

988,009.

Patented Mar. 28, 1911.

2 SHEETS-SHEET 1.

Fig. 2

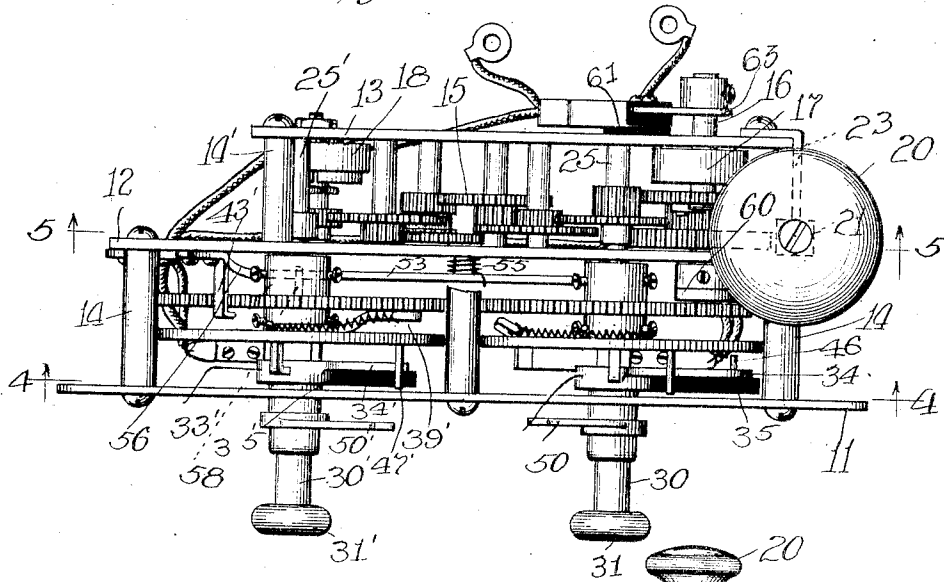


Fig. 1

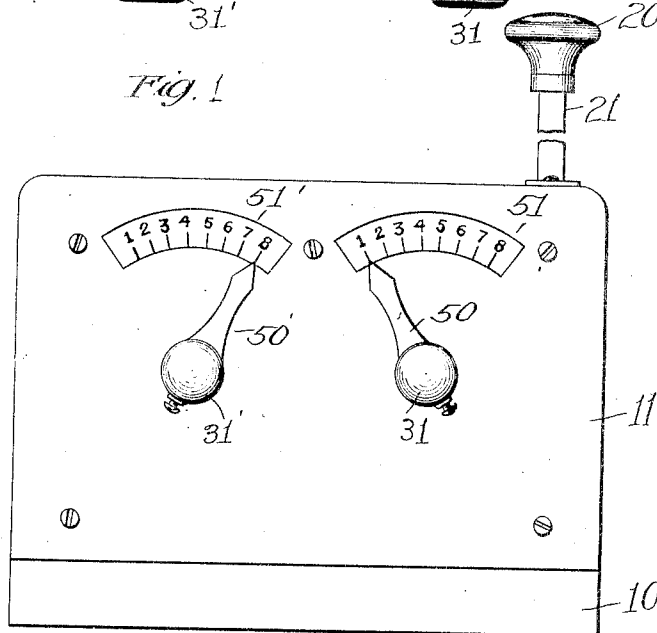
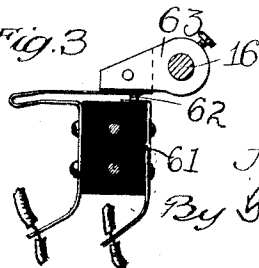


Fig. 3



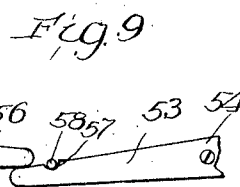
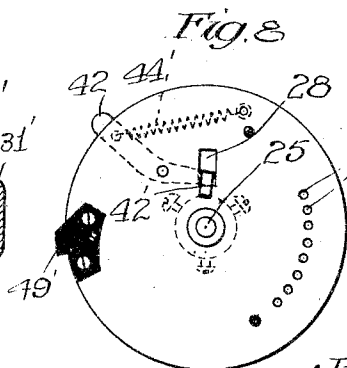
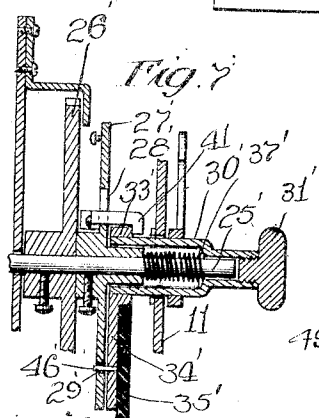
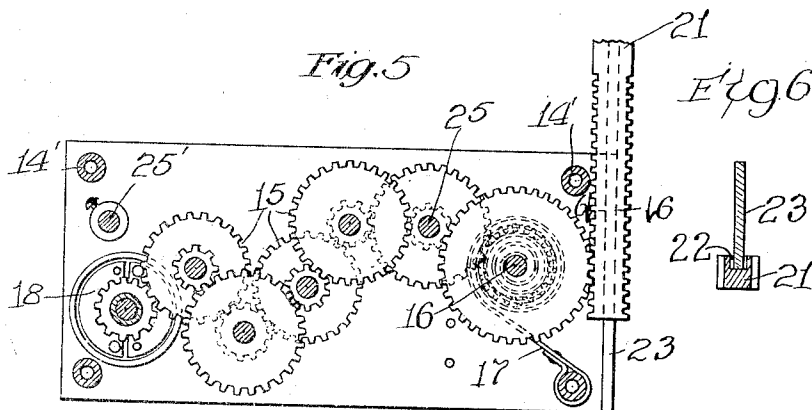
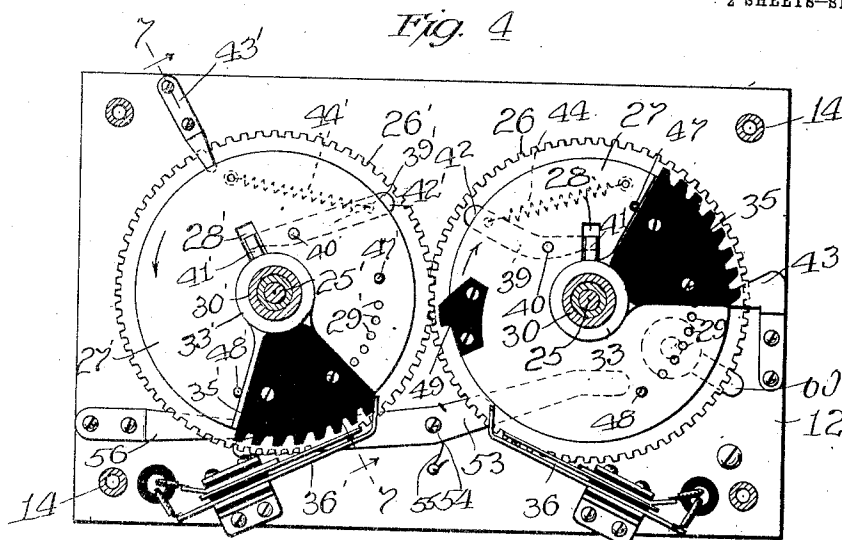
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2 SHEETS-SHEET 2.



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UNITED STATES PATENT OFFICE.

JUDSON McFELL, OF CHICAGO, ILLINOIS.

SIGNAL-TRANSMITTER.

988,009.

Specification of Letters Patent.

Patented Mar. 28, 1911.

Application filed August 19, 1909. Serial No. 513,605.

To all whom it may concern.

Be it known that I, JUDSON McFELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Signal-Transmitters, of which the following is a specification.

My invention relates to improvements in signal transmitters, and has for its general object to provide a mechanism for the electrical transmission of signals, adapted to be set to transmit different selective signals at will.

My invention consists in the construction and combinations of parts specified in the claims, and may best be understood through reference to the accompanying drawings, illustrating an embodiment of my invention which I have found to be advantageous in practice.

In said drawings, Figure 1 is an elevation of a transmitter embodying the invention; Fig. 2 is a plan view with parts broken away of the mechanical appliances removed from their casing; Fig. 3 is a detail of a switch; Fig. 4 is a section on line 4-4 of Fig. 2; Fig. 5 is a section on line 5-5 of Fig. 2; Fig. 6 is a section on line 6-6 of Fig. 5; Fig. 7 is a section on line 7-7 of Fig. 4; Fig. 8 is a detached view of one of the carriers; and Fig. 9 is a detail of the positioning lever and associated parts.

In the drawings, 10 indicates, in general, the casing, having secured thereto a front plate, 11, which forms a part of the carrying frame for the mechanism. Said frame is generally made up of the front plate, 11, a center plate, 12, and a rear plate, 13, properly connected in their separated relation by a series of suitable posts, 14 and 14'. The space between the forward plates 11 and 12 I will term the "switching space," and that between plates 12 and 13, the "motor space." The motor proper may be of any desired type, preferably spring-operated and arranged to be wound for each operation. In the construction shown, I provide a gear train, generally indicated at 15, having a winding arbor, 16, driven by a main spring, 17, and governed as to its rate of motion by a governor, 18, of suitable construction. The train may be wound by depression of a handle, 20, carried by a rack rod, 21, engaging the primary gear of the train and

guided in vertical motion by engagement of a slot, 22, in the side of said bar, with a guiding member, 23, mounted on the frame.

The motor serves to operate at a predetermined speed a power shaft, 25, which is arranged to operate the principal switching mechanism. Said power shaft extends from the rear plate 13 through the front plate 11, and a companion shaft, 25', is arranged adjacent the opposite end of the frame, the two shafts being connected for movement in unison but in opposite directions by a pair of intermeshing spur gears, 26 and 26', mounted thereon within the switching space. In general, the parts connected with these two shafts are similar, and therefore, I will describe only one thereof, characteristically like parts being indicated by the same number but those connected with the shaft 25' bearing the exponent prime (').

In front of the gear wheel 26, in the switching space, is a carrier, 27, fast upon the shaft and preferably in the form of a disk or wheel having therein a latch opening, 28, and a series of small holes, 29, which constitute part of the setting mechanism. Loose upon the shaft 25, beyond and normally free for both rotative and axial movement thereon, is an operating barrel, 30, passing through the front plate 11 and bearing on its extremity an operating head, 31. The barrel 30 bears a collar 33, at its inner end, carrying a projection, 34, on which is mounted a switch actuator in the form of an insulated peripherally toothed sector, 35, the teeth of which are arranged to cooperate with a suitable switch, 36, when the sector is rotated while in axially innermost position in the operating plane in which the switch is located. A spring, shown at 37' in Fig. 7, arranged in a coil about the shaft within the barrel, constantly tends to throw the barrel to outermost position, thereby to move the actuator into close proximity to the front plate 11, in which position the segment is removed from the switch or in a plane of disability. Whenever the actuator is axially moved to its operative plane, it is there latched by a latching lever, 39, pivoted, as at 40, to the rear side of the carrier 27, with one extremity forming a tooth, 41, passing through the aperture 28 in the carrier to latch the collar 33 when the actuator is pressed inward to its operative plane, and

the opposite end of said lever, 42, projecting to travel in a path of rotation which will occasion it to strike a tripping abutment, 43, and thereby move to unlatching position against the tension of its spring, 44.

The shiftable sector structure is provided with a pin, 46, arranged for coöperation with the holes, 29, in the carrier when the actuator is moved axially inward, thereby to hold the actuator against rotation on the carrier and to position any determinate number of teeth for coöperation with the electric switch 36 during the rotation of the signal wheel system. Limitation stops, 47 and 48, are provided upon the carrier for confining the free or adjusting rotary movement of the sector with respect to the carrier to that necessary to its engagement with any one of the series of apertures 29. If additional fixed teeth are required on any signaling wheel, they may be provided on the carrier in the operating plane, as indicated at 49.

For convenience in setting the movable sectors, I provide upon the barrel 30 a pointer, 50, arranged to sweep over a dial, 51, the two pointers 50 and 50' being arranged to pass each other in rotation. It will be apparent from an inspection of the drawings, that the two sectors are so mounted relative to each other and to the switches 36 and 36' that the sector 35' appurtenant to what I may term the "tens" wheel system, completes its movement through its operating angle or arc of coöperation with the switch 36' before the sector 35 appurtenant to the "units" wheel commences its operation. Accordingly, the collocation of index and sector is such that, as the pointer 50' is adjusted to any figure on the scale 51', a number of teeth corresponding with the index figure are set back of the long pen of the switch 36', so that when the wheel rotates, such number of teeth will immediately begin to pass the switch. The tripping device, 43', for the tens wheel, may be set anywhere throughout the balance of the circle, as it is only important to release the actuator for movement to disabled position before the rotation nears its end. As to the units devices, however, a closer and more accurate tripping adjustment must be made, as the tripping device, 43, must be so set that it will trip the latch 39 and free the operating sector for movement to disabled position with respect to its switch 36, just as the number of teeth indicated by the hand on the dial have passed the switch 36, so disabling the following teeth from operating on the switch. Accordingly, when the pointer 50 is moved to indicate any desired number on the scale, and the handle 31 is then pushed in to bring the sector to operating position, the carrier in its rotation will cause the indicated number of teeth to pass

the switch before the tripping end, 42, of the latch lever 39 is brought into contact with the stop 43; and then, before another tooth passes the switch, the sector is unlatched and thrown by its spring to disabled or outermost position for the balance of its rotation. Any fixed tooth or teeth, as 49, provided upon either wheel or carrier, will operate invariably and at each revolution of the wheel.

For insuring that the wheel will normally stand in a predetermined position, I provide a positioning lever, 53, pivoted, as at 54, to the frame and pressed by a spring, 55, into engagement with a fixed abutment, 56, in which position said lever stands with a shoulder, 57, in the path of movement of a pin, 58, projecting from the under side of the gear 26'. The winding stem is provided with a projection 60, so that at the termination of the winding movement it moves the positioning lever 53 to unlatched position, thereby freeing the signaling wheels for a complete rotation before the pin 58 again engages the spring-retained positioning lever.

Upon an insulating block, 61, on the back of plate 13 is mounted a spring-opening switch 62, which may suitably be connected in parallel to switches 36 and 36' to shunt them when closed, said switch being normally held closed by a finger 63, mounted upon shaft 16 in such manner that when the said shaft is rotated to wind the motor, the finger is removed from the switch and the latter is permitted to spring open.

Assuming that the two signaling switches 36 and 36' are connected in series in the line with the switch 62 connected normally to short circuit the line switches 36 and 36', the operation of the transmitter will be apparent. The operator, desiring, say, to call station 46, turns the handle 31' of the tens wheel until the pointer 50' points to numeral "4" on dial 51', and then pushes in upon the handle 31'. The rotary movement of the handle brings the operating sector 35 around out of contact with switch 36', to a point where only the last four of its teeth are in rear of the long pen of switch 36' and then the axial displacement of the handle 31' forces the sector axially inward so that its pin 46' engages one of the apertures 29' in the carrier, locking the parts against further rotative displacement, while the latch 41' engages the collar 33' of the handle barrel and holds the sector in, as illustrated in Fig. 7, so that said sector stands in the plane of the switch 36'. In similar fashion, the units pointer 50 is set upon the numeral "6" on its dial, positioning six teeth of the sector to pass the switch 36 before the sector is disabled. Then the winding handle 20 is depressed causing its rack 21 to wind the clock movement, the

first winding motion of the arbor 16 causing the arm 63 to free the switch 63 automatically to spring open, thereby potentiating for operation the two line switches, formerly short circuited by said switch 63. As the shaft 16 completes its advancing or winding movement, the arm 60 thereon engages the extremity of the positioning lever 53, depresses its end to free the pin 58 of the gear 26', and thereby trips the transmitter for rotation of its wheels under the influence of the wound clockwork. The unwinding of the clockwork is controlled by the governor, 18, and the relatively slow rotation imparted to the units signaling devices through the shaft 25 is transferred through the duplicate gears, 26, 26', to the tens signaling devices. As soon as the two wheels start in motion, the tens wheel commences operation, and the four rear teeth, with reference to the direction of rotation of the sector 35, operate the switch 36'. Shortly after the operating angle or arc of the tens wheel has passed the switch 36', the extremity, 42', of the latch lever 39' strikes the fixed trip 43' and is thrown over to release the sector and its barrel for spring return to its initial disabled position. Also just after the tens wheel completes its arc of operation, the sector of the units wheel comes into operative relation with its switch and remains in operative relation until its latching lever 39 strikes the releasing point 33 and frees the sector for movement to disabled position. The setting of the pointer 50 positions the sectors so that the number of teeth indicated by the relation of the handle to the reading scale may pass the switch 36 before the releasing operation occurs; and thereafter, the sector having moved to disabled position, the remaining teeth of the sector do not effect operations of the switch.

The operating arcs of the tens and units wheels may, of course, be of any desired proportion with respect to the full circle of the wheels, and I have shown the sectors as occupying only a small portion of the circumference of the wheel, in order that, after the completion of the operation of the units sector, the mechanism may run idly for a considerable portion of its cycle before the fixed tooth 49 opens the switch. When the cycle of rotation is completed, the pin 58 reengages the positioning bar 53 and the mechanism comes to rest in the same position from which it started.

It will be understood that, while I have herein described in some detail a particular embodiment of my invention, that the specific construction shown is illustrated for purposes of full disclosure and that numerous changes might be made in the embodiment of the invention without departure from its spirit and scope and within the scope of the appended claims.

What I claim is:

1. In a signal transmitter, the combination of a motor providing a rotatable shaft; a switch; a toothed switch-operating part movable into or out of the plane of the switch, and when out of the plane of the switch, rotarily adjustable with respect thereto; means for latching the switch-operating part in fixed relation to the shaft; and means for tripping said latching means.

2. In a signal transmitter, the combination of a motor providing a rotatable shaft, a switch; a toothed actuator for said switch rotarily adjustable upon said shaft in a plane of disability, and axially movable, in different positions of rotary adjustment, into an operating plane; latching means for automatically securing said operating part in said plane for rotation with the switch; tripping means for said latching means; and means for restoring the actuator to the plane of disability when released by the tripping means.

3. In a signal transmitter, a motor providing a rotatable shaft, a carrier on the shaft, a toothed actuator loose upon said shaft, a spring normally maintaining the actuator remote from the carrier in an inoperative plane, a latch for engaging and retaining said actuator in its operative plane, automatic releasing means for said latch, and a switch arranged for cooperation with said actuator only when the latter is in its operative plane.

4. In a signal transmitter, a motor having a rotatable shaft, a switch, a toothed actuator upon the shaft rotatable to selective position to vary a signal and axially movable to operative or inoperative relation to the switch, means for latching the actuator upon the shaft when in its operative plane, and means for automatically restoring the actuator to its inoperative plane.

5. In a signal transmitter, the combination of a motor providing a rotatable part, a carrier thereon, a latch carried by said carrier, latch-releasing means, a toothed actuator for the switch upon said rotatable part, a spring normally maintaining said actuator in an inoperative plane with respect to the switch and wherein it is loose upon the shaft for rotative movement, and positioning means for rotarily connecting the carrier and actuator when the actuator is moved to its operative plane.

6. In a signal transmitter, the combination of a motor; a plurality of carriers driven thereby; toothed actuators for the respective carriers, normally rotatable with respect thereto and in an inoperative plane, and axially movable toward the carriers to an operative plane; means for fixing the actuators against rotative movements with respect to their carriers when in the operative plane; latching means carried by the car-

riers to retain the actuators in the operative plane; tripping means for releasing said latching means; means for automatically moving the actuators to their normal inoperative plane, when freed by the latches; and electrical switching means associated with said actuators, for operation thereby only when said actuators are in their operative plane.

- 10 7. In a signal transmitter, the combination with a spring motor providing a train, a winding handle therefor and a shaft, of a carrier upon the shaft, a barrel loose on said shaft; a toothed actuator carried by
15 said barrel; a spring normally maintaining the actuator in an inoperative plane, wherein it is rotatable to different positions of adjustment with respect to the carrier, said

barrel being movable axially to bring the actuator into an operative plane; latching means for holding said actuator in the operative plane; means for automatically releasing said actuator and returning it to the inoperative plane; an electric switch arranged for operation by the actuator when the latter is in its inoperative plane; a stop determining the normal position of the carrier; and means for freeing the carrier from said stop, controlled by the winding handle.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

JUDSON McFELL.

In the presence of—

W. LINN ALLEN,
MARY F. ALLEN.