

[54] **CHANNEL SELECTION APPARATUS
FOR HIGH FREQUENCY RECEIVERS
WITH VARIABLE CAPACITANCE
DIODE TUNING**

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[22] Filed: **Jan. 27, 1970**

[21] Appl. No.: **6,148**

[30] **Foreign Application Priority Data**

March 8, 1969 Germany.....P 19 11 898.0

[52] U.S. Cl.**200/172 A, 200/168 R**

[51] Int. Cl.**H01h 3/04**

[58] Field of Search334/7, 47, 52, 86; 338/76,
338/119, 128, 129, 196, 198; 200/172 A, 50
A, 50 AA, 168 G, 168 R; 317/112

[56]

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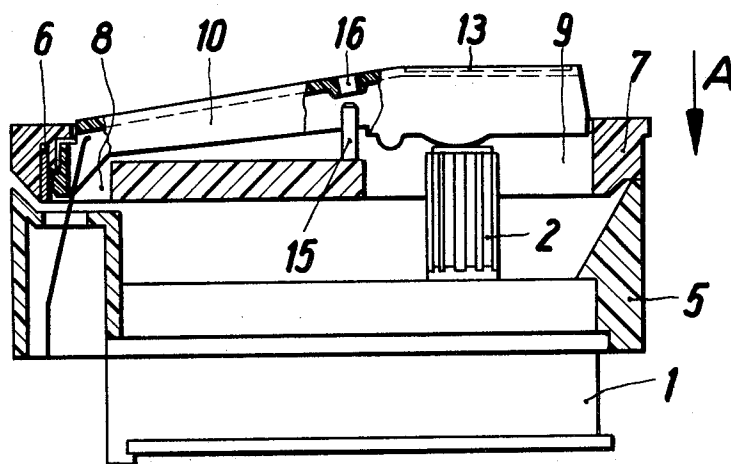
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[57]

ABSTRACT

A channel selection apparatus in the general form of a box having a swingable access door. The door is biased to remain open when opened and to remain closed when closed. The access door carries a plurality of manually depressible keys in the form of levers. Upon depression each lever engages and activates an electrical switch carried within the box.

10 Claims, 12 Drawing Figures



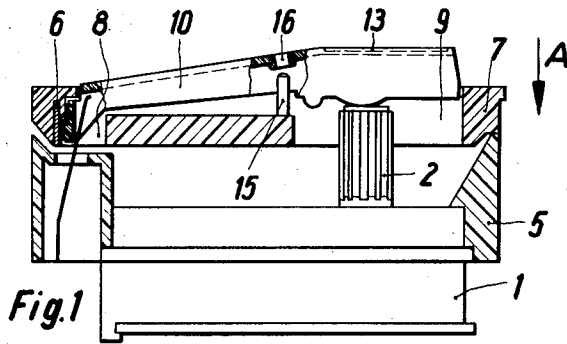


Fig.1

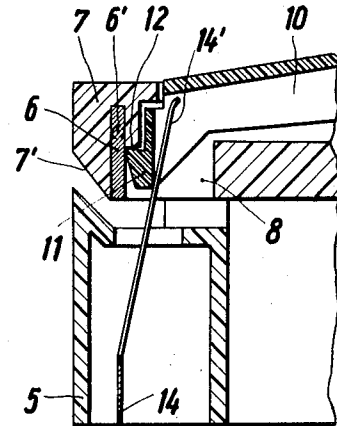


Fig.4

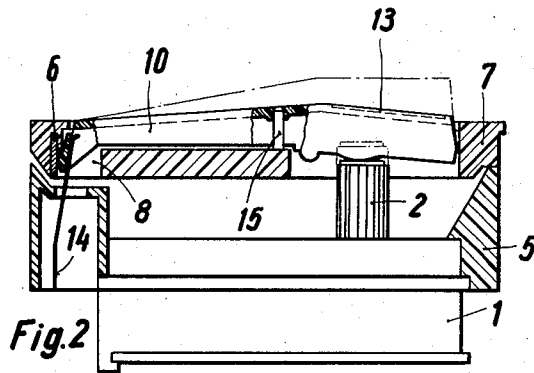


Fig.2

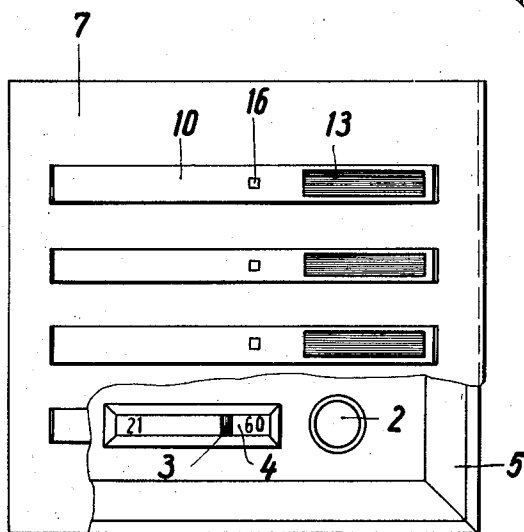


Fig.3

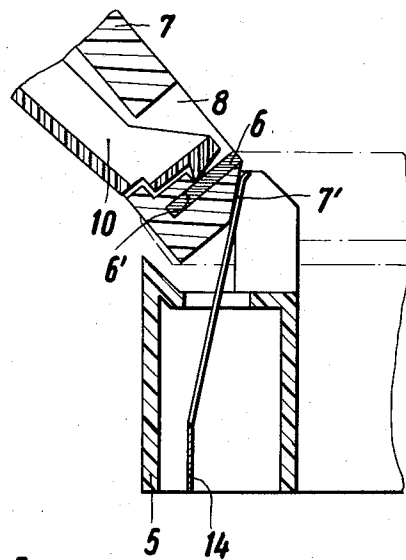
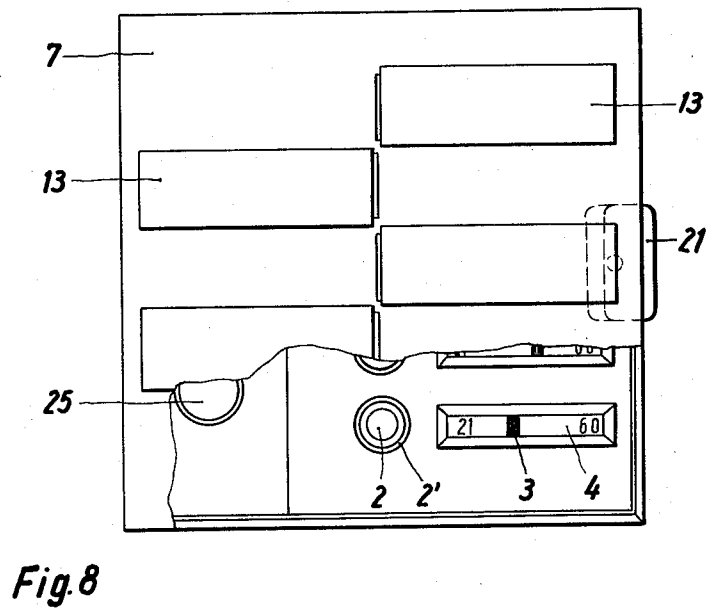
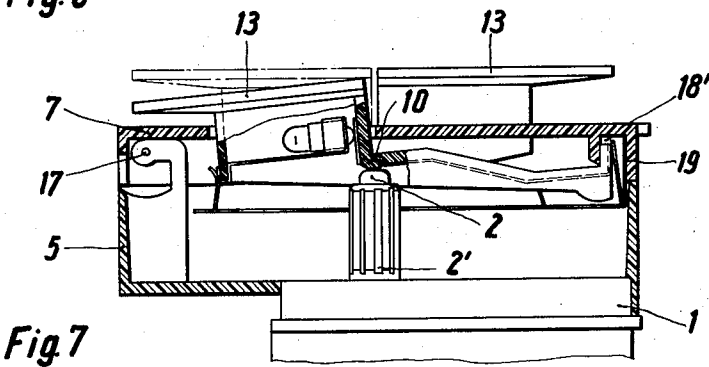
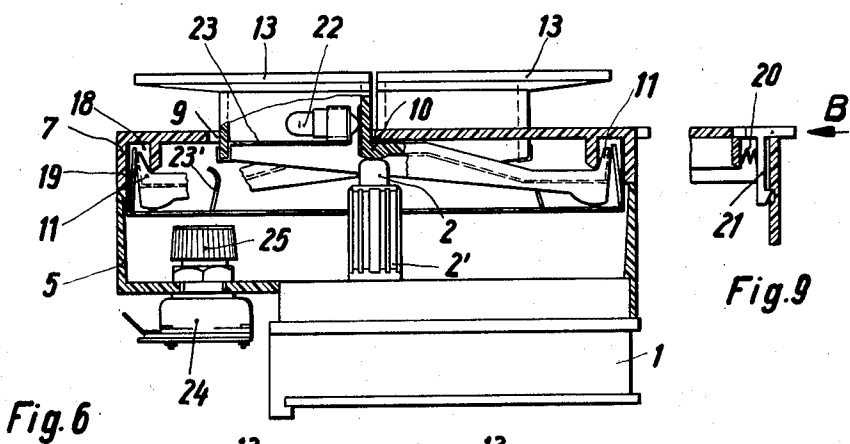


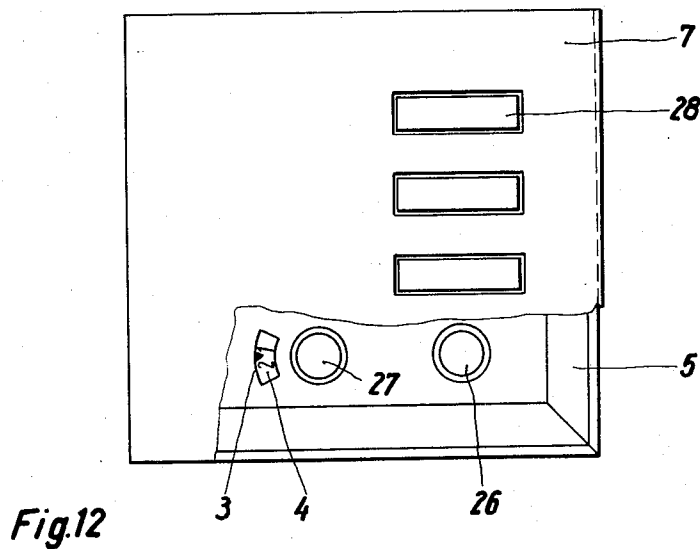
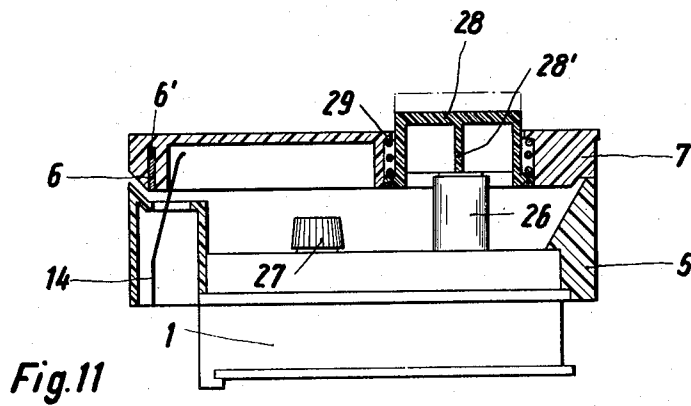
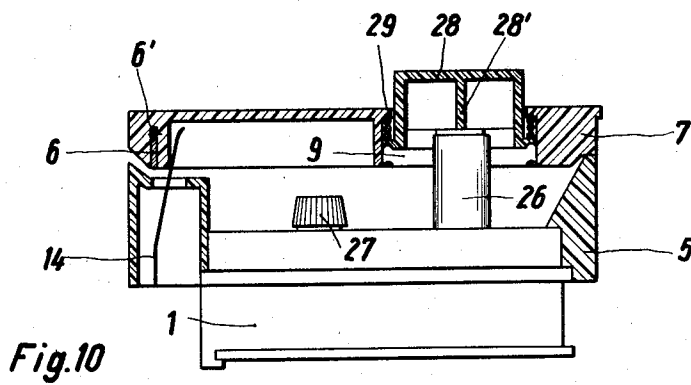
Fig.5

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CHANNEL SELECTION APPARATUS FOR HIGH FREQUENCY RECEIVERS WITH VARIABLE CAPACITANCE DIODE TUNING

The invention relates to a channel selection aggregate for HF-receivers with variable capacitance diode tuning, which consists of several voltage dividers provided with adjustment and indicating means for producing stored tuning voltages which are selectively connectable with the tuning capacitors by means of mutually releasing slide switches arranged in rows. Such aggregates are used on a large scale for broadcasting and television receivers in which they contribute considerably to the simplification of operation since as rule the slide switch of the respective channel store needs to be actuated but once for the storage of the desired transmitter. The adjustment means serving for the channel tuning, that is for the adjustment of the stored tuning voltages, and the indicating means thereof as well as adjustment organs, possibly provided for the range preselection, need not and should not be directly accessible during the normal operation of the device, since they could easily lead to an unknown or unintended faulty operation of the device. So as to avoid this disadvantage it has already been proposed to design the channels selection aggregate in the form of a slide-in unit, the front side of which is accessible also in the pushed-in position and on which the operating buttons for the switches are arranged, whereas the tuning handles for the voltage dividers and for the range-selection elements can be operated only after withdrawal of the aggregate from the device. Such an arrangement is however rather expensive and encumbered with the factors of unsafety on account of the guides required in the device for the slide-in unit and on account of its moveable feed lines.

Furthermore, it has for solving this problem already been proposed to arrange each channel store in a pocket or in its somewhat recessed niche and to provide it with a lid in the form of a large pressure button which is resiliently returning and rotatable or openable and resting on the switching on element in such a manner that it is operable by pressure on the closed lid. This arrangement has the disadvantage that the different channel stores either must have a relatively large distance from one another so that the adjustments can still be conveniently carried out by the fingers, or the adjustment has to be carried out for correspondingly closer arrangement with assistance means such as for instance is screw driver or a socket wrench.

So as to avoid the disadvantages of these known arrangements it is proposed according to the present invention to operate the slide switch in a channel selection aggregate of the above identified type by means of push buttons or keys supported in a pivoted door covering the adjustment and indicating means.

The storage elements remain in the arrangement according to the present invention always firmly connected with the device and may be selectively switched on with the door being closed by means of the keys supported in the door.

For adjusting the tuning voltages or the range preselecting elements, respectively, the swinging door is opened hereby all adjustment elements are simultaneously exposed and all indicating elements become visible so that the storage of the desired transmitters can be carried out unimpeded just as in the case of an open aggregate.

In a first embodiment of the invention, the keys are formed as lever keys and are so pivotally supported in the swinging door that they are in operative connection with the switch slides of the channel stores. The lever keys are suitably arranged so that their engagement point for the switch slide lies about in the middle between there pivot support and there operating handle. The force for operating the switch slide is thereby diminished by about one half, an effect which satisfies the desire demand easily moveable operating elements.

So as to hold the lever keys continuously in a defined position, it is suitable to let them rest on the switch slides with a slight pre-tension. On the other hand, it is desirable that during the adjustment of the tuning elements the swing door is continuously held in the open position.

According to a further embodiment for the invention, spring tongues are therefore provided on the channel selection aggregate which cooperate with projections of the lever keys and with an abutment surfaces of the swing door in a manner that in the closed position the lever keys are pressed by the effect of the spring tongues on the switch slides and the swing door against the frame of the aggregate and so that the swing door after the opening is held under the influence of the spring tongues on its abutment surfaces in the "Open" position.

An additional operational advantage can be achieved in a further embodiment of the invention thereby that the pivot bearings of the lever keys are alternately provided in the swing door on both sides of the row of switch slides. Thereby two rows of operating handles are provided, which are at a relatively great distance from each other and which belong in each case to even or odd numbered lever keys, respectively. Moreover, the distance between the handles following each other in one row is increased to double its value so that is spreading out of the key field is achieved altogether without increase of the required building space. The arrangement becomes thereby clearer and the danger of inadvertently pressing a wrong key is diminished.

In place of the lever keys, the aggregate can in accordance with the further embodiment of the invention be provided with push-buttons which are moveable in axial direction in the swing door in front of the switch slides.

In most cases of the application it is desirable that even at a somewhat greater distance from the device, the switched-on channel storage is well recognizable. Since—especially for a very short stroke of the slide switch—the position of the key in the switched-on condition is not very much different from the position in the condition of rest, it is proposed in accordance with a further embodiment of the invention to operate together with the key additionally an indicating device for the switching condition.

In a first embodiment of this indicating device, each channel storage of the aggregate is provided with a body, preferably a fluorescent colored body, which upon pressing the key slides into a recess of the latter and becomes visible on the front side of the key. The switched-on key is then clearly distinguishable even from a greater distance.

In a further embodiment of the invention, each channel store has, in a manner known per se, a small indicating lamp, the switching-on contacts of which are closed upon pressing the key.

The swing door provided in accordance with the invention on the channel selection aggregate, can in accordance with a further embodiment also serve for covering adjustment organs and other functions of the device, which have to be changed relatively seldom only, such as for instance the balance-regulator in stereo broadcasting devices or picture frequency regulators in television devices.

Further problems, details and features of the invention will be more easily understood from the following description and from the illustration in the attached drawings of several embodiments.

In the drawings:

FIG. 1 shows a section through a channel selection aggregate with one-sidedly supported lever keys, the section being taken through the middle plane of one key in its position of rest;

FIG. 2 shows the same section of this channel selection aggregate with the key in the switched-on position;

FIG. 3 is a plan view of the aggregate having the swing door partly broken away;

FIG. 4 shows, on an enlarged scale, a fragmentary part of the aggregate with the support of the swing door and of the keys in the closed position;

FIG. 5 shows the same fragmentary part in the open position;

FIG. 6 shows a section of a channel selection aggregate with alternately supported lever keys, the section being taken through the middle plane of one key in the position of rest;

FIG. 7 shows the same section of this aggregate in the switched-on position of the key;

FIG. 8 shows a plan view of this aggregate with the pivot door being partly broken away;

FIG. 9 shows a fragmentary part of this aggregate with the lock of the swing door;

FIG. 10 shows a section of a channel selection aggregate with axially slidable keys, the section being taken through the middle plane of the key in the position of rest;

FIG. 11 shows the same section of this aggregate with the key in the switched-on position; and

FIG. 12 shows a plan view of the aggregate, the pivot door being partly broken away.

The channel aggregate shown FIGS. 1 to 5 comprises the storage aggregate 1 containing four voltage dividers (not shown in detail), the divider voltage of which is fed into a capacitor tuned television tuning device by axially sliding its appertaining rotary slide button 2 in the direction of arrow A wherein a lock common to all voltage dividers simultaneously releases a previously switched-on voltage divider and thereby switches the same off. Upon sliding the button, the latter simultaneously coupled with the adjustment shaft of the voltage divider so that, upon rotating the same, the adjusted voltage may be varied, whereupon the channel is shown by hand 3 on scale 4, i.e. shown is the channel number assigned to such voltage.

Connected with storage aggregate 1 is an essentially rectangular plastic frame 5 on which, by means of the rod 6 and its bearing pins 6' the swing door 7 is pivotally supported. The swing door shows, at the same distance as the key buttons 2, four bearing openings 8 which are arranged close to rod 6, that is also close to the pivot axis of the swing door. Four further rectangular openings 9 are so arranged that, with the swing door

closed, they are directly in front of the front sides of the buttons 2. The lever keys 10 are so inserted into in the bearing openings 8 that they abut by a projection 11 on the front edge 12 in the bearing opening 8 of the swing door and are arranged with their handle portion 13 partly in the opening 9.

Leaf-spring tongues 14 are fastened in the side wall of frame 5 below the bearing openings 8 and project with their free ends 14' into the openings 8. With the swing door 7 closed, the tongue ends 14' lie with pre-tension on the inner side of the key lever projections 11. The spring tongues exert torque on the lever keys as well as on the swing door in clockwise direction on account of the arrangement of the points of engagement (shown FIG. 4) of this spring force in relation to the pivot axis of the lever keys 10 and the swing door 7, so that the lever keys rest with a slight pressure on the buttons 2 and so that the swing door is pressed onto frame 5 as shown in FIGS. 1 and 2. The torque exerted hereby on the lever keys is, however, kept so small that it does not lead to a dislocation of the key button 2. Such dislocation takes rather place only after an additional force is exerted by the operator on the handle portion 13 of the lever keys in the direction of the arrow A. The button 2, which at the given time has been pushed, then is locked in the switched-on position, the lever key resting also in this position (shown in FIG. 2) with light pre-tension on the button. When, for selection of another channel, another key is pressed, the common locking element of the slide button 2 is released, which, under the effect of its return spring provided in the storage aggregate 1 returns, into the position of rest and pushes in this position simultaneously the appertaining lever key back against the effect of spring 14 into the position of rest as shown in FIG. 1.

This aggregate is provided with an indicating device for the switched-on position. This indicating device comprises pintles 15 of fluorescent plastic on the swing doors 7 below the lever key 10 and recesses 16 in the front surface of the key levers are so provided that upon pressing the key the bolt slide into the recess. Hereby, the front end of pintles 15 becomes visible as a fluorescent spot in the switched-on position so that always the switched-on channel is recognizable even from a greater distance.

For changing the channel tuning, the swing door is pivoted in counter-clockwise direction until it reaches the position shown fragmentarily in FIG. 5. The spring tongue ends 14' rest in this with pre-tension on the inclined surface 7' of the swing door so that the latter is held with a light locking force in this position. The lever keys 10, which in this door position are not engaged by the spring tongues, are held by two small projections on the side walls of the handle part 13 in the opening 9. All buttons 2 and scales 4 are now freely exposed so that the individual channel stores may in each case be adjusted to the desired channel by pushing and subsequent rotation of the appertaining button 2, wherein all adjusted channels are simultaneously indicated by hand 3. After conclusion of the channel tuning, the swing door 7 is pushed by light pressure to the right out of the locked "Open" position and returns by itself into the closed position under the influence of the spring tongues 14.

FIGS. 6 to 9 illustrate an example in which the pivot bearing of the lever keys are arranged alternately on both sides of the row of buttons. In this example, the storage aggregate 1 is provided with five channel stores, in which the channel adjustment is effected by the sliding button 2 and the channel tuning by adjusting the voltage divider with the turn button 2' which is arranged concentrically to slide button 2. The adjusted channel is in each case shown, just as in the first example, on scale 4 by hand 3. Secured to the storage aggregate 1 is again the plastic frame 5 on which the swing door is pivotally supported by its pivots 17. The swing door is provided with five openings 9 for the handle portions 13, consisting of translucent plastic, of the angled-off lever keys 10. The first, third and fifth lever keys are arranged on the right hand side of and the second and fourth one on the left hand side of the row of buttons. The first, third and fifth lever keys 10 are supported by their projections 11 in the chambers 18 near to the pivot axis of the swing door and the second and fourth lever keys 10 are supported in the chambers 18' on the opposite side of the door. In each chamber 18, 18' there is a V-shaped spring 19 which, under influence on the projection 11 causes the lever key to rest which a light pressure on the front side of button 2. The swing door 7 is held by a bolt 21, biased by spring 20, in the closed position.

The switching-on and the switching-over of the channels takes place in the same manner as in the first example by pressure on the handle portion 13 of the lever keys.

The indication of the switched-on position is achieved in this case by small signal lamps 22 which are fastened beneath the translucent angled-off of handle portions 13 of the keys and the switch-on contacts 23-23' of which are closed upon pressing-in of the handle portions 13.

Beneath swing door 7 there is provided a rotary resistor 24 serving for the fine-adjustment of the picture frequency.

By pushing-in the bolt 21 in the direction of arrow B, the swing door 7 can be opened and the channel tuning may be carried out by means of the rotary button 2' as well as the adjustment of the rotary resistor 24 by button 25.

The third embodiment of the invention illustrated in FIGS. 10 to 12 comprises a storage aggregate 1 with four channel stores. The switching-on of the channels is achieved by means of slide buttons 26 and the adjustment of the apportioning voltage dividers is done by the rotary button 27. The switched-on channel is in each case indicated scale disk 4 which moves with button 27 and provided with marking 3.

The aggregate again has a plastic frame 5 on which the swing door 7 with bar 6 and its bearing pins 6' is pivotally supported and which is held in the closed position under the influence of the spring tongues 14. Four rectangular openings 9 are provided in the swing door 7, into which the hollow brick-shaped pressure keys 28 are inserted. These keys rest under the influence of spring 29 by a cross-rib 28' with a light pressure on the pressure buttons 26.

The switching-on and the switching-over of the channels is carried out by operation of the pressure keys 28. For channel tuning, the swing door 7 is turned to the

left whereupon it is locked by the cooperation of the spring tongues 14 with the inclined surface 7' of the swing door in the "Open" position in the same manner as in the first embodiment. The voltage dividers of the individual channel stores may then be adjusted by means of the rotary buttons 27.

The invention is not restricted to the details of the illustrated embodiments but it is intended to cover all modifications and adaptations which will easily occur to those skilled in the art and which fall within the spirit and the scope of the attached claims.

What is claimed is:

1. A channel selection apparatus for high frequency receivers of the type provided with variable capacitance diode tuning and adjustable voltage dividers for impressing variable voltages on the diodes, the improvement comprising,

- a. a plurality of manually depressible, reciprocating switches mounted on the apparatus, said switches being adapted to change impressed voltage on tuning diodes,
- b. a swingable door in the form of a covering panel pivotally supported at one end thereof on the apparatus and having an open and closed position relative to the apparatus,
- c. a plurality of manually depressible keys supported on said swingable door and having portions contiguous to and engageable with said switches,
- d. said manually depressible keys being levers, said levers being pivotally supported in said swingable door.

2. The apparatus of claim 1 wherein the point of engagement of said levers with said switches is between their pivotal support and their other ends.

3. The apparatus of claim 2 wherein said point of engagement is approximately midway of the length of the levers.

4. The apparatus of claim 1 including,

- a. spring means for biasing said swingable door closed, in the closed position of said door, and for biasing said swingable door open, in the open position of said door.

5. The apparatus of claim 1 wherein said lever keys are arranged so that adjacent lever keys are pivotal on opposite sides of said swingable door.

6. The apparatus of claim 1 including indicating means for identifying a key which has been actuated.

7. The apparatus of claim 6 wherein said indicating means is defined by a fluorescent pintle positioned below each lever and passing through an aperture in each lever only when said lever is depressed, to thereby expose the end of the pintle.

8. The apparatus of claim 6 wherein said indicating means is defined by a lamp mounted contiguous to each lever and energized upon actuation of the lever.

9. The apparatus of claim 4 wherein said spring means is defined by a tongue spring for each said lever key and affixed to the apparatus and having a portion of the spring in bearing engagement with its corresponding lever key, whereby both the individual lever keys and the swingable door are biased.

10. A channel selection apparatus for high frequency receivers of the type provided with variable capacitance diode tuning and adjustable voltage dividers for impressing variable voltages on the diodes, the improvement comprising,

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- a. a plurality of manually depressible, reciprocating switches mounted on the apparatus, said switches being adapted to change impressed voltage on tuning diodes,
- b. a swingable door in the form of a covering panel 5 pivotally supported at one end thereof on the apparatus and having an open and closed position relative to the apparatus,

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- c. a plurality of manually depressible keys supported on said swingable door and having portions contiguous to and engageable with said switches,
- d. spring means for biasing said swingable door closed, in the closed position of said door, and for biasing said swingable door open, in the open position of said door.

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