W. E. ZABST.

PARTY LINE TELEPHONE CALL MECHANISM.

APPLICATION FILED APR. 21, 1909.

958,847. Patented May 24, 1910.

3 SHEETS—SHEET 1.

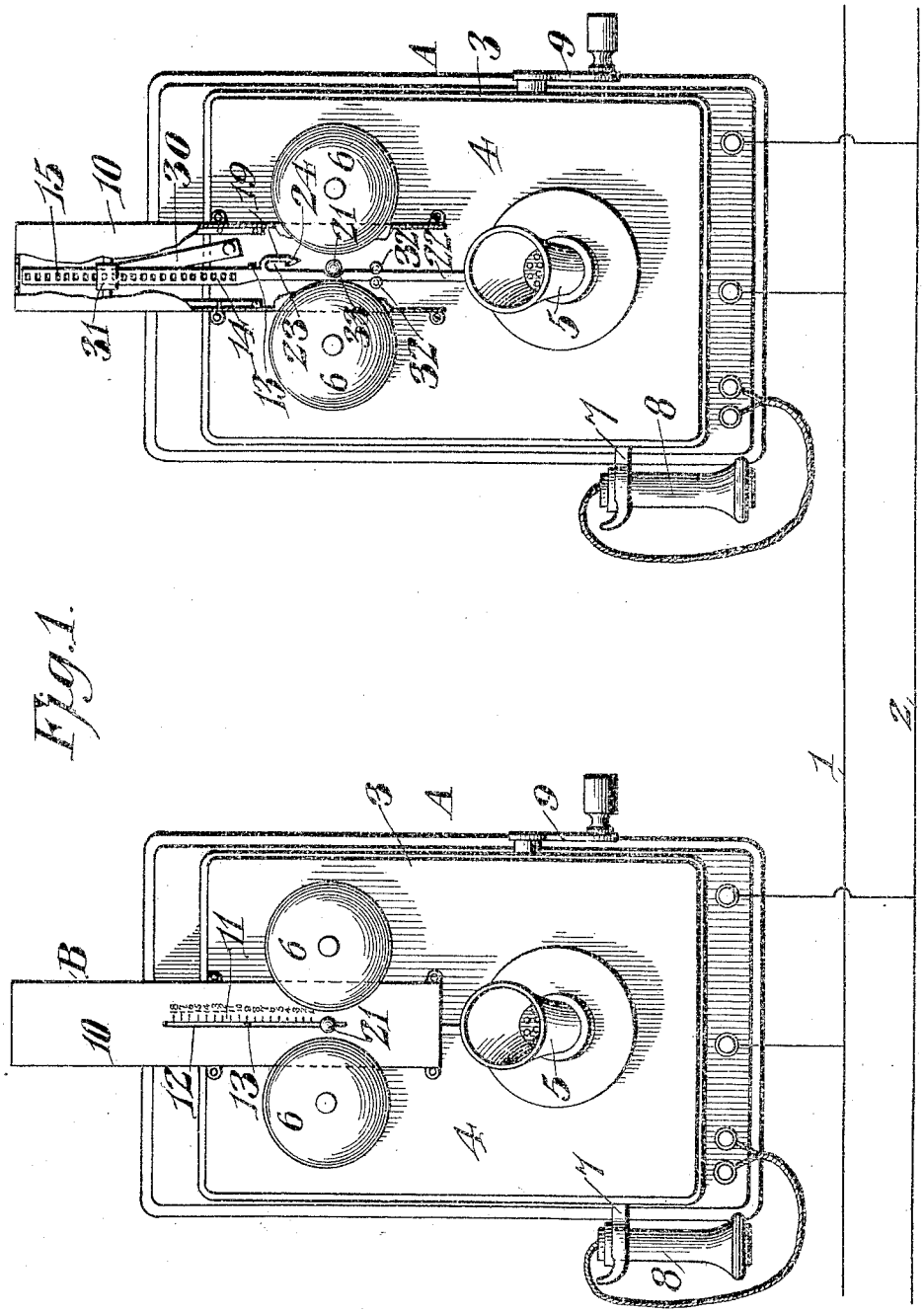

Fig. 1.

Witnesses

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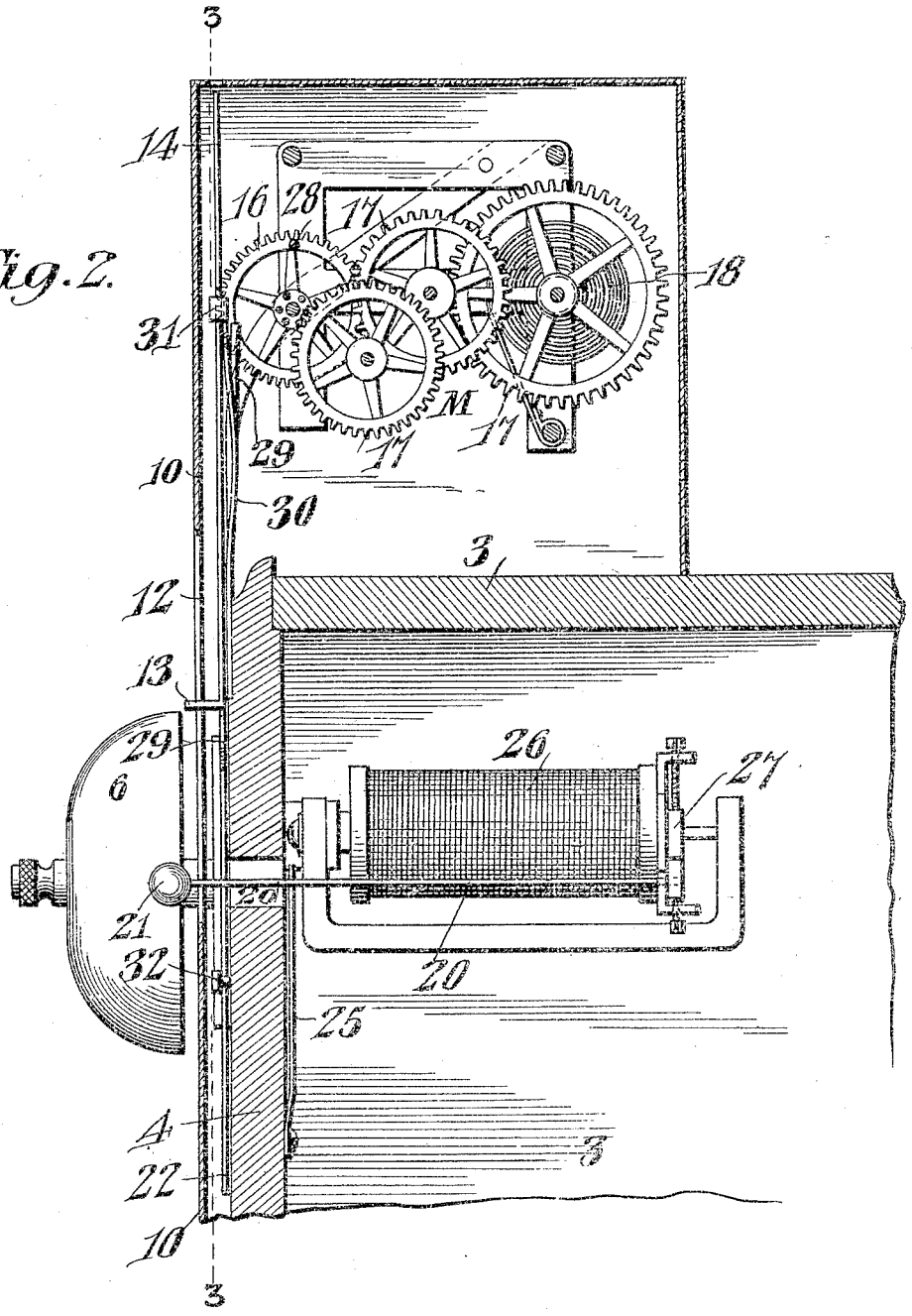
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

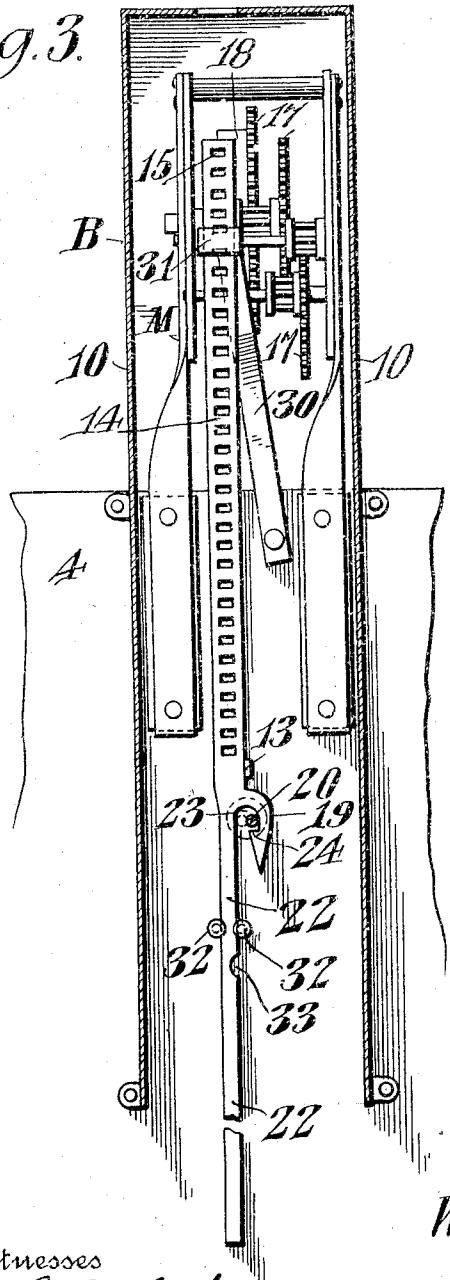


Fig. 4.

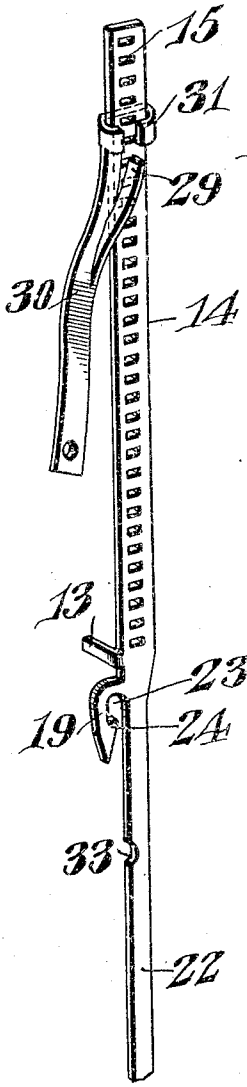
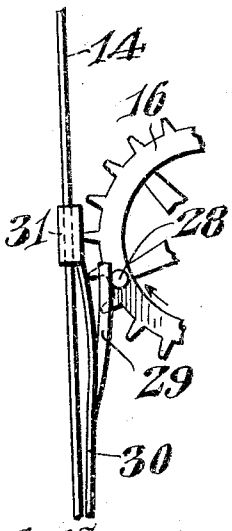


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM EDWARD ZABST, OF PORTAGE, WISCONSIN.

PARTY-LINE-TELEPHONE CALL MECHANISM.

958,847. Specification of Letters Patent. **Patented May 24, 1910.**

Application filed April 21, 1909. Serial No. 491,227.

To all whom it may concern:

Be it known that I, WILLIAM EDWARD 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 Party-Line-Telephone Call Mechanism, of which the following is a specification.

This invention relates to party line telephone call mechanisms of that character disclosed in the United States Patent No. 913,607, granted to me February 23, 1908, whereby a subscriber of the telephone system can call any other subscriber without the remaining subscribers of the telephone system becoming aware of the fact.

The invention has for one of its objects to improve and simplify the construction and operation of mechanisms of this character so as to be comparatively simple and inexpensive to manufacture, reliable and efficient in use, and composed of comparatively few parts.

Another object of the invention is the provision of a selective call mechanism which is in the nature of an attachment so designed that it can be applied to any ordinary telephone set without requiring any alteration therein.

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 showing two subscribers' telephone sets connected therewith, part of one of the call mechanisms being broken away. Fig. 2 is a central vertical section of the mechanism shown in applied position. Fig. 3 is a vertical section on line 3—3, Fig. 2. Fig. 4 is a perspective view of the combined brake device and selective call indicator. Fig. 5 is a detail sectional view showing the operative relation of the brake device with the brake wheel of the motor.

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

Referring to the drawings, and more particularly to Fig. 1, 1 and 2 designate the line wires of the telephone system across which are bridged the various subscribers' telephone sets designated generally by A, two subscribers' sets being shown in the present instance, although it is to be understood that any desired number may be employed. Each telephone set comprises a box 3 containing the ringing magneto, bell-operating electro-magnet, ringing and talking circuit switch, and other parts necessary to provide a complete working outfit. The box 3 has the usual door 4 that carries the transmitter 5 and signaling bells 6, and projecting from one side of the box is the usual switch fork 7 that supports the receiver 8, and at the opposite side of the box is the magneto-operating crank 9.

The selective call mechanism is designated generally by B and is constructed in the form of an attachment which is adapted to be supported on the door of a telephone box. This attachment comprises a dust-excluding and protective casing 10 of any approved construction, arranged over the telephone box and containing a motor M in the form of a clockworks. The casing is provided with a depending portion extending over the front of the door 4 and suitably secured thereto. This depending portion has an index 11 consisting of the numbers of the various subscribers of the system, the index being arranged along a vertical slot 12 in which moves an index hand 13. This index hand is carried by a rack-bar 14 vertically disposed in the casing 10 and having teeth 15 that mesh with a toothed brake wheel 16 of the motor mechanism, which wheel is driven by a train of gears 17 propelled by a coiled spring 18. The speed of the gears of the motor mechanism is controlled by any suitable governor commonly employed in spring-driven clockwork mechanisms, such for instance as an escapement. The brake wheel 16, Fig. 2, turns in a clockwise direction so that the index hand will move upwardly along with the index when the motor mechanism is operated. This rack-bar, besides serving as a movable index, constitutes a brake device for the motor, and for this purpose, the rack-bar is formed with a depending hook 19 which is adapted to engage the stem 20 of the hammer 21 for the signal

bells 6, and when the hook is engaged with this hammer, the rack-bar is prevented from moving upwardly so as to thereby arrest the operation of the motor. The rack-bar is provided with a depending extension or stem 22, the upper portion of which cooperates with the hook 19 to form a recess 23 for receiving the stem of the bell hammer, and the bill of the hook 19 is pointed to freely guide the hammer stem into the recess, there being a shoulder 24 located inwardly from the point of the bill to interlock with the stem of the hammer. As shown in Fig. 2, the hammer is biased in one direction by a spring 25, and the shoulder 24 of the hook is so arranged that this spring 25 will maintain the hammer stem interlocked with the shoulder.

Arranged within the casing or box 3 and carried by the door 4 thereof, is the usual electro-magnet 26 for the signal bells, and attached in the usual manner to the armature 27 of the electro-magnet is the hammer stem 20. When the parts are in zero position and the motor idle, the hammer stem is interlocked with the hook of the brake device of the motor. In order to release the brake, an initial current impulse is sent through the line to thereby energize the electro-magnet and move the hammer against the tension of the spring 25, thereby releasing the hammer stem from the shoulder 24 of the hook. The brake device being thus released, permits the motor to operate. After the motor has raised the rack bar as far as it will go, the rack-bar is adapted to be automatically released to drop to normal locking position by gravity. The rack-bar is released by a pin 28 on the brake wheel 16 of the motor, which engages a finger or cam 29 disposed behind the rack-bar to throw the rack-bar forwardly against the tension of the leaf spring 30, thereby releasing the rack-bar teeth from the teeth of the wheel 16 to permit the rack-bar to drop by gravity. The spring 30 has its lower end secured to the telephone box and its upper end formed into a collar 31 to constitute a guide for the upper end of the rack-bar, and this spring normally holds the rack-bar in engagement with the toothed brake wheel 16. The lower end of the rack-bar is guided between two pins or equivalent means 32 on the door 4 at opposite sides of the depending extension or stem 22 of the rack-bar. The extension 22 constitutes means for locking out the bells at all times except when the rack-bar is in a predetermined position. The extension 22 has a notch 33 which permits the hammer to freely operate when the said notch is opposite the stem of the hammer. These notches 33 are differently positioned in the various telephones, so that at no time will the notches of two telephone call systems be opposite their respective hammer stems. In other words, the notch of any given call mechanism is so related to the index hand 13 thereof that when this hand is opposite the telephone designating number on the index, the notch will be in line with the hammer so as to permit the bells of such telephone to be actuated, while the bells of all the other telephones will be locked out.

In practice, when the telephone system is idle, the various motors of the call mechanisms are locked by the respective brake devices, each device being in the position shown in Fig. 3, with the bell hammer engaged with the hook 19. When, for instance, any subscriber desires to call subscriber number 9, he turns the magneto crank 9 to send an initial current impulse through the system. This energizes the electro-magnets of all the signal bells, so that the stems of the hammers thereof will be moved to the dotted line position, Fig. 3, to permit the rack-bars to be moved upwardly by the motors. The hammers, however, are prevented from having full movement by the portions 22 of the rack-bars, so that the bells will not be sounded. The calling subscriber observes the movement of the index hand 13 upwardly along the index 11, and as soon as the index reaches the point opposite the telephone designated number of the subscriber to be called, he again operates the magneto crank to send an impulse to operate the bells of subscriber No. 9, the hammer of such bells being free to move to its full extent by reason of the fact that the notch 33 is in line with the stem of the hammer when the index hand reaches the number 9. It will thus be seen that only the subscriber desired will be called and the bells of all the other telephones will be locked out of use. The motors continue operating until the rack bars are released, after the index hands have reached the upper ends of the indexes, by the pins 28 of the brake wheels striking the fingers 29. Each rack bar is then permitted to drop, and in doing so, the pointed end of its hook 19 will engage the stem of the hammer and move the stem laterally against the tension of its spring 25 as the hammer enters the recess 23, and as soon as the hook passes the hammer, the same will move laterally by the spring 25 so as to interlock behind the shoulder 24. The pin 28 passes off the finger 29 after the hook 19 engages the hammer stem, and thereupon, the spring 30 moves the rack-bar into engagement with the wheel 19, so that the wheel will be prevented from turning, since the bell hammer holds the rack-bar against movement. Since the brake wheel cannot turn, obviously, the motor is stopped so that the driving spring will not uselessly lose its tension.

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 an apparatus of the class described, the combination of a motor, a movable member normally engaged with and normally subjected to a pull by the motor, and a bell mechanism including a hammer normally engaged with the member to oppose the pull of the motor and having its movement restricted by the member when the latter is in normal position and unrestricted when the member is in a predetermined position.

2. In an apparatus of the class described, the combination of a motor including an element subjected to an impelling force, a member normally engaged with the element to move therewith to a predetermined position, means for automatically releasing the member from the element, and a bell hammer normally engaged with the member to act through the same to prevent movement of the element and adapted to be released from the member to permit the same to move to a position where the hammer can be operated.

3. In an apparatus of the class described, the combination of a motor, a member moved by the motor, a bell hammer normally engaged with the member and free therefrom during operation of the motor for moving the member to a predetermined position to permit the hammer to operate, and an electro-magnet arranged to operate only on the hammer to initially disengage the same from the member and operate the hammer when the member is in said predetermined position.

4. In a system of the class described, the combination of a signal device having a movable member, a motor, and a single element initially engaged with the member to prevent movement of the element for holding the motor idle and adapted when released to permit the motor to operate, said element permitting the member to operate when the element is moved to a predetermined position by the motor.

5. In a system of the class described, the combination of a signal device including a movable element, a motor, and a single element operatively connected with the motor for constituting a brake therefor and having means forming a controller for the movable member, said element having an indicator for showing when the member is in position to permit the signal device to fully operate.

6. In an apparatus of the class described, the combination of a motor, a member moved continuously by the motor a given distance, means for releasing the member from the motor after the member traverses such distance, a bell hammer normally engaged with the member to prevent movement of the same and motor, means for disengaging the hammer from the member to permit the same to move to position where the hammer can operate, and means for engaging the member with the motor after the member reaches the end of its return movement and reëngages with the hammer.

7. In an apparatus of the class described, the combination of a motor, a member normally engaged therewith, and automatically disengaged therefrom at the end of the movement of the member in one direction, and an electro-magnetically operated bell hammer normally engaged with the member to operate therethrough for preventing movement of the motor, and with which the member reëngages at the time it reëngages with the motor, said member serving to control the time for operating the hammer.

8. In a system of the class described, the combination of a vibratory element, a motor, a reciprocatory member moved longitudinally in one direction by the motor and rendering the vibratory element inoperative except when a predetermined position is reached, means for releasing the member from the motor to permit the member to return to normal position by gravity, and means for automatically engaging the member with the motor after the member reaches its normal position.

9. In a system of the class described, the combination of an electro-magnetically operated signal member, a motor including a toothed wheel, and a rack-bar normally engaging the toothed wheel and with the member only when the motor is idle, whereby the member opposes the pull of the motor, said bar permitting a partial movement of the member to release the bar to permit full operation of the member when the rack-bar is in predetermined position.

10. In a system of the class described, the combination of a movable signal member, a motor including a toothed wheel, a rack-bar normally engaging the toothed wheel and preventing operation of the member except when the rack-bar is in predetermined position, and means for automatically releasing the rack-bar from the wheel to permit the rack-bar to return automatically to normal position.

11. The combination of a movable mem-

ber, a motor including a toothed wheel, a rack-bar releasably engaging the toothed wheel and normally engaged with the member for preventing the motor from moving the rack-bar, means movable with the rack bar for preventing the full movement of the member except when the rack-bar is in a predetermined position, and means for indicating when the rack-bar is in such predetermined position.

12. The combination of a movable member, a motor including a toothed wheel, a rack-bar releasably engaging the toothed wheel and normally engaged with the member for preventing the motor from moving the rack bar, means movable with the rack bar for preventing the full movement of the member except when the rack-bar is in a predetermined position, means for indicating when the rack-bar is in such predetermined position, and means controlled by the motor for automatically releasing the rack-bar from the said wheel.

13. The combination of a signal member yieldingly held in one position, a motor including a toothed wheel, a rack-bar normally engaging the toothed wheel and the said member and preventing full movement of the said member except when the rack-bar is in a predetermined position, and means for yieldingly holding the rack-bar engaged with the toothed wheel and automatically actuated to release the rack-bar for permitting the latter to return to normal position and automatically engage the said member.

14. In a system of the class described, the combination of a vibratory signal member, a motor mechanism including a rotatable element, a reciprocatory bar releasably engaging the element to be moved in one direction thereby and coacting with the member to permit operation thereof when the bar is in a predetermined position, means for yieldingly holding the bar in engagement with the element, a device acting in opposition to the said means for releasing the bar when the element has moved a predetermined distance, and an indicating means showing when the said member is in operative condition.

15. In a system of the class described, the combination with a signal member, a motor having a toothed wheel, a rack-bar meshing with the toothed wheel movable along the member and having a notch for permitting the member to fully operate when the bar is in a predetermined position, said rack-bar having means for releasably engaging the member for preventing the motor from operating, and means for releasing the rack-bar from the said toothed wheel to permit the rack-bar to return to normal position.

16. In a system of the class described, the combination of a motor, a vertically-movable element operatively associated therewith having an abutment, a vibratory signal member normally engaging the abutment for arresting the motion of the motor and prevented from full operation by the element except when the latter reaches a predetermined position, and a device for indicating said predetermined position of the element.

17. In a system of the class described, the combination of a vibratory signal member, a movable element having a shouldered hook with which the member releasably engages and having an index hand and also a notch for permitting the member to have full operation, a motor normally tending to operate the element while the member is engaged with the shouldered hook, and an index with which the finger coöperates for indicating when the notch is opposite the member, said hook being so arranged as to automatically interlock with the member upon the return movement of the element.

18. In a system of the class described, the combination of a vibratory signal member, a motor, a rack-bar movable in one direction by the motor and in the opposite direction by gravity, said rack-bar having a shouldered hook with which the member is releasably engaged, an index hand carried by the rack-bar, an index on which the hand moves to indicate the position for permitting operation of the signal member, means for yieldingly holding the rack-bar in engagement with the motor, and means operated by the motor for releasing the rack-bar to permit the same to return to normal position and to automatically engage the said hook with the signal member.

19. In a system of the class described, the combination of a signal member, a rack-bar movable along the member for controlling the movement thereof and having a shouldered hook with which the member is normally releasably engaged and also provided with an index hand, a motor having a toothed wheel meshing with the rack-bar and prevented from operating when the shouldered hook is engaged with the signal member, a spring forming a guide for the rack-bar and releasably holding the same in engagement with the toothed wheel, a cam arranged to disengage the rack-bar from the wheel against the action of the spring, and means moved by the motor for engaging the cam.

20. In a system of the class described, the combination of a motor having a toothed wheel, a rack-bar meshing therewith, a pin on the wheel, means with which the pin engages once in every revolution for releasing the rack-bar for permitting the latter to return to normal position, such rack-bar being automatically reëngaged with the toothed

wheel upon reaching its normal position, and a signal member controlled by the movement of the rack-bar.

21. In a system of the class described, the combination of a motor having a toothed wheel, a rack-bar engaging the wheel, a spring normally holding the rack-bar in engagement with the wheel, a cam carried by the spring, means driven by the motor for engaging the cam to release the rack-bar from the wheel, and a vibratory signal member controlled by the rack-bar and normally engaged therewith for preventing movement of the rack-bar and thereby holding the motor idle.

22. In a system of the class described, the combination of a motor having a toothed wheel, a vertically-disposed rack-bar, means for yieldingly holding the rack-bar in engagement with the wheel to be raised thereby, means for releasing the rack-bar from the wheel to permit the rack-bar to gravitate to normal position, said rack-bar having a recess open at its bottom and formed with a shoulder, and a spring-pressed signal member controlled by the rack-bar and arranged to be entered in the recess and engaged with the shoulder automatically as the rack-bar drops to thereby form the rack-bar into a brake for the motor.

23. In a system of the class described, the combination of a motor, a rack-bar moved in one direction by the motor and adapted to return in an opposite direction automatically, a downwardly extending hook arranged at one side of the rack-bar and provided with a shoulder, a vibratory member disposed horizontally and movable transversely to the direction of movement of the rack-bar to engage and disengage the shoulder, and means carried by the rack-bar for controlling the extent of movement of the signal member.

24. The combination with a telephone set having a signal member, an attachment controlling the operation of the member, said attachment including a motor, and a single element normally releasably engaged with the member to prevent operation of the motor and released by the initial movement of the member for controlling the full operation of the member.

25. An attachment for telephones comprising means for mounting the attachment on the telephone, a motor, and a single element having a movement of translation produced by the motor and operatively connected with the signal member of the telephone only when the motor is idle to normally prevent the latter from operating and determining the time when the signal member can operate after the motor starts.

26. An attachment for telephones comprising a casing having a slot, an index along the slot, a motor in the casing, and a device within the casing constituting a brake for the motor and normally engaged with and prevented from movement by the signal element of the telephone and released from the element only by an initial limited movement thereof for controlling the operation thereof and including an index hand movable along the slot and coöperating with the index to determine the position when the signal element is in operative condition.

27. A telephone comprising a support, and a signal mounted on the support and including an electro-magnetically-operated vibratory member, with a selective call attachment mounted on the support and including a motor, an element movable by the motor along the member to control the same and normally engaged with the member for preventing the motor from operating, said member having an initial movement less than its full operative movement for releasing the element to permit the motor to operate, and indicating means for showing by the position of the element when the member is capable of full operation.

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:
WALT M. BAILEY,
B. E. WAIT.