one of its signals, a pull connected with the transmitter for operating it when the box-door is open and the locking-device is in its locking-position, to transmit another signal, and when the locking-device is in its unlocking position and the telephone removed from its hook to transmit a different signal, substantially as described.

21. In a signal box having a telephone and

a supporting-hook for the telephone, a multiple signal transmitter, means for setting the transmitter to transmit different signals, an intermediary locking-device for the transmitter, controlled by the signal setting means and by the telephone-hook, a pull connected with the transmitter for operating it to transmit one of its signals when the locking-device is in its locking-position and for transmitting a different signal when the telephone is removed from the hook and the locking-device is in its unlocking position, substantially as described.

22. In a signal box a multiple signal transmitter, a plunger controlled by the box-door for setting the transmitter to transmit different signals, an intermediary locking device for arresting the transmitter at an intermediate part of its operation, the position of which is controlled by said plunger, an outside key for operating the transmitter when the box-door is closed and the locking device is in its unlocking position to transmit one of its signals, a pull connected with the transmitter for operating it when the box-door is open and the locking device is in its locking position to transmit another signal and when the locking device is in its unlocking position to transmit a different signal, substantially as described.

23. In a signal box having a telephone, a signaling train, means for operating it, a means operated by it for including the telephone in circuit, and means for arresting the train at an intermediate part of its operation while the telephone is included, substantially as described.

24. In a signal box having a telephone, a signaling train, means for operating it, a circuit closer for the telephone circuit, means operated by the train for operating said circuit closer to include the telephone in circuit, and means for arresting the train at an intermediate part of its operation while the telephone is included, substantially as described.

25. In a signal box having a telephone, a signaling train, means for operating it, a circuit closer for the telephone circuit, means operated by the train for operating said circuit closer to include the telephone in circuit and for subsequently operating said circuit closer before the train completes its operation to exclude the telephone, and means for arresting the train at an intermediate part of its operation while the telephone is included, substantially as described.

26. In a signal box having a telephone, a signaling train, means for operating it, a circuit closer for the telephone circuit, means operated by the train for operating said circuit closer to include the telephone in circuit, means for arresting the train when said circuit-closer is operated, and means for subsequently releasing the train, permitting it to resume its operation and finally complete its

operation and also to exclude the telephone, substantially as described.

27. In a signal box having a telephone, a signaling train, means for operating it, a circuit-closer for the telephone circuit, means operated by the train for operating said circuit closer, to include the telephone in circuit, means for arresting the train when said circuit-closer is operated, and means operated by closing the box door for releasing the train, permitting it to resume and finally complete its operation, and also to exclude the telephone, substantially as described.

28. In a signal box having a telephone, a signaling train, means for operating it, a circuit-closer for the telephone circuit, means operated by the train for operating said circuit closer to include the telephone in circuit, and an intermediary locking-device for temporarily arresting the train while the telephone is included, substantially as described.

29. In a signal box having a telephone, a signaling train, means for operating it, a circuit-closer for the telephone circuit, means operated by the train for operating said circuit-closer to include the telephone in circuit, an intermediary locking-device for arresting the train when said circuit-closer is operated, and means for subsequently operating said intermediary locking-device to release the train, permitting it to resume and finally complete its operation, and also to exclude the telephone, substantially as described.

30. In a signal box having a telephone, a signaling train, means for operating it, a circuit-closer for including the telephone in circuit, means operated by the train for operating said circuit-closer to include the telephone in circuit, an intermediary locking-device for arresting the train when said circuit-closer is operated, and means operated by closing the box door for releasing the train, permitting it to resume and finally complete its operation, and also to exclude the telephone, substantially as described.

31. In a signal box having a telephone, a signaling train, means for operating it, a circuit-closer for the telephone circuit, means operated by the train for operating said circuit closer to include the telephone in circuit, an intermediary locking-device for arresting the train when said circuit closer is operated, a plunger, the operation of which is controlled by the box door, and means operated by it for operating said locking-device to release the train, permitting it to resume and

finally complete its operation, and also to exclude the telephone, substantially as described.

32. In a signal box having a telephone, a multiple signal transmitter, means for setting it to transmit different signals, means for operating it, a circuit-closer for the telephone circuit, means operated by the transmitter for operating said circuit-closer to include the telephone in circuit, means for arresting the transmitter while the telephone is included in circuit, and means for subsequently releasing the transmitter, permitting it to resume its operation and operate said circuit closer to exclude the telephone, substantially as described.

33. In a signal box having a telephone, a multiple signal transmitter arranged to send a box number and a differentiating signal, means for setting the transmitter to transmit the different signals, means for locking the transmitter when the box number has been transmitted, and means, controlled by the telephone receiver, for moving said locking means into its unlocking position to enable the transmitter to send the differentiating signal, substantially as described.

34. A multiple signal transmitter arranged to send a box number and a differentiating signal, means for setting the transmitter to transmit the different signals, means for locking the transmitter when the box number signal has been transmitted, and means, controlled by the box-door, for releasing the transmitter at such time, and for changing the signal setting means, whereby the transmitter will resume and complete its operation without sending the differentiating signal, substantially as described.

35. In a signal-box, a multiple signal transmitter, means for operating it, means for setting the transmitter to transmit different signals which is controlled by the opening and closing of the box door, and an intermediary locking-device for said transmitter which is moved into its locking position by the opening of the box door, substantially as described.

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

FREDERICK W. COLE.

Witnesses:

B. J. NOYES,
H. B. DAVIS.