(No Model.) 2 Sheets—Sheet 1.

T. N. VAIL & J. A. SEELY.

TELEPHONE CENTRAL STATION APPARATUS.

No. 385,977. Patented July 10, 1888.

Fig. 1.

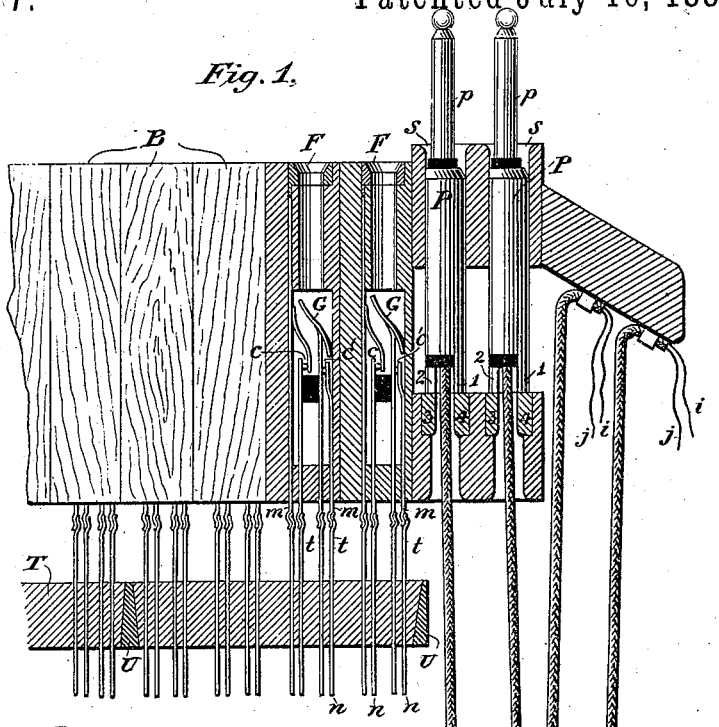
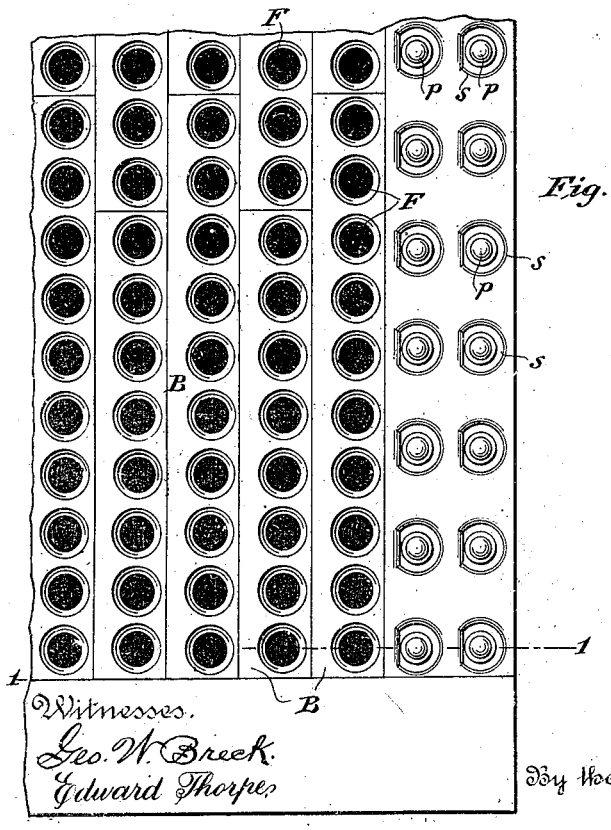


Fig. 2.



Witnesses.
Geo. W. Breck.
Edward Thorpe.

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(No Model.)

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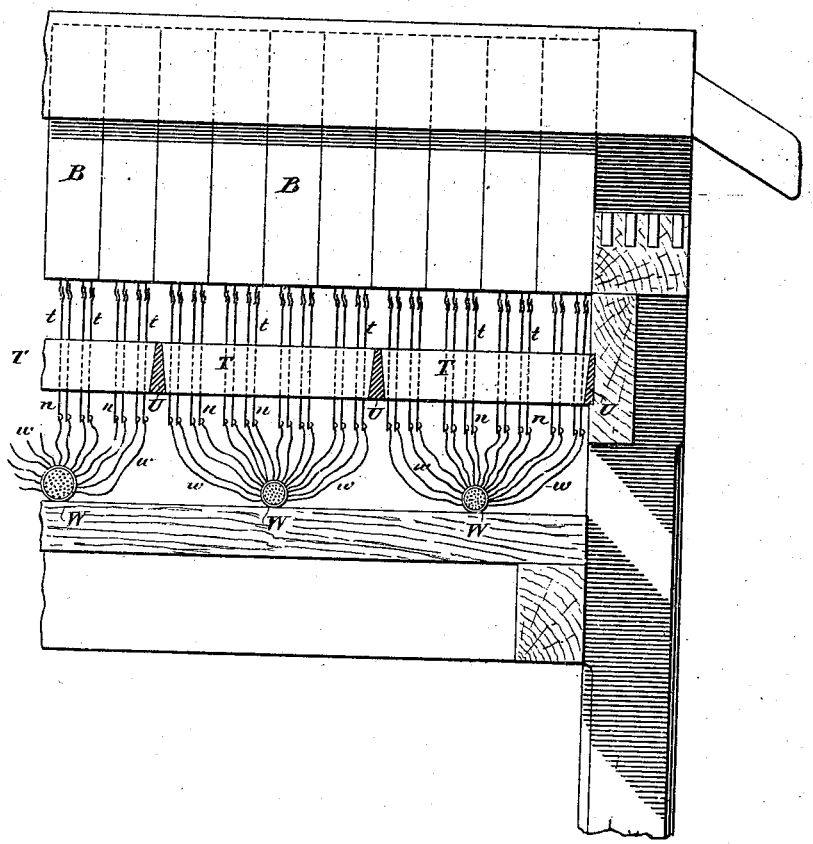
Fig. 3.



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UNITED STATES PATENT OFFICE.

THEODORE N. VAIL, OF BOSTON, MASSACHUSETTS, AND JOHN A. SEELY, OF NEW YORK, N. Y.

TELEPHONE CENTRAL-STATION APPARATUS.

SPECIFICATION forming part of Letters Patent No. 385,977, dated July 10, 1888.

Application filed March 1, 1888. Serial No. 265,783. (No model.)

To all whom it may concern:

Be it known that we, THEODORE N. VAIL and JOHN A. SEELY, citizens of the United States, and residents, respectively, of Boston, county of Suffolk, State of Massachusetts, and of the city, county, and State of New York, have jointly invented certain new and useful Improvements in Telephone Central-Station Apparatus, of which the following is a specification.

Our invention is an improvement in certain details of construction of switch-boards for use in telephone central stations. Such switch-boards consist of a series of spring-jacks and the plugs designed for use in connection therewith. Spring-jacks consist of two or more contact-points forming the terminals of a divided electrical circuit, such contacts being normally held together by the force of springs upon which one or both of said contacts are fixed. A spring-jack for use in a ground return circuit has but two severable contact-points. A jack for use in a metallic return-circuit has four such contact-points. A plug forming the terminal of a flexible connecting-cord is used with these jacks, and such plug has one or two contact-points, according as it is designed for use with a ground return or metallic circuit. These contact-points are so formed and arranged as to force apart the spring-actuated points of the jack, and when the plug is in position in the jack one-half the points of the jack are open and the points of the plug are substituted for such open points, so that the circuit entering the jack is broken and connected to the plug and cord of which it forms the terminal. These jacks are sometimes arranged with the plug-socket opening upon a horizontal plane, and when so arranged dust, dirt, and fragments of insulating material are liable to fall and lodge in the contact-points, thus causing a break or opening in the circuit. To prevent this, we have constructed a spring-jack having a dust-guard. This consists of a piece forming one contact-point placed between the opening or plug-socket and the severable points of the jack in such a position as to shed the dust and dirt, while it shields the contact-points from the evil effects of such dust and dirt. It is preferably placed at an angle with the plane of the hole, opening, or passage into the jack.

Another improvement consists in the arrangements for placing the jacks in position either in banks or singly, where they form parts of the electrical circuit, and may be readily removed for testing, cleaning, or repairing. The electrical conductors usually come to the tables or boards in the form of cables. These conductors are soldered to strips or pieces of metal, a series of such strips being firmly fixed in a portable block of insulating material. Each cable may be attached to one, two, or more such portable blocks. Each block is shaped to rest in a frame in such position as to bring the free ends of the strips referred to into registering position with the free terminals of the spring-jacks. The terminals of the spring jacks are fixed in a frame of insulating material in position to register with the fixed electrical contacts forming the terminals of the circuits. Both these contacts are corrugated or shaped so as to grip and hold together, while forming an electrical contact which may be severed without the use of tools of any kind. By this arrangement we avoid the soldering of joints anywhere near the spring-jacks, and may easily remove, replace, test, or repair any part. The jacks are placed in frames of insulating material in banks of, say, eight or ten, and may be very expeditiously inserted and removed. The plugs for these jacks forming the terminals of flexible cords are usually held in position with their bases resting upon fixed electrical contacts which register with electrical contacts on the base of the plug. If a plug forms the terminal of a double conductor-cord, there are two insulated contacts on its base, and if we desire to have these two contacts rest upon two fixed contacts, respectively, and to take up this same position whenever the plug is removed from a jack and allowed to seek its normal position automatically under the influence of a weight operating as a "gravity take-up" in a well-known manner, we must provide special means for securing this result. For this purpose we have provided a cylindrical plug, one side of which is flattened, and a plug-socket having a similar outline to

the cross-section of the plug. In this arrangement a plug can only reach its normal position when it is in the proper relative position with respect to the socket and contact-points.

The accompanying drawings illustrate our invention.

Figure 1 is a cross-section of a switch-board on line 1 1, Fig. 2; and Fig. 2 is a plan view of a section of the switch-board. Fig. 3 shows the cabled conductors having terminals fixed in portable insulating-blocks.

In Fig. 1 are shown two spring-jacks consisting of severable points *c c'*, held together by spring-pressure. F is a plug socket or passage from the surface of the board B, which is horizontally disposed. G is a dust-guard, also forming an electrical contact-point for one contact, *p*, of the jack-plug P. It is located between the passage F and contact-points *c c'*. Dust, dirt, and fragments falling through F are shed off and caused to fall below the points *c c'*, thus avoiding evil effects thereof. In these spring-jacks there are four severable contacts *c c'* and four free terminals like *m*. There are also a series of fixed terminals, *t*, in insulating-block T in position to register and electrically connect with terminals *m*, and the meeting points of both *m* and *t* are so formed as to lock together and make good electrical contact. The conductors are soldered to the terminals *t* at the point *n*, Fig. 3. There is a space between board B and portable insulating-blocks T for the passage of the hand and to facilitate changes.

U is a bar or division, of which there are several forming a frame for the portable insulating-blocks T. The conductors *w* of cable W are "fanned out" and soldered to strips *t t* at *n n*. These terminals *t* are fixed in the portable insulating-blocks T in position to make contact with terminals *m* of the spring-jack.

The two conductors *i* and *j*, passing through flexible cords C, terminate in plugs P, having two electrical contacts, 1 and 2, at their base. There are also fixed contacts 3 and 4, with which it is desirable that contacts 1 and 2 should connect at all times when plug P is in its normal position, said plug being returned to its normal position by the gravity take-up *w*, as well understood. Now, in order that these plugs when released and automatically returned to their normal position by weight *w* may always assume the same position, we provide a guide or passage having an eccentric geometrical formation, and we form the plug to correspond. We have chosen to make the guide circular, with a chord subtending a few degrees of the circle removed, as shown at *s* in Fig. 2. The cross-section of the plug is of similar outline and the entrance to the plug-socket is slightly flaring, as shown in Fig. 1, so that the plug, acting under the force of weight *w* and approaching socket F out of position, will right itself and sink into its normal position in proper position to unite contacts 1 and 2 with 3 and 4 respectively and uniformly.

What we claim, and desire to secure by Letters Patent, is—

1. A spring-jack consisting of two or more severable contact-points, an opening or passage to such points for the insertion of a jack-plug, and a shield or dust-guard constructed of suitable material to shed or deflect falling dust or dirt, movably supported between the mouth of the opening or passage and the severable contact-points.

2. In a spring-jack, the combination of two or more severable contact-points, an opening or passage to such points forming a plug-socket, and a shield or dust-guard forming an electrical contact for the said plug, all arranged substantially as described.

3. A switch-board consisting of a frame or support, two series of blocks of insulating material fitting into said frame or support, located in two parallel planes, a series of electrical instruments composing the operative mechanism of a switch-board, such as spring-jacks, having free terminals located in one series of blocks, one or more in each block, a series of electrical contacts having free terminals located in the second series of blocks in position to register with the terminals of the first series, and a series of electrical conductors connected to the second series of contacts, one conductor for each contact.

4. The combination, in a switch-board, of two or more insulated electrical contacts located in a plug-socket having an eccentric geometrical outline or formation, a switch-plug of similar geometrical outline or formation, having one or more insulated electrical contacts in position to register with the first-named contacts when said plug is in its normal position, and means for automatically returning such plug to its normal position when free to move, substantially as described.

5. A switch-board composed of a frame or support, one or more electrical instruments located in said frame having two or more free terminals, one or more portable blocks or sections of insulating material fitting into said frame, two or more conducting sections fixed in said blocks, their free terminals in position to register with the free terminals of the said electrical instruments, and wires or conductors connected to said conducting sections, substantially as described.

Signed at New York, county and State of New York, this 29th day of February, 1888.

THEO. N. VAIL.
JOHN A. SEELY.

Witnesses:
WM. H. BAKER,
J. MILTON FERRY, Jr.