

No. 772,459.

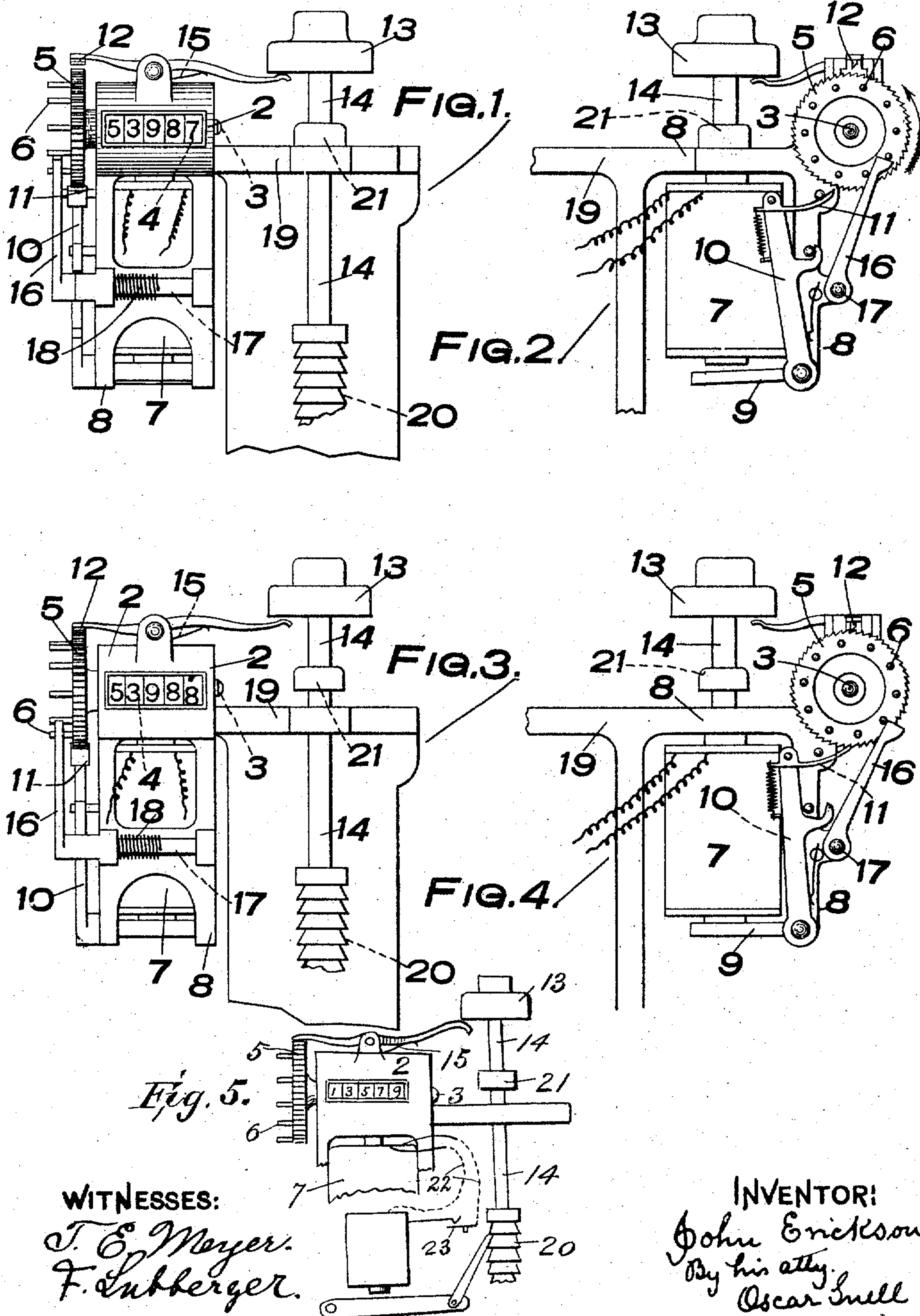
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J. ERICKSON.

COUNTER FOR REGISTERING CALLS FOR AUTOMATIC TELEPHONE
EXCHANGES.

APPLICATION FILED NOV. 15, 1902.

NO MODEL.



UNITED STATES PATENT OFFICE.

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COUNTER FOR REGISTERING CALLS FOR AUTOMATIC TELEPHONE-EXCHANGES.

SPECIFICATION forming part of Letters Patent No. 772,459, dated October 18, 1904.

Application filed November 15, 1902. Serial No. 131,501. (No model.)

To all whom it may concern:

Be it known that I, JOHN ERICKSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have
5 invented a new and useful Counter for Registering Calls for Automatic Telephone-Exchanges, of which the following is a specification.

My invention relates to means for registering only completed cycles of movements of
10 automatic telephone-exchanges; and my object is to construct a registering device which will register only by means of a plurality of movements, and if the cycle of such movements
15 is not completed the registering mechanism is returned to the position it assumed at the end of the last-registered cycle, as is described hereinafter and illustrated in the accompanying drawings, in which—

20 Figure 1 is a front elevation showing the device attached to the top portion of the frame of an automatic telephone-exchange switch, which latter is hereinafter partially described and its relation to the counting device fully
25 explained. Fig. 2 is a side elevation of the mechanism shown in Fig. 1. Figs. 3 and 4 are respectively front and side elevations similar to what is shown in Figs. 1 and 2, but with the mechanism moved from the normal position
30 to illustrate manner of operation. Fig. 5 is a broken diagrammatic view showing the connection between the actuating-motor of the counter and the selector mechanism.

Similar numerals indicate like parts throughout the several views.

35 The counter 2 in this instance is of the ordinary kind having a series of adjacent revolvable short cylinders with the numerals arranged around the periphery and the whole mounted
40 within the casing having a window 4, through which a number of numerals may be seen, the latter being changed to register the successive telephone-calls by the step-by-step movements of the central shaft 3. Ratchet-wheel 5 is
45 firmly mounted on shaft 3 and in this instance is provided with fifty teeth. At the side of the ratchet-wheel are ten projecting stop detents 6 to represent the nine numeral characters from "1" to "9," inclusive, and "0."

An electromagnet 7 is attached to frame 8, 50 of which latter a portion projects downwardly, and at the lower end thereof is pivotally mounted the magnet-armature 9 and an arm 10, connected therewith, the latter terminating in a pawl 11, which is adapted to engage ratchet-
55 wheel 5.

A spring-actuated detent 12 is pivotally mounted at the top of the counter-case, so that one end engages the ratchet-wheel 5, while the other end is adapted to be contacted and
60 the detent disengaged by the downward movement of a projection 13 at the top of switch-shaft 14. Spring 15 serves to yieldingly hold detent 12 in contact with ratchet-wheel 5.

A detent 16 is mounted at the outer end of 65 shaft 17, and the outer end of the detent is held in yielding engagement with detent 6 on ratchet-wheel 5 by virtue of spring 18 on shaft 17.

The top portion of the automatic telephone- 70 switch frame is shown at 19, and 20 indicates a portion of a cylindrical ratchet, through which shaft 14 may be lifted step by step vertically to several different positions.

The magnet 7 is connected with the select- 75 ing mechanism through suitable electrical circuits, which are only shown diagrammatically by the broken lines 22 in Fig. 5. This connection is normally open, as shown by the switch at 23, but may be closed in the usual
80 manner; but as such structures form no part of the present invention it is not thought necessary to further illustrate or describe them.

In the application of this counter to an automatic telephone-exchange the counter is 85 operated electrically, and it is particularly adapted to register calls in that class of automatic telephone-exchanges which comprise a series of selectors and connectors in which a plurality of electrical impulses are necessary
90 to connect one subscriber with another and in which only a complete cycle of movements fully establishes a connection, a partial cycle failing to fully operate the counter, which is caused to release and return to the last-regis- 95
tered number by the release of the switch to which it is attached when the latter assumes the normal position.

In Figs. 1 and 2 the counter and an automatic telephone switch-shaft (shown at 14) are in the normal position, the collar-stop 21 being in contact with the top of frame 19, and the detent-lever 12 is held out of engagement with ratchet-wheel 5 by the contact of the projection 13 with the inner end thereof, and the magnet-armature 9 is out of contact with magnet 7, and arm 10 is in a position when pawl 11 is out of contact with ratchet-wheel 5. Also the resiliency of spring 18 causes the upper end of detent 16 to be held against two of the detent-pins 6 on wheel 5, which latter is held in position thereby with an even row of numerals "53987" in view at the window 4, which we will assume is the number of previous calls that have been made. If now in attempting to make another call the telephone-exchange is operated, the switch-shaft 14 is first lifted the pitch of one tooth on ratchet 20, when the shaft assumes the position shown in Figs. 3 and 4, which permits the detent 12 to fall upon ratchet-wheel 5, and the counter mechanism be placed in position to start to register an additional call. We will assume that before switch-shaft 14 was raised one step, as stated, electromagnet 7 was cut out of all electric circuits, but in raising the shaft this magnet is switched into the circuits which are subsequently used for operating the mechanism at a telephone-exchange to make a call and to release the same and that it requires five separate electrical impulses to accomplish this result. Then lever 10, with its pawl 11, will be operated five times and move ratchet-wheel 5 one-tenth of a revolution, which will add one more call at window 4. If, however, an attempt has been made to call and the called subscriber is busy and no connection can be made, then magnet 7 will be energized but four times, which does not complete the cycle of five, and the parts will assume the positions shown in Figs. 3 and 4, with the numeral 8 within one step of the complete row in Fig. 3, and the detent 16, Fig. 4, held outward by one of the detent-pins 6 within one step of falling therefrom to the locking position shown in Fig. 2. In this incomplete cycle when the telephone-exchange is released the switch-arm shaft 14 will fall to the position shown in Figs. 1 and 2 and permit the detent 12 to rise from ratchet-wheel 5, when detent 16 by its inward or side pressure on one of the pins 6 with which it is in contact will serve to turn ratchet-wheel 5 backwardly until it again assumes the positions shown in Figs. 1 and 2 and no call be registered.

The number of electrical impulses necessary to operate an automatic telephone-exchange varies with the particular system employed and with the number of subscribers in any complete system when selector and connector switches are used, so that the cycle of electrical impulses may be more or less than five and the number of ratchet-teeth on wheel 5

relative to the number of detent-pins 6 may vary; but in every case a plurality of electrical impulses are necessary to complete a cycle of movements in the switches at the telephone-exchange and to fully operate the counter to register such cycle.

I claim as my invention—

1. In a device for registering calls for an automatic telephone-exchange, a counter, and a motor connection between the exchange and the counter adapted to operate the latter a plurality of times in registering one call.

2. In a device for registering calls for an automatic telephone-exchange, a counter, and a motor connection between the exchange and the counter adapted to operate the latter a plurality of times in registering one call, and means adapted to return the counter to the number of the previous call.

3. In a device for registering calls for an automatic telephone-exchange, a counter mechanism, a step-by-step motor connection between the exchange and the counter for operating the latter a certain number of times to complete a cycle of movements and register a call, said connection being provided with means adapted to release the counter and return the latter to the number of the previous call in an incomplete cycle of movements.

4. In a device for registering calls for an automatic telephone-exchange, a counter mechanism having a stop-detent ratchet connected therewith and a detent therefor, and an impulse-ratchet and pawl and detent also connected therewith, the latter ratchet having a plurality of teeth for each of the detent-stops, and means connected with the exchange for operating the impulse-ratchet a plurality of times for each stop-detent.

5. In a device for registering calls for an automatic telephone-exchange, a counter mechanism having a stop-detent ratchet connected therewith and a detent therefor, and an impulse-ratchet and pawl and detent also connected therewith, the latter ratchet having a plurality of teeth for each of the detent-stops, whereby the impulse-ratchet must be operated a plurality of times for each stop-detent to complete a cycle of movements and register a call, and means to release the counter and return the latter to the number of the previous call in an incomplete cycle of movements.

6. In a device for registering calls for an automatic telephone-exchange, a counter, a step-by-step motor connection between the exchange and the counter for operating the latter a certain number of times to complete a cycle of movements and register a call, and means for automatically returning the counter to the number of the previous call at the end of an incomplete cycle of movements and lock it against further backward movement.

7. In a device for registering calls for an automatic telephone-exchange, a counter pro-

vided with a step-by-step mechanism adapted to be operated a plurality of times to register a call, said mechanism including two detents, one of which is spring-pressed and is adapted to automatically return the counter to the number of the previous call at the termination of an incomplete call, and means in the exchange for releasing the other detent at said termination.

10 8. In a device for registering calls for an automatic telephone-exchange, a counter provided with a ratchet mechanism adapted to be operated a plurality of times to register a call, an impulse-pawl and two detents in engagement with said ratchet mechanism, an electromagnet for operating the pawl, a spring for actuating one of the detents, and a reciprocating member for releasing the other detent at the termination of an incomplete call.

20 9. In a device for registering calls for an au-

tomatic telephone-exchange, a counter, a ratchet-wheel connected therewith and provided with stops, the number of stops being an aliquot part of the teeth on the wheel, a pawl and a detent for engaging with the teeth 25 and a detent for engaging with the stops of the ratchet-wheel, an electromagnet for actuating the pawl and a movable member connected with the exchange-switch for releasing the detent from the teeth, and a spring 30 for holding the other detent in engagement with the stops.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN ERICKSON.

Witnesses:

OSCAR SNELL,

CHARLES J. ERICKSON.