

G. BABCOCK.
SIGNALING SYSTEM.

APPLICATION FILED MAY 31, 1906.

904,918.

Patented Nov. 24, 1908.

2 SHEETS—SHEET 1.

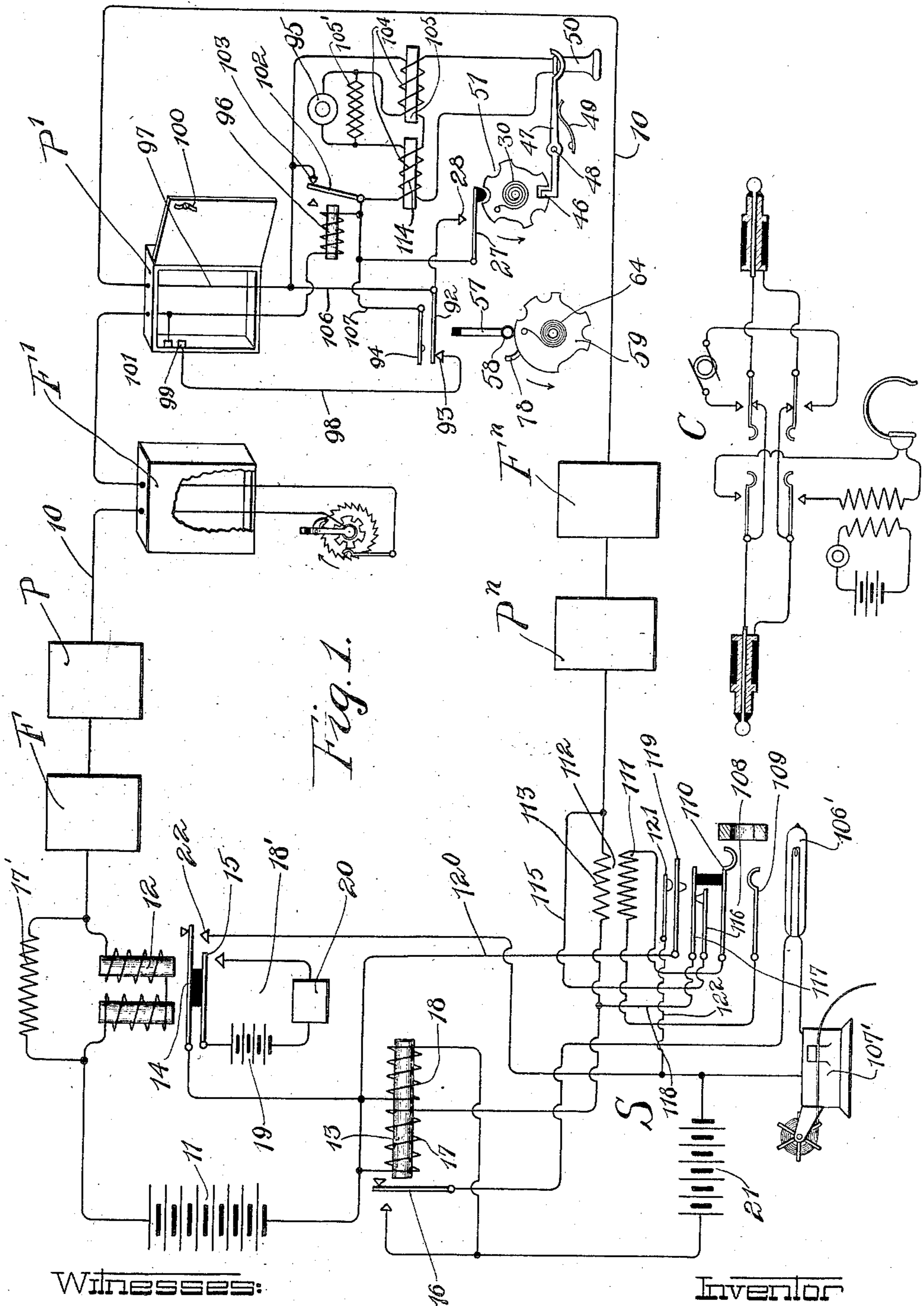


Fig. 1.

Witnesses:

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By

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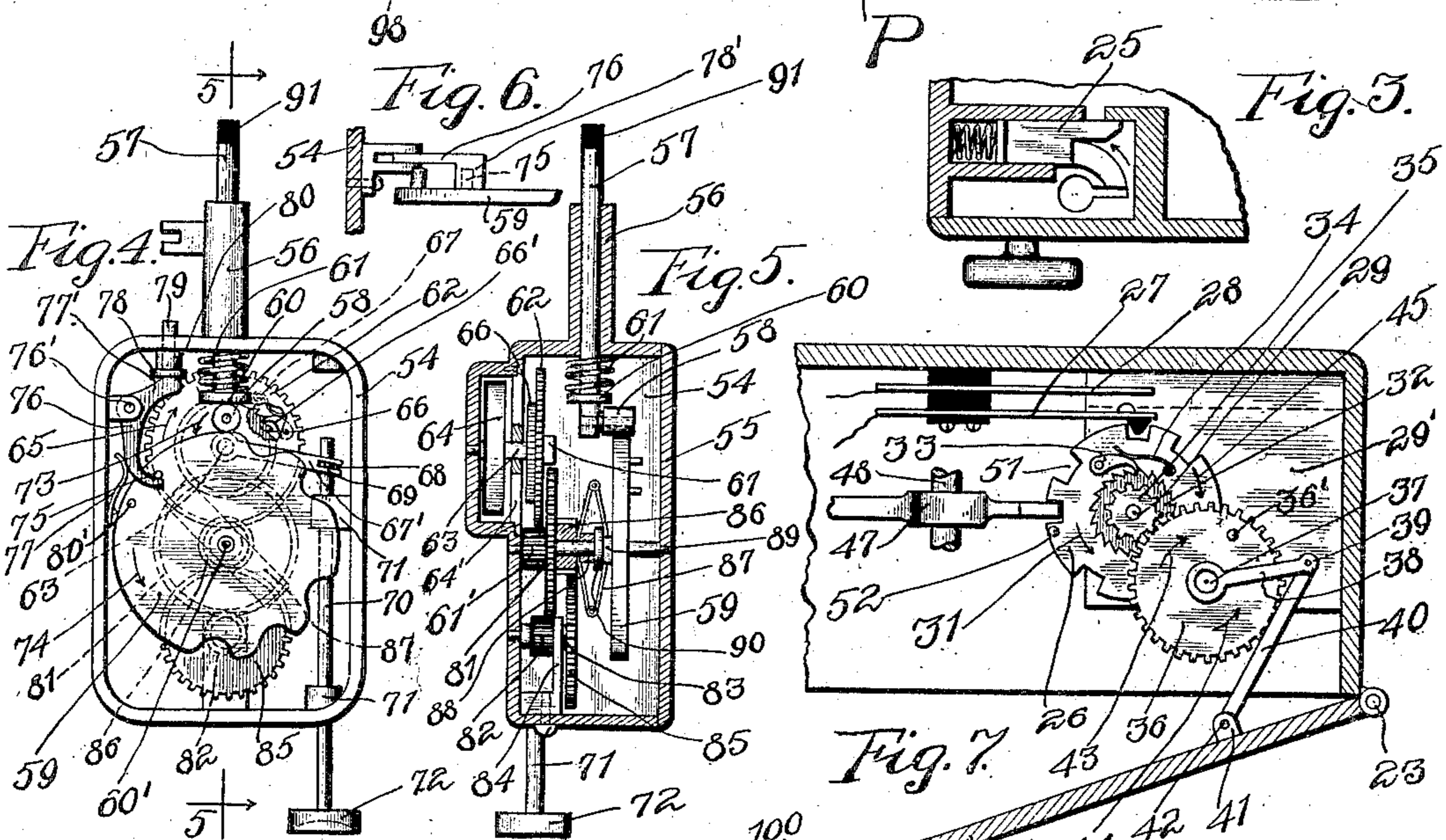
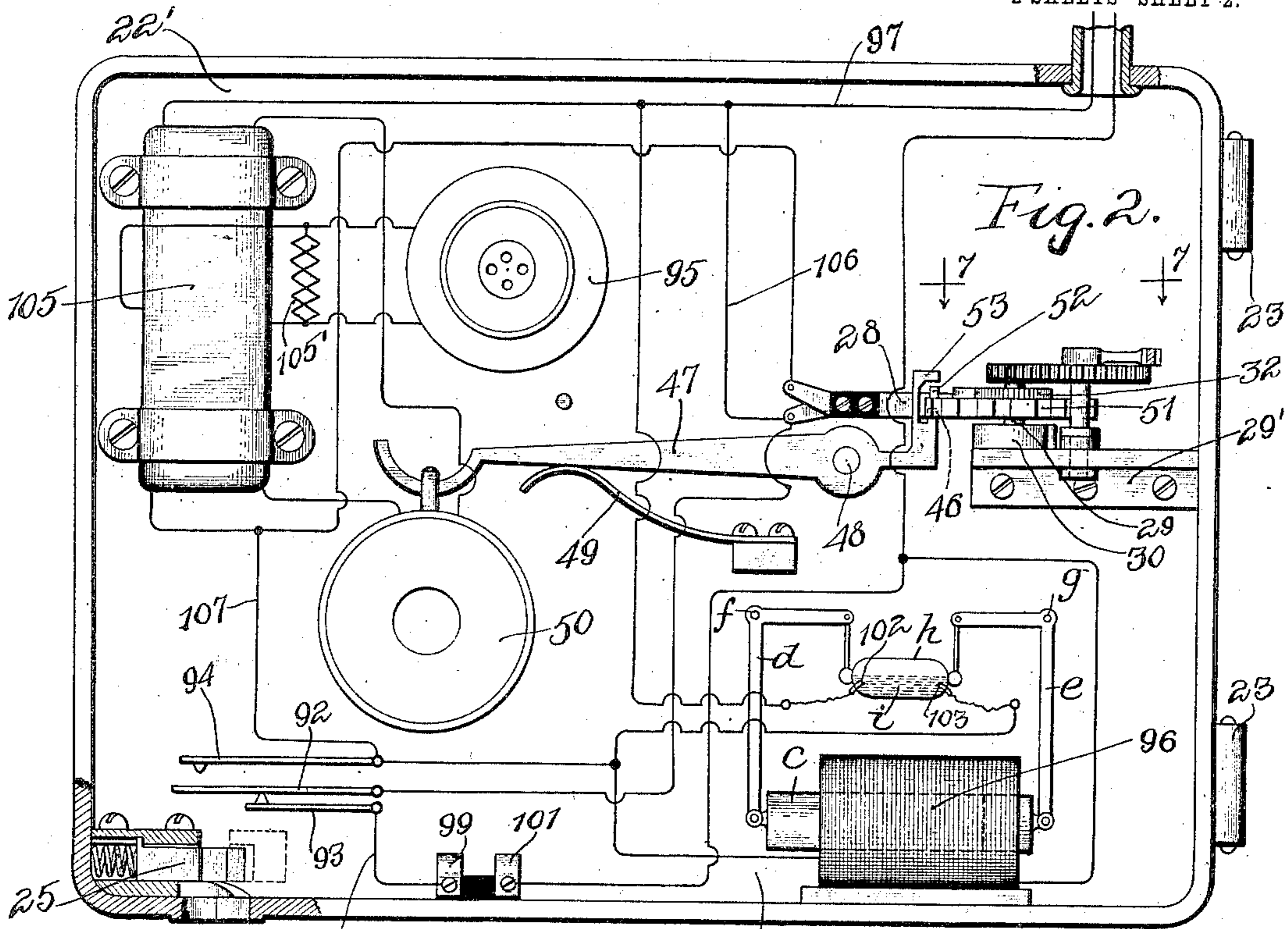
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UNITED STATES PATENT OFFICE

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SIGNALING SYSTEM.

No. 904,918.

Specification of Letters Patent.

Patented Nov. 24, 1908.

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To all whom it may concern:

Be it known that I, GARRISON BABCOCK, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Signaling Systems, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to combined fire alarm, police signal and telephone systems, and has for its object the provision of a system in which the operation of the various apparatus is, as nearly as possible, automatic.

In general it may be said that a system constructed in accordance with my invention provides a construction whereby the fire alarm boxes and police signal boxes are located in a single circuit and whereby the policeman's number and the number of the sub-station may be automatically telegraphed to the central station when the policeman or watchman opens the box to use the telephone apparatus in order to communicate with the central station.

My invention provides a system whereby each of the different officers is furnished with a key in which is disposed suitable mechanism for bringing about telegraphic communication with the central station, this telegraphic communication being in accordance with a predetermined code and for the purpose of causing the operation at the central station of indicating mechanism whereby the number of the officer may be recorded. Furthermore, I provide means whereby the number of the sub-station may be automatically telegraphed to the central station and recorded as in the case of the officer's number when the officer opens the box and brings into use the telephone apparatus for the purpose of making the report of his beat.

My invention will be more clearly understood by reference to the accompanying drawings, in which

Figure 1 is a diagrammatic drawing of the circuit arrangement employed. Fig. 2 is a more or less diagrammatic drawing of the policeman's telephone box, the cover being removed to illustrate more clearly the mechanism disposed therein. Fig. 3 is a detail view of the policeman's box. Fig. 4 is an elevation view of the policeman's key, part

of the case being removed to show the interior mechanism. Fig. 5 is a section taken on the line 5, 5 of Fig. 4. Fig. 6 is a detail view which will be hereinafter described. Fig. 7 is a view taken on the line 7, 7 of Fig. 2.

Referring now to Fig. 1, I have illustrated a main circuit wire 10 leading from the central station S to a series of fire alarm boxes F, F', F'', etc. and also to a series of police boxes P, P', P'', etc. The fire alarm boxes need not be specifically described in the present application, as their construction is well known to those skilled in the art. I provide means for interrupting the fire alarm circuit in accordance with a predetermined code, the breaks in the circuit being of different lengths and sequence according to a code employed by means of which the circuit employed at the central station indicates which of the fire alarm boxes has been manipulated. The main circuit leads through the main battery 11, the fire alarm relay 12 and the police signal relay 13, the circuit being normally closed, thereby holding the armatures 14 and 15 of the relay 12, and the armature 16 of the relay 13 in an attracted position. The relay 12 which may be of considerable impedance, is shunted by the non-inductive resistance 17' and controls, by means of its armature 15, the local circuit 18' including the source of current 19 and suitable indicating or recording means 20. The relay 12 and its armature are so adjusted that an absolute break in the main circuit causing the complete cessation of the flow of current will cause the retraction of the armature to close the local circuit and cause the operation of the signaling apparatus 20. A slight weakening of the current, however, due to the inclusion of a resistance in the main circuit will not sufficiently deenergize this relay to permit of the retraction of its armature. The relay 13 is sluggish or slow acting and is provided with two windings 17 and 18, the winding 17 being of a sensitive nature whereby a predetermined increase of resistance in the circuit will cause the retraction of the armature 16. The winding 18 of the relay 13 is included in a local circuit containing the auxiliary source of current 21 and adapted to be opened and closed at 22 by the retraction of the armature 14 of the relay 12. Taking into consideration now

those portions of the circuit which have so far been referred to, it will be seen that an absolute break in the main circuit, by reason of the actuation of the mechanism in any one of the fire alarm boxes will cause the deenergization of the fire alarm relay 12. Upon such deenergization the local circuit 18' will be closed and the indicating or recording means 20 will be operated. This deenergization will also cause the armature 14 to fall back upon the contact 22, thereby closing the local circuit through the winding 18 of the relay 13 and the source of current 21. The relay 13 thus remains energized and therefore the armature 16 will remain in its attracted position. It is thus apparent that the fire alarm apparatus may be operated without interfering in any way with the police recording mechanism at the central station. The circuit may be interrupted by the make and break mechanism in the fire alarm box in accordance with any predetermined code, whereby the indicating means 20 may indicate the location of the fire alarm box which has been manipulated. The armature 16 of the relay 13 is, as has been before stated, normally held attracted by reason of the normally closed main circuit through the relay 13 and through the main battery 11, and is held in this attracted position when an absolute break in the circuit takes place by reason of the closure of the local circuit through the winding 18 and the source of current 21. The apparatus at the sub-station is preferably mounted within the case 22'. Hinged at 23 is the door 24, said door being adapted to be normally held closed by way of the lock 25.

At 26 I have shown a break-wheel for interrupting a shunt circuit, the interruptions being of such a code that they may telegraph to the central station the number of the police box upon the proper operation of the make and break mechanism. Mounted as shown are the springs 27 and 28, the spring 27 being so controlled by the break-wheel 26 that it may make and break connection with the spring 28. I provide means whereby this make and break mechanism is set for operation by the closure of the box door and is brought into operation by the removal of the telephone receiver from its switch-hook. This construction is as follows: The break-wheel 26 is loosely mounted upon the shaft 29 about which is disposed a coiled spring 30 tending to produce a rotation of the shaft in the direction of the arrow 31, the shaft 29 being mounted in the frame piece 29' secured to the box. Keyed upon the shaft 29 is the ratchet wheel 32, which is normally engaged by the pawl 33 upon the break-wheel 26 and is normally held in such engagement by way of the spring 34. A gear-wheel 35 is also secured to the shaft 29 and meshes with the gear-wheel 36, loosely mounted upon a shaft

37, the shaft 37 being supported by the frame piece 29'. Mounted on the shaft 37 is the arm 38 to which is pivoted at 39 the connecting piece 40, this connecting piece being pivoted at 42 to the lug 41 on the box door. The gear 36 is provided with the pin 36' which is adapted for engagement with the arm 38, as is evident from the drawing. It is evident, by reference to Fig. 7, that the closing of the door will, by reason of the connecting piece 40 and arm 38, cause a rotation of the shaft 37, and, because of the engagement of the arm 38 with the pin 36', will cause a rotation of the gear 36, in the direction of the arrow 44. This will cause a rotation of the shaft 29 in the direction of the arrow 45, thereby winding the spring 30. The break-wheel 26 will be held stationary during this rotation by the stop 46 upon the receiver hook 47. Upon the opening of the box door the arm 38 will be removed from engagement with the pin 36', the mechanism, however, being retained by reason of the engagement of the stop 46 with the break-wheel 26. The receiver hook is pivoted at 48 and is associated with a spring 49 tending to raise the same, and it is evident from the drawing that when the receiver 50 is removed from the hook the stop 46 will be drawn out of engagement with the break-wheel 26, thereby releasing the mechanism and permitting its rotation in the direction of the arrow 31. The slots 51, 51 in the break-wheel 26 form the predetermined code and it is evident that the rotation of this break-wheel will cause the interruption of the circuit at the springs 27 and 28 according to this predetermined code. As I have shown in the drawing, the code is disposed upon the break-wheel so that the number of the sub-station may be telegraphed to the central station during one complete revolution of the break-wheel 26. In order that this break-wheel may make but one revolution each time that the door is opened and the receiver is removed from the hook, I provide the following construction: At 52 I have shown a pin disposed upon the break-wheel 26. When the receiver is removed from the hook, thereby removing the stop 16 from engagement with the break-wheel the projection 53 upon the receiver hook is lowered so that it is brought into the path of the pin 52. Thus, when the revolution has been practically completed, the further movement of the break-wheel 26 is prevented by reason of the engagement of the pin 52 with the projection 53. When the receiver is placed upon the hook the extension 53 is removed from engagement with the pin 52, whereby the break-wheel is free to move in the direction of the arrow 31. This movement is, however, very slight, as it is almost immediately stopped by reason of the return of the stop 46 to its normal position whereby

the break-wheel is secured against further rotation in either direction.

In order that the policeman's or watchman's number may be telegraphed to the central station automatically, I provide make and break mechanism within the watchman's key for unlocking the policeman's box. This key is clearly shown in Figs. 4, 5 and 6. The case 54 is provided with the cover 55 and the extension 56 which carries the key-blade for engagement with the latch mechanism of the lock. Within this extension is mounted the sliding rod 57 which is provided at its lower end with the roller 58, this roller being adapted for engagement with the break-wheel 59. In order to insure constant engagement between the roller 58 and the break-wheel 59, I provide the sliding rod 57 with the collar 60, between which and the key case is disposed the helical spring 61. The break-wheel is secured to the shaft 60'. Mounted in the key case and also mounted upon this shaft is the gear 61' which meshes with the gear wheel 62, loosely mounted upon the shaft 63, secured in the key case and in the brace 64'. About this shaft is disposed the coiled spring 64 which tends to produce rotation of the shaft in the direction of the arrow 65. Keyed to this shaft is the ratchet wheel 66 which is adapted to be engaged by the pawl 66'. A spring 67 holds the pawl 66' into this engagement. Also upon the shaft 63 is secured the arm 67', provided with the forked end 68 which is adapted for engagement with the pin 69 upon the sliding rod 70, mounted in the lugs 71, 71. The sliding rod 70 is provided at its outer end with the finger piece 72 and it is evident that when this rod is pushed inwardly it will cause a rotation of the shaft 63 in the direction of the arrow 73. This rotation will wind the spring, back movement of the shaft 63 being prevented by its association with other mechanism as follows: The spring 64 tends to cause rotation of the break-wheel 59 in the direction of the arrow 74. This rotation, however, is normally prevented by reason of the engagement with a pin 75 upon the break-wheel of the bell crank lever 76; this bell crank lever being pivoted at 76', and normally held in such engaging position by way of the spring 77. The pin 75 engages only that portion of the bell crank lever consisting of the projection 78' extending downwardly therefrom. This construction is clearly shown in Fig. 6. The arm 77' of the bell crank lever engages at its outer end the head 78 of the sliding pin 79, this pin being mounted in the boss 80 upon the key case. It is evident that a downward pressure upon the pin 79 will cause a movement of the bell crank lever 76 about the pivot 76', thus removing the projection 78' from engagement with the pin 75 and allowing the release of the break-

wheel mechanism. I prefer this method of releasing the break-wheel mechanism because it secures the release at the proper time entirely automatically. When the key is inserted in the lock of the police box the stud or pin 79 will engage the outer surface of the box and will be forced downwardly thereby securing the release of the break-wheel mechanism as has just been described. The break-wheel is to be of such construction that the projections and indentations thereon will cause a movement of the sliding rod 57 corresponding to the number of the watchman or policeman according to any predetermined code. Although it is not essential, I prefer to dispose these projections and indentations upon the break-wheel so that the number of the policeman will be telegraphed to the central station during one complete revolution of the break-wheel. In order that the movement each time that the key is inserted in the lock will be limited to but one revolution, I provide upon the break-wheel 59 the pin 80', this pin being disposed, as shown in the drawing, at a further distance from the shaft 60' than the pin 75. When the stud 79 is depressed, thereby allowing the rotation of the break-wheel, the projection 78' will be brought out of the path of the pin 75 and into the path of the pin 80'. It is thus evident that when the break-wheel has made practically a complete revolution the pin 80' will engage the projection 78', thus causing a halt in the movement of the mechanism. When the key is withdrawn from the lock the spring 77 will force the bell crank lever out of engagement with this pin 80', thereby allowing the further rotation of the break-wheel 59. This rotation will, however, be almost immediately stopped because the projection 78' has once more been placed in the path of the pin 75. It is thus seen that the mechanism is in position for rewinding, the back movement being prevented by this engagement. In order that the speed of this mechanism may be governed, I provide upon the shaft 60' the gear-wheel 81 which meshes with the pinion 82, mounted upon the shaft 83, which in turn is mounted in the key case and in the bearing 84. Upon this shaft 83 is also secured the gear-wheel 85 which meshes with the pinion 86 loosely mounted upon the shaft 60'.

Secured to the pinion 86 is the spring governor 87 and the collar 88. The spring governor engages, as clearly shown in Fig. 5, a groove 89 cut in an extension forming a part of the break-wheel 59. The rotation of the shaft 83 and the consequent rotation of the pinion 86 and the governing mechanism will cause, by virtue of centrifugal force, pressure of the collar 90 of the break-wheel 59 against the sleeve 88, this pressure being proportional to the speed of rotation of the mechanism.

anism. Thus the rate of rotation of the break-wheel is held constant in a simple and efficient manner. When the key is inserted in the lock the insulated end 91 of the sliding rod 57 engages the contact spring 92 thereby breaking connection between the spring 92 and the spring 93. Since the roller 58 is on the outer periphery of the break-wheel 59, the spring 92 will be brought into engagement with the spring 94. A rotation of the break-wheel 59 will secure a series of interruptions of the circuit at the springs 94 and 92, these interruptions corresponding to the indentations in the periphery of the break-wheel 59, these indentations corresponding to a predetermined code and the number of the watchman or policeman. This making and breaking of the circuit at this point will telegraph to the central station, as will be hereinafter described, this watchman's or policeman's number while he is opening the box. When the box has been opened and the receiver has been removed from the hook, the make and break mechanism within the box will be released, whereby the box number is telegraphed to the central station. The telephone apparatus, consisting of the receiver 50 and the transmitter 95 may then be brought into use whereby the policeman may be enabled to converse with the operator or other person at the central station. These circuit arrangements will be hereinafter described. At 96 I have shown a relay which I find it advantageous to use in this connection, this relay being of particular design, comprising the energizing coil 96, the core *c*, bell crank levers *d* and *e* pivoted to the ends of the core and pivoted at their elbows at *f* and *g*, respectively. A mercury cup *h* is suspended from the free ends of the levers and contains the contacts 102 and 103 and mercury *i*. The entire apparatus in the police box is normally short-circuited, this shunt consisting of the conductor 97, conductor 106 the spring 92, contact 93, conductor 98, contact 99, connector 100 and contact 101, the connector 100 being so disposed upon the door of the box that when it is closed it will electrically connect the contact pieces 99 and 101. This shunt is bridged about the relay 96 which is so constructed and adjusted that it requires a comparatively large current to secure operation while a lesser current will hold it in the operated position. On account of this relay being normally shunted, it is normally inoperative. The contact armature 102 of the relay 96 normally connects with the back contact 103, and when in this inert position effectively shunts the telephone apparatus. The purpose of this construction will hereafter appear.

Normally a circuit is complete through the fire alarm relay 12, main battery 11, the sensitive winding 17 of the relay 13 winding 113

and the various fire and police boxes. When the officer's key is inserted into the lock, connection between the spring 92 and the contact 93 will be broken, thereby breaking the shunt about the relay 96 and allowing the full current to pass through said relay. The relay is then operated, causing the attraction of the contact armature 102 and the consequent interruption of the shunt about the telephone apparatus. When the officer's key has been completely inserted and connection between the spring 92 and the spring 94 has been made, a shunt consisting of the conductor 106, spring 92, spring 94 and conductor 107 will be closed about the telephone apparatus. The telephone apparatus consists of the repeating coil 105, the primary winding 104 of which is divided into two parts, the transmitter being connected between the two parts, as indicated in the drawings. The secondary circuit consists of the secondary winding 114 and the receiver 50. I bridge the non-inductive resistance 105' about the transmitter 95, in order to insure a path for signaling current even if the transmitter connections be broken.

The operation of the springs 92 and 94 make and break the shunt about the primary winding 104 and the transmitter 95 and resistance 105', thereby cutting into and out of the circuit the joint resistance of the transmitter and the windings. The resistance of the relay 96 is so adjusted and the relay 13 is so adjusted that when the resistance of the relay 96 is in the circuit containing the fire alarm relay, the main battery 11, and the winding 17 of the relay 13, the current passing through the winding 17 will be sufficient to hold the armature 16 in an attracted position; but the adjustment of the relay 13 is such that when the joint resistance of the transmitter 95, winding 105' and the winding 104 is introduced into the circuit the current passing through this circuit will not be great enough to sufficiently energize the relay 13 so as to keep the armature 16 in an attracted position. This current, however, is sufficient to hold the armatures of the relay 12 in an attracted position so that this relay will not be in any way affected. It is evident now that if the circuit resistance condition changes at the springs 94 and 92 be made according to some predetermined code a corresponding action of the armature 16 of the relay 13 at the central station will be secured. The armature 16 is adapted to open and close a local circuit through a lamp 106', the signal recording device 107' and the current source 21. It is evident, then, that the action of the armature 16 of the relay 13 will cause a corresponding operation of the recording mechanism 107' and a flash of the lamp 106'. When the main circuit resistance condition changes, whereby the armature 16 of the relay 13 is released,

are made in accordance with some predetermined code, it is evident that the recording device 107' will register such telegraphic message made in accordance with the code.

5 Since the spring 92 is controlled entirely by the policeman's key, it is evident that the changes in the circuit at this spring will be made according to the code of the break-wheel in that particular policeman's key.

10 Each policeman having a different number, therefore a breakwheel of a different code, it is evident that when a policeman unlocks the police box upon his beat the circuit will average resistance condition changed by the

15 operation of the mechanism within his key according to the predetermined code whereby his particular number may be telegraphed to the central station and recorded upon the recording mechanism 107'. In

20 order to guard against the withdrawal of the key before the closing of the box, whereby the entire apparatus therein would be short-circuited, I interrupt the circuit at the contacts 99 and 101, this break adapted to be

25 closed while the box is closed by the contact spring 100.

After the policeman's number has been telegraphed to the central station and the box is opened, the policeman, in order to

30 communicate with the central station, lifts the receiver 50 from the receiver hook whereby, as has heretofore been explained, the breakwheel 26 is set in motion, the indentations upon this wheel forming a code according to which the circuit may be sub-

35 jected to a series of resistance changes by the operation of spring 27 and contact 28. Each time spring 27 is disengaged from contact 28 the introduction of the resistance of the

40 transmitter 95, the bridge 105' and primary winding 104 will result, the main line current flow being each time reduced to cause retraction of the armature 16 of the relay 13 whereby the local circuit through the lamp

45 106' and recording mechanism 107' may be closed a corresponding number of times. The code of the breakwheel 26 is such that it may telegraph to the central station the

50 number of the box which has been manipulated. The flashing of the lamp will indicate to the operator at the central station that an officer has removed the receiver from the hook at the substation. In order that the operator may converse with the officer or

55 connect him with any other person in the central station, I provide the cord circuit C. In order that the operator may connect her telephone instruments to the line, I provide the jack 108 consisting of the springs 109

60 and 110 which terminate in the secondary winding 111 of the induction coil 112, the primary winding 113 of which is in the main circuit. At the substation the receiver of the telephone set is connected with the

65 secondary winding 114 of the repeating coil

105. The primary winding 113 is normally shunted so as to exclude its resistance from the circuit while the telegraphing is taking place by the short-circuit consisting of the conductor 115, spring 116, spring 117 and 70 conductor 118. When the plug is inserted this shunt will be broken by reason of the mechanical action between the springs 110 and 117 whereby the winding 113 is brought into use. Simultaneously with this inter-

75 ruption of the shunt about the winding, a short-circuit is closed about the winding 17 in the main circuit, thus excluding the inductance of the winding 17 from the talking circuit. This short-circuit consists of the 80 conductor 118, spring 117, spring 119 and conductor 120. This would manifestly de-energize the relay 17 and cause the retraction of the armature 16 whereby the indicating mechanism of the lamp in the local 85 circuit would operate.

In order that the armature 16 may be held attracted, I provide means for closing the local circuit through the winding 18 and the battery 21 by way of the conductor 120, 90 spring 119, spring 121 and conductor 122. By this arrangement the winding 18 is energized simultaneously with the establishment of the shunt about the winding 17. Thus the armature 16 is held attracted during the 95 time conversation is being carried on. The winding 17' eliminates the necessity of talking through the relay 12. This arrangement enables the operator to converse with the policeman over a circuit free from inductance 100 and unnecessary resistances. When the conversation has been completed, the receiver is again hung upon its hook, thereby preventing the further operation of the mechanism at the substation, as has been hereinbefore 105 described. The closure of the box door rewinds the make and break mechanism within the box and also in conjunction with the withdrawal of the key closes the shunt about the apparatus within the box. 110

It is, of course, desirable that but one police box be in use at a time. In order that a second box cannot be brought into use when one is already in circuit, I so adjust and construct the relay 96 that when it is in 115 the circuit it will not allow the passage of the strong current required to bring about the initial operation of a second relay. The introduction of a second relay in a circuit will not, however, interfere with the opera- 120 tion of the relay already in the circuit, since, as has been before stated, the relay can be held in an attracted position by a current of considerably less strength than it took to bring about the initial operation. I thus 125 provide a fire alarm police signal and telephone system whereby a policeman may unlock the box and converse with the operator at the central station, the telegraphing of the policeman's number and of the substa- 130

tion number being secured entirely automatically.

It is evident that the key containing mechanism for engagement with the springs associated with the box door lock, as has heretofore been described, need not be limited to use with police signal boxes. The key may be one adapted to open ordinary door locks with which are associated the suitable springs to be operated.

While I have herein shown a preferred embodiment and but one application of my invention, it is evident that changes and modifications in construction and a different application could be made by those skilled in the art, without departing from the spirit and scope of my invention. I do not, therefore, wish to be limited to the precise construction and application herein shown and described.

I claim as new and desire to secure by Letters Patent:

1. In an alarm system, a central station, an alarm circuit extending therefrom, a police signal box connected in said circuit, contact springs within said box break-wheel mechanism in said box controlling said contact springs connected with said circuit, means whereby said break-wheel mechanism may be wound by the closing of the box door, telephone apparatus within said box, and means whereby said break-wheel mechanism is released upon the removal of the telephone receiver from its hook.

2. In an alarm system, a central station, an alarm circuit, a resistance in said circuit, break-wheel mechanism at the sub-station disposed within a box, contact springs associated with said break wheel mechanism; said break-wheel mechanism controlling said contact springs which, when operated, close a shunt about said resistance in the circuit, means for winding said break-wheel mechanism upon the closure of the box doors, telephone apparatus within said box, and means whereby the said break-wheel mechanism may be released upon the removal of the telephone receiver from its hook.

3. In an alarm system, a central station, an alarm circuit extending therefrom, a resistance in said circuit, a sub-station in said alarm circuit, break-wheel mechanism at the sub-station disposed within a box, contact springs associated with said break wheel mechanism, said break-wheel mechanism controlling the contact springs which, when operated, close a shunt about the resistance in the circuit, means for winding said break-wheel mechanism upon the closure of the box doors, telephone apparatus within said box, adapted upon actuation to release the wound up brake-wheel mechanism, whereby said contact springs may be operated to intermittently open said shunt about said resistance whereby the current in the line may

be intermittently decreased and signal receiving mechanism at the central station adapted to respond to this decrease in current.

4. In an alarm system, a sub-station in an alarm circuit extending from the central station, a resistance in said circuit, said sub-station consisting of a box, break-wheel mechanism within said box, means for winding said break-wheel mechanism upon the closure of the box door, contact springs controlled by said break-wheel mechanism, said contact springs being adapted to open and close a shunt about the resistance in the line, telephone apparatus disposed within said box, means whereby said break-wheel mechanism may be released upon the removal of the receiver from its hook, means for shunting the entire apparatus at the sub-station when the box door is closed, and a relay adapted to open a shunt about the telephone apparatus upon the opening of said shunt about the entire apparatus.

5. In an alarm system, a sub-station in an alarm circuit extending from the central station, a resistance in the circuit, said sub-station consisting of a box, break-wheel mechanism within said box, telephone apparatus within said box, means whereby said break-wheel mechanism may be wound upon the closure of said box and released by the removal of the telephone receiver from its hook, a relay for controlling a normally closed shunt about said telephone apparatus, contact springs associated with said break-wheel mechanism for controlling a shunt about said resistance in the line, and means whereby a shunt about the entire apparatus within said box may be caused upon the closure of the box door.

6. In an alarm system, a sub-station in an alarm circuit extending from the central station, a resistance in the circuit, said sub-station consisting of a box, break-wheel mechanism within said box, telephone apparatus within said box, means whereby said break-wheel mechanism may be wound upon the closure of said box and released by the removal of the telephone receiver from its hook, a relay for controlling a normally closed shunt about said telephone apparatus, contact springs associated with said break-wheel mechanism for controlling a shunt about said resistance in the line, means whereby a shunt about the entire apparatus within said box may be caused upon the closure of the box door, locking mechanism for said box, a key for unlocking said box, and springs disposed within said box approximate to the locking mechanism and adapted to be engaged by said key.

7. In an alarm system, a central station, an alarm circuit extending therefrom, a sub-station in said alarm circuit, said sub-station consisting of a box containing telephone

and break-wheel mechanism, contact springs within said box and disposed near the locking mechanism, a key adapted to engage said locking mechanism, and mechanism within said key associated with said contact springs whereby said contact springs may be operated.

8. In an alarm system, a sub-station in an alarm circuit extending from a central station, a resistance in the circuit, said sub-station consisting of a box containing telephone and break-wheel mechanism, locking mechanism for said box, contact springs disposed in said box near the locking mechanism, said contact springs normally closing a shunt about the apparatus within said box and adapted, when operated, to intermittently open a shunt about a resistance in the line whereby the current in said line is reduced, and signal receiving mechanism at the central station adapted to respond to this reduction in current.

9. In an alarm system, the combination of a main circuit, a signal box in the main circuit, contact springs in the box connected with the circuit, a key for opening the box, signaling mechanism within said key for association with said springs when the key is inserted to lock the box, and means for causing operation of the key mechanism to actuate the springs upon insertion of the key.

10. In an alarm system, the combination

of a main circuit leading to substations, a signal box at each substation, signaling apparatus within the box, a lock for the box, switch mechanism within the box near the locking mechanism and connected with the main circuit, a key for coöperating with the locking mechanism to unlock the box and for engaging with the switch mechanism upon insertion in the lock, and mechanism within the key structure for actuating the switch mechanism.

11. In an alarm system, the combination of a main line leading to a plurality of substations, a signal box at each substation for containing the substation signaling apparatus, a lock for the box, switch mechanism within the box near the lock and connected with the signaling circuits, actuating mechanism contained within a key structure adapted for connection with the lock to unlock the box, said actuating mechanism being brought into operative engagement with the switch mechanism upon insertion of the key structure in the lock, whereby the circuit conditions will be changed.

In witness whereof, I hereunto subscribe my name this 5th day of April A. D., 1906.

GARRISON BABCOCK.

Witnesses:

GEO. S. McMILLAN,
E. N. QUINBY.