

Feb. 6, 1934.

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1,945,837

REMOTE CONTROL APPARATUS

Filed Dec. 15, 1931

2 Sheets-Sheet 1

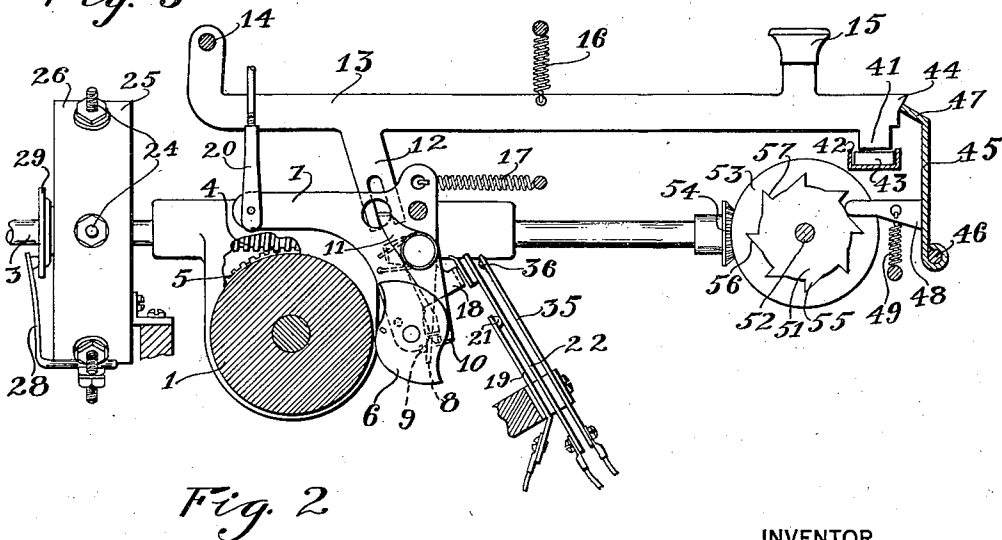
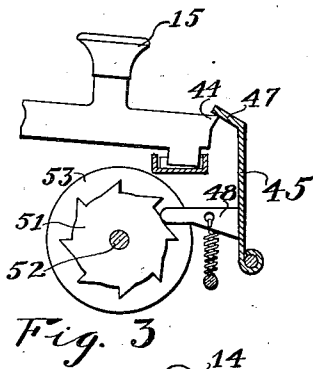
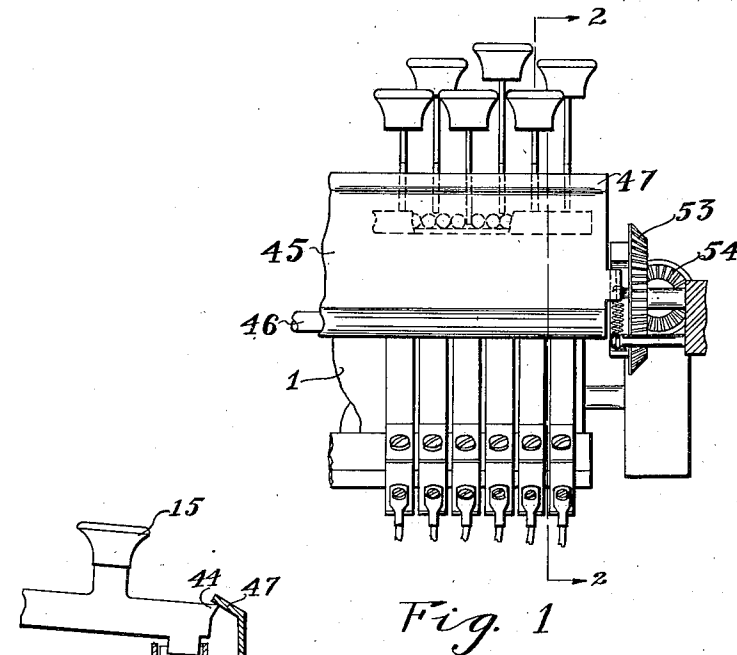


Fig. 2

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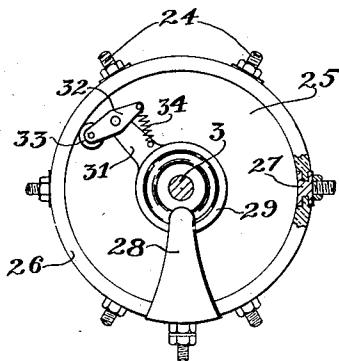


Fig. 5

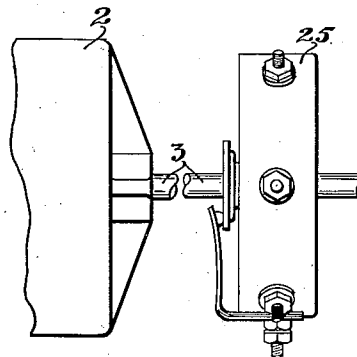


Fig. 4

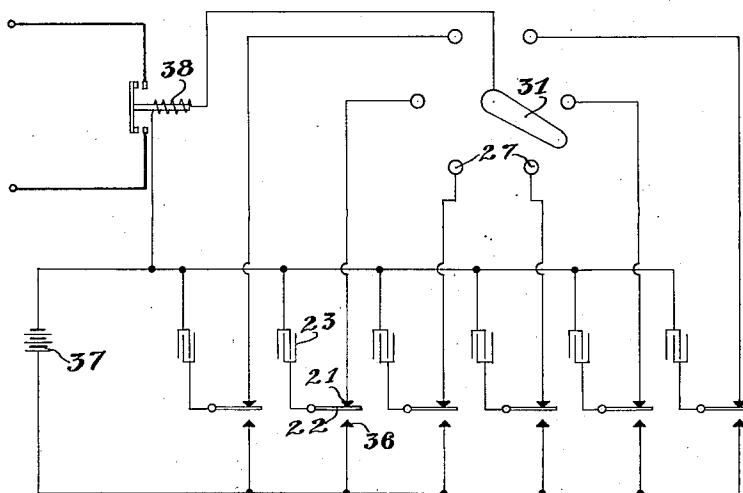


Fig. 6

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1,945,837

REMOTE CONTROL APPARATUS

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Application December 15, 1931

Serial No. 581,173

11 Claims. (Cl. 178—17.5)

This invention relates to remote control apparatus of the kind employed in controlling a remote printing apparatus by means of electrical impulses transmitted by wireless means.

5 In such a system, the transmitting apparatus comprises a suitable key controlled device and the receiving apparatus a suitable printing mechanism controlled by impulses from the transmitting apparatus at some distant point
10 through the agency of an electric wave. In practice, the transmitting apparatus may comprise a power driven typewriting machine of the kind having a power driven printing mechanism and keys for controlling it. The printing mechanism may be readily equipped with
15 means for closing a circuit for controlling the radio impulse. The transmitting apparatus may, however, consist of any suitable key controlled device for selectively operating a plurality of
20 devices for controlling a transmitter.

The printing mechanism of the receiving apparatus may be a similar power operated typewriting machine or a key controlled printing mechanism in which the operation of the keys
25 or the printing devices is controlled by electrical means such as magnets or solenoids. Each of the machines has a separate circuit for each key or corresponding type bar, each of which circuits is connected with a pole or contact
30 point of a commutator. Both the transmitting and receiving apparatus are thus provided with commutators having contacts corresponding to the characters to be transmitted, and each of the commutators has an arm movable
35 into successive engagement with the contacts, such commutator arms of transmitting and receiving apparatus being operated in perfect synchronism so that when the arm engages the contact corresponding to a selected character,
40 as the letter "B" in the transmitting apparatus, the commutator of the receiving apparatus also engages the contact corresponding to said letter "B" to close the proper circuit to print the selected character. In the operation of such a
45 transmitting apparatus, it is imperative that the contact corresponding to the character to be transmitted or to the depressed key be engaged by the arm to transmit the corresponding impulse before a second key is operated.

50 The principal object of this invention is the provision of simple, inexpensive and efficient means for so controlling the operation of the transmitting keys that only one key can be depressed during each complete rotation of the
55 commutator arm, or until the arm has made

contact with each of the commutator terminals, so that any of the condensers in circuit with the contacts which may have been charged by the operation of a key is discharged before the same condenser is recharged by the operation of the same key or another condenser charged by the operation of another key.

Another object of the invention is the provision of means for locking a key against repetition until after the commutator arm has made at least one complete revolution.

Still another object of the invention is the provision of means for locking all the other keys against depression when a key is depressed, so that no key can be depressed until after the commutator arm has made at least one complete revolution.

More specifically, the object of the invention is the provision of transmitting apparatus in remote control having a commutator driven at a speed determined by the speed of a corresponding commutator in a receiving apparatus, a plurality of contacts corresponding to commutator contacts and keys for controlling the closing of said contacts, means being provided for locking all keys against depression except the one depressed when a key is depressed, automatically operating means being provided for locking the key in depressed position, said locking means being automatically released after a minimum time interval, determined by the time required for the commutator to make a complete revolution.

To these and other ends, the invention consists in the construction and arrangement of parts that will appear from the following description when read in conjunction with the accompanying drawings, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a front elevation of so much of a transmitting apparatus as is necessary to illustrate one possible embodiment of the invention;

Fig. 2 is a vertical section of the same taken substantially on line 2—2 of Fig. 1 and looking in the direction of the arrows at said line;

Fig. 3 is a fragmentary view showing the key locking device in another position;

Fig. 4 is a fragmentary view showing the commutator and the driving motor in side elevation;

Fig. 5 is a rear elevation of the commutator, parts being shown in section, and

Fig. 6 is a diagram of the electric wiring.

Referring specifically to the drawings, in which like reference numerals refer to the same part in all the views, 1 is a power driven roller oper-

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actively connected with a suitable source of power, such as the electric motor 2 shown in Fig. 4. The drive shaft 3 of the motor has a worm 4 fixed thereto or made integral therewith which meshes with a worm gear 5 fixed on the shaft of the roller 1.

A cam 6 is revolvably mounted on a bell crank lever 7 in position to operatively engage the power driven roller. The cam 6 is normally out of engagement with the roller, but a spring-pressed arm 8 is pivoted on the bell crank 7 and engages a lug 9 projecting from the cam and tends to turn it into engagement with the roller or a projection on the cam into engagement with a stop 10 on the end of a stop lever 11 also pivoted on the bell crank 7. At its other end, the stop lever is offset laterally and engages the slotted end of an arm 12 projecting downwardly from a key lever 13 pivoted on the common pivot rod 14 and having a key 15 whereby it may be operated. A spring 16 connects the key lever with a fixed part and resiliently retains the lever in normal elevated position. When the key is depressed, it swings the stop lever to release the cam, and the arm 8 then operates to turn the cam into engagement with the power roller to be driven thereby. Rotation of the cam by the roller swings the bell crank lever 7 on which the cam is mounted. A spring 17 may connect the bell crank with a fixed part to insure its return to normal position after each operation when the cam turns to a position out of engagement with the power driven roller and a projection thereon again engages the stop lever.

The bell crank 7 has an arm projecting over the power roller, which may be operatively connected with suitable printing instrumentalities of any usual or well known construction by means of the link 20. The cam 6 is mounted on the other arm of the bell crank which projects downwardly and has a lug 18 projecting therefrom for a purpose presently to be explained.

A resilient contact arm 19 is mounted on the frame of the machine and has a contact 21 thereon which normally engages a resilient arm 22 also mounted on the frame of the machine adjacent to and in parallel relation to the arm 19 from which it is insulated in the usual manner. The contact 21 and arm 22 close a circuit through a condenser 23 and one of a plurality of terminals 24 of a commutator 25. The number of terminals 24 corresponds to the number of keys 15, one being provided for each character to be transmitted.

The commutator 25 is mounted conveniently on the frame of the machine in the embodiment illustrated herein, and is arranged concentric with the axis of the shaft 3. It comprises a ring 26 having a plurality of equally spaced circumferentially arranged contact points 27 connected with the terminals 24, each of which is connected with one of the contact points 21 by means of a suitable conductor. A wiper arm 28 is also mounted on the ring 26 and projects inwardly toward the center of the ring 26 and engages a ring 29 fixed on the shaft 3 to rotate therewith. Secured to or formed integral with the ring 29 is an arm 31 projecting radially therefrom, which carries an arm 32 pivotally mounted on its free end. On one end of the arm 32 is a wiper roller 33 adapted to engage the inner wall of the ring 26 and successively engage the contacts 27 mounted thereon. A spring 34 connects the other end of the arm 32 with a relatively fixed part and resiliently presses the roller 33 into contact with the inner wall of the ring 26. The resilient con-

tact arm 22 has its free end arranged in the path of the lug 18 on the bell crank 7, so that when the bell crank is operated, the lug engages the arm 22 and flexes it away from the contact 21 to break the circuit between the condenser 23 and its commutator contact 27.

A third resilient contact arm 35 is mounted on the frame and projects therefrom in parallel relation with the arms 19 and 22 and spaced from the latter and suitably insulated therefrom. At its free end, the arm 35 is provided with a contact point 36 in the path of the arm 22 so that when the arm 22 is operated to break its contact with the arm 19, it moves into engagement with the contact 36 and closes a circuit therewith through a suitable source of electric energy such as the battery 37 and the condenser 23 to charge the condenser. When the cam releases the bell crank 7 and it is returned to normal position under the action of the spring 17, the arm 22 returns to normal position by virtue of its own resiliency and breaks the circuit through the battery and condenser and reengages the contact 21 to close the circuit from the condenser to its contact 27 in the commutator. The ring 29 and its wiper 33 are connected with the condenser 23 through the arm 28 and a solenoid 38 by means of suitable conductors. When in the circuit with the battery or other source of energy the condenser becomes energized, and when the wiper of the commutator engages its corresponding contact, it closes its circuit through the solenoid 38 and the condenser discharges and energizes the solenoid which operates to close a switch which controls the aerial discharge.

In order that the impulses may be sent out in the same order in which the keys are operated so that there may be no confusion in receiving the same, it is necessary that only one condenser 23 be charged at any one time, since if more than one be charged, they may not be discharged in the same order in which they were charged or the keys depressed, and since they would be received in the order of discharge, there would be confusion in the reception. It is therefore desirable to limit the time interval between successive charges of the condensers or successive depressions of the keys to the time interval required for the commutator to make a complete revolution, during which each of the condensers would be placed in circuit with the solenoid 38 but only a charged condenser would discharge to operate the same. To this end, means are provided for locking all the keys against depression except the one depressed when a key is depressed and while it is depressed, and also locking the depressed key in depressed position during a minimum interval of time measured by the time required for the commutator to make a complete revolution. Each of the key levers 13 is provided with a downwardly projecting lug 41 arranged above the open upper side of a trough 42 horizontally arranged beneath the forward ends of the key levers. Arranged in the trough 42 is a plurality of rollers 43. The combined diameter of the rollers 43 is such that they contact each other and the ends of the trough when a key is depressed and its lug 41 inserted between two adjacent rollers. It will be noted that by this arrangement it is impossible to depress two keys at one time, or to depress another key while a key is depressed. When the depressed key is released and returned to its normal position by its spring 16, its lug 41 is disengaged from between the rollers and another key may be depressed.

Each of the keys is provided with a locking lug 44 at its forward end which has an upwardly and forwardly inclined cam surface which is adapted to cooperate with a pivoted locking member or plate 45. The plate 45 is pivoted on a rod or shaft 46 extending across the front of the apparatus below the keyboard and extends upwardly from said rod. At its upper side, the plate 45 has an upwardly and rearwardly inclined lip 47 which engages the front ends of all the key levers at or adjacent the lower edges of the lugs 44. The plate 45 has a rearwardly projecting arm 48 which is connected with a fixed part by a spring 49 which resiliently presses the lip 47 of the plate into engagement with the front ends of the key levers. By this arrangement, when a key is depressed, it cams the locking plate 45 forwardly against the resiliency of its spring 49. After the lug 44 on the front end of the key passes under the lip 47 on the locking plate, the spring 49 swings the lip rearwardly over the lug which it engages to retain the key in depressed position. As previously stated, automatic means are provided for releasing the locking plate from the depressed key, said means being so timed that the key is released only after a minimum time interval, measured by the interval of time required for the commutator to make a complete revolution. To this end, a star wheel 51 is mounted at one side of the keyboard behind the plate 45. The star wheel is fixed on a shaft 52 which also has a beveled gear 53 fixed thereon. A beveled gear 54 is fixed on the forward end of the shaft 3 and meshes with the beveled gear 53 to drive the star wheel. The star wheel 51 is provided with a plurality of arms 55 spaced equal distances from each other and arranged circumferentially thereon. The arms 55 are arranged to engage the inner end of the arm 48 on the locking plate and swing the locking plate from engagement with the keys to release any key which it may have locked in depressed position. Each of the arms 55 is of the form clearly shown in Fig. 2 of the drawings, having a cam surface 56 on its front side or that side which first engages the arm 48 and on which the arm rides against the tension of its spring to disengage the locking plate from the keys, the depressed key being disengaged at substantially the time when the arm 48 reaches the top or apex of the arm of the wheel. The other side 57 of the arm of the wheel is arranged radially so that when the arm 48 passes over its apex, the spring 49 immediately operates to return the locking plate to its normal position. The gears 53 and 54 are so related that the commutator arm 31 makes a complete revolution, or more than a complete revolution while the star wheel 51 is turned through an arc measured by the distance between two of its adjacent arms.

While a commutator of usual construction is shown and described, it will be understood that any suitable or preferred form of distributor may be employed in its place. It is also well known that an electric current such as that which controls the aerial discharge may be controlled by means of a beam of light directed on a suitable photo-electric cell and controlled by suitable key operated means. It will, therefore, be understood that this invention is not limited to exact construction of the embodiment illustrated herein, and that this application is intended to cover such changes or modifications as come within the spirit of the invention or scope of the following claims.

I claim:

1. A remote control apparatus comprising a plurality of condensers, means for selectively charging said condensers, means for successively closing the circuits of said condensers for discharging the same, and means for limiting the operation of said means for charging said condensers to a maximum of an operation to charge one of said condensers during the time interval required for successively closing all of said condenser circuits.

2. A remote control apparatus comprising a plurality of condensers, a commutator having a plurality of contacts corresponding to said condensers and connected therewith, means for selectively charging said condensers, means movable into successive engagement with said contacts for discharging said condensers, and means for limiting the successive operation of said charging means to a maximum of an operation to charge one only of said condensers during the time interval required for successively closing the circuits of all of said condensers.

3. A remote control apparatus comprising a plurality of condensers, a commutator having a plurality of contacts corresponding to said condensers and connected therewith, means for selectively charging said condensers, an arm movable to successively engage said contacts for discharging said condensers, means for driving said arm at a predetermined rate of speed, and means for limiting the successive operation of said charging means to a maximum of a single operation during the time interval required for moving said arm into successive engagement with all of said contacts.

4. A remote control apparatus comprising a plurality of condensers, keys operable to selectively charge said condensers, means for successively closing the circuits of said condensers for discharging the same, and means for limiting the operation of said keys to a maximum of one key operation during the time interval required for successively closing all of said condenser circuits.

5. A remote control apparatus comprising a plurality of condensers, a plurality of normally open circuits corresponding to said condensers, key controlled means for selectively closing said circuits to charge the condensers, a plurality of contacts in circuit with said condensers, means movable into successive engagement with said plurality of contacts for discharging said condensers, a key corresponding to each of said condensers and operable to close its circuit, and means for limiting the successive operation of said keys to a maximum of one key operation during the time interval required for said movable means to successively engage all of said contacts.

6. A remote control apparatus comprising a plurality of condensers, keys for selectively charging said condensers, a continuously driven member for successively closing the circuits of said condensers for discharging the same, and means for locking said keys against operation until the circuit of the previously charged condenser has been closed to discharge the same.

7. A remote control apparatus comprising a plurality of condensers, a plurality of circuits operable to charge said condensers, a key corresponding to each of said circuits and operable for selectively closing the same to charge said condensers, movable means for successively closing the circuits of said condensers for discharging the same in a predetermined interval of time, means for limiting the minimum time interval between successive operations of the same key to the time

interval required for discharging the condensers, and means for locking all the other keys against operation during said time interval.

8. A remote control apparatus comprising a plurality of condensers, keys for selectively charging said condensers, a continuously driven member for closing the circuits of all of said condensers in a predetermined interval of time for discharging the same, and means for limiting the time interval between successive operations of any of said keys in said predetermined interval of time.

9. A remote control apparatus comprising a plurality of switches, a commutator having contacts corresponding in number to the number of switches, an arm movable into engagement with all of said contacts successively in a predetermined interval of time, keys for selectively controlling the operation of said switches, a locking device cooperating with all of said keys for locking a key in operated position when operated, a star wheel, a plurality of equidistantly spaced arms on said star wheel each adapted to operate the locking device to release the operated key, and means for turning said star wheel through a maximum arc measured by the distance between adjacent arms during said predetermined interval of time.

10. A remote control apparatus comprising a plurality of switches, a commutator having con-

tacts corresponding in number to the number of switches, a revoluble arm movable into engagement with all of said contacts successively in a predetermined interval of time, keys for selectively controlling the operation of said switches, a locking device cooperating with all of said keys for locking a key in operated position when operated, means operable by the operation of any of said keys for locking the other keys against operation while a key is in its operated position, a star wheel, a plurality of equidistantly spaced arms on said star wheel each adapted to release the locking device when the star wheel is rotated, and means for turning the star wheel through a maximum arc measured by the distance between adjacent arms during said predetermined interval of time.

11. A remote control apparatus comprising a transmitting device, a plurality of condensers for controlling the operation of said transmitting device, a distributor having continuously revoluble synchronized means for successively connecting each of said condensers with the transmitter during each complete revolution, a plurality of keys corresponding in number to the number of condensers for selectively charging the same, and means for limiting the maximum operation of said keys to a single key during a complete rotation of said revoluble means.

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