

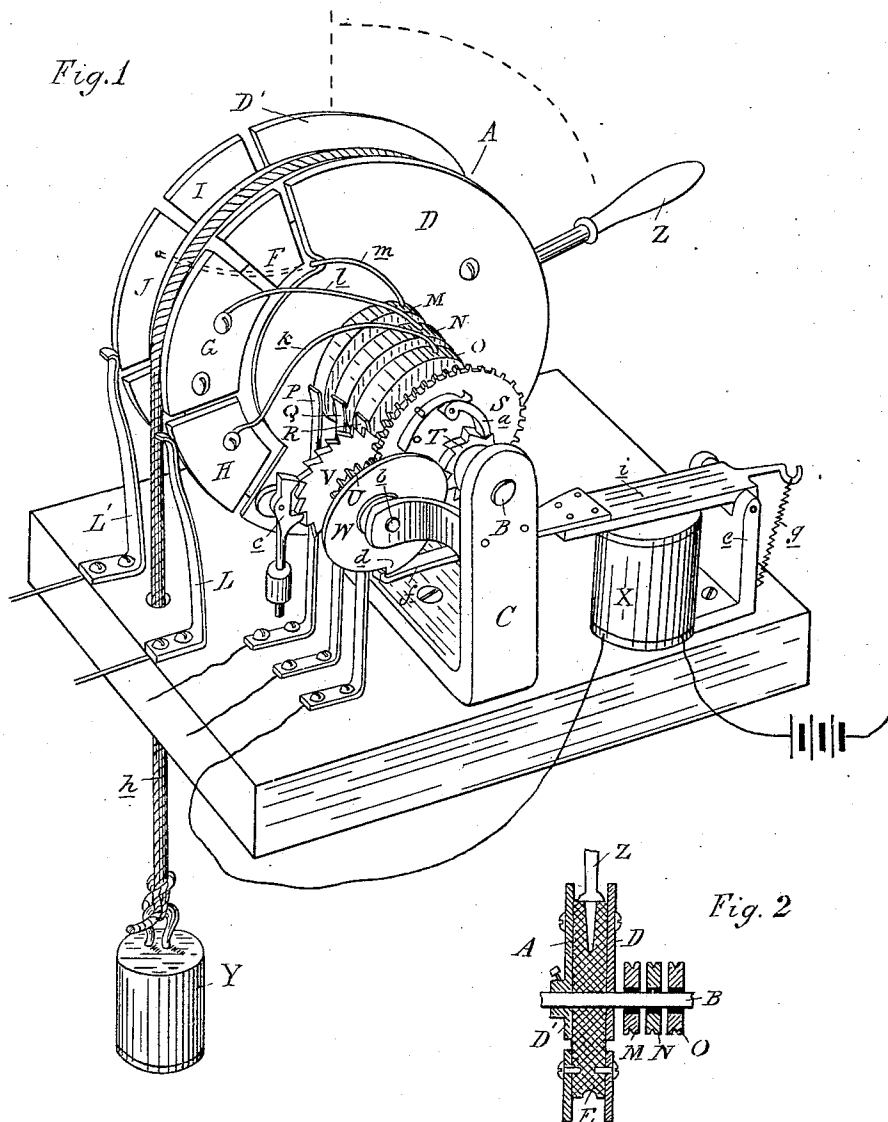
(No Model.)

W. A. JACKSON & W. R. COLE.

TELEPHONE SYSTEM.

No. 310,282.

Patented Jan. 6, 1885.



Attest
J. Paul Mayer
Attorney

Inventors
William A. Jackson
William R. Cole
By *Thos. S. Sprague* Atty

UNITED STATES PATENT OFFICE.

WILLIAM A. JACKSON AND WILLIAM R. COLE, OF DETROIT, MICHIGAN, AS-
SIGNORS TO THE WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS.

TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 310,282, dated January 6, 1885.

Application filed March 5, 1881. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM A. JACKSON and WILLIAM R. COLE, of Detroit, in the county of Wayne and State of Michigan, have
5 invented new and useful Improvements in Telephone Systems; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of
10 this specification.

This invention relates to new and useful improvements in automatic telephone-exchange switches; and the invention consists in the arrangement, construction, and combination of
15 the different parts, all as hereinafter set forth, and pointed out in the claims.

In most telephone-exchange systems each operator has, for the proper performance of his work, three different circuits at his disposition: first, his individual telephone circuit;
20 second, a battery or test circuit, and, third, a generator-circuit. To prevent a multiplicity of wires, one circuit is often made to include part of one or two other circuits, and the use of interlocking switches then becomes necessary;
25 but as the order of operating these switches is generally the same in every case of connection, we have contrived a mechanically-impelled device by means of which, at the proper moment, all these switches are automatically operated in their order and for the necessary time
30 interval, said device being also adapted to restore all the switches simultaneously to their normal position.

35 In the drawings which accompany this specification, Figure 1 is a perspective view of our mechanically-impelled switch. Fig. 2 is a cross-section thereof.

A is a grooved wheel, secured upon the shaft
40 B, which is journaled in proper bearings of the supporting-frame C. The wheel A consists of the metallic disks D D' and the intervening rubber or other insulating disk, E.

F, G, H, I, and J are a series of insulated
45 sections of the disks D and D', respectively. They form the movable contact-pieces of the switch.

L and L' are two contact-springs bearing against the faces of the disks D D', respectively.
50 They form the stationary contact-pieces of the switch.

M N O are three circular metallic disks secured upon the shaft B, and insulated therefrom.

P Q R are three spring-contacts for the disks
55 M N O, respectively.

S is a gear-wheel sleeved upon the shaft B, and provided with a pawl, a.

T is a ratchet-wheel secured upon the shaft B.

U is a pinion secured upon the counter-
60 shaft b.

V is an escape-wheel, and c is its governor.

W is a wheel secured upon the counter-shaft
b, and provided with the shoulder d upon its
65 face.

X is an electro-magnet. i is its armature, which is pivoted to a standard, e, and terminates at the forward end into a catch, f, adapted to engage with the shoulder d of the wheel W.

g is a coil-spring adapted to hold the armature i normally open.
70

Y is a weight secured by a cord, h, to the wheel A between its disks D D'.

Z is a handle by means of which the wheel
A may be rotated.
75

The insulated section H of disk D is connected by a wire, k, to the disk O. The insulated section G of disk D is connected by a wire, l, to disk N, and the section J of disk D' is connected by a wire, m, to the disk M. One end
80 of the coil of the electro-magnet X is connected to the contact-spring R, and its other end is connected to the test-battery circuit. The contact-spring Q may be connected with the generator-circuit, and the contact-spring P with the operator's telephone-circuit. The contact-springs
85 L and L' may represent normally-disconnected terminals for the subscribers' lines. Normally the switch is in the position shown in the drawings, with the contacts for the telephone
90 and test circuits closed, and the operator is at liberty, as far as the condition of the switch is concerned, to establish his telephone and test circuits on the switch-board; but as soon as the test-circuit is closed by the operator
95 the electro-magnet X becomes excited, and, attracting its armature, releases the catch f from its engagement with the shoulder d of the wheel W, allowing the wheel A to revolve. The revolution of the disk D first breaks the
100 contacts L H, then successively makes and breaks the contacts L G and L F until the

spring L comes in contact with the solid part of the disk D, when the wheel A is arrested by a new engagement of the shoulder *d* with the catch *f*. The revolution of the disk D' first breaks the contacts L' J, then makes and breaks the contacts L' I, and then, after making the contact L' D', it stops. When the revolution of the wheel A has stopped, the handle Z is in the position shown in dotted lines, and the switch may now be easily restored by the operator to its normal position.

While we have above and in a general way only indicated and described the use of the insulated segment-contacts H, G, and J, we have, in a parallel application for an improvement in telephone-exchange system and apparatus therefor, also shown how the insulated sections F I may be used in connection with other apparatus to give another signal, and also how the contacts of the springs L L' with the solid part of the disks D D' may be used to connect the subscribers' lines. The precise arrangement and number of the insulated contacts and their connection with the different electrical circuits also depend upon the kind of telephone-exchange system to which our switch is applied; but the arrangement shown in the drawings may be easily changed to suit different requirements.

What we claim as our invention is—

1. A mechanically-impelled telephone-switch having stationary contact-springs and movable segment-contacts electrically insulated and forming a part of a rotary disk or disks, said connections forming a part of a series of independent circuits, in combination with an electro-magnet included in one circuit of the series and a clock-work acted on by said electro-magnet to effect its release, to impart a uniform motion to the switch to successively make and break each circuit in the series, substantially in the manner described.

2. In a mechanically-impelled telephone-switch, the combination of the revolving wheel A, carrying a series of insulated segment-contacts, with the insulated disks M N O, contact-springs P Q R, bearing on said in-

50 insulated disks, and the wires *k l m*, for electrically connecting the said insulated segments with the insulated disks, substantially as and for the purpose described.

3. In a telephone-switch including a series of independent circuits, the combination of the mechanically-impelled wheel A, forming a part of said circuits and its regulating clock-work, the detent-wheel W, provided with shoulder *d*, and the electro-magnet X, included in one of said circuits, and provided with an armature, *i*, arranged to contact with the shoulder *d* of said detent-wheel, whereby a single momentary exciting of the electro-magnet disconnects the armature and shoulder *d* and permits the entire revolution of the wheel W, to successively make and break the remaining circuits of the series, substantially as and for the purposes herein set forth.

4. In a telephone-switch, the combination of the metal disks D D', having electrically disconnected segmental sections which form the movable contact-pieces of the switch, with the insulating-disk E and the stationary contact-springs L L', substantially as and for the purpose described.

5. The combination of a mechanically-impelled telephone-switch, D D', carrying insulated segmental sections forming the terminals of a series of circuits, and stationary contact-springs L L', forming the other terminals of a series of circuits, with a regulating clock-work and an electro-magnet located in and forming a part of one circuit of the series, and constructed and arranged to automatically release said clock-work and permit the escape-wheel thereof to make an entire revolution, to compel said segmental sections to successively contact with the springs L L', to make and break each circuit of the series successively, substantially as and for the purposes specified.

WILLIAM A. JACKSON.
WILLIAM R. COLE.

Witnesses:

H. S. SPRAGUE,
E. SCULLY.