

C. T. MASON.
TELEPHONE SWITCHBOARD.
APPLICATION FILED SEPT. 8, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

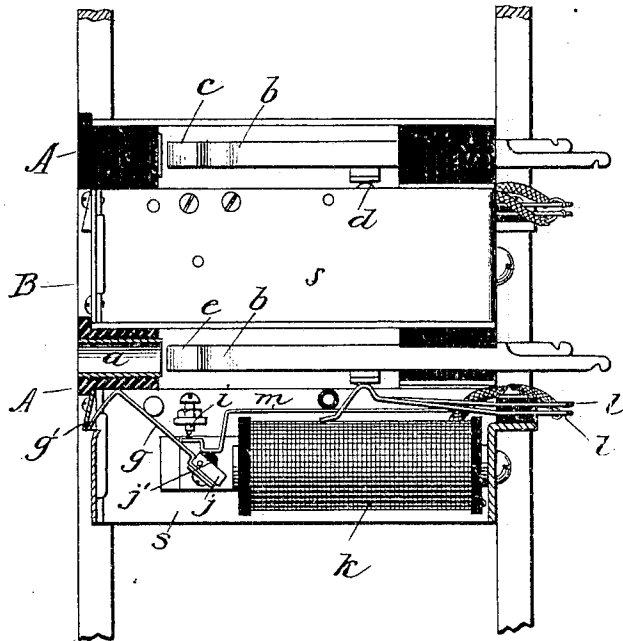


Fig. 2.

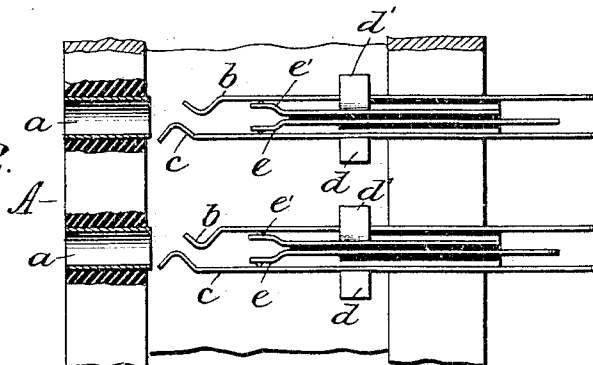
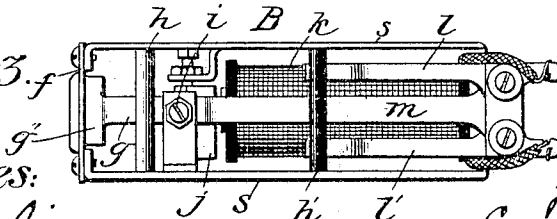


Fig. 3.

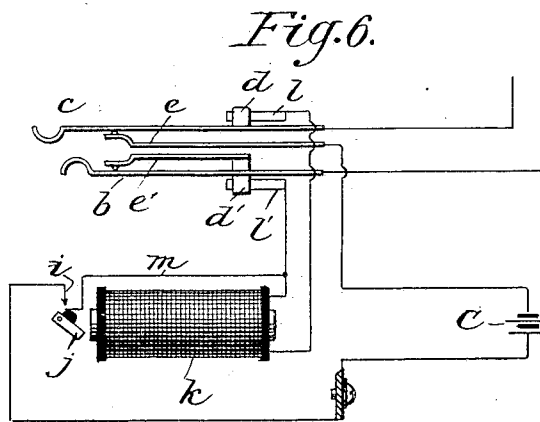
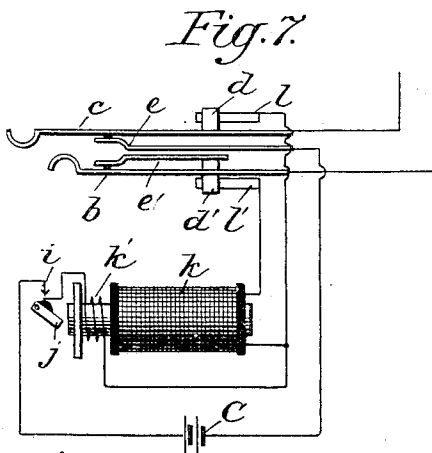
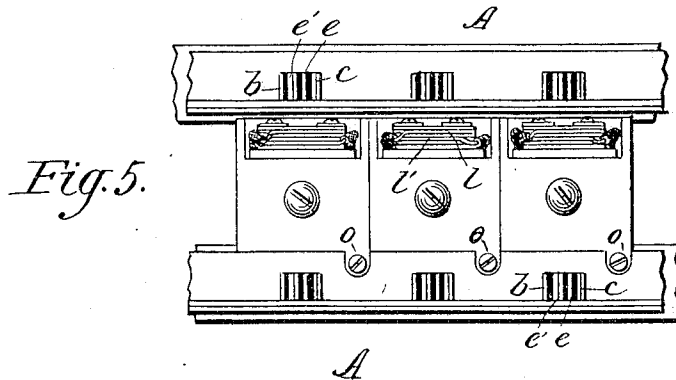
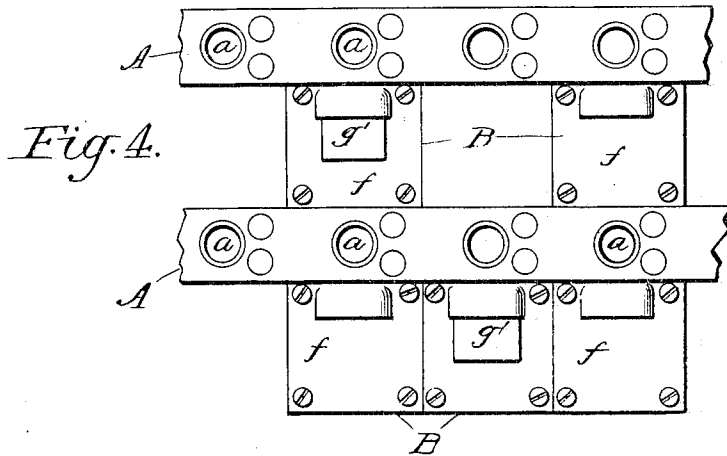


Witnesses:
O. W. Edlin.
Chas. J. O'Neill

Inventor:
C. T. Mason
By his attys
Rennie & Goodenough

C. T. MASON.
TELEPHONE SWITCHBOARD.
APPLICATION FILED SEPT. 8, 1904.

2 SHEETS—SHEET 2.



Witnesses:

D. W. Edlin.
Chas. J. O'Neill

Inventor:

C. T. Mason
By his atty
Pennie & Goldborough

UNITED STATES PATENT OFFICE.

CHARLES T. MASON, OF SUMTER, SOUTH CAROLINA, ASSIGNOR TO THE
SUMTER TELEPHONE MANUFACTURING COMPANY, OF SUMTER, SOUTH
CAROLINA, A CORPORATION OF SOUTH CAROLINA.

TELEPHONE-SWITCHBOARD.

SPECIFICATION forming part of Letters Patent No. 787,929, dated April 25, 1905.

Application filed September 8, 1904. Serial No. 223,745.

To all whom it may concern:

Be it known that I, CHARLES T. MASON, a citizen of the United States, residing at Sumter, county of Sumter, State of South Carolina, have invented certain new and useful Improvements in Telephone-Switchboards; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in telephone-switchboards, and has for its object to provide a switchboard comprising a series of jack-strips each containing a series of spring-jacks and a series of drops corresponding in number to the jacks, said drops being individually and removably supported by the jack-strips, together with contact devices on the respective jacks and drops so related that when the drops are applied to the strips circuit connections are established between the corresponding jacks and drops.

In the construction of telephone-switchboards as heretofore practiced the arrangement of drops and jacks has fallen under one of two heads—viz., that wherein the jack and drop are entirely separate and distinct from each other, each being applied to the board as an independent unit, and that wherein the jack and drop are combined in a unitary structure which is secured to the board. Experience has demonstrated that the jack seldom if ever requires repair and adjustment after it has been installed, whereas the drop is liable to injury or disarrangement due to lightning or other causes, and it is therefore desirable that it should be readily accessible and removable for repairs or replacement.

It is the purpose of my invention, therefore, to provide a switchboard of simple compact structure in which the jacks and drops are arranged in proximity to each other, with the individual drops removably supported between adjacent jack-strips, so

that when the several drops are secured in place they automatically complete the necessary circuits with the jack, thereby facilitating easy and rapid removal of the drops for adjustment and repair.

Referring to the accompanying drawings, Figure 1 is a fragmentary sectional elevation through a switchboard embodying my invention, showing the arrangement of the jacks and drops, the lower jack and drop being shown in section. Fig. 2 is a plan view of the under side of the jack-strips, showing the relation of the several contacts. Fig. 3 is a plan view of one of the drops. Fig. 4 is a front elevation of a fragment of the switchboard, showing the arrangement of jack-strips and drops. Fig. 5 is a rear elevation of two jack-strips and a row of drops, showing the manner of connecting the drops to their supporting-strip. Fig. 6 is a diagrammatic view of a single drop and jack, showing the mode of wiring. Fig. 7 is a corresponding view illustrating a modification embodying a relay for holding the drop-shutter in exposed position.

Referring to the drawings, A indicates a jack-strip comprising a relatively long flat block provided with a series of plug-sockets *a*, behind each of which there is mounted in an appropriate recess in the block jack-springs *b c e e'*, which are supported by the usual insulation, so that their ends project beyond the rear surface of the switchboard for ready attachment of the line and circuit wires, as will be understood by those skilled in the art. These strips are secured to the framework of the switchboard in horizontal parallel relation, as indicated in Figs. 1, 4, and 5, the spaces between adjacent strips being just wide enough to receive a series of drops B corresponding in number to the jacks, so that when the jack-strips and drops are all assembled they will practically fill the front of the board, each drop being located below each corresponding jack.

The several drops are constructed as individual units capable of being separately ap-

plied to and removed from the switchboard without interfering with the other elements thereof. Each drop B consists of a rectangular frame *s*, of metal, the front wall *f*' of which is provided with a slot formed by slitting the upper section thereof and forcing the metal about the same outward, said slot permitting the passage of the shutter of the drop to fall into view when the drop is actuated, as will be understood by reference to Figs. 1 and 4. Mounted in the rectangular frame is the magnet *k*, by means of which the drop is actuated, said magnet having co-operating therewith an armature *j*, which is pivoted in lateral brackets extending from the side walls of the rectangular frame, the axis of rotation of the armature *j* being forward of its geometrical axis, so that said armature normally hangs downward in front of the magnet-pole and swings up into horizontal position in alinement with the axis of the magnet-core when said magnet is energized. Secured to the armature *j* is a metal strip *g*, the forward end of which is enlarged and bent downward at substantially a right angle to form the drop-shutter *g'*, which, as above stated, is adapted to pass through the slot in the face-plate *f*' when the drop is actuated and to be withdrawn from view through the slot and behind the upper part of the face-plate when the magnet *k* is deenergized and the armature rocks into its normal position, as shown in Fig. 1.

Secured between strips of insulation mounted upon the rear of the rectangular frame *s* are two springs *l l'*, having projecting clips at their rear ends, to which are secured the terminals of the coil of magnet *k*. The front ends of the springs *l l'* are provided with an upward bend which brings said strips into engagement with contacts *d d'*, respectively, projecting laterally from jack-springs *c* and *e'*, so that as the drop is shoved into position between the jack-strips the proper circuit connections between said drop and its jack are established.

Secured between the insulation which supports the springs *l l'* is a third spring or contact strip *m*, which passes above the electromagnet and is bent downward over the front end thereof to constitute a movable contact coöperating with an adjustable screw-contact *i*, projecting from the inside wall of the metallic frame *s*, as shown in Fig. 1.

The bend in the forward part of the spring *m* is engaged by a boss or projection *j'* on the upper face of the armature *j*, so that when the armature is attracted by the magnet *k* the free end of spring *m* is thrown into engagement with the contact-screw *i*, thereby closing the relay-circuit to hold the armature in its attracted position and expose the drop until the magnet is deenergized by the insertion of the plug, as will be more particularly explained hereinafter.

When the armature assumes its lower position after the magnet has been deenergized, the spring *m*, which has a normal downward set, moves out of contact with screw *i* and the relay-circuit is broken. Two rods *h h'*, running transversely of the rectangular frame *s*, serve to limit the upward movement of the strip *g* and to impart the necessary downward trend to spring *m*, respectively.

On the rear face of each drop-frame there is a depending lug *o*, which is adapted to be secured to the adjacent face of the jack-strip by means of a screw passing through a perforation in said lug and engaging the strip, whereby the drop is securely held in position on the jack-strip, and the several drops are thus held rigidly in position between adjacent strips.

The circuit connections from the line through the jack and the drop are illustrated diagrammatically in Figs. 6 and 7. In the former figure one of the line-wires is connected to the jack-spring *c* and the other line-wire is connected to jack-spring *b*. Intermediate spring *e* is connected to a common battery C, which in turn is in electrical connection with the jack structure which constitutes a common return for all the jacks. Springs *l* and *l'*, as hereinbefore described, are connected to the terminals of the coil of magnet *k* and spring *m* on the jack is in electrical connection with spring *l'*, and as the contact-screw *i* is directly connected to the iron frame of the drop and the latter is connected or grounded on the jack structure the following circuits will be rendered operative when a signal is sent in over the line: jack-spring *c* from the line connected therewith to contact *d*, spring *l*, magnet *k*, spring *l'*, contact *d'*, intermediate jack-spring *e'*, jack-spring *b*, back to line, the impulse over the line serving to energize the magnet and attract its armature *j*, which causes the shutter on the arm *g* to drop through the slot in the face of the drop-frame, thereby giving the necessary indication and also causing armature *j* to force the spring *m* into engagement with contact *i*, which closes a circuit from battery C to magnet *k* to hold the armature in its retracted position, said circuit being as follows: from battery C to intermediate jack-spring *e*, to jack-spring *c*, contact *d*, spring *l*, to the magnet, thence to spring *m*, contact *i*, through the drop-frame back to the battery. The shutter will remain in its lower position until this latter circuit is broken by the insertion of a plug in the jack which separates jack-springs *c* and *b* from the intermediate springs *e e'*, thereby breaking the circuit of the battery C through the magnet *k*, which latter is deenergized, permitting the armature *j* to fall and retract the shutter and also permitting spring *m* to move out of engagement with contact *i*.

The wiring arrangement illustrated in Fig. 130

7 is substantially the same as that just described except that an additional relay-coil k' is mounted upon the core of the magnet k , said relay-coil k' being closed through battery C when the armature j forces contact-spring m into engagement with the contact-screw i . In this latter arrangement the main magnet k is energized only by the current coming in over the line and is intended to attract the armature and display the signal, whereas the coil k' is designed merely to hold the armature in its retracted position and for this reason may be a comparatively small coil, as indicated.

It will be seen that by applying the requisite number of jack-strips and drops a switchboard for any desired number of subscribers may be rapidly and economically constructed, and that any particular drop may be removed and replaced by merely disconnecting the fastening-screw in the lug o of the drop, and, furthermore, that the act of inserting the drop in position between adjacent jack-strips establishes the necessary circuit connections between the drop and its corresponding jack.

Having thus described my invention, what I claim is—

1. In a telephone-switchboard, the combination of a series of jack-strips, each containing a plurality of jacks, and a series of drops corresponding to the jacks, said drops being supported by the jack-strips and each removable therefrom as a whole without dissociating or separating the parts thereof.

2. In a telephone-switchboard, the combination of a series of jack-strips, each containing a plurality of jacks, and a series of drops corresponding to the jacks, and means for separately and removably connecting the individual drops to the jack-strips without dissociating or separating the parts of the several drops.

3. In a telephone-switchboard, the combination of a series of jack-strips each containing a plurality of jacks, a series of drops, corresponding to the jacks, individually and removably supported by the jack-strips without dissociating or separating the parts of the several drops, and means for automatically connecting the drops with the corresponding jacks as said drops are placed in position on the jack-strips.

4. In a telephone-switchboard, the combination of a series of jack-strips, each containing a plurality of spring-jacks, a series of drops individually and removably supported by the jack-strips without dissociating or separating the parts of the several drops, contacts on the jack-springs and springs on the drops engaging said contacts to connect the

respective jacks and drops as the latter are placed in position on the jack-strips.

5. In a telephone-switchboard, the combination of parallel series of jack-strips, each strip containing a plurality of spring-jacks, a series of drops individually and removably supported between adjacent rows of jack-strips without dissociating or separating the parts of the several drops, contacts on the jack-springs, and springs on the drops engaging said contacts to connect the respective jacks and drops as the latter are placed in position on the jack-strips.

6. In a telephone-switchboard, the combination of a series of jack-strips each strip containing a plurality of spring-jacks, separate and independent drops removably supported on said strips without dissociating or separating the parts of the several drops, each drop having a lug whereby the same is secured to a jack-strip, and contacts on the respective jacks and drops which are brought into engagement to electrically connect the jacks and drops when said jacks and drops are mechanically connected.

7. In a telephone-switchboard, the combination of a series of jack-strips, each strip containing a plurality of spring-jacks, separate and independent drops removably supported on said strips without dissociating or separating the parts of the several drops, circuit connections between the respective jacks and drops which are automatically established when the drops are applied to the strips, and a relay-circuit for each drop which is closed when the drop-shutter falls, to hold said shutter in exposed position until the circuit is broken by the insertion of a plug in the corresponding jack.

8. The combination of a jack-strip containing a plurality of jacks, a series of drops corresponding to the jacks, each of said drops being individually and removably supported upon the jack-strip without dissociating or separating the parts of the several drops, and means for automatically connecting the drops with the corresponding jacks as said drops are placed in position on the jack-strip.

9. The combination of a jack, a drop supported thereon so as to be separately removable therefrom without dissociating or separating any of the parts of the drop, and means for automatically establishing electrical connection between the drop and the jack as said drop is placed in position on the jack.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES T. MASON.

Witnesses:

F. C. MANNING,
C. J. ROWLAND.