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(54) RADIO HOUSING ASSEMBLY

(71) We, MOTOROLA, INC., a corporation of the State of Illinois, United States of America, of 9401 West Grand Avenue, Franklin Park, Illinois, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to a radio housing for battery-operated radio apparatus, such as a radio receiver or radio pager. In such apparatus, it is necessary to afford access to the battery for replacement of the same. It is known to provide a plastics frame member forming four or more sides of the housing, with a cover secured thereto, as by screws extending through openings of the cover and engaging inserts provided in the moulded housing member. This has the objection that the inserts moulded in the plastics housing to receive the screws involves substantial cost, and this construction also results in a high percentage of rejects, further increasing the cost. To prevent loss of the screws, captive machine screws may be used, with involves additional cost. Further, the screws have an objectionable appearance, and if not screwed in completely form projections which may catch on the pocket when the radio is inserted or removed to damage the same.

35 To provide access to the battery in the housing, various arrangements have been used, with some requiring removal of a cover secured by screws, which requires the use of a screw driver or coin when it is desired to change the battery. The cover for the battery may be a small button with threads or other interlocking projections, but a small cover has the objections that it is easily lost or misplaced. In some cases, plastics members with engaging projections have been used to cover the battery compartment, but these do

not provide a secured fastening after being removed a number of times.

Another problem in prior miniature radio housing arrangements is that connections are required between the housing and the printed circuit board, carrying the electrical components particularly to provide connections to the battery. This requires disengagement of connections when removing the board from the housing, which increases the maintenance time. Also it is desired to be able to use both single use (Mercury) and rechargeable (Nicad) batteries, and to be able to recharge the battery without removing it from the housing.

According to the present invention there is provided battery-operated radio housing assembly having a printed circuit board arranged to be energized by a battery, a frame member having portions forming one end and two opposite sides of a housing and arranged to receive the board and a battery therein, with the battery adjacent said one end of the housing, a U-shaped cover member forming the opposite end and two opposite sides of the housing, said frame member being arranged to receive said cover member in sliding relation thereon, with said cover member having a first position with respect to said frame member to form an enclosed housing, said cover member being slidable to a second position with respect to said frame member to open said housing adjacent said one end thereof to provide access to a battery therein.

In one embodiment of the invention the frame member may be moulded of plastics material and has portions forming one end and two opposite sides of a housing for apparatus. A U-shaped cover member is slidably positioned in grooves in the frame member and forms two opposite sides of the housing, which are at right angles to the two sides formed by the frame member, and the second

end of the housing. The cover member includes a clip for holding the radio apparatus, which may be a radio pager, in the pocket of the person using the same. A detent structure secured to the frame engages an aperture in the cover to hold the cover closed. The clip has a button arranged to release the detent so that the cover can be slid on the frame member to expose the battery compartment to permit installing or removal of the battery. A second detent prevents the cover from being further removed so that it protects the printed circuit board. This second detent includes a resilient member which requires a tool to release the same to thereby protect the printed circuit board and components from exposure and objectionable tampering by the user. The printed circuit board has contacts for engaging both single use and rechargeable batteries, and contacts are provided in the housing which are connected only to the rechargeable battery for charging the same without removal from the housing.

In a second embodiment of the invention, a resilient insulating member is provided having a mounting portion secured to one end of the frame member and first and second flaps extending therefrom. The first flap covers the printed circuit board and holds the same in position on the frame member, and the second flap provides a cover over the battery. A spring structure secured to the frame member has a projecting portion which forms a detent and engages an aperture in the cover to hold the cover closed. The detent can be overcome so that the cover can be slid on the frame member to a position such that the second flap can be flexed outwardly to expose the battery to permit installing or removal of the same. The cover has a cutout portion with a tongue which, in this position of the cover, engages the projecting portion of the detent to prevent the cover from being further removed. In this position, the cover holds the first flap over the printed circuit board so that it protects the same. The detent can be released from the tongue to permit further removal of the cover, only by the use of a special tool, to thereby protect the printed circuit board and components from exposure and objectionable tampering by the user.

The invention will now be described by way of example only with particular reference to the accompanying drawing wherein:

Figure 1 is a perspective view of a radio pager having a housing assembly in accordance with the invention;

Figure 2 is an exploded view of the pager of Figure 1 showing the housing parts and the chassis;

Figure 3 is a plan view of the back side

of the moulded frame member of the housing;

Figure 4 is a cross-sectional view of the pager with the housing closed;

Figure 5 is a cross-sectional view along the lines of 5—5 of Figure 4;

Figure 6 is a cross-sectional view with the cover partially open to expose the battery;

Figure 7 is a cross-sectional view along the lines 7—7 of Figure 6;

Figure 8 shows the hinge and spring structure for the clip;

Figures 9 and 10 show the housing with rechargeable and single use batteries therein and the connections thereto;

Figure 11 is an exploded perspective view of the battery holder;

Figure 12 is a perspective view of a radio pager having a housing assembly in accordance with another embodiment of the invention;

Figure 13 is an exploded view of the pager of Figure 12 showing the housing parts and the chassis;

Figure 14 is a plan view of the back side of the moulded frame member of the housing showing the detent structure;

Figure 15 is a cross-sectional view of the pager with the housing closed showing the frame member along the lines 15—15 of Figure 14;

Figure 16 is a cross-sectional view with the cover partially open to expose the battery;

Figure 17 is a cross-sectional view along the lines 17—17 of Figure 15;

Figure 18 is an enlarged view showing the detent structure; and

Figure 19 illustrates the key which is used to release the detent.

The radio apparatus of the invention is shown in Figure 1, and is illustrated as a radio pager. It will be apparent that the housing arrangement can be used for other radio devices. Figure 2 shows the parts in exploded relation and the invention will be described in connection with Figures 1 and 2.

The housing includes a moulded plastics member 10 which forms a frame for supporting the printed circuit board 20, and which also forms one end 11 and a pair of opposite sides 12 and 13 of a housing for the radio apparatus. The frame member 10 also includes a web 14 extending between the sides 12 and 13, and an end 15 which is not an exposed side of the housing.

The board 20 may include an insulating board having conductors thereon which rests on projections 21 moulded in the frame member 10. Components extend from the bottom side of the printed circuit board 20 when positioned as shown in Figure 2, with the components indicated at 23 in Figures 4 and 6. An insulating pad 30 is positioned adjacent the board 20 to prevent shorting of the conductors thereon. Space is provided

in the housing for a battery 24 which is connected to the circuit of the board 20.

A cover member 16 is provided which is U-shaped and may be formed from flat metal stock. The cover includes end 17 and sides 18 and 19, which form the second end and a pair of opposite sides of the housing. Grooves 22 are moulded in the side walls 12 and 13 of the frame for receiving the sides 18 and 19 provided by the cover. The end wall 17 of the cover has an opening 25 for receiving the actuator of a switch 26 secured to the board 20. The board may also include a sound transducing device from which sound can pass through opening 27 in the frame 10 and through the openings 29 in the cover to be heard by the user of the device. A retaining clip 28 is provided on the cover 16 so that the pager or other device can be held in a pocket of the user.

The parts shown in exploded positions in Figure 2 are held assembled by dropping the board 20 into the frame 10 and placing the insulating pad 30 on top of the board to provide an insulating cover over the circuit conductors thereon. Then the cover 16 is slipped onto the frame member 10, with the sides 18 and 19 within grooves 22 in the side walls 12 and 13 of the frame member. The pad 30 may be of resilient material to hold the board against the parts of the frame 10.

The cover 16 is held in closed position on the frame 10 by a detent arrangement which is shown in Figures 3, 4 and 5. Figure 3 shows the back side of the web 14 of the frame member 10. This includes a tongue 32 having a projection 33 at its end. The projection 33 extends into an opening 35 (Figure 2) in the side 19 of the cover 16, which is positioned under the lip of the retaining clip 28. The projection 33 thus holds the cover 16 in closed position with respect to the frame member 10. Although the tongue 32 and projection 33 are illustrated as integral with the web 14 of the frame, a separate metal clip mounted on the web may be used.

To permit the cover 16 to slide with respect to the frame member 10, a spring biased release button 38 is provided in the clip 28. This has a plunger 39 with an end which engages the projection 33 to push the same into a position clear of the side wall 19. As shown in Figure 5, the top of the button 38 is elongated and supported only at the ends, and is made of a material so that the centre part which supports the plunger 39 can flex to move the projection 33. This allows the cover to slide to the position shown in Figure 6. In this position the end 19a of the side 19 clears the opening 14a in the web member 14, so that access is provided to the battery 24. The user can, therefore, change the battery and slide the cover closed, with the projection 33 locking in the

opening 35 of the cover to hold the cover closed. The opening of the cover 16 to provide access to the battery 24 does not expose the board 20, as the movement of the side 18 of the cover to the position shown in Figure 6 merely exposes a portion of the insulating pad 30, which is between the board 20 and the cover side 18.

The cover is held in the position shown in Figure 6, by a second detent 42 which is at the end of a spring member 43 secured to the cover side 19 by a rivet 41 or the like. The spring member 43 has bent up ears 44 which form the mounting for the clip 28. As shown in Figure 6, the detent 42 extends through opening 45 in the side 19 of the cover and engages the end 15 of the member 10 to prevent the complete removal of the cover 16 from the frame member 10, when the projection 33 is freed from the opening 35 in the cover side 19. In order to release the detent 42, a tool 46 can be inserted through an opening 47 (Figure 2) in side 19 to engage the spring 43. The opening 47 is exposed only when the cover is in the position shown in Figure 6. This makes it possible to flex the spring 43 so that detent 42 clears the end wall 15 of the frame member 10. The detent 42 and the end wall 15 may have slanting surfaces so that the spring 43 automatically flexes when the cover is slid onto the frame member 10.

The board 20 has a battery retainer 50 preassembled thereon as is clearly shown in Figures 9, 10 and 11. The retainer has conducting projections 51 extending through openings 52 in the board 20 for connection to the circuit provided on the board. An opening 53 (Figure 11) is provided in the board below the battery, and an aligned opening is provided in pad 30, so that the battery can be forced out of the retainer 50 through the opening 14a in the web member 14 (Figure 6).

Figures 9 and 10 show the connecting arrangement whereby either a single use or a rechargeable battery can be used. Connections are made to charging contacts 55 and 56 in the housing so that the battery can be charged without being removed from the housing. The contacts 55 and 56 extend through the wall 11 of the housing so that the radio receiver can be placed in a pocket or receptacle in a charger, which has contacts arranged to engage the charging contacts 55 and 56. This permits recharging the battery without removing the same from the receiver.

Figure 9 shows a rechargeable battery 24a in the retainer 50, which may be a Nicad battery, which has a projection 58 engaging contact pin 59 supported by the retainer 50. The pin 59 is connected to contact strip 60 which has a resilient part engaging the contact 55 in the housing. A connection is made

to the other end of the battery by a resilient clip 62 which has a projection connected to conductor 63 on the printed circuit board 20. A resilient clip 64 connected to the conductor 63 engages the charging contact 56 on the housing. Accordingly, connections are made from the battery terminals to the charging contacts 55 and 56 which permit charging of the battery while in the housing. A resilient contact 65 engages the front end of the battery 24, and has a projection connected to the circuit on the chassis 20 to provide an energizing connection between the battery and the circuit. Inasmuch as the contacts 60 and 64 resiliently engage the charging contacts 55 and 56, the chassis can be removed without removal of fixed connection between the board and the housing.

Figure 10 shows the battery retainer 50 with a non-rechargeable battery 24b therein. Connections to the circuit are made by the resilient connectors 62 and 65 in the same manner described with reference to Figure 9. However, as the battery 24b does not have a projecting terminal at the end which engages the contact 59, there is no connection between the battery and the charging contact 55. Accordingly, there is not a complete circuit between the battery and the contacts 55 and 56 which can connect the battery to a charger. This arrangement is necessary to prevent damage to the battery, and possibly to the radio receiver, in the event that a radio receiver with a non-rechargeable (Mercury) battery is inadvertently placed in a charger.

A second embodiment illustrating the radio apparatus of the invention is shown in Figures 12 to 19. Figure 12 shows the housing containing the radio apparatus, and Figure 13 shows the parts in exploded relation. The housing includes moulded plastics member 110 and cover member 116 which are similar to the housing members in the structure shown in Figures 1 to 11. The printed circuit board 120 includes an insulating circuit board 121 having conductors thereon. Components extend from the bottom side of the circuit board 121 with the components indicated at 123 in Figures 15 and 16. A bracket 122 is provided on this side of the circuit board 121 for receiving a battery 124, and for making connections to the circuit on the board 120.

An insulating flexible plastics member 130 is provided having a mounting portion 131 secured to the inside of the end wall 111 of frame member 110, and flaps 132 and 133 extending therefrom. The mounting portion 131 can be secured to the end wall 111 by rivets 134, which can also be used to provide external connections to the radio, as for charging the battery. The flap 132 is constructed to be folded down into engagement

with the circuit board 120, and has ribs 135 at the edges and in the centre which bear against the chassis to hold the same in position within the frame member 110. The flap 133 on the member 130 covers an opening 136 in the web 114, through which the battery is inserted to place the same in the bracket 122 and engages the battery to hold the same in place.

The parts shown in exploded positions in Figure 13 are held assembled by dropping the board 120 into the frame 110 and folding the insulating flap 132 on top of the chassis to provide an insulating cover over the circuit conductors thereon.

Then the cover 116 is slipped onto the frame member 110, with the sides 118 and 119 within grooves 129 in the side walls 112 and 113 of the frame member. Figure 17 is a cross-sectional view showing the assembled structure. As previously stated, the member 130 is made of flexible insulating material and the flap 132 thereof has ribs 135 which bear against the board to hold the same within the frame 110. The side 118 of the cover 116 provides pressure against the flap 132 which exerts resilient pressure on the board. Pads 138 of resilient material are secured to the sides 112 and 113 of the frame member 110 to resiliently hold the board in position laterally. The flap 133 also has ribs 133a which bear against the battery 124, with the flap 133 being held in position by the side 119 of the cover 116. The board 120 is resiliently held in the housing by the flaps 132 and 133, the resilient pads 138 and other resilient members which engage the frame member 110 and/or cover 116.

The cover 116 is held in closed position on the frame 110 by a detent arrangement which is shown in Figures 14, 15 and 16. Figure 14 shows the back side of the web 114 of the frame member 110. This includes a plastics member 140 having a projection 141 at its end. A spring 143 bears upwardly against the member 140 (Figures 15 and 16). The projection 141 is positioned to extend into an opening 142 in the side 119 of the cover 116, which is positioned under the top of the retaining clip 128 (Figure 15), when the cover is closed. The projection 141 tends to hold the cover 116 in closed position with respect to the frame member 110. As shown in Figure 15, the projection 141 has rounded edges so that when pressure is applied, the spring 143 will flex so that the projection 141 moves down and the cover 116 can slide with respect to the frame member 110.

In Figure 16, the cover is shown slid to a position in which the end 119a of the side 119 clears the end of the flap 133, so that the flap can be flexed upwardly as shown. This provides access to the battery 124 through the opening 136 in the web 114. An opening 137 is provided in the flap 132, and 130

5 this is clear of the side 118 of the cover, so
that an elongate object can be used to press
against the battery 124 to force the same
through the opening 136. The user of the
10 radio can, therefore, change the battery with
the cover in the position shown in Figure 16.
The flap 133 has an end 133b which engages
the edge 136a of the opening 136 in web 114
to hold the battery in position when the cover
15 116 is slid to the position shown in Figure 16.
The flap is shown in this position in Figure
15. The cover can then be slid closed so
that the projection 141 enters the opening
142 in the cover 116 to hold the cover closed.
20 This opening of the cover 116 to provide
access to the battery 124 does not expose
the board 120, as the movement of the side
118 of the cover to the position shown in
Figure 16 merely exposes a portion of the
insulating flap 132 which is between the
board 120 and the cover side 118. This flap
is held by the cover side 118 when in this
position, so that it covers the board.

25 The cover 116 is held against further re-
moval, when in the position shown in Figure
16, by engagement between the projection
141 on member 140 and a tongue 144 formed
in the side 119 of cover 116. The tongue
30 144 is formed by a punched opening 145 in
the side 119 of cover 116 (Figures 13 and
18), and fits into a recess 146 in the projec-
tion 141 (Figures 14 and 18). This inter-
engagement, which is shown in Figure 18,
prevents the complete removal of the cover
35 116 from base 110.

In order to release the interengagement
between tongue 144 and projection 141, a
tool or key 148 is provided, which is shown
in Figure 19. This is a plastics bar having
40 a head 150 thereon, with a pair of transverse
ribs 152 projecting therefrom. The key can
be placed under the clip 128 (Figure 16),
with the ribs 152 engaging the projection 141
on the opposite sides of the recess 146. In
45 Figure 18, the ribs 152 on the key 148 are
shown by dotted lines. Pressure on the clip
128 will then cause the ribs 152 on the key
to move the projection 141 downward. This
flexes the spring 143, so that projection 141
50 will move below the cover 116 and the inter-
engagement between the projection 141 and
the tongue 144 is released. The cover 116
can then be completely removed from the
frame member 110.

55 As shown in Figure 14, the web 114 of
the frame 110 has a further opening 139
therein. This permits inspection of com-
ponents 123 on the board 120 without re-
moving the board from the frame. For ex-
60 ample, the receiver may have selective de-
vices for responding to particular paging
codes. The devices can be placed so that
indications thereon are visible through the
opening 139 to make it possible to determine
65 the code to which the receiver will respond.

The housing assembly described provides
a complete housing formed by a frame mem-
ber and a cover member. The members are
held in assembled relation by detents, and
no screws or other removable connecting ele-
70 ments are required. This makes it possible
to open the housing without the use of a
screwdriver or other tool. However, a tool
is required to completely open the housing
to provide access to the printed circuit
75 board. The board includes a retainer for
holding a battery which may be either of the
single use or rechargeable type, and when a
rechargeable battery is used, connections are
made to contact pins for charging the same
80 without removal from the housing. The as-
sembled housing has a neat appearance with
no screw heads or other fastening devices in
view to disturb the styling lines. As the
board has no external connections, it can be
85 removed when required without disconnect-
ing leads.

WHAT WE CLAIM IS:—

1. Battery-operated radio housing as-
90 sembly having a printed circuit board ar-
ranged to be energized by a battery, a frame
member having portions forming one end
and two opposite sides of a housing and
arranged to receive the board and a battery
95 therein, with the battery adjacent said one
end of the housing, a U-shaped cover mem-
ber forming the opposite end and two oppo-
site sides of the housing, said frame member
being arranged to receive said cover member
100 in sliding relation thereon, with said cover
member having a first position with respect
to said frame member to form an enclosed
housing, said cover member being slidable
to a second position with respect to said
105 frame member to open said housing adjacent
said one end thereof to provide access to a
battery therein.

2. An assembly as claimed in claim 1
wherein said frame member is moulded of
110 plastics material and has grooves along
opposite sides thereof, and said cover mem-
ber is formed of sheet metal and has edges
positioned in said grooves in said frame
member.

3. An assembly as claimed in claim 1
including insulating means between said
cover member and the printed circuit board
and cooperating with said cover member to
hold the board in position on said frame
120 member.

4. An assembly as claimed in claim 1
including a resilient insulating member hav-
ing a mounting portion with first and second
flaps extending on opposite sides thereof,
125 said mounting portion being secured to said
one end of said frame member with said first
flap extending over said printed circuit board
and said second flap extending over the
battery, said board being held in position
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5 this is clear of the side 118 of the cover, so
that an elongate object can be used to press
against the battery 124 to force the same
through the opening 136. The user of the
radio can, therefore, change the battery with
the cover in the position shown in Figure 16.
The flap 133 has an end 133b which engages
the edge 136a of the opening 136 in web 114
to hold the battery in position when the cover
116 is slid to the position shown in Figure 16.
The flap is shown in this position in Figure
15. The cover can then be slid closed so
that the projection 141 enters the opening
142 in the cover 116 to hold the cover closed.
This opening of the cover 116 to provide
access to the battery 124 does not expose
the board 120, as the movement of the side
118 of the cover to the position shown in
Figure 16 merely exposes a portion of the
insulating flap 132 which is between the
board 120 and the cover side 118. This flap
is held by the cover side 118 when in this
position, so that it covers the board.

The cover 116 is held against further re-
moval, when in the position shown in Figure
16, by engagement between the projection
141 on member 140 and a tongue 144 formed
in the side 119 of cover 116. The tongue
144 is formed by a punched opening 145 in
the side 119 of cover 116 (Figures 13 and
18), and fits into a recess 146 in the projec-
tion 141 (Figures 14 and 18). This inter-
engagement, which is shown in Figure 18,
prevents the complete removal of the cover
116 from base 110.

In order to release the interengagement
between tongue 144 and projection 141, a
tool or key 148 is provided, which is shown
in Figure 19. This is a plastics bar having
a head 150 thereon, with a pair of transverse
ribs 152 projecting therefrom. The key can
be placed under the clip 128 (Figure 16),
with the ribs 152 engaging the projection 141
on the opposite sides of the recess 146. In
Figure 18, the ribs 152 on the key 148 are
shown by dotted lines. Pressure on the clip
128 will then cause the ribs 152 on the key
to move the projection 141 downward. This
flexes the spring 143, so that projection 141
will move below the cover 116 and the inter-
engagement between the projection 141 and
the tongue 144 is released. The cover 116
can then be completely removed from the
frame member 110.

As shown in Figure 14, the web 114 of
the frame 110 has a further opening 139
therein. This permits inspection of com-
ponents 123 on the board 120 without re-
moving the board from the frame. For ex-
ample, the receiver may have selective de-
vices for responding to particular paging
codes. The devices can be placed so that
indications thereon are visible through the
opening 139 to make it possible to determine
the code to which the receiver will respond.

The housing assembly described provides
a complete housing formed by a frame mem-
ber and a cover member. The members are
held in assembled relation by detents, and
no screws or other removable connecting ele-
ments are required. This makes it possible
to open the housing without the use of a
screwdriver or other tool. However, a tool
is required to completely open the housing
to provide access to the printed circuit
board. The board includes a retainer for
holding a battery which may be either of the
single use or rechargeable type, and when a
rechargeable battery is used, connections are
made to contact pins for charging the same
without removal from the housing. The as-
sembled housing has a neat appearance with
no screw heads or other fastening devices in
view to disturb the styling lines. As the
board has no external connections, it can be
removed when required without disconnect-
ing leads.

WHAT WE CLAIM IS:—

1. Battery-operated radio housing as-
sembly having a printed circuit board ar-
ranged to be energized by a battery, a frame
member having portions forming one end
and two opposite sides of a housing and
arranged to receive the board and a battery
therein, with the battery adjacent said one
end of the housing, a U-shaped cover mem-
ber forming the opposite end and two oppo-
site sides of the housing, said frame member
being arranged to receive said cover member
in sliding relation thereon, with said cover
member having a first position with respect
to said frame member to form an enclosed
housing, said cover member being slidable
to a second position with respect to said
frame member to open said housing adjacent
said one end thereof to provide access to a
battery therein.

2. An assembly as claimed in claim 1
wherein said frame member is moulded of
plastics material and has grooves along
opposite sides thereof, and said cover mem-
ber is formed of sheet metal and has edges
positioned in said grooves in said frame
member.

3. An assembly as claimed in claim 1
including insulating means between said
cover member and the printed circuit board
and cooperating with said cover member to
hold the board in position on said frame
member.

4. An assembly as claimed in claim 1
including a resilient insulating member hav-
ing a mounting portion with first and second
flaps extending on opposite sides thereof,
said mounting portion being secured to said
one end of said frame member with said first
flap extending over said printed circuit board
and said second flap extending over the
battery, said board being held in position

within said frame member by said first flap extending thereover and engagement thereof by said cover member.

5 5. An assembly as claimed in claim 4 wherein said first flap has ribs thereon for engaging said board to hold said board within said frame member.

10 6. An assembly as claimed in any one of claims 1 to 3, comprising a detent structure including a projection on said frame member engageable with said cover member when said cover member is in said first position for holding the same in such position, and a clip on said cover member having a portion cooperating with said detent structure to release the same so that said cover member is slidable to said second position to afford access to the battery.

20 7. An assembly as claimed in claim 6 wherein said clip has an opening with a button therein, and a plunger extending from said button at said opening in said cover member and engageable with said projection to move the same to a position so that said cover member is free to slide on said frame member.

30 8. An assembly as claimed in claim 6 including interengaging portions on said frame member and said cover member to hold the same in said second position, the interengaging portions on said cover member being resilient to permit release thereof so that said cover member can be removed from said frame member.

35 9. An assembly as claimed in any one of claims 1 to 5 including detent means having a spring biased member secured to said frame member and having a projecting portion, said cover member having an opening to receive said projecting portion when said cover member is in said first position.

40 10. An assembly as claimed in claim 9 wherein said cover member has a cut out portion forming a tongue which engages said

projecting portion of said detent means when said cover member is in said second position, with said spring biased member arranged to be moved so that said projecting portion clears said tongue to permit movement of said cover member from said second position for removal thereof from said frame member.

11. An assembly as claimed in claim 10 wherein said projecting portion has a recess shaped to receive said tongue to provide interengagement therebetween.

12. An assembly as claimed in claim 1 including a retainer arranged to receive an elongate battery having a terminal at each end thereof, and including connecting means connected to said board having resilient portions engaging the ends of the battery for connecting the same to said board, and charging contacts secured to said housing and connected to said connecting means for charging a battery within said housing.

13. An assembly as claimed in claim 12, wherein said connecting means for engaging one end of the battery includes a first part for connecting the battery terminal to conductor means on said printed circuit board, and a second part for connecting the battery terminal to one of said charging contacts, and said second part being arranged to make electrical connection to the terminal of a battery of one configuration and to be insulated from the terminal of a battery of a second configuration.

14. A radio housing assembly substantially as hereinbefore described with reference to and as shown in Figures 1 to 11 or Figures 12 to 19 of the accompanying drawings.

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