April 29, 1952 H. C. HANSEN 2,594,644

RADIO RECEIVER TUNING SWITCH

Filed Dec. 11, 1947 2 SHEETS—SHEET 1

Fig. 1.

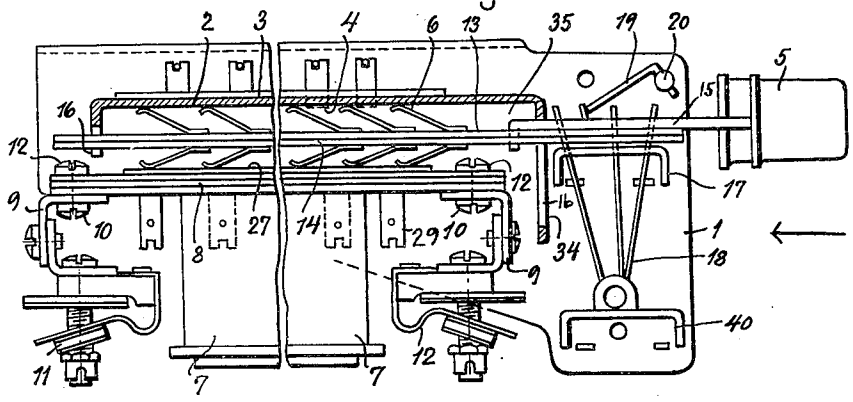
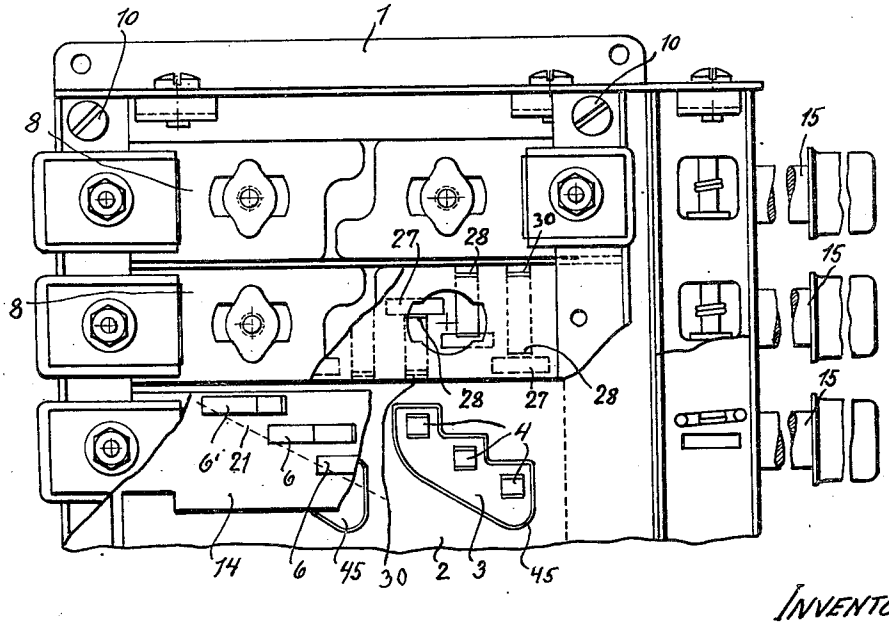


Fig. 2.



INVENTOR
HARRY C. HANSEN
By Young, Emery & Thompson Attys.

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Filed Dec. 11, 1947 2 SHEETS—SHEET 2

Fig. 3.

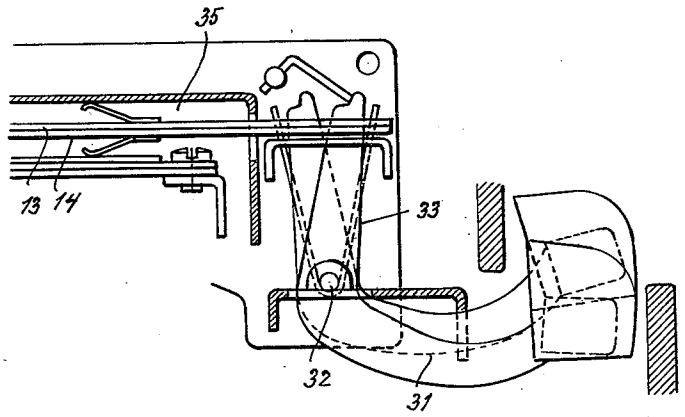


Fig. 4.

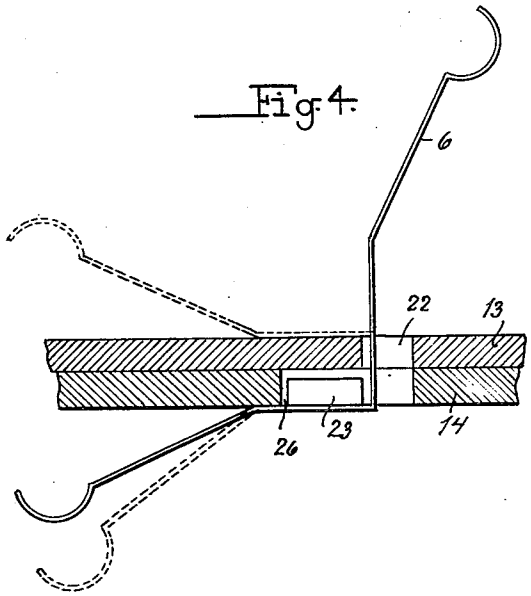
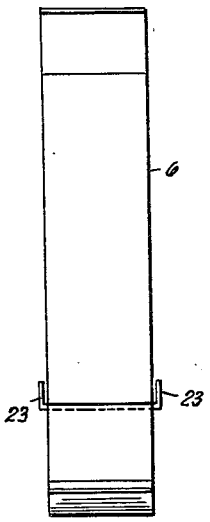


Fig. 5.



INVENTOR
HARRY C. HANSEN
By Mann, Emery & Thompson Attys.

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RADIO RECEIVER TUNING SWITCH

Harry Clifford Hansen, Charlottenlund, Denmark

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Patent expires December 4, 1966

2 Claims. (Cl. 200—16)

1

The present invention relates to a device for selectively tuning a radio receiver to any one of a plurality of pre-set wave-lengths comprising a plurality of contact supporting members slidably mounted between two mutually parallel walls each of which is provided with a number of stationary contacts arranged to be interconnected in pairs by way of contacts on said supporting members when set to predetermined positions.

One object of the invention is to construct a device of the said kind in which the slidably mounted contact supporting members will be directly accessible for inspection and if desired for removal through one face of a frame of the tuning device in which the said two walls are mounted in mutually parallel position. To this end one of said walls is mounted in a secondary frame associated with the said walls to form a structural unit therewith which wall comprises a plurality of substantially rectangular plates of insulating material arranged side by side in one of the said plates and each adapted to carry contacts having terminals for connecting said contacts to a presettable tuning element to be mounted on the plate.

The said secondary frame is easily detachably connected to the main frame of the device. If the secondary frame is released from the main frame, the said contact supporting members being slidably mounted in the space between the said two walls would be directly accessible and may if desired be removed through the face of the tuning device which was covered by the wall mounted in the said secondary frame.

In order to enable the removal of the slidably mounted contact supporting members through the said face of the device and said contact supporting members being at one end connected to setting means are guided in slots in the main frame which slots are open towards the wall mounted in the said detachably mounted secondary frame, so that the end of the movable contact supporting members after removal after the secondary frame and the wall and the said plates mounted therein may be swung out of the main frame, e. g. in the downward direction and are removed if desired.

The end of each slidably mounted contact supporting member facing the setting member projects through an aperture in the front of the frame of the coil unit and is connected with or forms itself a setting member to be operated by a push button or other suitable operating member. The setting member may be connected with the contact supporting member by a finger or arm engaging a notch in the said part, which arm is

2

released from the switch part when the latter is swung downwards as mentioned above in order to be removed from the unit. If the operating member of the contact supporting member is a push button the said aperture in front side of the frame of the tuning device is made so great that the push button may be drawn out through it in which way it is rendered possible to withdraw the contact supporting member by displacement of this part in its longitudinal direction after having been swung downwards as mentioned above.

The contacts mounted on each slidably mounted contact supporting member as well as the fixed contacts mounted on the said two walls are offset relatively to each other in the direction of movement of said supporting member and also in the transverse direction. A number of said contacts may preferably be arranged to partially overlap in the direction of movement of the slidably mounted contact supporting member. The manner in which the other details of a device according to the present invention, e. g. the manner in constructing the slidably mounted supporting members and the manner in which the contacts mounted on these members are performed and attached to same would appear from the following explanation of a device according to the present invention in connection with the accompanying drawing in which:

Fig. 1 shows a vertical section through a tuning device according to the invention,

Fig. 2 a bottom view of a part of the tuning device partly in section,

Fig. 3 a modified embodiment of a part of the tuning device in side elevation,

Fig. 4 a sectional side view of part of a movable switch member of the tuning device before the final attachment of a contact of this member, and

Fig. 5 an end view of a movable switch contact.

1 is one of the side members of the frame of a tuning device which frame in addition to this side piece comprises another corresponding side piece, not shown, and an intermediate metal plate 2, Figs. 1 and 2. On this metal plate several insulating plates 3 are mounted side by side and each of these insulating plates forms a supporting member for a number of stationary contacts 4. Three of these contacts are visible in Fig. 2. These contacts 4 extend through an aperture 45 in the metal plate 2 down into the region of movement of a number of contacts 6 mounted on a movable insulating switch member 13, 14, which is disposed between two mutually parallel walls one of which consists of the wall 2 including the plate 3 mounted thereon, whilst the other of said

walls consists of a number of plates 8 which are prepared from an insulating material and are arranged side by side. Each of the plates 8 supports a complete set of tuning coils 7.

Each of the contacts 6 serves the purpose of interconnecting an individual contact 4 to a separate stationary contact member 27 which is mounted on the supporting member 8 located below the contact 4 in question. The supporting member 8 is attached on two parallel rails 9, which rails by means of screws 10 are rigidly attached to the side members 1 of the frame in such a manner that the rails 9 together with the tuning coils and the wall, comprising the supporting member 8 and the coils 7 mounted thereon and trimmer condensers 11, if such condensers are used, as a unit may be removed from the said frame.

Each supporting member 8 carries a complete set of tuning coils 7, which means a coil for each high-frequency current circuit to be tuned, and the supporting members 8 are each attached to the detachable rails 9 by means of screws 12, Fig. 1, so that when the rails 9 after removal of the screws 10 have been detached from the frame of the tuning device, then the supporting members 8 may separately be removed from the rails after removal of the appurtenant screws 12.

The number of electrical switches 4, 6, 13, 14, 27 arranged side by side in the tuning device so that the movable parts 6, 13, 14 of the said switches are located in the compartment 35 between the two parallel walls formed by the plates 2 and 3 and the plates 8 respectively, corresponds to the number of different wave lengths on which the receiver is to be tuned. The slidably mounted supporting member 13, 14 of each of said switches comprises two insulating plates 13 and 14 which lie flat upon one another and are interconnected by means of the contact members 6 mounted on same, as more detailed described below. Each of the members 13, 14 is coupled to an individual setting member 15 adapted to operate the switch by displacement of the movable part 6, 13, 14 of same longitudinally, which means in direction of the arrow shown in Fig. 1.

One end of each of the setting members 15 is guided in a separate slot 16 in a bent part 34 of the metal plate 2. Each setting member 15 is loosely mounted on a rail 17 inserted between the side pieces 1 of the frame of the tuning device, which rail 17 serves the further purpose of limiting the possible movements of the free ends of a spring 18 adapted to carry the slidably mounted contact supporting member back from the coupling-in position when a locking rail 19, Fig. 1, serving the purpose of locking the switch in the contact closing position, is released from the setting member 15 by rotation of a pin 20. The construction of this locking member is well-known in the art and does not form part of the present invention and will consequently not be further described. A portion of the lowermost plate 14 of a slidable switch part is visible in the left hand side of the lowermost part of Fig. 2, in which part the coil supporting members 8 and the main portion of the movable switch member is removed in order to make some of the contacts 4 visible. In the intermediate portion of Fig. 2 a part of the lowermost layer of the coil supporting member 8 is removed in order to make parts of the contacts 27 visible in this figure.

The contacts 6, the number of which corresponds to the number of the contacts 4 are as appears from Fig. 2 displaced relatively to each

other both in the longitudinal and the transverse direction of the switches, which means that the contacts 6 are displaced relatively to one another along a line 21 forming an angle from 30° to 45° with the moving direction of the switch part. Each of the contacts 6 consists as appears from Figs. 4 and 5, of a strip 6 of a resilient metal plate. Before being mounted on the member, comprising the two plates 13 and 14, the contact strips 6 are bent to the shape shown in full lines in Fig. 4. One end of the strip 6 is then passed through a transverse slot 22 in the member comprising the two plates 13 and 14 so that two laterally disposed flaps 23 on the central part of the contact strip 6 engage the plate 14 and are received each in a separate laterally disposed slot or side aperture 26 in the plate 14 whereafter the end of the contact strip 6 extending through the slot 22 is bent from the position shown in full lines in Fig. 4 to the position shown in dotted lines in Fig. 4, so that the central part of the contact member 6 would engage the side faces of the plates 13 and 14 and clamp the said two plates firmly together.

One of the free ends of each contact 6 will, when the movable switch part is inserted in the compartment 35 and moved to the coupling-in position, abut against one of the contacts 4, whereas the second free end of each of the contacts 6 will abut against a separate contact 27 on the supporting member 8 of the appurtenant complete coil set.

Some of the contacts 27 are indicated partly in dotted lines in the central part of Fig. 2. Each supporting member 8 comprising three insulating plates which lie flat upon each other and the contact 27 consisting of a T-shaped metal plate strip are mounted on the uppermost layer of the member 8 so that the transverse end portion of the T-shaped contact number 27 rests against the face of said layer facing the movable contact members 6, 13, 14 and so that the central portion of the T-shaped contact member being bent at a right angle is extended through a laterally disposed slot 28 in the said layer, whereafter the said central portion of the contact 27 is bent transversely of the supporting member to be clamped between the uppermost and the intermediate layer of the member 8. The end of the said bent portion of the contact 27 is passed through a slot 30 in the lowermost layer of the supporting member 8, through which slot 30 the part 29 of the contact piece 27, 29 protrudes beyond the supporting member 8 and serves as terminal to which one end of a tuning coil 7 is to be soldered.

As appears from Fig. 2, the slots 45 through which the contacts 4 project towards the contacts 6 have a steplike shape in order to cause that the contacts 6, when moved away from a position in which the said contacts abut against their individual contacts 4 to a position in which the connection between the contacts 6 and 4 is interrupted, should engage the metal plate 2 and thus connect all of the coil ends connected to the contacts 27 to the metal plate 3. In this way a short-circuit of the coils is obtained when the coils are not connected up in the circuits of the receiver since all of the other ends of the coils are in conductive connection with the frame of the tuning device. For this purpose, on each supporting member 13, 14 a separte contact 6' Fig. 2 in addition to the switch contacts 6 cooperating with contacts 4 is provided, which contact 6' is adapted to connect one of the ends of each of

the appurtenant coil permanently with the metal plate 3 seeing that the contacts 6' constantly abuts against the metal plate 3.

The embodiment shown in Fig. 3 differs from the one in Fig. 1 in the way that instead of push buttons for the control of the switches pivotally mounted keys 31 are used which keys are pivoted on a pin 32 on the frame of the coil unit and consist of angular levers one arm 33 of which is carried through a slot in the supporting members 13, 14 of the movable switch contacts.

If the rails 9 in combination with the supporting members 8 arranged on same and the coils 7 are detached, Figs. 1 and 2, the free ends of the supporting members 13, 14 of the movable switch part may be swung downwards, since the slots 16 in which the said free ends are guided, are open in a downward direction, and by this downward movement the movable switch part 6, 13, 14 can be carried down into a position in which the contacts 6 mounted on same are directly accessible and can be inspected. At the same time direct access will be obtained to the contacts 4 projecting from the bottom face of the insulating plate 3.

The switch parts 6, 13, 14 may if desired be entirely detached from the frame of the tuning device by releasing the rail 17 and the supporting rail 40, Fig. 1, for all of the springs 18, from the connection with the frame of the coil unit and detaching it, whereafter the contact supporting member after first being taken out of the slot 16, is to be displaced longitudinally away from the front side of the coil unit, the metal plate 2 having an aperture 34 sufficiently great to allow the push button 5 to be carried through the same.

In the embodiment shown in Fig. 3 the movable switch part will release itself from the upward directed end of the arm 33, when its end facing away from the keys is turned downwards whereafter it can be directly withdrawn in its longitudinal direction through the side of the chamber 35, in which the contact supporting members are located, the said side being opened through the removal of the coil supporting members 8.

Having now particularly described and ascertained the nature of my invention and in what manner the same is to be performed I declare that what I claim is:

1. A device for selectively tuning a radio receiver to any one of a plurality of pre-set wave lengths, comprising a main frame, a wall mounted in said main frame, a second wall parallel with and spaced from said first-mentioned wall, a secondary frame associated with said second-mentioned wall to form a structural unit therewith, said secondary frame being readily detachably connected with said main frame, a plurality of contact supporting members mounted in parallel relationship for slidable movement between said walls, a plurality of contact members mounted on each of said supporting members to project towards each of said walls for engagement with the surface thereof, a plurality of fixed

contacts mounted on said first-mentioned wall in respective zones thereof facing the individual slidable contact supporting members, a plurality of fixed contacts mounted on said second-mentioned wall and arranged in positions to be connected each to an individual contact in said first-mentioned wall by means of the contacts of the said slidably mounted contact supporting members when set to predetermined positions, operating means for slidably moving said contact supporting members longitudinally of said plates to their operated positions, means having slots open at their ends facing away from said first-mentioned wall to guide said contact supporting members adjacent one end thereof, means for guiding said contact supporting members adjacent the other end thereof in a plane substantially perpendicular to said parallel spaced walls and operating members engaging each a slot in the last-mentioned end of a separate one of said slidable contact supporting members, the said slots and the operating members cooperating with said slots being arranged to be released automatically from one another if the opposite ends of the contact supporting member are displaced in a plane perpendicular to said parallel spaced walls.

2. A device according to claim 1, in which the said first-mentioned wall carrying fixed contacts comprises a metal plate provided with apertures, and a plate of insulating material lying flat upon said metal plate on the side thereof facing away from said other wall, said fixed contacts being mounted in said insulating plate, in the zones of said apertures, the ends of the contact members cooperating with said stationary contacts engaging the said metal plate when said supporting member is in its non-operated position, and in which each of the fixed contacts mounted on said other wall is permanently engaged by the contact member cooperating therewith irrespective of whether the supporting member occupies its non-operated position or its operated position.

HARRY CLIFFORD HANSEN.

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