

(No Model.)

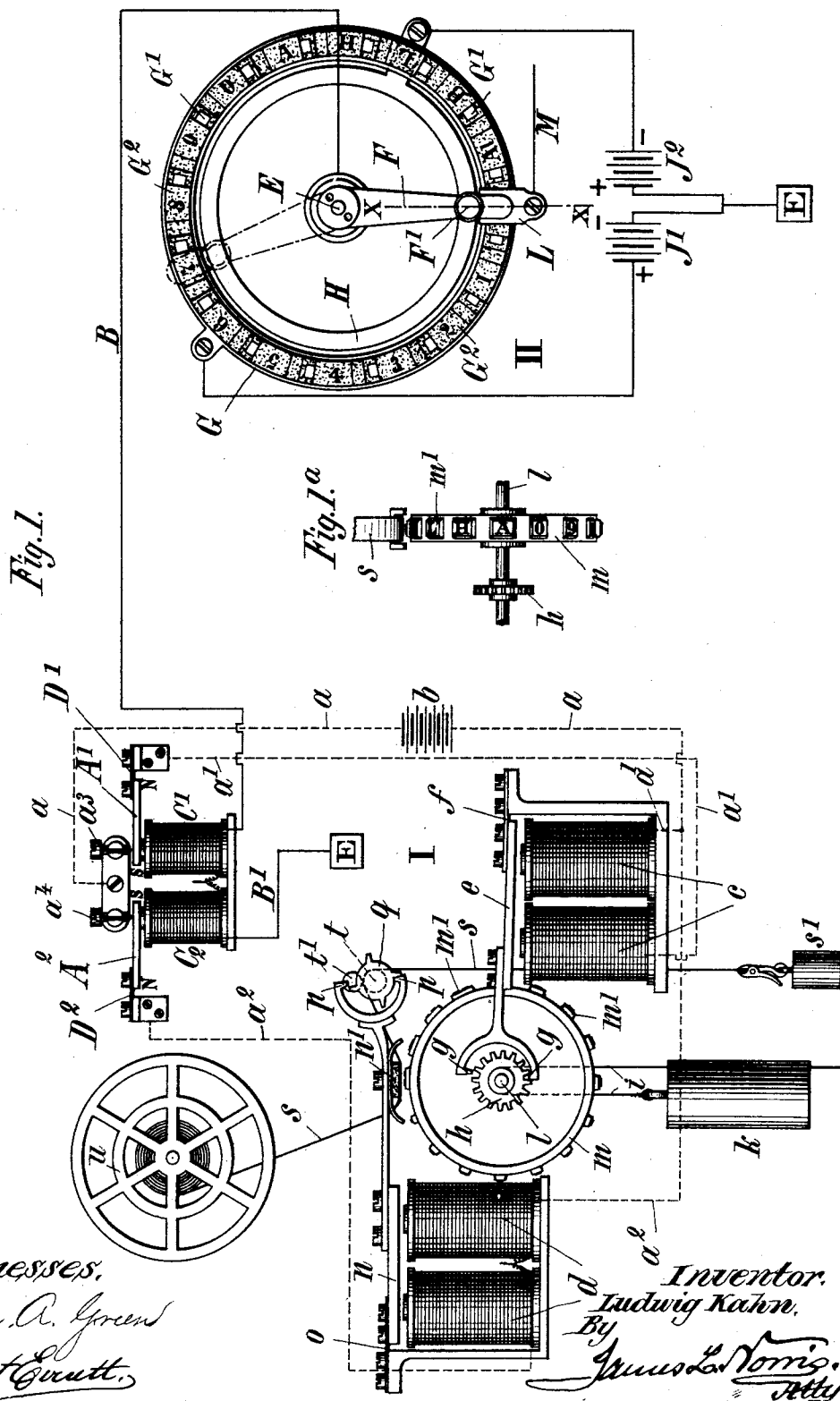
2 Sheets—Sheet 1.

L. KAHN.

APPARATUS FOR REGISTERING TELEPHONE CALLS.

No. 513,364.

Patented Jan. 23, 1894.



THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.)

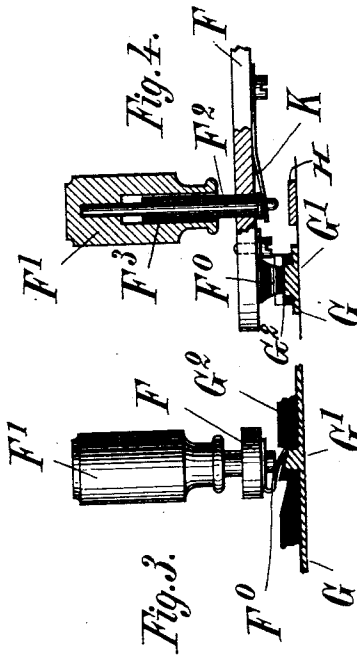
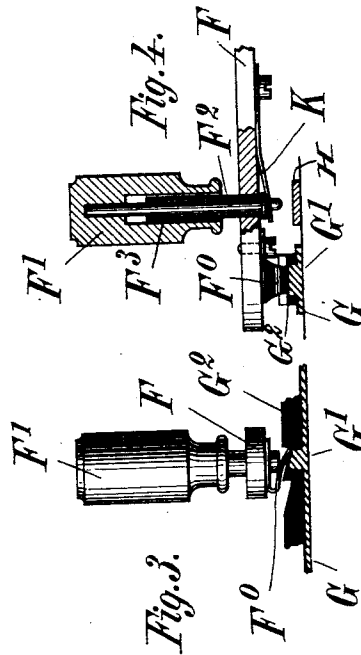
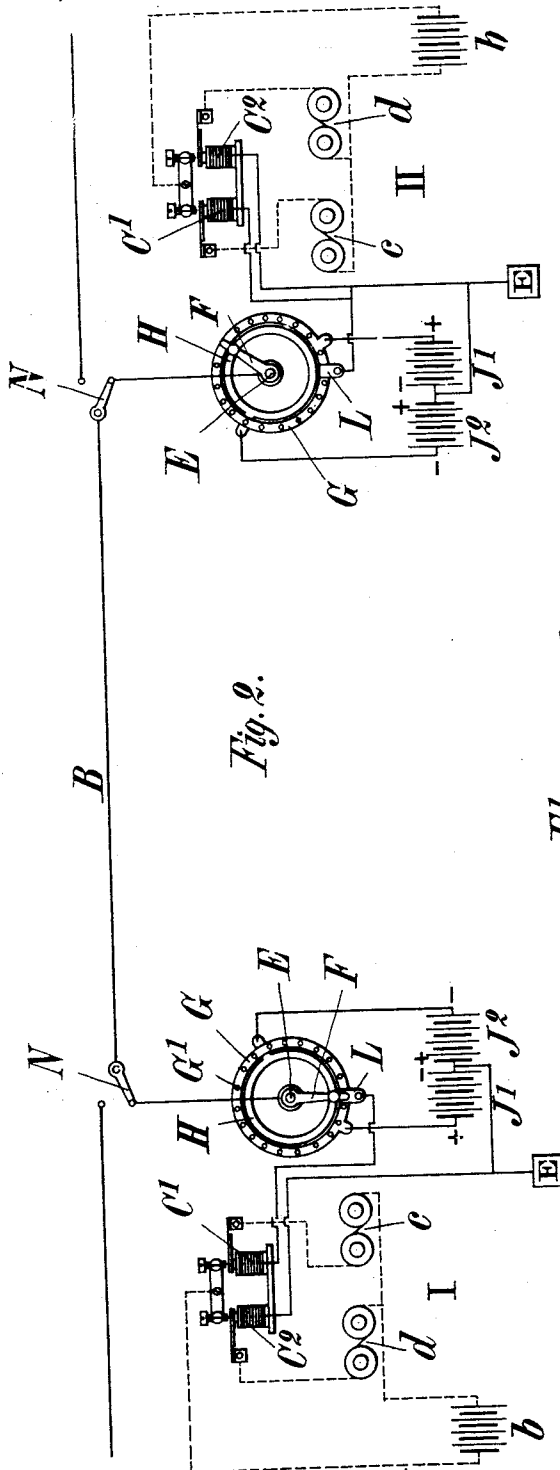
2 Sheets—Sheet 2.

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APPARATUS FOR REGISTERING TELEPHONE CALLS.

No. 513,364.

Patented Jan. 23, 1894.



Witnesses:
G. H. Rea,
Robert Emmett.

Inventor:
Ludwig Kahn
By *James L. Torrey*
Atty

UNITED STATES PATENT OFFICE.

LUDWIG KAHN, OF HAMBURG, GERMANY.

APPARATUS FOR REGISTERING TELEPHONE-CALLS.

SPECIFICATION forming part of Letters Patent No. 513,364, dated January 23, 1894.

Application filed March 2, 1893. Serial No. 464,446. (No model.)

To all whom it may concern:

Be it known that I, LUDWIG KAHN, a subject of the German Emperor, residing at Hamburg, in the German Empire, have invented certain new and useful Improvements in Apparatus for Registering Telephone-Calls, of which the following is a specification.

My invention relates to improvements in apparatus for registering telephone calls, and especially to a transmitter for producing currents of alternating polarity to operate a printing telegraph at a distant station from the call station designed to register the place and number of the latter in the event of the call signal not being heard at the distant station.

In the accompanying drawings Figure 1 is a diagram of the principal means and their wire connections for carrying out the present invention. Fig. 1^a, shows a side elevation of the printing device in detail. Fig. 2 is a diagram illustrating the wire connections of two distant callstations. Fig. 3 is an end view of the switch lever of the transmitter, the contact ring being in section, and Fig. 4 is a side elevation of the former and a section on the line $x-x$, Fig. 1.

Similar letters refer to similar parts throughout the several views.

As shown in Fig. 1 by the part I, the conductor a , of the local battery b is divided into two branches a' and a^2 , the branch a' of which conducts the current through the coils of the pair of electromagnets c c , while the branch a^2 conducts current to the electromagnets d d . When the branch a' receives current in the manner hereinafter explained the electromagnets c , c attract an armature e attached to a spring f and carrying at its free end two pawls g g . The pawls are arranged to engage alternately with the teeth of an escape wheel h after the manner of an anchor escape movement and thus regulate the rotation of the shaft l of the said wheel which rotation is caused by a cord i with a weight k . On the shaft of the escape wheel is provided a type wheel m with the same number of types m' as the escape wheel h possesses teeth, so that each time the electromagnets c c are energized the type wheel serving as an indicator is turned through the space of one type. When the type designed for the

printing and inked in a suitable manner has arrived opposite the pad n' of an armature n to be attracted by the electromagnets d d and attached to a spring o it prints the characters or signs upon a paper band s moved intermittently below the pad n' . The movement of the paper band wound from a roller u and passing between the rollers t t' is preferably effected by means of a weight s' fixed to the paper band by automatic clamping tongs, the forward movement being regulated similarly to that of a clock or watch escapement, which consists of the two pawls p p connected with the armature n and the escape wheel g secured upon the axis of one of the aforesaid guide rollers t t' . Whether the current of the local battery flows through the branch a' or the second branch a^2 , depends on which of two magnets A' A^2 attached to the springs D' or D^2 is repelled by the corresponding pole of the electromagnets C' C^2 placed opposite to the said magnets and actuated by means of the current in the line wire B. One of the said magnets is then forced against the contact-pieces a^3 a^4 included in the conductor a of the local battery and designed to close the circuit. The coils of these two electromagnets C' C^2 are so arranged that poles of unlike name are presented to the magnets A' A^2 while the magnets themselves present their poles of like name to the electromagnets. A change in the direction of the current causes only that one of the magnets A' A^2 to be repelled opposite to which is an electromagnet of the same name. This change in the direction of the current is effected by means of the switch represented in Fig. 1 by the part I; in Figs. 3 and 4 it is shown in detail. This switch consists essentially of the lever F adapted to be turned upon a journal E and two concentric sliding rings G H. One of them in the example the outer ring G is permanently in electrical connection with the positive pole of one line battery J' while the other ring H is connected in the same manner with the negative pole of the second line battery J^2 . The outer sliding ring G is provided at its upper surface with projections G' , Figs. 1, 3 and 4, the number of which corresponds with that of the types m' on the type wheel m .

Below the switch lever F a sliding spring

F^0 is provided which, on coming in contact with one of the projections G' causes the current of the line battery I' to flow through the line conductor B to the electromagnet $C' C^2$ of the telephone station called and through a wire B' to the earth plate. Such a closing of the circuit always causes the circuit $a a'$ to be closed once, so that after turning the switch lever F round once, the type wheel m will also occupy its initial position again. In order that this turning movement may always take place in the same direction the sliding ring G designed for closing the circuit is covered with a ring G^2 made of non-conducting material and having its surface formed after the manner of ratchet wheel teeth; through this ring of non-conducting material the projections G' pass into the upper face of the teeth and into the reach of the contact spring F^0 of the lever F .

On the face of the ring G^2 are provided the characters or signs corresponding with the types on the type wheel m , in such a manner that the position of the switch lever F indicates which of the types m' on the type wheel is just opposite the pad n^4 and ready to print from. In order that this may take place the switch lever F has to be turned so far that the sliding spring F^0 is no longer in contact with the projection G' of the ring G , which corresponds with the character to be printed and remains in the neighboring space between the teeth of the insulating ring G^2 . Then a knob F' serving as a handle on the switch lever F is pressed against the tension of a spring K , Fig. 4 toward the sliding ring H designed for closing the circuit so far that a pin F^2 provided in the said knob establishes, by means of a sleeve F^3 surrounding it, electrical connection between the ring H and the switch lever F and therefore of the line battery J^2 with the electromagnets $C' C^2$; the printing of the corresponding type will take place as the armature n is attracted. At the moment when the electrical connection discontinues owing to the knob being released, the paper band s is caused to move forward.

When this apparatus is not in use the switch must of course be so placed that the current in the line coming from any telephone station can pass to the electromagnets $C' C^2$ designed for changing the direction of the current. This is effected by a contact

piece L used for closing the circuit and connected by a wire M with these electromagnets.

Fig. 2 shows how the line wire B is joined to the improved apparatus by means of switches N .

In the apparatus shown the characters consist essentially of the numerals 0 to 9. The sign "Office" must moreover be provided if the apparatus is used in large towns. In case such an apparatus is to be employed for communicating with other places another sign is added, which indicates the name of the place to which the call station belongs. When communicating such a message it is expedient to print first the number of the telephone station, then the sign "Office" and the number of the latter and finally the sign of the place.

What I claim is—

In apparatus for registering telephone calls, the combination with a line wire, and a printing telegraph adapted to be actuated by currents of alternating polarity, of the two concentric sliding rings G, H , one of which, as G , is provided on its upper face with projections G' corresponding with the types on the type wheel of the printing telegraph, an insulating or non-conducting ring G^2 carried on the ring G and through which the said projections G' are extended, the surface of the ring G^2 being provided with ratchet teeth and with characters or signs corresponding with the types of the printing telegraph type wheel, the electrically connected line batteries $J' J^2$ one of which has one of its poles permanently in electrical connection with the ring G while the other battery has its opposite pole connected in the same manner with the wheel H , and the switch lever F connected with the line wire and adapted to close the circuit first through one of the projections G' of the ring G to set the type wheel and then through the ring H to register the call signal, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 9th day of February, 1893.

LUDWIG KAHN.

Witnesses:

ALEXANDER SPECHT,
DIEDRICH PETERSEN.