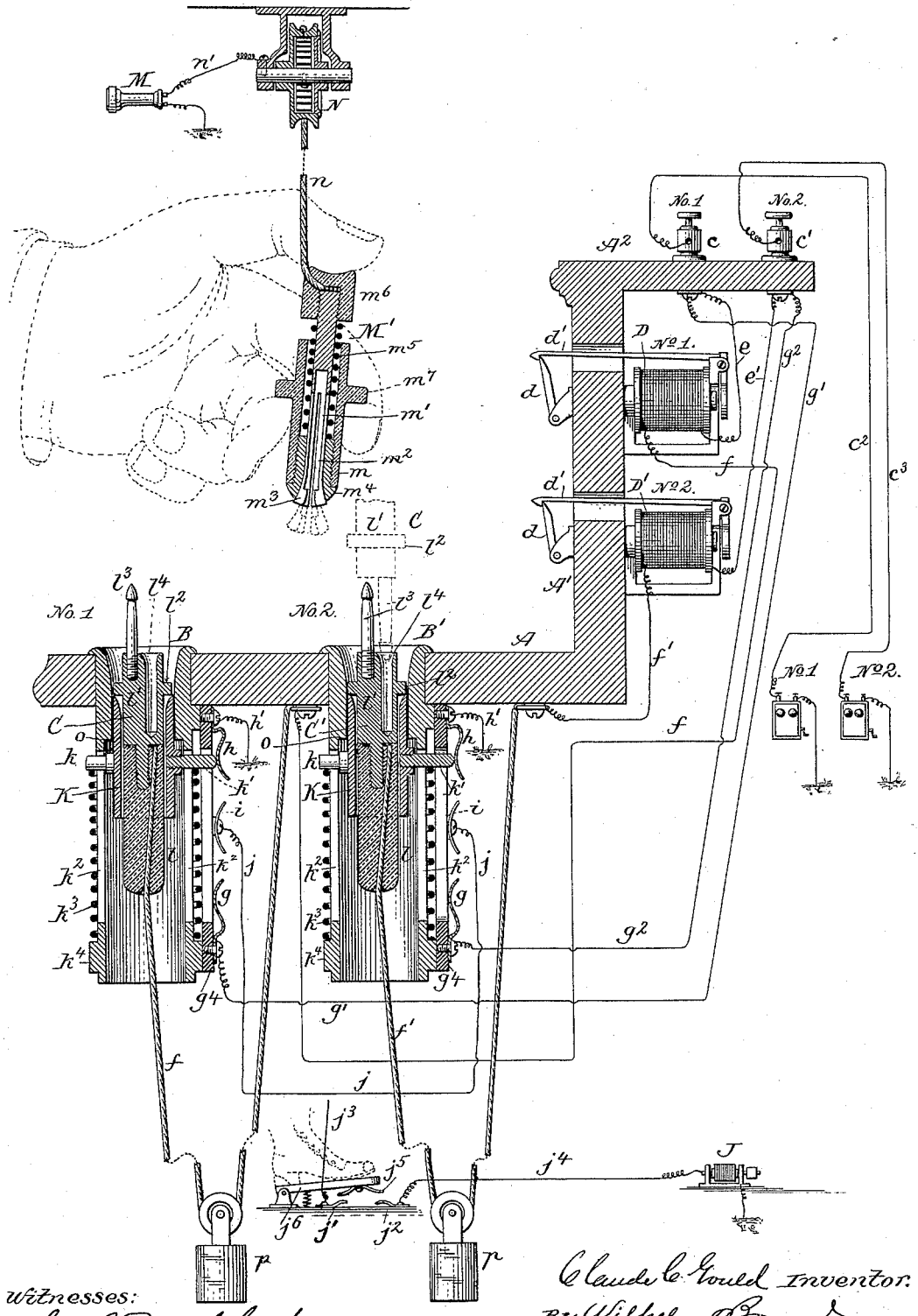
(No Model.)

C. C. GOULD.

TELEPHONE SWITCH SYSTEM.

No. 422,765. Patented Mar. 4, 1890.



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UNITED STATES PATENT OFFICE.

CLAUDE C. GOULD, OF BATAVIA, ASSIGNOR TO THE EASTERN ELECTRICAL MANUFACTURING COMPANY, OF WHEATFIELD, NEW YORK.

TELEPHONE-SWITCH SYSTEM.

SPECIFICATION forming part of Letters Patent No. 422,765, dated March 4, 1890.

Application filed July 23, 1889. Serial No. 318,351. (No model.)

To all whom it may concern:

Be it known that I, CLAUDE C. GOULD, a citizen of the United States, residing at Batavia, in the county of Genesee and State of New York, have invented new and useful Improvements in Telephone-Switch Systems, of which the following is a specification.

This invention relates to the switch-board systems which are employed in telephone-exchanges for connecting together the different subscribers in communication with the central office or exchange.

The object of my invention is to provide a simple switch system whereby connections between the subscribers can be conveniently and rapidly made.

The invention consists of the improvements which will be hereinafter fully set forth, and pointed out in the claims.

The accompanying drawing represents a sectional elevation of my improved switch-board system, the sockets, plugs, and connections of two subscribers being shown in the drawing.

A represents the table portion of the switch-board, and A′ the upright portion thereof, having a ledge or horizontal top A^2.

B B′ represent sockets or tubular supports arranged in the table A, and C C′ are the removable plugs inserted in the same.

c c′ represent two binding-posts attached to the horizontal top A^2, and with which the subscribers' main lines c^2 c^3 are connected.

D D′ are the annunciators attached to the upright portion A′ of the switch-board, and *d* the pivoted aprons thereof. The apron of each annunciator is held in a raised position by a vertically-swinging hook *d′*, attached to the armature of the annunciator in the usual manner.

e represents a wire connecting the binding-post *c* with one end of the coil of the annunciators D, and *e′* a wire connecting the binding-post *c′* with one end of the coil of the annunciator D′.

f f′ represent wires connecting the opposite ends of the coils with the plugs C C′.

g represents a main-line contact or spring arranged at the lower portion of each socket B B′, and g' g^2 are wires or legs connecting said contacts with the binding-posts *c c′*. Each of these contact-springs is attached to a non-conductive plate g^4, secured to one side of each socket, whereby the contacts are insulated from the sockets.

h represents a contact-spring secured to the upper portion of each socket and connected with the ground by a wire *h′*.

i represents a generator contact-spring arranged on each socket between its upper and lower contacts and secured to the non-conductive plate g^4, and *j* is a wire connected with the generator-contacts of all the sockets on the switch-board.

j' j^2 represent dead generator-contacts secured to the floor in proximity to each other and connected, respectively, by wires $j^3 j^4$ with the main generator-wire *j* and a generator J.

j^5 represents a movable contact arranged above the dead generator-contacts j' j^2 and adapted to connect the latter, so as to establish a connection between the generator J and the generator-contacts *i* of the sockets. This movable contact is attached to the under side of a treadle j^6, pivoted to the floor.

K represents a movable plug seat or holder arranged in each support B B′. This plug-seat consists of a metallic sleeve provided with lateral guide pins or studs *k k′*, which project through longitudinal slots k^2, formed in opposite sides of the socket.

k^3 represents a spiral supporting-spring surrounding each socket and bearing with its lower end against an annular shoulder k^4 at the lower end of the socket and with its upper end against the pins or studs *k k′*, so as to hold the movable sleeve in an elevated position. The stud *k′* of each sleeve projects outwardly a sufficient distance to engage against the upper contact *h* when the sleeve is raised, and against either the intermediate generator-contact *i* or the lower contact *g* when the sleeve is depressed.

The plugs C C′, which are adapted to fit in the seats K, each consist of a non-conductive handle portion *l* and a metallic portion *l′*, having an annular rim or shoulder l^2, adapted to rest upon the upper end of the sleeve K, as shown in the drawing. The metallic portion of the plug is provided with a shoul-

dered contact-pin l^3, projecting from the inner end of the plug and on one side of said pin, with a socket or recess l^4 for receiving the pin of another similar plug when the plugs are placed end to end, as represented by dotted lines in the drawing. The end of the wire connected with each plug is in contact with the metallic portion l' of the plug. When the plugs are seated in their holders, as represented in the drawing, a circuit is established between the subscribers and the central office by the main lines c^2 c^3, binding-posts c and c', annunciators D D', plug-wires f f', the metallic portions l' of the plugs, the movable sleeves K, studs k', contact-springs h, and ground-wires h'.

M represents the operator's listening-telephone, and M' a coupler whereby the operator's telephone is connected with the plugs of the subscribers' lines. This coupler consists of a cylindrical tube m of non-conductive material and a movable metallic coupling-sleeve m', arranged within the tube. The lower portion of this sleeve is split longitudinally to form a number of spring-arms m^2. These arms are provided at their lower ends with hooks or catches m^3, which are designed to embrace the pin l^3 of a plug and interlock with the shoulder thereof. The lower portion of the bore of the tube m, in which the split portion of the coupling-sleeve m' is arranged, is tapered outwardly, as shown, so that upon pushing the sleeve inwardly the spring-catches project beyond the end of the coupler and spring outwardly, in which position they may be attached to or detached from the pin of the plug, while upon retracting the sleeve the spring-catches are moved inwardly toward each other and caused to clasp the shouldered pin. The coupler is readily attached to a plug by pressing its spring-catches over the tapering shoulder of the pin. The tapering bore of the coupler is preferably formed in a screw-plug m^4, fitted in the end of the tube m, as shown in the drawing.

m^5 represents a spiral spring surrounding the coupling-sleeve m' and interposed between the plug m^4 and a thumb-piece m^6, arranged at the upper end of the sleeve. The coupler is provided with an annular rim or shoulder m^7, against the under side of which the index and middle fingers of the hand are placed and whereby the coupler is conveniently held.

n represents the conducting-wire connected with the metallic sleeve m' of the coupler, and preferably wound upon a spring-pulley N, journaled in brackets suspended from the ceiling or other support.

n' is a wire connecting the operator's listening-telephone M with the metallic brackets of the pulley N. Connection is established between these brackets and the wire of the coupler by the metallic spindle of the pulley and the spring coiled thereon. Upon releasing the coupler the spring-pulley winds the wire of the coupler upon the pulley and elevates the coupler above the table of the sockets in the switch-board.

For convenience in describing the operation of the system the subscribers' sockets and annunciators, the binding-posts c c', and the subscribers' telephones are numbered, respectively, 1 and 2. For instance, subscriber No. 1 desires to be connected with subscriber No. 2. Upon calling the central office the armature of annunciator No. 1 is vibrated and the apron thereof caused to drop, notifying the operator at the central office that subscriber No. 1 has called. The operator loops the listening-telephone into the circuit by connecting the coupler M' with plug No. 1, and after doing so releases the coupler, whereupon the spring-pulley N raises the coupler with the interlocked plug and lifts the latter out of its socket, thereby breaking the contact between the plug and the plug-seat K of the socket and breaking the ground-connection h of the socket. The operator is now connected with the subscriber by the coupler M', plug-wire f, annunciator D, wire e, binding-post c, and main line c^2. Having ascertained that subscriber No. 1 desires to communicate, say, with subscriber No. 2, the operator now detaches the coupler from plug No. 1, connects the latter with the plug of subscriber No. 2 by inserting the pins l^3 of the plugs into each other's recesses l^4, and pushes the two connected plugs into the socket of plug No. 2 until the stud k' of the plug-seat of socket No. 2 comes in contact with the lower contact-spring g. The plugs are held in this depressed position in the socket by tipping the same after they are depressed, so as to engage the shoulder l^2 of the outer plug under a shoulder o, arranged in the upper portion of the socket. The subscribers are now connected by the main line c^2 of subscriber No. 1, binding-post c, wire e, annunciator D, plug-wire f, and plugs C C', plug-seat K of No. 2, stud k' of said seat, contact-spring g, wire g^2, binding-post c', and main line c^3 of subscriber No. 2. At the same time that the operator presses the plugs down into socket No. 2 he depresses the treadle j^6 and connects the contact i with the generator, so that in being shifted from the upper contact-point h to the lower contact g, and before touching the latter, the stud k' rides over the generator-contact i, thereby momentarily interposing the generator in the circuit, causing the bells of both subscribers to be rung and notifying the subscribers that they are connected. During the interval that the stud k' is in contact with the generator-contact i the current passes over the wire f' of plug No. 2 and through annunciator No. 2, and causes the apron of the latter to drop; but as soon as the stud k' leaves the upper contact h and passes said generator-contact the ground-connection of socket No. 2 and the connection with annunciator No. 2 are broken, and the current passes from the lower contact g over

the wire g^2 directly to the main line of subscriber No. 2. After having connected the subscribers the operator replaces the two fallen aprons. When either or both subscribers ring off, the current passes through the annunciator of the calling subscriber and causes the apron thereof to drop, thus notifying the operator that the subscribers have finished. He now replaces the fallen apron, disconnects the two plugs, and replaces the plug of the called subscriber in its socket, as shown in the drawing, when the parts are again in their normal position ready for another call.

The portions of the connecting wires or cords attached to the plugs are preferably provided with weights p, as shown, so as to firmly press the rim l^2 of the plugs against the upper ends of the plug-seats K and form a reliable contact therewith.

My improved switch-board is simple in construction, and can be produced at comparatively small expense.

I claim as my invention—

1. The combination, with the main line and a plug connected therewith, of a socket or support, a ground-contact, a main-line contact, and a movable plug seat or holder arranged in said support and adapted to form a contact with either the ground-contact or the main-line contact, substantially as set forth.

2. The combination, with the main line and a plug connected therewith, of a socket or support, a ground-contact, a main-line contact, and a generator-contact, and a movable plug seat or holder arranged in said support and adapted to form a contact with the ground-contact, the generator-contact, or the main-line contact, substantially as set forth.

3. The combination, with the main line and a plug connected therewith, of a socket or support, a ground-contact, a main-line contact, a movable plug seat or holder arranged in said support and adapted to form a contact with either the ground-contact or the main-line contact, and a spring bearing against said plug seat or holder, substantially as set forth.

4. The combination, with the main line and a plug connected therewith, of a socket or support, a ground-contact, and a main-line contact, a movable plug seat or holder arranged in said support and adapted to form a contact with either the ground-contact or the main-line contact, a spring bearing against said plug seat or holder, and a locking device whereby the plug-holder is held in a depressed position in the support, substantially as set forth.

5. The combination, with a socket or support having an internal offset or shoulder, of a ground-contact and a main-line contact, a movable plug seat or holder arranged in said support, a spring bearing against said plug-seat, and a plug connected with the main line and provided with a rim or shoulder adapted to interlock with the offset or shoulder of said support, substantially as set forth.

6. The combination, with the main line and a plug connected therewith, of a socket or support, a movable plug-seat arranged in said support, ground and main-line contacts, a generator, a generator-contact arranged between the ground and main-line contacts, dead-contacts connected, respectively, with said generator and generator-contact, and a movable contact for connecting said dead-contacts, substantially as set forth.

7. The combination, with the main line and a plug connected therewith, of a socket or support, a ground-contact, a main-line contact, a movable plug seat or holder arranged in said support and adapted to form a contact with either the ground-contact or the main-line contact, an operator's listening-telephone, and a coupler or contact whereby said telephone is connected with the plug of the main line, substantially as set forth.

8. The combination, with the main line and a plug connected therewith, of a socket or support, a ground-contact, a main-line contact, a movable plug seat or holder arranged in said support and adapted to form a contact with either the ground-contact or the main-line contact, an operator's listening-telephone, a coupler connecting the listening-telephone with the plug of the main line, and a lifting device whereby the coupler and the plug connected therewith are elevated, substantially as set forth.

9. The combination, with the main line and a plug connected therewith, of a socket or support, a ground-contact, a main-line contact, a movable plug seat or holder arranged in said support and adapted to form a contact with either the ground-contact or the main-line contact, an operator's listening-telephone, a coupler connecting the listening-telephone with the plug of the main line, and a spring-pulley upon which the connecting-wire of said coupler is wound, substantially as set forth.

10. The combination, with a plug having a projecting pin, of a coupler consisting of a tubular handle and spring-catches made lengthwise movable in said handle and adapted to interlock with the pin of the plug, substantially as set forth.

11. The combination, with a plug having a headed or shouldered pin, of a coupler consisting of a tubular handle having a tapering bore, spring-arms made lengthwise movable in said handle and having locking hooks or catches, and a spring whereby the movable spring-arms are drawn into the tubular handle and contracted, substantially as set forth,

Witness my hand this 9th day of April, 1889.

CLAUDE C. GOULD.

Witnesses:
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