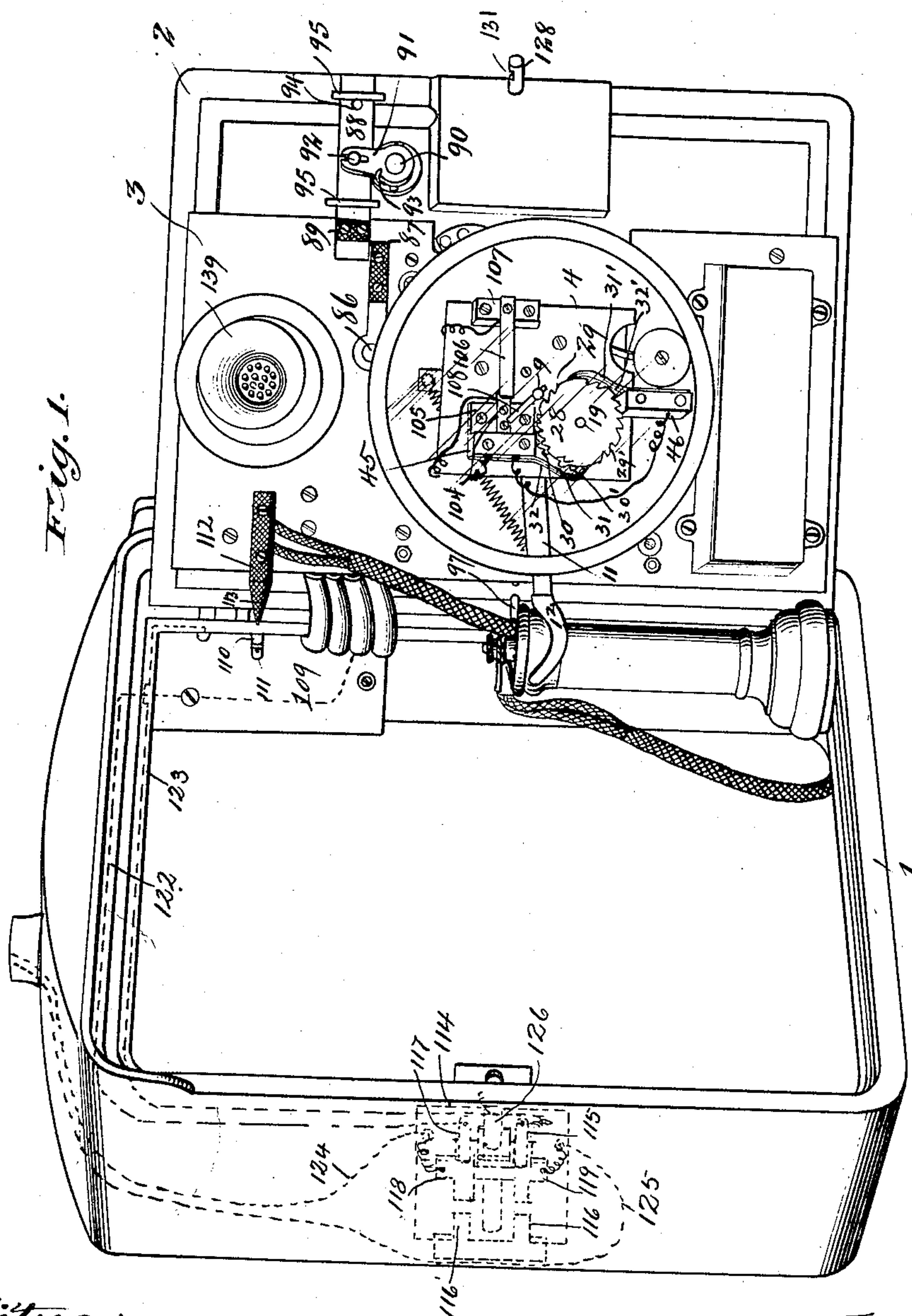


E. E. SALISBURY.  
 COMBINED AUTOMATIC SIGNALING AND TELEPHONE SYSTEM.  
 APPLICATION FILED NOV. 25, 1901.

921,894.

Patented May 18, 1909.

6 SHEETS—SHEET 1.



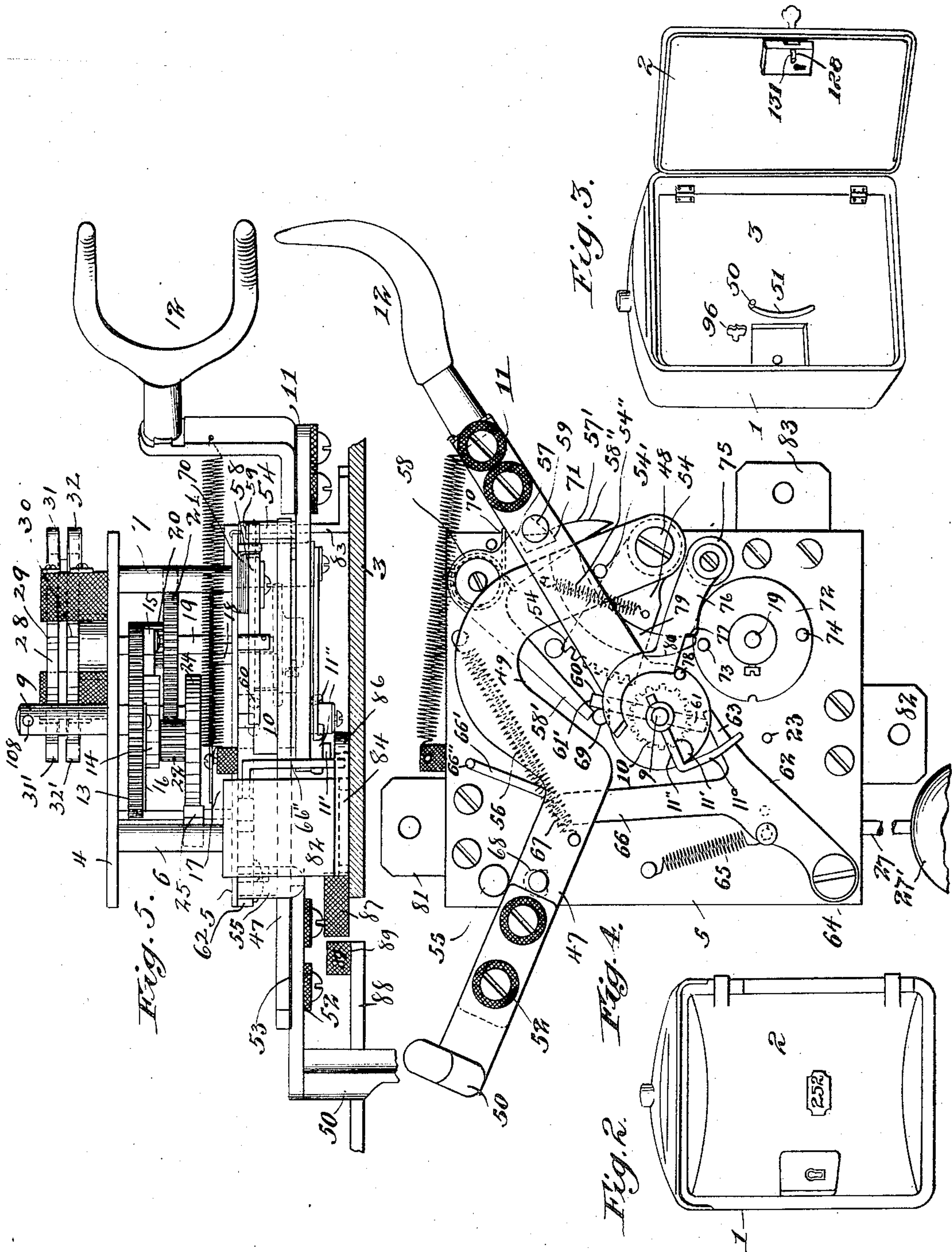
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 6 SHEETS—SHEET 2.



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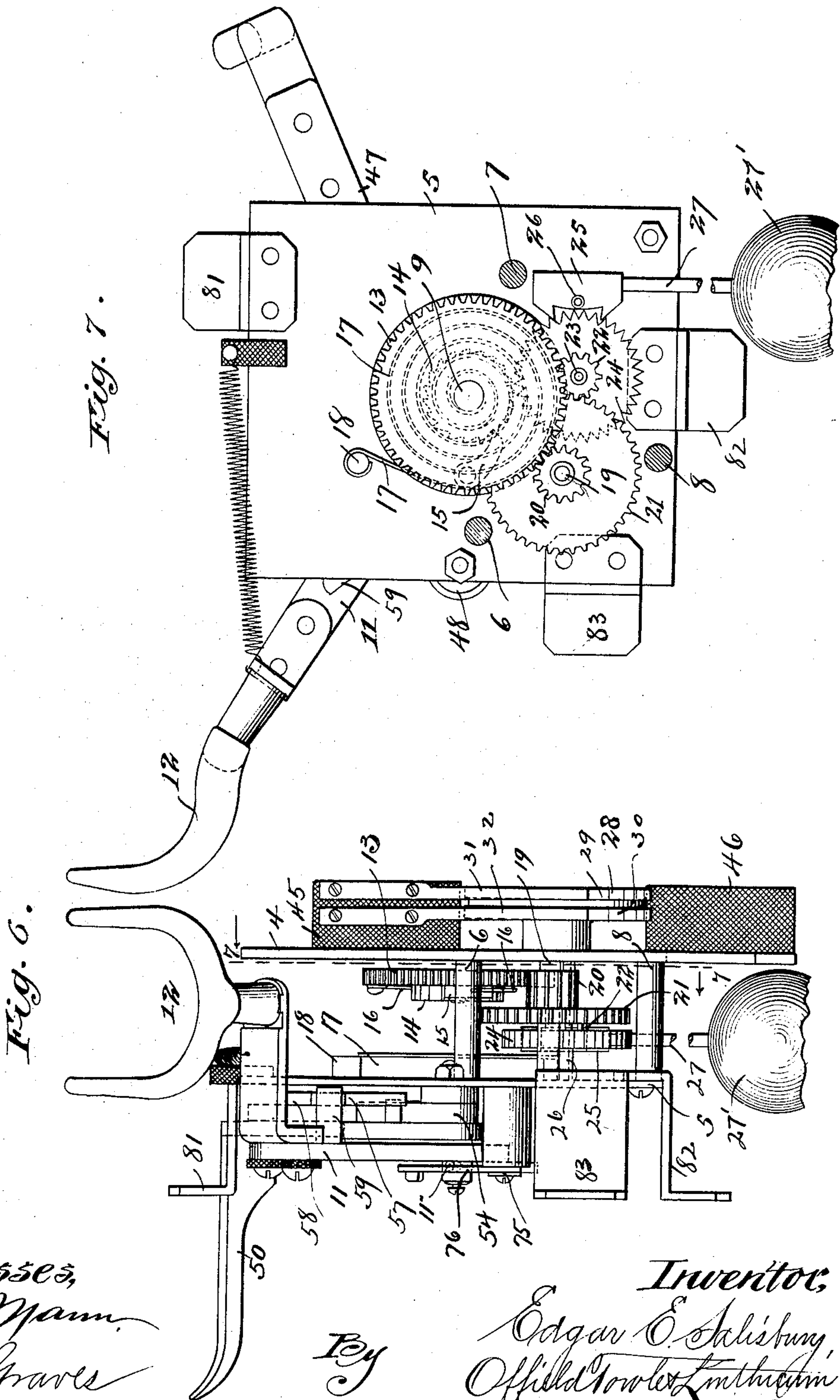


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6 SHEETS—SHEET 3.



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6 SHEETS—SHEET 4.

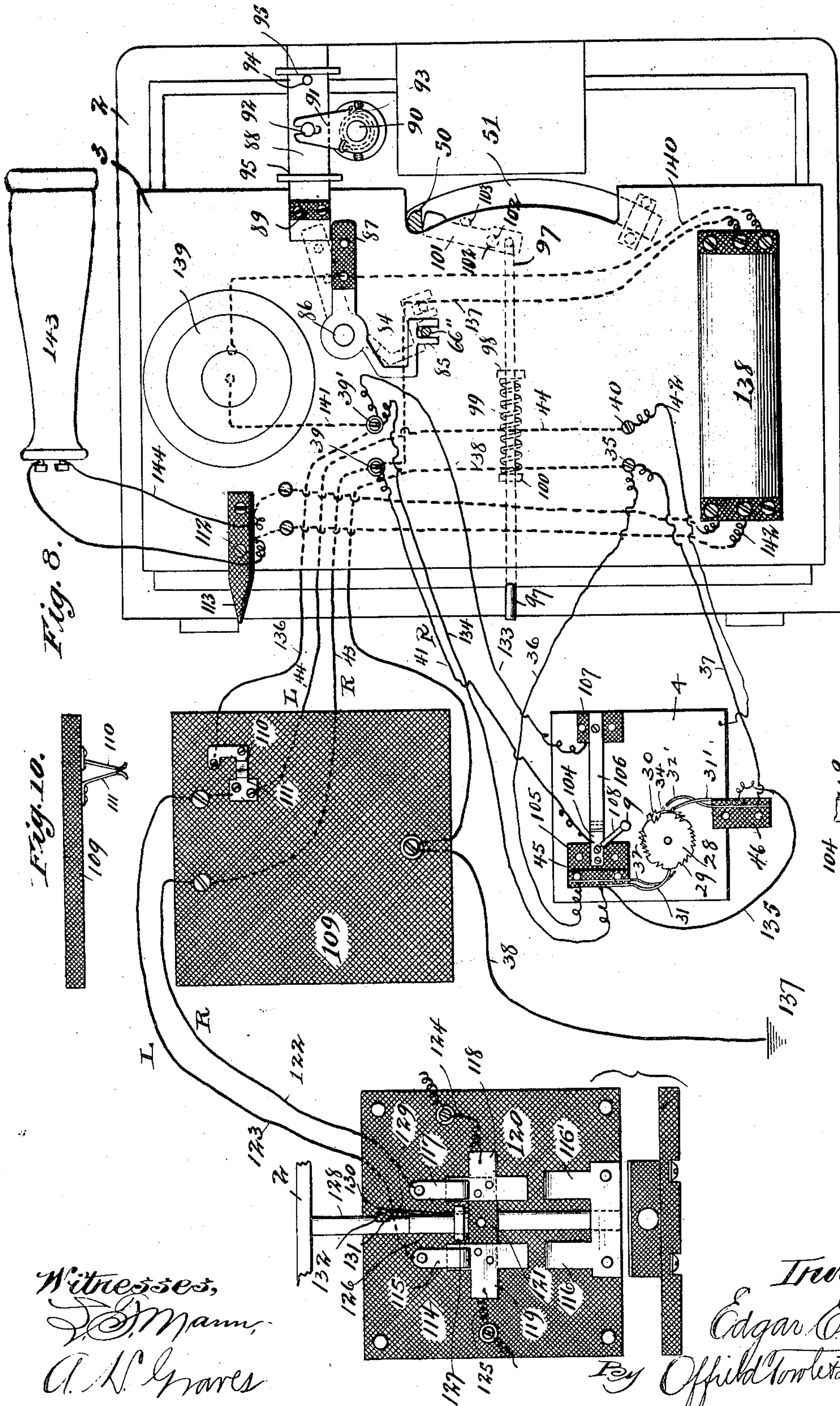


Fig. 8.

Fig. 10.

Fig. 11.

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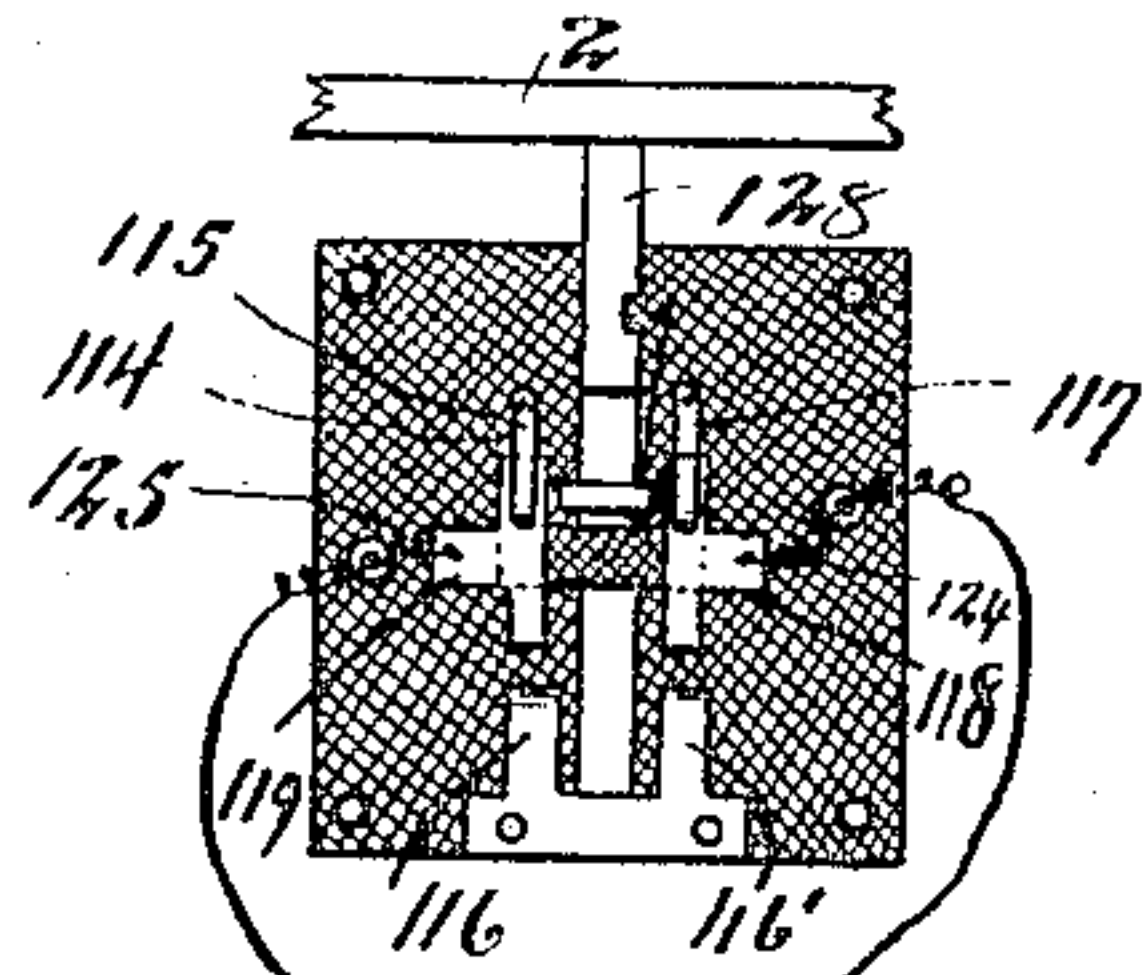
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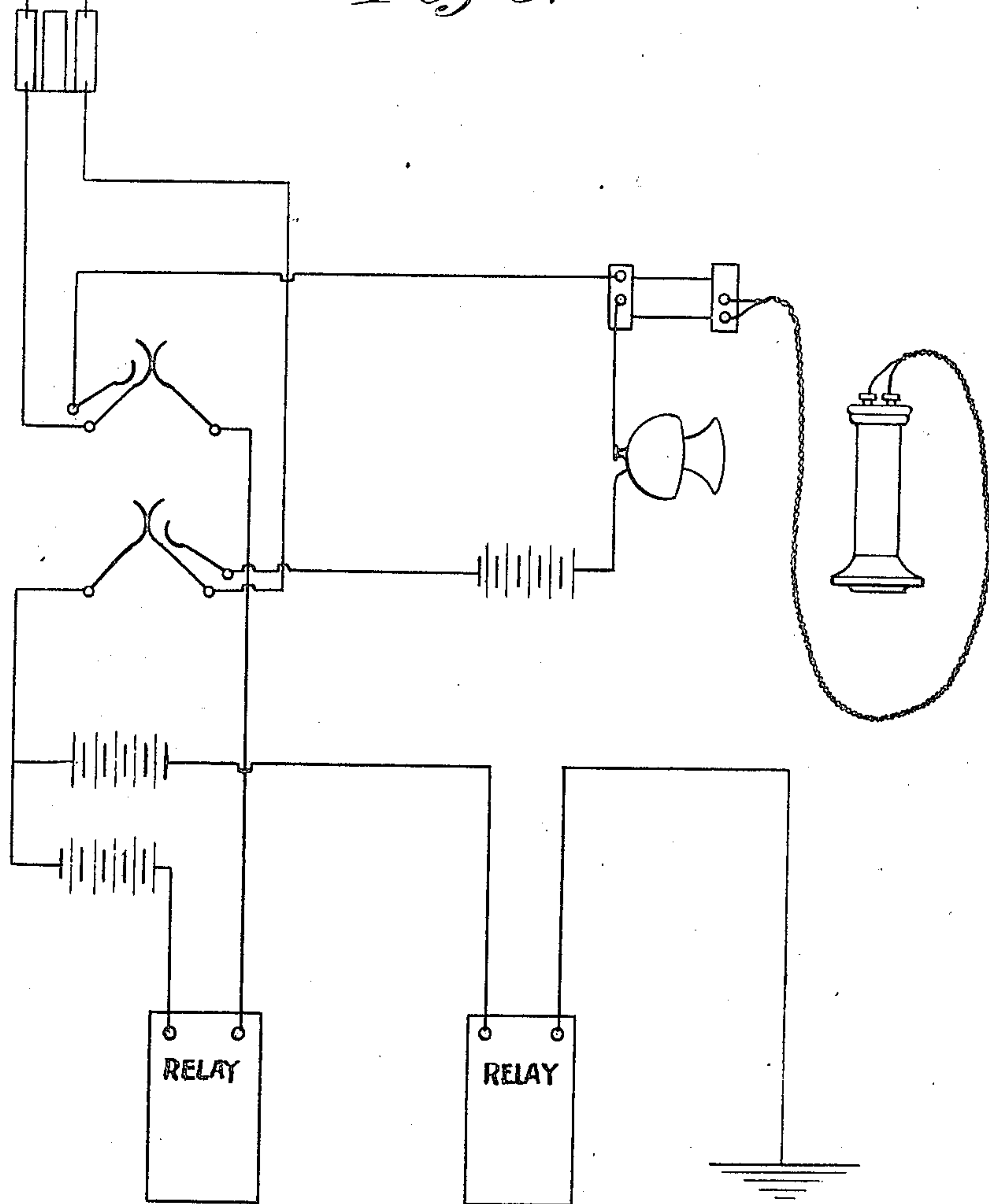
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6 SHEETS—SHEET 5.



*Fig. 9.*



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6 SHEETS—SHEET 6.

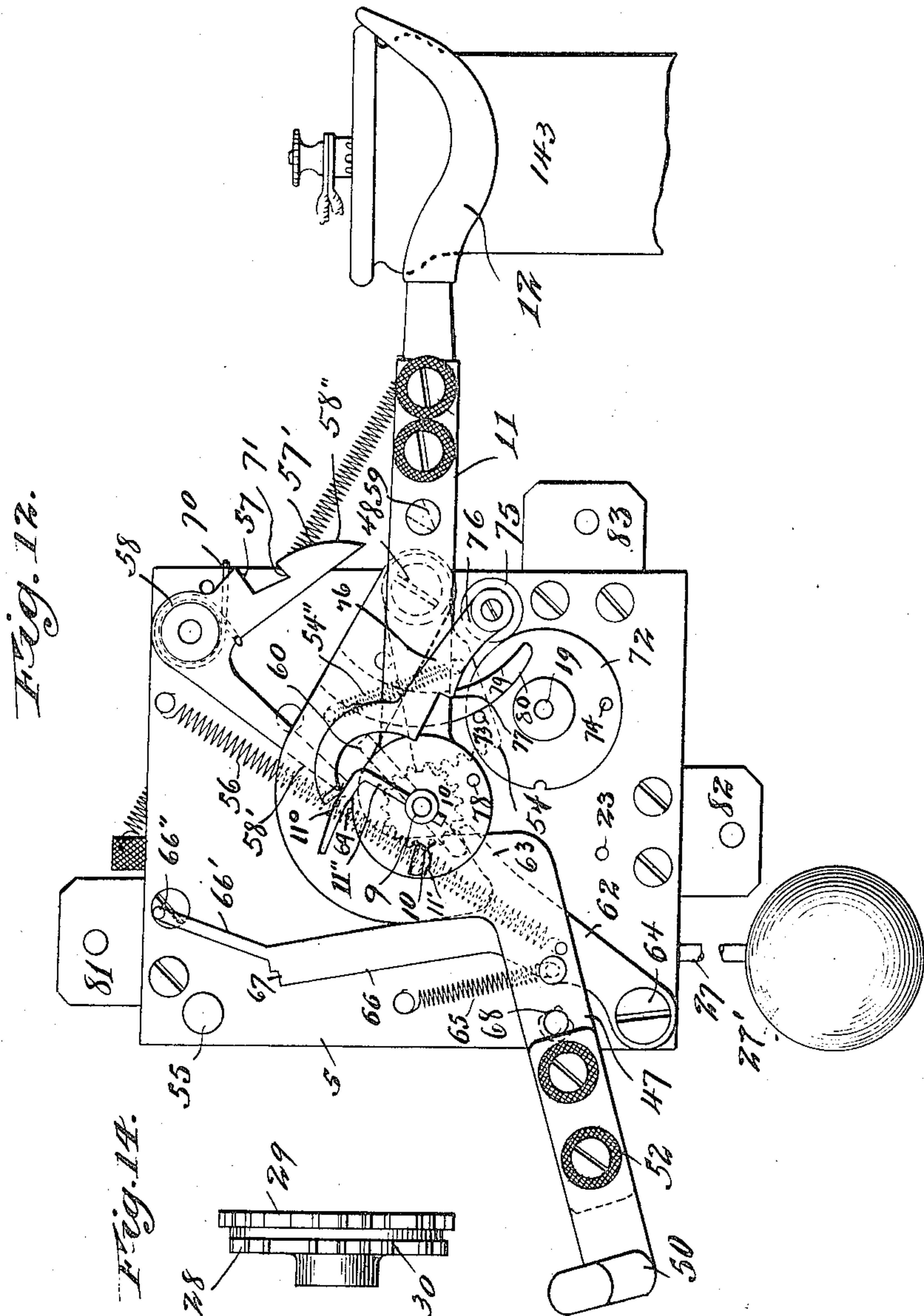
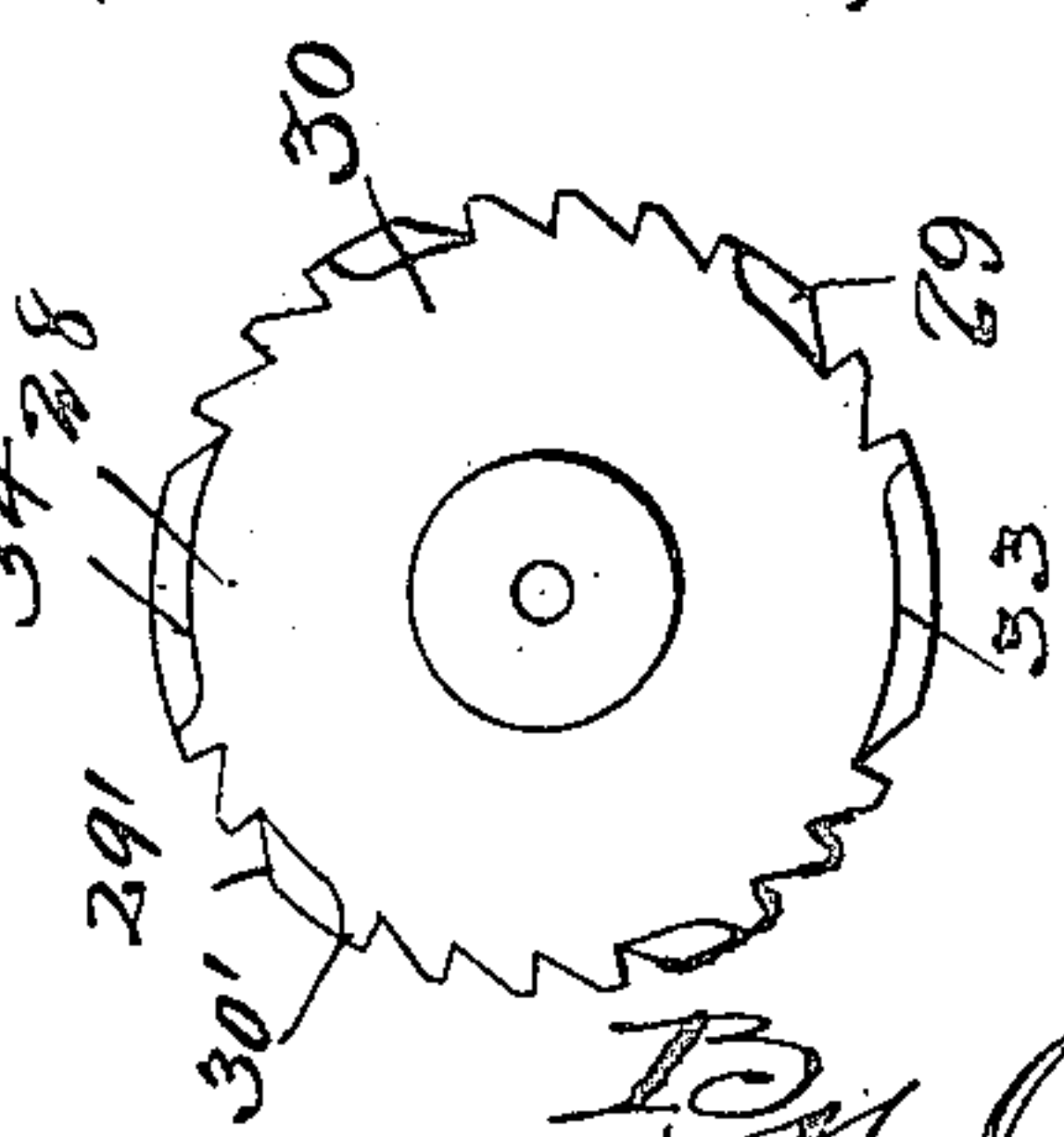


Fig. 12.

Fig. 14.

Fig. 13.



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# UNITED STATES PATENT OFFICE.

EDGAR E. SALISBURY, OF CHICAGO, ILLINOIS, ASSIGNOR TO SIGNALPHONE ALARM COMPANY,  
A CORPORATION.

## COMBINED AUTOMATIC SIGNALING AND TELEPHONE SYSTEM.

No. 921,894.

Specification of Letters Patent.

Patented May 18, 1909.

Application filed November 25, 1901. Serial No. 83,606.

*To all whom it may concern:*

Be it known that I, EDGAR E. SALISBURY, of Chicago, Illinois, have invented certain new and useful Improvements in a Combined Automatic Signaling and Telephone Sys-

tem, of which the following is a specification. This invention relates to improvements in combined automatic signaling and telephone systems, and refers more specifically to a system especially designed for use in sending in fire alarms or the like, although, as will hereinafter appear the system is capable of application to other uses.

Among the salient objects of the invention are to provide a system which reduces to a minimum the possibilities of becoming accidentally disarranged or failing to send in a full and exact signal, the signaling apparatus being to this end made as nearly automatic throughout as possible; to provide a combined system so constructed and arranged that the telephone may be used independently of the alarm system; but is at the same time so combined therewith that the telephone cannot by any possibility be operated to interfere with the signaling mechanism, in case the operator tries to both telephone and send in an alarm; to provide in a system of the character referred to improved details of construction and arrangement which render it possible to send in different kinds of signals over the same wires, as, for example, a "regular alarm" operating to sound gongs or other signals and recording the station from which the call is sent in, and a "still alarm" which records the station from which the signal is sent, but does not sound the gong or other alarm; to provide an improved system wherein a complete metallic circuit is combined with a ground to ground circuit in such manner that either circuit may be relied upon for use and the disabling of one does not necessarily disable the other; to provide operating mechanism which prevents the possibility of confusing the character of the alarm being sent in, as, for example, when a "regular alarm" is being sent in to prevent the mechanism being so changed as to send a "still alarm" and vice versa when a still alarm is being sent to prevent a regular alarm from being switched in; and, in general, to provide an improved apparatus of the character referred to.

To these ends the invention consists in the matters hereinafter described and more par-

ticularly pointed out in the appended claims, and the same will be readily understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a general perspective view of a call-box embodying my invention, the box being shown open, and the internal mechanism mounted upon the inner door exposed to view. Fig. 2 is a front elevation of the box closed. Fig. 3 is a perspective of the box with the outer door only open. Fig. 4 is a view showing the automatic signaling mechanism in side elevation, the view being taken looking at that side of the mechanism which is applied and attached to the inner face of the door, or, in other words, looking at the face of the mechanism opposite that shown in Fig. 1. Fig. 5 is a top plan view of the mechanism shown in Fig. 4, fragmentary portions of the swinging door upon which said mechanism is mounted and adjacent portions of the casing being shown in section. Fig. 6 is a side elevation of said mechanism looking at the right-hand side of the mechanism, as shown in Fig. 4. Fig. 7 is a vertical section taken on line 7—7 of Fig. 6 and looking in the direction of the arrows. Fig. 8 is a view partly diagrammatic, and partly of actual construction showing the inner face of the inner door with the upper mechanism removed and including also a detail of an automatic switch mechanism operated by the opening and closing of the door, the latter mechanism being shown in inside face elevation. Fig. 9 is a diagrammatic view of the circuit connections at the headquarters station; the automatic switch mechanism mounted upon the door of the alarm box being repeated from Fig. 8 so as to show more clearly the relative connections. Fig. 10 is a detail top plan view of the cut-out switch which is opened by the closing of the inner door. Fig. 11 is a fragmentary detail in top plan view of a second switch mechanism. Fig. 12 is a view similar to Fig. 4 showing the parts in changed position. Figs. 13 and 14 are face and edge elevations respectively of the contact wheel.

A brief explanation of the general functions and operation of an apparatus embodying my present invention will, it is thought, aid materially in a ready comprehension of the exact mechanism employed. Describing then the apparatus generally, it comprises a



box having two doors, an outer door controlled by a lock, and which, when open, affords access to a manually operable lever, which, when pulled down and released, serves to send in a general alarm automatically, and an inner door upon the interior of which is mounted the principal signaling mechanism and a subscriber's telephone set combined therewith. The inner door is held closed simply by a turn button so that it may be opened freely, but automatic mechanism is provided which, when the outer door has been opened and the regular alarm lever pulled down, serves to prevent the inner door from being opened until the signaling mechanism has completed its automatic operation, the object of this arrangement being, of course, to prevent interruption of the signals being sent in as a regular alarm.

In case it be desired to send what is known as a "still alarm", namely, an alarm which merely calls the attention of headquarters to the signaling instrument at that station, but does not sound the general alarm, this "still-alarm" is sent by opening the inner door and removing the receiver of the telephone set from its supporting hook, whereupon the signaling mechanism, released by the removal of said receiver, automatically sends in the still alarm. Mechanism is provided which automatically locks such parts as might be made to interfere with the signaling mechanism during the sending in of the still alarm, but at the end of the sending in of this series of signals, the mechanism is again restored to operative condition so that the telephone may be used in the ordinary manner of a regular telephone.

The system comprises an all-metallic circuit and a ground to ground circuit over the same lines, the all-metallic circuit being employed for sending in the regular alarm, and the ground to ground circuit for sending in the still alarm. The automatic switch mechanism is, therefore, provided, which is operated by the opening of the inner door to short circuit or cut-out that part of the all-metallic circuit which includes the signaling mechanism, but this short circuiting takes place at a point in the line outside the telephone set circuit, so that while the telephone apparatus employs the all-metallic circuit while in use, its operation can, nevertheless, not affect the signaling apparatus to send in a false alarm. The ground connection at the call box which enables a still alarm to be sent in while the inner door is open, notwithstanding the signaling apparatus has been short-circuited so far as the metallic circuit is concerned, comprises one or more contact fingers which normally stand free from the contacting make and break wheel or element which is operated mechanically and automatically by the removal of the receiver from its hook, so that this ground connection

is normally an open one and does not interfere with the use of the telephone, but transmits the signal by being alternately closed and opened during the traverse of the contacting wheel past the contacting finger.

Inasmuch as the opening and closing of both the inner and outer doors serves to operate certain switch mechanisms, means are provided for automatically locking each of these doors against closing at improper times; means being provided for automatically locking open the outer door as soon as it has been opened, so that it cannot be closed until the authorities with what I term the "release-key" operate the lock, and means being provided for locking the inner door against being opened during the time a regular alarm is being sent in. Various other co-operating mechanisms are provided, contributing to render the apparatus "fool proof" so that it cannot be improperly operated at any time either by the excited citizen, by careless inspectors or repairers, or by tamperers.

With the above general description in mind I will now proceed to describe more in detail the particular mechanism employed in the present instance for carrying out the invention.

Referring to the drawings, Fig. 1 designates as a whole the main body of the call-box which is of suitable, strong and weather-proof construction, is made to open at its front side, and provided with double doors 2 and 3 respectively closing said opening; these doors being hinged at the same side, as indicated clearly in Fig. 3. Upon the inner face of the inner door is mounted the movement or spring actuated mechanism, which serves to send in the alarm signals; the signals caused by this mechanism being of the make or break order, and the number or designation of the particular box being operated, being determined by the number of makes and breaks and intervals between makes and breaks, after the Morse system.

Referring more particularly to Fig. 1, and Figs. 4 to 7 inclusive, 4 and 5 respectively designate front and back frame plates which form the principal frame supports upon which the mechanism of the movement is mounted; said frame plates being spaced apart and held rigidly with each other by means of a plurality of cross frame members or space bolts as 6, 7 and 8. 9 designates a main shaft or arbor journaled to extend through the front and back plates near the central portion thereof, and extending some distance beyond or outside of said plates at each of its ends. Upon said shaft adjacent to, and immediately outside of the back plate is keyed a pinion 10, and outside of said pinion is loosely mounted a receiver-hook arm 11, the end of which terminates in the usual fork 12 to receive the receiver body.



The end of the receiver arm is operatively connected with the main shaft so as to rotate the latter positively when the receiver arm is depressed, by means of a stud 11' mounted upon the hub portion of said arm, and engaging a through-pin 11" inserted through said shaft, as best shown in Fig. 15. Between the frame plates is loosely mounted upon the main shaft a gear 13, and adjacent thereto, but mounted rigidly upon the main shaft a ratchet wheel 14 adapted to engage a pawl 15, mounted upon the side of the gear 13, and held in engagement with the ratchet by means of a suitable spring 16, likewise mounted upon the gear 13. The watch spring 17 mounted upon the inner face of the back plate by means of a stud 18 secured to its outer end and operatively connected at its inner end with the main shaft, tends to constantly rotate the main shaft in the direction of movement operating to lift the receiver arm after the latter has been depressed. By reason of the ratchet and pawl engagement between the main shaft and gear 13, the latter is therefore rotated positively during the upward movement of the receiver arm, but remains stationary during the downward movement of said arm. 19 designates a second shaft or arbor journaled in the frame plates, adjacent to the periphery of the gear 13, and carrying a pinion 20 rigid therewith and intermeshing with said gear 13. Upon said shaft 19 is also mounted a gear 21 likewise rigid with the shaft and arranged to intermesh with the pinion 22 of a third shaft 23, which also carries an escapement-wheel 24. 25 designates an escapement-pallet mounted upon a rock-shaft 26 adjacent to and in position to cooperate with said escapement-wheel; a pendulum shaft 27 being connected with the lower end of the pallet which carries at its lower end a pendulum 27'. The train of gearing thus described serves to regulate the return rotation of the main shaft after it has been rotated in one direction by the receiver hook arm, or by another lever to be hereinafter described, so as to impart a uniform and relatively slow return movement to said main shaft. Upon the front end of the shaft 19, outside of the front plate, is mounted the contact or character-wheel 28 which serves to make and break the circuit; said wheel being rigid with the shaft upon which it is mounted. In the present instance said contact-wheel is of duplex character constituting in effect two contact-wheels side by side, each of which is provided with series of contact teeth, as 29 and 30. In the present instance also each of the duplicate wheels has a second series of contact teeth as 29' and 30' respectively, which second series are arranged in diametrically opposite relation to the other series of the same wheel, and are duplicates thereof. The object of this ar-

range is to secure greater certainty of operation in the making and breaking of the circuit, and to this end I provide two brushes as 31 31' and 32, 32'; for each of the two wheels the respective pairs of brushes being arranged in exactly diametrically opposite relation, so that they will simultaneously make and break contact, or, in other words operate synchronously with each other. The duplicate contact wheels are in electrical connection with each other, and are, as shown herein, in fact, made integral with each other, and are alike, with the exception that one of said wheels, namely, that one upon which the series of contact teeth 30 and 30' are formed, is provided at diametrically opposite points, as indicated at 33, 34 (Fig. 13) with cut-away portions, which prevent the brushes 32 and 32' which cooperate with that contact wheel, from resting in contact with the latter during the time said wheel occupies its normal stationary position.

The brushes 32 and 32' are respectively connected with a binding post 35 mounted upon the inner door, by means of conductors 36 and 37, as indicated clearly in the diagrammatic Fig. 8, and the binding post 35 is in turn connected with the ground at 137 through a conductor 38, also as shown clearly in said figure. The two brushes 31 and 31' are electrically connected with each other by a conductor 135, and the brush 31 with a binding post 39' by means of a conductor 134. It may be mentioned at this point that the several brushes which cooperate with the contact wheel, are mounted upon insulating blocks 45 and 46, while the contact wheel itself is in electrical connection with the other metallic parts of the movement, as will hereinafter appear.

In addition to the receiver arm hereinbefore described as mounted upon the main shaft, another arm or lever is provided which is also capable of actuating the main shaft alternately. Referring to Fig. 4, 47 designates a manually operable lever pivotally mounted at one end upon the back plate by means of a suitable stud 48 and bent between its ends as indicated at 49, to avoid interfering with the main shaft and extending obliquely across and upwardly, approximately in alinement with the normal position of the receiver hook arm; it being understood that the normal position of the receiver arm is depressed, with the receiver supported thereon. At its free end said arm is provided with a right-angle extension or handle portion 50, which extends back through a suitable slot 51 in the inner door, and protrudes beyond the latter sufficiently to enable it to be grasped and pulled down. The handle end portion 50 of said lever is insulated from the main body thereof, as indicated at 52 and 53 in Figs. 4 and 5.



The slot 51 is formed concentric with the pivotal axis 48 of said lever. Upon the pivot stud 48 and moving independently of the lever 47, is mounted a gear segment 54, which is arranged to intermesh with the pinion 10 of the main shaft when said lever is oscillated downwardly; the angular width of said segment and the throw of the lever connected therewith, being such as to rotate the main shaft and thereby wind the motor spring a sufficient amount to impart two complete revolutions to the contact wheel during the unwinding movement, which is permitted after the return of the lever. The segment is moved positively during the downward movement of the handlever, by means of a stud 54' mounted upon said lever and engaging the upper side of the segment, but the return movement of the segment is accomplished by the return rotation of the signaling mechanism after the hand lever has completed its return; the segment being yieldingly connected with the handlever by means of a coiled contractile spring 54'' which, at the end of the upward movement of the segment lifts the latter free from the gear 10. In this connection it may be explained that the revolution imparted to said main shaft by the movement of the receiver arm in one direction, is only sufficient to rotate the contact wheel shaft one-half revolution, and it will be remembered that the rotation of the contact wheel is not accomplished during the downward movement of either the receiver hook lever or arm, or the lever 47 (which for convenience, will hereinafter be termed the hand lever), but after said levers have returned to their uppermost positions. The limit of movement of the hand lever upwardly is determined by means of a fixed stud 55, and it is normally drawn toward its uppermost position by means of a coiled contractile spring 56, while the limit of upward movement of the receiver arm is determined by a shoulder 57 formed upon a peculiarly shaped pivotally mounted detent 58, mounted upon the back frame plate, and which shoulder 57 is engaged by a stud 59, carried by said receiver arm.

Describing now the mechanism whereby the movement of the receiver arm and hand lever are controlled in such manner that only one of said levers can be operated at a time; the other being locked immovably from the time one lever leaves its normal position until it has returned to this position. 60 designates a through-pin, best shown in Fig. 4 which is inserted through the main shaft of the movement adjacent to the outer face of the back frame plate and projecting at each of its ends some distance beyond its shaft, as shown clearly in said figure. The shorter end 61 of said through-pin, normally rests in engagement with one arm 63 of a Y-shaped detent or locking member 62, which is piv-

otally mounted at 64 upon said back plate and is normally held outwardly in bearing with said through-pin by means of a coiled spring 65. 66 designates the second arm of said detent, which is arranged to extend upwardly; the end of this arm being provided with a shoulder 67, which, when said detent is permitted to oscillate by depression of the hand lever and consequent withdrawal of the end of the through-pin, tends to swing under a stud 68, mounted upon the hand lever. The arm 66 does not, however, engage the stud 68 until said arm has returned to its normal upper-most position, since it is the downward movement of the hand lever which withdraws the end 61 of the through-pin which holds said detent and the latter is, therefore, not permitted to swing under the stud until the stud has descended below the shoulder. Upon the return of the hand lever, however, the arm 66 snaps into engagement with the stud and remains thus engaged until the end 61 of the through-pin has returned to its normal position by the subsequent gradual return movement of the mechanism. The long end 61' of the through-pin engages a stud 69 mounted upon the back plate, and thereby limits the return motion of the main shaft under the action of the watch or motor spring 17, when the receiver arm is permitted to rise. At the time while said through-pin is resting in engagement with the stud 69, it also engages the depending arm 58' of the V-shaped detent 58, hereinbefore referred to, thereby holding the latter inwardly against the tension of a spring 70 acting upon said detent and tending to oscillate it in a direction to bring its opposite arm into bearing with the stud 59 of the receiver arm. The engaging arm 58'' of said detent is provided with a hook-shaped notch 71, which is adapted to engage with the stud 59 and lock the receiver arm against downward movement, when said detent is permitted to swing outwardly under the action of the spring 70. Inasmuch as the receiver arm is normally depressed, the through-pin is normally rotated away from the stud 69, and the V-shaped detent is, therefore, in readiness to snap into locked engagement with the receiver-arm when the latter is permitted to rise, which it does quickly when the receiver is lifted therefrom, and it will remain thus locked until the gradual unwinding of the movement carries the through-pin into position to retract the V-shaped detent. The receiver-arm may, therefore, be operated repeatedly, but never during the unwinding movement of the mechanism.

Means are provided for locking the movement from starting to automatically actuate the contact wheel, until whichever lever has been drawn downwardly to set the movement, has completely returned to its upper-



most limit. In the case of the receiver arm this is accomplished as follows: Upon the shaft or arbor 19 at a point outside of the back plate, is rigidly mounted a detent wheel 72, which carries two outwardly projecting studs 73, 74. Adjacent to said detent wheel, upon a suitable stud 75, is pivotally supported a latch or detent 76, which is provided at a point intermediate its length upon its lower side with a shoulder 77 adapted to engage with either of the studs 73, 74, to hold the shaft 19, from rotation; this shaft being the one upon the opposite end of which the contact wheel is mounted. Upon the receiver arm at a point slightly removed from the main shaft, is mounted a lifting stud 78, which, when the receiver arm is in its uplifted position, engages the under side of the detent 76 and lifts it sufficiently to permit the studs 73 and 74 to pass by the shoulder 77 without engaging. As soon, however, as the receiver arm begins to move downwardly, the stud 78 permits the detent 76 to descend and thus prevents the detent wheel 72 from rotating; it being understood that the studs 73 and 74 are so located with reference to the normal stationary position of the shaft 19 that one or the other of said studs will be directly beneath the shoulder 77. In order to similarly lock the detent wheel 72 against movement during the actuating movement of the hand lever 47, the latter is provided with a curved downwardly projecting arm 79, the surface or edge 80 of which remote from the pivotal axis of said hand lever, is curved concentric with said axis, and arranged to pass in front of that one of the studs 73 or 74 which happens to be uppermost, as said hand lever is depressed. The length of the arm 79 is such as to just permit the studs 73 and 74 to pass by its lower end when the hand lever is fully lifted.

Inasmuch as the normal position of the receiver-arm is depressed, and the detent 76 is, therefore, in position to arrest the movement of the detent wheel 72, it is necessary to provide means for lifting said detent 76, whenever the movement is to be actuated by the hand lever 47. To this end, therefore, the through-pin 11" is provided with an extension 11' bent rearwardly, with reference to the direction of rotation of the shaft during the downward movement of the receiver arm, which extension acts as a cam to engage the free end of the detent 76 and lifts the latter out of the way of the pins 73 and 74. The normal position of the through-pin 11" is that shown in Fig. 4, and in which position it does not interfere with the operation of said detent 76 when actuated by the receiver arm, as hereinbefore described. The movement constructed and arranged as described is secured rigidly against the inner face of the inner door, conveniently by means of a plurality of brackets, as indicated at 81,

82 and 83, through which and into the door are inserted suitable securing screws; it being understood that when thus secured in position the hand hold 50 of the hand lever will protrude through the slot 51 and outside of the door, as indicated in Fig. 3.

Describing next the mechanism which operates to prevent the inner door from being opened during the time a regular alarm is being sent in, the arm 66 of the Y-shaped detent 62 is provided at its upper end with an extension 66' having a right-angled out turned portion 66'', which extends within the fork 85 of a lever 84 (see Fig. 8) which is pivotally mounted, as indicated at 86 upon the inner face of said inner door at a point intermediate its length. The oscillation of the detent 62, which accompanies the downward movement of the hand lever, rocks the oscillatory lever 84 in a direction to lift its free end 87 upwardly into the position indicated in dotted lines in Fig. 8, in which position it stands within the path of the locking bolt 88 which holds the inner door locked; it being understood that said bolt is shifted endwise to release or unlock the door in a formal manner.

The signaling movement as a whole, is insulated from the inner door upon which it is mounted, by means of suitable insulation interposed between the brackets which support said movement and the face of the door to which they are attached, as well, also, as the oscillatory lever 84, and in order to prevent the forming of an electrical circuit through said oscillatory lever when it is engaged by the locking bolt 88, the rear end of the latter which engages said oscillatory lever, is formed of a block of insulating material, as indicated at 89. The locking bolt 88 is operated by means of a turn-button shaft 90, journaled to extend through the door and provided upon its inner end with a slotted crank-arm 91 which engages a pin 92 upon the bolt; said crank-arm being normally held or pressed in a position to throw the bolt outwardly by means of a spring 93 applied thereto; the outward movement of the bolt being limited by a stud 94, which engages one of the guides 95, through which the bolt plays.

In order to lock the hand lever against movement at all times while the inner door is open, I mount upon the outer face of the inner door a rod or plunger 97, which is arranged to reciprocate through a suitable guide 98 and is normally pressed in the direction of the hinged edge of the door by means of a coiled expansion spring 99 interposed between the guide 98 and a collar 100 upon said plunger. That end of the plunger adjacent to the hinged edge of the door is adapted to engage with the door jamb as the latter is closed, so as to shift the plunger endwise against the tension of the spring 99. The



opposite end of said plunger is connected with one end of a rocking detent 101 which is pivoted between its ends at 102 to the outer face of the door, and is arranged to project at its opposite end and beneath the hand hold 50 of the hand lever, in such position as to lock the latter against movement whenever the door is swung open and the plunger thereby permitted to shift inwardly. The oscillation of the locking detent, under the action of the spring 99 is limited by means of a suitable stud 103. Obviously, when the door is closed the detent will be automatically withdrawn out of the path of the hand lever.

At the time the telephone is being used, it is necessary that one of the circuits, which in the normal operation of sending signals is closed, should be opened, and I provide means for automatically opening this circuit by the operation of the mechanism incident to the removal of the receiver from the receiver arm.

Referring more particularly to Figs. 1 and 8, and particularly to the diagrammatic representation of the contact wheel and connected parts shown in Fig. 8, 104 designates a fixed contact piece mounted upon a suitable insulating block 105 upon the outer face of the front frame plate, and 106 designates a spring-contact finger similarly mounted upon an insulating block 107, and normally resting in engagement with the contact 104. The engaging end of the spring contact 106 is curved outwardly, as best shown in detail Fig. 11, and upon the end of the main shaft which projects through the front plate, is mounted a radial arm 108, which in the normal position of the receiver arm, stands away from said contact finger, but when the receiver arm has been removed and the main shaft thereby permitted to rotate, is carried into engagement with the outwardly curved end of the spring finger and opens the circuit between it and the fixed contact 104. It may be explained at this point, that the operation of the hand lever does not effect the opening of the circuit between contacts 104, 106, since the depression of the hand lever rotates the arm 108 in a direction away from the spring contact finger, and upon its return it is always arrested in the position shown in Figs. 1 and 8, and it is only when the receiver arm is released and rises, that the arm 108 opens the circuit as described.

As mentioned in the preliminary description of the apparatus, the metallic circuit is short circuited, so as to cut out the signaling apparatus during the time the inner door is open for the purpose of either sending a still alarm or using the telephone. This is accomplished by means of the following mechanism. Referring to Fig. 8, 109 designates as a whole a block of insulating material which is secured to the inner surface of the

side wall of the box adjacent to the hinge axis of the inner door, and upon this block is mounted a pair of spring contact blades 110, 111 respectively, which, when unrestrained, bear against each other, as shown clearly in plan view Fig. 10. Upon the inner face of the inner door is mounted a wedge-shaped member 112, also of insulating material, and so arranged that the pointed end thereof 113 will pass between the intermediate ends of the spring blades 110 111 and force the latter apart, as the door reaches its closed position, thereby interrupting the circuit at this point. Inasmuch as the call-box mechanism is never employed, except when the box is opened, I take advantage of this circumstance to normally cut the entire mechanism out of circuit with the line wires so as to avoid any danger of the box being injured by lightning or other stray currents which might pass over the lines. To this end, therefore, I mount upon the inner face of the side wall of the call-box, adjacent to the swinging edge of the door, a switch mechanism, shown in detail in Fig. 8 at the left-hand side thereof; said switch mechanism being mounted upon an insulating block, designated as a whole 114. This mechanism comprises four pairs of spring contact blades as 115, 116, 116' and 117, two pairs on each side being arranged to face toward the two pairs at the opposite side, so that a blade-like switch-member designated as a whole 118, may reciprocate between said pairs to alternately open and close circuits therethrough. The blade member 118 is of two-part construction, the opposite ends thereof 119 and 120 being insulated from each other by means of an interposed insulation block 121. The stationary blades 117 and 115 are respectively connected with the right and left hand sides of the signaling circuit of the apparatus by means of conductors 122 and 123, while the opposite ends of the movable member 118 are respectively connected with the right and left main lines by means of conductors 124 and 125. The blades 116 and 116' are integral with each other and, therefore, close the circuit between the main right and left lines when the switch-blade member is shifted into engagement with the same.

In order to actuate the movable switch-member, the latter is provided with an extension 126 working through a guide 127 and adapted to be engaged at its end by a stud or projecting arm 128 mounted upon the inner face of the outer door of the call-box, as best indicated in Fig. 3. The length of the stud 128 is such as to force the movable blade-member into open position or into engagement with the blades 116 and 116' when the door is fully closed. In order to move the switch-blade member positively into engagement with the contact blades 115, 117



during the opening movement of the door, the extension 126 is provided with a spring-catch 129 which projects beyond the end of said extension, and is provided with a hooked end 130 adapted to engage a corresponding notch 131 formed in the stud 128. And in order to release said spring-catch at the proper moment when the door has been opened sufficiently to properly close the switch, a stud 132 is mounted upon the base-block 114 and arranged to project into the path of the inclined outer end of the spring-catch so as to engage the latter and force it outwardly out of engagement with the notch, thereby disengaging the stud from the switch-blade member at the proper point. Upon the closing movement of the door the end of the stud 128 engages the extension 126 and shifts the switch in the opposite direction; the spring-catch passing into engagement with the notch 131 as soon as it is moved away from the stud 132.

The mechanism of the apparatus concerned in the signaling and telephoning operations, having now been described, a description of the arrangement of the circuits will be in order. Referring more particularly to the diagrammatic Figs. 8 and 9, and assuming that the outer door is open and the inner door closed, in which position the circuit would be open at the switch-blades 110, 111, instead of closed as shown, and the apparatus in condition for sending in a regular alarm, the circuit may be traced as follows: from the right-hand main line, entering the box through the switch blades 120, 117, and conductor 122 to the conductor 43 connected with the binding post 39; thence through conductor 41 to contact piece 104, spring-contact finger 106, and back to a binding post 39' through a conductor 133. From the binding post 39' a conductor 134 leads to one of the brushes 31, which, it will be remembered, are normally in bearing with the contact wheel 28. The two brushes 31 and 31' are electrically connected by means of a conductor 135. It will also be remembered that the principal parts of the mechanism of the movement, including the contact wheel, are in electrical connection. The return circuit, therefore, may be traced from the front plate 4 through a conductor 42 to a binding post 40, thence through a conductor 44 to the contact device 111, and thence to the contact blade 115 through the left-hand conductor 123, and to the main line through the movable switch-blade and conductor 125. The contact brushes 31 and 31' are so adjusted as to bear upon the contact wheel and the latter is provided with teeth so constructed that the rotation of the wheel past the brushes breaks the circuit between each tooth, thereby sending in a series of impulses which operate the responsive mechanism at headquarters; and, in the case

of sending in the regular alarm, it will be remembered that the contact wheel is rotated by the motor spring 17, after the movement has been set by the actuation of the hand lever. Next describing the circuit as it exists when a still alarm is sent in, and in which case the inner door, as well as the outer door is open, the circuit from the main right-hand line in through the switch mechanism and several conductors to the contact wheel, will be the same as before described. However, in view of the fact that the circuit is now closed between contact blades 110 and 111, so that a complete metallic circuit is formed from the binding post 39 through the conductor 41, contact devices 104, 106 and conductor 133 back to the binding post 39', and from the latter to the contact strip 110 through a conductor 136, it will be seen that the operation of the contact wheel will fail to open the circuit and the instruments at headquarters responsive to the metallic circuit, will, therefore, not be operated. However, a normally open circuit is provided from the contact wheel to ground which is alternately closed and opened by the operation of the contact wheel, and it is this circuit which operates the still alarm mechanism. This circuit may be traced as follows: from the contact brushes 32 and 32', which, it will be remembered are normally out of bearing with the contact wheel, through conductors 36 and 37 to a binding post 35, and from this binding post through a conductor 38 to ground, as indicated at 137. As the contact wheel rotates and the several teeth thereof are brought into bearing with the brushes 32 and 32', this circuit is closed to ground, it being understood that the opposite end of the line at headquarters is also grounded, thereby forming the necessary circuit to operate the still alarm mechanism. In this connection it may be pointed out that inasmuch as the contact wheel is, at the time of sending in a still alarm in electrical connection with both right and left hand main lines, this ground to ground circuit will operate equally well should either one of the main lines happen to be disabled, so long as one remains intact. The still alarm, it will be remembered, is sent in automatically by simply lifting the receiver of the telephone from the receiver-arm, thereby permitting the latter to rise.

It now remains to describe the metallic telephone circuit, which is placed in readiness for operation as soon as the telephone receiver has been removed from the receiver-arm, and the automatic movement of the mechanism in sending in the still alarm has been completed. As the main shaft, which carries the arm 108 (see Fig. 1) approaches its final position, or that position which it occupies at the end of sending in the still alarm, said arm 108 opens the circuit contact be-



tween the switch members 104, 106 as hereinbefore described. The telephone circuit is then as follows: from the right-hand main line through binding post 39 and a conductor 137 to the primary of the induction coil 138, through said primary and thence to the transmitter 139 through a conductor 140, and from the transmitter to binding post 39' through a conductor 141. From the binding post 39', the circuit is back to the contact brushes 31 and 31' by a conductor 134, through the movement, and from the front plate 4 back to binding post 40, and thence out to the main line through conductor 44 contact strap 111 and conductor 123, thus completing the circuit. The circuit through the receiver, which is as usual an induced current, may be traced from the secondary of the primary out through a conductor 142 to and through the receiver 143, and back to the secondary through a conductor 144.

The use and operation of the telephone is obviously precisely identical with that of any ordinary telephone and need not, therefore, be described.

The apparatus has now been fully described, and in connection with the description of the several features thereof, its use and carrying out its several functions has been clearly described, and it is, therefore, deemed entirely superfluous to repeat these operations.

I claim as my invention:

1. In an electric alarm system the combination of a call-box, a signaling mechanism arranged therein and comprising a movable contact device provided with two series of contact projections adapted to send over the line definite series of impulses, a spring motor whereby said signaling mechanism may be automatically operated, means for releasing said signaling mechanism to permit it to operate automatically under the action of said spring motor, a contact brush adapted to cooperate with one series of contact projections of said movable contact device, normally out of electrical contact with said contact device, a ground to ground circuit extending from the headquarters station through said contact brush, movable contact device and the ground, a second contact brush arranged to cooperate with the second series of contact projections of the movable contact device and normally forming a closed circuit there-through, a complete metallic circuit extending from headquarters through said last mentioned contact brush, movable contact device and back to headquarters, a closure for the call-box arranged to control access to said releasing mechanism, and a switch operatively connected with said closure, normally held open when the closure is closed and operating to automatically close the complete metallic circuit when the closure is opened, for the purpose set forth.

2. In an electric alarm and telephone system, the combination of a call-box provided with outer and inner closures, automatic signaling mechanism and a subscriber's telephone set arranged within said call-box, a ground to ground circuit extending from headquarters to and through the signaling mechanism, a complete metallic circuit likewise extending from headquarters to and through the signaling mechanism, a manually operable device controlling the operation of said automatic signaling mechanism, accessible and operable when the outer closure is opened, and a second manually operable device controlling the operation of said signaling mechanism accessible and operable when both inner and outer closures are opened, a switch mechanism, operatively connected with the inner closure and operating to short-circuit said signaling mechanism when the inner closure is opened, whereby mechanism responsive to the signaling mechanism of the call-box through the metallic circuit may be operated when the outer closure only is open, and other mechanism responsive to the grounded circuit may be operated when the inner closure is open, for the purposes set forth.

3. In a combined electric alarm and telephone system, the combination of a call-box provided with outer and inner closures, automatic signaling mechanism mounted upon the inner side of the inner closure, a motor spring operatively connected with said signaling mechanism, a hand lever operatively connected with said signaling mechanism and having a part extending through said inner closure and accessible for operation from the outside of the latter, a telephone receiver-arm operatively connected with said signaling mechanism and operating to release the latter for operation when the telephone receiver is removed therefrom, a make and break contact device forming a part of said signaling mechanism, and provided with two series of contact projections, a normally open contact brush cooperating with one of said series of contact projections, and a normally closed contact brush cooperating with the other series, a ground to ground circuit extending from headquarters through the normally open contact brush and said make and break device to ground, and a complete metallic circuit likewise extending from headquarters through the normally closed contact brush and make and break device and back to headquarters.

4. In an electric alarm system the combination of a call-box, a signaling mechanism arranged therein, and comprising a contact wheel provided with two series of contact projections, a spring motor whereby said signaling mechanism may be automatically operated, means for releasing said signaling



mechanism to permit it to operate automatically under the action of said spring motor, a contact brush adapted to cooperate with one series of contact projections, normally in contact with said wheel, a complete metallic circuit extending from headquarters to said call-box and including said contact brush and contact wheel, a second contact brush arranged to cooperate with the second series of contact projections of said contact wheel and normally out of circuit therewith, a grounding conductor connected with said last mentioned brush at the call-box station, and a grounding connection at the headquarters end of said metallic circuit, a shunt line and a switch for short-circuiting said signaling mechanism relatively to said metallic circuit, the portions of said contact wheel constituting the two series of contact projections being electrically connected with each other whereby the ground to ground circuit may be used over either the right or left main lines of the metallic circuit, substantially as described.

5. In a combined electric alarm and telephone system, a call-box, an automatic signaling mechanism arranged therein, comprising a movable contact device adapted to send over the line definite series of impulses, a spring motor adapted to operate said signaling mechanism automatically, means for tensioning said spring, means for releasing said signaling mechanism to permit it to operate automatically under the action of said spring motor for sending in a regular alarm, a main line wire circuit extending from headquarters to and through said signaling mechanism, a shunt loop connected with said main circuit at the call-box, a subscriber's telephone set electrically connected in said shunt circuit, a telephone receiver arm adapted to support the receiver of said telephone set, said receiver arm constituting a second releasing means which permits the signaling mechanism to operate for sending in a still alarm, and an automatic switch connected with a moving part of said signaling mechanism and operating to open the main line circuit through said signaling mechanism as the latter approaches the conclusion of its movement, as and for the purpose set forth.

6. In a combined electric alarm and telephone system, a call-box, an automatic signaling mechanism arranged therein comprising a movable make and break contact device, a motor mechanism adapted to operate said make and break device, means for releasing said signaling mechanism to permit it to operate automatically for sending in a regular alarm, a subscriber's telephone set connected in circuit with the signaling mechanism but operable independently thereof, an interlocking mechanism serving to positively lock the telephone mechanism against functional operation during the functional

operation of the signaling mechanism, and other locking mechanism operating to positively lock the signaling mechanism against functional operation during functional use of the telephone mechanism for the purposes set forth.

7. In a combined electric alarm and telephone system, a call-box, an automatic signaling mechanism arranged therein and comprising a motor actuated by a movable make and break device, a hand lever operatively connected with said signaling mechanism for setting the latter in operative condition, a telephone receiver arm constituting a release adapted to permit the automatic operation of the signaling mechanism, a subscriber's telephone set operatively connected in circuit with the signaling mechanism, and automatically operated detents interconnected to operate alternatively, one to lock the receiver arm against functional operation, while the signaling mechanism is operating and the other to lock the hand lever against functional operation while the telephone is in use, for the purposes set forth.

8. In a combined electric alarm and telephone system, the combination of a call-box, an automatic signaling mechanism arranged therein comprising a movable make and break contact device, a spring motor adapted to operate said make and break contact device automatically, a hand lever operatively connected with said motor mechanism and operating to set the latter when oscillated in one direction, but free to return independent of the movement of the signaling mechanism, a retarding mechanism operating to control the operation of the signaling mechanism after it has been set by the hand lever, a receiver arm constituting a support for the telephone receiver, and also a release controlling movement of the signaling mechanism, a subscriber's telephone set connected in circuit with the signaling circuit, an automatic locking mechanism operating to lock the signaling mechanism against movement after it has been set by the forward movement of the hand lever until the hand lever has substantially returned to its initial position, and an automatic locking mechanism operating to control the position of the receiver arm, normally permitting free movement of said arm, but automatically brought into operative relation to the latter during the functional operation of the signaling mechanism, for the purposes set forth.

9. In a combined electric alarm and telephone system comprising a signaling mechanism, the combination with a manually operable actuating device for operating said signaling mechanism, and a telephone receiver support operatively connected with said signaling mechanism to control movements of the latter, of a detaining device controlling the movements of the signaling



mechanism, a part moving with said manually operable actuating device and operating to prevent movement of the detaining device in all positions of the manually operable actuating device, except its normal or initial position, and a detent moving with said receiver support arranged to normally prevent movement of said detaining device and automatically shifted to release the latter when the telephone receiver is removed from the support, for the purpose set forth.

10. In a combined electric alarm and telephone system comprising a signaling mechanism, the combination with a manually operable actuating device for operating said signaling mechanism, and a telephone receiver support operatively connected with said signaling mechanism to control movements of the latter, of a detaining device controlling the movements of the signaling mechanism, a part moving with said manually operable actuating device and operating to prevent movement of the detaining device in all positions of the manually operable actuating device, except its normal or initial position, and a detent moving with said receiver support arranged to normally prevent movement of said detaining device and automatically shifted to release the latter when the telephone receiver is removed from the support, said last mentioned detent being operatively connected with the manually operable actuating device so as to be shifted out of operative position during the functional operation of the latter, for the purposes set forth.

11. In an electric alarm system, the combination with a call-box having outer and inner closures and an automatic signaling mechanism, operable to send signals of one character while the outer closure is open and the inner closure closed, and of another character when both closures are open, of means for preventing the opening of said inner closure during the automatic operation of said signaling mechanism, comprising a shiftable detent operatively connected with said automatic mechanism and brought into operation by the functional operation of the latter, said shiftable detent being arranged to prevent the release of the locking mechanism of the inner door, substantially as described.

12. In an electric call-box provided with a closure and an automatic signaling mechanism mounted upon said closure, and adapted to operate automatically for a predetermined interval after being manually released, manually operative means for effecting release of said signaling mechanism while said closure is open, manually operable means for effecting the release of said signaling mechanism while the closure is closed, a locking mechanism controlling the opening of said closure, and an automatic detent operatively connected with said signaling

mechanism and brought into operation by the starting of the latter, said detent being arranged to prevent the unlocking of the door during the pre-determined operation of the signaling mechanism, substantially as described.

13. In an electric call-box provided with a closure and an automatic signaling mechanism mounted upon said closure and adapted to operate automatically for a predetermined interval after being manually released, a hand lever operatively connected with said signaling mechanism for setting the same and accessible when the closure is closed, a second lever operatively connected with said signaling mechanism for releasing said mechanism, and accessible only when the closure is open, and an automatic locking device for locking said manually operable lever.

14. In an electric system, the combination with a box provided with a closure and electrically operated signaling mechanism therein, of a main line circuit including said box, but normally shunted around said signaling mechanism, means for automatically switching said circuit through said mechanism as the box is opened, comprising a switch mounted within the box provided with a shiftable conductor-member permanently connected with the main line extending from said box, a part thereof arranged to project into the path of the closure during the closing movement of the latter, which movement operates to shift said conductor-member to cut out said signaling mechanism, an interlocking mechanism adapted to positively connect said shiftable member with the closure so as to shift the former to cut in said signaling mechanism during the opening movement of the closure, and an automatic disconnecting mechanism operating to release said interlocking mechanism at a predetermined point in the opening movement of the closure, for the purpose set forth.

15. In an automatic electric alarm system, the combination with the call-box provided with a hinged door, and the signaling mechanism arranged therein, of means for automatically opening a circuit leading to and through said signaling mechanism when said door is closed comprising a switch base mounted upon the interior of the box, and provided with oppositely disposed pairs of contact blades and a shiftable blade member adapted to reciprocate between said pairs of blades, said shiftable member being permanently connected with the main line wires leading into the box, and one pair of said contact blades being permanently connected with the conductors leading to and through the signaling mechanism, a projection mounted upon the door and adapted to engage and shift the shiftable switch member into open



circuit position when the door is closed, a spring latch mounted upon the part engaged by said projection and operating to automatically interlock with the latter when said parts are brought into contact, and a throw-off stud mounted upon a stationary part in the path of the spring latch and adapted to disengage the latter from projection during the opening movement of the door for the purposes set forth.

16. In an automatic electric alarm system, the combination with the call-box provided with a hinged door, and the signaling mechanism arranged therein, of means for automatically opening a circuit leading to and through said signaling mechanism when said door is closed comprising a switch base mounted upon the interior of the box, and provided with oppositely disposed pairs of contact blades and a shiftable blade member adapted to reciprocate between said pairs of blades, said shiftable member being permanently connected with the main line wires leading into the box, and one pair of said contact blades being permanently connected

with the conductors leading to and through the signaling mechanism, a projection mounted upon the door and adapted to engage and shift the shiftable switch member into open circuit position when the door is closed, a spring latch mounted upon the part engaged by said projection and operating to automatically interlock with the latter when said parts are brought into contact, and a throw-off stud mounted upon a stationary part in the path of the spring latch and adapted to disengage the latter from projection during the opening movement, of the door, the pair of contact blades with which said shiftable switch member is engaged, when in open circuit position, being electrically connected with each other whereby a closed circuit is formed, from one main line to the other which does not extend through the signaling mechanism.

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Witnesses:

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