(No Model.)

A. VAN WAGENEN.

TRANSMITTER.

No. 588,511. Patented Aug. 17, 1897.

Fig. 1.

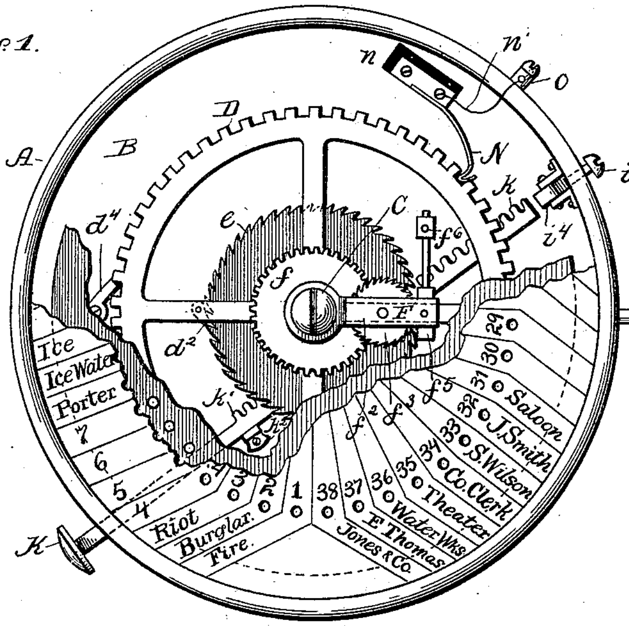


Fig. 1a

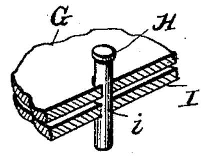


Fig. 2.

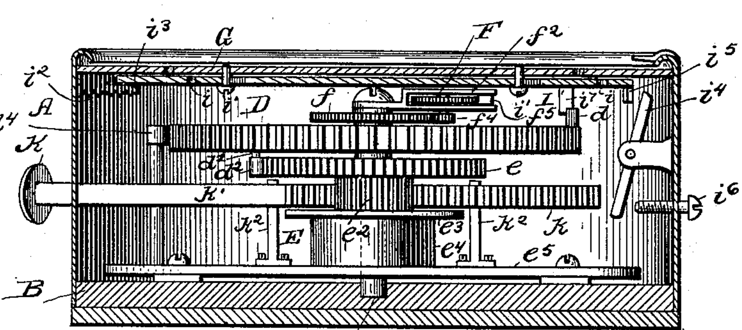
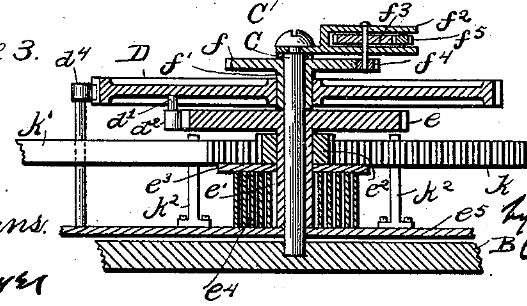


Fig. 3.



Witnesses
Victor J. Evans.
[illegible]

Inventor
A. Van Wagenen.
by [illegible]
Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ANTHONY VAN WAGENEN, OF SIOUX CITY, IOWA.

TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 588,511, dated August 17, 1897.

Application filed April 30, 1896. Serial No. 589,738. (No model.)

To all whom it may concern:

Be it known that I, ANTHONY VAN WAGENEN, a citizen of the United States, residing at Sioux City, in the county of Woodbury and State of Iowa, have invented certain new and useful Improvements in Transmitters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in transmitters for use in systems of electrical intercommunication, and more particularly to improvements in that class thereof designed for use in connection with automatic telephone-exchange systems; and it consists in the improved transmitter, the construction and arrangement of the parts of which will be hereinafter fully described, and particularly pointed out in the claims.

One object of my invention is to provide a transmitter in which the electrical contacts necessary to give any desired signal or operate a switch shall be produced during the continuous forward movement of the circuit making and breaking mechanism used, and in which provision will be made for the continued forward movement of the circuit making and breaking mechanism, after it has performed its function, to its normal or zero position.

A further object of my invention is to provide means for preventing the setting of the indicator at the point to which the circuit making and breaking mechanism is desired to move until sufficient power has been stored in the power mechanism for operating the circuit making and breaking mechanism to cause said mechanism to pass through a complete cycle of movement.

My invention belongs to the class of transmitters especially designed for use in automatic telephone-exchange systems, which is described in the application of Messrs. Clark, Ellacott, and Johnson, filed September 28, 1893, Serial No. 486,748, in the operation of which a circuit making and breaking mechanism is used which is movable in a prescribed path, an indicator is employed movable in the same or a corresponding path and adapted to be set in one or more positions in said path in advance of said circuit making and breaking mechanism, and means are provided for moving said circuit making and breaking mechanism, after each setting of said indicator, to a position corresponding to that occupied by the same.

My improved transmitter differs, however, essentially from that described in the application referred to, in that I provide means for causing the circuit making and breaking mechanism, after it has moved to a position corresponding to that occupied by the indicator, to continue its forward movement until it has reached its normal or zero position, thus rendering it easier for a subscriber to operate the transmitter and also lessening the likelihood of the transmitter being left in such a condition as to continue the communication between two subscribers after the use of the service instrument or telephone has ceased.

In accomplishing the objects of my invention I make use of a revoluble circuit making and breaking wheel, centrally journaled within an inclosing case, and store the power required to cause movement of such circuit making and breaking wheel by manual operation of a push-button projecting outside of the case. A dial is provided which has formed thereon the names, numbers, or other designations of the communications desired to be established, and a series of apertures, one for each such designation, into which plugs or other indicator devices are adapted to be inserted and arrest the movement of the circuit making and breaking wheel at that point, thus causing such circuit making and breaking wheel to properly actuate the switch or other device with which it may be in electrical communication.

In order to insure the storage of sufficient power to properly operate the circuit making and breaking wheel at each actuation thereof, I provide a guard-plate supported directly underneath the dial and having formed therein a series of apertures adapted when in suitable position to register or correspond with the apertures formed in the dial-plate,

but normally held in a suitable manner out of registering position with such apertures, and provide a connection between the guard-plate and the power mechanism for operating the circuit making and breaking wheel such that the guard-plate is only moved into a position where the apertures therein register or correspond with the apertures in the dial when the power required to actuate the circuit making and breaking wheel has been completely stored. I thus make it necessary to store sufficient power in the circuit making and breaking wheel to cause a complete single revolution of the same before it is possible to insert the indicator-plug or other device at the aperture corresponding to the designation of the desired connection. The circuit making and breaking wheel will therefore return unaided to its normal or zero position as soon as the indicator-plug has been withdrawn.

My invention is fully illustrated in the drawings which accompany and form a part of this application, in which the same reference letters refer to the same or corresponding parts, and in which—

Figure 1 is a top plan view of my transmitter, a portion of the dial and of the guard-plate being broken away to show the circuit making and breaking wheel and the operative mechanism in connection therewith. Fig. 1^a is a detail view showing the operation of the indicator-plug. Fig. 2 is a side elevation of my transmitter, the case having been broken away. Fig. 3 is a detail view showing the manner of mounting the circuit making and breaking wheel, the escapement mechanism, and the power mechanism upon the central shaft.

Referring to the drawings, A represents the case of the transmitter. This case may be made of any suitable material, but is preferably made of nickel-plated metal in order to give the same a neat and attractive appearance. The case is formed with a bottom or bed plate B, from the center of which extends upward the central shaft C. Upon the central shaft are loosely mounted the circuit making and breaking wheel D, the power mechanism E, and the main gear-wheel f of the escapement mechanism F. In my present construction the gear-wheel f and the circuit making and breaking wheel move together, while the power mechanism has a movement independent of that of the circuit making and breaking wheel.

The top of the case A is closed by the dial G, upon which are ranged in circular series the names, numbers, or other designations of the connections which are desired to be established through the action of the transmitter. It will be noticed that as the use of this transmitter is not limited to systems of automatic telephone-exchanges I have shown on the dial designations such as "Ice," "Ice-water," &c., which would be customarily used when the transmitter was employed in hotel annunciator systems, and have also shown on the dial designations such as "Riot," "Burglar," &c., which would be found thereon when the transmitter is used for alarm-signals. Any desired designations may be placed on the dial. There are also formed on the surface of the dial a series of apertures corresponding in number to the designations which are placed thereon, in which plugs H are adapted to be inserted and limit the movement of the circuit making and breaking wheel by engaging with the stop d, formed on the upper surface of the same.

The placing of the indicator-plugs into the apertures formed in the dial is normally prevented, however, by the guard-plate I, in which are formed a series of apertures i, corresponding in number to the apertures formed on the dial and adapted when moved in proper position to register with the same and permit passage of the indicator-plugs. The guard-plate I is suspended to the under surface of the dial-plate by headed screws i', which pass through slots formed in the guard-plate. The guard-plate is normally held, so that the apertures formed therein do not register with the apertures formed in the dial, by the spring i^2, which is fastened at one end to the side of the case and at the other end engages with the stop i^3, projecting from the under surface of the guard-plate. The movement of the guard-plate into such a position that the apertures thereof register with the apertures formed in the dial is effected by the engagement of the pivoted lever i^4, mounted, as shown, in a bracket projecting from the side of the case, with the stud i^5, projecting from the under surface of the guard-plate. The pivotal movement of the lever i^4 is effected by the inward thrust of the rack-bar k, which forms a part of the push-button K, and the amount of the pivotal movement thereof possible is limited and determined by the set-screw i^6. The operation of these parts can best be considered after a description of the circuit making and breaking mechanism and the power mechanism for operating the same.

The circuit making and breaking wheel D is rigidly secured to the sleeved portion of the gear-wheel f, which is mounted upon the shaft C. The periphery of the circuit making and breaking wheel is formed with teeth, cogs, or projections equal in number to the number of designations upon the upper surface of the dial-plate or the maximum number of subscribers in the system. With the periphery of the circuit making and breaking wheel engages the contact-spring N, which is mounted upon an insulated base n, as shown, and is connected with a binding-post O by the insulated wire n', and thence to the outlying circuit. The circuit making and breaking wheel D forms the other branch of the circuit, for it is not insulated from the case A, and the case A is provided with a

binding-post O', by which it may be connected with the other pole of the switching-circuit. It will thus be seen that the circuit is broken and made every time a cog upon the circuit making and breaking wheel D passes the contact-spring N.

The mechanism by means of which power is stored for causing revolution of the circuit making and breaking wheel D is as follows: From the under surface of the circuit making and breaking wheel projects a stud d', which bears a pawl d^2, adapted to engage with a gear-wheel e. The gear-wheel e is directly mounted upon the central shaft C and is provided with a sleeve e', upon which are mounted the driving-pinion e^2, the plate e^3, which forms the upper portion of the case provided for the driving-spring, and the driving-spring e^4. The spring e^4 is secured at one end to the sleeve e' and at the other end to the bottom case-plate e^5. It will thus be seen that rotation in one direction of the power-pinion and of the parts connected therewith can take place without movement of the circuit making and breaking wheel, but that the pawl connection between the circuit making and breaking wheel and the gear-wheel e will cause movement of such circuit making and breaking wheel when the power-pinion and the parts connected therewith move in a given direction.

The power required to operate the circuit making and breaking wheel is stored in the power mechanism E by pushing inward the push-button K as the rack k, which is formed on the push-button bar k', engages with the power-pinion e^2 and causes rotation of the same and of the gear-wheel e, to which such pinion is secured. The length of the rack k is so regulated with reference to the size of the pinion e^2 used that a complete inward thrust of the push-button causes such pinion e^2 to rotate through a complete revolution, and thereby to store power in the spring e^4 sufficient to cause the pinion and the parts connected therewith to be returned through a complete cycle of movement before such power is expended.

At the completion of the inward thrust of the push-button K the inner end of the rack-bar k engages with the pivoted lever i^4 and actuates the same, so as to cause it to move the guard-plate I into such position that the apertures formed therein register with the apertures formed in the dial-plate, and thus permit the insertion of the indicator-plug in the aperture corresponding with the connection desired to be made. Guides k^2 are provided for the push-button bar k' in order to hold the rack-bar which is formed thereon in engagement with the pinion e^2. As soon as the push-button K is released, after having been caused to travel through its limit of movement, the spring e^4 acts to cause rotation of the pinion e^2 and the parts connected therewith in a direction opposite to that caused by the inward thrust of the push-button, and thereby causes the engagement of the pawl d^2 with the toothed periphery of the gear-wheel e, and thus a movement of the circuit making and breaking wheel corresponding to that of the power mechanism. Movement of the circuit making and breaking wheel during the storage of power in the operative mechanism therefor is prevented by the engagement of the pawl d^4 with the periphery thereof.

The speed of rotation of the circuit making and breaking wheel is regulated by the escapement mechanism F, which is formed as follows: Upon the central shaft C is loosely journaled the gear-wheel f, to the extended sleeve f' of which the circuit making and breaking wheel D is keyed. On the central shaft, also, just above the gear-wheel f, is rigidly held a frame f^2, which serves to form a support for the escapement-wheel f^3, (which is driven by rotation of the gear-wheel f by means of a pinion f^4, mounted on its bearing-shaft,) and a pivoted pallet f^5, formed with a weighted pendulum-arm f^6, as shown. Thus rotation of the circuit making and breaking wheel results in movement of the gear-wheel f and the train in connection therewith and in the vibration of the pallet f^5. The retarding action thus produced is of a character well known, and is well suited to perform the function for which it is here designed.

The operation of my transmitter is as follows: When a connection is to be made, the push-button K is pressed inward until the inner end thereof engages with the pivoted lever i^4, and thus moves the guard-plate I into such a position that the apertures formed therein register or correspond with the apertures formed in the dial. By the inward thrust of the push-button the pinion e^2 is also turned through a complete revolution, as a result of the engagement therewith of the rack-bar k upon the push-button bar k', and sufficient power is stored in the spring e^4 to return the pinion e^2 and all parts in connection therewith through a complete revolution. When the push-button K has been pressed inward as far as it can be, and the guard-plate I has moved so that the apertures formed therein register with the apertures formed in the dial, the indicator-plug H may be inserted through the aperture on the dial corresponding with the connection which it is desired to make. The push-button may now be released, and the spring e^4 will act to cause revolution of the pinion e^2 in a direction opposite to that which it had when power was being stored in said spring, and as a consequence of the pawl connection of the circuit making and breaking wheel D with the gear-wheel e will also cause the circuit making and breaking wheel D to rotate and to cause during its movement the making and breaking of the circuit by the action of the contact-spring N against its toothed periphery. The

movement of the circuit making and breaking wheel is positively arrested when it reaches a position corresponding to that to which the indicator has been set by the engagement of the lower end of the plug H with the stop *d*, formed on the upper surface of the circuit making and breaking wheel. The desired connection will now be established. Upon removal of the indicator-plug H the circuit making and breaking wheel will continue its forward rotation until it has reached its normal or zero position after having passed through a complete revolution.

The circuit making and breaking wheel is normally locked from movement by the engagement of the stop *d* with the stop i^7, which projects downward from the guard-plate, but which is removed from engagement when such guard-plate is pushed inward by the action of the push-button.

It is apparent that many modifications and changes may be made in the structure which I have herein described without departing from the spirit and scope of my invention, so that I do not limit myself to the precise details of construction shown, but

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

1. In a transmitter, the combination with circuit making and breaking mechanism movable in a prescribed path, forward, and having no return or backward movement, and an indicator adapted to be set in one or more positions in the same or a corresponding path in advance of said circuit making and breaking mechanism and to arrest the operation of said mechanism at a position corresponding to that occupied by said indicator, of power mechanism for operating said circuit making and breaking mechanism, adapted to cause said mechanism to travel over its entire path at each actuation thereof, substantially as described.

2. In a transmitter, the combination with circuit making and breaking mechanism movable in a prescribed path, forward, and having no return or backward movement, a dial-plate having a series of apertures therein, and plugs adapted to be inserted in said apertures in advance of said circuit making and breaking mechanism and arrest the operation of said mechanism, of power mechanism for operating said circuit making and breaking mechanism, adapted to cause said mechanism to travel over its entire path at each actuation thereof, substantially as described.

3. In a transmitter, the combination with revoluble circuit making and breaking mechanism movable in a prescribed path forward and having no return or backward movement, a dial-plate having a series of apertures therein, and plugs adapted to be inserted in said apertures in advance of said circuit making and breaking mechanism, and arrest the operation of said mechanism, of power mechanism for operating said circuit making and breaking mechanism, adapted to cause said mechanism to travel over its entire path at each actuation thereof, substantially as described.

4. In a transmitter, the combination with revoluble circuit making and breaking mechanism movable in a prescribed path forward and having no return or backward movement, a dial-plate having a series of apertures therein, and plugs adapted to be inserted in said apertures in advance of said circuit making and breaking mechanism, and arrest the movement of said mechanism, of a case, a spring attached to said case and connected with said circuit making and breaking mechanism, and means for imparting tension to said spring, substantially as described.

5. In a transmitter, the combination with a revoluble circuit making and breaking wheel movable in a prescribed path forward and having no return or backward movement, a dial-plate having a series of apertures therein, and plugs adapted to be inserted in said apertures in advance of said circuit making and breaking mechanism and arrest the movement of said wheel, of power mechanism for rotating said wheel, substantially as described.

6. In a transmitter, the combination with a revoluble circuit making and breaking wheel movable in a prescribed path forward and having no return or backward movement, a dial-plate having a series of apertures therein, and plugs adapted to be inserted in said apertures and arrest the movement of said wheel, of a case, a spring attached to said case and to said circuit making and breaking mechanism, and means for imparting tension to said spring, substantially as described.

7. In a transmitter, the combination with a case, circuit making and breaking mechanism therein, movable in a prescribed path, forward, and having no return or backward movement, and an indicator adapted to be set in one or more positions in the same or a corresponding path in advance of said circuit making and breaking mechanism, and to arrest the operation of said mechanism at a position corresponding to that occupied by said indicator, of power mechanism for operating said circuit making and breaking mechanism, a hand-operated device outside of said case, and mechanism operated thereby for actuating said power mechanism, substantially as described.

8. In a transmitter, the combination with a case, circuit making and breaking mechanism therein, movable in a prescribed path, forward, and having no return or backward movement, and an indicator adapted to be set in one or more positions in the same or a corresponding path in advance of said circuit making and breaking mechanism, and to arrest the operation of said mechanism at a position corresponding to that occupied by said indicator, of power mechanism for operating

said circuit making and breaking mechanism, a push-button outside of said case, and mechanism operated by said push-button for actuating said power mechanism, substantially as described.

9. In a transmitter, the combination with a case, circuit making and breaking mechanism therein, movable in a prescribed path, and an indicator adapted to be set in one or more positions in the same or a corresponding path in advance of said circuit making and breaking mechanism, and to arrest the operation of said mechanism at a position corresponding to that occupied by said indicator, of power mechanism for operating said circuit making and breaking mechanism, a push-button outside of said case, and a rack-and-pinion connection between said push-button and said power mechanism, substantially as described.

10. In a transmitter, the combination with a case, a revoluble circuit making and breaking wheel movable in a prescribed path forward and having no return or backward movement, a dial having a number of apertures therein, and plugs adapted to be inserted in said apertures in advance of said circuit making and breaking wheel and to arrest the operation thereof, of power mechanism for operating the circuit making and breaking wheel, a push-button outside of said case, and mechanism operated thereby for actuating said power mechanism, substantially as described.

11. In a transmitter, the combination with a case, a central shaft, a circuit making and breaking wheel movable in a prescribed path forward and having no return or backward movement, a dial having a number of apertures therein, and plugs adapted to be inserted in said apertures and arrest the movement of said wheel, of a pinion on said shaft, said pinion and said circuit making and breaking wheel being independently movable, connection between said pinion and said circuit making and breaking wheel, operated when said pinion is moved in one direction, a spring attached to said pinion and to said case, and means for storing power in said spring, substantially as described.

12. In a transmitter, the combination with a case, a central shaft, a circuit making and breaking wheel movable in a prescribed path forward and having no return or backward movement, a dial having a number of apertures therein, and plugs adapted to be inserted in said apertures and arrest the movement of said wheel, of a pinion on said shaft, said pinion and said circuit making and breaking wheel being independently movable, connection between said pinion and said circuit making and breaking wheel, a spring attached to said pinion and to said case, a push-button outside said case, and a rack-bar integral therewith engaging said pinion, substantially as described.

13. In a transmitter, the combination with circuit making and breaking mechanism movable in a prescribed path, forward, and having no return or backward movement, and an indicator adapted to be set in one or more positions in the same or a corresponding path in advance of said circuit making and breaking mechanism, and to arrest the operation of said mechanism at a position corresponding to that occupied by said indicator, of power mechanism for operating said circuit making and breaking mechanism, adapted to cause said mechanism to travel over its entire path at each actuation thereof, and means for preventing backward movement of said circuit making and breaking mechanism, substantially as described.

14. In a transmitter, the combination with a toothed circuit making and breaking wheel movable in a prescribed path forward and having no return or backward movement, a dial-plate having a series of apertures therein, and plugs adapted to be inserted in said apertures in advance of said wheel, of power mechanism for operating said wheel, and a pawl engaging with the periphery of the same for preventing backward movement thereof, substantially as described.

15. In a transmitter, the combination with circuit making and breaking mechanism, a dial having a number of apertures therein, and indicator-plugs adapted to be inserted therein, of a guard-plate having apertures therein adapted to register with the apertures in the dial, means for normally holding said plate so that said apertures do not register, and means for moving said plate to place the apertures in registering position, substantially as described.

16. In a transmitter, the combination with circuit making and breaking mechanism, a dial having a number of apertures therein, and indicator-plugs adapted to be inserted therein, of a guard-plate having apertures therein adapted to register with the apertures on the dial, means for normally holding said plate so that such apertures do not register, and means for moving said plate to place the apertures in registering position, and also operating said circuit making and breaking mechanism, substantially as described.

17. In a transmitter, the combination with a revoluble circuit making and breaking wheel, a dial having a number of apertures, plugs adapted to be inserted in said apertures, and arrest the operation of said wheel, and power mechanism for operating said circuit making and breaking wheel, of a guard-plate having a series of apertures therein adapted to register with the apertures in said dial, means for normally holding said plate so that said apertures do not register, and means for moving said plate so as to place the apertures in registering position, and also actuating said power mechanism, substantially as described.

18. In a transmitter, the combination with circuit making and breaking mechanism mov-

able in a prescribed path forward and having no return or backward movement, of power mechanism for operating the same, means of storing power in said power mechanism, and locking mechanism normally engaging said circuit making and breaking mechanism and preventing movement thereof, but adapted to be thrown out of engagement therewith by the operation of said power-storing mechanism.

In testimony whereof I affix my signature in presence of two witnesses.

ANTHONY VAN WAGENEN.

Witnesses:

C. C. ROSCOE,

ELIZABETH HANKS.