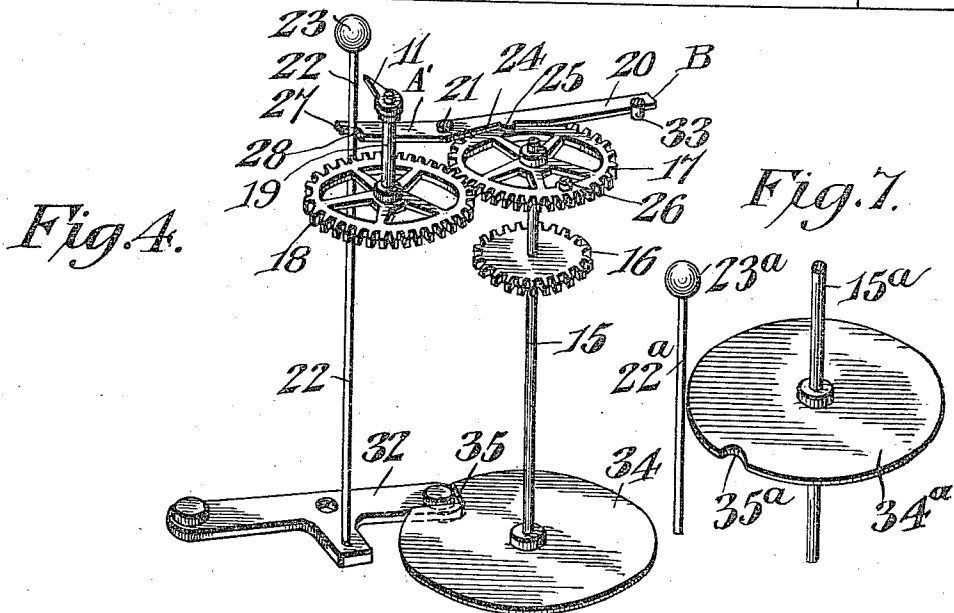
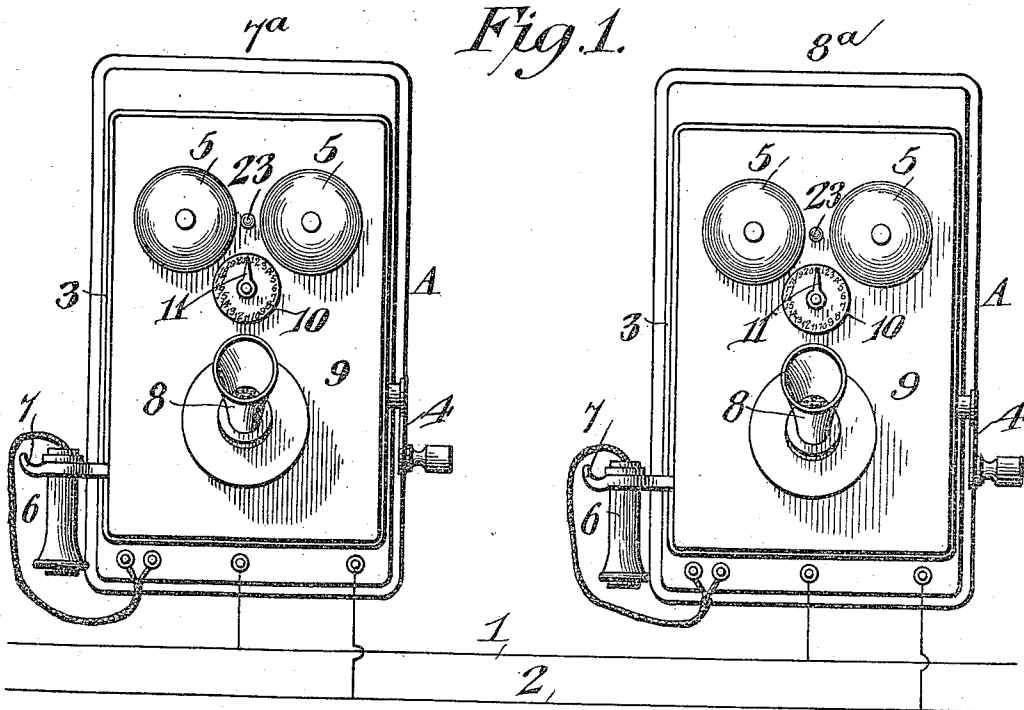


948,941.

Patented Feb. 8, 1910.

3 SHEETS—SHEET 1.



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TELEPHONE CALL SYSTEM.
APPLICATION FILED APR. 27, 1909.

948,941.

Patented Feb. 8, 1910.

3 SHEETS—SHEET 2.

Fig. 2.

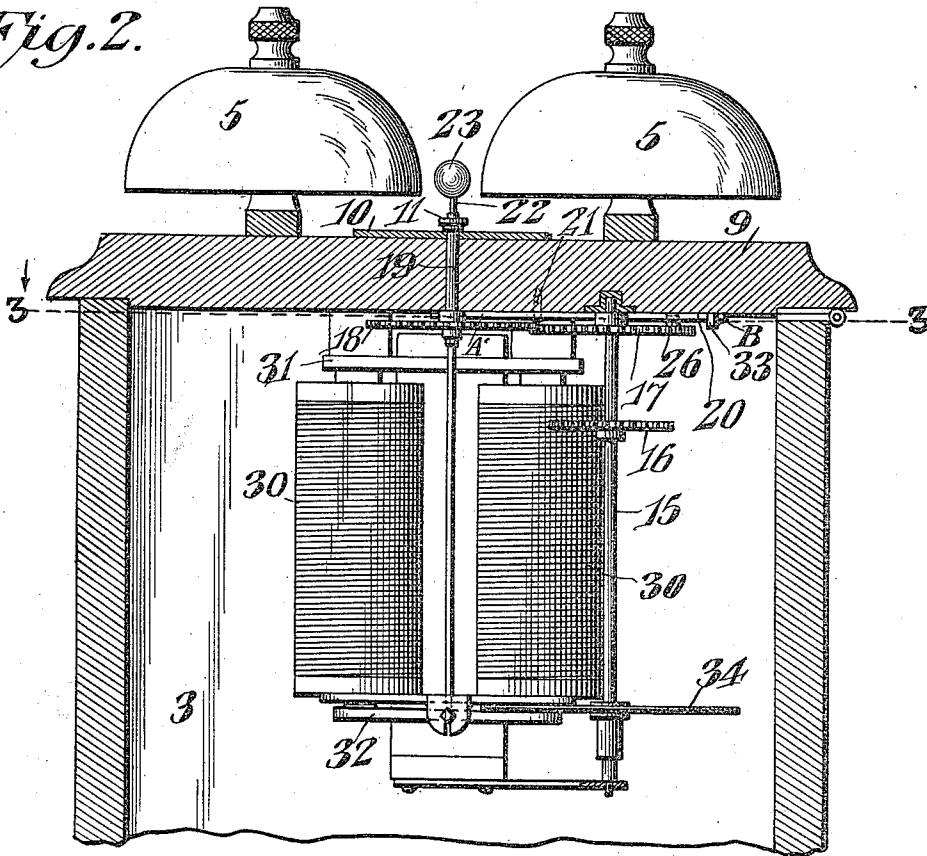
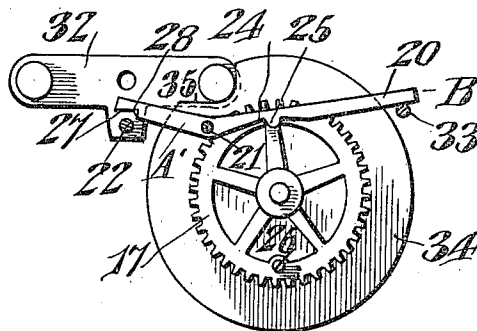


Fig. 6.



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948,941.

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3 SHEETS—SHEET 3.

Fig. 3.

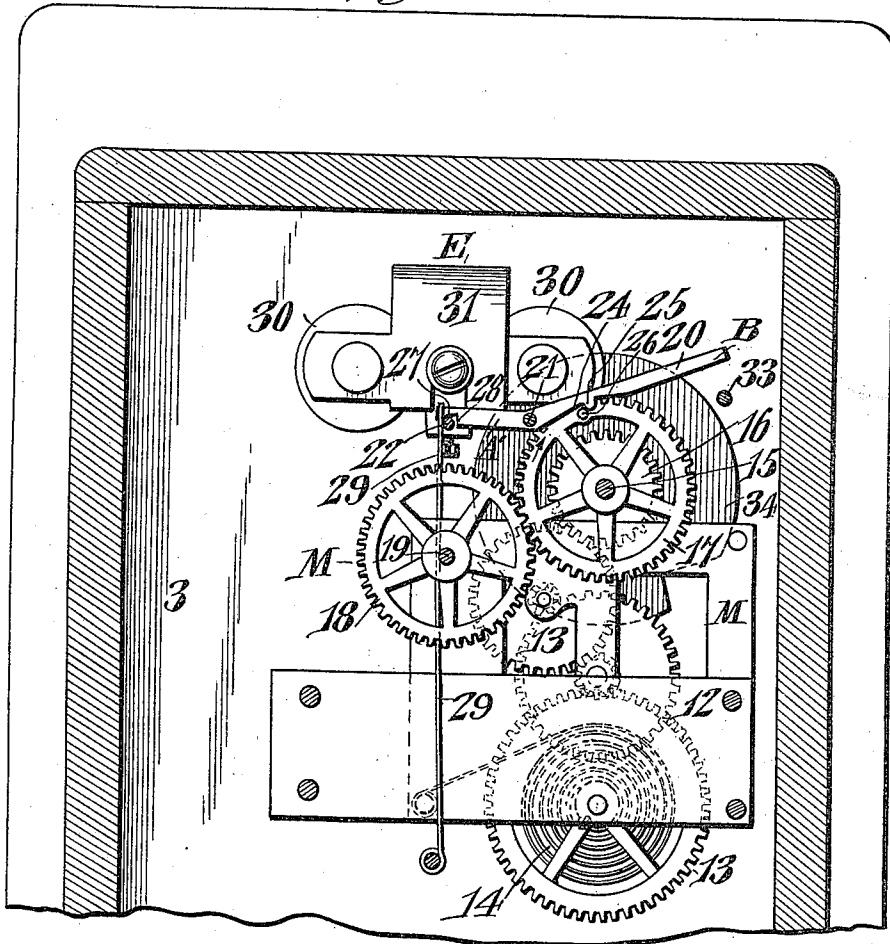
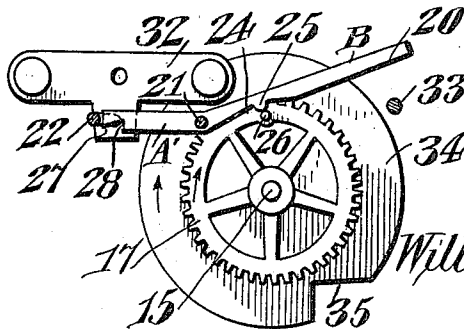


Fig. 5.



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UNITED STATES PATENT OFFICE.

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TELEPHONE CALL SYSTEM.

948,941.

Specification of Letters Patent.

Patented Feb. 8, 1910.

Application filed April 27, 1909. Serial No. 492,474.

To all whom it may concern:

Be it known that I, WILLIAM E. ZABST, a citizen of the United States, residing at Portage, in the county of Columbia and State of Wisconsin, have invented a new and useful Telephone Call System, of which the following is a specification.

This invention relates to a telephone call system intended more especially for party line systems of that type whereby any subscriber can signal to any other subscriber on the line without the intervention of a central exchange operator and without any other than the called subscriber being aware of the signal, the invention consisting in improvements in call mechanisms of the character disclosed in the United States Patent No. 913,607, granted to me February 23, 1909.

The present invention has for its principal objects to provide an extremely simple control mechanism whereby all the ringing signals of all the subscribers' telephone sets, other than those of the calling and called subscribers' are locked out of use so that the likelihood of eaves-dropping is minimized so that only the two subscribers are aware of the fact that the line is busy.

Another object of the invention is the provision of a reliable controlling mechanism including a clockwork mechanism and a single element between one of the wheels thereof and the hammer of the telephone ringer for automatically starting the motor while an initial impulse is sent through the telephone line, and for stopping the motor after a predetermined time allowed for the signal to be given, in combination with a means for preventing the ringer hammer from operating except when the motor has operated a predetermined time to render a given subscriber's apparatus operative.

With these objects in view and others, as will appear as the description proceeds, the invention comprises the various novel features of construction and arrangement of parts which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawings, which illustrate one embodiment of the invention, Figure 1 is a diagrammatic view of a telephone system showing two telephone sets in elevation connected therewith. Fig. 2 is a horizontal section taken through one of the telephone sets. Fig. 3 is a fragmentary section on line 3—3, Fig. 2. Fig. 4 is a per-

spective view of the motor-stopping device and ringer damper disk. Figs. 5 and 6 are detail sectional views showing the different positions of the brake lever for the motor. Fig. 7 is a fragmentary perspective view of a modified form of controller for the ringer hammer.

Similar reference characters are employed to designate corresponding parts throughout the views.

Referring to Fig. 1 of the drawings, 1 and 2 designate the line wires of the telephone system, to which are connected the telephone subscribers' telephones A, there being any desired number of telephones in the party line and each subscriber having his telephone designated by proper number, and it may be assumed that the telephones shown are numbered 7^a and 8^a, respectively. Each telephone set consists of a box 3 containing the usual magneto operated by a crank 4, and also the electro-magnet for operating the hammer for the bells 5. The receiver 6 is mounted on the usual switch-fork 7 projecting from the side of the box, and the transmitter 8 is arranged on the door 9 of the box, the various circuit connections being arranged in the usual manner.

Arranged on the front of the door 9 is a dial 10 of a calling selective device having numbers corresponding to the numbers of the various subscribers on the line, and movable over this dial is an index hand 11 which normally assumes a zero position and is adapted to turn during the act of calling a subscriber to enable the calling subscriber to know when the system is in proper condition for signaling to the subscriber desired.

Arranged within the box 3 and supported on the inner face of the door is a motor M of the clockworks type, which drives the index hand 11. This motor comprises a frame 12 secured to the door and having a train of gears 13 driven by a coil spring 14. The clockworks includes a shaft 15 which is provided with a gear wheel 16 meshing with one of the gears 13, and on this shaft 15 is a brake wheel 17 having gear teeth meshing with a gear wheel 18 on the shaft 19 that carries the index hand 11. Coöperating with the brake wheel 17 is a gravity-actuated controlling lever 20 fulcrumed at 21 on the door of the telephone box. This lever is provided with short and long arms A' and B, respectively, the latter overbalancing the former. The short arm is adapted to engage

the stem 22 of the bell hammer 23, so that the said stem will serve as a means for locking the lever 20 in position to hold the motor normally idle. The long arm B of the controlling lever has a recess 24 forming a lug or shoulder 25 with which a pin 26 on the brake wheel is adapted to engage to prevent rotation of the brake wheel when the mechanism is not in use, thereby preventing the spring from uselessly loosening its tension. The short arm of the lever is provided with a notch 27 to receive the stem 22 of the bell hammer, and this notch provides a shoulder 28 against which the bell hammer is normally held by the returning spring 29 therefor. The bell hammer is operated by the usual electro-magnet E having the spools 30, permanent magnet 31, and pivoted armature 32, to which the hammer stem is connected.

Normally, the parts are in the position shown in Fig. 3, which represents that the brake or controlling lever is holding the motor idle while the index hand 11 is in zero position. Obviously, all the clock mechanisms of the various telephones on the line will be in the same condition, and as soon as any subscriber desires to call another, he sends an initial current impulse through the line by a turn of the magneto crank. In doing this, each bell electromagnet is energized and the first movement of the armature is in such direction as to remove the hammer stem 22 from under the short arm A' of the brake lever 20, so that the latter will be moved to the position shown in Fig. 5. That is to say, as soon as the hammer 23 moves to the left from the position shown in Fig. 3, the longer arm of the brake lever will be forced upwardly by the cam action between the pin 26 and the projection or abutment 25 of the brake lever, it being understood that the brake wheel constantly tends to rotate in a clockwise direction, by virtue of the clockworks spring 14. It will thus be seen that the brake lever has released the motor mechanism, so that the train of gears will operate to turn the hand 11 on the calling selective device. As soon as the hand reaches the number of the subscriber to be called, the calling subscriber vigorously operates his magneto crank so as to send an impulse through the line to operate the bells or signals. The brake lever does not interfere with the ringing of the bell, for the reason that it is only momentarily in the position shown in Fig. 5, because as soon as the pin 26 passes under the abutment 25, the lever will gravitate to the position shown in Fig. 6, so that the shorter arm will be out of the path of the bell hammer stem. The lever is held in released position in coöperative relation with the projection 26, so that as soon as the brake wheel makes one revolution the lever will auto-

matically arrest the movement of the motor, and for this purpose, a stop 33 is provided on the door 9 to be engaged by the long arm of the lever as it swings down by gravity.

In order to prevent the bells of the subscribers' telephones, other than those of the calling and called subscribers, from being actuated, the shaft 15 of each calling mechanism is provided with a lock-out device or damper which is in the form of a disk 34 rigidly secured to the shaft 15, as shown clearly in Fig. 4, and this disk is of such thickness as to freely pass between one end of the electromagnet armature 32 and the adjacent pole face of the electromagnet core, and there is sufficient clearance to provide for the initial movement of the armature to release the hammer stem from the brake lever 20 for the starting of the motor, but the movement of the armature will not be sufficient to permit the hammer 23 to strike the bells 5. Each disk 34 has a peripheral notch 35 which permits the complete actuation of the armature when the notch aligns with the extremity thereof. The notches 35 of the disks 34 in the various telephone call mechanisms will be relatively displaced around the peripheries of the disks according to their respective numbers, so that the notches of no two disks will ever register with their armatures at the same time. The notches will be so related to the index hands 11 of the various calling mechanisms that when the index of any given subscriber's telephone is opposite that subscriber's number, the notch of the disk 34 will be aligning with the armature, so that the latter will be free to operate and effect the ringing of the bell.

To illustrate the operation, let it be assumed that the subscriber 7^a desires to call the subscriber 8^a. The subscriber 7^a operates his magneto crank to send an impulse through the line to thereby cause the bell hammers to release the brake levers. Thereupon, all the motors begin to operate, and the index hands 11 of all the telephones turn over their respective dials. As soon as the calling subscriber sees the index hand reach the number 8, which is the designation of the subscriber he wishes to call, he again turns the crank several times to send a strong impulse through the line. As the disk 34 in the call mechanism of the subscriber's telephone 8^a is the only one that has its notch 35 aligning with the armature, it is obvious that the call bell of number 8^a telephone will be actuated, all the other call bells being locked out for the time being. After a signal is thus given, the motors of the various telephones continue to operate until the index hands make a complete revolution, when the brakes automatically set. If the call is not answered for any reason, a second signal can be sent in the same manner as above de-

scribed, and no subscriber will be aware of a signal being given except the calling and called subscribers.

In the modification shown in Fig. 7, the means for controlling the operation of the ringer hammer consists of a disk 34^a which is mounted on the brake wheel carrying shaft 15^a in such a position that the periphery of the disk is in close proximity to the stem 22^a of the ringer hammer 23^a, so that the hammer will have sufficient initial movement to release the brake lever, and in the periphery of the disk is a notch 35^a so positioned that when it is opposite the ringer hammer, the latter can operate through its full range for sounding the ringer. In other words, the disk 34^a is intended to operate directly on the hammer stem, instead of indirectly, as in the preferred construction where the disk is interposed between the electro-magnet and armature for the ringer.

From the foregoing description, taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the apparatus which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims appended hereto.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In a call mechanism for telephone systems, the combination of a signal member, a motor, and a pivoted brake lever normally engaging the signal member and held thereby in position to brake the motor and arranged to gravitate out of coöperative relation with said member after the motor starts to permit free operation of the member.

2. In a call mechanism for telephone systems, the combination of a vibratory signal member, means for yieldingly holding the signal member in a definite position, a motor having a brake wheel, and a single element normally maintained by the member in engagement with the brake wheel.

3. In a call mechanism for telephone systems, a spring-pressed vibratory signal member, a motor including a brake wheel, a brake lever normally engaged by the member and held engaged with the wheel, and means for operating the signal member to release the lever and thereby automatically release the lever from the brake wheel.

4. In a call mechanism for telephone systems, the combination of a vibratory signal member, a spring for biasing the same, an electro-magnet operating the member, a mo-

tor, an indicating means operated by the motor, a brake lever normally engaging the signal member and motor for holding the latter idle, and means for permitting an initial movement of the signal member to release the lever without giving the signal and for permitting full operation of the signal member after the motor has operated a predetermined time.

5. In a call mechanism for telephone systems, the combination of a signal member, an electro-magnet having an armature to which the signal member is connected, a rotary disk movable over the armature for permitting a limited initial movement thereof without causing a signal and having a notch for permitting the armature to fully actuate when the notch aligns therewith, an indicating means for showing when the notch is aligned with the armature, a shaft on which the disk is mounted, a brake wheel driven by the shaft, and a brake device releasably held by the signal member in engagement with the brake wheel.

6. In a call mechanism for telephone systems, the combination of an electro-magnetically operated signal member, an electro-magnet for actuating the same including a core and armature, said member being connected with the armature, a rotatable element arranged to engage one end of the armature to limit the movement of the latter and member except when the element has reached a predetermined position, a motor operatively connected with the element for driving the same, an indicating device driven by the motor in synchronism with the said element, and a brake lever normally engaging the member and released by the initial movement thereof to control the motor.

7. In a call mechanism for telephone systems, the combination of an electro-magnetically operated signal, a rotary element arranged to control the extent of movement of the member, a shaft carrying the element, a brake wheel carried by the shaft, a motor driving the shaft, an indicating device driven by the shaft for showing when the member is capable of full movement, and a lever arranged to gravitate to released position and normally directly engaging the signal member and brake wheel and adapted for holding the motor idle and to release the brake wheel upon the initial movement of the signal member.

8. In a call mechanism for telephone systems, the combination of a vibratory signal element, a motor-driven device for controlling the extent of movement thereof, an indicating means for showing when the signal means is capable of a definite movement, operating connections between the said means and device, a motor, and a single element between the signal means and motor for holding the latter normally idle and

automatically released first from the signal member and then from the motor.

9. In a call mechanism for telephone systems, the combination of a vibratory signal member, an electro-magnet having an armature connected with the member, a notched disk disposed in coöperative relation with the armature for controlling the extent of movement of the member, a shaft carrying the disk, a brake wheel on the shaft, an indicating means driven by the shaft and showing the position of the disk, a lever having an abutment at one side of its fulcrum and a recess at the opposite side, said recess being arranged to releasably receive the signal member, an abutment on the brake wheel for engaging the lever to arrest the movement of the lever, and a stop for holding the lever in coöperative relation with the abutment on the brake wheel when the lever is released from the signal member.

10. In a call mechanism for telephone sys-

tems, the combination of an electro-magnetically operated signal member, an element for controlling the extent of movement of the member, a motor driving the element and having a brake wheel, an indicating means driven by the motor for showing the position of the said element, a lever tending to gravitate to released position, engaging abutments on the lever and brake wheel, and a spring pressing on the signal member for releasably holding the same in position to maintain the lever in braking position with the said abutments engaging each other.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WILLIAM EDWARD ZABST.

Witnesses:

A. ZIENERT,
J. E. HEATH.