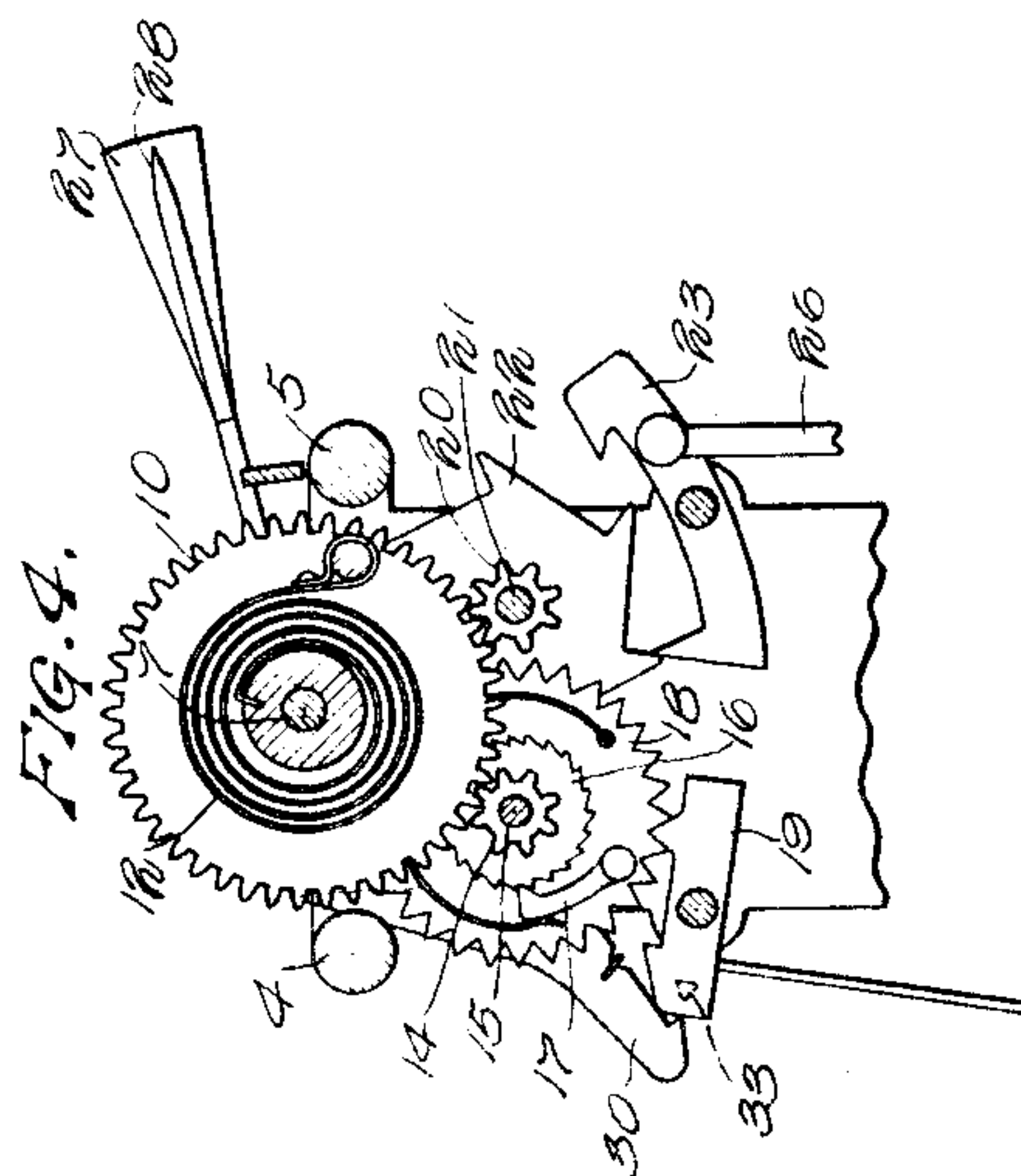
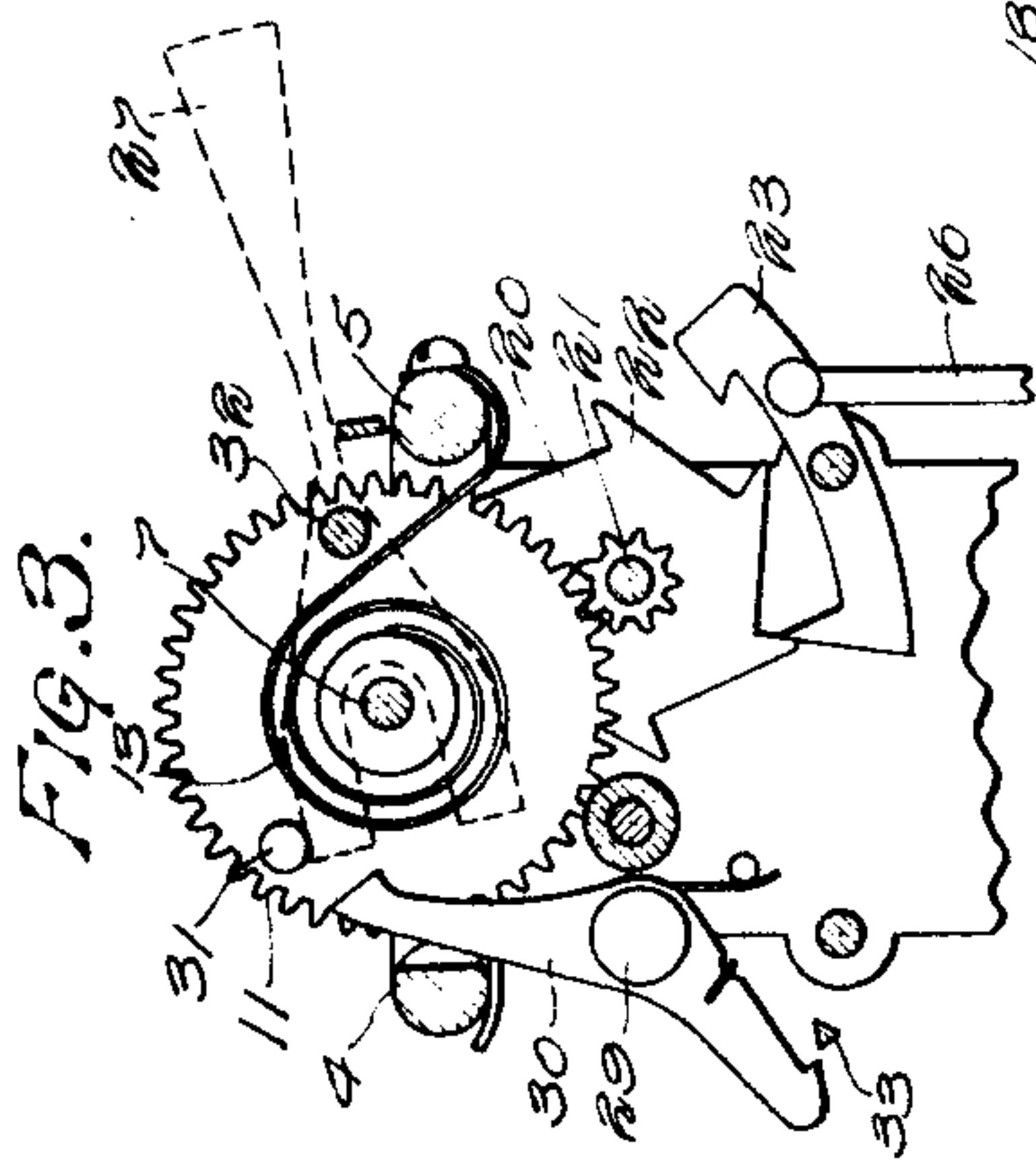


1,112,994.



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SPEED-INDICATOR FOR CALLING DEVICES.

1,112,994.

Specification of Letters Patent.

Patented Oct. 6, 1914.

Application filed October 30, 1911. Serial No. 657,594.

To all whom it may concern:

Be it known that I, JOHN ERICKSON, a citizen of the United States of America, and resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Speed-Indicators for Calling Devices, of which the following is a specification.

My invention relates to a speed indicator for calling devices—that is, to a mechanism for indicating when a calling device for an automatic telephone system is operated at the proper speed.

It is very essential to the successful operation of automatic switches in an automatic telephone system, especially those known as the two-wire type—that is, switches which are controlled over a metallic line circuit—that the calling device should operate at the proper speed so as not to transmit the impulses which operate the switch either too fast or too slow. In order to control the speed, the calling device is provided with an adjustable governor, which governor must be adjusted so that the calling devices will run at the proper speed. Heretofore, the one adjusting the calling device has had to depend merely upon his own judgment to determine when the calling device was properly adjusted. The usual manner was to connect the calling device with an automatic switch, and by observing the operation of this switch when the calling device was operated to decide whether or not the adjustment was correct.

My present invention relates to a device by means of which the adjuster can determine absolutely when the calling device is adjusted to operate at the proper speed, and comprises an indicating mechanism which will indicate when the calling device is operating at a correct speed, and will also indicate how much too slow or too fast the calling device is operating.

While I have illustrated my invention as being particularly adapted for use in connection with calling devices of an automatic telephone system, it will be readily understood that my invention is not limited to such use, but may be used in many other instances where it is desired to obtain an indication of when a device is operating at the proper speed.

In the accompanying drawings Figure 1

is a front view of the device. Fig. 2 is a side view of the same. Fig. 3 is a view of a section on the line 3—3 in Fig. 2. Fig. 4 is a view of a section taken on line 4—4 in Fig. 2.

The frame for the mechanism comprises two plates 2 and 3 which are secured to and separated from each other by the posts 4 and 5 and the block 6. Journaled in the plates 2 and 3 there is a shaft 7 to which there is firmly secured, outside of the plate 2, a key 8 and a lever 9. Loosely mounted on the shaft 7, between the plates 2 and 3, there are two gear wheels 10 and 11 which are provided with the actuating springs 12 and 13, respectively. The gear wheel 10 meshes with a pinion 14 (Fig. 4) which is firmly secured to a shaft 15, which shaft is journaled in the side plates. Likewise secured to the shaft 15 there is a ratchet wheel 16. Loosely mounted upon the shaft 15 and carrying a pawl 17 which coöperates with the ratchet wheel 16, there is an escapement wheel 18, coöperating with which there is a small escapement lever 19.

The gear wheel 11 meshes with a pinion 20 (Fig. 3) which is firmly secured to a shaft 21, to which latter there is also secured an escapement wheel 22. Coöperating with the escapement wheel 22 there is an escapement lever 23. Mounted upon the lower side of the block 6 there is an electromagnet 24 having a pivoted armature 25. A link 26 connects the armature 25 with the escapement lever 23.

From the above description it will be seen that the mechanism comprises two separate gear trains, one of which is shown in Fig. 3 and the other in Fig. 4, each having a separate driving spring and escapement device. To the gear wheels 10 and 11 there are attached the pointers or indicators 23 and 27, respectively. Rotatably mounted upon a pin 29 there is a lever 30, the upper end of which projects up between the wheels 10 and 11 and into the path of the pins 31 and 32 on the wheel 11. When either of the pins 31 or 32 passes the upper end of the lever 30, its lower end is forced into engagement with the small three-sided pin 33 which projects laterally from the side of the escapement lever 19. Insulatively mounted upon the face of the plate 2 there is a pair of contact springs 34 and 35 which are

adapted to be forced into contact by a bushing 9^a on the lever 9 when it is in the position shown.

If the key 8 be turned in a counter-clockwise direction the rearwardly extending portion of the lever 9 (Fig. 2) may be caused to force the indicators 27 and 28 over until they strike the post 4, thereby rotating the wheels 10 and 11 and winding up the springs 12 and 13. When the indicators are thus forced over against the post 4, the pin 32 in the wheel 11 comes into engagement with the upper end of the lever 30, forcing it back so as to cause the lower end of said lever to engage the pin 33 to lock the escapement lever 19 to prevent the wheel 10 and pointer 28 from returning to their original positions. The wheel 11 is locked in its advanced position by the engagement of its escapement wheel 22 with the escapement lever 23. The lever 23 cannot be vibrated by its escapement wheel as can the lever 19, and the only way the wheel 11 can be returned to its original position is by energizing and deenergizing the magnet 24 a number of times to permit the wheel 22 to escape step by step. As soon as the wheel 11 rotates one step on its return movement, the pin 32 disengages the lever 30, which thereupon frees the escapement lever 19. The wheel 10 thereupon begins to rotate back to its original position, its speed being governed by the escapement lever 19. The pin 31 in the wheel 11 is placed in such a position that after the wheel 11 has completed a predetermined number of steps on its return rotation, said pin engages the end of the lever 30, causing it to again lock the escapement lever 19 and arrest the motion of the spring 12 and pointer 28.

The manner of using the device is as follows: The magnet 24 is connected in circuit with the calling device to be tested and a source of current, and the key 8 is turned to bring the pointers 27 and 28 over against the post 4. The calling device is now operated in the usual manner, usually for the highest number of impulses which it will call. These impulses momentarily open and close the circuit of the magnet 24, which results, as has been explained, in causing the pointer 27 to be rotated back to its original position step by step in synchronism with the impulses. As soon as the pointer 27 is rotated the first step, the pointer 28 is unlocked and begins its independent return movement. The mechanism is so adjusted that the pointer 28 completes its return rotation in the time which is required for the calling device to complete its series of impulses when it is operating at the proper speed. Therefore, if the calling device is operating at the proper speed, the pointers 27 and 28 will sweep over their arcs at the same speed. If the calling device is running too fast, the

pointer 27 will run ahead of the pointer 28, and if the calling device is operating too slow, the pointer 27 will lag behind the pointer 28. As explained, the lever 9 is arranged to close the springs 34 and 35 when it is forced by the pointers to the position shown. The springs 34 and 35 are arranged to short-circuit the calling device. Therefore, as soon as the pointer 28 completes its travel, the calling device is short-circuited and no more impulses can be delivered to the magnet 24, and the pointer 27 will come to rest. If the calling device is slow, the arm 27 will not have completed its travel when it comes to rest, and the position in which it stops will indicate how much too slow the calling device is. If the calling device is too fast, all the impulses will be delivered to the magnet and the arm 27 will come to rest before the pointer 28 completes its travel. The pin 31 in the wheel 11 is placed so that it strikes the arm 30 and locks the escapement 19 when the magnet 24 is energized after the last impulse is delivered by the calling device. Therefore, the arm 28 will be brought to rest before it completes its travel and the position in which it stops indicates how much too fast the calling device is.

While I have illustrated one specific form of my invention, it will be understood that I do not wish to be limited to such an exact structure, as many specific mechanical changes may be made without departing from the spirit and intent of my invention.

What I claim as my invention is:—

1. In a speed indicator for calling devices, a pair of pointers, means for moving one of said pointers at a predetermined speed, means for moving the other of said pointers in synchronism with the calling device being tested, and means whereby the first pointer is started in operation by the operation of the second pointer.

2. In a speed indicator for calling devices, a pair of pointers, means for moving one of said pointers at a predetermined speed, step-by-step means for moving the other of said pointers in synchronism with the calling device being tested, and means whereby the second pointer locks the first pointer against movement.

3. In a speed indicator for calling devices, a pair of pointers, means for rotating one of said pointers at a predetermined speed, means for rotating the other of said pointers a predetermined distance in synchronism with the calling device being tested, and means for stopping either of said pointers when the other reaches the limit of its movement.

4. In a speed indicator for calling devices, a pair of pointers located adjacent to one another, means for moving one of said pointers at a predetermined speed, means for moving the other of said pointers

and an escapement mechanism operated in synchronism with the calling device being tested for controlling the speed of said other pointer.

5. In a speed indicator for calling devices, a pair of pointers, means for moving one of said pointers at a predetermined speed, and means for moving the other of said pointers step by step in synchronism with the calling device being tested, means for limiting the extent of movement of said pointers, and means for stopping both of said pointers when one reaches the limit of its movement.

6. In a speed indicator for calling devices, a pair of pointers, means for moving said pointers, an escapement mechanism controlling the movement of one of said pointers and adapted to move the same at a predetermined speed, a second escapement mechanism for controlling the movement of the other of said pointers, and a magnet for controlling the second escapement adapted to be energized in synchronism with the impulses transmitted from the calling device being tested.

7. In a speed indicator for calling devices, a pair of movable pointers, a separate train of gears for controlling the movement of each of said pointers, means for moving one of said pointers a predetermined distance, means for moving the other of said pointers, and means for stopping either of

said pointers when the other pointer has reached the end of its movement. 35

8. In a speed indicator for calling devices, a pair of movable pointers, means for moving said pointers, an escapement mechanism for controlling the movement of each of said pointers, means for moving said 40 pointers from one position to another, means for holding said pointers in said second position, a magnet adapted to be operated in synchronism with the impulses transmitted from the calling device being 45 tested for controlling the movement of one of said pointers, and means for releasing said second pointer and permitting it to return to said first position at a predetermined speed upon the initial energization 50 of said magnet.

9. In a speed indicator for calling devices, a pair of movable pointers, means for moving one of said pointers a predetermined distance, means for moving the other 55 in synchronism with the calling device, and means for stopping the first-mentioned pointer when the second pointer reaches the limit of its movement.

Signed by me at Chicago, Cook county, 60 Illinois, this 26th day of October, 1911.

JOHN ERICKSON.

Witnesses:

ARTHUR J. RAY,
E. D. FALES.