

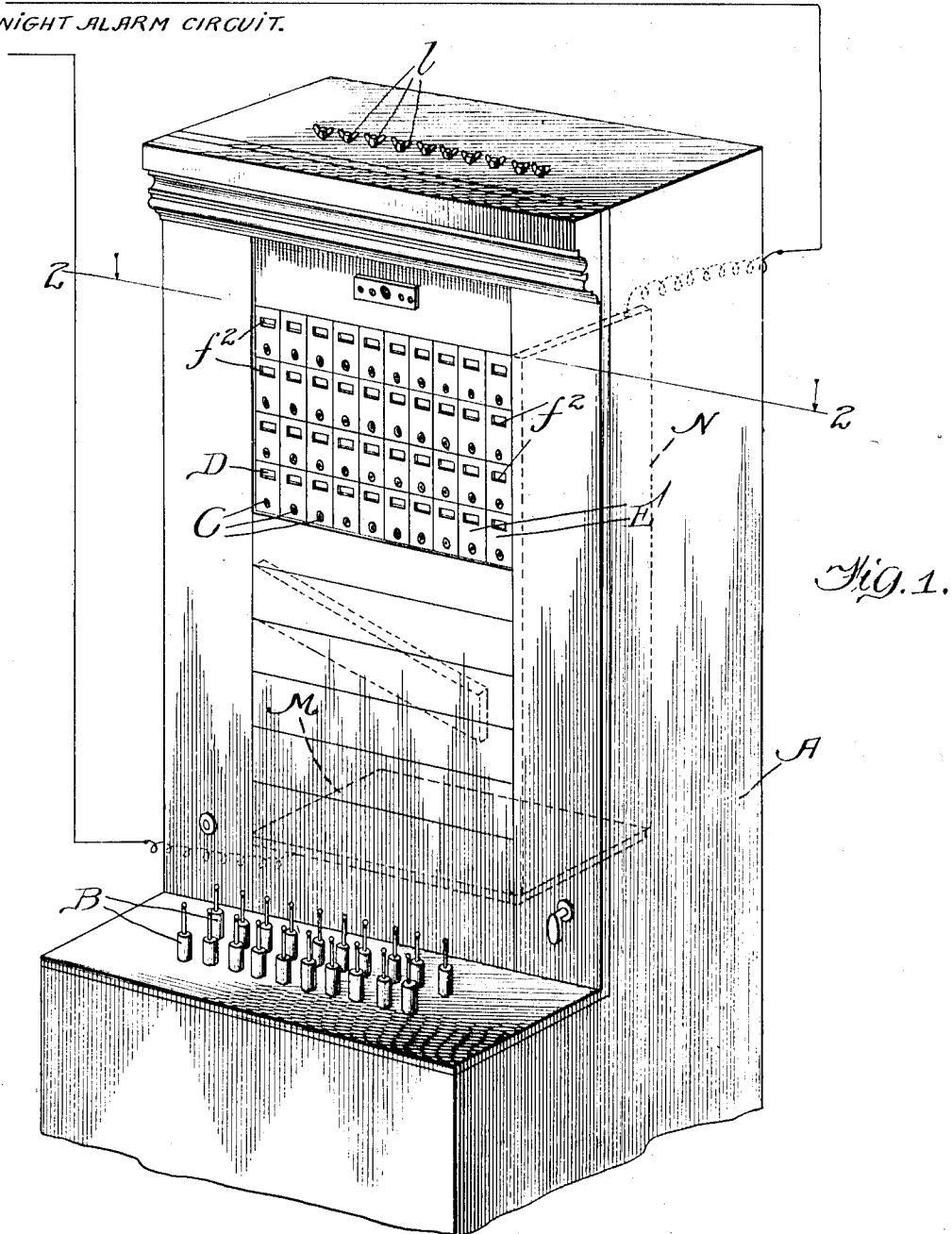
P. C. BURNS.  
TELEPHONE SWITCHBOARD.  
APPLICATION FILED DEC. 5, 1907.

1,054,275.

Patented Feb. 25, 1913.

5 SHEETS—SHEET 1.

NIGHT ALARM CIRCUIT.



Witnesses:  
Wm. D. Lipp  
L. U. Domaradzky

Inventor:  
P. C. Burns  
By Buckley, Howard & Dring  
Attorneys

P. C. BURNS.  
TELEPHONE SWITCHBOARD.  
APPLICATION FILED DEC. 5, 1907.

1,054,275.

Patented Feb. 25, 1913.

5 SHEETS—SHEET 2.

Fig. 2.

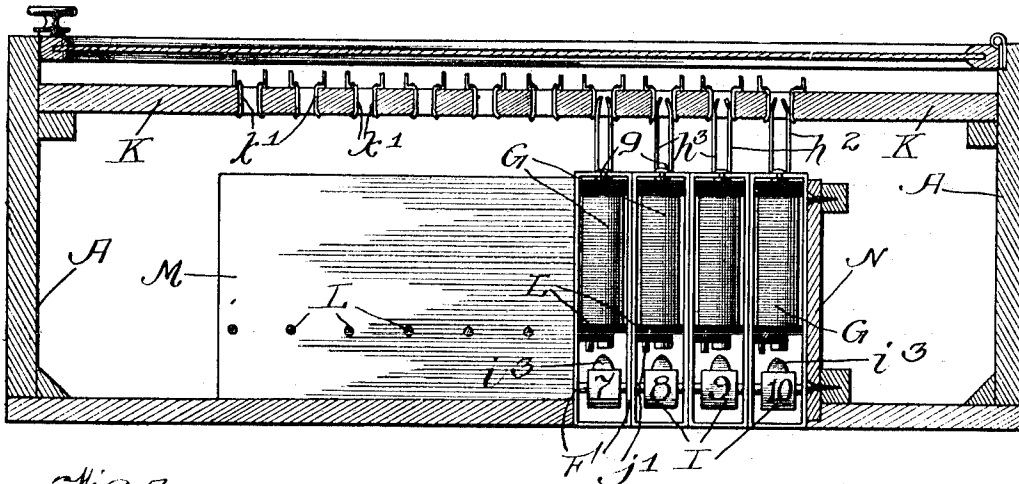
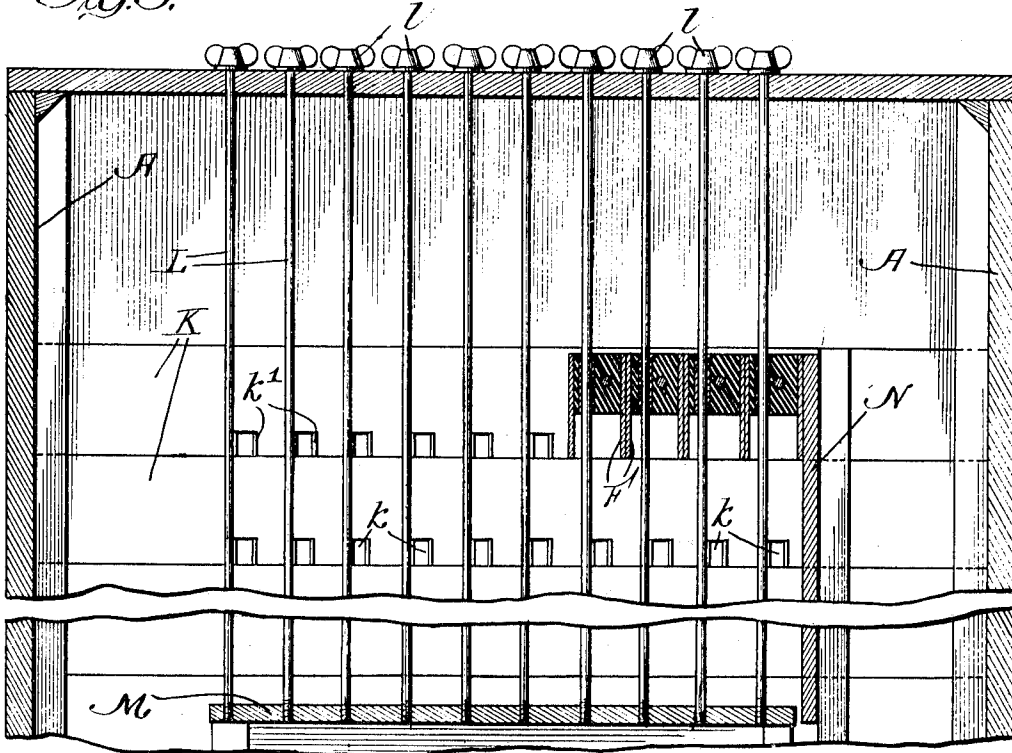


Fig. 3.



Witnesses:  
H. D. Perry  
G. V. Donnan Jr.

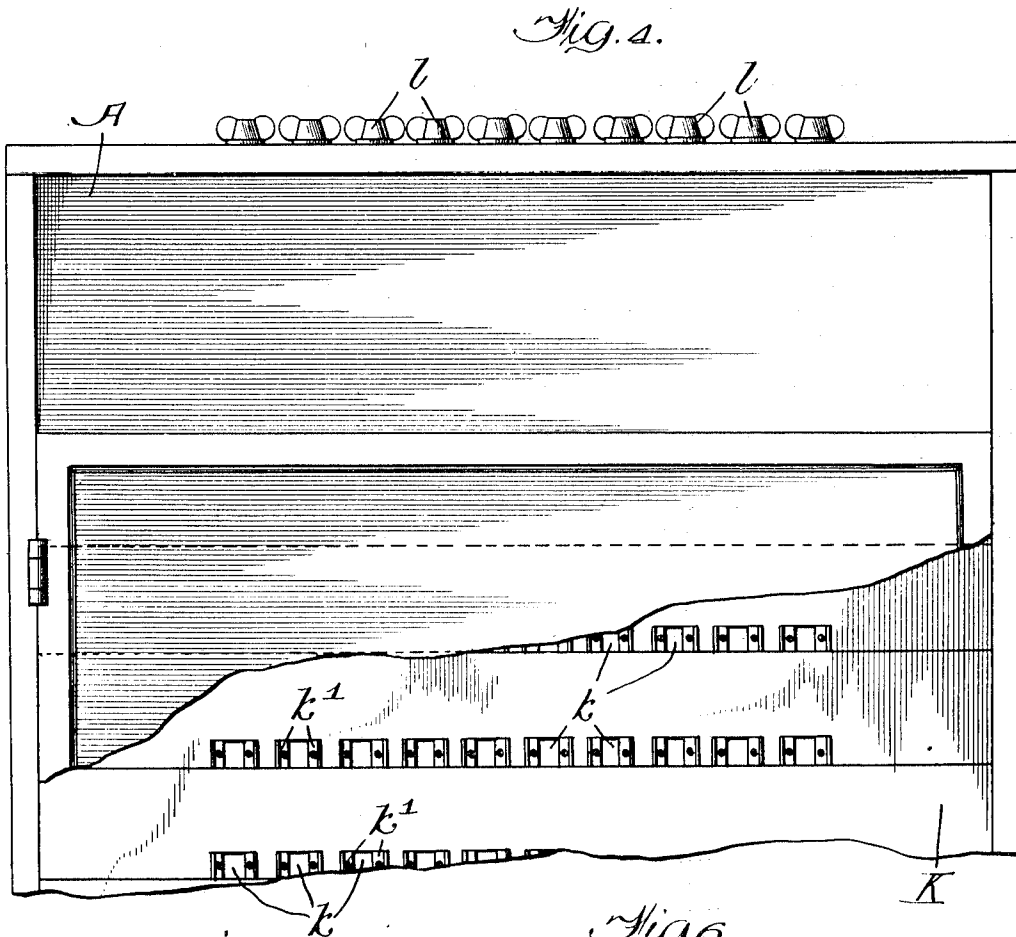
Inventor:  
P. C. Burns  
By Bulkeley Straub & Drury  
attorneys

P. C. BURNS.  
TELEPHONE SWITCHBOARD.  
APPLICATION FILED DEC. 5, 1907.

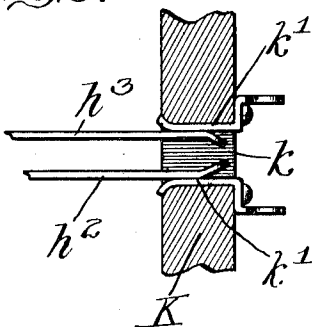
1,054,275.

Patented Feb. 25, 1913.

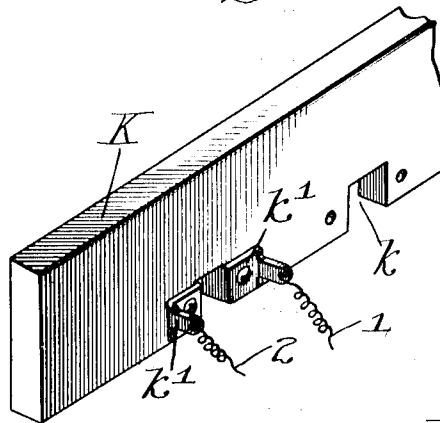
5 SHEETS—SHEET 3.



*Fig. 5.*



*Fig. 6.*



Witnesses:  
*Wm. D. Perry*  
*L. U. Donnan Jr.*

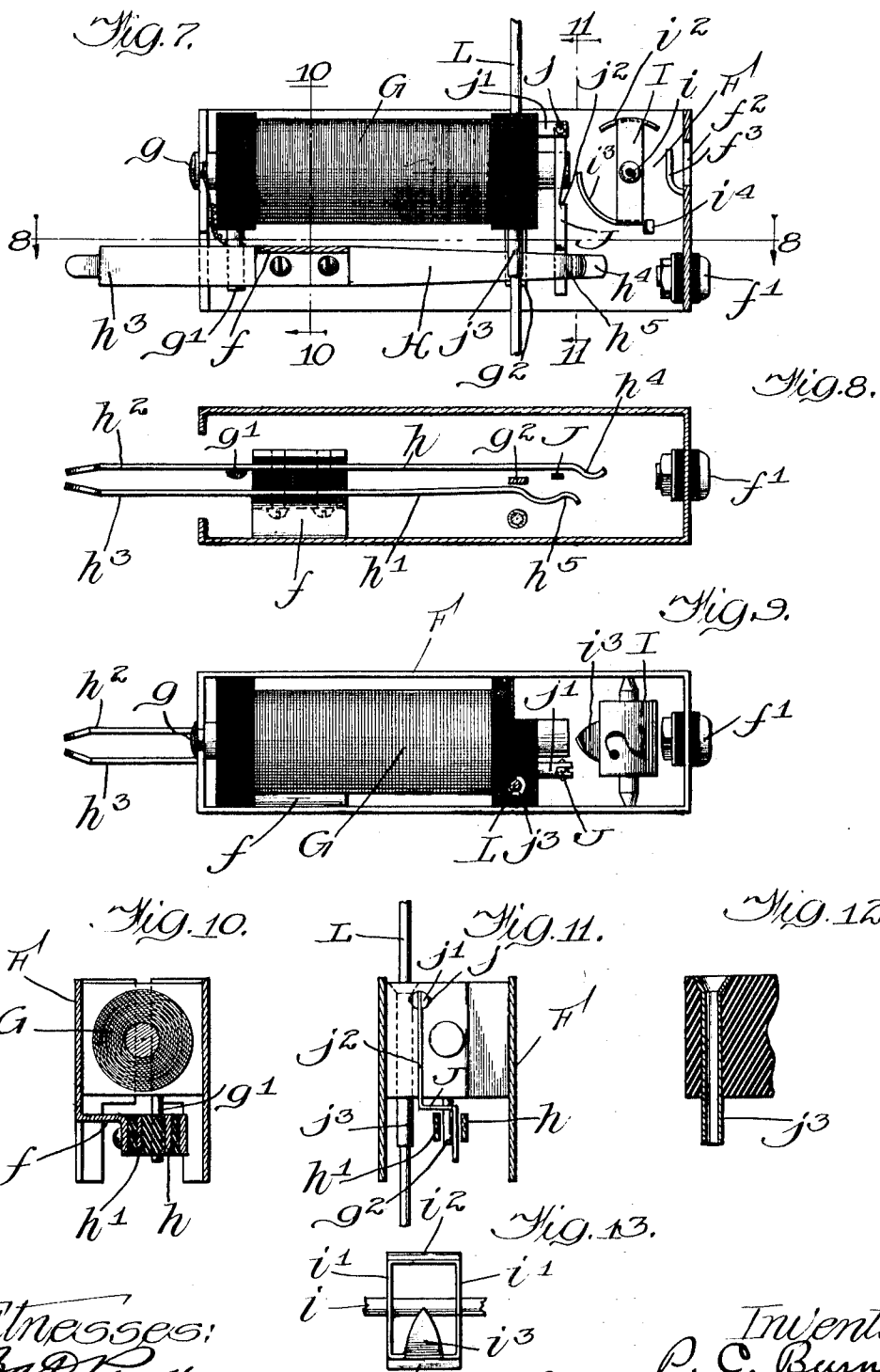
Inventor  
*P. C. Burns*  
By *Bulkey, Macdonald & Drury*  
Attorneys

P. C. BURNS.  
TELEPHONE SWITCHBOARD.  
APPLICATION FILED DEC. 5, 1907.

1,054,275.

Patented Feb. 25, 1913.

5 SHEETS—SHEET 4.



Witnesses:  
Ed. Perry  
G. V. Domarus Jr.

Inventor:  
P. C. Burns  
By Bulky & Sons  
Attorneys

P. C. BURNS.  
TELEPHONE SWITCHBOARD.  
APPLICATION FILED DEC. 5, 1907.

1,054,275.

Patented Feb. 25, 1913.

5 SHEETS—SHEET 5.

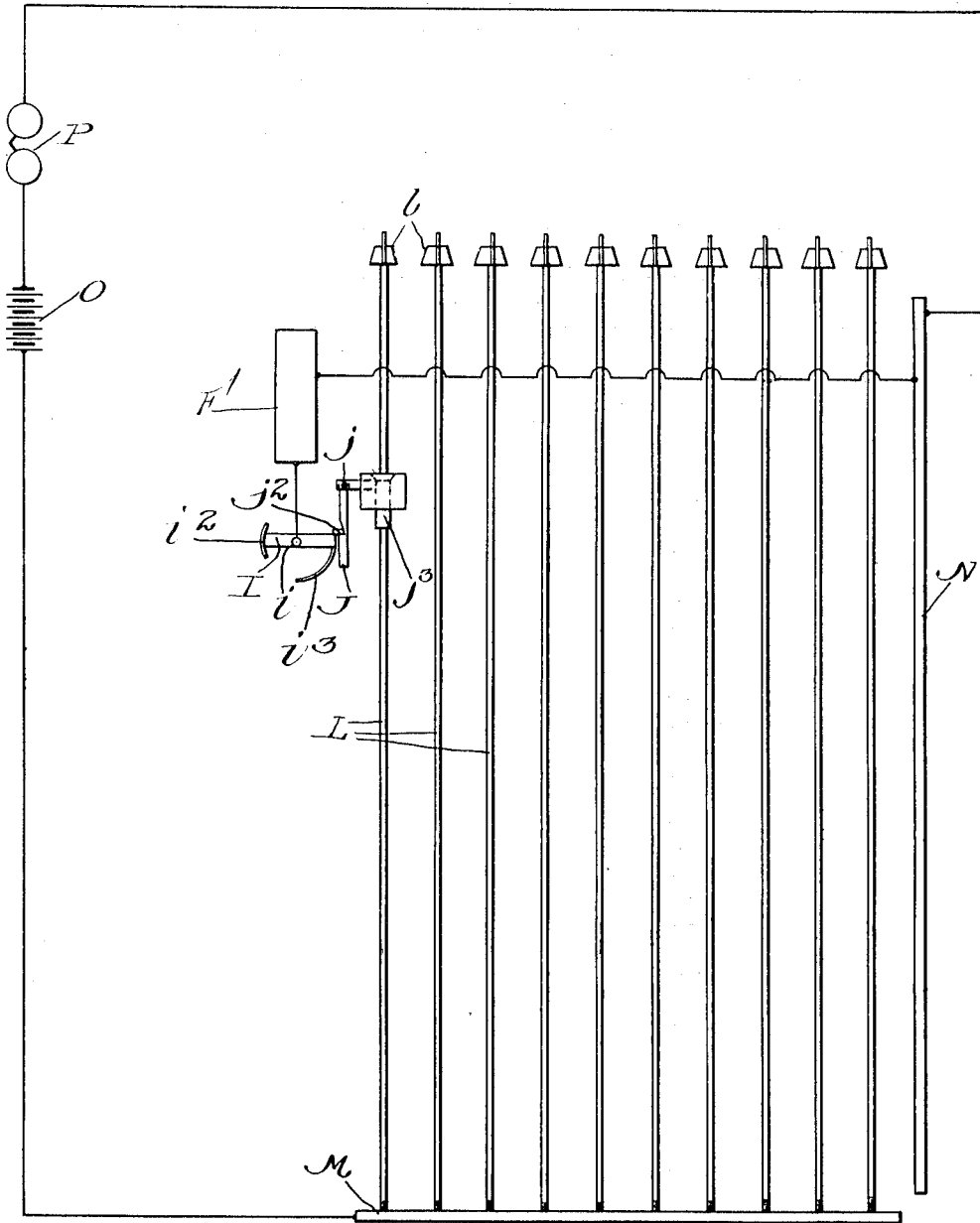


Fig. 14.

Witnesses:  
B. A. Perry  
L. U. Donnan Jr.

Inventor:  
P. C. Burns  
By Bulkeley & Naundrup  
Attorneys

# UNITED STATES PATENT OFFICE.

PETER C. BURNS, OF CHICAGO, ILLINOIS.

## TELEPHONE-SWITCHBOARD.

1,054,275.

Specification of Letters Patent.

Patented Feb. 25, 1913.

Application filed December 5, 1907. Serial No. 405,206.

*To all whom it may concern:*

Be it known that I, PETER C. BURNS, a citizen of the United States of America, and resident of Chicago, Cook county, Illinois, have invented a certain new and useful Improvement in Telephone-Switchboards, of which the following is a specification.

My invention relates to telephone switchboards of that type in which electrical annunciators and spring jacks are allotted to the different subscribers' telephone lines terminating at the board.

It relates more particularly to switchboards of this character in which provision is made for automatically restoring the annunciators to non-signaling position by insertion of the operator's connecting plugs in the spring jacks associated with the said annunciators.

More especially my invention relates to manual switchboards of this type in which the spring jacks and annunciators are associated together, each annunciator and its allotted spring jack constituting a unit, and each unit being readily insertible and removable from the body or frame structure of the switchboard.

Generally stated, the object of my invention is the provision of an improved and highly efficient switchboard of the foregoing general character.

Special objects of my invention are the provision of improved means for automatically restoring the annunciators by the insertion of the operator's connecting plugs; the provision of improved means for combining the spring jacks with the annunciators in such manner as to provide the switchboard with units which are allotted to the different subscribers' lines terminating at the board, and each of which units is readily insertible in and removable from the switchboard; the provision of improved means for holding the said units in place in the switchboard, and for connecting the said units in multiple with the terminals of a night bell or other local circuit; the provision of improved means whereby the annunciators are held in normal or non-signaling position by gravity, and locked in signaling position by latching means adapted to be released by the insertion of the operator's connecting plugs, whereby the visual signals of the annunciators are re-

turned by gravity to normal or non-signaling position; the provision of improved means whereby the different units, each comprising a spring jack and an annunciator, can be readily removed without opening the back door of the switchboard; and the provision of certain details and features of improvement and combinations tending to increase the general efficiency and serviceability of a telephone switchboard of this particular character.

To the foregoing and other useful ends my invention consists in matters hereinafter set forth and claimed.

In the accompanying drawings,—Figure 1 is a perspective of a telephone switchboard embodying the principles of my invention. Fig. 2 is an enlarged horizontal section on line 2—2 in Fig. 1. Fig. 3 is a vertical section through a portion of the top or upper part of the switchboard. Fig. 4 is a rear elevation of the upper portion of the switchboard, a portion of the door or back of the switchboard being broken away to bring into view the line terminals or clips at the back of the board. Fig. 5 is an enlarged detail section of the rear contacts of one of the combined annunciators and jacks. Fig. 6 is a perspective of a portion of the back, showing the line terminals or clips for one of the telephone lines. Fig. 7 is a side elevation of one of the units or combined annunciators and jacks, the side wall or casing of the same being broken away to bring into view the different parts thereof. Fig. 8 is a horizontal section on the line 8—8 in Fig. 7. Fig. 9 is a plan of the structure shown in Fig. 7. Fig. 10 is a cross section on line 10—10 in Fig. 7. Fig. 11 is a cross section on line 11—11 in Fig. 7. Fig. 12 is a detail sectional view of one of the night alarm contacts of one of the said units. Fig. 13 is a detail rear elevation of one of the pivoted visual signals of the said units. Fig. 14 is a diagram of the night alarm circuit in which the units are included in multiple—that is to say, in which the visual signals and latches of the different signals, as well as the retaining rods for said units, are connected in multiple, so that the operation of any annunciator will close the night alarm circuit.

As thus illustrated, the casing or structure A of the switchboard may be of any suitable known or approved character. The

plugs B can also be of any suitable or desired character, and are adapted to be inserted in the spring jacks C in the usual and well known manner.

5 Referring to Fig. 1, it will be seen that each spring jack is associated with the visual signal of an annunciator D, and that each jack and its associated annunciator constitutes a unit E. It will also be seen that  
10 these units are arranged in rows, both vertically and horizontally, and that each annunciator and its associated jack is individual to a certain subscriber's line. The other or usual equipment of the switchboard  
15 may be of any suitable character.

Referring more particularly to Figs. 7 to 13 inclusive, it will be seen that each unit or combined annunciator and jack comprises a rectangular metal casing F, adapted to inclose an electro-magnet G, a spring  
20 jack H, a visual signal or annunciator I, and a latch J, which latter has its upper end  $j$  pivoted upon a metal pin  $j^1$  secured to one end of the said electro-magnet. The  
25 other end of said electro-magnet is secured by a screw  $g$  to the rear end of the box-like casing F, as shown in the drawings. The lower portion of said casing is provided with an inturned projection  $f$ , upon which  
30 are mounted the jack springs  $h-h^1$ , the said springs being insulated from the said metallic casing F. These jack springs have rear end portions  $h^2-h^3$ , as well as forward portions  $h^4-h^5$ , which latter are arranged  
35 just back of the insulated thimble or jack socket  $f^1$ , which latter is secured to the front end of the casing F, as shown in the drawings. The said removable electro-magnet G has a terminal  $g^1$  which normally  
40 rests against the jack springs  $h^2$ , and another terminal  $g^2$  which normally rests against the jack springs  $h^1$ , as shown more clearly in Fig. 8 of the drawings. The back of the switch board is provided with notches  
45 or openings  $k$ , in which are inserted line terminals or clips  $k^1$ , as shown more clearly in Figs. 5 and 6 of the drawings. The subscribers' line wires 1—2 can then be soldered or otherwise secured to the outer ends of  
50 these clips or terminals, leaving the inner ends of the latter projecting within the openings  $k$ , in the manner shown. With this arrangement the rear end portions  $h^2-h^3$  of the jack springs are adapted to be  
55 inserted in the said openings  $k$ , and to engage between the terminals  $k^1$ , for the purpose of making contact therewith, thus automatically closing connection between the jacks and the subscribers' lines. Each annunciator or visual signal I has a cross pin  
60 or axis  $i$  by which it is journaled or pivoted upon the sides of the casing F, in the manner shown. Each annunciator or visual signal consists preferably of a piece of sheet  
65 metal bent to provide side portions  $i^1$  and

an upper portion  $i^2$ , which latter portion bears the number of the subscriber and is adapted to be brought opposite the opening  $f^2$  in the front of the casing F, as shown in the drawings. The construction is also such  
70 as to provide each annunciator or visual signal with a lower and rearwardly extending portion  $i^3$ , and with a bottom or lip portion  $i^4$ , the latter adapted to engage the notch  $j^2$  in the latch. Each annunciator or visual  
75 signal is preferably made of magnetic metal, so that when the magnet is energized the portion  $i^3$  is attracted, and the annunciator thereby caused to assume a horizontal position, thus bringing the lip or lower portion  
80  $i^4$  into engagement with the said notch on the latch. In this way the annunciators or visual signals are held by gravity in normal or non-signaling position, and are forcibly drawn or swung up into horizontal  
85 position to give the required signal. When once drawn up by the energizing of its associated magnet, each annunciator or visual signal is latched and held in such condition by its associated latch. When a plug  
90 is inserted in the associated jack, however, the end of such plug engages the lower end of such latch J, thus releasing the annunciator or visual signal, and allowing the latter to fall by gravity to normal or non-signaling position. When the annunciator  
95 is attracted, the number on its upper end is brought opposite the opening  $f^2$ , which latter is normally closed by the guard  $f^3$ , but which is positioned slightly back of the said  
100 opening. In this way, the signal portion  $i^2$  of the annunciators can swing down into position between the guard  $f^3$  and the opening  $f^2$ , thus giving a signal which will indicate to the operator that the subscriber  
105 to whom this annunciator is allotted desires a connection. With this arrangement, the guards  $f^3$  prevent accidental insertion of the plugs through the openings  $f^2$ , and thus protect the annunciators or visual signals  
110 against malicious or accidental breakage or tampering therewith. Furthermore, the insertion of the plug in the jack disengages the spring  $h^1$  from the magnet terminal  $g^2$ , thus opening the circuit of the  
115 said magnet.

Each pin  $j$  is connected with a socket  $j^3$  which extends through the head or insulated end portion on the end of the magnet. I  
120 will be seen that these sockets  $j^3$  are arranged vertically, and with such arrangement the sockets are all in line in each vertical column or row of units. This affords opportunity for a convenient fastening in of the units by means of rods L which are inserted  
125 through the said sockets  $j^3$ , in the manner shown more clearly in Fig. 3. The lower portion of the switchboard can be provided with a bar M into which the lower ends of the rods L are engaged. The side  
130

of the switchboard can be provided with another bar or common conductor N with which the end members of the horizontal rows of units contact. In this way, a plurality of the annunciators I are connected in multiple to the bar N, while all of the latches J are connected in multiple, through the medium of the rods L, with the bar M, in the manner shown more clearly in Fig. 14 of the accompanying drawings. In this figure the night alarm circuit can easily be traced through the annunciator of one of the units, as follows: From one pole of the battery O, through the night alarm bell P, through the bar N, thence through the casing F of the unit and through the annunciator or visual signal I, through the latch J and the pin  $j$ , through the socket  $j^3$ , through the bar M, and thence to the other pole of the said battery. This circuit, of course, is closed as long as the annunciator is held in signaling position, but is open as soon as the plug is inserted and the annunciator restored to normal position. With this arrangement, each rod L is common to all of the units in a vertical row or column and serves in addition to hold in position all of the units of such vertical row or column. The casing or body portions F of the different units are all in contact with each other, and consequently the annunciator of any particular unit is always in electrical connection with the bar N, regardless of whether or not the unit is in actual contact with such bar. An absolutely isolated unit, however, would require some special connection with the bar N; but in the use of the switchboard, and in the arrangement of either a small or large number of units therein, it is possible to avoid any such isolation of any particular unit. The upper ends of said rods are preferably provided with thumb pieces  $l$  by which they can be turned for the purpose of adjusting them in place. In this way, as explained, each rod not only has its electrical function of preserving the continuity of the night alarm circuit, or of any other circuit, but also has the additional or mechanical function of serving to hold in place the members of one of the vertical rows or columns of units. Consequently, no fastening devices are necessary at the back of the board and the units can be inserted and removed without opening the door or back of the board. In fact, the spring tension of the end portions  $h^2$ — $h^3$  of the jack springs are amply sufficient to hold the units in place, as they are squeezed tightly between the clips or terminals  $k^1$ , and the friction is sufficient to hold the units in place. It is evident, therefore, that the rods L serve to lock the units in place, and that the units are in reality self-retaining—that is to say, each unit will operate actively retain its position after the rods are

withdrawn. The continuity of the subscribers' line circuits is not dependent in any way on the structure of the rods, as the rods maintain the continuity of the night alarm circuit and serve merely to lock the units in place, but not as a means of forcibly holding the units in place. With this construction, the units are easily and readily inserted and removed, without manipulating or breaking any connections at the back of the board. These annunciators or visual signals are light and simple in construction, and are drawn into signaling position by the energizing of the electrical magnets, and then returned to normal or non-signaling position by gravity. In other words, the insertion of the plugs serves to unlatch the annunciators or visual signals to allow the same to assume their normal or non-signaling position. Consequently, a jar or vibration of the switchboard can not throw any of the annunciators into signaling position, the closure of a line circuit being absolutely essential for this purpose—that is to say, the actuation of any particular annunciator to signaling position being contingent upon the energizing of its associated magnet. Each annunciator or visual signal has one end thereof adapted for signaling purposes, and the other end of the same is adapted to serve as an armature for the associated magnet, whereby the entire mechanism to be operated by the magnet is at its forward end. In other words, the annunciator or visual signal and the armature for operating the same are preferably integral, being made of a single piece of sheet iron, and the unitary device thus provided is arranged between the end of the magnet and the front wall of the casing. Furthermore, it will be seen that the magnet G can be removed without disturbing any other parts of the unit. This is also true of the annunciator I, as this element of the unit can be removed without disturbing any other portions thereof. It will also be seen that the spring jack H can be removed without disturbing any other elements of the unit.

What I claim as my invention is:

1. A telephone switchboard comprising a back having clips arranged in pairs, and spring jacks each provided with a pair of parallel terminals or contacts adapted to be inserted between the members of a corresponding pair of clips or terminals on the back of the board, and plugs adapted to be inserted between the forward ends of said terminals.

2. A telephone switchboard provided with a back having openings therein, clips associated with and extending through said openings, and spring jacks provided with terminals or contacts adapted to be inserted in said openings and between said clips.

3. A telephone switchboard comprising a

back, units removably mounted in said board, clips or line terminals on the said back, each unit provided with rearwardly extending parallel spring terminals or contacts adapted to be inserted between and in engagement with a pair of the clips or terminals on the back of the board, whereby the mere insertion of a unit is sufficient to bring the said springs or terminals thereof into electrical contact with the corresponding pair of clips or terminals on the back of the board, said springs adapted to be pressed toward each other to permit their insertion between the said clips or line terminals.

4. A telephone switchboard comprising a back, clips or line terminals on the said back, units provided at their rear ends with springs adapted to be inserted between and in engagement with pairs of said clips or line terminals, and rods adapted to be inserted through said units to lock the same in place on the switchboard, each rod extending through a plurality of said units.

5. A telephone switchboard comprising a local circuit, units provided with metallic body portions or frames included in said circuit, each unit also provided with electromagnetically operated means included in said circuit, and rods extending through said units and connected in multiple in said circuit.

6. A telephone switchboard comprising a local circuit, annunciators for said switchboard, latches for holding the annunciators in signaling position, and means by which

said latches are included in and adapted to close said circuit.

7. A telephone switchboard comprising a plurality of units, rods inserted through said units to hold the same in place, and a local circuit including said rods in multiple, each rod extending through a plurality of said units.

8. A telephone switchboard comprising an electro-magnet, a socket in the end of said magnet, a latch electrically connected with said socket, an electrical annunciator adapted to be operated by the magnet, said latch adapted to catch and hold the annunciator in signaling position, a rod inserted through the socket in the end of the magnet, a metal frame on which the annunciator is mounted, and a local circuit including the said metal frame and annunciator and latch and socket and rod in series.

9. A telephone switchboard having lines leading thereto, terminal devices for said lines, rods or keys extending through said devices to hold the same in place, means for engaging the inner ends of said rods or keys, and threaded sockets for engaging the threaded outer end portions of said rods or keys.

Signed by me at Chicago, Illinois, this 31st day of October 1907.

PETER C. BURNS.

Witnesses:

SARAH LEWIS,

ALBERT JOHN SAUSER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."