

March 9, 1937.

H. CHIRÈIX

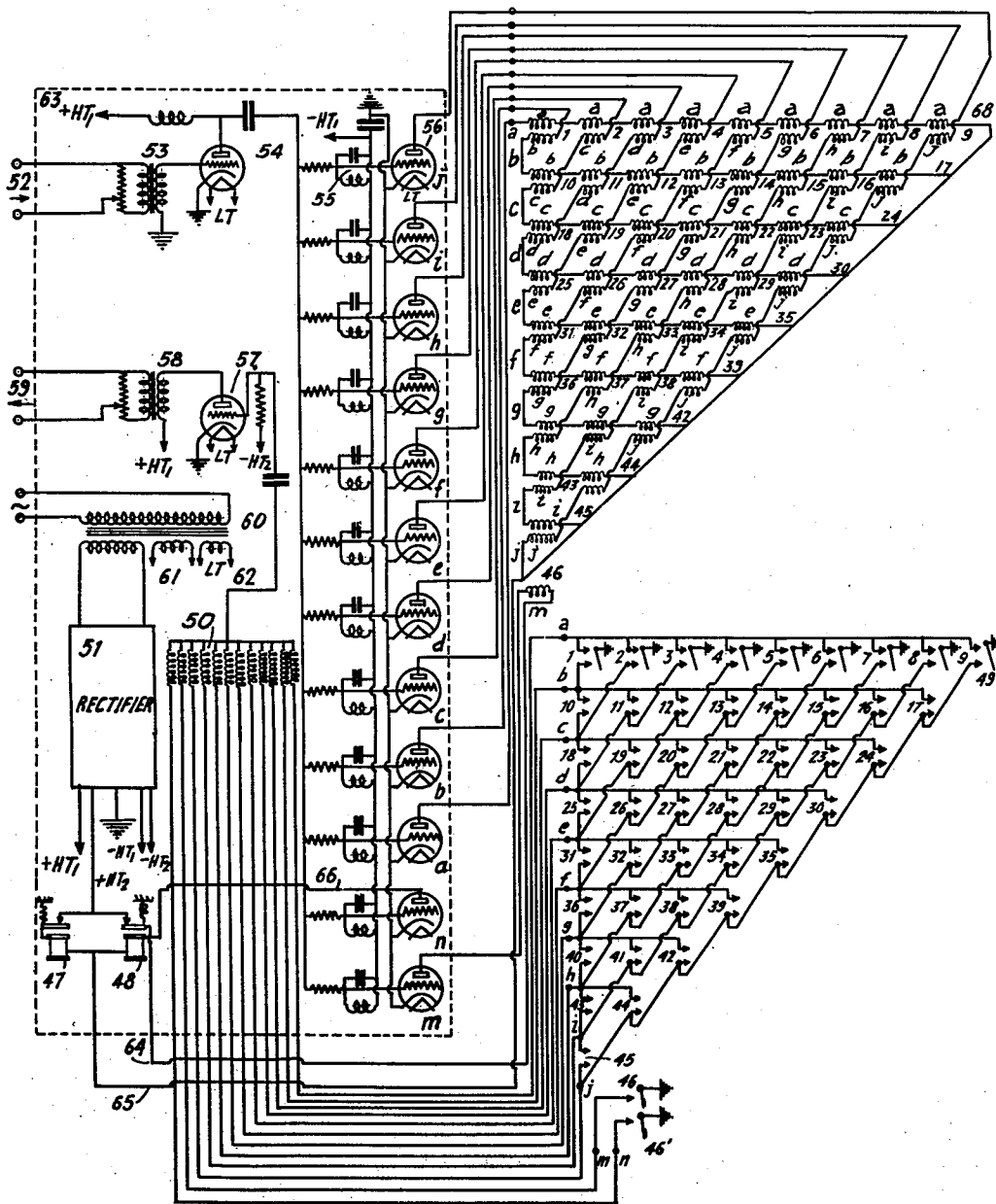
2,073,333

TELEGRAPH SYSTEM

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2 Sheets-Sheet 1

Fig. 1



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Fig. 2

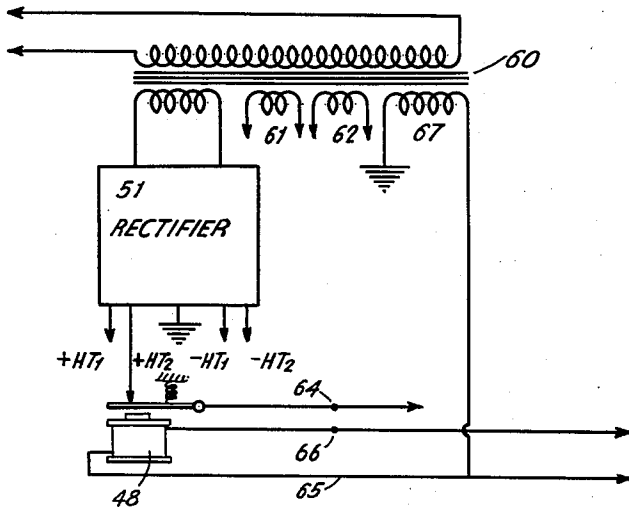
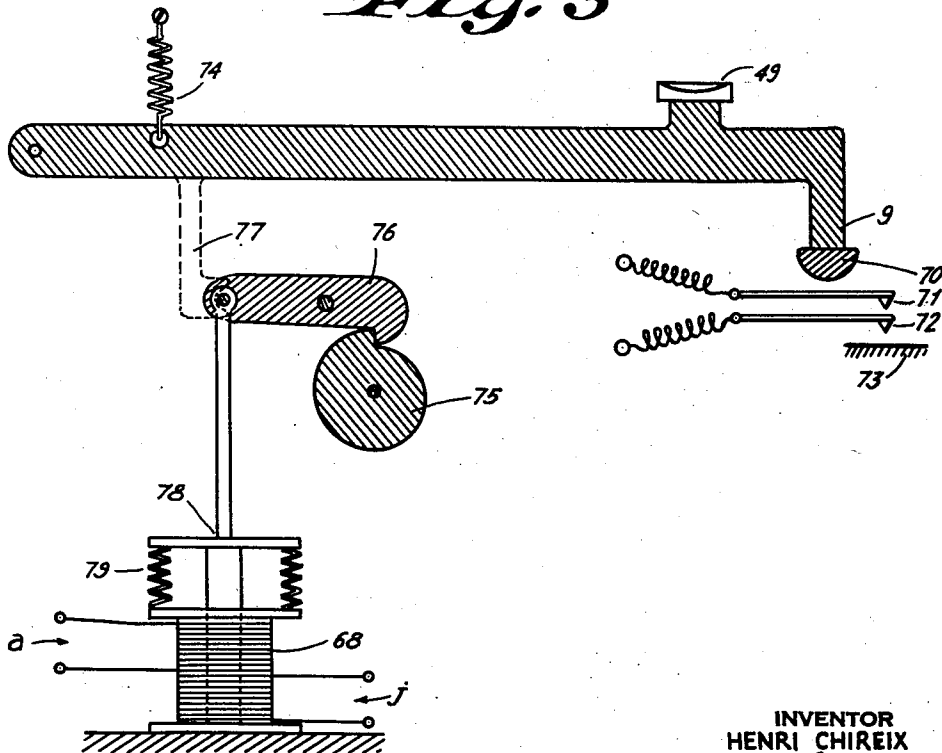


Fig. 3



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TELEGRAPH SYSTEM

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In France May 11, 1933

8 Claims. (Cl. 178—25)

The present invention relates to printing telegraph systems and is more particularly concerned with such systems which are employed in high speed telegraphy.

5 An object of the invention is to provide a device responsive to signals substantially characterized by the transmission of waves each of which is constituted by two superimposed different frequencies, while the receiving system comprises releasing selector relays of the ionized gas grid glow tube type, i. e., a gaseous conduction tube having a control electrode, and known by the trade-name "Thyratron". A gaseous conduction tube of this type has a grid, plate and anode and is characterized by the feature that the glow or flash strikes when a positive potential is applied to the grid, the latter thereafter losing control of the tube, which may be reset by interrupting the plate circuit.

20 The invention will be hereinafter described with reference to the annexed drawings, in which:
Figure 1 shows a circuit diagram of a combined transmitter and receiver according to the invention,

25 Figure 2 shows a modification of the supply of certain grid, gas-filled glow tubes, and
Figure 3 shows an embodiment of the striking key in a machine according to the invention.

The system shown in Figures 1 and 2 allows a typewriter (for example, of the Remington make) of the electric type to be controlled without any modification thereof being necessary, except the addition in the base of the housing of electromagnets such as 68, which directly actuate the key levers, such electromagnets being inserted electrically in the plate circuit of small grid, gas filled tubes 56, of the type mentioned above.

These grid, gas filled tubes, to the number of 12, are themselves excited by very selective circuits of audio frequency and the code employed consists essentially in characterizing each letter or sign by the single transmission (of any duration) of one signal combined of two frequencies selected among 10 possible frequencies. There are thus 45 combinations possible with these 10 frequencies.

The advantage of the system in wireless telegraphy is that the signals may be about seven times longer than in the "start-stop" teletype, and consequently it is possible to take advantage of an excessively sharp resonance over the range of audio frequencies, while no synchronism is, on the other hand, necessary.

The 45 combinations of two frequencies termed 55 from *a* to *j* are employed as follows: 43 of the

combinations are employed for striking all the signs, one is employed for manipulating the space bar, and one is employed for effecting the automatic return of the carriage at the end of the line. The two supplementary frequencies *m* and *n* serve one for passing from "letters" to "figures" and the other for cancelling this operation. There are thus 86 letters or signs actually at the disposal of the operator.

The circuit diagram is quite simple. The received signal incoming at 52 supplies in parallel, through a transformer 53 and an amplifier 54, twelve very selective circuits 55. Each of these circuits is such that the magnification ratio of the circuit, that is to say the ratio of the potential collected or received at the terminals of a reaction element (self induction or capacity) to the drop of potential over the whole of the circuit, which is equivalent at the resonance to an ohmic resistance, is for example of the order of 100:1. The selective circuits are graduated for respectively selecting frequencies between the limits of 500 and 800 cycles per second for example; these circuits themselves supply the glow tubes 56, the plate circuits of which are fed by direct current and lettered *a, b, c, d, e, f, g, h, i, j, . . .*

Each of the electromagnets 68 actuating the levers, comprises two equal coils, that is, 90 coils are employed for the 45 electromagnets numbered 1 to 45. Each plate circuit of the grid, gas filled glow tubes lettered from *a* to *j* therefore comprises in series 9 coils corresponding to 9 different electromagnets. Figure 1 shows the electric circuit diagram of the connections, and it is readily appreciated that each electromagnet is actually fed by two gas filled glow tubes actuated by different frequencies. If, therefore, a certain combination, *bf* for example, is received, 9 electromagnets will be excited by *b* and 9 by *f* but only one will be excited simultaneously by *b* and by *f*. There will consequently be 17 electromagnets excited each by one half the ampere turns exciting the remaining (eighteenth) electromagnet. As the attractive force is proportional to the square of the ampere turns, it is a simple matter to regulate the current so that only the magnet which is fully energized operates.

The "relay" shown at 47 (relay independent of the typewriter) which, if necessary, is made slow acting, is located in the common return lead of all the plate circuits of the 10 glow tubes *a, b, c, d, e, f, g, h, i, j*, and the contact thereof is normally closed. The function of this relay is to cut off the plate current of the flashed glow

tubes for the purpose of resetting the device to rest.

One of the electromagnets numbered from 1 to 45 serves, as has already been explained, to restore the carriage at the end of its motion. The shifting from letters to figures or to capitals, is effected by means of the glow tube *m* which directly operates the corresponding lever by means of the electromagnet 46. It will be noticed that the plate circuit of this glow tube *m* remains closed until the contact of the relay 48 is actuated by the glow tube *n* through the wire 66, which contact is normally closed. The transmission of a single and even brief signal thus controls the shifting from letters to figures. The position striking "figures" will be maintained operative until a signal, which operates the relay 48, cuts off the plate current supplying the electromagnet 46.

The circuit of the relay 48 must, like the circuits of the electromagnets numbered from 1 to 45, be closed by the relay 47 which ensures the de-energization of the gas filled glow tubes. Without this control it would be impossible to shift afresh to capital letters as the circuit of the electromagnet 46 would remain open.

An advantageous modification which is shown in Figure 2 consists in supplying all the glow tubes, except *m*, with alternating current of 50 cycles. Under these conditions, the relay 47 may be dispensed with and replaced by a transformer connected to the mains (primary winding 60, and secondary 67). Nevertheless, the feeding of the glow tube *m* with direct current over the wire 64 is still necessary for the purpose of remaining in the position striking "figures" as long as desired.

The striking for sending signals may also be effected on a typewriter of ordinary character, and in which the lowering of the levers, such as 49, controls, in addition, two contacts determining the frequency of oscillation of two generators among the frequencies available, the sources of which are shown diagrammatically by the windings 50. The frequencies *m* and *n* are controlled by the contacts 46 and 46'. Thus, the transmissions desired are manipulated and transmitted at the transmitting station at 59 after passing through the amplifier 57 and the transformer 58.

The combination corresponding to the automatic return of the carriage may be controlled, not by a key but by a contact provided on the carriage, in such a manner that this movement takes place synchronously at the two stations.

Naturally, the same machine (for example of an electric Remington type) may fulfil at the same time both the functions of transmitter and of receiver by providing it with the electromagnets designated 68 (receivers) and the contacts designated 71 and 72 (transmitters). In this case, the electrical equipment of the transmitting station (audio frequency generators) and of the receiving station (selective circuits 55, and glow tube relays 56) may be grouped into a single box 63 also containing the plate potential rectifier 51, the heating supply by way of the transformer 60 feeding the rectifier valve at 61 and all the glow tubes and amplifiers at 62, in such a manner that the whole may operate from one current supply.

The approximate space taken up by this box would be of the order of 75 x 25 x 40 cm. There is thus obtained a comparatively simple unit.

The same machine (of the Remington electric type for example) may serve as transmitter and

receiver in all cases where it is not desired to have simultaneous transmission and reception.

It is sufficient to this end to remove the mechanical connection between the key levers and the releasing pawls. The key levers then close the contacts controlling the two audio frequency generators, and the pawls of the type carriers are actuated by electromagnets corresponding to the combinations of frequencies transmitted.

This embodiment is shown in Figure 3.

The key lever, for example that of the key 9, when pressed down at 49, closes, by means of the insulating buffer 70, the contacts 71 and 72 connecting to the common return through the mass 73, the two frequencies corresponding to the given sign. The lever is brought back by the spring 74. In an ordinary machine, the striking by a type carrier is released by the driving ratchet 75 which is held by the pawl 76 normally connected with the lever by a fork 77. In a machine according to the invention, this fork is dispensed with and the pawl 76 is actuated by an armature core 78 which is restored by the spring 79, and attracted by the electromagnet 68 carrying two windings *a* and *j* corresponding to the frequencies received which characterize the sign struck.

In this case, the striking of the letters sends out the combinations of frequencies which are transmitted to the receiving station and may, in addition, actuate the transmitting machine thus giving at the same time a copy of the wording despatched, which is thus automatically checked, transmission by the receiving machine being however prevented.

An installation thus comprises in its entirety one machine, and the box mentioned comprises the whole of the electrical equipment of the apparatus.

What I claim and desire to secure by Letters Patent of the United States is:

1. Type writing machine provided with type carriers and remotely controlled by electric signals composed of several frequencies emitted simultaneously, comprising means for collecting the signals, releasing selector relays of the ionized gas type connected to said collecting means for selecting the particular frequencies in the signal, selective circuits interposed between the relays and the means for collecting the signals, electromagnets for actuating the type carriers of the machine circuits comprising each one electromagnet controlling the type carrier responsive to a predetermined frequencies combination and the relays supplying the same combination, said circuits comprising means for energizing the said electromagnet to be operated and for energizing other electromagnets insufficiently to be operated, and means for cutting off the circuits of the energized relays after the operation of the type carrier.

2. Machine according to claim 1, in combination with means comprising electromagnets responsive to a particular signal for returning the carriage of the machine at the end of its travel, said electromagnets being energized by gaseous conduction tubes having grid electrodes.

3. Machine according to claim 1, in combination with means comprising electromagnets responsive to a particular signal for actuating the spacing bar of the machine, said electromagnets being energized by gaseous conduction tubes having grid electrodes.

4. Machine according to claim 1, in combination with means comprising electromagnets re-

sponsive to a particular signal for actuating the mechanism shifting the carriage for the purpose of striking a different series of signs, said electromagnets being energized by gaseous conduction tubes having grid electrodes.

5 5. Machine according to claim 1, in combination with means comprising electromagnets responsive to a particular signal for actuating the mechanism shifting the carriage for the purpose
10 of striking a different series of signs, and means for cutting off the circuits of the said last electromagnets by means of a predetermined signal, said electromagnets being energized by gaseous
15 conduction tubes having grid electrodes, the last mentioned signal being relayed by a single gaseous conduction tube having a grid electrode.

20 6. Machine according to claim 1, in combination with a transmission line, current sources for supplying the frequencies composing the signal, a keyboard the keys of which are adapted to
25 close contacts interconnected between themselves and with the said sources so that each key controls the same simultaneous combination of frequencies which actuates the type carrier corresponding to this key, and means for transmitting

ting a simultaneous combination of predetermined frequencies over the transmission line.

7. Machine according to claim 1, in combination with a source of alternating current interposed in the circuits of the releasing gaseous conduction relays. 5

8. Machine according to claim 1, in combination with a transmission line, current sources for supplying the frequencies composing the signal, a keyboard, the keys of which are adapted to
10 close contacts interconnected between themselves and with the said sources so that each key controls the same simultaneous combination of frequencies which actuates the type carrier corresponding to this key, and means for transmitting
15 a simultaneous combination of predetermined frequencies over the transmission line, in combination with means for dissociating the depression of a key controlling the transmission
20 of a predetermined signal and the action of the control system of a type carrier rendered operating by the same incoming signal, whereby the automatic depression of the key simultaneous
25 with the reception of the corresponding signal is precluded.

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