

Dec. 15, 1936.

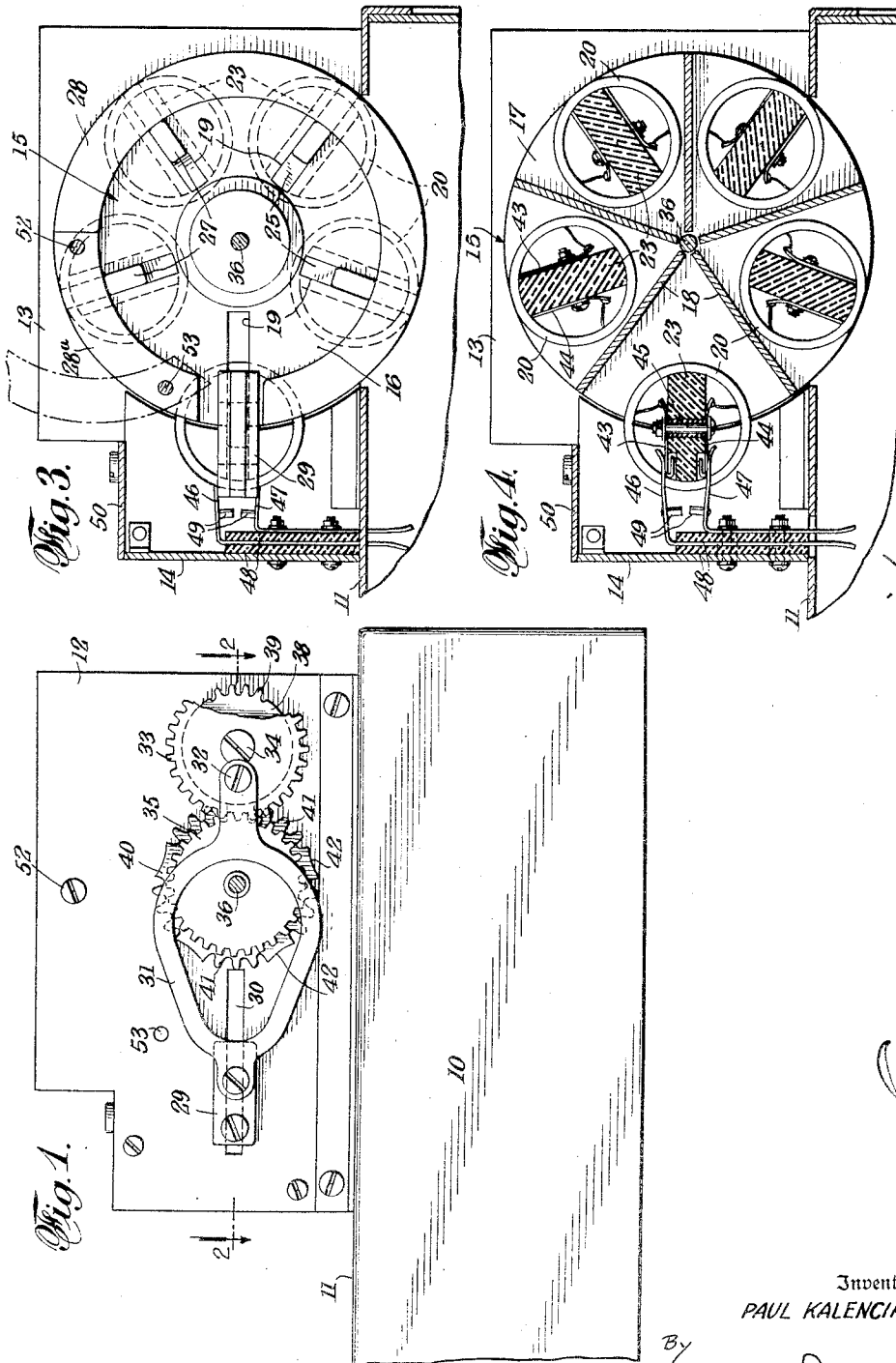
P. KALENCIK

2,064,348

SWITCHING DEVICE FOR RADIO RECEIVING AND OTHER ELECTRICAL SYSTEMS

Filed Nov. 1, 1935

3 Sheets-Sheet 1



*Coil moved out of its  
Compartment into operative position when  
selected coil is opposite its station.*

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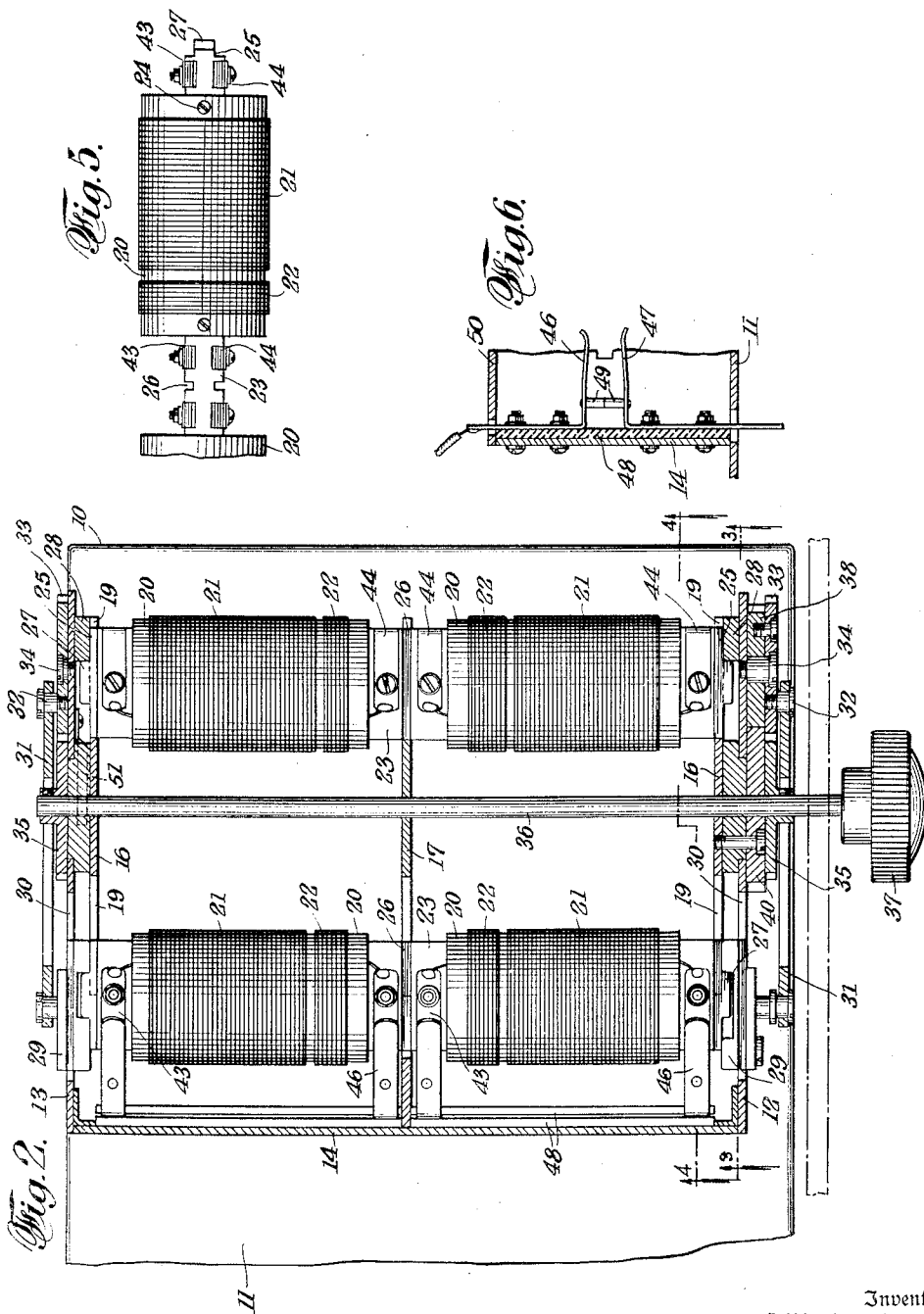
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

*Fig. 7.*

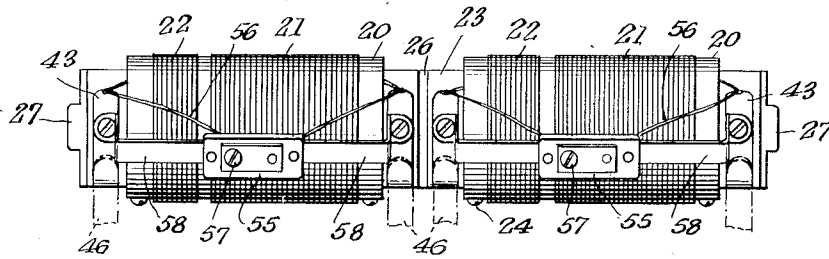


*Fig. 8.*

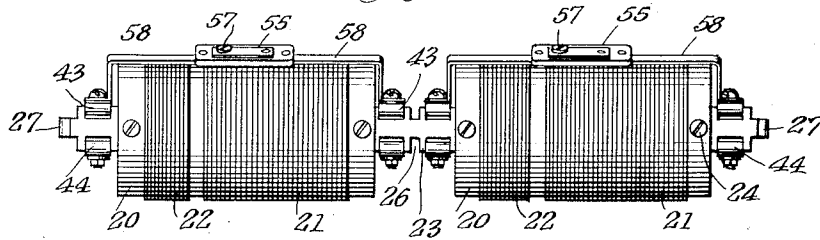
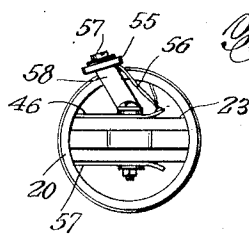


*Fig. 9.*



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## UNITED STATES PATENT OFFICE

2,064,348

SWITCHING DEVICE FOR RADIO RECEIVING  
AND OTHER ELECTRICAL SYSTEMSPaul Kalencik, New York, N. Y., assignor of one-  
half to John F. Rider, New York, N. Y.

Application November 1, 1935, Serial No. 47,755

16 Claims. (Cl. 171-119)

The present invention relates to improvements in devices for selectively introducing electrical units, as for example, induction coils and/or condensers into the circuit of a radio receiver or transmitter, or for changing coils in generator circuits such as oscillators, etc., and includes an improvement of the apparatus disclosed in my copending application, Serial Number 29,180, filed June 29, 1935, being a continuation in part of said application.

Because of the present trend, radio receivers, particularly, are provided with a plurality of inductance devices, such as coils, which may be introduced into the circuit of the receiver in accordance with the wave band to which said receiver is to be tuned. Since there are several such bands of wave lengths, many attempts have been made to provide means for introducing into the receiver circuit, a selected coil or coils suitable for tuning said receiver to any station in a particular wave band. Heretofore, apparatus designed for this purpose, though theoretically feasible, were generally faulty in that they were complicated, expensive to construct and difficult to maintain in efficient operation.

This invention, seeking to obviate the above-mentioned faults, and others, has for its major object the provision of a simple, compact and sturdy device for expeditiously introducing into the radio circuit a selected electrical unit or units such as, an inductance instrumentality or instrumentalities and/or capacitance instrumentality or instrumentalities.

The invention also seeks to provide a device of this character, operable by a single control knob, in which a plurality of such electrical units are each selectively adapted to be connected in an electric circuit, particularly that of a radio receiver.

The invention also contemplates the provision of a rotatable carrier for such electrical units and means to connect a selected unit in a circuit by projection of same from its inactive position in the carrier after the latter has been rotated.

The invention further contemplates the provision of a rotatable carrier for the coils and means to rotate the carrier and to then successively project the coils for connection in a circuit after the projected coil shall have reached a given position.

Further features of the invention reside in the provision of means in such a device for readily removing and replacing coils in the carrier, and in the provision of shields between adja-

cent coils adapted to be removed in the event mutual inductance of coils is desired.

Another contemplated feature of the invention resides in the provision of means for maintaining the potential across the terminals of the coils substantially uniform and thereby not deleteriously effecting the tubes of the receiver during the period of change from one coil or coils to another.

A further contemplated feature of the invention is to provide simple and efficient drive means between the control knob and the coil carrier, and between said knob and the means for moving a selected coil from said carrier to a position in connection with the radio circuit.

Another feature of the invention resides in the provision of a compact device of this character adapted to be mounted in a convenient manner upon the chassis of a radio receiver, whereby the coil connecting terminals are judiciously positioned so electric connections therefrom may be generally short to provide an assembly which is neat, easy to trace, and inexpensive to construct.

Still another feature of the invention resides in providing a suitable condenser associated with each coil, which condenser may be mounted across either or both windings of the coil and being provided with simple means for varying the capacity thereof.

The foregoing and many other objects, features and advantages of the invention will become more clearly apparent from the following specification, which is descriptive of the preferred embodiment of the invention illustrated in the accompanying drawings.

While the device, as described and shown, is associated with a radio receiver, it is understood that embodiments thereof may be employed in association with radio transmitters or other electric systems requiring the introduction of a coil or coils therein. Also, while the present disclosure speaks of coils and condensers, it should be apparent and should be understood that this invention is not limited thereto but that other electrical units or devices may be handled by a mechanism as herein contemplated. Furthermore, the word coil as employed herein is not to be construed in a limited sense, but a broad interpretation thereof is contemplated, such as, including any inductance instrumentality.

In the drawings:

Fig. 1 is a front elevational view, the control knob being broken away, of a device constructed in accordance with presented invention.

Fig. 2 is a plan sectional view thereof as taken along the line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view as taken along the line 3—3 of Fig. 2.

Fig. 4 is a similar view as taken along the line 4—4 of Fig. 2.

Fig. 5 is a fragmentary detail view of one of the coil units.

Fig. 6 is a fragmentary vertical sectional view showing an alternate form of connecting means for that coil unit which is in circuit.

Fig. 7 is a top plan view of a coil unit provided with condensers as herein contemplated.

Fig. 8 is a front view thereof.

Fig. 9 is an end view thereof.

Referring to the drawings in greater detail, the device is shown as being supported upon the chassis 10 of a radio receiver, said chassis having a top plate 11 which may support tubes, fixed coils, condensers and such other devices necessary in apparatus of that kind.

The coil switch device, as herein contemplated, may be constructed as a unit adapted to be applied wherever desired, or it may be incorporated structurally with the radio receiver chassis.

In the present instance a pair of plates 12 and 13 are mounted in the respective front and rear of the chassis, and to more effectively stabilize these plates another plate 14 is arranged as a supporting wall connecting said plates 12 and 13.

In the rigid frame so formed, there is mounted for rotation a coil carrier 15 having end walls 16, and where gangs of coils are used as herein illustrated, one or more intermediate walls 17. In addition, the carrier may be provided with radially disposed plates 18 for the dual purpose of stiffening said carrier and for acting as shields between adjacent coils supported in said carrier. The walls 16 and 17 are each provided with a plurality of open radially disposed slots 19 positioned between the shields 18.

The carrier thus formed is provided with a plurality of equal compartments uniformly spaced, and each of said compartments is adapted to receive within the periphery of the plates 16 and 17, a coil or the like 20, which is preferably provided for the purpose with primary windings 21 and secondary windings 22. In order to definitely position said coils in said compartments a dielectric bar 23 serves as a mounting member for the coils comprising the gang or unit 20, said coils being secured to said mounting member by means such as the screws 24.

The coil gangs or units as more clearly shown in Figs. 2 and 5, and as can be readily understood, may comprise a single coil or two or more coils. The dielectric bar 23 of each of these coil units is preferably provided at its ends with a portion 25 engageable in the slots of the end plates of the carrier and with a reduced portion 26 slidably engaged in the slots of the intermediate wall thereof.

The extreme ends of the bar 23 are each formed with an extension 27, normally engaged by the inner periphery of a fixed partial ring 28 for retaining the coil units in position on the carrier and for engagement with a slide 29 mounted in each of the walls 12 and 13, each slide being guided in a slot 30 in said walls.

Each slide 29 is connected by means such as the link 31 with a crankpin 32 carried by a spur gear 33 pivoted for rotation on the respective walls 12 and 13 at 34. Each gear 33 is preferably meshed with another spur gear 35 fixed on the shaft 36 which is provided with a manipulating control

knob 37. It is apparent therefore that rotation of the knob 37 will by means of the aforementioned gears and link, reciprocate the slides 29 in their guide slots 30.

Fixed to the spur gear 33 there is preferably provided a wheel 38 having a set of one or more cogs 39, the remainder of the periphery of said wheel being smooth.

Mounted for rotation on a shaft 36, a wheel 40 having plural sets of cogs 41 intermittently engageable with the cogs 39, is provided with arcuate portions 42 in spaced relation with the sets of cogs, said portions 42 being successively associated with the smooth perimeter of the wheel 38. As is well known, the mechanical movement thus attained will afford for one complete revolution of the wheel 38 and hence of the knob 37, that partial rotation of the wheel 40 commensurate with the number of groups of cogs 41.

In the present instance five such groups are shown, and for this reason a complete revolution of the knob 37 will rotate the wheel 40 one-fifth of a revolution, and since said wheel is fixed with the carrier, the carrier will have a similar rotation. It is understood of course that the movement of rotation is for a short period of rotation of the knob 37, the carrier being stationary for the remainder of rotation of the knob.

The ratio between the gears 33 and 35 may of course, be varied if desired so only a partial rotation of the knob will serve to operate the device.

The relationship between the cogs 39 and crankpin 32 is preferable such as to have the slides 29 in retracted position during the motion of the carrier, the projection and retraction motion of the slides occurring during the stationary period of said carrier.

In the above manner it should be apparent that when the slides 29 are in the retracted position, that is at the extreme right, the grooves in said slides are positioned to engage the extensions 27 of the coil units, and upon projection of said slides toward the left the coil unit so engaged will be moved in that direction to a position as indicated in the drawings in Figs. 1 to 4, inclusive.

It is in this position that the coil so projected is connected into the electric circuit of a radio receiver in a manner hereinafter set forth.

Each bar 23 is provided, in flanked relation with each of the coils thereon, with pairs of coil terminal contacts 43, 44 as best shown in Figs. 4 and 5, the contact 43 being connected to one end of one of the windings of said coil and the contact 44 to the other end.

As seen in Fig. 4 these contacts are insulated from each other as by the means of the dielectric bushing 45. When projected, as previously described, the contacts 43 and 44 of a coil unit are engaged respectively by spring connector contacts 46 and 47 insulated from the casing and from each other by dielectric sheets 48. The contacts 46 and 47 each are provided with short circuiting contactors 49 for the purpose of eliminating a drop in potential between said contacts 46 and 47 during such a period when no coil is in circuit therebetween.

It will be noted from the present disclosure, wherein a five coil unit carrier is shown, that four of said coils are at all times out of circuit, and that a selected one of said coils may be placed in circuit by the simple turning of the knob 37.

Upon perusal of the drawings, particularly of Fig. 4, it will be seen that the coil unit which is in circuit may be effectively shielded by adjacent

shields 18, the top plate 11 of the chassis, the front wall 14 of the frame, the end walls 12 and 13, and a top plate 50 bridging the walls 12 and 13. It will also be noted that said coil unit is substantially centrally disposed within said surrounding shields and plates, reducing to a minimum, possible capacity effects.

It will be noted also that connectors 46 and 47 are bent downwardly so their ends protrude within the hollow of the chassis where they are conveniently positioned for connection to other devices comprising the radio receiver.

If desired, however, one or both of the connectors may be bent upwardly, as shown in Fig. 6, to provide convenient terminals for connection, as for instance, with the control grid of a radio tube.

Since the carrier is mounted for rotation in the frame of the device, and for the reason that the shields 16 should be effectively grounded to the chassis, a brush such as shown at 51 is provided to afford a positive grounding of said carrier, said brush being secured to the frame of the device and contacting a portion of the carrier.

Replacement or removal of any of the coil units may be expeditiously accomplished by merely removing the screw 52 in each of the plates 12 and 13, thereby freeing the segment 28a forming part of the ring 28 so that said segment may be rocked about its pivot 53. When the segment 28a is rocked to the dotted line position shown in Fig. 3, the uppermost coil unit may readily be extracted from the carrier and so any coil positioned at this point may be also readily removed.

As shown in Figures 7, 8 and 9, each coil 20 of the coil units may be provided with a condenser 55 connected across either winding 21 or 22 as for instance at 56—56. These condensers are preferably of the type known as trimmer condensers and, in the usual manner, are provided with an adjusting screw such as shown at 57.

It is preferred to mount these condensers so that they lie substantially within the periphery of the carrier 15 so as not to interfere with cover plates or the like. One manner of mounting the condensers comprises a pair of brackets 58, each held by the screw which secures the terminal contacts 43 and 44 and fastening the condenser to the free ends of said brackets.

As can be readily understood with the incorporation with each coil of a condenser as above described, the efficiency of said coil when introduced into a circuit is considerably enhanced.

By this invention there is provided a selectively employable electrical system adapted for use in radio transmitters and receivers, radio transmitters, oscillators, amplifiers, such as for example, intermittent and radio amplifiers, etc. This invention is also applicable for use in meter shunts, relays and capacitors, in fact any system in which it is desired to selectively change electric units, such as for example, coils and/or condensers or the like.

From the foregoing detailed specification, it is apparent that an improved, simple and practical device for the purpose intended has been provided. It is apparent, however that immaterial changes and modifications may be made by skilled persons without departing from the true spirit and scope of the invention as outlined in the appended claims. Hence, interpretation of said claims should not be based on the present specific disclosure but rather on the pertinent prior art.

Having thus described my invention, what I

claim as new and desire to secure by Letters Patent, is:—

1. In a device of the character described, a carrier, a plurality of electrical units supported in said carrier, means for rotating said carrier, and means for moving a selected unit towards and away from the axis of said carrier.

2. In a device of the character described, a rotatable carrier, a plurality of electrical units supported therein, means for intermittently rotating said carrier, slide means successively engageable with said units, and means for reciprocating said slide means during the period of rest of the carrier and thereby moving a unit engaged therewith into and out of its normal position in the carrier.

3. In a device of the character described, a rotatable carrier, a plurality of coil units supported therein, means for intermittently rotating said carrier, slide means successively engageable with said coil units, and means for reciprocating said slide means during the period of rest of the carrier and thereby moving a coil unit engaged therewith into and out of its normal position in the carrier.

4. In a device of the character described, a rotatable carrier, a plurality of coil units supported therein, terminal contacts on each of said coil units, connector contacts, means for intermittently rotating said carrier, slide means successively engageable with said coil units, and means for reciprocating said slide means during the period of rest of the carrier and thereby moving a slide engaged coil unit and its terminal contacts into and out of engagement with the mentioned connector contacts.

5. In a coil switching device for radio receiver or the like, a rotatable carrier, a plurality of coil units circumferentially supported in said carrier, means for intermittently rotating said carrier, and means for moving a selected coil unit from said carrier towards and away from the axis of said carrier during the period of rest thereof.

6. In a coil switching device for radio receiver or the like, a rotatable carrier, a plurality of coil units circumferentially supported in said carrier, means for intermittently rotating said carrier, means for moving a selected coil unit from said carrier towards and away from the axis of said carrier during the period of rest thereof, and means to shield said selected coil unit during its position removed from said axis.

7. In a coil switching device for radio receiver or the like, a rotatable carrier, a plurality of coil units circumferentially supported in said carrier, means for intermittently rotating said carrier, means for moving a selected coil unit from said carrier towards and away from the axis of said carrier during the period of rest thereof, and means to shield said selected coil unit during its position removed from said axis, said shield means comprising radial plates on the carrier and portions of the frame supporting said carrier.

8. In an electrical switching device for radio receiver or the like, a rotatable carrier, a plurality of electrical units circumferentially supported in said carrier, means for intermittently rotating said carrier, and means for moving a selected unit towards and away from the axis of said carrier during the period of rest thereof.

9. In a coil switching apparatus for radio receiver or the like, a rotatable carrier, a plurality of electrical units circumferentially supported in said carrier, means for intermittently rotating

said carrier, and means for moving a selected unit towards and away from the axis of said carrier during the period of rest thereof.

5 10. In a device of the character described, a rotatable carrier, a plurality of electrical units supported therein, terminal contacts on each of said units, connector contacts, means for intermit-  
10 tently rotating said carrier, slide means successively engageable with said units, and means for reciprocating said slide means during the period of rest of the carrier and thereby moving a slide engaged unit and its terminal contacts into and out of engagement with the mentioned connector contacts.

15 11. In a device of the character described, a rotatable carrier, a plurality of electric units supported in said carrier, and means for rotating said carrier and successively projecting the said units, respectively, relative to the carrier for  
20 connection with an electric circuit, after the projecting unit shall have reached a given position.

25 12. In a device of the character described, a rotatable carrier, a plurality of electric units supported in said carrier, and means for intermit-  
30 tently rotating said carrier and successively projecting the said units, respectively, relative to the carrier for connection with an electric circuit, after the projecting unit shall have reached a given position, said means including an instrumentality for returning the projected unit to its initial position.

35 13. In a device of the character described, a rotatable carrier, a plurality of electric units supported in said carrier, and means for inter-  
mittently rotating said carrier and successively

projecting the said units, respectively, relative to the carrier for connection with an electric circuit, after the projecting units shall have reached a given position, and a control knob for operating the said means. 5

14. In a device of the character described, a rotatable carrier, a plurality of electric units supported in said carrier, and means for intermit-  
10 tently rotating said carrier and successively projecting the said units, respectively, relative to the carrier for connection with an electric circuit, after the projecting unit shall have reached a given position, said means including an instru-  
15 mentality for returning the projected unit to its initial position, and a control knob for operating said means.

15. In a device of the character described, a rotatable carrier, a plurality of electric units removably supported in said carrier, and means  
20 for intermittently rotating said carrier and successively projecting the said units from said carrier for connection with an electric circuit, after the projecting unit shall have reached a given position, and a control knob for operating the said means. 25

16. In a device of the character described, a rotatable carrier, a plurality of inductance units removably supported in said carrier, and means  
30 for intermittently rotating said carrier and successively projecting the said units from said carrier for connection with an electric circuit, after the projecting unit shall have reached a given position, and a control knob for operating the said means.

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No references