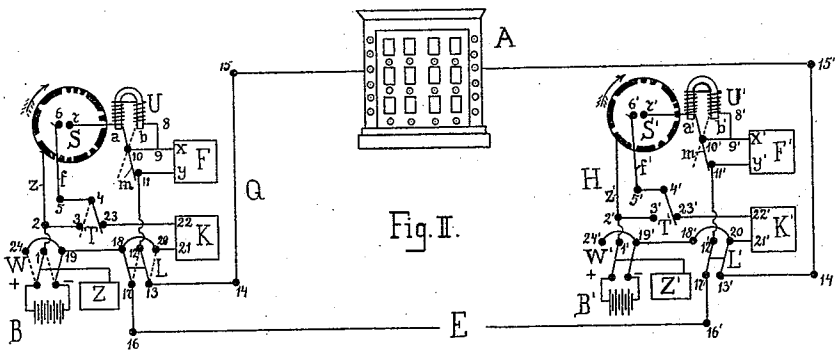
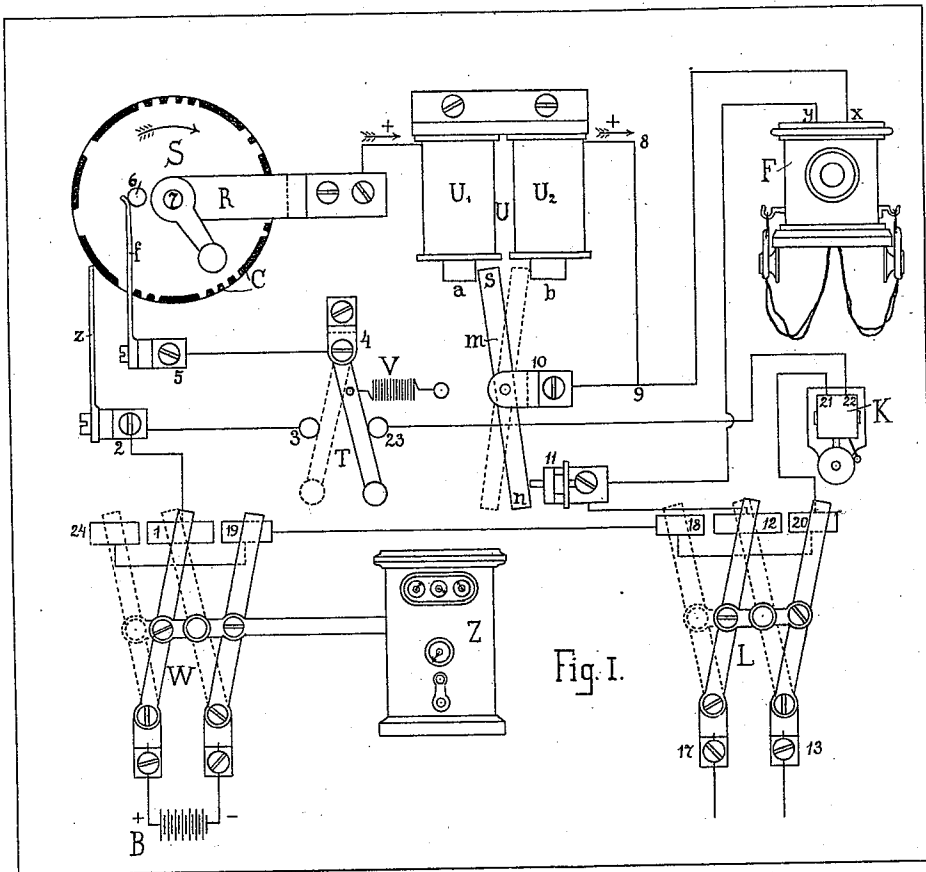


(No Model.)

F. QUATRAM.
REGISTERING APPARATUS FOR TELEPHONES.

No. 553,964.

Patented Feb. 4, 1896.



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UNITED STATES PATENT OFFICE.

FRANZ QUATRAM, OF PANKOW, GERMANY.

REGISTERING APPARATUS FOR TELEPHONES.

SPECIFICATION forming part of Letters Patent No. 553,964, dated February 4, 1896.

Application filed July 26, 1895. Serial No. 557,199. (No model.)

To all whom it may concern:

Be it known that I, FRANZ QUATRAM, a subject of the German Emperor, residing at Pankow, near Berlin, Germany, have invented 5 new and useful Improvements in Registering Apparatuses for Telephones, of which the following is a specification.

My invention relates to that class of telephone systems in which the several subscribers 10 are connected by a central office; and the object of my invention is to provide means by which the use of the telephone is not registered unless the user connected by the central office to the subscriber called for is informed by the latter of his being present and 15 ready for communicating with him. I attain this object by the means illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatical view of an individual apparatus of my invention in connection 20 with the telephone and the signal-bell of a single station, and Fig. 2 a similar view of two stations provided each with my invention and connected to each other by the central office. 25

Similar letters and figures refer to similar parts throughout both views.

Referring first to Fig. 1, my apparatus consists of a battery B, connected by two conductors 30 to a commutator W, which consists of two switch-levers secured parallel to each other by a cross-piece, the right-hand continuation of which actuates the registering device Z, and of contact-pieces 24 1 19. Another commutator L, consisting of two similar 35 switch-levers and contact-pieces 18 12 20, is connected to the ground-wire at 17 and at 13 to the wire conducting to the central office. Contact-pieces 24 19 of the commutator W are 40 respectively connected by conductors and further connected by another conductor extending from piece 19 to piece 18.

A disk S, of metal, journaled at 7 in a support R, likewise of metal, is provided with a 45 laterally-projecting pin 6 and with strips or pieces C of an insulating material at its edge, so as to form a discontinuous contact-surface, against which bears a contact-spring z, connected at its other end at 2 by conductors to 50 the contact-piece 1 of commutator W and to a contact-pin 3. Another contact-spring, Y, bears against pin 6 in the normal position of

disk S, as represented in Fig. 1, and the other end of spring Y is connected at 5 by a conductor to a switch-lever T, pivoted at 4 and 55 held in position by a spring V, so as to bear against a pin 23. A conductor extends from the latter pin to the alarm device K, entering the same at 22, and is in circuit with a conductor passing from contact-piece 20 of commutator L and entering the device K at 21. 60

A contact-piece 11 is connected by a conductor to the contact-piece 12 of commutator L and by another conductor to the telephone device F, the said conductor entering the device F at y and being connected to one of the 65 telephone-wires, while another conductor, 9, connected to the other telephone-wire, leaves the device F at x and extends to a contact-piece 10, in which is pivoted a magnetic bar 70 m. The northern pole n of the latter bears normally against a contact-pin of piece 11.

Conductor 9 is connected to the support R referred to heretofore by a branch 8 coiled on 75 reels U' U² mounted on cores a b of soft iron, thus forming an electromagnet, and the south pole of bar m will be attracted by the core a, when the positive current passes through conductor 8, as indicated in Fig. 1 by positive arrows, and by the core b, when the 80 direction of the positive current has been inverted by switching the commutator W, as indicated by dotted lines with reference to the commutator W and to the bar m. By these means when bar m occupies its dotted 85 position the circuit is broken between the bar and the contact-piece 11, and the current cannot pass but through the telephone, but when bar m is in contact with piece 11, although the telephone-circuit is closed as heretofore, the current will not pass through the 90 telephone, but take the shorter way through bar m between contact-pieces 10 11 by reason of its resistance being lower than that afforded by the telephone-coil. 95

Referring to Fig. 2, the left-hand part Q of this figure corresponds to Fig. 1, and no further description is deemed necessary while in the right-hand station H the indexed numerals respectively corresponding to the non-indexed ones of station Q indicate similar 100 parts. In this figure the central office is indicated by A and the ground-line by E, and the subscriber of station Q is supposed to call

for communicating with the subscriber of station H, so that the use of the telephone is to be registered at station Q.

From the foregoing the working of my apparatus will be understood to be as follows: The subscriber at Q brings firstly the commutator L into the position indicated by dotted lines in Fig. 1 and by full lines in Fig. 2. Then he turns lever T against contact-pin 3, as indicated by dotted lines in Figs. 1 and 2, whereby the circuit of the battery B is closed as follows: B⁺, 1, 2, 3, 4, 5, f, 6, S, 7, U, 8, 9, 10, m, 11, 12, 13, 14, 15, A, E, 16, 17, 18, 19 to B, and the current thus sent from the battery to the central office by ringing a bell or releasing an annunciator at that office calls the officer. The positive current of the said circuit being supposed to take the way indicated by the positive arrows of Fig. 1, the magnetic bar m will remain in its normal position represented by full lines. The subscriber at Q then releases lever T, which returns by spring V to its normal position *ic* to bear against contact-pin 23. The officer of the central office having been called closes a circuit of a battery placed at that office and the positive current thus taking the way: A, 15, 14, 13, 12, 11, 10, 9, 8, U, 7, S, 6, f, 5, 4, 23, 22, K, 21, 20, 18, 17, 16, E, A rings the alarm-bell K and turns bar m into the position indicated by dotted lines, so as to break the contact between the said bar and contact-piece 11 and bring the telephone F into the said circuit.

The subscriber is thus enabled to communicate by the telephone with the officer at the central station, in order to inform him of the subscriber he wants to be connected with. This connection having been made with the subscriber at H, the subscriber at Q turns again lever T against pin 3, whereby the magnetic bar m is brought again into its full-line position and the alarm device K' of station H will be rung by the positive current, as follows: B⁺, 1, 2, 3, 4, 5, f, 6, S, 7, U, 8, 9, 10, m, 11, 12, 13, 14, 15, A, 15', 14', 13', 20', 21', K', 22', 23', 4', 5', f', 6', S', 7', U', 8', 9', 10', m', 11', 12', 17', 16', E, 16, 17, 18, 19 to B. The subscriber at Q then releases lever T which swings back against pin 23, and the subscriber at H, if present and ready for communicating with the calling subscriber, turns disk S' around once, whereby the edge of this disk when passing by the contact-spring z' brings about an intermitting ringing-signal at K, corresponding to the disposition of the insulating strips and pieces provided on the edge of disk S', and consisting of distinct sounds differently timed, indicating the several numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 on the same principle as letters are indicated by points and dashes in the Morse telegraph. The disk S of each subscriber is of individual construction so as to correspond with his subscribing number, and the subscriber at Q is thus enabled to verify by the signal given that he is just connected with the subscriber he wants to communicate with. The circuit perform-

ing the said ringing-signal by means of disk S', when passing by spring z', is as follows: B⁺, 1', 2', z', S', 7', U', 8', 9', 10', m', 11', 12', 17', 16', E, 16, 17, 18, 20, 21, K, 22, 23, 4, 5, f, 6, S, 7, U, 8, 9, 10, m, 11, 12, 13, 14, 15, A, 15', 14', 13', 20', 18', 19' to B', the contact between spring f' and pin 6' being broken during the turning movement of disk S'. The subscriber at Q thus being sure that he will use his telephone as intended brings now the commutator W into the position indicated by dotted lines in Figs. 1 and 2 and turns lever T against contact-pin 3, the circuit of battery B thus being closed, as follows: B⁺, 24, 19, 18, 17, 16, E, 16', 17', 12', 11', m', 10', 9', 8', U', 7', S', 6', f', 5', 4', 23', 22', K', 21', 20', 13', 14', 15', A, 15, 14, 13, 12, 11, m, 10, 9, 8, U, 7, S, 6, f, 5, 4, 3, 2, 1 to B. The positive current thus passing through the electromagnets U and U' in an inverted direction, the bars m and m' will be brought into the dotted-line position, breaking the contact with pieces 11 and 11', respectively. In the same line, by shifting the commutator W into the dotted-line position, the registering device Z has been actuated and the use of the telephone has been registered. The subscriber at Q then releases lever T, which returns into contact with pin 23 and brings back the commutator W into the position represented by full lines. The circuit is now closed as follows: F, y, 11, 12, 13, 14, 15, A, 15', 14', 13', 20', 21', K', 22', 23', 4', 5', f', 6', S', 7', U', 8', 9', x', F', y', 11', 12', 17', 16', E, 16, 17, 18, 20, 21, K, 22, 23, 4, 5, f, 6, S, 7, U, 8, 9, x, F. The telephones F and F' thus being in the circuit, the subscribers at Q and H can communicate with each other. The communication having been finished, the subscriber at Q gives the ringing of signal by turning lever T against pin 3, whereby the bars m and m' are returned to their normal position, (indicated by full lines,) and then releasing lever T, and shifts finally the commutator L to its full-line position, the apparatus at Q thus being in the same condition as that at station H and ready for being called on by any other subscriber.

In order to advertise an absent subscriber of his having been called for, I combine a Morse apparatus with my invention registering the call-signal in the usual manner. The subscriber at H, for instance, before leaving his office will then turn out of the circuit the alarm device K' and insert instead thereof a Morse apparatus.

The subscriber at Q, when calling for the subscriber at H and receiving no counter-signal, may then turn his disk S once round so as to print his subscribing number on the strip of the Morse apparatus at H without shifting the commutator W nor actuating the registering device, and the communication called for may be performed after the return of the absent subscriber informed by the printed strip of his having been wanted.

Having fully described my invention, what

I claim, and desire to secure by Letters Patent, is—

1. In a registering apparatus for telephones the combination of a battery B, a commu-
5 tator W in circuit with the battery, a registering device Z actuated by the commutator, an electromagnet U, in circuit with the commutator and with the telephone F, a switch T for breaking and closing the circuit be-
10 tween the commutator and the electromagnet, and a magnetic switch-bar *m*, actuated by the electromagnet, for breaking and closing the circuit between the electromagnet and the telephone, all substantially as set
15 forth and for the purposes specified.

2. In a registering apparatus for telephones the combination of a battery B, a commutator W in circuit with the battery, a registering device Z actuated by the commutator, an elec-
20 tromagnet U in circuit with the commutator and with the telephone F, a switch T for breaking and closing the circuit between the commutator and the electromagnet, a magnetic switch-bar *m*, actuated by the electro-
25 magnet, for breaking and closing the circuit between the electromagnet and the telephone, a commutator L in circuit with the central office, a conductor connecting the commuta-
tor L to the telephone, and a conductor con-

necting the commutators W and L, all sub- 30
stantially as set forth and for the purposes specified.

3. In a registering apparatus for telephones the combination of a battery B, a commutator W in circuit with the battery, a registering 35
device Z actuated by the commutator, an electromagnet U in circuit with the commutator and with the telephone F, a switch T for breaking and closing the circuit between the commutator and the electromagnet, a mag- 40
netic switch-bar *m*, actuated by the electromagnet for breaking and closing the circuit between the electromagnet and the telephone, a commutator L in circuit with the central office, a conductor connecting the commuta- 45
tor L to the telephone, a conductor connecting the commutators W and L, an alarm device K, a conductor connecting the commutator L to the alarm device and a conductor connecting the alarm device to the switch T, all substan- 50
tially as set forth and for the purposes specified.

In witness whereof I have signed this specification in presence of two witnesses.

FRANZ QUATRAM.

Witnesses:

WM. HAUPT,

E. HILDEBRANDT.