

April 18, 1933.

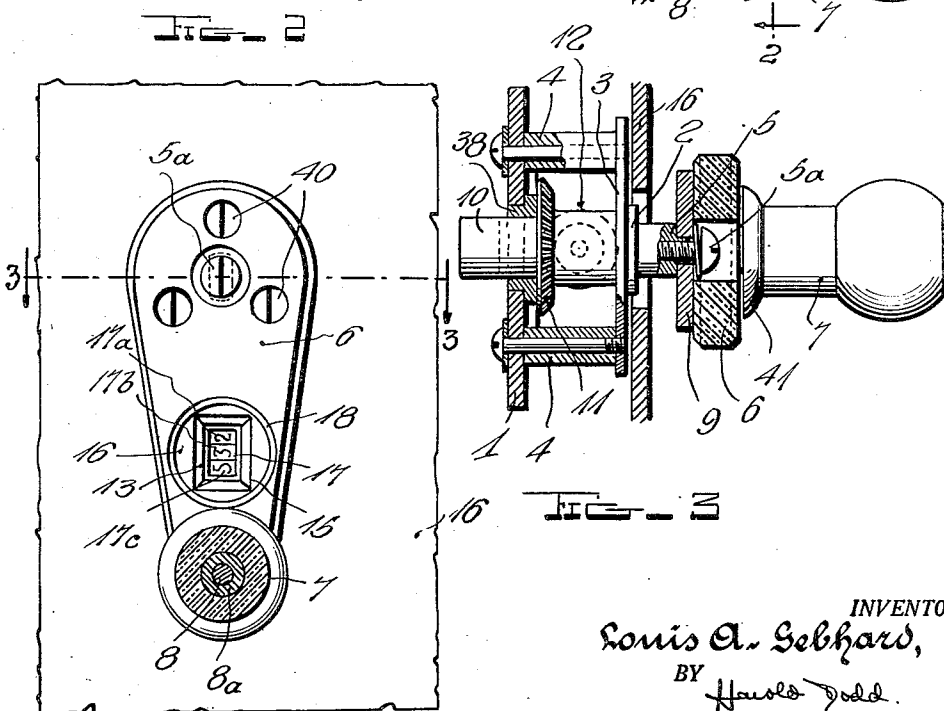
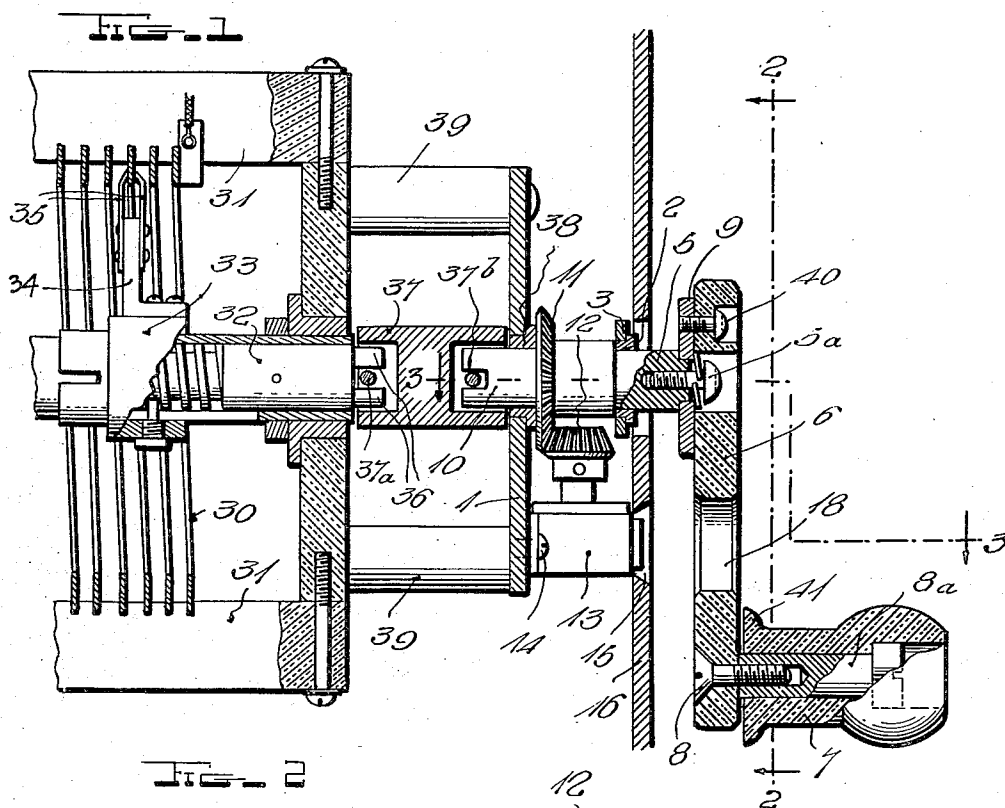
L. A. GEBHARD

1,903,759

CONTROL APPARATUS

Filed May 26, 1930

2 Sheets-Sheet 1



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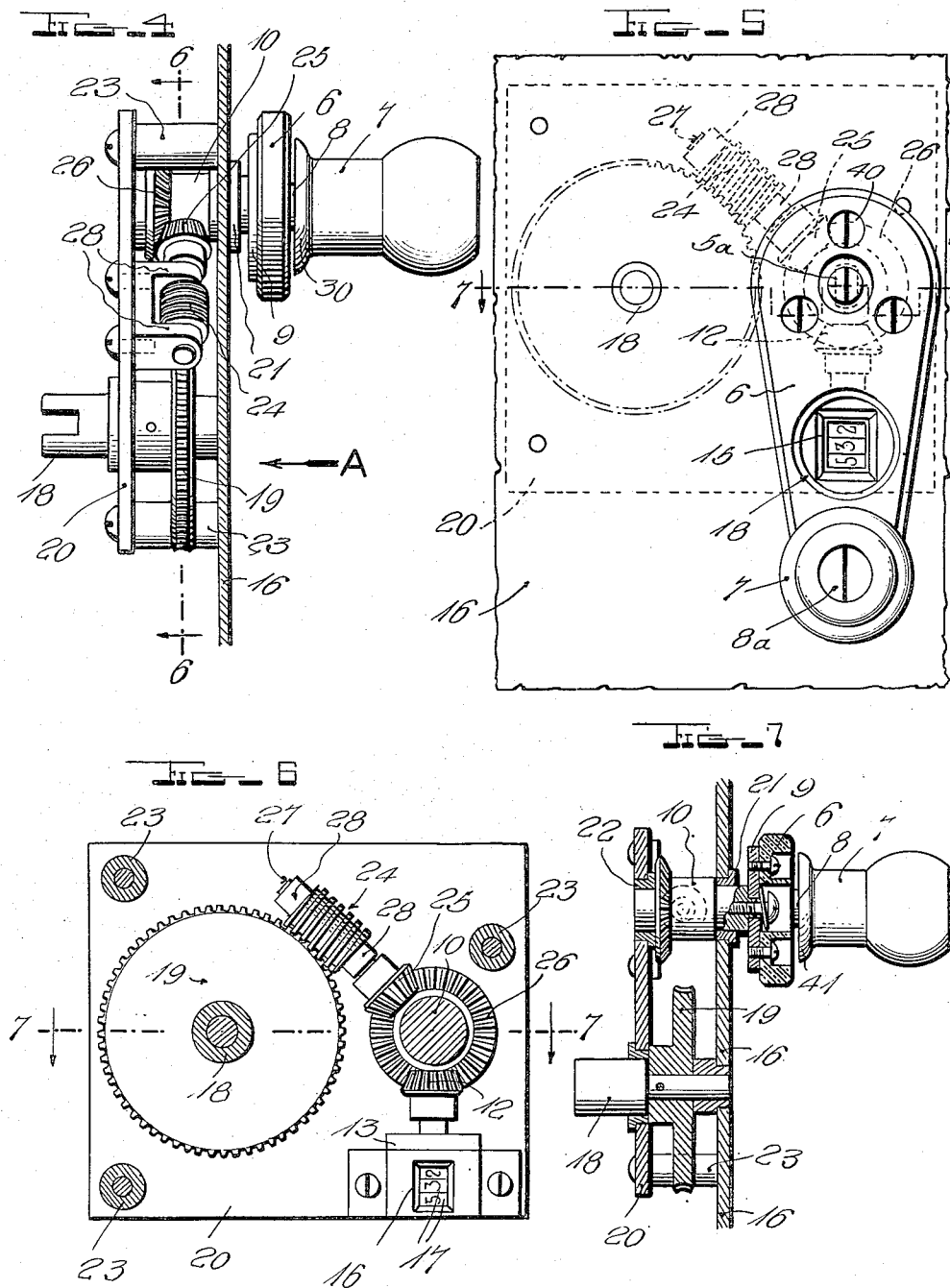
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CONTROL APPARATUS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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CONTROL APPARATUS

Application filed May 26, 1930. Serial No. 455,721.

My invention relates broadly to adjusting mechanism for high frequency signaling apparatus and more particularly to a control mechanism for signaling apparatus.

5 One of the objects of my invention is to provide a construction of control apparatus for signaling systems by which the signaling system may be adjusted to operate upon a selected frequency and restored to that adjustment in accordance with a reading of a positive form of indicator actuated by the control apparatus.

Another object of my invention is to provide a control means for selectively fixing the operating frequency of a high frequency signaling apparatus in which a positive indication is given for each successive position of the control shaft enabling the control means to be moved to different selected positions and restored thereto at any time.

A further object of my invention is to provide a construction of rotary control device for adjusting the frequency setting of a variable impedance element in a signaling system in which a positive indicator is mounted immediately adjacent the rotary control device and is observable substantially throughout the entire range of rotary adjustment of the control device for determining the adjustment of the variable impedance element at all times.

A still further object of my invention is to provide a construction of rotary crank for a control mechanism in a signaling system having means for sighting the dial of a counter-mechanism directly in alignment with the crank when the crank passes over the counter-mechanism enabling a full vision reading to be obtained from the counter-mechanism throughout the range of adjustment of the control mechanism.

Other and further objects of my invention reside in the construction of control mechanism for signaling systems as set forth more fully in the specification hereinafter follow-

ing by reference to the accompanying drawings, in which:

Figure 1 is a central vertical longitudinal sectional view taken through the control mechanism of my invention with parts shown in side elevation; Fig. 2 is a front elevation showing the crank of the control mechanism positioned directly over the counter-mechanism which is observable through the center line of the crank; Fig. 3 is a cross-sectional view through the control mechanism on line 3—3 of Fig. 1; Fig. 4 is a top plan view of a modified form of control mechanism embodying my invention, parts being broken away to more clearly illustrate the assembly of the parts of the control mechanism; Fig. 5 is a front elevation of the control mechanism looking in the direction of arrow A in Fig. 4; Fig. 6 is a transverse cross-sectional view taken through the control mechanism of Fig. 4 on line 6—6 thereof; and Fig. 7 is a horizontal sectional view through the control mechanism on line 7—7 of Figs. 5 and 6.

In high frequency signal transmitter systems, the control of required frequency adjustments has become highly complicated. Rapid shifting in frequency is imperative which has introduced a large number of controls into the transmitter. The proper adjustment of these controls for the particular frequency settings is relatively difficult. I have provided a simplified form of indicator mechanism for the adjustment of the rotary shaft controlling the variable impedance element which must be moved in the course of the frequency adjustment of the transmitter.

In the apparatus of my invention an insulated crank is connected to a rotary drive system which in turn connects to the variable impedance element whose frequency characteristics are to be varied. A counter-mechanism is mounted immediately adjacent the rotary shaft and is geared thereto so that movement of the crank imparts corresponding movement to the counter-mechanism.

Normally the counter-mechanism could not be read as the crank passes over the counter in the course of rotation but I have so constructed the crank that an aperture is formed therein at a radius which passes through the counter-mechanism enabling the readings of the counter to be observable throughout the full 360 degrees of movement of the crank. A very compact assembly of the control apparatus is obtainable by the arrangement of mechanism as embodied in my invention.

I have illustrated my invention as controlling an impedance element in the form of an inductance 30 which is mounted upon frame 31. A rotary drive shaft 32 extends through the center of the frame 31 and provides a guide for the slide 33 which carries a radially extending arm 34 having brushes 35 thereon for engaging opposite sides of the strip constituting the inductance 30. The shaft 32 terminates in a forked member 36 to which there is coupled the insulated link 37 recessed at each end thereof to receive the end of control shaft 10 and the end of the driven shaft 36. Suitable pins shown at 37a and 37b extend through link 37 to form an insulated driving connection from control shaft 10 to the shaft 32. A plate 1 carries a bearing 38 for shaft 10. The bearing 35 is mounted in plate 1 and plate 1 is carried by the frame 31 of the inductance in spaced relation thereon by means of pedestal insulators 39. The shaft 10 extends through the front of panel 16 of the transmitter and is supported directly behind the panel 16 in bearing 2 carried by strip member 3 mounted at opposite ends from plate 1 by spacer members 4. The shaft 10 projects beyond the front of panel 16 as indicated at 5 and is engaged by plate member 9 secured thereon by screw 5a. The plate member 9 is drilled at a plurality of positions adjacent the periphery thereof to receive screws which pass through the insulated crank 6 as represented at 40. The crank 6 tapers from a relatively wide diameter adjacent plate 9 to a smaller end diameter at the extremity thereof in which there is secured the screw member 8 which engages the spindle 8a forming an insert for the insulated handle 7. The insulated handle 7 is provided with an enlarged flange 41 at the end thereof forming a protection to the operator against injury arising from severe burns which tend to occur when certain metal parts of a high frequency transmitter are touched. The operator grasping knob 7 is protected against contact with any metal parts by the extension of the flange 41. The operator's fingers cannot then come in actual contact with the front panel 16 of the transmitter.

The plate 1 provides a support for a metallic counter which I have shown at 13, the counter being supported by screws 14 with respect to the front of panel 1. The counter

is observable through an aperture 15 in panel 16 enabling the multiplicity of movable calibrated drum members 17 therein to be read from the front of the transmitter. The shaft 10 carries bevel gear 11 which meshes with the bevel gear 12 of the counter 13 so that as crank 6 is revolved the counter 13 is actuated and the relationships of the calibrated drum members 17 change in corresponding manner also. The position of the frequency adjusting member behind the panel of the transmitter is correspondingly changed. When the transmitter is calibrated the numbers appearing on the calibrated drum members 17 are charted for particular frequency adjustments of the transmitter so that the operator in setting the transmitter on a particular frequency may be directly guided by the readings of the calibrated drum members 17. The calibrated drum members are driven by gear 12 meshing with gear 11 in suitable ratio, for example two to one. It will be understood that the calibrated drum members move in a certain relationship one to the other, that is to say, a relationship of units, for example of ten to one, so that for one revolution of the calibrated drum 17a ten units will pass the observing window 15 in the panel 16. For each revolution calibrated indicator drum 17b is moved one unit, while indicator drum 17c moves one for each ten revolutions of the drum 17b. One revolution of crank 6 will serve to move drum 17a two complete revolutions imparting corresponding movement in the same proportion to the other indicator drums. Depending upon this position of the threads in shaft 37, the advance of the movable contactor along the inductance may be controlled. In order that the operator may accurately observe the readings of the calibrated indicator drums throughout the range of movement of the crank 6, I provide a sighting opening 18 in the crank 6 through which the readings of the calibrated indicator drums are observable even though the crank 6 is moved directly over the aperture 15 in the transmitter panel 16. Auxiliary bearings are eliminated by setting the counter 13 as close as possible to the shaft 10 thereby increasing the precision of operation of the counter.

In Fig. 4, I have illustrated a modified form of control mechanism wherein a reduction gearing is interposed between the crank 6 and the drive shaft which extends through the variable impedance member of the transmitter. The reduction gearing is mounted from plate 20 having spacer members 23 extending to the panel 16 of the transmitter. The crank 6 connects to shaft 10 which is journaled by the bearing 21 in panel 16 and bearing 22 in plate 20. A bevel gear 26 is carried by shaft 10 which meshes with the bevel gear 25 carried on shaft 27 which is

rotatably mounted in yoke 28. The shaft 27 carries worm 24 thereon which engages with the worm gear 19 carried on shaft 18. Shaft 18 is journaled for rotary movement between plate 20 and panel 16 and imparts slow movement to the variable impedance device whose shaft rotates once for a multiple number of revolutions of crank 6. The same provision is made in the modified form of my invention for calibrating the ratio of the drive shaft 18. That is, the counter 13 is maintained with the bevel gear 12 thereof in engagement with bevel gear 26 so that rotation of the crank 6 simultaneously imparts movement to the calibrated drum dials 17 at the same time that rotary movement is transmitted to drive shaft 18. Shaft 10 in the modified form of my invention illustrated in Figs. 4—7 serves as a spindle and does not directly transmit rotary movement to the variable impedance. The movement from shaft 10 is transferred through the worm 24 and worm gear 19 to the control shaft which in turn drives the shaft leading to the variable impedance element.

I have found the method of calibrating the rotary movement which is applied to the variable impedance element of the transmitter highly practical in construction and successful in operation. Any number of control shafts may project from the transmitter panel with their associated counters and by checking the number of controls against the required readings on the counters the operator may move the controls to the required positions.

While I have described my invention in certain preferred embodiments, I desire that it be understood that modifications may be made and that no limitations upon my invention are intended other than are imposed by the scope of the appended claims.

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

1. In control apparatus for a high frequency signaling system, a rotary shaft for varying the effective impedance of said signaling system, a panel structure through which said shaft projects, a mechanical counter driven by said shaft and having calibrated drums movable by units for each revolution of said rotary shaft member, a crank formed of insulating material with a driving knob thereon, connecting means between said crank and the projecting end of said rotary shaft member, said panel structure being apertured within the circle described by the outer end of said crank for displaying the indications of said counter, said crank being apertured in alignment with said mechanical counter for observing the readings of said mechanical counter therethrough.

2. In a high frequency signaling system, a frame structure, a rotatable drive shaft

journaled in said frame structure, a crank connected to said drive shaft for imparting movement thereto, a driven shaft journaled in said frame structure, a reduction gearing interconnecting said drive shaft with said driven shaft, and a mechanical counter geared to said drive shaft, said panel structure being apertured within the circle described by the outer end of said crank for displaying the indications of said counter. said mechanical counter being visible through an aperture formed in said crank upon completion of each revolution of said crank for observing the readings on said mechanical counter.

3. An indicator comprising a frame structure, a driven shaft journaled in said frame structure, a worm wheel on said shaft, an angularly disposed bracket member supported by said frame structure, a rotatable device journaled in said bracket member, a worm on said rotatable device meshing with said worm wheel, a bevel gear on said rotatable device, a driving shaft, a bevel gear on said driving shaft meshing with the bevel gear on said rotatable device, an indicator mechanism supported by said frame structure, a shaft member for operating said indicator mechanism, a bevel gear on said shaft member meshing with the bevel gear on said driving shaft, a crank for operating said driving shaft in a circular path over the field of said indicator mechanism, said crank being apertured to enable said indicator mechanism to be viewed when said crank moves directly across the indicator mechanism.

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