Aug. 12, 1924. 1,505,055

A. R. MOLINS

SECRET SYSTEM FOR RADIOTELEGRAPHY

Filed May 19, 1922 4 Sheets-Sheet 1

Fig. 1a.

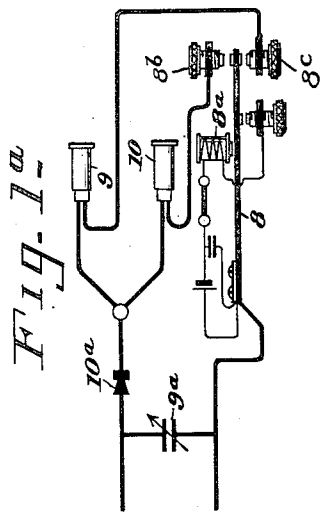


Fig. 2a.

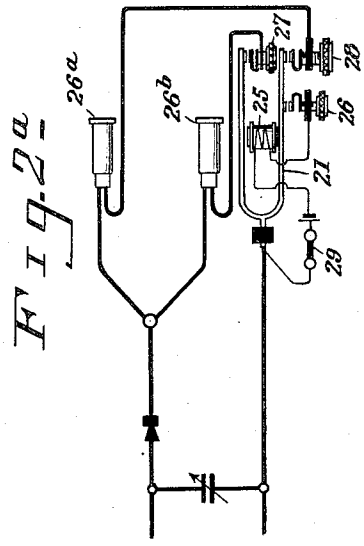


Fig. 1.

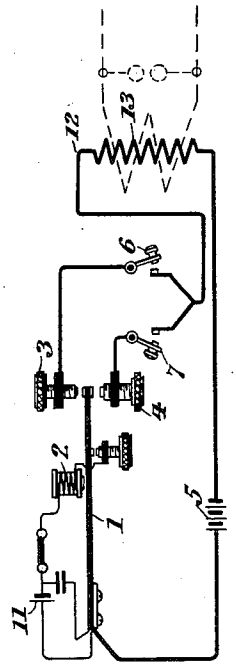
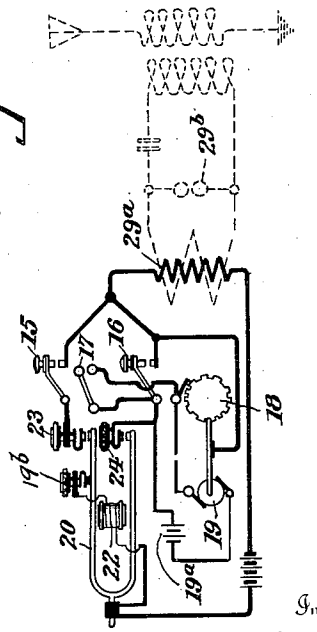


Fig. 2.



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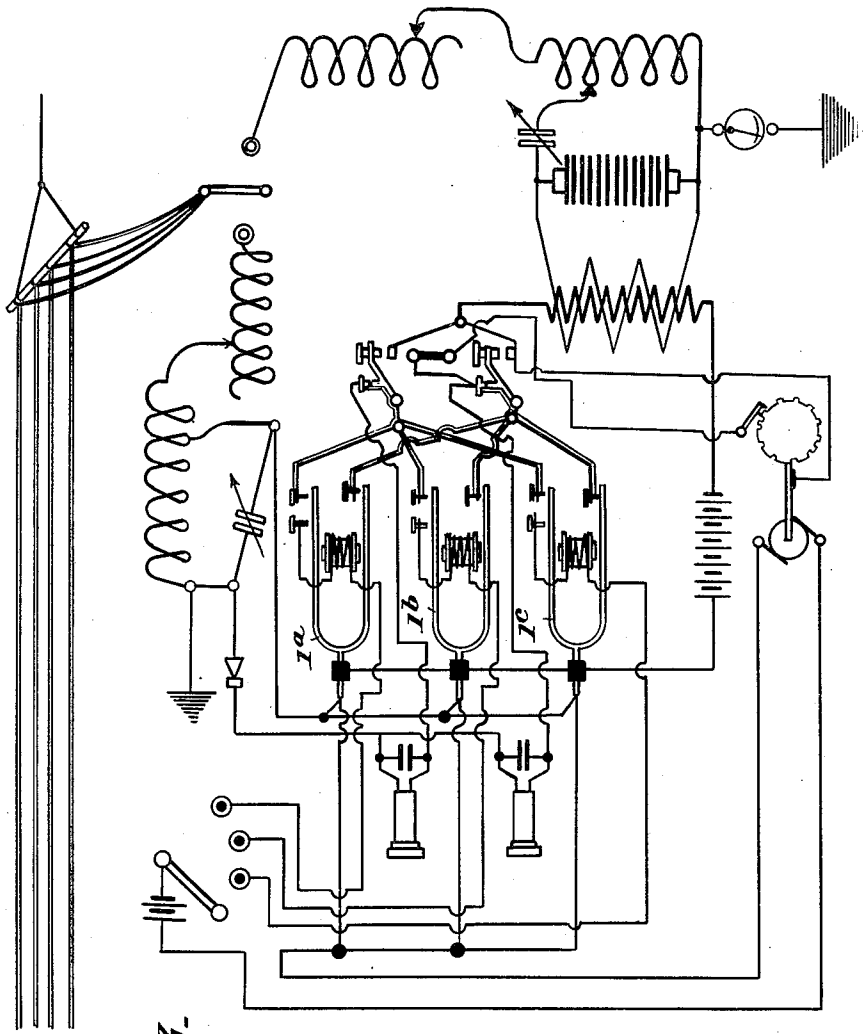


Fig. 2.

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SECRET SYSTEM FOR RADIOTELEGRAPHY

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Fig. 4.

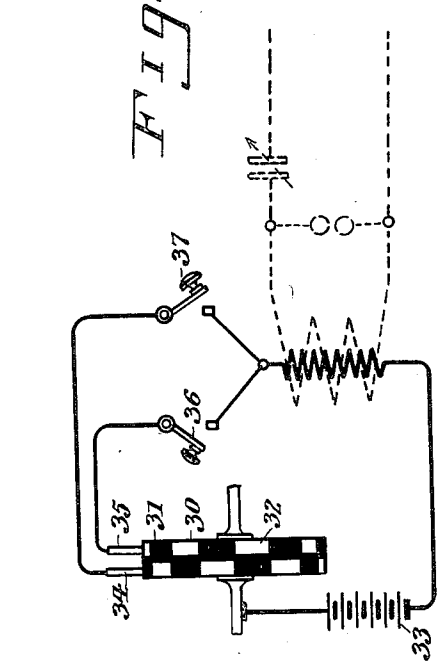


Fig. 4a.

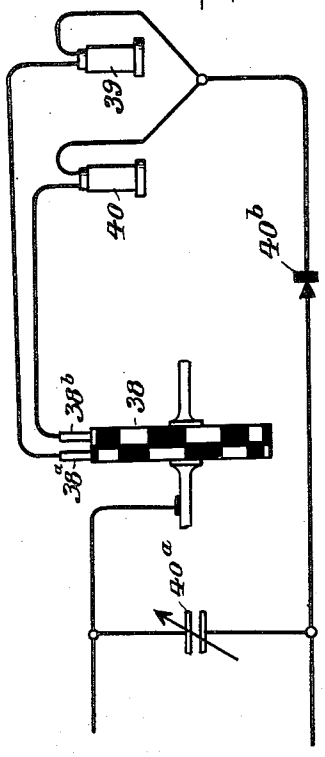
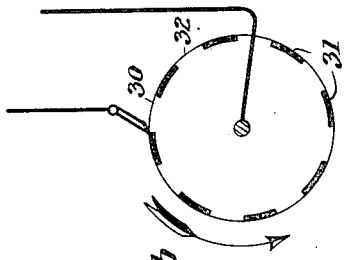


Fig. 4b.



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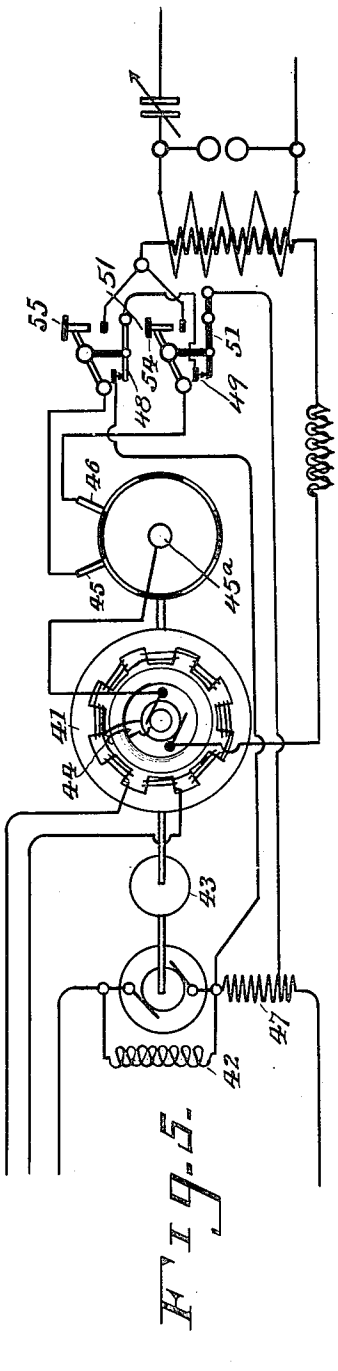


FIG. 5.

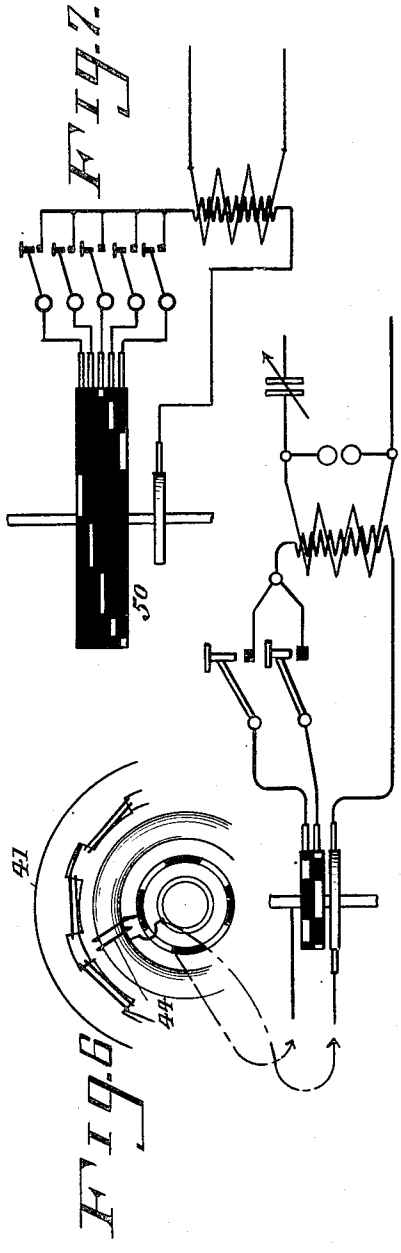


FIG. 7.

FIG. 6.

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Patented Aug. 12, 1924. 1,505,055

UNITED STATES PATENT OFFICE.

AGUSTIN R. MOLINS, OF HABANA, CUBA.

SECRET SYSTEM FOR RADIOTELEGRAPHY.

Application filed May 19, 1922. Serial No. 562,054.

To all whom it may concern:

Be it known that AGUSTIN R. MOLINS, a subject of the King of Spain, residing at Habana, Cuba, Lawton #24, Island of Cuba, has invented certain new and useful Improvements in Secret Systems for Radiotelegraphy, of which the following is a specification.

This invention relates to the secret transmission and reception of radio communications. One of the fundamental principles of this invention is to transmit one, two, three or more radio telegrams or messages which are absolutely mixed, using only one transmitting frequency. This result can be obtained by means of a vibratory or circular movement dividing an electric current in two or more circuits, each one having a telegraphic key.

While I particularly show the application of my invention as used with wireless telegraphy, this process of mixed messages can also be employed for wire telegraphy as well. It will be shown in the description following that the main object of this invention is to keep secret radio communications.

These and other objects are obtained in the radio system described in the following specification and illustrated in the accompanying drawings, in which:

Figure 1 is a diagrammatic view of my invention showing the simplest form or the vibrator solution, and a sending device.

Figure 1[a] shows the receiving end of the vibrator solution.

Figure 2 is a diagrammatic view of a modified form showing the sending device of a tuning fork solution.

Figure 2[a] shows the receiving end of the tuning fork solution.

Figure 3 is a diagrammatic view of another modified form showing the multiplex tuning fork solution.

Figs. 4 and 4[b] are diagrams of a further modification showing the invention by means of a circular interrupter, on the sending device.

Figure 4[a] shows the circular interrupter at the receiving end.

Figures 5 and 6 show diagrammatic views of other modified forms of my invention by means of an alternator solution.

Figure 7 shows the alternator solution employing a multiplex system of keys.

In describing the invention I shall refer to the drawings in which similar reference characters designate corresponding parts thruout the several views, and referring first to my preferred form of the invention known as the vibrator solution as shown in Figures 1 and 1[a], this shall be known as the simplest solution of my invention and the other systems following or modifications, are derived from this first or vibrator solution. Referring to the drawings, the numeral 1 represents a flexible vibrator, which derives its power from an electromagnet 2 connected with an electric cell 11, of the usual or any preferred type and which works similar to the ordinary electric cell. The vibrator 1 with its vibratory movement for example, 400 cycles or more per second makes alternative contact with the screws 3 and 4 dividing in this form the current of the battery 5 into two circuits. These two circuits have operating keys 6 and 7. The vibrator in this case is making about 400 cycles per second so that I will have 400 contacts per second in each circuit 6 and 7. At the point 12 in the primary circuit of transformer 13 the circuit is under control of both keys 6 and 7.

Thus it will be shown that if two radio men send telegrams, one with each key the communication will be absolutely mixed and therefore no radio station can understand the radio telegram except the senders. Consequently the antenna system will radiate a series of signals and at the receiving station there will be a mixed message. At the receiving end as shown in Figure 1[a] we have another vibrator 8 similar to the one shown in Figure 1 and this likewise is driven at a rate of 400 cycles or contacts per second which divides the mixed message in two circuits. One message is received at the telephone 9 and the other one at the telephone 10. The telephone 9 receives the telegram sent by the key 6 in Figure 1 and the telephone 10 receives the message sent by key 7 in Figure 1. The messages received are thus divided by a simple mechanical means, thru the vibrator 8, and the electromagnet driver 8[a]. This vibration causes the vibrator 8 to make contact with the two screws 8[b] and 8[c] shown at the right end. These messages are received by the usual radio receiving apparatus employing a detector 10[a] and then the messages divided and carried into the receivers 9 and 10 respectively. The current received by the antenna system (not shown) charges the condenser

9^a and the rectified current passes thru to the telephones 9 and 10 alternatively by means of the vibrator 8.

Another form of my invention is known as the tuning fork solution which will be seen in Figures 2 and 2^a. I can also obtain the vibratory movement by means of a tuning fork, as is shown by fork 20 at the transmitter in Figure 2 and I also employ one at 21 as shown in Figure 2^a at the receiver end. There will be, of course, the same number of vibratory periods at the sending end as at the receiving end.

When there is a very important message to be sent the radio man in transmitting from his station will, to avoid having his signals read by a station other than that for which the message is intended, transmit with the key 15 which has associated opposite a switch 17. This switch 17 closes what I term a trouble circuit, the trouble circuit comprises a metallic disc 18 notched at its periphery to form a circuit closer with a cooperating brush. Thus the circuit is made and broken just as if the key 16 was transmitting and as if there was another message being sent. The immediate results received are the same as if two telegrams were being transmitted at the same time. The metallic disc 18^c turned by means of a small electric motor 19 which receives its power from the battery 19^a through a circuit formed through the intermittent contact 19^b. In the practical arrangement of the circuits the motor 19 is started when the switch 17 is closed, and remains at rest when the switch 17 is open. The mechanical means employed here in this tuning fork solution will be used in all of the following modified forms or other solutions given in this description. At the transmitting end the tuning fork is driven by the electromagnet 22 which makes alternate contact with the screws 23 and 24, in circuit with the keys 15 and 16. At the receiving end as shown in Figure 2^a the situation is similar, the electromagnet 25 is timed by the screw 26 and the contact of the circuit with the telephones 26^a and 26^b is obtained with the two screws 27 and 28 respectively. A switch 29 is provided in the circuit of the electromagnet 25. The transformer is shown at 29^a and the oscillator at 29^b. These are the usual type as used in nearly all radio apparatus.

A further tuning fork solution is shown in Figure 3 where I employ the same tuning fork as transmitter and receiver. In this device I can employ two, three or any number of tuning forks with different vibratory periods. As shown in the drawings I employ three tuning forks in this solution giving different vibratory periods. 1^a shows a fork having 900 vibratory periods, 1^b shows 700 vibratory cycles and in 1^c shows a fork having 500 vibratory cycles. In the natural operation I use only one of these tuning forks but any of the three tuning forks giving 500, 700 or 900 vibratory cycles per second can be used in combination.

If necessary we can use the three or more tuning forks at the same time transmitting and receiving. As each tuning fork has two keys and two telephones at work, six telegrams will be sent and six received at the same time without the least possible trouble. From this solution it can easily be seen that any number of tuning forks and keys and telephones can be used at the same time. The mechanical means employed in this method is merely a multiplex system of transmitting and receiving the message whereas in Figures 2 and 2^a only one tuning fork is used.

There is another method of obtaining these desired results by means of a circular interrupter solution as shown in Figure 4 and the periodical interruptions that I have obtained by means of a vibratory movement, can also be obtained by a circular movement. The circular interruptive movement is obtained by means of a wheel 30 which has on its periphery spaces of insulation 31 and conductor 32, which alternately receive contact from the collectors 34 and 35. The wheel in this form receives its power from electric battery 33 and the current is divided by the collectors 34 and 35 into two circuits. The circuit from the collector 34 includes a key 37 and the circuit leading from the collector 35 includes a key 36.

At the receiving end as shown in Figure 4^a there is another wheel of similar character 38 which runs at the same speed and divides the current received into a clear message. The message is received thru the collectors 38^a and 38^b in the telephones 39 and 40 respectively. At the receiving end there is the usual type of variable condenser 40^a and the ordinary form of detector 40^b as in the ordinary type of radio apparatus.

The final solution that I have shown in the drawing is known as the alternator solution as shown in Figures 5, 6 and 7 of the drawing. The alternator 41 is driven by an electric motor 42 and is maintained in constant angular speed by means of the regulator 43. When the bobbins 44 are between two pole faces the current produced is zero and it is at this time that the collectors 45 and 46 change the connections with keys 54 and 55 by means of the commutator 45^a formed of insulating material, which is of a similar character as shown in Figure 4.

The fields of the motor and of the alternator are supplied separately and the motor field includes a resistance 47 for regulating speed. When either key 54 or 55 is depressed the motor will tend to increase its speed, but the resistance 47 is partially cut out and the

angular speed thereby remains constant. The contact members 48 and 49 pivoted at 51 are closed accordingly as keys 55 and 54 are depressed and arranged to regulate the insertion of the resistance 47 in the motor field. This action is simultaneous with the operation of the keys 54 and 55.

It will be understood that I can employ any number of keys at the transmitting end and in Figure 7 I have shown 5, but 7, 10 or more may be employed. At the receiving end which is similar to the device shown in Figure 4a, the operation is similar and the mixed message is divided as shown in Figure 4a. If the transmitter has 5 keys there will of necessity be 5 telephones employed on the receiving end.

All of the solutions that I have shown are very simple in operation and are ideal for military purposes. They may be used in aeroplanes, the advance lines in an army, and on all small naval vessels.

The alternator solution is designed to be used for large naval fleets, and all powerful stations such as transoceanic transmitting stations but this can also be used for smaller stations.

From the foregoing, it will be seen that I have provided a simple, inexpensive and mechanical means for carrying out the objects of my invention, and modifications in the electrical circuits, and radio receiving apparatus with which my invention is employed, etc. can be readily made. Every radio station to-day can be fitted with this invention at very little expense.

While I have particularly described the elements best adapted to perform the functions set forth, it is obvious that various changes in form, proportion, and in the minor details of construction may be resorted to, within the scope of the appended claims, without departing from the spirit or sacrificing any of the principles of this invention.

What I claim is:

1. A secret radio communication system, comprising in combination a radio transmitting apparatus, a control circuit, a tuning fork located in said control circuit, a plurality of contacts carried on one side of said fork and a single contact carried on the other side of said fork, an electromagnet electrically connected to a source of supply with one of said contacts whereby said tuning fork is continuously vibrated, a keying circuit connected in series with said control circuit and one of said contacts on one side of said fork, an automatic transmitting device connected in series with said control circuit and the other contact on the opposite side of said fork whereby said transmitter is caused to radiate a series of signals during spaced intervals in said keying circuit, and receiving means at the radio receiving station responsive to signals transmitted by said keying circuit but irresponsive to signals transmitted by said automatic transmitting device.

2. A system of secret radio communication, comprising in combination a radio transmitter, a control circuit for said transmitter, a source of energy in said control circuit, a set of keying circuits connected with said control circuit and arranged to be alternately connected with said source of energy, a circuit connected to each of said keying circuits for maintaining said source of energy constant during signaling, and a receiving apparatus including a rectifier, a set of separate telephones, means for connecting one of said telephones alternately with said rectifier whereby one of said telephones receives signals transmitted by one of said keying circuits.

3. A secret system for radio signaling, comprising in combination a radio transmitter, a control circuit for said transmitter, vibrating means located in said control circuit, a pair of keying circuits arranged to be alternately connected with said control circuit through said vibrating means, an automatic repeating transmitter arranged to be substituted for one of said keying circuits, a radio receiving station including in combination means for receiving the signal energy, a rectifier, a responsive circuit connected with said rectifier, vibrating means in said circuit, and a pair of telephones arranged to be alternately connected with said rectifier through said vibrating means whereby said telephones separately respond to signals transmitted upon operation of the separate keying circuits or to signals transmitted by one of said keying circuits and automatic repeating transmitter.

4. A secret system for radio signaling, comprising in combination a radio transmitter, a control circuit for said transmitter, vibrating means located in said control circuit, a pair of keying circuits arranged to be alternately connected with said control circuit through said vibrating means, a radio receiving station including in combination means for receiving the signal energy, a rectifier, a responsive circuit connected with said rectifier, vibrating means in said circuit, and a pair of telephones arranged to be alternately connected with said rectifier through said vibrating means whereby said telephones separately respond to signals transmitted upon operation of the separate keying circuits.

5. A system of secret radio transmission and reception, comprising in combination a radio transmitter, a control circuit for said transmitter, a pair of keys for separately closing said control circuit, continuous vibratory means located in said control circuit, contacts located on opposite sides of

said vibratory means, one of said contacts being connected with one of said keys and the other of said contacts being connected with the other of said keys, a radio receiving station including radio receiving apparatus, a rectifier, a responsive circuit, a pair of separate telephones in said circuit, vibratory means, a contact located on one side of said vibratory means and connected with one of said telephones and another contact located on the opposite side of said vibratory means and connected with the other of said telephones whereby one of said keys at the transmitting station operates one of said telephones at the receiving station and the other of said keys at the transmitting station operates the other of said telephones at the receiving station.

In testimony whereof I affix my signature.

AGUSTIN R. MOLINS.