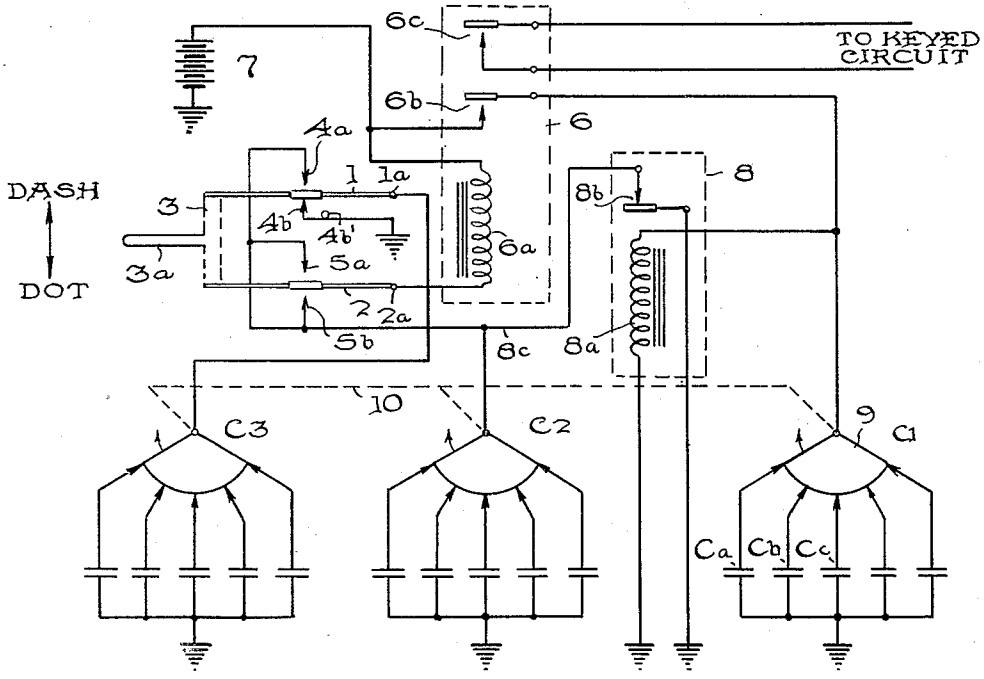
Aug. 17, 1948. D. PARSON, JR 2,447,088

KEYING SYSTEM

Filed June 5, 1946

Fig. 1.



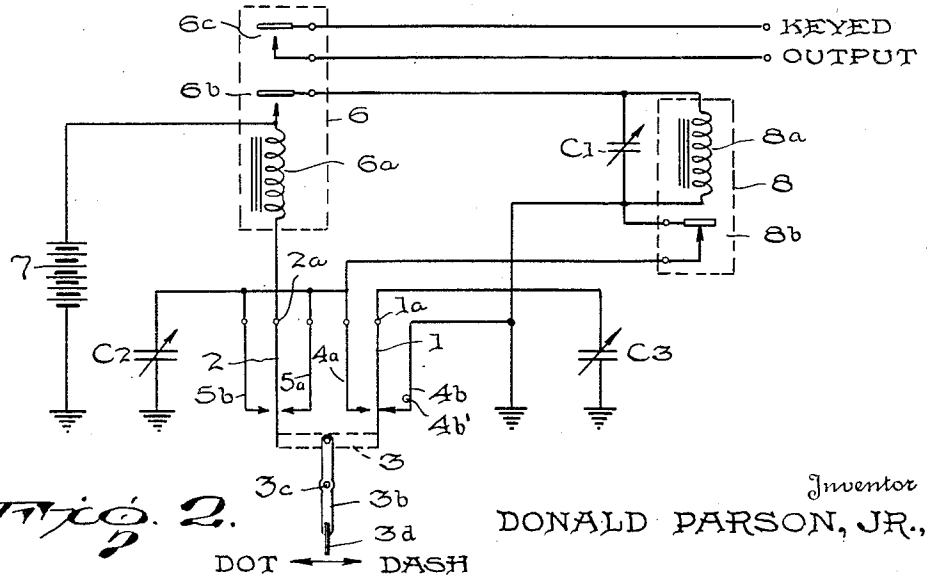


Fig. 2.

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KEYING SYSTEM

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8 Claims. (Cl. 178—82)

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This invention relates to a keying system useful in transmitting telegraph signals, and it is especially concerned with keying systems of the type in which "dash" signals are transmitted automatically so long as the key is held in one position and "dot" signals are transmitted automatically so long as the key is held in another position.

Keying systems of this general type are already known but some of these prior systems are rather complicated and require special power sources for the operation of vacuum tube elements, and other systems which do not employ vacuum tube elements involve the use of duplicate relay systems for transmitting the "dot" and "dash" signals.

An object of my invention is to devise a keying system of the type described which is simple in construction, requires few parts, and is inexpensive to manufacture.

Another object of the invention is to devise a keying system of the type described which does not require the use of vacuum tubes with their special power supply sources but depends for its operation upon ordinary electromagnetic relays.

The keying system of my invention involves only two relays and three condensers in addition to the usual key and source of current.

According to the preferred form of my invention a transmitting relay is energized immediately when the key is moved to either position, and the energizing circuit of this relay is completed through normally closed contacts of a spacing relay which has a condenser shunted around its winding to prevent immediate closing of its contacts after its energizing circuit has been opened. The spacing relay also has a condenser shunted around its normally closed contacts, and this second condenser serves to prolong the energization of the transmitting relay after the contacts of the spacing relay have opened. In the "dash" position of the key a third condenser is connected in parallel with the second condenser to still further prolong the time of energization of the transmitting relay after the contacts of the spacing relay have opened. In the "dot" and "neutral" position of the key, the third condenser is short-circuited to dissipate the charge thereon.

My invention is illustrated in the accompanying drawing in which

Figure 1 is a circuit diagram schematically illustrating the preferred form of the invention; and

Figure 2 is a simplified diagram illustrating the same circuit arrangement shown in Figure 1 but adapted for use of a different type of key.

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Referring to Figure 1 of the drawing the key is formed of two parallel switch blades 1 and 2 supported at their ends 1*a* and 2*a*. The outer ends of these blades are joined by a suitable insulating connection 3 having a forwardly extending finger piece 3*a* by which the blades 1 and 2 may be moved simultaneously to one side or the other of their normal positions. Blade 1 is normally positioned between a pair of fixed contacts 4*a* and 4*b* and blade 2 is likewise normally positioned between a pair of fixed contacts 5*a* and 5*b*. In the neutral position of the key the blades do not make contact with contacts 4*a*, 5*a* and 5*b*, but contact 4*b* engages blade 1. This contact is mounted on a spring support so the blade 1 may be moved to the "dot" position, but a stop 4*b'* prevents the contact 4*b* from following the blade to the "dash" position. A transmitting relay represented within the dotted rectangle 6 has an energizing winding 6*a* one terminal of which is connected to blade 2 and the other terminal being connected to a suitable source of energizing current represented by the battery 7. The other terminal of the source 7 is grounded or connected to a suitable return circuit. A "spacing" relay represented within the dotted rectangle 8 has an energizing winding 8*a*, one terminal of which is grounded and the other terminal is connected through contact 6*b* of relay 6 to source 7. The contacts 8*b* of relay 8 are normally closed and serve to complete a connection from ground to fixed contacts 4*a*, 5*a* and 5*b* of the key through conductor 8c. Fixed contact 4*b* of the key is grounded.

The circuit to be keyed is controlled by normally open contacts 6c of relay 6.

A variable condenser C1 is connected in shunt to the energizing winding 8*a* of relay 8, and while this variable condenser may be of any suitable construction, it is shown in the drawing as being formed of a plurality of small condensers C*a*, C*b*, C*c*, etc., which may be connected in parallel by means of a rotary sector switch 9. A second variable condenser C2 is connected from the conductor 8c to ground, and this condenser may be constructed in the same manner as condenser C1. A third variable condenser C3 is connected from the blade 1 of the key to ground. The rotary switch blades of the condensers C1, C2 and C3 may be connected together for simultaneous operation by any suitable mechanical means represented by the dotted lines 10.

Operation of the arrangement shown in Figure 1 is as follows: Assume that the key is moved to the "dot" position, the circuit for energizing the transmitting relay 6 may be traced from source

7 through the winding 6a through blade 2 of the key to contact 5b through connection 8c to contacts 8b of spacing relay 8 and to ground back to the other terminal of source 7. Completion of this circuit causes immediate closing of contacts 6b and 6c of transmitting relay 6. Contact 6b completes an energizing circuit for spacing relay 8, and contact 6c closes the circuit to be keyed. Relay 8 operates immediately and opens the original energizing circuit for relay 6 at contacts 8b, but relay 6 does not release immediately because the opening of contacts 8b inserts condenser C2 in series with the relay winding 6a, and the charging of this condenser from the source 7 serves to prolong the energization of relay 6 after opening of the contacts 8b. As soon as condenser C2 becomes charged to a predetermined amount, and its charging current diminished to a value insufficient to maintain relay 6 in the operated position, relay 6 releases, and the transmitting circuit is opened at contact 6c. Also, the circuit of spacing relay 8 is opened at contact 6b, but this relay does not release immediately by reason of the fact that the condenser C1 discharges through the winding 8a.

As soon as condenser C1 has discharged to a predetermined amount, contact 8b of relay 8 closes and reenergizes the winding 6a of relay 6 and also discharging condenser C2 (and C3 if on "dashes") to repeat the cycle described above.

From the foregoing it will be understood that the duration of the "dot" signal will be determined by the value of condenser C2, and the duration of the interval between "dot" signals is determined by the value of condenser C1.

The operation of Figure 1 when the key is moved to the "dash" position is the same as that described above for the "dot" position except that in this case condenser C3 is connected in parallel with condenser C2 by engagement of key blade 1 with the fixed contact 4a. This connection effectively increases the capacity connected in series with transmitting relay winding 6a when the contacts 8b of spacing relay 8 are open, and thereby increases the time interval during which the transmitting relay 6 remains energized. This connection does not increase the interval between successive "dash" signals, since this interval is determined by the value of condenser C1 alone.

In the "dot" and "neutral" positions of the key, condenser C3 is short-circuited to dissipate any charge which may have been impressed thereon in the "dash" position of the key.

By varying the values of condensers C1, C2 and C3, any desired relation may be obtained between the length of the "dot" interval, the "dash" interval, and the space interval between signals. By providing for the simultaneous variation of these three condensers by the interlocking control means represented at 10, it is possible to adjust the keying circuit for fast or slow operation to suit different operators. For example, if one operator wishes to send at a relatively slow rate, the control 10 would be moved in a direction to increase the values of condensers C1, C2 and C3, whereas for an operator who transmits at a greater speed the control 10 would be adjusted so that these condensers would have smaller values. The control 10 might be provided with a scale which would indicate the speed of operation in "words per minute" for any given setting.

Figure 2 is a simplified circuit diagram of the same circuit illustrated in Figure 1 with certain changes, and elements in this figure which perform the same function as elements in Figure 1 are indicated by like reference numerals. The main difference between Figures 1 and 2 is in the arrangement for operating the key. In Figure 2, instead of using a finger extension mounted directly on the insulating connection 3 between the two key blades 1 and 2, the key is operated by means of a lever 3b pivoted at 3c and having one end connected to the insulating bar 3. The free end of the lever 3b is provided with a finger piece 3d by which the key is operated. Another slight change in Figure 2 from the arrangement shown in Figure 1 is that contacts 4a and 4b are arranged on opposite sides of the blade 1. The operation of Figure 2 is believed to be clear from the foregoing description of operation of Figure 1.

I claim:

1. In a keying system, the combination of a transmitting relay having two sets of normally open contacts, a spacing relay having a set of normally closed contacts, a transmitting key having two transmitting positions, circuit connections controlled by said key in both transmitting positions for completing an energizing circuit for said transmitting relay through the normally closed contacts of said spacing relay, an energizing circuit for said spacing relay controlled by one set of contacts of said transmitting relay, a condenser shunted across the windings of said spacing relay to delay the release thereof, a second condenser connected across the contacts of said spacing relay to prolong the energization of said transmitting relay after opening of the contacts of said spacing relay, and a circuit controlled by said transmitting key in one transmitting position for connecting a third condenser in parallel with said second condenser.

2. A keying system according to claim 1 and including interlocking control means for simultaneously increasing or decreasing the values of said three condensers.

3. In a keying system, the combination of a transmitting relay having two sets of normally open contacts, a spacing relay having a set of normally closed contacts, a transmitting key having two transmitting positions, circuit connections controlled by said key in both transmitting positions for completing an energizing circuit for said transmitting relay through the normally closed contacts of said spacing relay, an energizing circuit for said spacing relay controlled by one set of contacts of said transmitting relay, a condenser connected across the contacts of said spacing relay to prolong the energization of said transmitting relay after opening of the contacts of said spacing relay, a second condenser, and a circuit controlled by said transmitting key in one transmitting position for connecting said second condenser in parallel with said first-mentioned condenser.

4. A keying system according to claim 3 and including interlocking control means for simultaneously increasing or decreasing the values of said two condensers.

5. In a keying system, the combination of a transmitting relay having a set of normally open contacts, a spacing relay having a set of normally closed contacts, a transmitting key having two transmitting positions, circuit connections controlled by said key in both transmitting positions for completing an energizing circuit for said transmitting relay through the normally closed contacts of said spacing relay, an energizing circuit for said spacing relay controlled by the nor-

mally open contacts of said transmitting relay, a condenser connected across the contacts of said spacing relay to prolong the energization of said transmitting relay after opening of the contacts of said spacing relay, and means controlled by said transmitting key in one position thereof for increasing the value of said condenser.

6. In a keying system, the combination of a transmitting relay having a set of normally open contacts, a spacing relay having a set of normally closed contacts, a transmitting key having two transmitting positions, circuit connections controlled by said key in both transmitting positions for completing an energizing circuit for said transmitting relay through the normally closed contacts of said spacing relay, an energizing circuit for said spacing relay completed by the normally open contacts of said transmitting relay, and circuit connections controlled by said transmitting key for connecting different values of capacity across the contacts of said relay in different transmitting positions of said key.

7. A keying system according to claim 1 wherein said key has a neutral position between said transmitting positions, and including contacts controlled by said key for shortcircuiting said third condenser in one of said transmitting positions and in said neutral position.

8. A keying system according to claim 3 wherein said key has a neutral position between said transmitting positions, and including contacts controlled by said key for shortcircuiting said second condenser in one transmitting position and in said neutral position.

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