No. 779,893. PATENTED JAN. 10, 1905.

W. D. WATKINS.

SELECTIVE SIGNALING SYSTEM.

APPLICATION FILED NOV. 4, 1903.

3 SHEETS—SHEET 1.

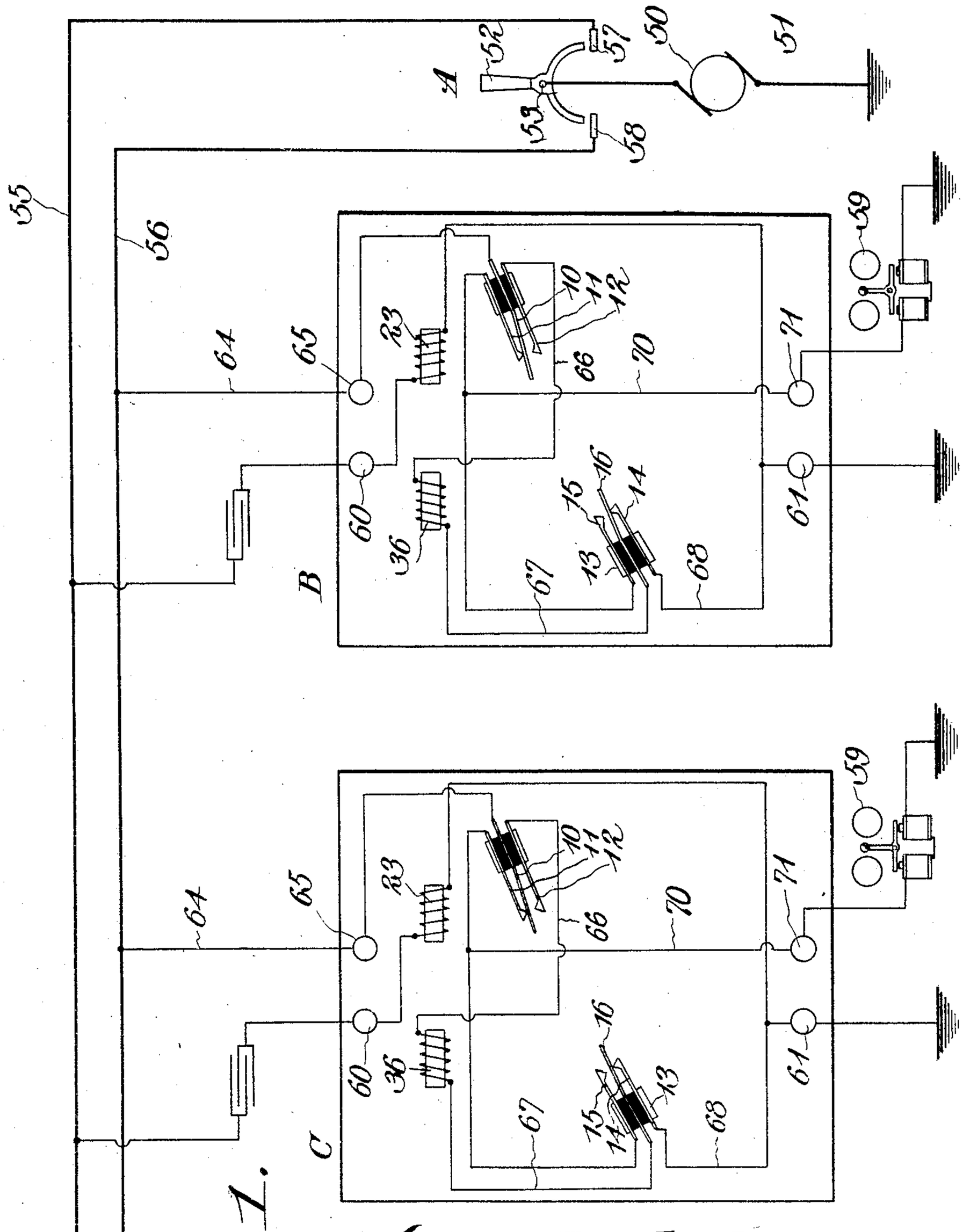

Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 2.

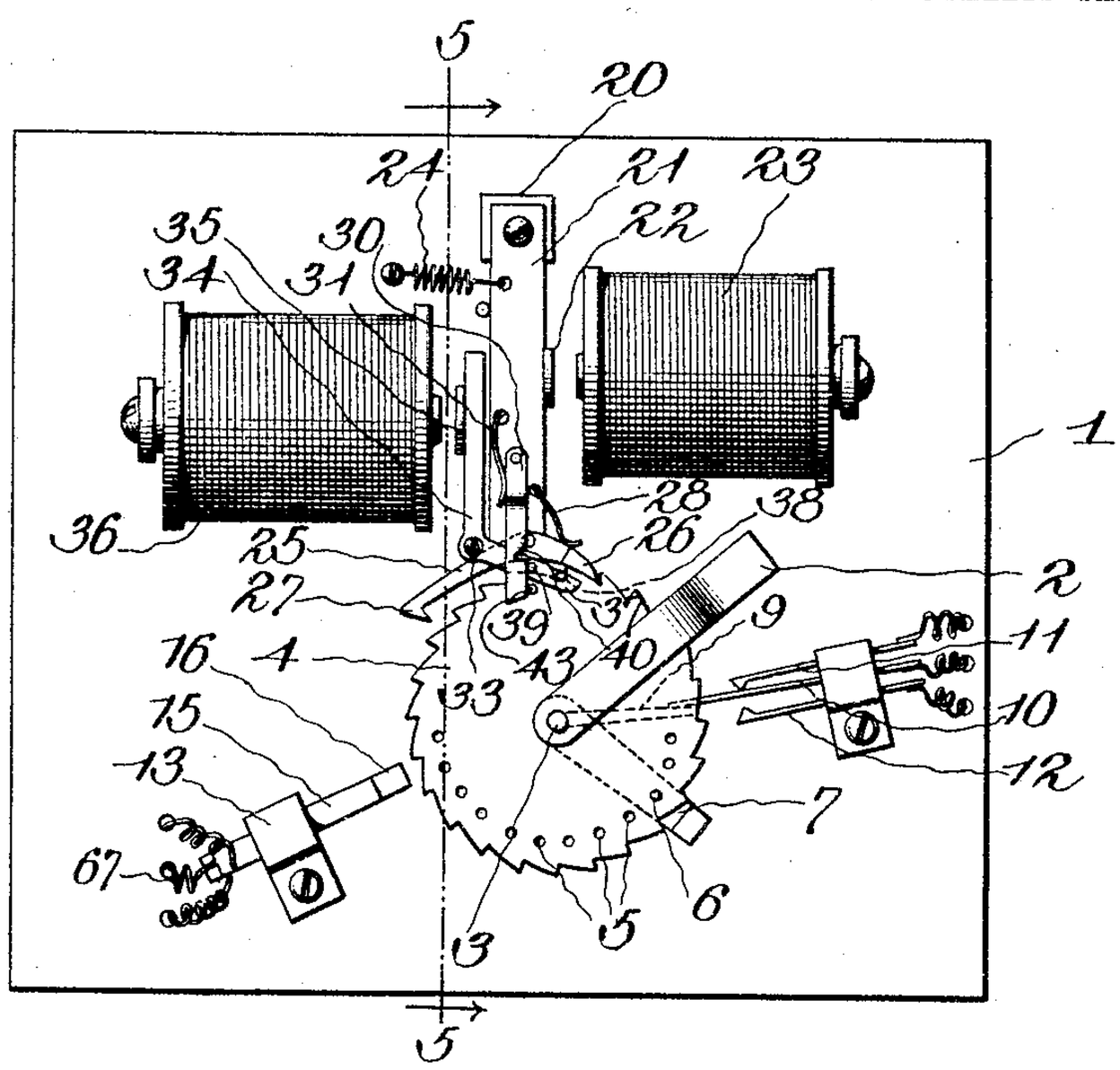
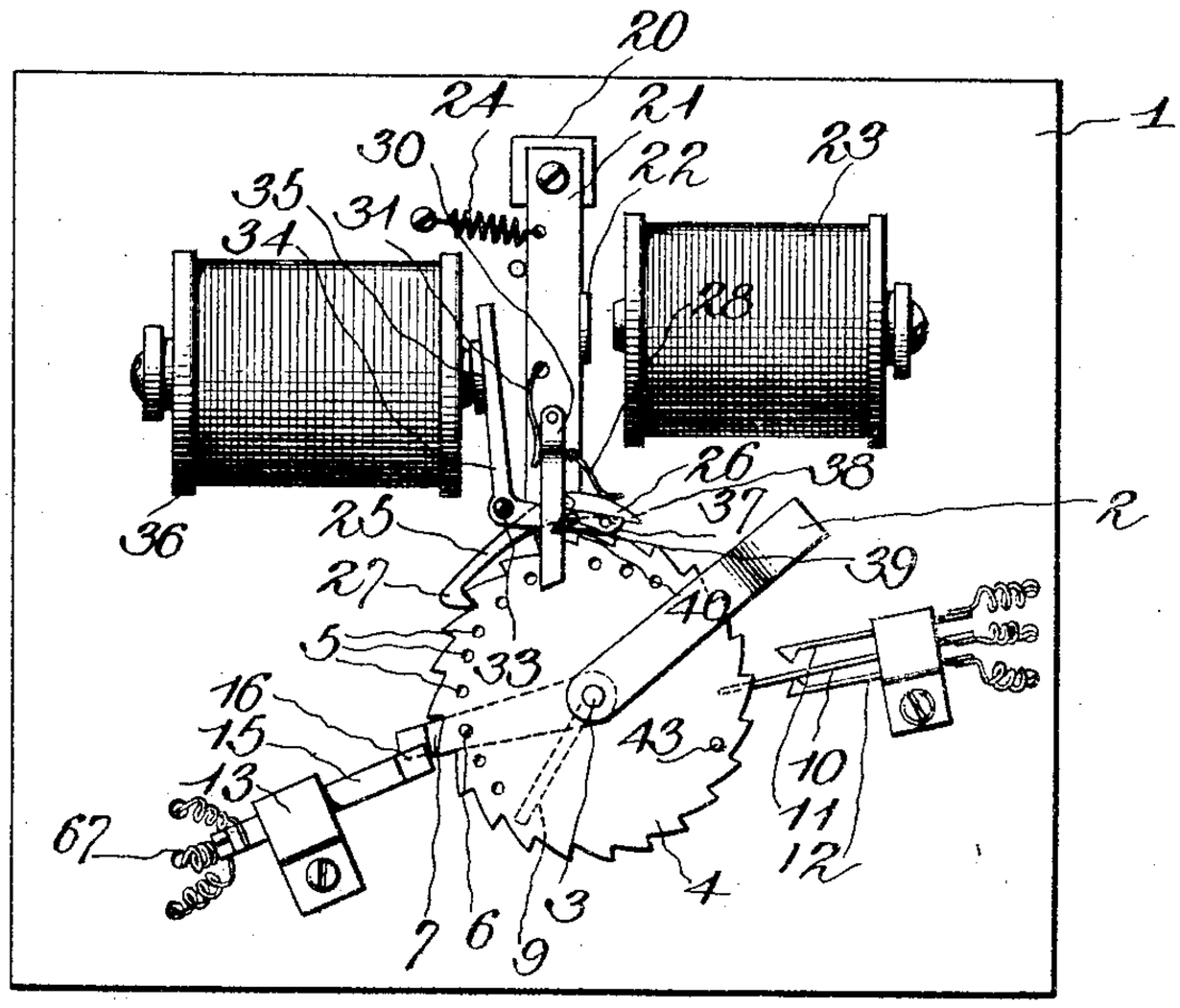


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 5.

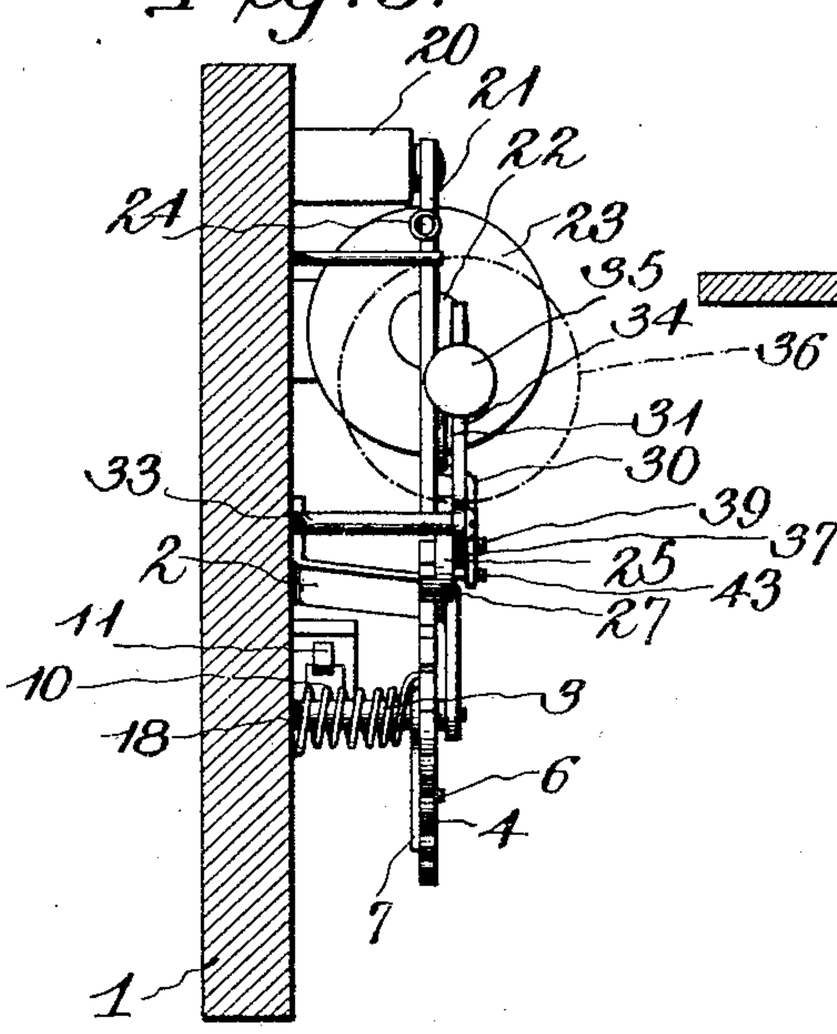


Fig. 6.

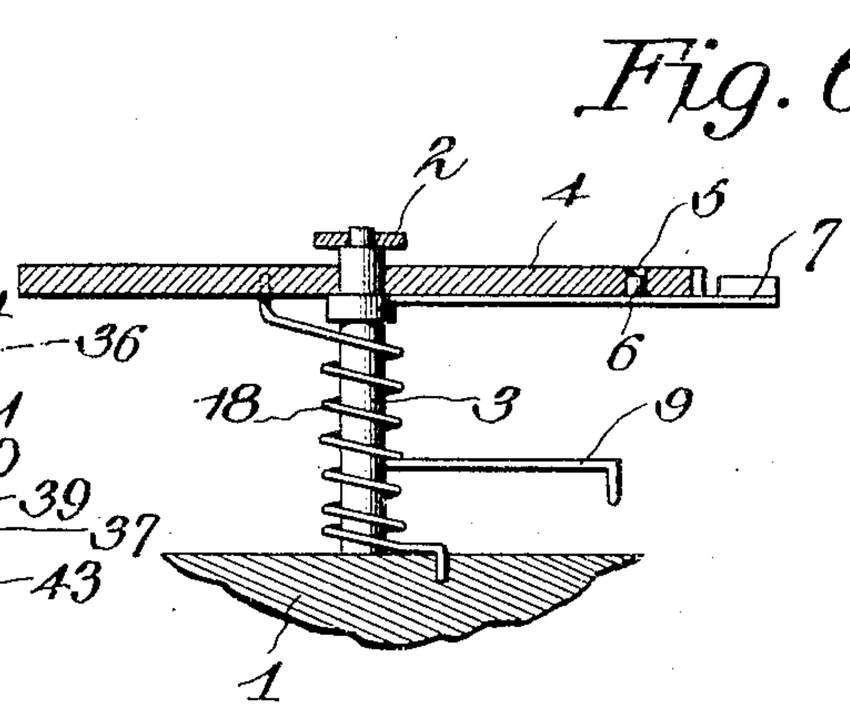
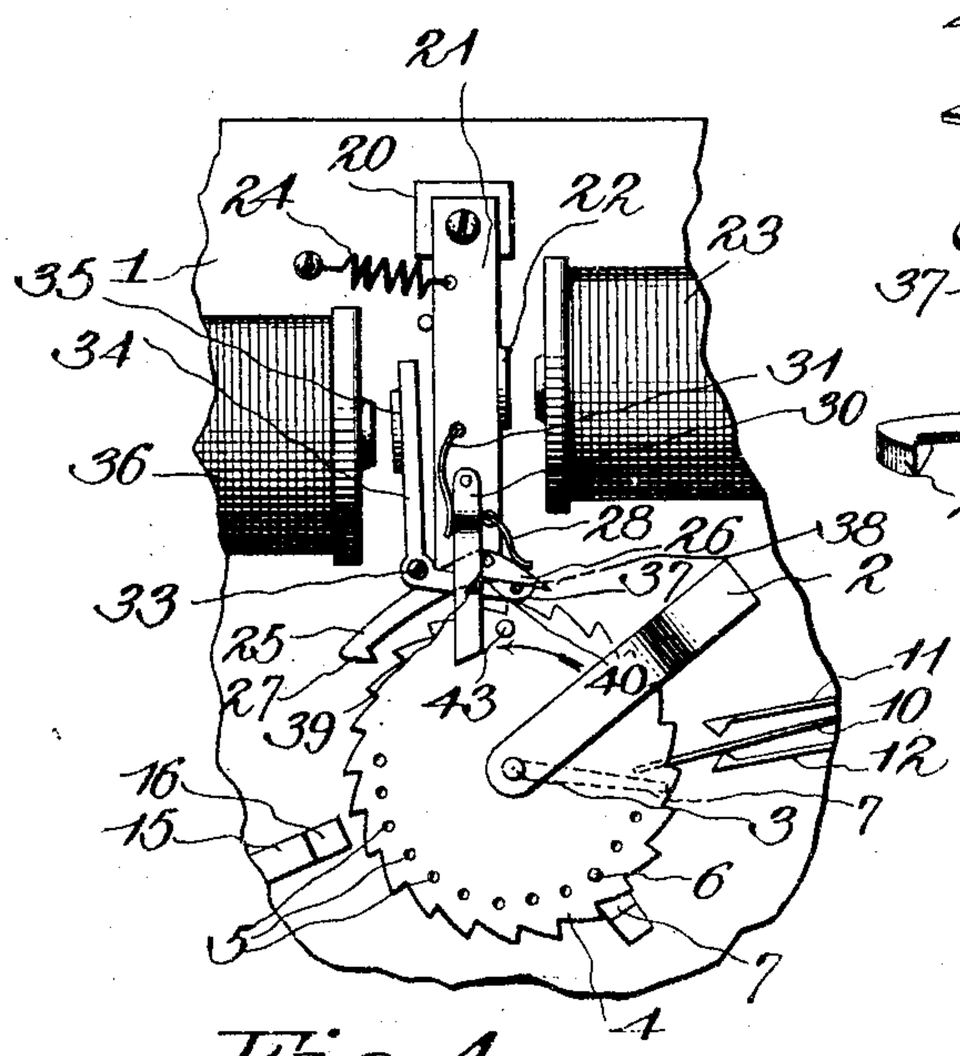


Fig. 7.

Fig. 4.



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No. 779,893. Patented January 10, 1905.

UNITED STATES PATENT OFFICE.

WILLIAM D. WATKINS, OF SAN JOSE, CALIFORNIA, ASSIGNOR TO WATKINS MANUFACTURING COMPANY, OF SAN JOSE, CALIFORNIA.

SELECTIVE SIGNALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 779,893, dated January 10, 1905.

Application filed November 4, 1903. Serial No. 179,837.

To all whom it may concern:

Be it known that I, WILLIAM D. WATKINS, a citizen of the United States, residing at San Jose, in the county of Santa Clara and State of California, have invented a new and useful Selective Signaling System, of which the following is a specification.

This invention relates to certain improvements in selective signaling systems of that general class wherein an operator may sound a call-bell or other signal at any desired station on a party-line without sounding the corresponding signals at any other station.

One of the principal objects of the invention is to provide a selector of the step-by-step type in which a current sent along the line will operate to effect movement of the selecting mechanism to a position to close a plurality of contacts that govern the second line which when energized will effect the ringing of the call-bell or other signal and at the same time will serve as a means for releasing the selector from its adjusted position and allowing it to return to initial position.

A still further object of the invention is to provide a novel form of selector in which a pair of separate actuating-magnets are employed, the circuits of the magnets extending, respectively, from the opposite sides of a two-wire system to a ground or a metallic return and in which a generator arranged at central is employed for energizing the lines successively to effect first the adjustment of the selector to circuit-closing position and then the release of such selector to permit its return to initial position.

A further object of the invention is to provide a selector of the step-by-step type in which a pair of independent electromagnets are provided with armatures, one of the armatures carrying a pawl or similar member for effecting a step-by-step movement and the other being provided with means for raising the pawl out of engagement with the toothed selecting-disk.

With these and other objects in view, as will hereinafter appear more fully, the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a general diagram showing a selective signaling system arranged in accordance with the invention. Fig. 2 is an elevation of the selector, the parts being shown in the normal position. Fig. 3 is a similar view showing the position of the parts when the selector has closed the signaling-circuit. Fig. 4 is a view of a portion of the mechanism illustrated in Figs. 2 and 3, showing the position assumed by the parts during the releasing movement, the selector-disk being moved toward its initial position. Fig. 5 is a transverse sectional elevation of the selector on the line 5 5 of Fig. 2. Fig. 6 is a detail sectional view drawn to an enlarged scale and illustrating the construction of the disk and its supporting means. Fig. 7 shows in perspective the more important parts of the mechanism detached.

Similar characters of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In the drawings, 1 indicates a base-plate to be arranged at each local station along the line. Each base-plate carries a bracket 2, and the bracket and the plate are provided with vertically-alining bearings for the reception of a vertical arbor or shaft 3, to which is secured a ratchet-wheel or selector-disk 4. The disk is provided with a large number of perforations 5, preferably spaced at a distance apart corresponding to the pitch of the teeth and serving to receive a pin 6, that is carried by a spring-arm 7, loosely mounted on the arbor 3. This arm projects in a radial line, preferably to a point beyond the periphery of the disk, and its angular position may be adjusted to correspond with the number of the station at which it is located, the arm at station No. 1 being in radial alinement with the

first opening and the arm at station No. 2 being in radial alinement with the second opening, and so on throughout the several stations on the system. The shaft or arbor 3 also carries a second circuit-closing arm 9, which is located at the same point at each station and normally engages a contact-spring 10 and holds the same in engagement with a contact-block 11; but so soon as the disk starts to move the arm 9 will release the arm 10, and the latter will immediately move into engagement with a contact-block 12 to effect the closing of another circuit, as hereinafter described.

At a suitable point on the base-plate is secured a standard 13, carrying two contact-blocks 14 and 15 and an intervening contact-spring 16, that normally engages the lowermost block 14. When the radially-disposed arm 7 is moved by movement of the disk, it will come into contact with and raise the spring 16 into engagement with the contact 15 and close the circuit leading to the call-bell or other signal at the local station. Normally the toothed selecting-disk is maintained in initial position by a coiled torsion-spring 18, surrounding the arbor 3 and having one end connected to the disk and the other to the base-plate.

The base-plate carries a lug or standard 20, on which is pivoted an armature-lever 21, carrying an armature 22, disposed within the field of force of an electromagnet 23, normally held away from the poles of the electromagnet by a spring 24. To the lower end of the lever 21 is pivoted a pawl 25, having at one end a tooth 26 and at its opposite end a locking tooth or catch 27, both of which are adapted to engage the teeth of the selector-disk at different stages of the operation of the latter; but normally the tooth 27 will be held away from the teeth of the disk by means of a small leaf-spring 28. From the construction it will be readily apparent that each time the electromagnet 23 is energized it will attract the armature and the lever 21 will be swung to the right, so that the tooth 26 will impart a step-by-step movement to the selector-disk. The lever 21 further carries a catch 30, that is acted upon by leaf-spring 31, its movement under the influence of the spring being limited by a suitable stop.

The base-plate carries a standard 33, to which is pivoted an armature-lever 34, having an armature 35 disposed within the field of force of an electromagnet 36. The armature-lever 34 is provided at its lower end with an arm 37, carrying two pins 38 and 39, of which the latter forms a stop for limiting movement of the catch 30, and said pin is further adapted to enter a locking-notch 40 of the catch during a portion of the releasing operation of the selecting mechanism. The pin 38 serves to engage the teeth of the ratchet each time pawl 26 moves the latter one tooth, so that the pawl can return while the ratchet is held. The pin 38 is arranged under the pawl 25 in such position that when the electromagnet 36 is energized it will elevate the toothed end 26 of the pawl and cause its disengagement from the teeth of the selector-disk, while the opposite end 27 of the pawl will be forced into engagement with such teeth and will prevent at this time returning movement of the selector-disk under the influence of the spring 18. When the magnet 36 is energized, the pin 39 will ride up alongside the catch 30 to a point slightly above the notch 40, and so long as the magnet 36 is energized the end 37 of the pawl may be held positively in engagement with the teeth of the selector-disk. When the magnet 36 is deënergized, the armature-lever 34 will tend to reassume its normal position; but this will be prevented by the descent of the pin 39 into the notch 40, the engaging movement being assisted by the spring-bearing of the catch 30. When in this position, the two ends of the pawl are out of engagement with the teeth of the selector-disk, and the latter will rapidly return to its normal position under the influence of spring 18. At about the completion of the returning movement a pin or lug 43 on the slector-disk will engage against the notched side of the catch 30 and will throw the same to the left, thereby releasing the pin 39 and allowing the pawl 25 to reassume its normal position, with the tooth 26 in engagement with one of the teeth of the selector-disk.

Before describing the operation of the selector-disk reference is had to Fig. 1, showing in diagrammatic form a sending or central station A and two stations B and C, all connected to form a party-line. At the central station is a generator 50, of which one pole is connected to the ground through a wire 51, and the opposite pole is connected to a switch-lever 52, pivoted on a pin 53, that may be carried by any suitable base or frame. The two metallic line-wires 55 and 56 are connected, respectively, to contact-plates 57 and 58, arranged adjacent to the opposite circuit-closing fingers of the switch 52, and by moving this switch in one direction a current may be sent out from the generator along one line, and by a circuit-closing movement in the opposite direction a current may be sent out along the other line, in each case returning by ground to central. At each of the local stations is arranged a selector of the type already described and a signal 59, that is shown in the present instance in the form of an electromagnetic call-bell. The several contacts and electromagnets of the selecting mechanism heretofore described are shown in a normal position in the diagram, and the

operation of the device in calling-station C will be readily understood. The local station B is responsive to a single pulsation—that is to say, a single movement of the selector-disk will adjust the contacts for the ringing of the call-bell—while station C is responsive to two pulsations and station D (not shown) to three pulsations. The parts being in normal position, the operator at central moves switch 52 to close the circuit from the generator to switch 52, to contact 57, to line-wire 55, binding-post 60, electromagnet 23, binding-post 61, to ground, and return to central station. This effects a movement of each of the selector-disks to the extent of a single tooth, and the arm 9, carried by each arbor 3, will move away from contact 10, breaking circuit at 11 and closing in part a circuit which leads from main line 56 through wire 64, binding-post 65, contacts 10 and 12, wire 66 to electromagnet 36, and from thence by way of wire 67 to the central contact 16. The contact 16 being normally engaged with contact-block 14, the circuit will be closed through wire 68 and thence by way of the binding-post 61 to the ground-wire; but at this time it is to be understood there is no current passing over the line-wire 56, so that when the first movement of the selector-disk at station B brings the arm 7 into engagement with spring 16 there will be no current passing to the call-bell. When the operator has closed the circuit through line-wire 55 for the desired number of times, as twice in calling station C, the arm 7 at station C will pass under the spring 16 and move the same into engagement with the contact-block 15, so that the line-wire 56 will then be connected through wire 64, binding-post 65, contact 10, contact 12, wire 66, electromagnet 36, wire 67, contact 16, contact 15, wire 70, binding-post 71, to bell 59, and thence to ground, and when the operator moves the switch 52 into engagement with the contact 58 this circuit will be energized and the bell will ring. During all the time the bell is ringing the electromagnet 36 is energized and positively holds the catch 27 in engagement with the teeth of the selector-disk, so that it becomes impossible for the latter to return to its initial position; but as soon as the switch 52 is moved to open position and the electromagnet is deënergized the pin 39 will enter the notch 40 and allow the pawl to move until both of its ends are out of engagement with the selector-disk and the latter returns to initial position under the influence of the torsion-spring 18 and when nearing the initial position pin 43 will engage the catch 30 and move the same to releasing position in order to permit the toothed end 26 of the pawl to again engage a tooth of the selector-disk.

A selecting mechanism of the class herein described is responsive to either direct or alternating currents, and the signal at each local station may be of any desired character or may be the usual call-bell in general use on telephone systems.

Having thus described the invention, what is claimed is—

1. In selective signaling devices, a toothed selector-disk, a pair of independently-operable electromagnets, a double-ended pawl carried by the armature of the first magnet and having one of its ends normally in engagement with the disk to impart step-by-step rotative movement thereto, and means carried by the armature of the second electromagnet for changing the position of the pawl and engaging its opposite end with said disk.

2. In selective signaling devices, a toothed selector-disk, means for controlling the signaling-circuit, a pair of electromagnets, independent armatures for the magnets, means carried by one armature for engaging and effecting a step-by-step movement of the selector-disk, means carried by the second armature for moving the disk-engaging means out of position, a catch for holding the disk-engaging means in the disengaged position, and means carried by the selector-disk for engaging said catch and moving the same to releasing position.

3. In selective signaling devices, a toothed selector-disk for controlling a signaling-circuit, a pair of electromagnets, independent armatures for the magnets, a pawl pivoted to one armature and having its opposite ends toothed for engagement with the selector-disk, means carried by the second armature for engaging the pawl and moving the same to disk-locking position, a pivoted catch for holding the pawl in unlocking position, and a pin or lug carried by the selector-disk for engaging the catch during the return of the disk to initial position.

4. In selective signaling devices, a toothed selector-disk for controlling a signaling-circuit, a pair of electromagnets, independent armatures for the magnets, a pawl carried by the first armature and having both of its ends toothed for engagement with the disk, means for normally maintaining one of the toothed ends of the pawl in engagement with the disk, a pin or lug carried by the second armature for raising the normally engaged end of the pawl from the disk and for moving the opposite end thereof into locking engagement with the disk, a catch having a notch or recess, a pin carried by the second armature for engaging said notch or recess and holding the pawl with both ends disengaged from the disk, a spring for restoring the disk to initial position, and a pin or lug carried by the disk and serving to engage and release the catch during the returning movement of the disk.

5. In telephone selective devices, a selector-

disk having marginal teeth, a pair of electromagnets, armatures for said magnets, a double pawl carried by one armature one end serving to impart a step-by-step movement to the disk, a lever carried by the opposite armature, and a pin mounted on the lever and serving as a stop-pawl for engaging the teeth at each operation of the main pawl, said pin serving also to raise the main pawl from engagement with the teeth and moving its opposite end into locking engagement therewith.

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

WILLIAM D. WATKINS.

Witnesses:

W. S. ORVIS,

EMMA J. ORVIS.