(No Model.)

C. E. SCRIBNER.

SELECTIVE SIGNAL.

No. 574,223. Patented Dec. 29, 1896.

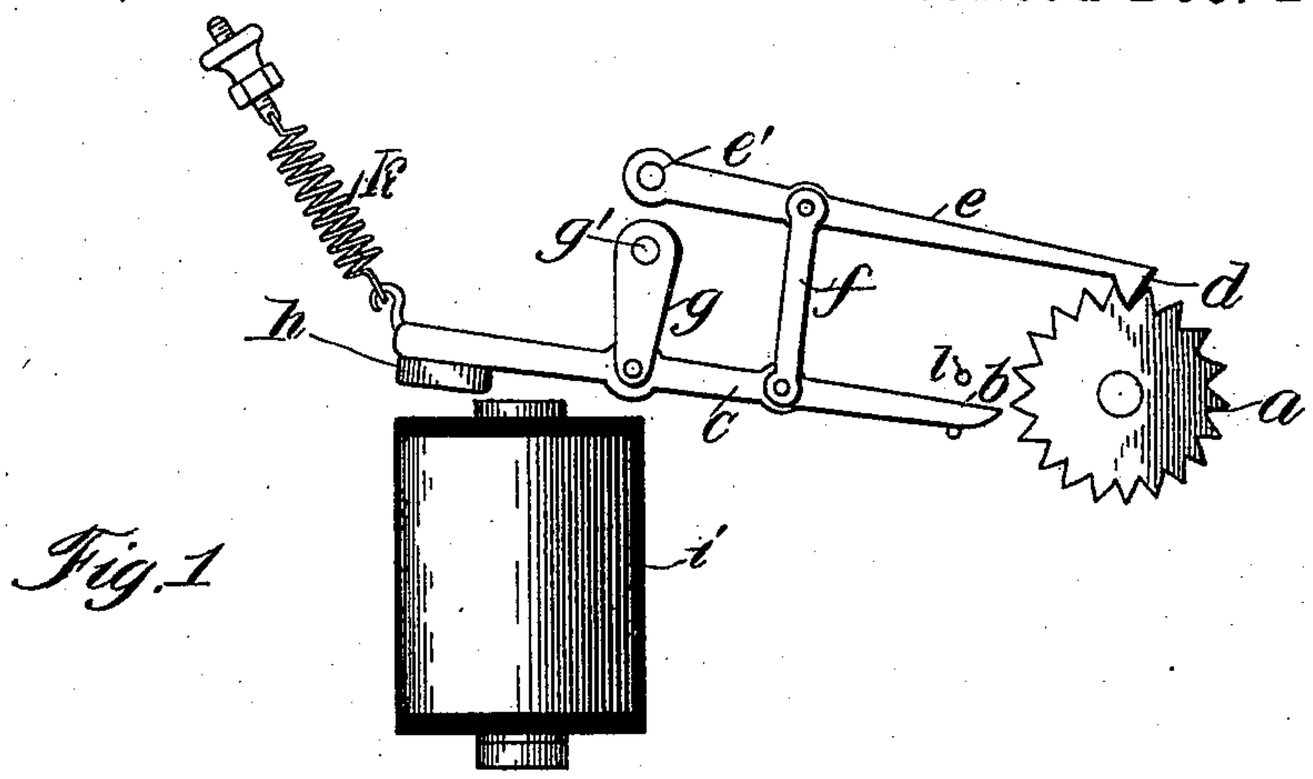

Fig. 1

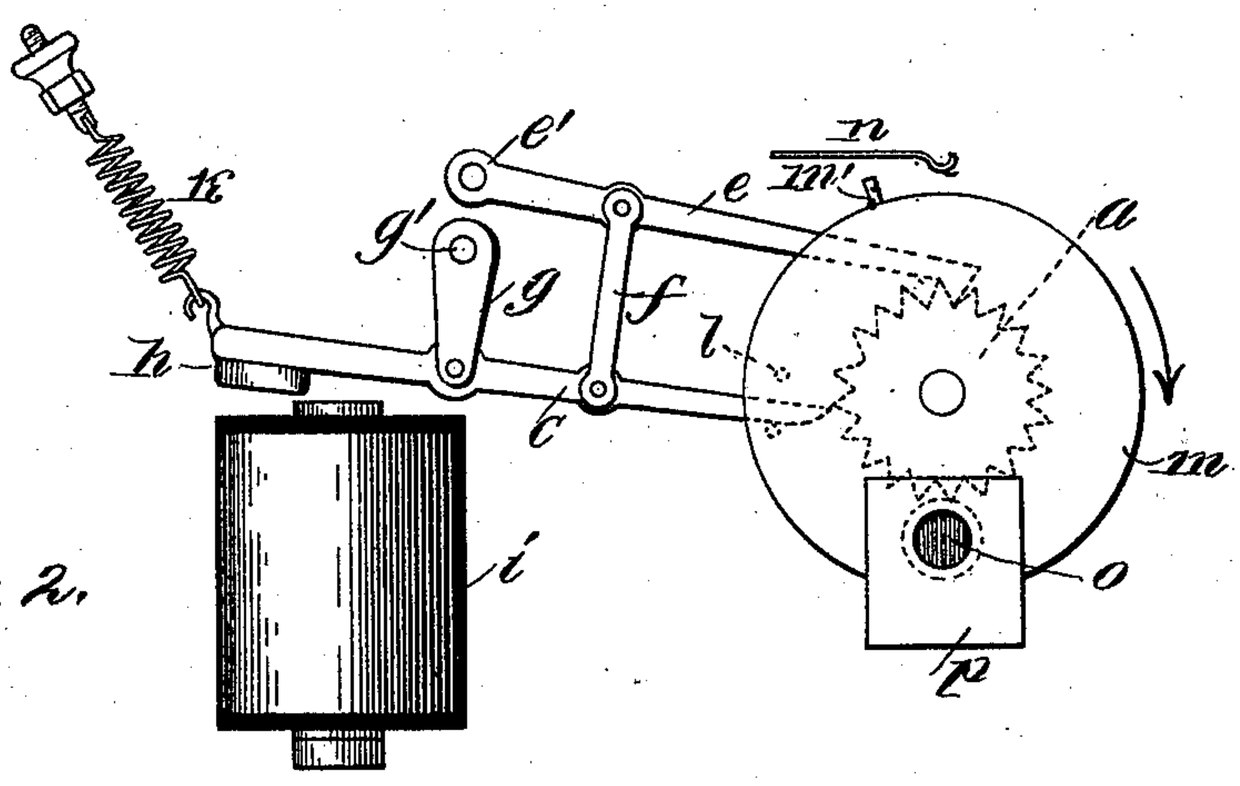

Fig. 2.

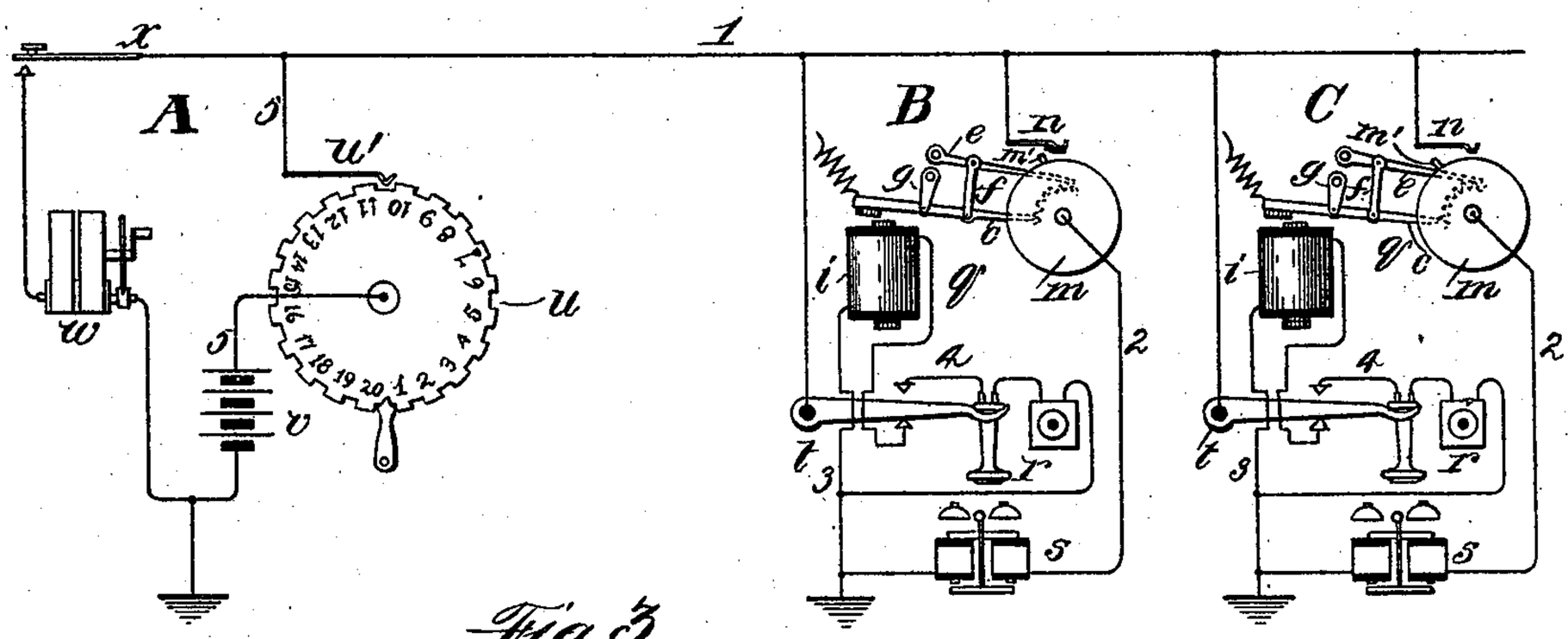

Fig. 3.

Witnesses:
George L. Cragg
De Witt C. Tanner

Inventor:
Charles E. Scribner.
By Burton & Brown
Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF SAME PLACE.

SELECTIVE SIGNAL.

SPECIFICATION forming part of Letters Patent No. 574,223, dated December 29, 1896.

Application filed August 23, 1895. Serial No. 560,208. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Selective Signals, (Case No. 400,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention concerns the mechanism of selective signals. It applies particularly to those selective signals in which commutators or switches are advanced simultaneously through successive steps until a particular switch at the substation which it is desired to bring into circuit has reached its proper position. The primary feature of my invention is a new motor device for the commutator or switch, which aims to prevent irregular action or failure in operation. A secondary feature is a "busy-indicator," to show at any substation whether the common line be free for use. Those forms of ratchet or step-by-step movement which have been employed in mechanism of this character have been subject to various irregularities of action, among which the most troublesome was the failure of the ratchets or pawls to engage the ratchet-wheel, which might permit the wheel either to remain unmoved or to escape from control and rotate too far forward or backward. In either event the different ratchet-wheels of the series would lose their consonance of movement.

In my invention I provide means for imparting to the pawl which actuates the ratchet-wheel both a longitudinal and a transverse movement, by which it is caused, first, to enter between two teeth of the ratchet-wheel and then to thrust the wheel forward, and in combination with this pawl I use a retaining-ratchet which is adapted to be withdrawn from engagement with the wheel only during the transverse movement of the pawl. In the complete device the pawl is carried at the extremity of a lever which is journaled in one end of a link whose other extremity is pivoted on a fixed point, the lever being arranged nearly radially to the wheel. This lever may carry the armature of the motor-electromagnet. The ratchet is carried upon another pivoted lever parallel with the pawl-lever and is connected with the latter lever by a transverse link. The ratchet rests normally in engagement with the ratchet-wheel, the pawl being withdrawn from the wheel. Under the action of the electromagnet the pawl is first advanced to enter between two teeth of the wheel and is then moved laterally to advance the wheel, the ratchet being simultaneously withdrawn from engagement with the wheel. In the recession of the armature-lever, the ratchet again engages the ratchet-wheel, while the pawl still registers with the wheel, and the pawl is finally withdrawn. There is thus no moment during the operation of the device in which either the ratchet or the pawl is not present between two teeth of the ratchet-wheel. The irregular advance or the retrogression of the wheel is thus rendered impossible. The ratchet-wheel may be fixed to or connected with any usual form of commutator—as, for example, a rotating disk carrying on its periphery a contact-point which shall effect at some point of its revolution the necessary circuit connection for signaling the station.

A second feature of my invention, the busy-indicator, consists in a target or indicator carried by the rotating commutator, which is visible only during the normal or idle position of the apparatus, and which, by its disappearance, indicates at each of the party substations that the line is already in use.

My invention is shown in the accompanying drawings.

In the drawings, Figure 1 represents the essential elements of the motor mechanism. Fig. 2 shows the same parts in connection with the commutator and the signal. Fig. 3 is a diagram illustrating the connection of these instruments on a line-circuit.

Referring to Fig. 1, the essential parts of my improved motor device are the ratchet-wheel *a*, the pawl *b*, and the lever *c*, which carries it, ratchet *d*, a lever *e*, carrying the latter, and the link *f*. The pawl-lever *c* is pivoted to one end of a link or arm *g*, which is carried at its other extremity on a fixed pivot *g'*. The ratchet-lever *e* is pivoted at its extremity

e'. Lever c carries the armature h of motor-magnet i and is acted upon by an adjustable retractile spring k. Spring k is arranged to exert its attraction on lever c in an oblique direction, pulling strongly away from the magnet, and at the same time much more feebly in a longitudinal direction on the lever c. Normally the ratchet d rests in engagement with the ratchet-wheel a. When magnet i is excited, its attraction on armature h first moves the latter in a direction parallel to the lever c, since the force of spring k is more feebly exerted in opposition to such movement. The pawl b is by this movement thrust between two teeth of wheel a. The lever c in this movement swings freely on the links f and g, and hence does not disengage ratchet d from the wheel. When this longitudinal movement of the lever has taken place through a certain range, the downward pull of the magnet i on its armature h becomes more effective. The lever c is then rocked on its pivot in link g, whereby a transverse movement is communicated through link f, which raises the ratchet d away from the wheel a. At the same time the pawl b, being in engagement with wheel a, moves upward and thrusts the wheel forward through a predetermined amount. The range of this advance may be limited by suitable stops, as l, to one division or tooth of the ratchet-wheel.

When the magnet i becomes inert, spring k retracts the lever c in an oblique direction. The first movement of the mechanism brings the ratchet d again into engagement with the wheel, after which the pawl b is withdrawn from its engagement with the wheel. It is obviously impossible for the wheel a to move forward more than the predetermined amount, since during its forward movement the pawl b is positively thrust between two teeth of the wheel. It is equally impossible for the wheel to execute any backward movement, since at all times either pawl b or ratchet d is in engagement with it.

In Fig. 2 the same mechanism is shown in connection with a disk m, which is mounted upon the spindle with ratchet-wheel a. A contact-spring n is placed near the disk in position to touch a pin m', which is carried on the periphery of the disk. The pins m' are placed in different positions on the disks of the selective signals at different substations, being distributed about the peri, heries of the disks at points corresponding to the stops or teeth of the ratchet-wheel in a well-known manner.

Disk m has painted on it a colored spot o, which when the apparatus is idle appears behind an opening or window in a fixed screen p, which may, if desired, be the case of the instrument. Any movement of the disks for the purpose of transmitting a selective signal will cause the disappearance of the spot o, and the hiding of this spot will be taken as indicating that the line is in use.

Fig. 3 represents a telephone-line 1, which extends from a central station A to two party substations B and C. Each of the substations is equipped with a selective signal q of the character described, a telephone-set r, a signal-bell s, and a telephone-switch t. The spring n of the selective signal is connected with line conductor 1. The pin m', through the disk m, is connected by conductor 2 to earth through the bell s. The magnet i of the selective signal is arranged in a branch 3 from the line conductor, which is controlled by the telephone-switch t being closed while the receiving-telephone rests on the switch. The telephone instruments r are placed in a branch 4, which is closed to line conductor 1 in alternation with the branch 3. The pin m' at station B is placed one space or tooth away from contact-spring n, so that a single pulsation of current will bring it into contact with the spring. The corresponding pin at station C is placed two spaces from spring n, so that two pulsations of current will be required to bring it into connection with the spring.

At the central station the operator is furnished with a commutator or contact-making wheel u, which has on its periphery as many contact-segments adapted to engage with a spring u' as there are teeth on the ratchet-wheels of the selective instruments. The wheel u and contact-spring u' are in a ground branch 5 from line conductor 1, including a battery v. The operator is also furnished with a generator w of signaling-current and a key x, by means of which the generator may be connected with the line-circuit.

When the operator wishes to signal a particular station B or C, she may turn the wheel u to transmit the necessary number of pulsations of current to bring the pin m' at the desired station into contact with the spring n. Then depressing the key x and operating the generator w she may ring the bell s at that station, the circuit 2 through that bell being then completed.

In order to reset the different selective instruments to their normal positions, the wheel u may be turned through the complementary portion of its revolution, during which movement it will transmit enough pulsations of current to bring all the ratchet-wheels around to their initial positions.

The mechanical movement or motor device which constitutes the principal feature of my invention is of course not limited to use for selective signaling and may be operated otherwise than by an electromagnet. The oblique or successive longitudinal and transverse movement of lever c may be obtained in many other ways, which may be readily adapted for any particular purpose.

I claim, broadly, as new and desire to secure by Letters Patent—

1. In a selective signal, the combination with a ratchet-wheel and an electromagnetic device adapted to advance the said wheel through successive stages in response to pulsations of current, a contact-point moving

with said ratchet-wheel, circuit connections adapted to be closed when said contact-point is in a particular position, a disk moving with said ratchet-wheel, and a target carried by said disk adapted to be displayed when the commutator is in position to close said circuits, substantially as described.

2. The combination with a ratchet-wheel of a pawl, means for imparting to the pawl successively a longitudinal movement radially to the wheel and then a transverse movement, a detent, and a link connecting said detent and pawl adapted to cause the detent to be disengaged from the ratchet-wheel during the transverse movement of the pawl, as described.

3. In combination, a ratchet-wheel, a lever and a pawl carried thereby, a second end-pivoted lever parallel with the first lever, and a detent carried thereby normally engaging the ratchet-wheel, a link connecting the levers, and means for imparting to the pawl-lever successively a forward movement radially to the ratchet-wheel and a transverse movement, as described.

4. In combination, a ratchet-wheel, a lever *c* and a pawl carried thereby, a link *g* at one end of which said pawl is pivoted, a lever *e* pivoted at one extremity a detent engaging the ratchet-wheel carried at the other extremity of said lever *e*, a link *f* connecting the levers, an armature carried by lever *c*, and an electromagnet adapted to exert its attraction obliquely upon its armature to effect a forward and a transverse movement of the armature, as described.

5. In combination, a ratchet-wheel, a lever free to move longitudinally and transversely, and a pawl carried by the lever a detent, and a link connecting the detent with the pawl, a spring adapted to oppose the transverse movement of the lever more than its longitudinal movement, and a motor device for moving the lever, as described.

6. In combination, a ratchet-wheel, a lever pivoted to one extremity of a pivoted link, a pawl carried by the lever adapted to engage the ratchet-wheel, an end-pivoted lever parallel therewith, and a detent engaging the ratchet-wheel carried thereon, a link connecting the pawl with the detent, an armature on the pawl-lever, an electromagnet adapted to act obliquely upon the armature to produce a forward and transverse movement of the pawl, a switch-contact operated by the ratchet-wheel, and a station-circuit including any suitable electrical instruments controlled by the switch-contact, as described.

In witness whereof I hereunto subscribe my name this 12th day of July, A. D. 1895.

CHARLES E. SCRIBNER.

Witnesses:

ELLA EDLER,

MYRTA F. GREEN.