(No Model.) 6 Sheets—Sheet 1.

J. SACK.

AUTOMATIC INDIVIDUAL TELEPHONE CALL APPARATUS.

No. 492,110. Patented Feb. 21, 1893.

Fig. 1.

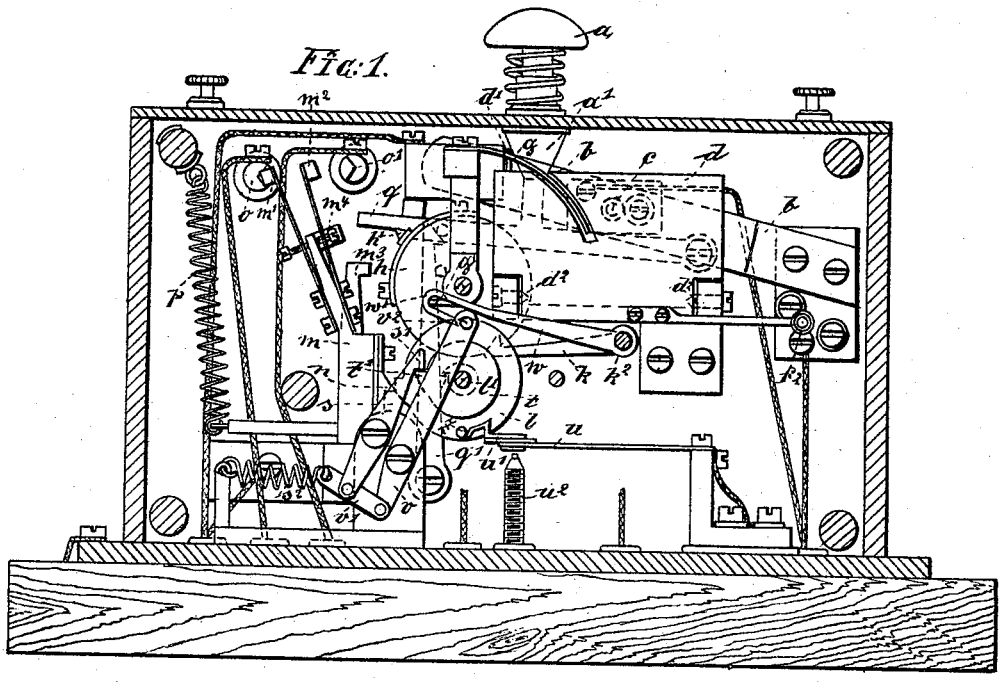
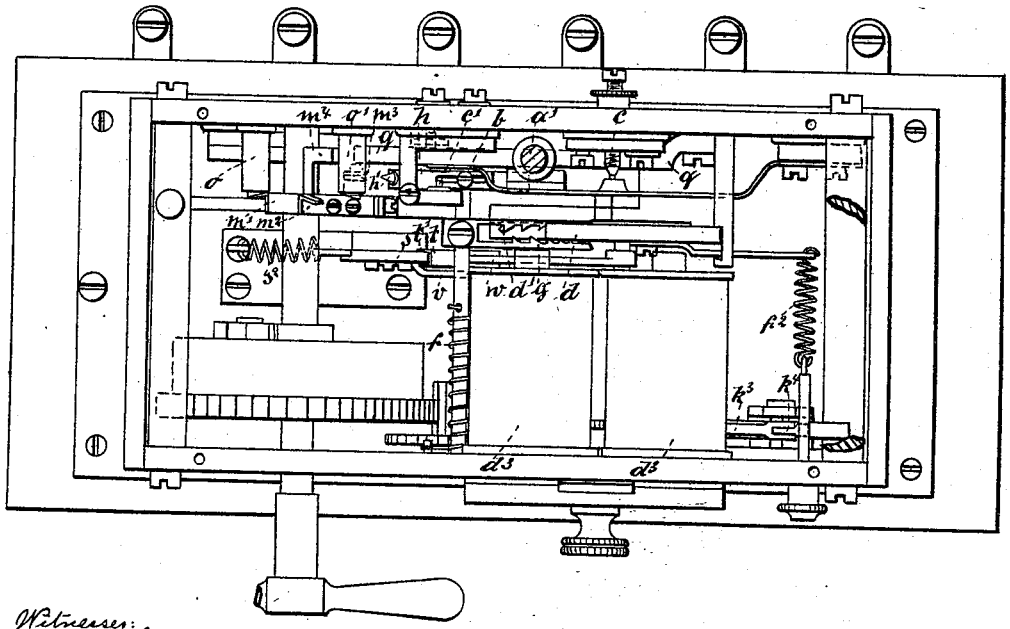


Fig. 2.



Witnesses:
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A. Poughkamans.

Inventor:
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by his attorneys
Roeder & Briesen

(No Model.) 6 Sheets—Sheet 2.

J. SACK.

AUTOMATIC INDIVIDUAL TELEPHONE CALL APPARATUS.

No. 492,110. Patented Feb. 21, 1893.

Fig. 3.

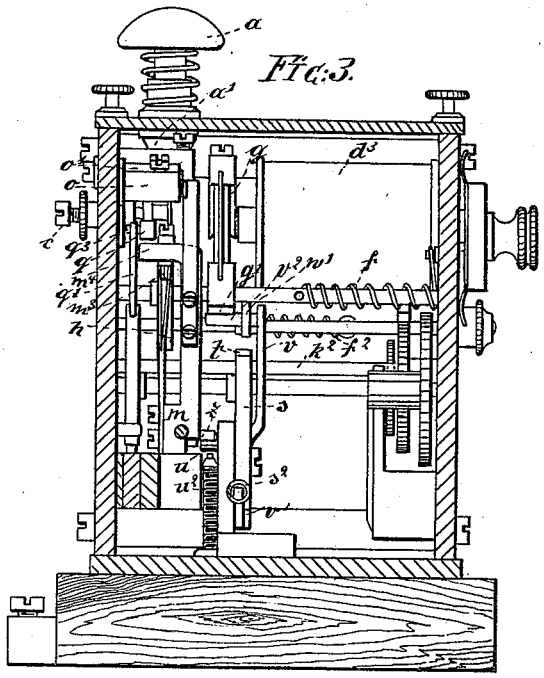


Fig. 5.

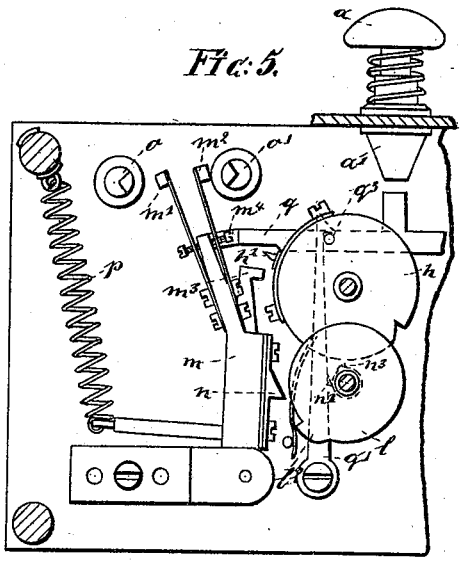
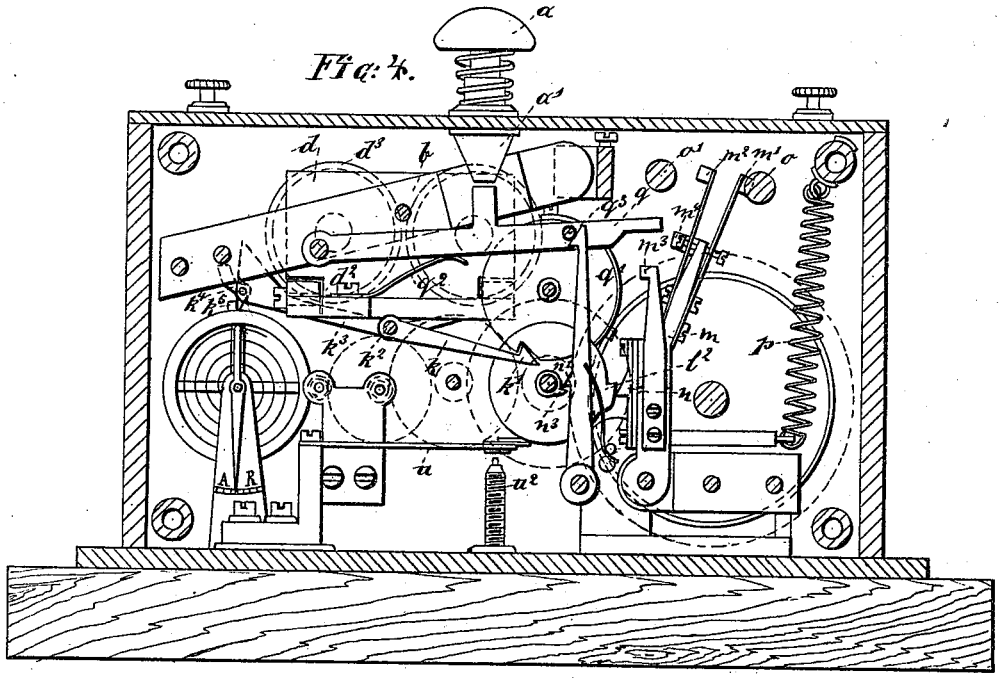


Fig. 4.



Witnesses:
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(No Model.) 6 Sheets—Sheet 3.

J. SACK.

AUTOMATIC INDIVIDUAL TELEPHONE CALL APPARATUS.

No. 492,110. Patented Feb. 21, 1893.

Fig: 6

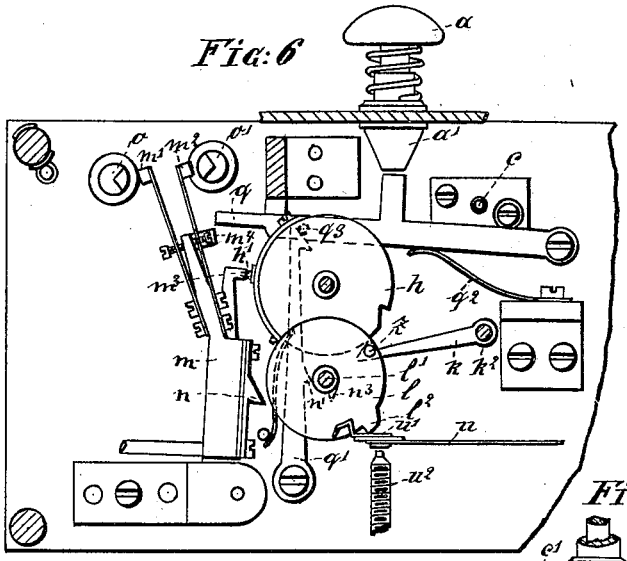


Fig: 7.

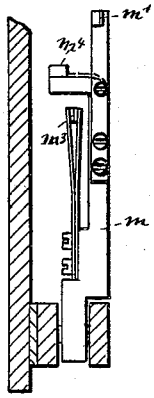


Fig: 8.

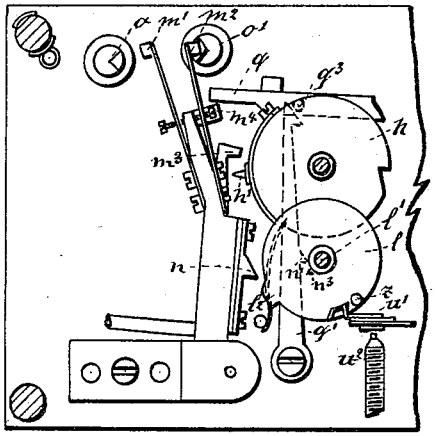


Fig: 9.

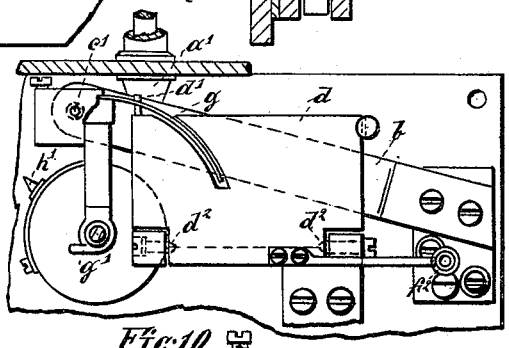


Fig: 10.

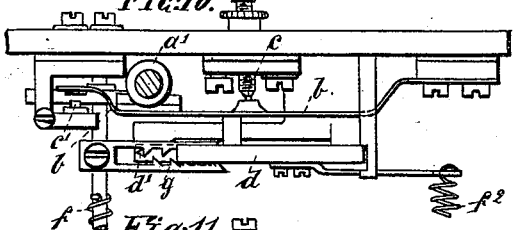


Fig: 11

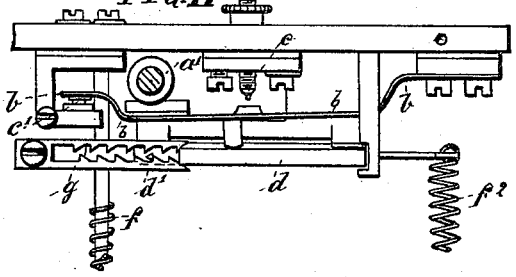
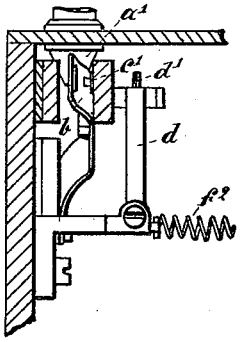


Fig: 12.



Witnesses,
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A. Longhman.

Inventor:
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by his attorneys
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(No Model.) 6 Sheets—Sheet 4.

J. SACK.

AUTOMATIC INDIVIDUAL TELEPHONE CALL APPARATUS.

No. 492,110. Patented Feb. 21, 1893.

Fig. 13.

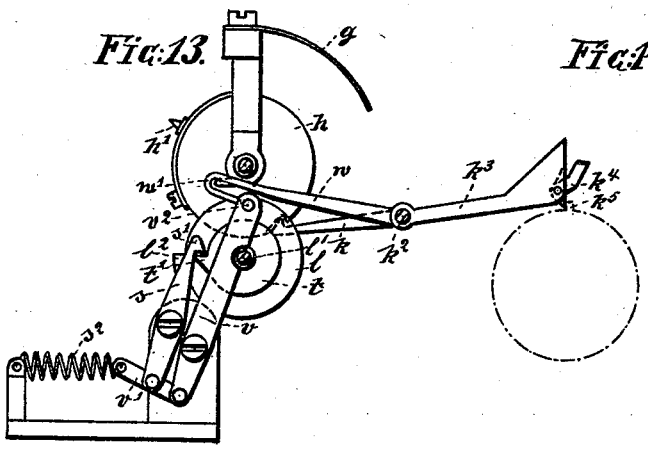


Fig. 14.

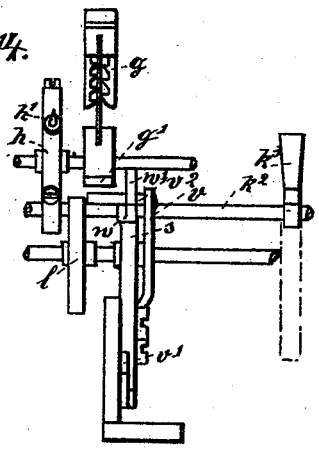


Fig. 15.

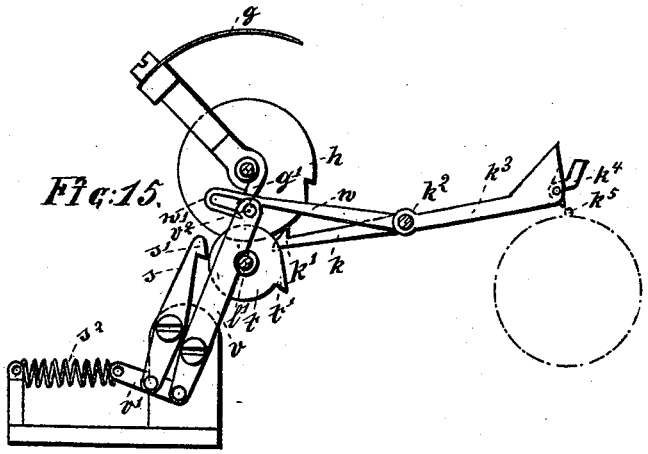
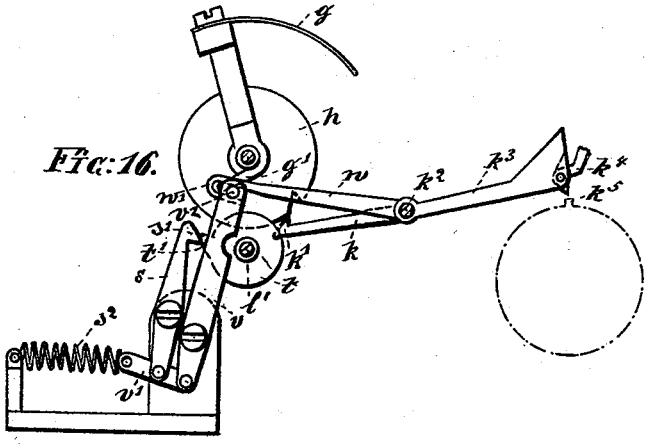


Fig. 16.



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AUTOMATIC INDIVIDUAL TELEPHONE CALL APPARATUS.

No. 492,110. Patented Feb. 21, 1893.

Fig. 20a.

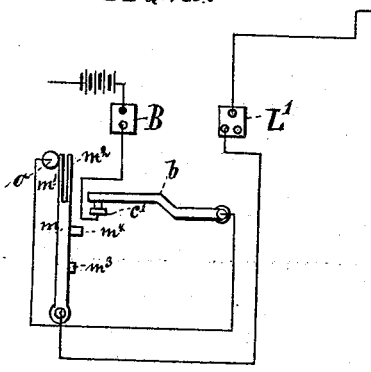


Fig. 20b.

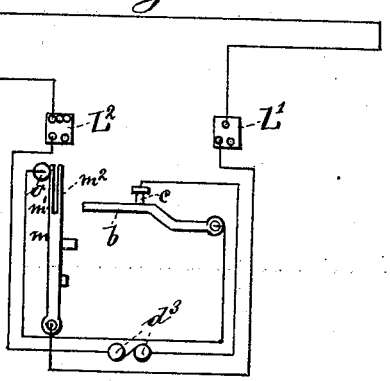


Fig. 21.

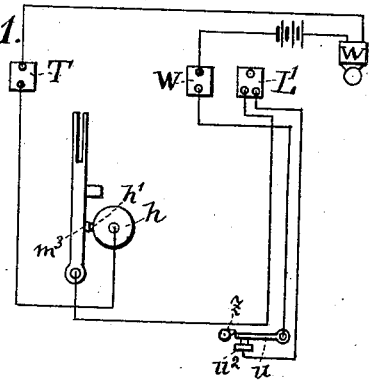
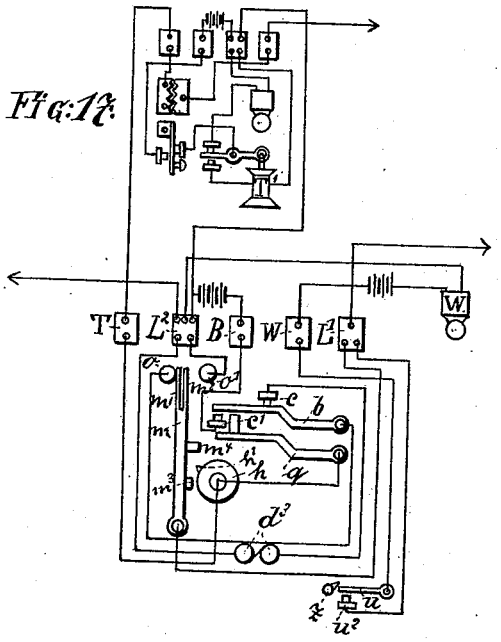


Fig. 17.



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AUTOMATIC INDIVIDUAL TELEPHONE CALL APPARATUS.

No. 492,110. Patented Feb. 21, 1893.

Fig 18a

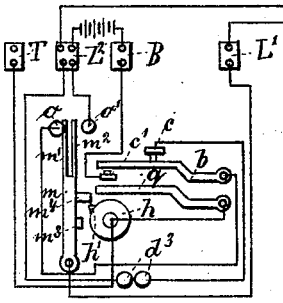


Fig: 18b

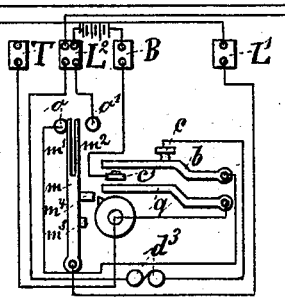


Fig: 18c

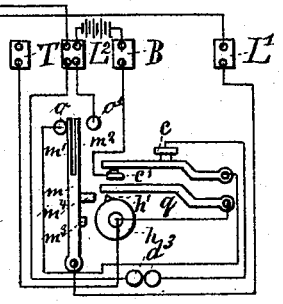


Fig: 19a

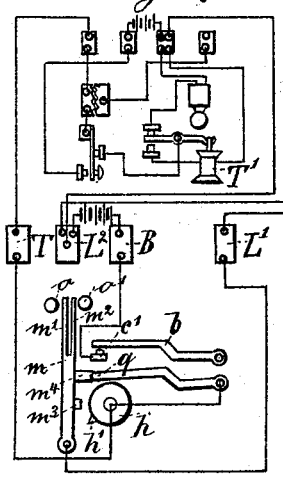


Fig: 19b

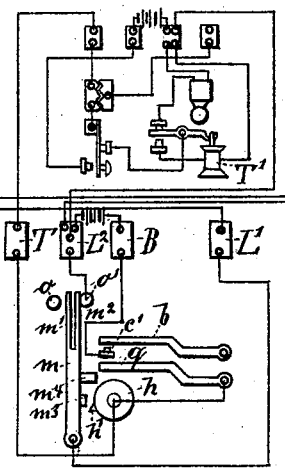
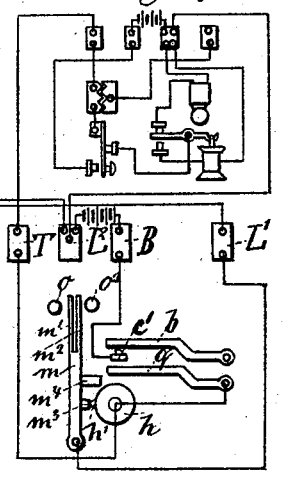


Fig: 19c



Witnesses:
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A. Jonghmans.

Inventor:
J. Sack per
Roeder & Briesen
attorneys

UNITED STATES PATENT OFFICE.

JOSEPH SACK, OF BERLIN, GERMANY.

AUTOMATIC INDIVIDUAL TELEPHONE-CALL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 492,110, dated February 21, 1893.

Application filed September 18, 1891. Serial No. 406,062. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH SACK, a subject of the German Emperor, residing at Berlin, Germany, have invented certain new and useful Improvements in Automatic Individual Telephone-Call Apparatus, of which the following is a specification.

This invention relates to a telephone call apparatus by means of which the called up station may be readily connected with the transmitting station, while the other stations in the circuit are entirely disconnected, so that the latter cannot interrupt or intercept the conversation.

The invention consists in the various features of improvement more fully pointed out in the claims.

In the accompanying drawings: Figure 1 is a longitudinal section through the apparatus. Fig. 2 a plan Fig. 3 a cross section. Fig. 4 a longitudinal section with the parts in a different position. Fig. 5 an elevation of part of the apparatus. Fig. 6 a further elevation with the parts in a different position. Fig. 7 an end view of spring *m*. Figs. 8 and 9 are still further elevations of the apparatus. Figs. 10, 11 and 12 are details of the toothed segment *g* and spring *b*. Figs. 13 to 16 are further details of the disk *h* and co-operating parts and Figs. 17, 18^a, 18^b, 18^c, 19^a, 19^b, 19^c, 20^a, 20^b, and 21 show the circuits.

The letter *a* represents the key having wedge shaped plug *a'*, which on depression of the key bears against armature *d*, and the contact spring *b*, to push the latter away from pin *c* and against pin *c'* (Fig. 11). The current then passes (Fig. 19) from the battery over connection B, contact *c'* spring *b*, contact pin *o*, spring *m'*, lever *m*, connection L' and thence through the other instruments in the circuit and back or to the earth. In those apparati within the circuit, in which spring *b*, remains in contact with pin *c*, the current runs over connection L', lever *m*, spring *m'*, pin *o*, spring *b*, pin *c'*, and thence through the electro-magnets d^3, connected therewith, to connection L^2, and to the earth or farther on through the conducting wires. The electro-magnets d^3, at each station will become active and attract their armatures *d*. The armature *d*, is free to turn on pivots d^2, and is normally drawn away from the electro-magnet by a spring f^2, (Figs. 9, 10 and 11.)

The armature is provided with pin *d'*, movable within the toothed slotted segment *g*. This segment *g*, is moved by spring *f*, to the left for the distance of one tooth, during each motion of the armature. If at any one station, the key is depressed three times, to three times close the circuit, the armatures will be attracted and released three times and the segments *g*, will be moved forward three teeth at each station.

Upon the shaft of the segment there is set a disk *h*, having contact pin *h'*. This pin, as will be described further below, comes into contact with contact spring m^3, during one particular position only of disk *h*. The pins *h'*, are differently arranged upon the disks, at the different stations. Thus if the key is depressed once, the pin *h'*, of say the first station, makes contact with spring m^3, while by a double depression of the key, the pin *h'*, of the second station makes contact with its spring &c (see Fig. 20).

The apparatus is provided with a clockwork which is immediately disconnected upon a motion of segment *g*, and disk *h*. The clockworks of all the stations within the circuit will be simultaneously set in motion, if at any one station contact is made, by a depression of the key, because the magnets will attract the armatures of all the stations and thus the segments *g*, and disks *h*, will all be moved forward. At the transmitting station also the clockwork is disconnected, because by a pressure upon the key *a*, the plug *a'*, is pressed against armature *d*, and thus the pin *d'*, liberates the segment *g*, for the distance of one or more teeth. The segment *g*, falls under the action of its spring and takes the disk *h*, with it. The clockwork is now disconnected by the disk *h*. This disk is provided with a notch, which is engaged by a tooth *k'*, of lever *k* (Figs. 1, 4, 6, 13 to 16). The lever turns on shaft k^2, carrying lever arm k^3, having pawl k^4. The pawl k^4, is placed over the clock escapement, having stop k^5, and permits such stop to turn in one, but not in the other direction. When the stop k^5, rests against the pawl, the spring of the escapement remains under tension. Thus, as

soon as the lever k, is depressed and the lever arm k^3, is raised, the escapement is at once set into action by its spring. This occurs on the turning of disk h, because the tooth k', will then be pressed out of its notch and the lever k, and arm k^3, will be set in motion (Figs. 15 and 16).

The clockwork will cause primarily a motion of the contact lever m. This takes effect because after a few seconds (during which the key has been depressed one or more times) the tooth l^2, of disk l turning a shaft l', will leave the nose n, of lever m, and the latter is by spring p, moved toward the contact pin o, (Figs. 1, 5, 6 and 8).

At the stations that are not to be called up, the lever m will with spring m^2, lie against pin o', whereby these apparati are all disconnected and a direct communication is established through the conducting wires that are attached to the connection L' and L^2. The current will travel over connection L', lever m, spring m^2, pin o', to connection L^2, and to the conducting wires or the earth. At the transmitting and receiving stations however, the telephone or the call is brought into the circuit (Fig. 18). At the transmitting station the depression of key a, will cause simultaneously the depression of a lever q, placed beneath plug a'. The lever q, will be held down by pawl q', against the action of a spring q^2. When the tooth l^2, of disk l, leaves the nose n, of lever m, the latter will with its projection m^4, bear against lever q. Thus lever m, is held in a position, that it can neither go with spring m', to contact o, nor with spring m^2, to contact o' (Fig. 5). The current will therefore travel over lever m, lever q, connected with connection T, (Fig. 20) and over the telephone or call to the ground or back. At the receiving station the making of the contact will, as has been stated, cause the pin h', to come into such a position, that the spring m^3, on lever m, will strike against the pin. Thus the lever m, is also put into a position, that it will, with springs m', m^2, touch neither pin o, nor pin o'. As the disk h, is connected with connection T, the current can travel over lever m, spring m^3, pin h', disk h, connection T, &c. to the receiving instrument or call. The contact between lever m, and lever q, or spring m^3, and pin h', takes place only after a short motion of the clockwork. The current for the call station is now closed as follows: from the key over connection T, lever q, projection m^4, lever m, connection L', to the conducting wires and to the called station, thence over connection L', lever m, spring m^3, nose h', disk h, connection T, to the instrument T', and thence to the call or through the instrument to connection L^2, and thence back or to the earth. The segment g, and disk h, are moved back by nose t', (Figs. 1, 13 to 16) after one revolution of disk t, mounted on shaft l'. This nose moves backward the lever s, having nose s', and held by spring s^2. Thus the lever v, is simultaneously moved in the same direction, in as much as it is connected with lever s, by arm v'. The lever v, carries at its upper end a pin v^2, which strikes against nose g', of the segment and thus the latter is turned slowly out of the position shown in Fig. 15. The pin d', of the armature, does not offer any resistance to this motion, because the teeth of the segment are inclined in that direction (Figs. 2, 10 and 11). After the segment has turned back, the clockwork is again simultaneously stopped. Together with the segment, the disk h, placed on the same shaft, comes back into its primary position, so that the tooth k', of lever k, can fall into the notch. This causes the lever k^3, with its pawl k^4, to drop and stop the escapement. In order to prevent the clockwork from being stopped before the nose t', of disk t, can resume its primary position (Figs. 1, 4 and 13) and can pass the nose s', of lever s, an additional lever arm w, terminating in hook w', is secured to shaft k^2. This hook engages the pin v^2, of lever v, as soon as the latter is moved out of its normal position by nose t' (Figs. 4, 15 and 16) so that the lever w, is held and the lever arm k^3, remains raised, even if the notch in disk h, would permit an engagement with the tooth k'. As soon as the nose t', leaves the lever and the latter is drawn back by spring s^2, the lever v, will resume its normal position and the pin v^2, will leave lever w', so that the lever arm k^3, can fall down by gravity. Immediately before the segment g, or simultaneously therewith, the lever q, comes back into its normal position, because the nose n^3, on shaft l', (Figs. 4 to 6 and 8) will strike against nose n', of pawl q', before the disk has completed its rotation. The nose n^3, will thus draw the pawl back from pin q^3, so that the spring q^2, can push the lever q, back into its normal position.

If the call of the receiving station is not to be acted upon directly by the battery or the induction current, but by a local current, a special contact system having a local battery is used. This consists of spring u, with isolated nose u', and contact screw u^2, (Figs. 1, 3, 4, 6 and 8.) The disk l, carries a pin z, which presses the spring u, against contact disk u^2, after the apparatus has run a short time. This closes the call circuit for about ten seconds. The local current now runs as follows (Fig. 18): from battery to connection W', spring u, contact screw u^2, connection L', lever m, spring m^3, nose h', disk h, connection T, to the call and back to battery.

The circuits are indicated in Figs. 17 to 21. Upon the depression of the key, the current travels as follows (Fig. 20^a): from the battery over connection B, contact c', spring b, pin o, spring m', lever m, connection L', and thence through the following apparati and back through the ground. In those apparati within the circuit in which the spring b, remains in contact with pin c, (Fig. 20^b) the current travels as follows: from connection L', lever m, spring m', pin o, spring b, pin c, electromag-

net d^3, connection L^2, and thence to the ground or to the continuation of the circuit.

At the transmitting apparatus, in which the key is depressed at the telephone or the inductor is revolved (Fig. 19[a]) the current travels as follows: over connection T, disk h, lever q, projection m^4, lever m, connection L', through the wires to the receiving station and there over projection L', lever m, spring m^3, nose h', disk h, connection T, to the telephone. The current passes either over the telephone lever to the alarm, or if the telephone is in use, through the telephone to connection L^2 and thence back or to the ground.

At the stations which are not desired to be connected (Fig. 19[b]) the lever m, makes contact by spring m^2, with pin o'. This disconnects the several apparati and causes a direct connection of the wires secured to the connections L', and L^2, because the current travels over connection L', lever m spring m^2, contact pin o', to the connection L^2, and to the continuation of the circuit or to the ground.

At the receiving station (Fig. 19[c]) in which the lever m, with its projection m^3, makes contact with pin h', of disk h, the current travels as follows: over connection L', lever m, spring m^3, pin h', disk h, connection T, and to the telephone or to the alarm.

The local current travels as follows: from the battery to connection W, spring u, contact u^2, connection L', lever m, spring m^3, nose h', disk h, connection T, to the alarm or back to battery.

An indicator may be employed which shows when the clockwork of an apparatus has run down and which simultaneously cuts off the apparatus, so that the current can continue over the circuit, or with the last apparatus, can return or go to the ground.

What I claim is—

1. The combination of lever m, with the pins o, o', disks h, having nose h', and lever q, with which the lever m, is adapted to make contact, substantially as specified.

2. The combination of key a, having plug a', with lever q, adapted to be depressed by the plug, pawl q', adapted to engage the lever and with contact spring b, contacts c', c, and segment g, substantially as specified.

3. The combination of spring u, with screw pin u^2, disk l, having pin z, and nose l^2, and with lever m, spring m', and contact o, substantially as specified.

4. The combination of lever q with shaft l' having nose n^3, disk l having tooth l^2, lever m having nose n and projection m^4 and with pawl q' having nose n', substantially as specified.

5. The combination of segment g, having nose g', with shaft l', disk t, having nose t', levers s, v, w, pin v^2, notched disk h, lever k, having nose k', and pawl k^4, and with an escapement adapted to be engaged by the pawl, substantially as specified.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOSEPH SACK.

Witnesses:
AUGUST BÜTTNER,
PAUL SHOPPE.