(No Model.) 2 Sheets—Sheet 1.

M. W. DEWEY.

ELECTRIC SIGNALING APPARATUS.

No. 395,958. Patented Jan. 8, 1889.

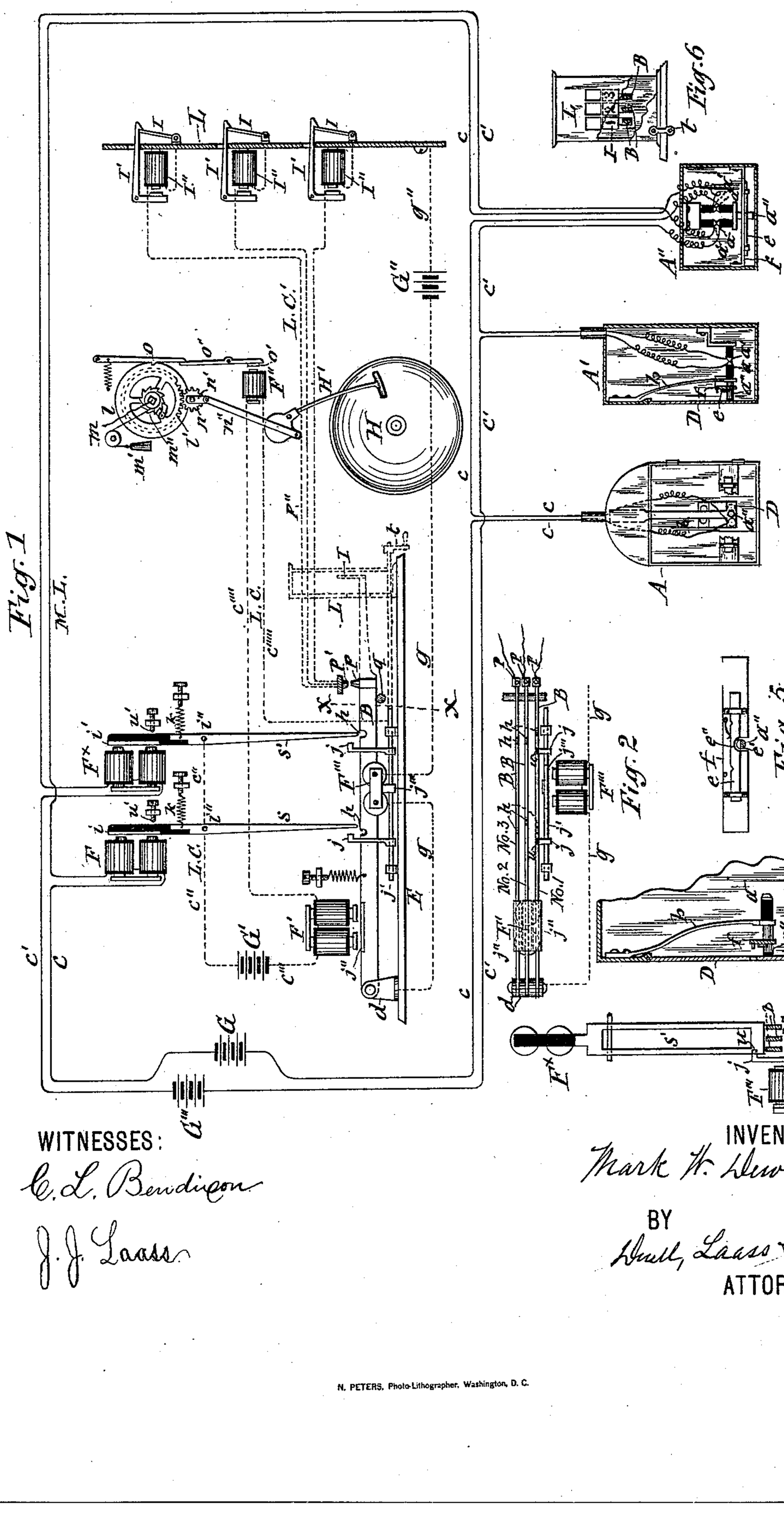

Fig. 1

Fig. 6

Fig. 2

Fig. 5

Fig. 4

Fig. 3

WITNESSES:

C. L. Bendixon

J. J. Laass

INVENTOR

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(No Model.) 2 Sheets—Sheet 2.

M. W. DEWEY.

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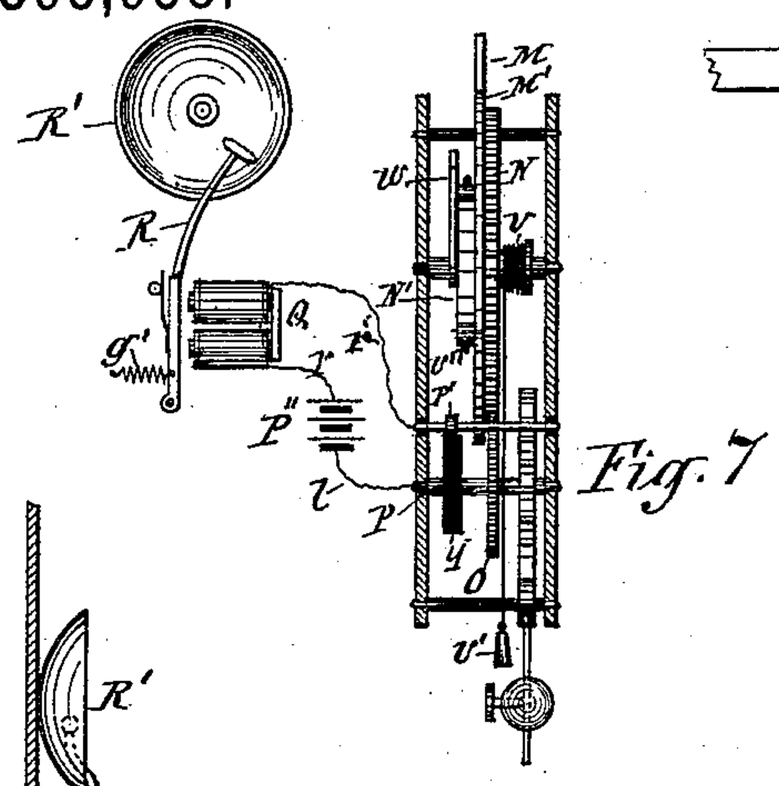

Fig. 7

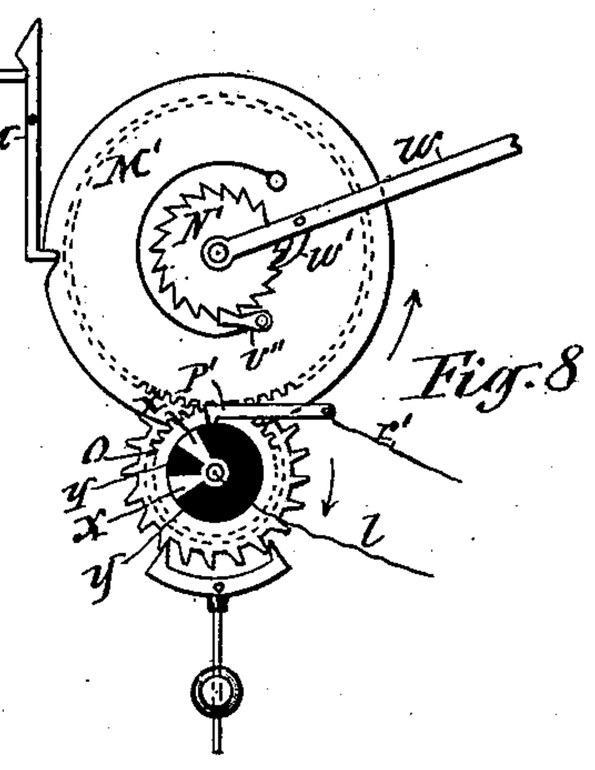

Fig. 8

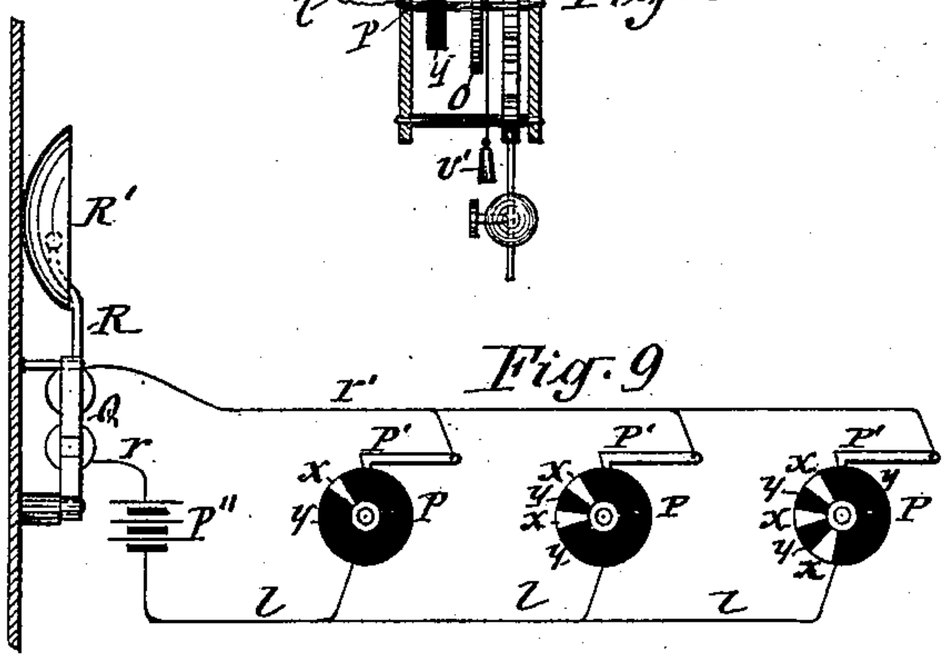

Fig. 9

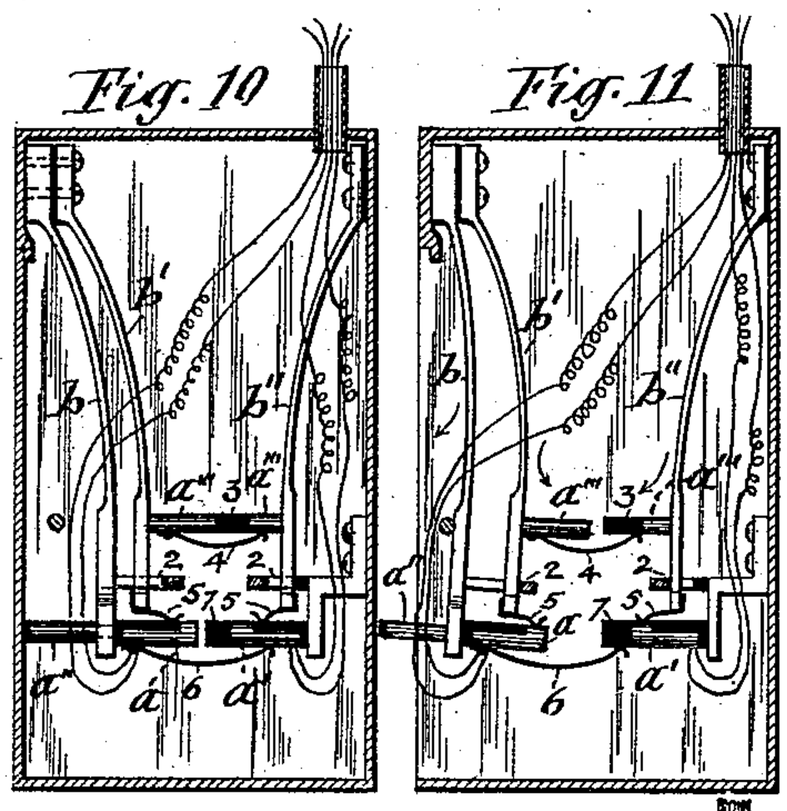

Fig. 10 Fig. 11

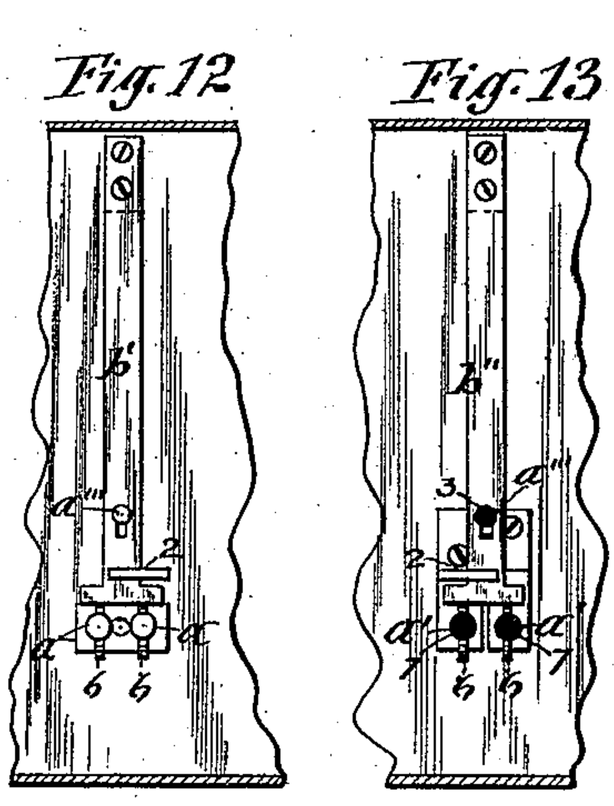

Fig. 12 Fig. 13

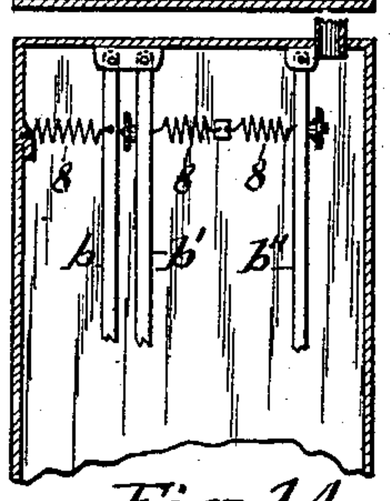

Fig. 14

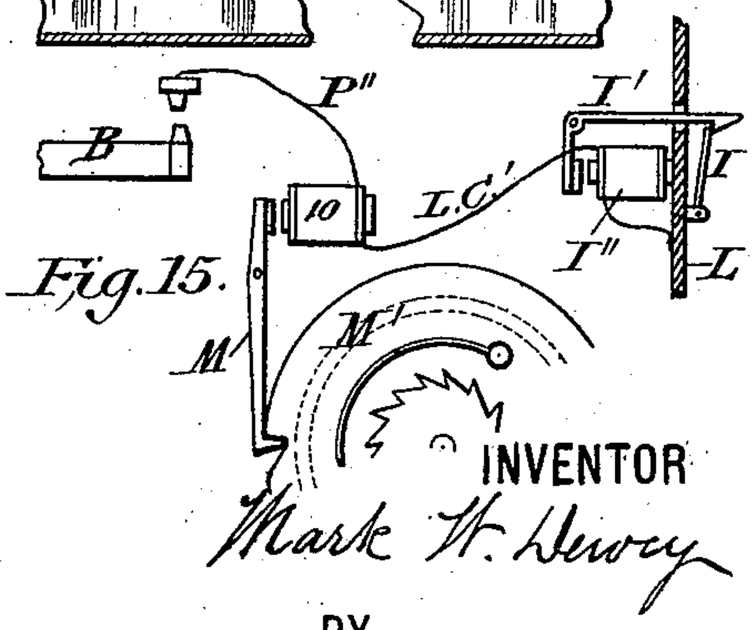

Fig. 15.

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UNITED STATES PATENT OFFICE.

MARK W. DEWEY, OF SYRACUSE, NEW YORK, ASSIGNOR OF TWO-THIRDS TO EMIL LAASS AND CHARLES H. DUELL, OF SAME PLACE.

ELECTRIC SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 395,958, dated January 8, 1889.

Application filed March 31, 1888. Serial No. 269,168. (No model.)

To all whom it may concern:

Be it known that I, MARK W. DEWEY, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Electric Signaling Apparatus, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention consists in a novel system of electrically transmitting signals involving the use of selecting devices similar to those for which I have filed an application for patent October 30, 1886, Serial No. 217,558, but in this case operated in a different manner and by different means.

The invention is fully illustrated in the annexed drawings, in which Figure 1 is an elevation of the signaling apparatus with its electric connections. Fig. 2 is a detached top plan view of the feeders and their actuating-magnets. Fig. 3 is a vertical transverse section on line *x x*, Fig. 1. Fig. 4 is an enlarged vertical transverse section of the portion of the signal-box which is provided with the door and the devices operated by said door. Fig. 5 is a detached front view of the latch, which is operated by a key inserted in the box. Fig. 6 is a front elevation of the annunciator-case, a portion thereof being broken away to illustrate the internal parts thereof. Figs. 7 and 8 are elevations of the mechanisms for operating the gong which strikes the number of the box from which the alarm is sent. Fig. 9 illustrates the circuit-breakers employed in connection with the aforesaid mechanism. Fig. 10 is an enlarged side view of the interior of an alarm-box having a plurality of circuit makers and breakers and devices for operating the same simultaneously, and showing the same with the door of the box closed. Fig. 11 shows the same with the door open. Figs. 12 and 13 are face views of the circuit makers and breakers arranged, respectively, at the front and rear of the interior of the alarm-box. Fig. 14 is a side view of a modification of the spring-supports of the electric contact-points, and Fig. 15 illustrates a modification of the means for operating the detent of the clock mechanism which sounds gong ringing the number of the signal.

Similar letters of reference indicate corresponding parts.

A A′ A″ represent transmitting-stations, which in this case are shown in the form of fire-alarm boxes, from which the alarm is sent to the fire-engine house or to the police-station, according to the location of the annunciator. Each of said boxes is provided with a door, D, which is preferably at the front and hinged to the box. *a* and *a′* represent two electric contact-points arranged inside of the box, and one of said contact-points is secured stationary to the box in any suitable manner, and the other contact-point is supported on a spring, *b*, which tends to draw the same away from the stationary contact-point. The spring-supported contact-point *a* has projecting from it a push-bar, *a″*, against the end of which the door presses when closed and thus holds the point *a* in contact with the point *a′*. A slight movement of the door from its closed position allows the spring *b* to draw the two contact-points *a a′* apart and thus break the circuit, which causes the transmission of the alarm, as hereinafter explained.

In order to permit access to the interior of the box when required without actuating the alarm-signal, I connect to the box a bolt or latch, *e*, for locking the contact-point *a* in its position in contact with the point *a′*, said latch sliding across the push-bar *a″* and in a notch, *e′*, in said bar and being guided on a bar, *f*, secured stationary to the interior of the box. The engagement of the latch with the notch *e′* prevents the push-bar *a″* from sliding longitudinally. The latch is also provided with a notch, *e″*, and by sliding the latch so as to bring the notch *e″* thereof directly over the push-bar *a″* the latter is free to move when the door of the box is opened for the purpose of giving the alarm. The aforesaid latch is operated by a suitable key inserted through the front of the box.

The contact-points *a a′* are insulated from the box, and wires *c c′* are extended from the contact-points, said wires and contact-points varying in number according to the number of boxes in the circuit. Two wires will accommodate three boxes, three wires will accommodate seven boxes, four wires fifteen

boxes, and so on, each additional wire doubling the number of boxes and adding one to said number possible to be placed in the circuit and a corresponding number of signals on the annunciator-board. Thus with ten wires one thousand and twenty-three boxes may be placed in the circuit and a corresponding number of signals sent. This ratio of increase in the number of boxes in proportion to the number of wires is due to the employment in connection with said wires of a selecting device similar to that illustrated in my prior application for Letters Patent, filed October 30, 1886, Serial No. 217,558. Said selecting devices are located at the receiving-station and consist of the feelers B B, of the form of bars, disposed edgewise vertically and side by side horizontally and parallel, and pivoted at one end to posts *d d*, rising from a suitable base, E. The free ends of the feelers rest on a suitable stop, *q*. There is one of said feelers required for each alarm-box in the circuit, and each feeler has in its top edge a number of notches, *h h*, corresponding to the number of wires in the circuit. The notches are arranged in different relative positions in each feeler, as shown in Fig. 2 of the drawings.

F F$^{\times}$ represent magnets secured to a suitable support above the feelers B B, which magnets are connected with the main-line circuits marked M L in the drawings and consisting of the batteries G G$'''$, wires *c c*, running from said battery G successively through the alarm-boxes A and A$''$, and thence through the magnet F and to the aforesaid battery, and wires *c' c'*, running from the battery G$'''$, through the boxes A$'$ and A$''$, to the magnet F$^{\times}$, and thence to the battery.

i and *i'* represent the armatures of said magnets. Said armatures are rigidly fastened to the upper ends of vertical plates *s* and *s'*, which are pivoted at *i'' i''* to a suitable support. The lower ends of the said plates extend across the entire series of feelers B B, as shown in Fig. 3 of the drawings, and when either of the armatures *i i'* is released from its respective magnet the lower end of the plate connected to said armature is drawn by a spring, *k*, against a stop, *j*, and when in this position one of the feelers B has its notches *h h* coinciding with the overhanging plates *s s'*. The said plates are composed of metal from their pivots to their lower extremities. The stops *j j* are also composed of metal, and constitute electric contact-points which are in a local circuit marked L C in the drawings. The stops or contact-points *j j* are secured to a rock-shaft, *j'*, by means of which they can be swung out of contact with the plates *s s'*, as hereinafter described. To the top of each feeler is attached a metal plate, *j''*, which constitutes an armature for the magnet F$'$, arranged over the feelers and in the local circuit L C, extending from the battery G$'$ through wire *c''*, one or both plates *s s'*, stops *j*, rock-shaft *j'*, wire *c'''''*, magnet F$''$ of the audible signal, thence by wire *c''''*, through magnet F$'$, back to the battery G$'$. Hence, when one of the plates *s s'* is released from its respective magnet and drawn against the stop *j*, the local circuit is closed and the resultant electric impulse energizes the magnet F$'$ and causes the same to attract the armatures *j''*, and thus lift the feelers B B B. However, only the single feeler which has its notches *h h* coinciding with the overhanging plates *s s'* is allowed to rise sufficient to bring its contact-point P in contact with the stop P$'$, the other feelers being debarred from rising the aforesaid distance by the top edges of the feelers encountering the lower end of the plates *s s'*. The aforesaid impulse through the local circuit L C also energizes the magnet F$''$ of the audible signal, and thereby sounds the alarm-bell H through the medium of suitable mechanism, which is here represented in the form of a notched disk, *l*, and gear-wheel *l'*, secured to one and the same shaft, *m*, which receives rotary motion by a weight, *m'*, connected to the end of a cord wound upon a drum, *m''*, mounted loosely on the aforesaid shaft and connected therewith by a pawl and ratchet in the usual manner. A pinion, *n*, meshes with the gear-wheel *l'*, and has connected to it a crank, *n'*, which, by a pitman, *n''*, is connected with the hammer H$'$ of the bell or gong H. A detent engages the notched disk *l* and temporarily locks the same. The armature *o'* is connected to a pivoted lever, *o''*, which is arranged to throw the detent *o* out of engagement with the disk *l* when the armature *o'* is attracted to the magnet F$''$; hence, when the local circuit L C is closed, as hereinbefore described, the detent *o* is caused to liberate the disk *l*, and the gear-wheel *l'* is then allowed to rotate and actuate the bell-hammer H$'$ by the medium of the pinion *n*, crank *n'*, and pitman *n''*.

L represents an annunciator, which may be of any suitable form. The form here shown, for exemplification, consists of a board or frame on which are pivoted the drops I I I, of the common and well-known form, said drops bearing the signal-numbers on one side and presenting the same at the front of the annunciator board or frame when the drops are in their released or suspended positions. Levers I$'$ I$'$ I$'$ are pivoted on the annunciator-frame and adapted to engage at one end with the drops to hold the same in elevated or reversed positions to conceal the signal-numbers, as illustrated in full lines in Fig. 1 of the drawings. The opposite ends of the aforesaid levers constitute armatures of magnets I$''$ I$''$ I$''$. An electric impulse through one of said magnets causes its respective armature to throw the lever I$'$ out of engagement with the drop I, which then falls into a suspended position and presents its number at the front of the annunciator-case.

The described annunciator is actuated by a second local circuit, marked L C$'$ in the drawings, and which is formed as follows: To

the free end of each feeler B, I attach an electric contact-point, *p*, over each of which is arranged a stationary contact-point, *p'*, from each of which latter is extended a wire, *p''*, to one of the magnets I''. To the rock-shaft *j'* is attached an arm, *j'''*, which serves as an armature for magnet F'''. This magnet is in the wire *g*, leading from battery G'' to fulcrum *d* of feelers B. Another wire, *g''*, is extended from the battery G'' to the front plate or frame of the annunciator L, which is composed of metal to serve as a conductor, with which the magnets I'' are electrically connected.

The operation of my invention thus far described is as follows: To send the fire-alarm to the engine-house or main station of the fire-department it is only necessary to open the door D of the alarm-box A or A' or A'' nearest the locality of the fire. Upon opening the said door the contact-points *a a'* are automatically separated from each other, and thus the circuit through the wires connected with said box is broken. Assuming the alarm to be given from box A, the circuit over the line *c* is broken, and thus the plate *s* is allowed to swing against the stop *j*, while the other plate, *s'*, remains dormant. This position of the plate allows the feeler B No. 1, which has its two notches *h h* directly under the two plates, to be attracted to the magnet F'. If the alarm is given from the box A', the circuit over the line *c'* is broken and the plate *s'* is allowed to be drawn against the stop *j*, and thus the feeler B No. 2, which has its notches *h h* directly under the two plates, is allowed to rise, and when the alarm is given from box A'' the circuits over both lines *c c'* are broken, and therefore both plates *s* and *s'* are allowed to swing against the stops *j j*, and this allows the feeler No. 3 to rise, the relative position of the notches in the feelers being illustrated in Fig. 2 of the drawings.

The movement of either plate *s s'* closes the circuit over the line L C by the contact of the plate with the stop *j*, as hereinbefore described, and thus rings the alarm-bell H. At the same time the raised feeler B brings its contact-point *p* in contact with the point *p'*, which is directly over it, and thereby closes the local circuit L C' through the wire *p''*, which connects the aforesaid contact-point *p'* with the magnet I'' of the annunciator-drop I, bearing the number corresponding to that of the box from which the alarm is sent. The same electric impulse causes the magnet F''' to attract the armature *j'''*, and thereby draws the stops *j j* away from the plate or plates *s s'*. This breaks the circuit over the line L C, and thereby allows the detent *o* to re-engage with notch in disk *l* and stop the ringing of the alarm-bell H, and allows the feelers B B B to drop to their normal position, and this motion of the feelers separates the contact-points *p p'* from each other, and thus breaks the circuit over the line L C'. The armature of the magnet I'', being thereby released, allows the suspended drop I to be replaced into engagement with its armature or lever I'. To the free ends of the stops *j j*, I attach insulators *u*, as shown in Fig. 2 of the drawings. The purpose of these insulators is this, viz: In withdrawing the stops *j j* from the backs of the plates *s s'* the latter are drawn slightly farther rearward by the springs *k k* until arrested by other stops, *u'*. Should the circuits through the main lines M L be left open until after the circuit through the line L C' is broken, the stops *j j* in swinging back toward the plates *s s'* collide with the edges of said plates, and in this collision the insulators *u* become interposed between the stops and plates, and thus prevent the circuit through the line L C' from becoming closed until the plates *s s'* are swung away from the stops *j j* by the closing of the circuits through the main lines M L and the resultant attraction of the armatures *i i'* to the magnets F F×. A suitable clock-work for operating a gong, so as to ring the number of the signal, may be located between the feelers and annunciator and operated by said feelers, as illustrated in Figs. 7, 8, and 9 of the drawings, in which B denotes one of the feelers hereinbefore described. On a shaft secured to the frame of the clock-work is loosely mounted a drum, *v*, from the side of which projects a sleeve on which are loosely mounted a notched disk, M', and a gear-wheel, N, which is fixed to the said disk so as to rotate in unison therewith. A pivoted detent, M, has one end adapted to engage the notched disk M', so as to lock the same, and the opposite end of the detent is cam-shaped and in engagement with the free end of the feeler B, so as to be actuated thereby when moved, as hereinbefore described. On the drum *v* is wound a cord, to the free end of which is attached a weight, *v'*.

On the disk M' is pivoted a pawl, *v''*, which engages a ratchet-wheel, N', rigidly attached to the sleeve of the drum *v*. The aforesaid weight *v'* affords the necessary power to rotate the disk M' when released from the detent M. If desired, a coil-spring may be employed in lieu of the cord and weight.

w designates a lever pivoted either on the aforesaid sleeve or on the shaft, and having connected to it a dog, *w'*, engaging the ratchet-wheel N'. By oscillating this lever rotary motion is imparted to the ratchet-wheel and drum *v* to wind up the cord carrying the weight *v'*. The gear-wheel N meshes with a pinion, O, rigidly attached to a pivoted shaft, to which is likewise secured a metallic disk, P, from which project radially one or more metallic arms, *x*, and between these arms are secured insulating-sectors *y y*. On the edge of the sectors normally rides the free end of a pivoted metallic bar, P'. A wire, *l*, is extended from the shaft of the disk P to a battery, P'', a wire, *r'*, is extended from the battery to magnet Q, and a wire, *r'*, is extended from the bar P' to the said mag-

net. The armature of the magnet is attached to the pivoted bell-hammer R, which is held away from the bell or gong R′ by a spring, *g′*. The attraction of the armature to the magnet causes the hammer to strike the gong. When the notched disk M′ is locked by the detent M, the bar P′ rides on the insulating-sector *y*, and consequently the circuit through the magnet Q is broken. As soon as the feeler B throws the detent out of engagement with the notched disk M′ the disk P is rotated by the clock-work, and during the revolution of said disk the bar P′ is made to ride over the metallic arms *x* of the disk, and in doing so the circuit is closed and the resultant electric impulse causes the hammer R to strike the gong R′.

There is a set of the described clock-work and circuit making and breaking mechanism for each feeler, and the number of arms or electric contact-points *x* on each disk P corresponds to the number of the alarm-box, which, by the main lines M L and magnets F and F×, brings the plates *s* and *s′* in position to allow one of the feelers B to set in motion the corresponding clock-work with its disk.

Instead of operating the aforesaid clock-work mechanically by the feelers B B, it may be operated in the local circuit L C′, as shown in Fig. 15 of the drawings, in which 10 designates a magnet included in said circuit and disposed opposite an armature attached to the detent M, and as the impulses pass through said circuit the armature of the detent is attracted by the magnet, and said detent is thereby thrown out of engagement with the disk M′. The aforesaid magnet is included in one of the wires P″. (Shown in Fig. 1 of the drawings.)

It is obvious that by a slight modification of the various mechanisms normally-closed local circuits may be employed. When the main lines are very extensive, it may be necessary to operate the magnets F F× by local circuits controlled by relays in the main lines. It is also obvious that more than one receiving-station may be placed in any suitable locality in the circuit. The described apparatus can be materially simplified by attaching annunciator-disks I directly to the free ends of the feelers B B and inclosing the same in an annunciator-case, L, as represented by dotted lines in Fig. 1 of the drawings. The rock-shaft *j′* is then to be extended to the front of the annunciator-case and to be provided with a crank or suitable handle, *t*, by which to turn it so as to throw the stops *j j* out of contact with the plates *s s′* when desired to break the circuits L C, which actuates the alarm-bell or audible signal, magnet F‴ being in this case omitted.

Where several contact-points are in an alarm-box it is essential that the contact of all of said points is broken simultaneously, and in order to insure this action I employ in said box an extra set of contact-points, *a‴*, as shown in Fig. 10 of the drawings, which contact-points constitute a concentrating circuit maker and breaker. Both of the said contact-points of the extra set are supported by separate springs, which bear toward each other and hold said contact-points normally in contact. The springs are limited in their movement by stops 2 2. One of the contacts is partly composed of hard rubber, 3, or other suitable insulating material, for the purpose to be presently described. A spring, 4, attached to the under side of the other contact-piece, bears against the under side of the first-mentioned contact, and when the box is in its closed position said spring bears on the metal of the contact-point. The spring-arms *b′* and *b″*, carrying the extra contacts *a‴*, extend below the latter and have affixed to their lower extremities a number of springs, 5 5, equal to the number of main or primary contacts *a* and *a′*, the ends of the springs bearing on insulated material on the upper side of said contacts when the box is closed, as aforesaid. The circuits are closed through the main or primary contacts *a* and *a′* by springs 6 6, attached to the under side of contacts *a* and bearing with their free ends on the contacts *a′*, and when the circuits are thus closed the currents cannot flow through the extra contacts *a‴ a‴*, because the springs 5 5 rest upon insulating material, and in order to send a signal from the box it is necessary to first shift the said springs to the conducting material to allow the current to flow through them and through the extra contacts *a‴ a‴*. Then the currents are to be broken through the main contacts *a* and *a′*, thereby causing all the currents flowing through the box to flow through the extra contacts *a‴ a‴*, and finally the latter is to be broken, which breaks simultaneously all the currents necessary to give the signal.

The operation is performed automatically with the opening and closing of the door. When the door is opened slightly, the main spring-arm *b* bears outward and allows the set of springs 5 on the extra spring-arm *b′*, carrying the extra contact *a‴*, to shift to conducting material on main contacts *a;* then the stop 2 on the main spring-arm *b*, as the door is opened farther, draws the extra spring-arm *b′* with it, allowing the other extra spring-arm, *b″*, to move also to shift its springs 5 to conducting material on main contacts *a′*. Then, and not until then, are the circuits broken through the main contacts by the springs 6 6 on the under side of same moving onto insulating material, 7. Then all the currents flow through the extra contacts *a‴*, and by opening the door still farther said extra contact-points are also separated farther, causing the spring 4 to shift from conducting to non-conducting material 3, as shown in Fig. 11 of the drawings.

I think it unnecessary to describe the reverse operation on closing the door, as it will

be readily understood. It is obvious that the operation may be performed almost instantaneously.

I do not limit myself specifically to the form of spring-arms *b b' b''* shown in Figs. 10 and 11 of the drawings, as the same admits of several modifications, one of which is illustrated in Fig. 14 of the drawings, and consists in hinging said arms on the alarm-box and employing spiral springs 8 8 for imparting the requisite action to the arms.

It is obvious that each wire can be run back direct to the central station after it has passed through the boxes in which it is required to form the combination.

My described signal apparatus is adapted for operating burglar-alarms, hotel-annunciators, and various other analogous purposes, in which cases suitable push-buttons or keys may be employed in lieu of the herein-described alarm-box, and in some cases all the keys may be arranged in one place to send different signals therefrom, said push-buttons and keys being so well known in the art that an illustration of the same is deemed unnecessary in this case.

I do not limit myself to the use of the specific selecting devices—viz., the notched feelers B B, with the oscillatory plates *s s'*—inasmuch as other analogous selecting devices known in the art may be employed in connection with my improved signaling apparatus.

I would call special attention to one very important advantage of my improved signaling apparatus, and this consists in the fact that by the employment of an annunciator at the central office or any station operated automatically and instantaneously with the act of opening the door of the signal-box I exhibit by said annunciator the number of the box from which the signal is sent, thus apprising the fireman of the location of the fire at once, and without waiting to hear the alarm-bell strike the number, which requires considerable time and is often inaudible, owing to the noise about the receiving-station.

What I claim as my invention is—

1. A plurality of transmitting-stations, a number whereof are each equipped with a single circuit maker and breaker connected with a single line-wire, and the remainder of said stations being each equipped with a combination of two or more circuit makers and breakers connected with a corresponding number of line-wires, in combination with a plurality of interchangeably-movable feelers, magnets in the main-line circuits, and armatures for said magnets controlling the movements of said feelers, as set forth.

2. In combination with a plurality of line-wires, a plurality of interchangeably-movable feelers, magnets in the line-wires, armatures for said magnets controlling the movements of said feelers, a series of signal-boxes, a number thereof equal to the number of the aforesaid wires being provided with a single circuit maker and breaker, and the remainder of said boxes being each equipped with a combination of circuit makers and breakers connected with two or more of the aforesaid wires, and the circuit makers and breakers being operated automatically with the opening and closing of the doors of the boxes containing the same, as set forth.

3. A signaling system comprising a plurality of transmitting-stations, a number whereof are each equipped with a single circuit maker and breaker connected with a single line-wire, and the remainder of said stations being each equipped with a combination of two or more circuit makers and breakers connected with a corresponding number of line-wires, in combination with a plurality of interchangeably-movable feelers, magnets in the line-wires, armatures for said magnets controlling the movements of said feelers, and an audible signal in a local circuit also controlled by the movements of said armatures, substantially as set forth.

4. A signaling system comprising a plurality of transmitting-stations, a number whereof are each equipped with a single circuit maker and breaker connected with a single line-wire, and the remainder of the said stations being each equipped with a combination of two or more circuit makers and breakers connected with a corresponding number of line-wires, in combination with a plurality of interchangeably-movable feelers, one for each transmitting-station, magnets in the line-wires, armatures for said magnets controlling the movements of said feelers, and an annunciator operated by the movement of the aforesaid feelers, substantially as set forth.

5. In a signaling apparatus, the combination of a plurality of line-wires, transmitting-stations connected with said line-wires, magnets F F$^{\times}$ at the receiving-station connected with the said line-wires, plates *s s'*, operated by said magnets, feelers B B, operated by a local circuit, a clock-work having the detent M arranged to be actuated by the feeler, the metallic disk P, rotated by said clock-work, metallic arms *x x*, projecting from said disk, insulators *y y* between the arms, the pivoted bar P', the gong R', hammer R, magnet Q, arranged to actuate the hammer, the battery P'', and wires connecting the disk P, magnet Q, and bar P' with the battery, substantially as described and shown.

6. In combination with the feelers B B and movable plates *s s'*, the battery G', contact-stops *j j*, magnet F', audible signal mechanism, magnet F'', for operating said signal mechanism, and an electric conductor connecting the plates, stops, and magnets with the battery, substantially as described and shown.

7. In combination with the feelers B B and pivoted plates *s s'*, the batteries G G''', main-line circuit-wires, circuit makers and breakers connected with said wires, magnets F F$^{\times}$ in said circuits and arranged to actuate the

aforesaid plates, battery G′, magnet F′, arranged to actuate the feelers, circuit-closers *j j*, and an electric conductor connecting magnet F′ with the battery G′, as and for the purpose set forth.

8. In combination with the feelers B B and pivoted plates *s s′*, the batteries G G‴, main-line circuits M L, composed of separate wires, one for each of said plates, magnets F F×, for operating the plates, signal-boxes each connected with one or more of the aforesaid wires, circuit-breakers connected to said boxes, and the plurality of circuit-breakers in a box, arranged to operate simultaneously, substantially as set forth.

9. In combination with the feelers B B and pivoted plates *s s′*, the batteries G G‴, main-line circuits M L, composed of separate wires, one for each of said plates, magnets F F×, connected with the main lines and arranged to operate said plates, signal-boxes each connected with a different wire or different set of wires of said circuits, circuit-breakers connected to said boxes, the battery G′, stops *j j*, and the magnet F′, arranged to operate the feelers, and electric conductors connecting the plates *s s′*, stops *j j*, and magnet F′ with the battery G′, substantially as set forth and shown.

10. In combination with the feelers B B, magnet F′, for operating said feelers, and pivoted plates *s s′*, the battery G′, arranged to operate the feelers, the rock-shaft *j′*, stops *j j*, connected to said rock-shaft, the alarm-tripper *o″*, magnet F″, for operating said tripper, local circuit-wire connecting the plates *s s′* with one of the poles of the battery G′, wire connecting the rock-shaft *j′* with the magnet F″, wire connecting the magnet F″ with the magnet F′, and wire connecting the magnet F′ with the battery G′, substantially as described and shown.

11. In combination with the feelers B B and pivoted plates *s s′*, the rock-shaft *j′*, stops *j j* and armature *j‴*, connected to said rock-shaft, magnet F‴, for attracting said armature, battery G″, contact-points *p*, attached to the feelers, contact-points *p′*, annunciator L, magnets I″ I″ I″, wire *g*, and feelers B, connecting the magnet F‴, respectively, with the contact-points *p* and with the battery G″, and wires *p″* and *g″*, connecting the annunciator-magnets, respectively, with the contact-points *p′* and with the aforesaid battery, and an audible signal operating electrically and simultaneously with the annunciator, substantially as described and shown.

12. The combination, with a signal-box having a movable door, of an electric contact-point secured stationary to the interior of the box, an electric contact-point supported movably in the box and normally separated from the other contact-point, a push-bar projecting from the movable contact-point toward the door, and a latch adapted to lock the push-bar and prevent the same from following the movement of the door, as set forth.

13. In a plurality of line-circuits, a signal-station in said circuits, a plurality of primary circuit makers and breakers at said station, and a supplemental circuit maker and breaker carried on movable electric conducting-supports adapted to make and break contact with the metallic portions of the primary circuit makers and breakers, substantially as specified and shown.

14. In a fire-alarm signal-box, a plurality of primary circuit makers and breakers, through each of which a separate current flows, and a supplemental circuit maker and breaker actuated automatically by the primary circuit makers and breakers and carried on movable electric conducting supports adapted to make and break contact with the metallic portions of the primary circuit makers and breakers, substantially as set forth and shown.

15. In a fire-alarm signal-box, the combination of a plurality of primary circuit makers and breakers, consisting of stationary contact-points *a′* and movable contact-points *a*, carried on spring-arm *b* and actuated by the opening and closing of the door of the box, the spring 6, connected at one end to the metallic portion of one of the said contact-points and having its free end adapted to make and break contact with its opposite contact-point, the spring-arms *b′* and *b″*, with springs 5 5 attached to said arms and adapted to make and break contact with the conducting material of the contact-points *a a′*, stops 2 2, for limiting the movement of the spring-arms *b′ b″*, concentrating circuit making and breaking contact-points *a‴ a‴*, carried on the spring-arms *b′ b″*, the insulating material 3, interposed between the contact-points *a‴ a‴*, and the spring 4, connected at one end to one of said contact-points and having its free end adapted to make and break contact with the conducting material of the opposite contact-point, substantially as described and shown.

In testimony whereof I have hereunto signed my name, in the presence of two witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 28th day of March, 1888.

MARK W. DEWEY. [L. S.]

Witnesses:
C. H. DUELL,
C. L. BENDIXON.