

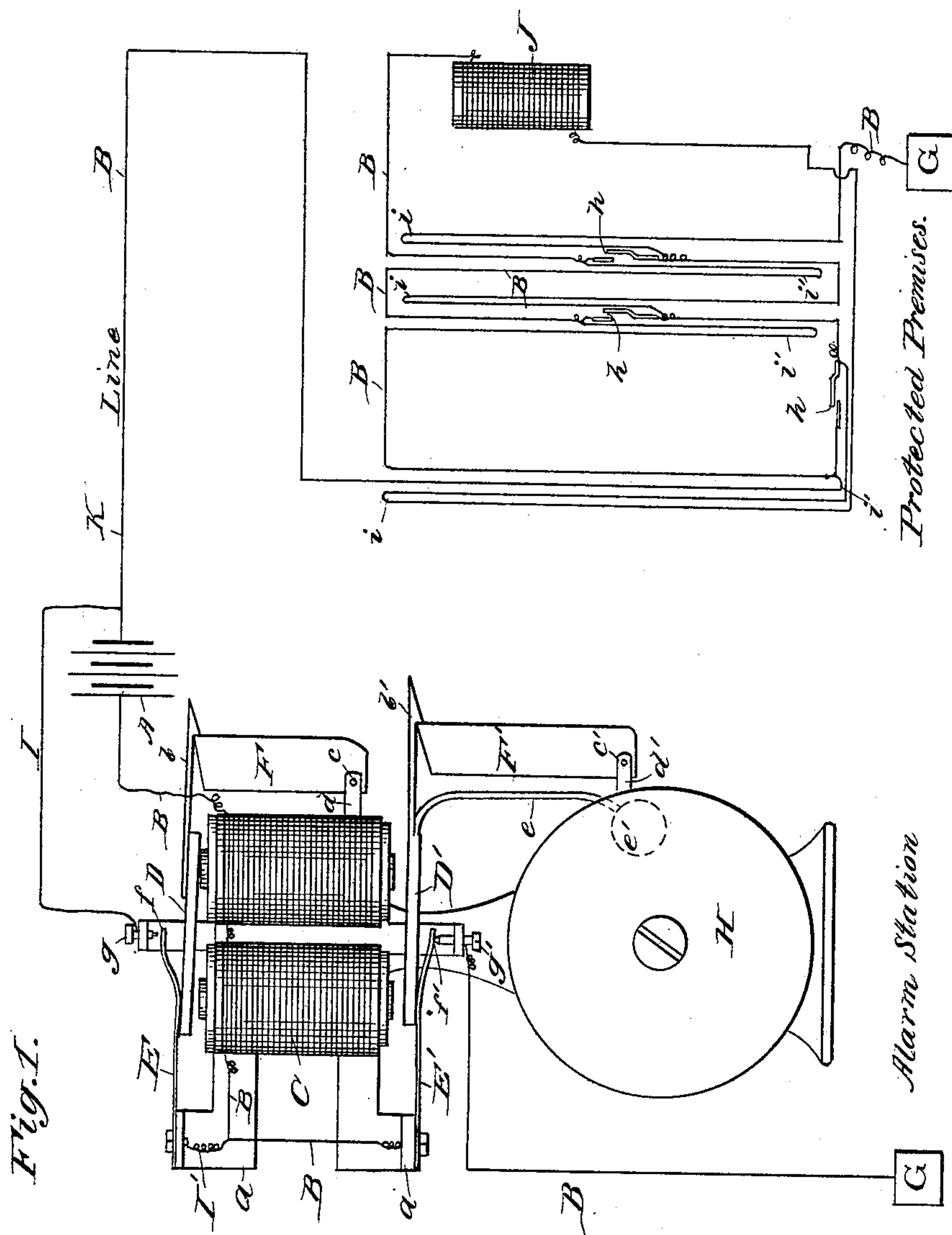
(No Model.)

4 Sheets—Sheet 1.

P. K. STERN.
BURGLAR ALARM SYSTEM.

No. 351,408.

Patented Oct. 26, 1886.



Attest:

Andrew W. Steiger.

R. H. Troy.

Inventor:

P. K. Stern

By Jacob Felbel
Att'y:

(No Model.)

4 Sheets—Sheet 2.

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Fig. 4.

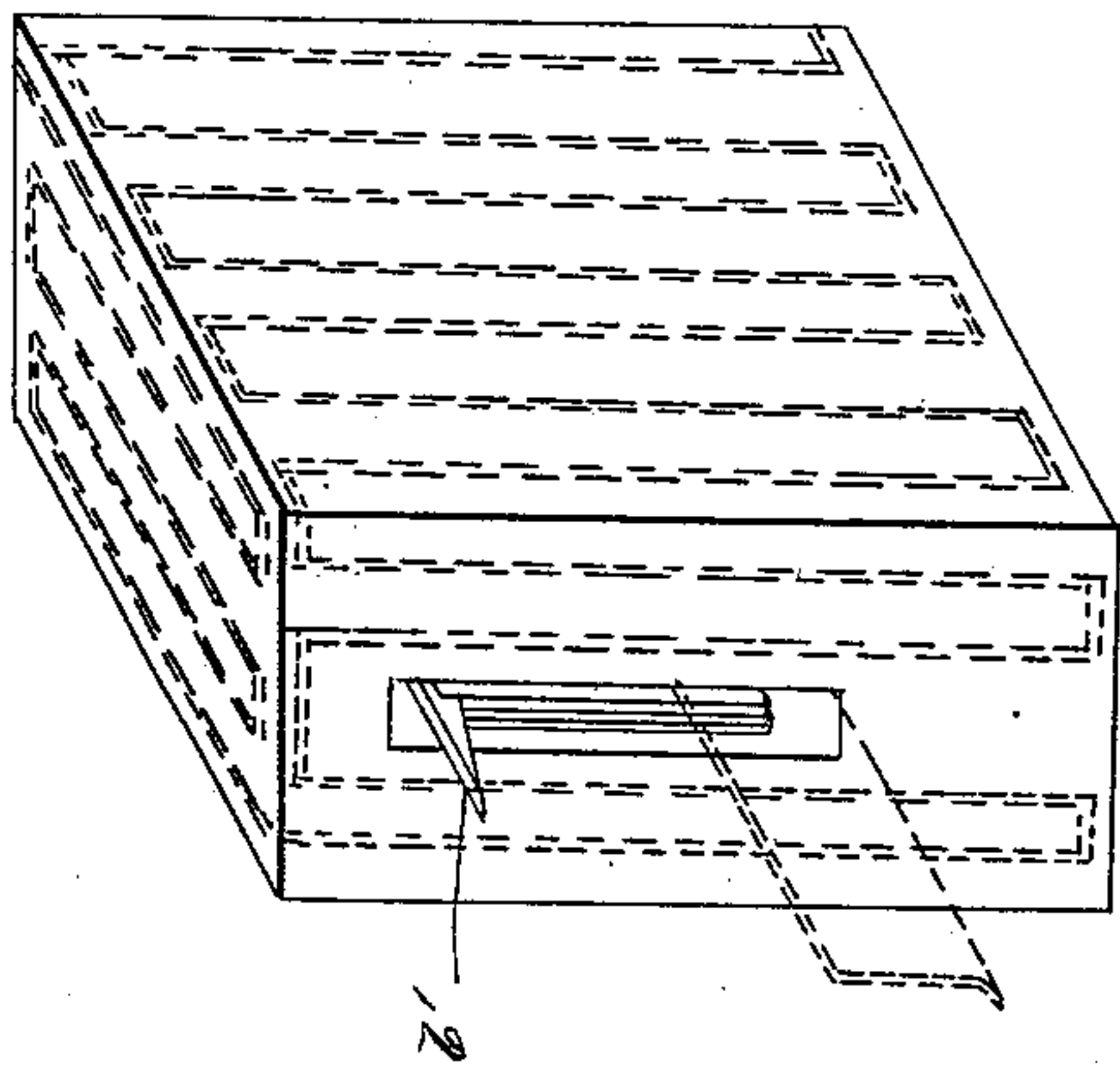


Fig. 8

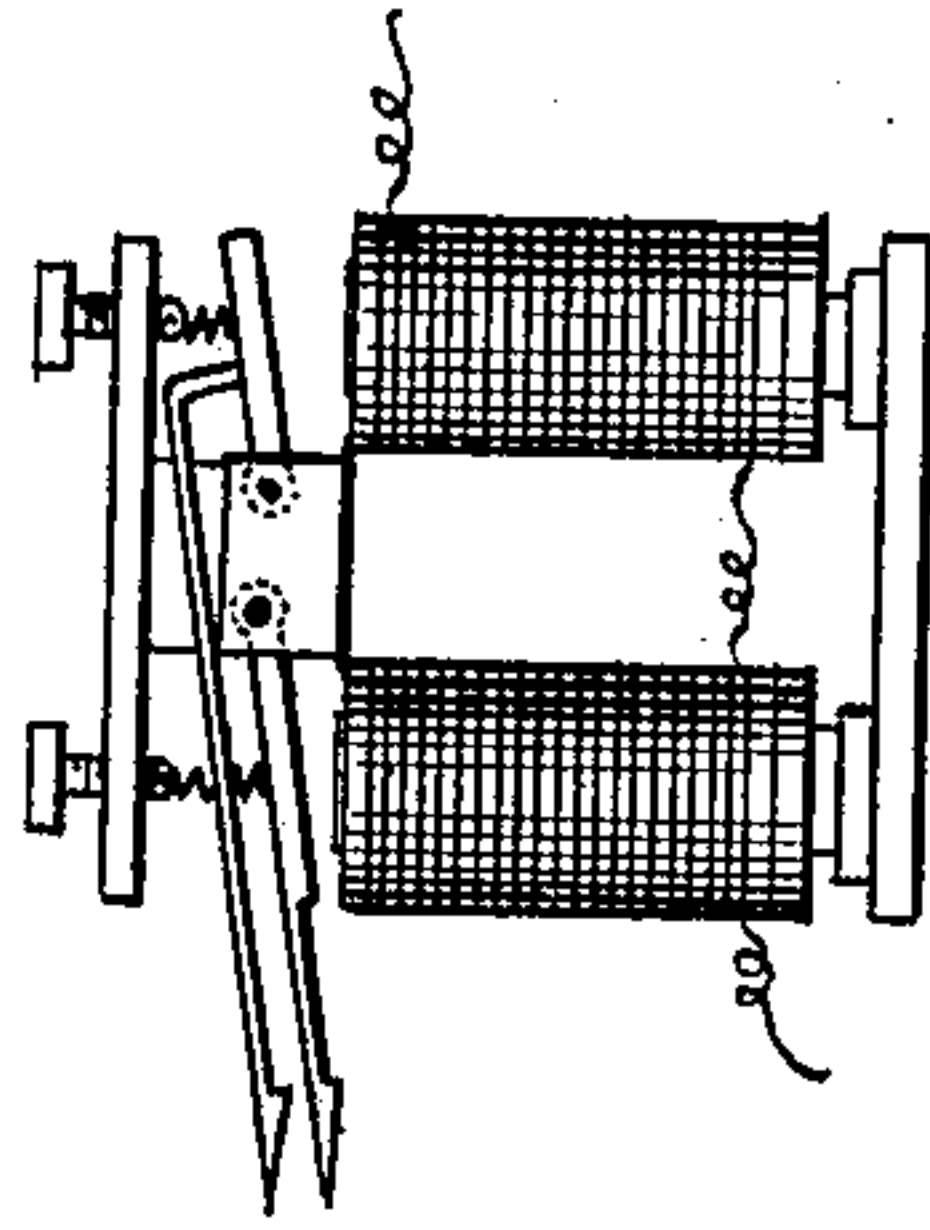


Fig. 2.

Alarm Station.

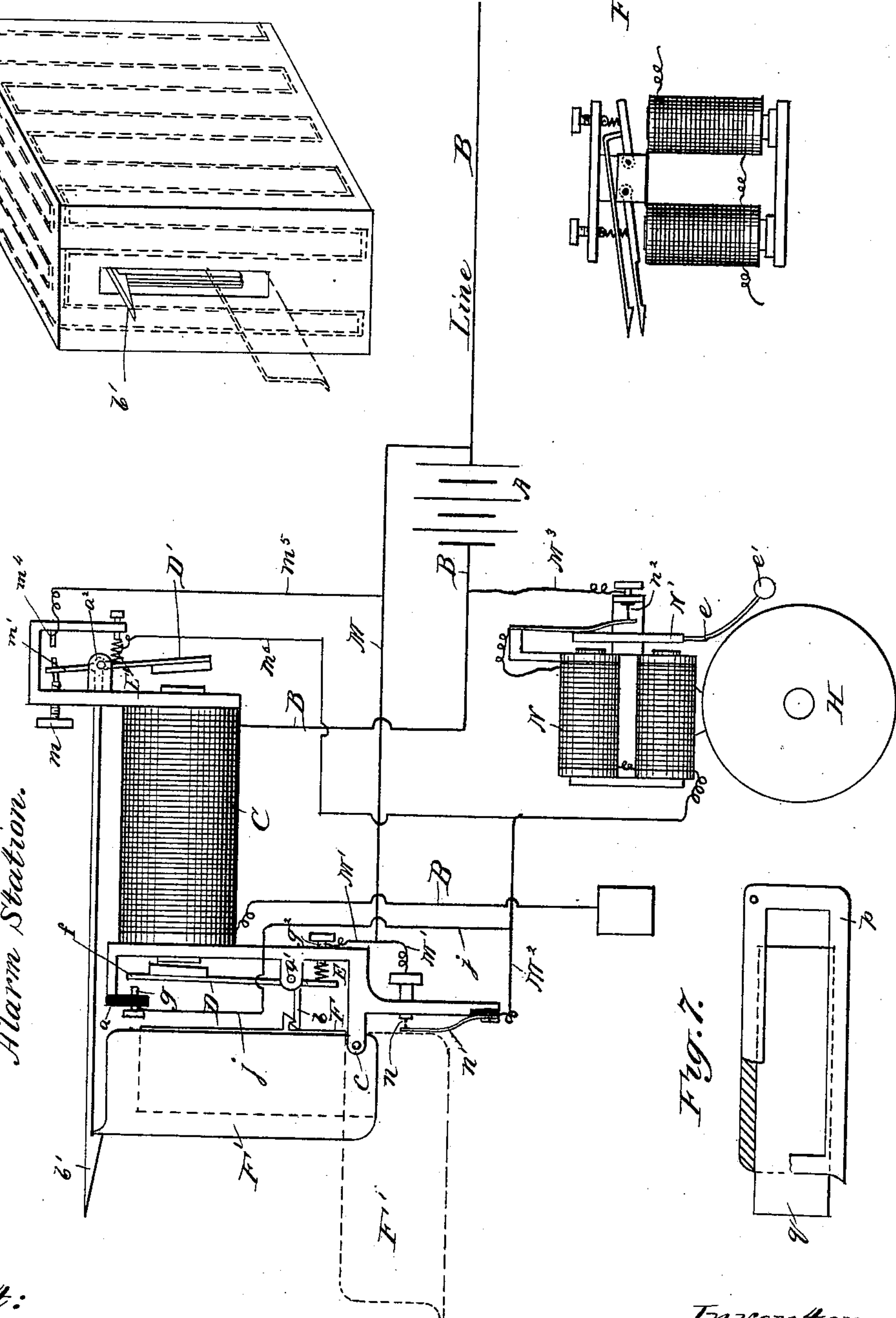
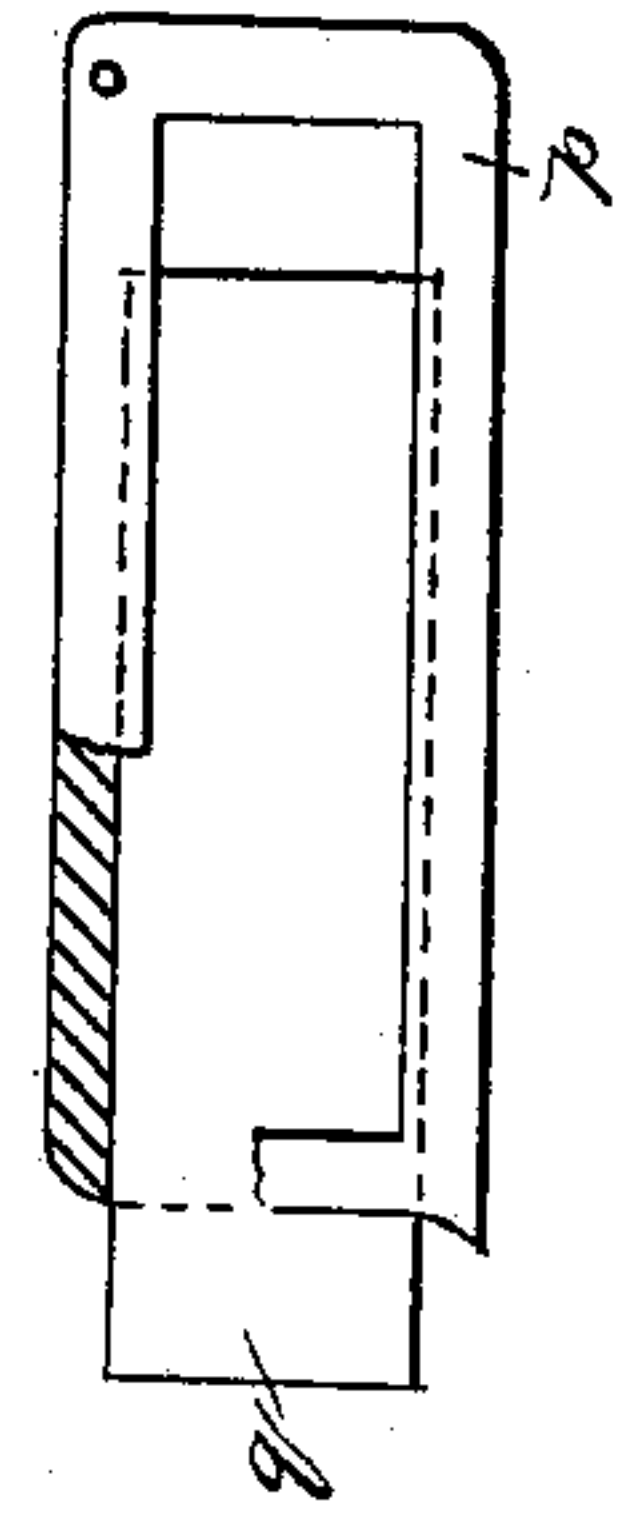


Fig. 7.



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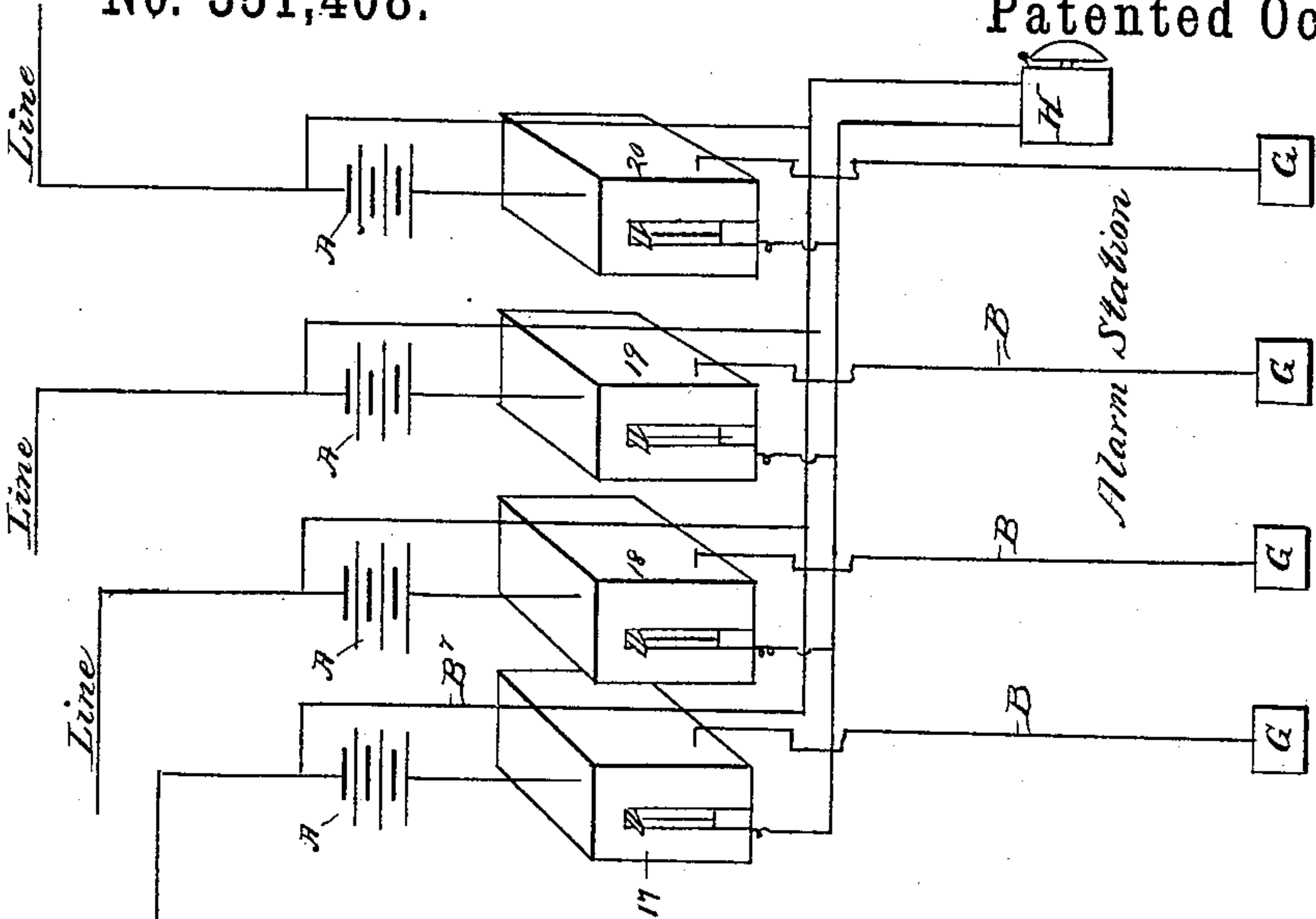
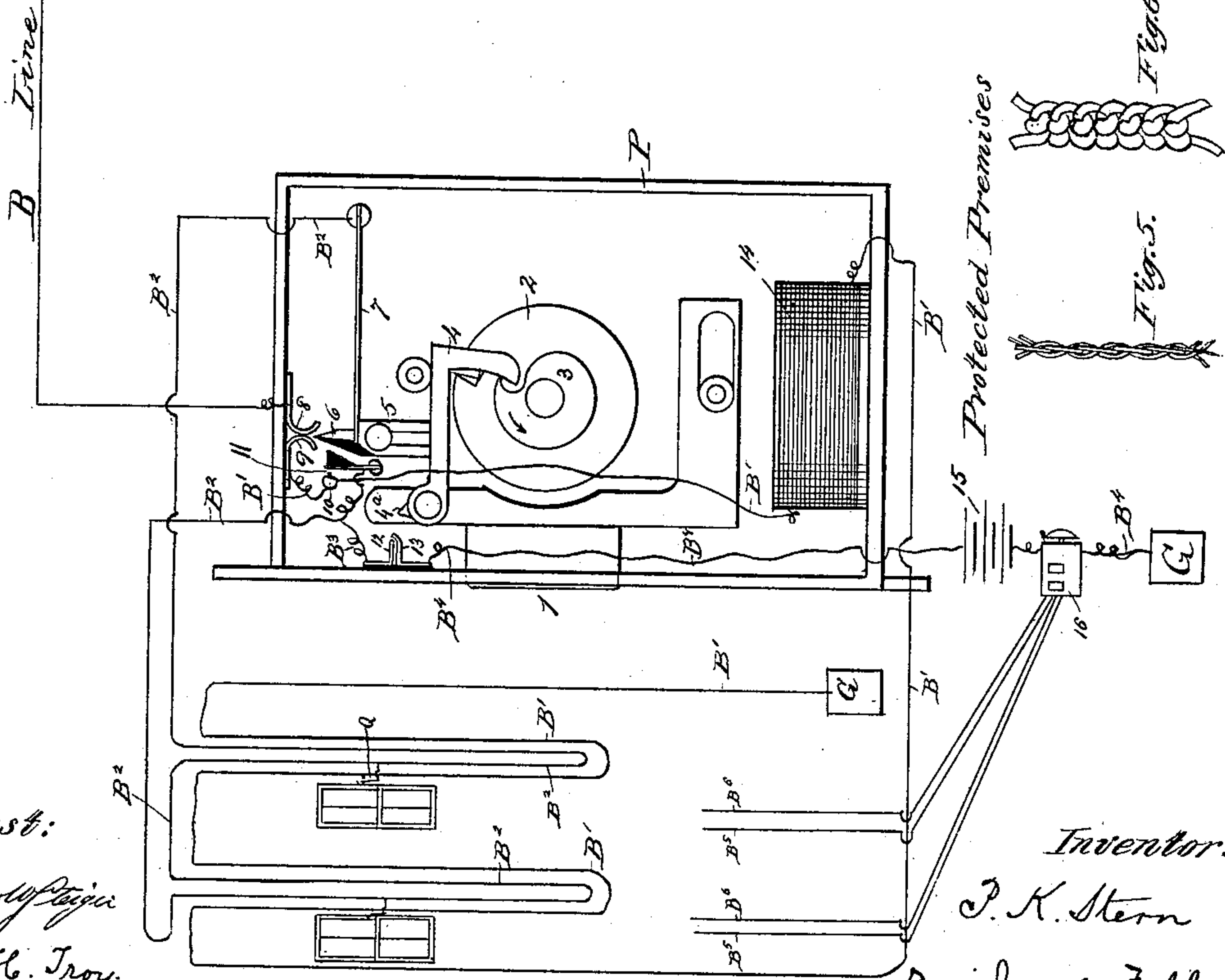


Fig. 3.



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4 Sheets—Sheet 4.

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BURGLAR ALARM SYSTEM.

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Fig. 11.

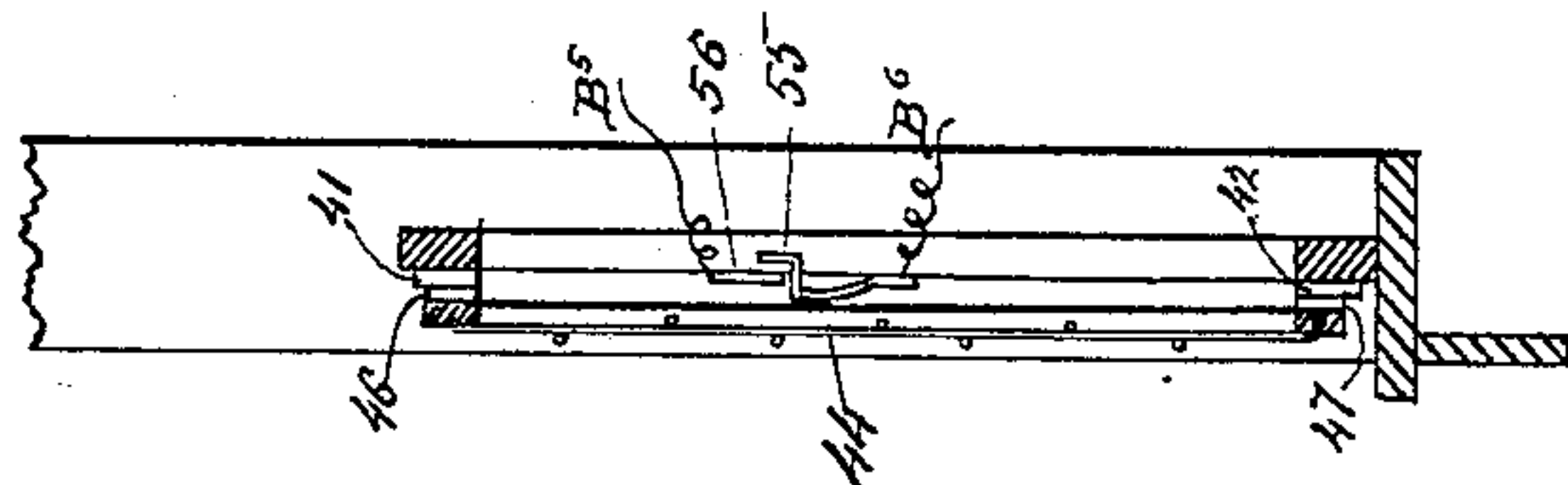


Fig. 10

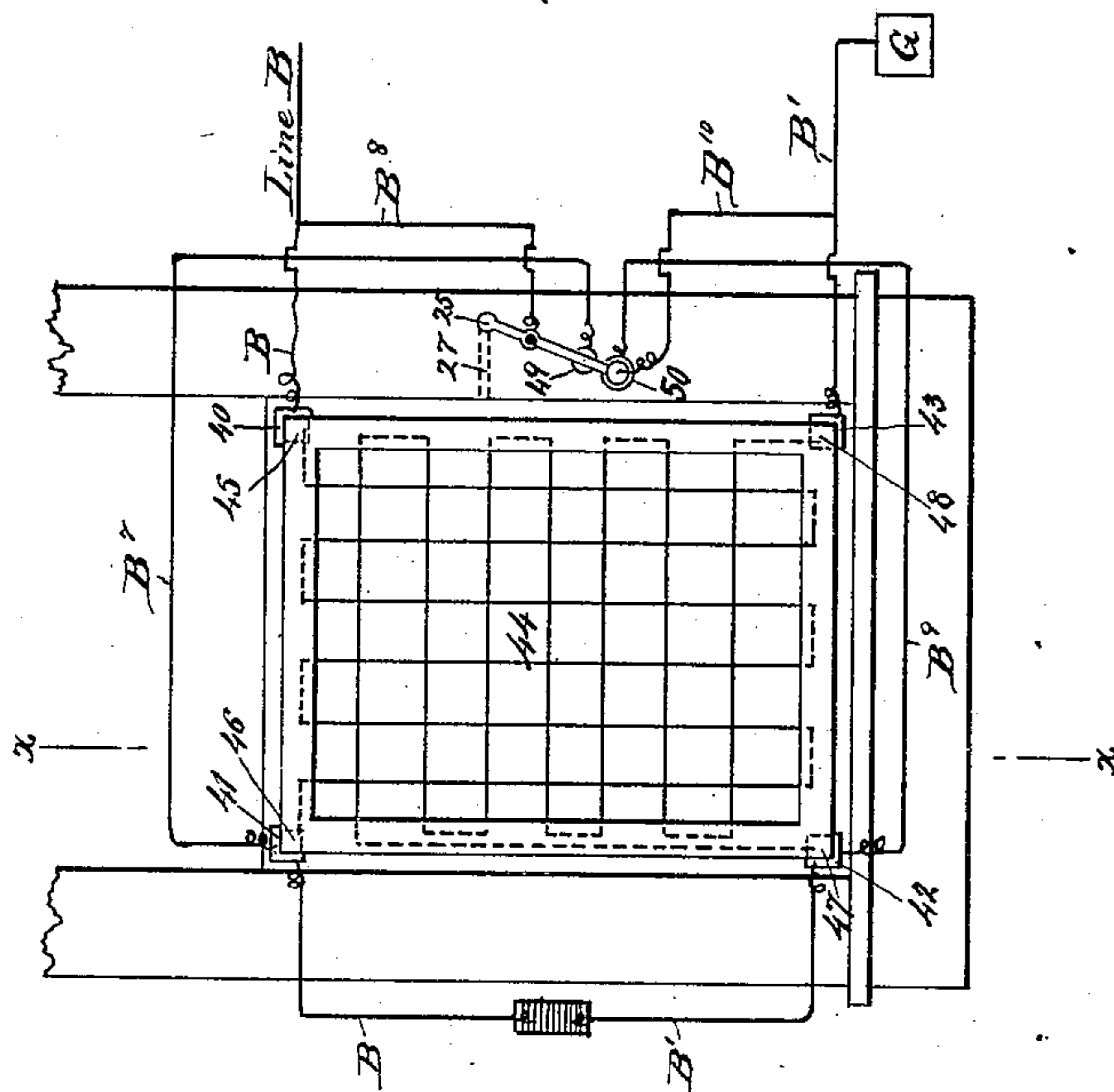
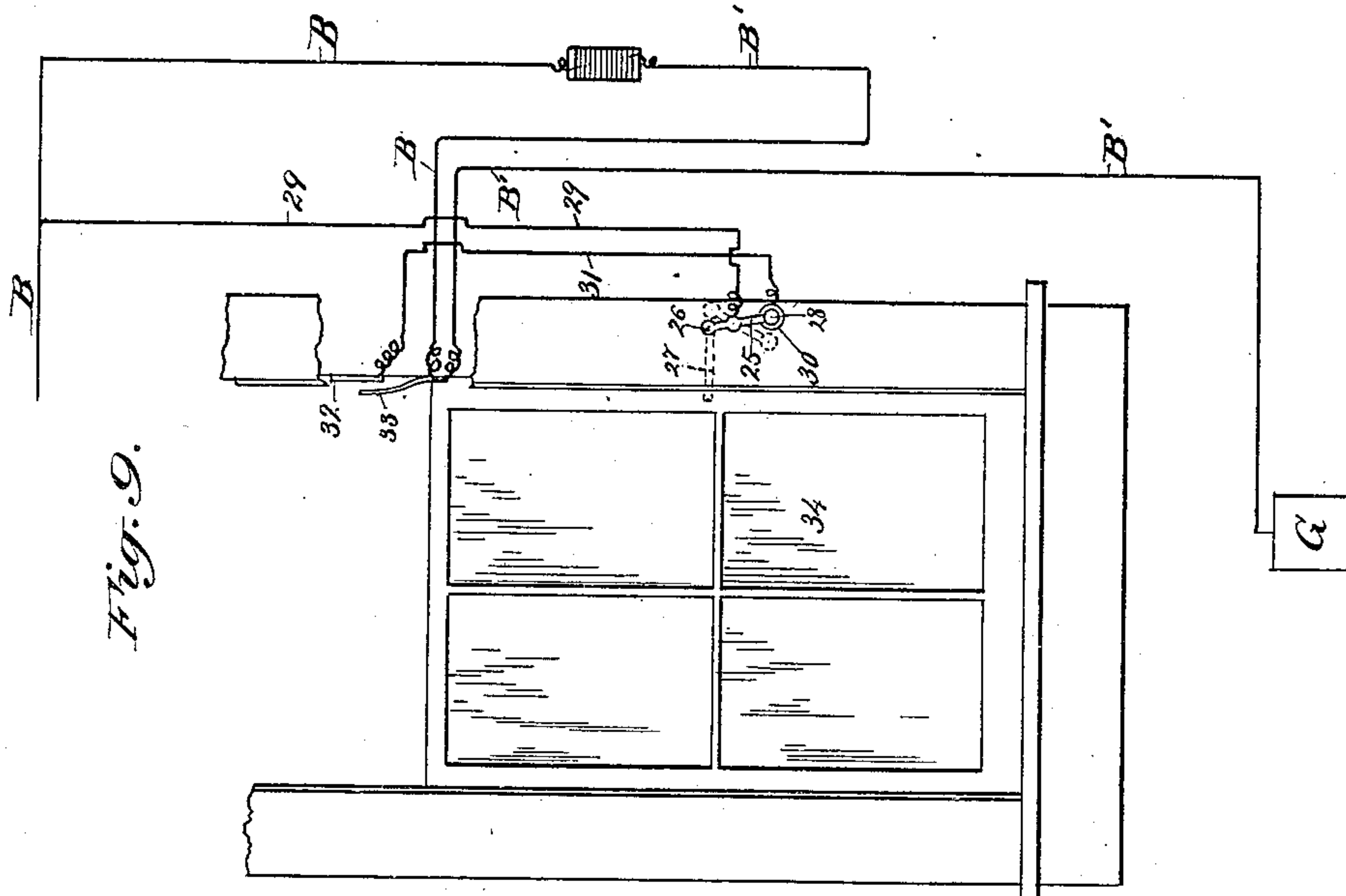


Fig. 9.



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UNITED STATES PATENT OFFICE.

PHILIP K. STERN, OF TORONTO, CANADA.

BURGLAR-ALARM SYSTEM.

SPECIFICATION forming part of Letters Patent No. 351,408, dated October 26, 1886.

Application filed August 18, 1885. Serial No. 174,710. (No model.)

To all whom it may concern:

Be it known that I, PHILIP K. STERN, a subject of the Queen of Great Britain, and a resident of Toronto, in the county of York and Dominion of Canada, have invented certain new and useful Improvements in Burglar-Alarm Systems, of which the following is a specification.

My invention in burglar-alarm systems relates to that type in which the premises to be protected is in electrical connection with an alarm-station, and in which a resistance coil or medium is provided at the protected premises, through which the current passes during the normal condition of the line and out of which the current is shunted upon the grounding of any of the house-connections, thus increasing the strength of the current and giving an alarm at the police or other station, and my invention also relates to that class of burglar-alarm systems in which a breakage or cutting of the line-wire will immediately throw into operation at the alarm-station a local electrical circuit, and cause an alarm to be given.

The main objects of my improvement are to secure a more complete protection than has heretofore been obtained, and by means more effective, simple, and economical, all of which will be hereinafter more fully explained, and particularly pointed out in the claims of this specification.

In the drawings which accompany this specification, Figure 1 is a diagrammatical view of a burglar-alarm system embodying some of my improvements in the simplest form now known to me. Fig. 2 is a like view of that part of the system operating at the alarm-station, and carried out in a manner somewhat different from that illustrated at Fig. 1. Fig. 3 is a diagrammatical view showing the system at the alarm-station as having a number of subscriber's instruments with a single bell to be rung by any of such instruments, and also showing at the protected premises a combination-lock used in connection with my system, and a local alarm-circuit for testing the protected premises previous to switching on the main line to the alarm-station. Fig. 4 is a perspective view of an annunciator-box, wired according to one of my improvements. Fig. 5 is a detail view of a line and a ground-insulated wire braided or twisted together for

wiring purposes. Fig. 6 is a view of two wires knotted for wiring purposes. Fig. 7 is a sectional plan view of an annunciator drop card and case. Fig. 8 is an end elevation of two electro-magnets, each provided with an armature and an annunciator-lever and responsive to different strengths of currents. Fig. 9 is a detail view of a window and window-fastening and switch combined for use in my improved system. Fig. 10 is a like view of a detachable window-screen with combined fastener and switch. Fig. 11 is a sectional view of the same applied to a window and with a test-circuit added, the section being taken at the line *xx* of Fig. 10.

In the several views the same parts will be found designated by the same letters and numbers of reference, and the premises or structure to be protected will be marked "Protected Premises," while the place at which the burglar-alarm is sounded will be indicated by the words "Alarm-Station."

The system illustrated at Fig. 1 embodies the idea of the employment at the alarm-station of a separate bell for each of the premises protected, and shows only one protected premises and the necessary instruments for use in connection therewith at the alarm-station: In this figure is illustrated three of the features of my various improvements—namely, first, an electro-magnet and two armatures so constructed and arranged as to be operated by currents of different strengths; secondly, two annunciator-drops to indicate respectively a break in the main circuit and a grounding of any of the contacts at the premises protected; and, thirdly, intermixed and twisted insulated wires at the protected premises so as to prevent looping or short-circuiting. At the alarm-station is a battery, A, from which the line-wire B passes to and through an electro-magnet, C, and from thence through various metallic devices, to be presently referred to, to the ground, as indicated at G. At the ends of the electro-magnet are arranged armatures D and D', mounted, respectively, on spring-arms E and E', each secured at its outer end to a branch, *a*, of the metallic frame-work in which the electro-magnet is arranged. The forward ends of the armatures D and D' are formed or provided with hooked extensions *b* and *b'*, which in their normal positions engage with

the free ends of annunciator-drops F and F', pivoted, respectively, at *c c'* to arms *d* and *d'* of the main frame. From the armature D' depends an arm, *e*, provided at its lower end with a button or hammer, *e'*, adapted to strike a bell or gong, H, suitably mounted in the instrument, as shown. The action of the spring-arm E is to keep raised the armature D, when the electro-magnet is demagnetized, while the action of the spring-arm E', together with the weight of the armature D' and its appendages, is to keep lowered said armature until such time as the electro-magnet shall be abnormally strengthened. Each of the spring-arms E E' is disposed at its inner free end, *f f'*, to form contact-points with screws *g* and *g'*, to operate the alarm-bell H on either the breaking of the main circuit or the cutting out of the resistance at the premises protected. From the battery to the screw *g* is run a wire, I, and from the spring E to the wire B is run another wire, I', forming a local alarm-circuit. The line-wire B passes to the premises through the points to be protected, through a resistance-coil, J, and is then grounded. At *h h h* are arranged spring-contacts for windows and doors, or other parts to be protected.

The wire B represents my improved method of wiring a premises to be protected, and for convenience' sake is shown arranged in two sets of continuous loops, *i* and *i'*, obtained in the manner clearly illustrated.

The line-wire is disposed throughout the premises, is connected to the resistance coil or medium, is returned and braided, knotted, or twisted with the portion first disposed, and is then passed to the ground or continued to the central station to form a metallic circuit.

In practice, in wiring a structure I should use wires twisted, braided, or knotted together, and run them continuously to the various points to be guarded. To one end of the resistance-coil I should connect one end of one of the twisted, braided, or knotted wires, and to the other end of the resistance-coil I should connect one end of another of the twisted, braid, or knotted wires, the other end of which latter I should run to the ground or continue in metallic circuit to the central station. By thus wiring the premises the same effect is produced as by running a single wire to points to be protected, connecting it to a resistance-coil, and then returning and braiding, twisting, or knotting the same with the portion first disposed, as above referred to. In each case the electric current is obliged to pass over one strand of the braided, twisted, or knotted wire, then through the resistance-coil, then back to the braided, twisted, or knotted wire, and then over another strand thereof before passing from the premises. By reason of the entanglement of the wires and the distribution of them, so as to compel the electric current to take the course described, it will be seen that it is almost impossible for a burglar or other person to attach shunt-wires while inside of the premises, and thus prepare to ef-

fect an entrance at some subsequent time without giving an alarm.

Heretofore the method of wiring premises in burglar-alarm systems of the type to which my improvements relate has been such that a person on the inside of the structure could remove portions of the wires, and could "loop" the circuit so as to subsequently effect an entrance from the outside without giving an alarm at the central office. A premises wired according to my plan will not permit this, and hence is much more secure than a premises wired after the method previously practiced.

The operation of the system as illustrated at Fig. 1 is as follows: It being understood that the main circuit runs from one pole of the battery A through the structure or premises to be protected, then through the ground back to the station, up through the contacts *g'* and *f'*, along the spring E', up through the electro-magnet C, and out to the opposite pole of the battery, thus magnetizing the electro-magnet C sufficiently to attract the weaker armature D, as shown. Supposing the line to be broken or cut at any point from the locality K to the ground at the premises, the effect will be to demagnetize the electro-magnet C and permit the spring E to raise and make a contact at the points *f* and *g*, thereby throwing into operation the local circuit. Immediately this has occurred the electro-magnet becomes remagnetized, but this time more powerfully, owing to receiving the full strength of the battery, the main line and resistance-coil being cut out. When this shall have occurred, both armatures are attracted, the upper one breaking contact, thus again demagnetizing the electro-magnet and releasing both armatures. This make and break of the armatures is continued until either the local circuit is switched off or the break in the main line is repaired, the bell ringing all the while. During the initial releasement of the armature D the annunciator-card F is permitted to drop, and will indicate to the attendant in charge a rupture in the line, and during the initial attraction of the armature D' the annunciator-card F' will drop, and, bearing the subscriber's name, will inform the attendant whose line is broken. Now, supposing a contact be made by raising a window, or opening a door, &c., at any of the localities marked *h*, the line will be grounded and the resistance-coil shunted out of the circuit. When this shall have occurred, the electro-magnetism in the cores will be increased and the lower armature, D', attracted, releasing the card F', ringing the bell, and interrupting the main circuit. During this vibration of the lower armature the upper armature, D, will remain stationary, on account of the spring E' returning the armature D' to contact before sufficient of the magnetism has passed from the cores to permit the lighter spring E to raise the upper armature; hence during merely the grounding of the wires at the protected premises, only the card F', having the subscriber's name and address, will be exhibited. By using two

cards, one to show a break in the line and the other the subscriber's name and address, and having them work in the manner described, this desideratum is gained, that if the line has
 5 been simply grounded the attendant need only send a policeman to the premises, while if it has been broken he can send a policeman and also a lineman to make any necessary repairs.

Referring now to Fig. 2, the apparatus there-
 10 at shown works on the same principle as that shown at Fig. 1.

The principal difference between the instru-
 ment shown at Fig. 2 and that at Fig. 1 is that
 a separate local bell-circuit is introduced, which
 15 is set into operation upon the dropping of either or both of the annunciator-cards. The main circuit runs from the battery through the elec-
 tro-magnet C and down to the ground. (Indi-
 cated at G.) The armature D corresponds
 20 with the weaker armature D of Fig. 1, and the armature D' corresponds with the heavier armature D' of said figure. In the frame-
 work *a* of the instrument the armature D is pivoted at *a'*, and is provided with a hooked
 25 extension, as *b*, for engaging with the break-indicating annunciator-card F'. *g* is a contact-screw, from which a wire, *j*, runs and joins the
 local bell-circuit wire M². E is a spring corre-
 sponding in function to that marked E at Fig. 1.
 30 The armature D' is pivoted at *a''*, and is provided with a hooked extension, as *b'*, for en-
 gaging with the name and address annunciat-
 or-card F'. E' is a spiral spring, alike in
 mode of operation to that marked E' at Fig. 1.
 35 *m* is an adjusting-screw for obtaining the prop-
 er distance between the magnet and the arma-
 ture D', and operates in connection with an
 extension, *m'*, of the said armature. The local
 bell-circuit includes the battery A, wires M,
 40 M', M², J, M³, and B, the contacts *g f g' n n' n''*,
 the electro-magnet N, armatures D and N', and
 the bell H. Supposing the line-wire of the
 main closed circuit to be broken, the electro-
 magnet C will be demagnetized and the spring
 45 E will throw out the armature D and make
 contact at *g f*. This will establish the local
 bell-circuit through the armature D, wires M'
 M, battery A, wire B, wire M³, electro-mag-
 net N, wire M², wire *j* to contact-screw *g*, and
 50 ring the alarm. When the armature D vi-
 brates to make the contact *g f*, the hook *b*
 thereof disengages the card F and permits
 it to swing down at the pivotal point *c* and
 makes contact between *n* and *n'*, thus making
 55 another connection in the bell-circuit and in-
 suring a more efficient operation of the instru-
 ment. When the local bell-circuit has been
 thrown into operation by the breaking of the
 line-wire, the armature D remains in contact
 60 at *g f* until the line shall have been repaired
 and the card F raised. In this case the name-
 bearing card F' will not be dropped, but the
 card F will be inscribed with the subscriber's
 name, as well as with a word to indicate the
 65 break. Now, supposing the line to be grounded
 at any of the windows, doors, &c., of the prem-
 ises protected, and thus shunting the resist-

ance-coil, the magnet C will become strength-
 ened, and will draw in the armature D', thus
 dropping the card F', which will make a con-
 70 tact at *n n'* similar to that made by the other
 card, and throw into operation the local bell-
 circuit, thereby giving an alarm. At the same
 time the armature will make another contact
 at *m'* and a connection with the local alarm-
 75 circuit through the wires *m'* and *m''*. The cards
 in the modification shown at this figure (2) of
 the drawings indicate, as in the exemplifica-
 tion of my invention at Fig. 1, respectively, a
 break in the line-wire and a simple grounding
 80 of the contact at the premises, so that the at-
 tendant in charge at the alarm-station may
 know whether to send out only a policeman or
 both a policeman and a lineman to make any
 requisite repairs. 85

In my improved system of burglar-alarms
 the instruments at the alarm-station are all
 preferably incased, as shown at Fig. 4, and
 protected with an electrical envelope, so as to
 prevent any tampering with the instruments. 90

At Fig. 3 of the drawings, P represents a
 lock, which may be of any preferred construc-
 tion, through the medium of which a sub-
 scriber may throw the line-wire into a condi-
 95 tion to either give or not give an alarm upon
 the grounding of the house-connections. For
 this purpose I prefer a combination-lock, with-
 in the case of which I arrange a switch mech-
 anism that can only be operated during the op-
 eration of the lock mechanism. 1 designates
 100 the bolt of the lock; 2, the tumblers thereof;
 3, the catch-bolt, and 4 the drop-bolt having
 a heel, 4'. 5 is a bifurcated bar, provided at
 6 with a contact-plug, which is insulated at one
 side, and having a spring, 7, the action of
 105 which is to keep the rear ends of the bar 5
 against the upper face of the drop-bolt. 8
 and 9 are contact-springs, pressing tightly to-
 gether. 10 is a contact-button, and 11 is an in-
 sulated spring-contact. 12 and 13 are two
 110 other spring-contacts. 14 is a resistance-coil,
 also located within the lock-case. The line-
 wire B connects with the contact 8. From the
 contact-spring 9 extends a wire, B', through
 the button 10, through the resistance-coil
 115 throughout the house and the ground. From
 the spring 7 a wire, B², runs throughout the
 house and returns to the insulated spring-con-
 tact 11. From the wire B², at a point near con-
 tact 11, a branch wire, B³, connects with the
 120 contact 12, and from the contact 13 extends an-
 other wire, B⁴, out through the lock-case to a
 local battery, 15, alarm-bell and annunciator
 16, and from thence to the ground. Wires B⁵
 and B⁶ extend from the contact-points of the
 125 windows and doors, &c., in the house to the
 annunciator 16.

17, 18, 19, and 20 represent subscribers' in-
 struments at the alarm-station, and A A A A
 a battery for each instrument. The line-wire
 130 B runs through the instruments, as hereinbe-
 fore explained, and out to the ground. From
 each instrument a wire, B', runs from the up-
 per pole of the battery through the bell H, and

back to the instrument, as explained of Fig. 2. In the condition of the lock and switch mechanisms, as represented, the current from the battery A at the instrument 17 is running
 5 through the wires B and B', the contacts 8 and 9 and 10, resistance-coil 14, to the ground G, and the windows, doors, &c., may be opened and closed at pleasure without giving an alarm, as the resistance-coil cannot thus be
 10 shunted and the current increased in strength sufficiently to operate the electro-magnet and armature of the instrument. This condition of the system it will be understood will be often desired; but while things are in this
 15 state it will be seen that by the use of my braided and twisted wires it will be almost impossible for one within the building to cut the wires (with the hope of short-circuiting and preparing for the future) without giving an
 20 alarm at the central or police station.

Now, supposing it be desired to lock up the premises and put the entire system into operation, the catch-bolt is turned in the direction of the arrow, and the bolt 1 is shot. Immediately the sliding bolt is shot the lug or heel 4^a
 25 on the drop-bolt makes a contact between the devices 12 and 13, and the local circuit B' B² B³ B⁴ is thrown in, and if any window or door be open the line will be grounded, on account of the
 30 contacts connected with the wires B' and B² being pressed together, and the alarm (at the premises) will be rung, and the annunciator in connection therewith indicate such open door or window. This circuit I call a "test-
 35 circuit," and is for the purpose of giving notice upon the locking up of the premises to the occupant thereof of any open door or window without at the same time notifying the attendant at the central office. If the test-circuit bell
 40 ring, the occupant will of course see that the open window is closed before proceeding to switch on the main line by completing the operation of the lock. If the test-circuit bell should not ring, the occupant will know that
 45 all the doors, windows, &c., are closed, and hence he may proceed to throw in the main line. Finding everything to be all right, the occupant will continue the turning of the catch-bolt 3 until the drop-bolt is raised out of the
 50 notches of the tumblers 2, during which the contact at 12, 13, and 4^a is broken, the plug 6 of the forked bar pushed in between the contact-springs 8 and 9, and the spring 11 forced into contact with the button 10, and by continuing the turning of the catch-bolt, the tumblers are disarranged and the combination
 55 thrown off. Now the circuit is through the line B, spring 8, plug 6, spring 7, wire B², through the premises, back into the lock, through the contact 10 11, wire B', resistance-coil 14, out the lock, through said wire about the premises, grounding at G. It will be seen
 60 that if no test-circuit were provided and upon locking up any window or door should be open, a false alarm would be sounded at the police-station. If, now, a contact be made, as at Q, between the wires B' and B², outside of the lock,

as at a window, the resistance will be shunted, the heavier armature at the station attracted, thus dropping the subscriber's card F' and
 70 throwing in the local alarm-circuit at the station. During this shunting of the resistance the current will pass through line B, contact 8, plug 6, spring 7, wire B², through the contact at Q to wire B' and ground at G. It will
 75 be understood that the alarm H is adapted to be rung by any of the annunciators 17 18 19 20 at the alarm-station. The lock-case is surrounded by an electrical envelope or covering, (similar to that provided for the annunciators,) a
 80 continuation of the main line B, for the purpose of giving an alarm upon drilling through and attempting to pick the lock. When protection is no longer required, (as in the day-time,) the bolt 1 is retracted in the usual way of
 85 working combination-locks, whereupon the spring 7 pushes back the plug 6 and the parts are thrown into their normal conditions, as represented at Fig. 3.

At Fig. 3, instead of having four wires to braid or twist, as at Figs. 1 and 5, there are
 90 only two, B' and B², which I prefer to entangle by knotting, as shown at Fig. 6.

The annunciator shown at Fig. 7 is composed of an open metallic frame-work, p, slot-
 95 ted lengthwise interiorly to receive the cards q in a removable manner.

At Fig. 8 are shown two electro-magnets, each having a separate armature provided with annunciator-holding devices, and the arrangement of the structure is such that, if it
 100 were used in lieu of the electro-magnet C, it would have the same mode of operation.

Fig. 9 shows a combined window-fastener and switch. In burglar-systems it is desirable
 105 to make provision for opening a window without giving an alarm at the central station and without switching off the main line from the premises at other points. In the arrangement shown at this figure the lever 25 is pivoted at
 110 26, and is provided at 27 with an arm which enters a hole in the window, and with a handle portion, 28. From the pivot of the lever a wire, 29, runs and joins the line-wire B. From a contact-button, 30, extends a wire, 31, which
 115 joins a contact-plate, 32, that is insulated from the line-wire B. A contact-spring, 33, is secured to the ground-wire B'. A window is represented, and is designated by the numeral 34. In this view the bolt 27 is illustrated as
 120 in engagement with the window, and the arm of the lever as in contact with the button 30. The current is now running through the line B and ground-wire B'. If it be desired, now, by the occupant to raise the window, the lever
 125 will be moved from off the button 30, thus retracting the bolt, as illustrated by dotted lines. Upon raising the window the spring-contact 33 will be moved against the insulated contact 32; but, as will be seen, the line cannot ground,
 130 because the connection at 30 is broken. It will be understood, however, that no other window or inlet of the premises is switched off by the operation just performed, and that

the system is continued throughout, except at this locality. If while the window is in the position illustrated a burglar on the outside should force the window while the switch-lever 25 is in contact with the button, immediately the spring 33 comes in contact with the button 32 the line will be grounded and an alarm given at the central station. In giving this alarm the current will pass from the line B through the wire 29, lever 25, button 30, wire 31, contacts 32 and 33 to wire B', and to ground. It will be seen that the lever 25 acts both as a fastener and a switch for the window, so that the latter may be raised upon the proper manipulation of the lever without giving any alarm.

In cases where it is desirable to raise windows and open doors and insert screens for electrical protection, I provide an arrangement such as seen at Figs. 10 and 11. Against the frame-work of the window are secured four metallic plates, 40, 41, 42, and 43, and upon the frame of the screen 44 are fastened four other plates or springs, 45, 46, 47, and 48, in contact therewith. The screen is made of fine wire, braided or knotted, which is included in the circuit when the switch and fastener are in engagement with the screen. The line-wire B connects with the plate 40 and with the plate 41 and the ground or return-wire with the plates 42 and 43. From the plate 41 extends a branch wire, B', to a button, 49, and from the line-wire B extends a wire, B⁸, to an insulated portion of the lever 25. From the plate 42 extends a wire, B⁹, to the contact-button 50, and from another portion of the lever 25 extends a wire, B¹⁰, connecting with the wire B'. When the screen is in and the bolt 27 withdrawn, as shown, the current passes from line B to contact-plates 40 and 45, through the screen, up through the contacts 46 and 41, to the line B again, through the premises and resistance-coil to wire B', contact-plates 42 and 47, through the screen again, out through contacts 48 and 43, over the wire B', and, if desired, to the ground; and at this time there is also a portion of the current shunting through B, B⁸, 25, 49, B', 41, and B, and back through B', 42, B⁹, 50, 25, B¹⁰, and B'. If, now, the screen be removed and the contacts at 40 45, 41 46, 42 47, and 43 48 be broken, the current will pass wholly through the last-mentioned circuit, but no alarm will be given. When the screen is in and the bolt 27 shot, the contacts between the lever and the buttons 49 and 50 will be broken and there will be no shunt-circuit, and the circuit will be that first mentioned. In this condition of affairs, if an attempt be made to break through the screen or short-circuit the wires, an alarm will be given at the central office. The function of the screen-fastener and switch is substantially the same as that used for windows. Its purposes are mainly to permit the removal of the screen without giving an alarm and to prevent the subscriber from removing the screen without switching off the current, so as to avoid giving a false

alarm at the central station. It will be seen that in order to retract the bolt 27 the lever must be so moved as to accomplish the desired switching off.

At Fig. 11 is shown the fact that when the screen is in, the test-wire circuit is open at that point, the contacts 55 and 56 being apart; hence no alarm at the house-bell and annunciator 16, Fig. 3, will be given. When the screen is removed, the springs 55 and 56 are in contact, and if the bolt 1 of the lock P, Fig. 3, be shot, to throw into operation the system, a local alarm at 16 will be sounded and continued until the screen shall have been replaced.

The switching-off of either windows or screens, as just explained, has no effect whatever upon the test-circuit, which operates always independently to indicate any open window or door, &c., before the switching-on of the main line to the central office.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a burglar-alarm system, the combination of a main closed circuit including a resistance medium and an electro-magnet having two armatures responsive to different strengths of current therein, a local circuit at the alarm-station, a signaling apparatus included in said local circuit, and a single battery for supplying the electric current to both the main and local circuits, as set forth.

2. In a burglar-alarm system, the combination of a main closed circuit extending from an alarm-station to a guarded structure, a local circuit including a signaling or indicating apparatus at the alarm-station, an electro-magnet in the main circuit, having armatures D and D', responsive to different strengths of current, as described, and an annunciator or indicator held by the armature D during the normal condition of the main circuit, and adapted to be released upon a decrease in or interruption of the current of said circuit, as and for the purposes set forth.

3. In a burglar-alarm system, the combination of a main closed circuit extending from an alarm-station to a guarded structure, a local circuit including a signaling or indicating apparatus at the alarm-station, an electro-magnet in the main circuit, having armatures D and D', responsive to different strengths of current, as described, and an annunciator or indicator held by the armature D' during the normal condition of the main circuit, and adapted to be released upon an increase of current in said circuit, as and for the purposes set forth.

4. In a burglar-alarm system, the combination of a main closed circuit extending from an alarm-station to a guarded structure, a local circuit including a signaling apparatus at the alarm-station, an electro-magnet in the main circuit, having armatures D and D', responsive to different strengths of current, as described, and annunciators held by the said armatures during the normal condition of the main circuit, and adapted to be released one

upon a decrease in or interruption of the current and the other upon an increase of the current in said main circuit, as and for the purposes set forth.

5. In a burglar-alarm system, the combination of a main closed circuit extending from an alarm-station to a guarded structure, an electro-magnet included in said circuit, having armatures D and D', responsive to different strengths of current, as described, annunciators controlled by said armatures, and local circuits and signaling means at the alarm-station, said local circuits being adapted to be closed by the said armatures and by the annunciators, as and for the purposes set forth.

6. The combination of a lock comprising a bolt and means for projecting and retracting it, devices for conducting a current of electricity through different paths, one or the other of which the said current is always traversing, and a switch mechanism connected to the lock mechanism and operated thereby during the projections and retractions of the locking-bolt, as and for the purposes set forth.

7. In a burglar-alarm system, the combination of a main closed circuit extending from an office to a protected premises, a lock at the protected premises, comprising a bolt and means for projecting and retracting it, devices for conducting a current of electricity through different paths, one or the other of which said current is always traversing, and a switch mechanism located within the lock-case and connected to and operated by the lock mechanism during the projections and retractions of the locking-bolt thereof, as and for the purposes set forth.

8. In a burglar-alarm system, the combination of a main circuit extending from an office to a protected premises, a permutation-lock at the protected premises, containing devices for conducting the current of electricity through different paths therein, one or the other of which paths the said current is always traversing, and a switch mechanism located within the lock-case and operated by the drop-bolt and tumblers of the lock mechanism, for turning the current of electricity from one path to another, according as the lock mechanism is operated, as set forth.

9. In a burglar-alarm system, the combination of a main circuit extending from an office to a protected premises, a lock at the protected premises through which said current is always passing, a local alarm-circuit at the protected premises running to points thereat through which access might be gained, and extending through the said lock, and a device in connection with the lock mechanism for establishing the local circuit, whereby an alarm at the protected premises only is given in case any window, door, &c., is open, as set forth.

10. In a burglar-alarm system, the combination of a main circuit extending from an office to a protected premises, a lock at the premises, containing devices for conducting

the current through different paths therein, one or the other of which paths the said current is always traversing, a local normally-open alarm-circuit including a door or window at the protected premises and extending through the lock, a device in connection with the lock mechanism for closing the said local alarm-circuit, and a switch mechanism operated by the lock mechanism, for turning the current of the main line from one path to another upon the completion of the locking movements or operations, as set forth.

11. In a burglar-alarm system, the combination of a main closed circuit extending from an office to a protected premises, a lock at the latter, a resistance-coil located within the case of said lock, and conductors, also located within the lock-case, for connecting the resistance-coil in the said main closed circuit, as and for the purposes set forth.

12. In a burglar-alarm system, the combination, with a main circuit extending from an alarm-station to a protected premises, of a test-circuit at the protected premises and a signaling apparatus included in said circuit, whereby upon the closing up of the premises the occupant thereof may be informed as to whether any door, window, or other point through which access might be gained is open, as set forth.

13. In a burglar-alarm system, the combination, with a main line extending from a central station to a guarded structure, a window, or screen, and a branch circuit at said structure, of a combined switch and fastener, whereby the window or screen may be switched off from the inside of the structure without giving an alarm at the station, and whereby the occupant of the premises is prevented from raising the window or screen without switching off the main line, thus avoiding giving a false alarm, as set forth.

14. In a burglar-alarm system, the combination, with a main line extending from a central office to a guarded structure, of a screen, a combined switch and fastener, a branch circuit, and a test-circuit at said structure, whereby when the screen is removed the test-circuit alarm is rung to indicate to the occupant an unprotected portion of the structure, but not the alarm located at the central office, as set forth.

15. In a burglar-alarm system such as described, the combination of a main line extending from a central office to a protected premises, a window, door, or other opening at the latter provided with contact devices, a wire screen included in said circuit and provided with contact devices to register with those at the window, door, or other opening, a branch circuit, and a switch and fastener, all as and for the purposes set forth.

16. In a burglar-alarm system employing a resistance coil or medium, a conductor composed of strands of insulated wires knotted, braided, or twisted together, disposed throughout the premises at the points to be protected,

and having one end of one of the wires connected to one end of the resistance-coil and one end of another of the wires connected to the other end of the resistance-coil, so as to include the latter in the circuit, whereby the current is caused to pass over one of the strands of the wires of the said conductor, then through the resistance-coil, and then over another strand of the said wires, as set forth.

Signed at New York, in the county of New York and State of New York, this 15th day of August, A. D. 1885.

PHILIP K. STERN.

Witnesses:

JACOB FELBEL,
JOHN J. ENNIS.