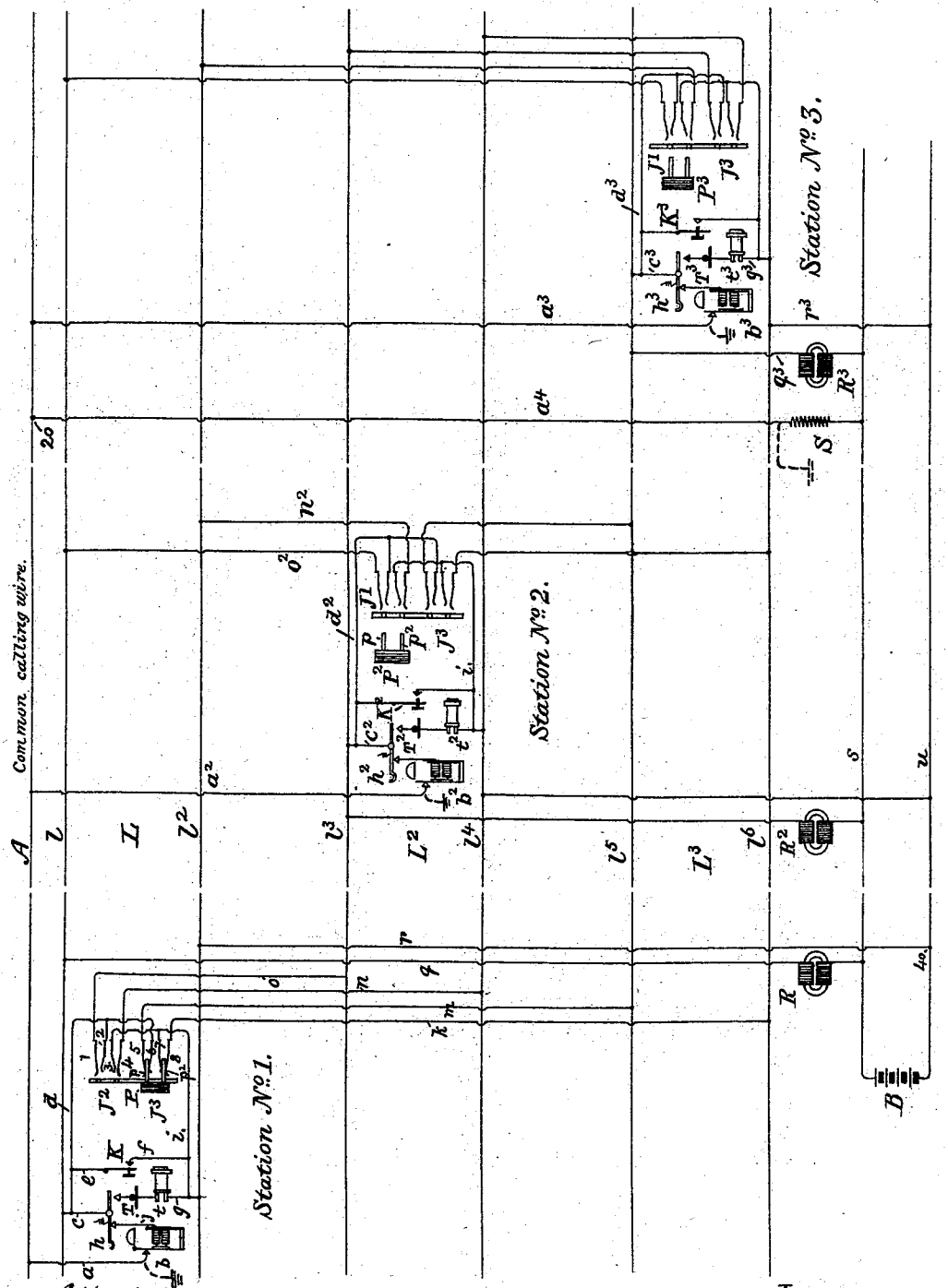
(No Model.)

T. C. WALES, Jr.

TELEPHONE SPEAKING TUBE SYSTEM.

No. 531,078. Patented Dec. 18, 1894.



Attest.

Frank C. Lockwood.

Granville Pierce

Inventor.

Thomas C. Wales Jr.

UNITED STATES PATENT OFFICE.

THOMAS C. WALES, JR., OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE AMERICAN BELL TELEPHONE COMPANY, OF SAME PLACE.

TELEPHONE SPEAKING-TUBE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 531,078, dated December 18, 1894.

Application filed April 7, 1894. Serial No. 506,731. (No model.)

To all whom it may concern:

Be it known that I, THOMAS C. WALES, Jr., residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Telephone Speaking-Tube Systems, of which the following is a specification.

This invention relates to systems of electrical circuits and apparatus used for telephonic interconnection and communication in hotels, factories, &c., often denominated "telephone speaking tube systems," in which there are a plurality of stations, each of which is provided with means for connecting, signaling, and speaking with every other associated station, and in which a common source of electrical supply is employed for signaling and for talking purposes.

The object of my invention is to do away with expensive apparatus and complicated circuits, and replace them with others less costly, but equally, if not more efficient, and more simple in construction and manipulation.

To these ends the invention consists of a plurality of telephone circuits, preferably metallic in twisted pairs, extending between a plurality of stations, combined with a source of electricity and a calling wire, there being at each station a vibrating call bell in a branch of the calling circuit; telephones in a normally open bridge; and switching devices consisting of spring jacks the normally open terminal springs of which are connected by branches to both conductors of each circuit; and a circuit connector or uniter. The switching devices are double or four point switches or spring jacks one for each circuit, the two inner springs of which are normally open branch terminals from the respective sides or conductors of the home circuit, and the two outer springs are normally open branch terminals from the respective conductors of one of the other circuits. The connector is a double plug, the insertion of which into a jack connects the two conductors of the home circuit with the two conductors of another circuit, and permits the bridging in of the call key and of the telephones.

A common source of electric current is employed for signaling and conversational purposes, and consists preferably of a battery located at one of the associated stations, or at any suitable place, from the poles of which, branches in pairs extend to the two conductors of each of the associated circuits. One of each of these pairs of branches connects with a common pole of the battery and with the upper or hook switch conductor of each of the associated circuits, and includes the helices of an electro-magnetic retardation or choking coil; and from the same common pole of the battery circuit, a branch wire which includes the helix of a simple resistance coil, connects to a common call wire which extends to all of the stations and has branches to the lower contact of each hook switch, and includes the helices of a vibrating call bell. The calling device at each station consists of a key or press button bridged in between the conductors of each home circuit. The telephones are in a normally open bridge between the two conductors of each home circuit, and when the receiving telephone is removed from the hook switch, the said bridge is automatically closed and the telephones are connected therein; all of which I will now proceed to describe and point out in the claims.

In the drawing which illustrates my invention are shown three metallic circuits, L L^2 and L^3, a common calling wire, A, and the battery circuit or bus bars *s*, *u*, the metallic circuits being preferably bunched into a cable, and extended through the several associated stations. The conductors *l*, l^2, l^3, l^4 and l^5 l^6 constitute the sides of the respective circuits L, L^2 and L^3, and are twisted together as is common in telephone cables. At each station are spring jacks J J which are connected by branches to the other circuits, as for instance at station No. 1. The outer springs 1 and 4 of jack J^2 are connected by branches *o* and *n* to the conductors l^3 and l^4 of the circuit L^2, and the outer springs 5 and 8 of jack J^3 are connected by branches *m* and *k* with the conductors l^5 and l^6 of circuit L^3. The upper inner springs 2 and 6 of the two jacks are connected by wire *d* with the conductor *l* and the lower inner springs 3 and 7 are connected by the wire *i* with the conductor l^2 of the home circuit L. A branch *a* from the call

wire A terminates at the back contact of the vibrating bell b whose armature is in circuit with its helices and wire j which terminates in the lower contact of the hook switch h. The hook switch is connected to the upper conductor l by the wire c. The telephones T and t are in the normally open branch g from the conductor l^2.

K is a press button or key connected by wire e to the wire d, and has an anvil or contact at the terminal of branch f from wire i.

q and r are branch wires from conductors l and l^2 to the bus bars or conductors s and u respectively; and in the branch q is inserted the electro-magnetic resistance or choking coil R.

It will of course be understood that the two helices of coil R are not necessarily connected close together, as shown, in the same branch conductor, but that the same effect will be obtained by including one helix in each of the branches q and r.

The apparatus at all of the stations is the same; and all the branches from the battery bus bars or conductors to the circuit conductors and call wire, are connected at the place where the battery is located, there being no necessity to extend the battery conductors to each station.

P is a double plug and consists of a handle of non-conducting material in which are inserted the metal pins p and p^2.

a^4 is a wire connecting the call wire A with the battery bus bar s and includes the helix or helices of a common resistance coil without a core, S.

The operation of the system is as follows: Let us suppose that station No. 1 wishes to call up and converse with station No. 3. The pins, p, and, p^2, of plug, P, are inserted between the springs 5, 6 and 7, 8 respectively of jack J^3 as shown at station 1. The effect of this operation is to connect the conductors l l^2 of circuit L with the conductors l^5 l^6 of circuit L^3, and when the key K is pressed upon its anvil, the circuit is closed through the battery B causing the vibrating bell b^3 at station No. 3 to ring (and also the vibrating bell at the home station No. 1) as will be seen by tracing the circuit. Starting from battery B by wire u, branch r^3, conductor l^6, branch k spring 8, pin p^2, spring 7, wires i and f, key K, wires e and d, spring 6, pin p, spring 5, branch m, conductor l^5, wire c^3, bell b^3, wire a^3, to and along call wire A, wire a^4, and by conductor s to the other pole of battery B. It will be seen that the bell b^3 at station No. 3 is in a derived circuit around the electro-magnetic retardation coil R^3 the vibrating bell b, at the home station being also in a derived circuit around the local retardation coil R. The circuit from the battery through the bell b at station No. 1 is from point 40, on conductor u, by branch r, conductor l^2, wires g and i and f, key K, wires e, d, and c, hook switch h, wire j, bell b, wire a, and along the call wire A to junction 20 and wire a^4, conductor s to battery, B. The resistance S, (about five ohms,) in wire a^4 is placed there to prevent the bells from ringing too loudly. Upon releasing the key K at station No. 1 the bell ceases ringing, and the telephone t is taken from its hook switch h which automatically opens the bell circuit and completes the talking circuit through its back contact by bridging the telephones between the conductors l, l^2 of the circuit L. The same result ensues in the circuit No. 3 when the telephone t^3 is removed from its hook switch h^3, the two circuits being connected together by means of the branches k and m, as will be seen by tracing them as follows:

Starting from telephone T at station No. 1 by hook switch h, wires c and d, springs 6 and 5 of jack J^3, branch m conductor l^5 to station No. 3, wire c^3, hook switch h^3, wire g^3 and telephones T^3 and t^3, conductor l^6, branch k, springs 8 and 7 of jack J^3, wires i and g to telephones at station No. 1. This is the talking circuit.

The circuit from the battery B to telephones at station No. 1 is as follows: from battery by conductor u, branch r, conductor l^2, wire g and telephones t and T, wire c, conductor l, branch q, conductor s, to other pole of battery, and the circuit from the battery to the telephones at station No. 3 is from battery by conductor u, branch r^3, conductor l^6, wire g^3, and telephones t^3 and T^3, wire c^3, conductor l^5, branch q^3, conductor, s, to other pole of battery.

The circuits can be simplified by leaving out the calling wire A, and its branches a, a^2, a^3, &c., and the connecting wire a^4, if the back contacts of the vibrating bells and the wire a^4 are grounded as shown in dotted lines, but I prefer to employ the common calling wire connected as shown and described.

I claim—

1. In a telephone speaking tube system comprising a plurality of stations, the combination of a plurality of circuits; a common source of electricity; a call wire connected by branches to said circuits and source of electricity; said circuits extending to each station and there provided with normally open branch terminal switches or spring-jacks, with a circuit uniter, with a call key in a normally open bridge of the home circuit, and with a signal receiving instrument in a branch of said call-wire; and branches from said circuit conductors to the said source of electricity containing an electro-magnetic resistance; whereby upon the connection of the circuit uniter with a spring-jack and the closure of said key bridge, the signal receiving instrument at a distant station is operated, substantially as described.

2. In a telephone speaking tube system comprising a plurality of stations, the combination of a plurality of circuits, a common source of electricity, and a call wire connected by branches to said circuits and source of electricity, as set forth; the said circuits extend-

ing to each station and there provided with normally open branch terminal switches or spring jacks, with a circuit uniter, with a call key in a normally open bridge of the home circuit, and with a signal receiving instrument in a branch of said call wire; and branches from the said circuit conductors to the said source of electricity one of each pair having included therein an electro-magnetic resistance, whereby upon the connection of the circuit uniter with a spring jack, and the closure of the said key bridge the signal receiving instrument at a distant station is operated.

3. In a telephone speaking tube system comprising a plurality of stations, the combination of a plurality of circuits, a common source of electricity, and a call wire as set forth, the said circuits extending to each station and there provided with normally open branch terminal switches or spring jacks, one for each circuit, with a circuit uniter, and telephones in a normally open bridge of the home circuit; and branches from the said circuit conductors to the said source of electricity one of each pair having included therein an electro-magnetic resistance; whereby upon the connection of the circuit uniter with a spring jack and the removal of the telephone from the hook switch, the home circuit is linked to a distant station, and the telephones are automatically bridged into the said circuit.

4. In a telephone speaking tube system comprising a plurality of stations, the combination of a plurality of circuits, a common source of electricity, and a call wire, as set forth, the said circuits extending to each station and provided with normally open branch terminal switches or spring jacks one for each circuit, the inner springs of which are connected to the respective conductors of the home circuit and the outer springs of which are connected to the respective conductors of the associated circuits as set forth with a plug connector, and telephones in a normally open bridge of the home circuit, and branches from the said circuit conductors to the said source of electricity one of each pair having included therein an electro-magnetic resistance; whereby upon the insertion of the plug connector into a spring jack, and the removal of the telephone from the hook switch, the home circuit is linked to a distant station, and the telephones are automatically bridged into the said circuit.

5. In a telephonic system of interconnection comprising a plurality of stations, the combination of a plurality of circuits extending to each station, and a common source of current supply for signaling purposes associated with each circuit, there being at each station switching and calling devices, an electro-magnetic retardation coil in a branch conductor between one pole of the source of electricity and the home circuit, and a call bell in the signaling circuit which is normally a derived circuit around the said electro-magnetic retardation coils, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 28th day of March, 1894.

THOMAS C. WALES, JR.

Witnesses:
GEO. WILLIS PIERCE,
JOSEPH A. GATELY.