June 25, 1968 W. J. RACE 3,390,338

RECEIVER MOUNTING APPARATUS PERMITTING ADJUSTMENT OF CONTROL SHAFT POSITION

Filed Aug. 16, 1965 2 Sheets-Sheet 1

Fig. 1.

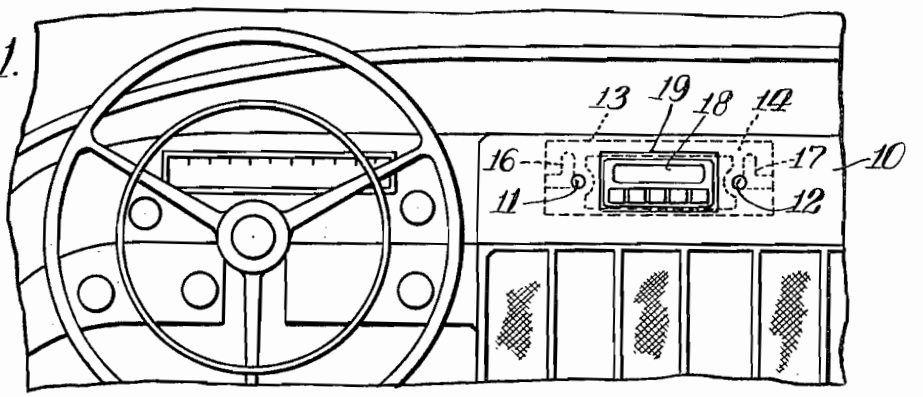


Fig. 2.

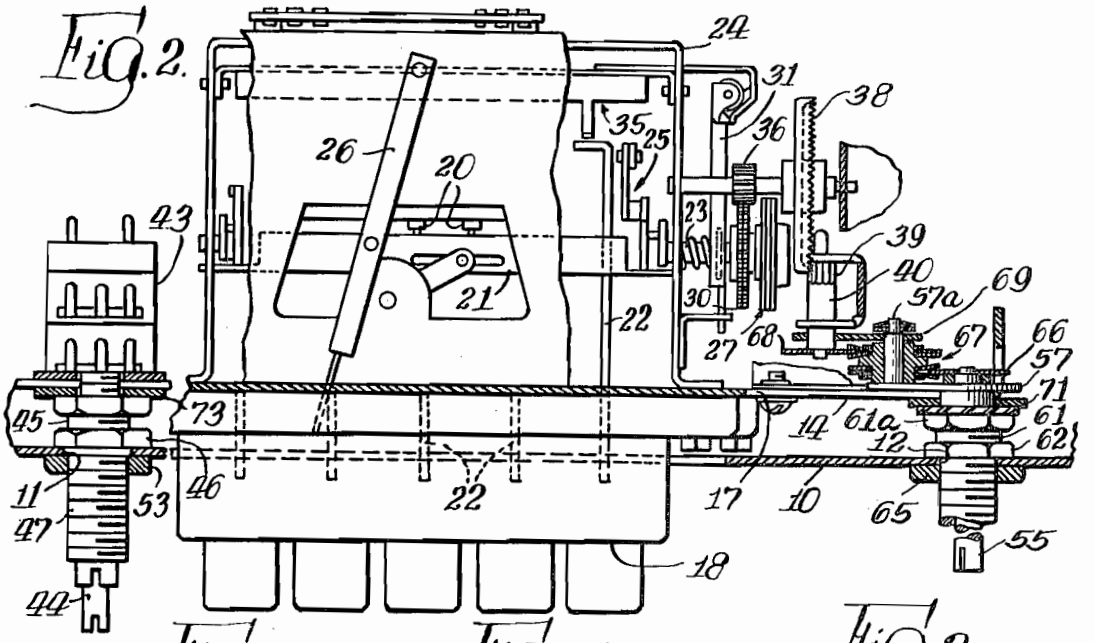


Fig. 3a.

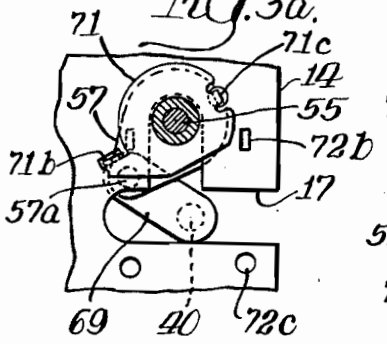


Fig. 3b.

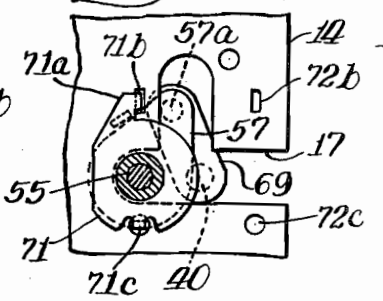
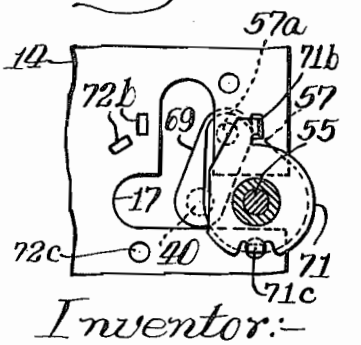


Fig. 3c.



Inventor:-
William J. Race,
By Mueller, Aichele & Rauner Attys

June 25, 1968 W. J. RACE 3,390,338

RECEIVER MOUNTING APPARATUS PERMITTING ADJUSTMENT OF CONTROL SHAFT POSITION

Filed Aug. 16, 1965 2 Sheets-Sheet 2

Fig. 4.

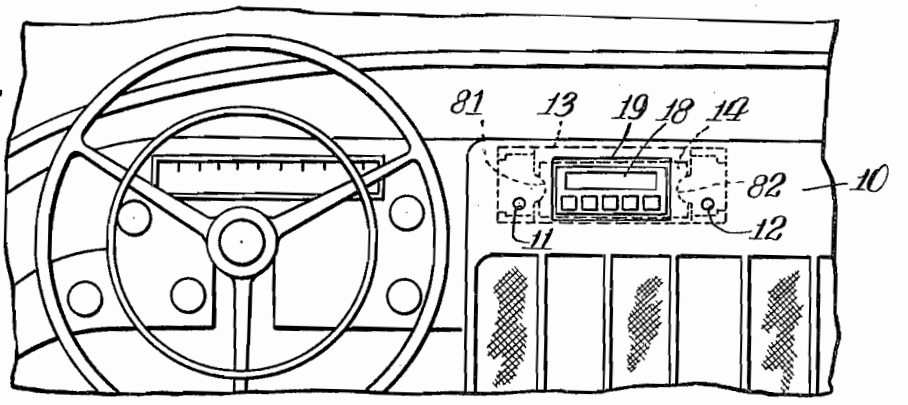


Fig. 5.

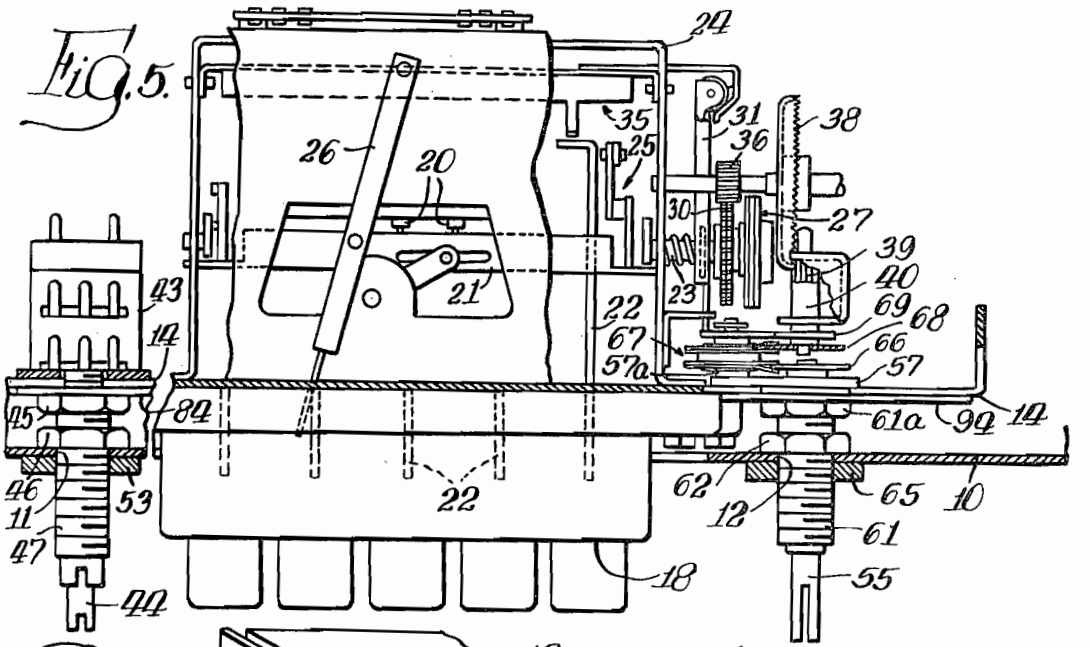
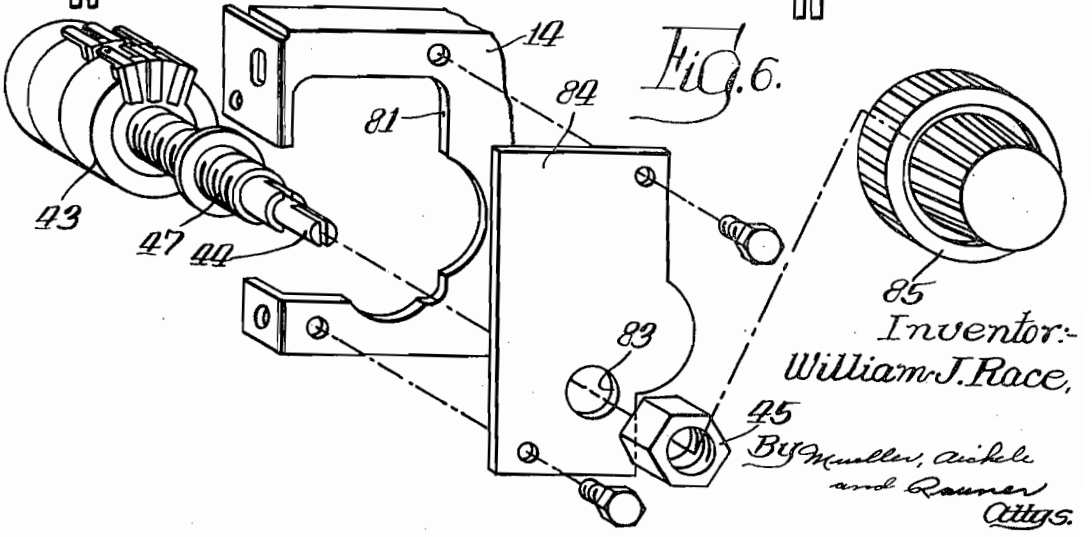


Fig. 6.



Inventor:-
William J. Race,
By Mueller, Aichele and Rauner Attys.

United States Patent Office 3,390,338 Patented June 25, 1968

3,390,338

RECEIVER MOUNTING APPARATUS PERMITTING ADJUSTMENT OF CONTROL SHAFT POSITION

William J. Race, Franklin Park, Ill., assignor to Motorola, Inc., Franklin Park, Ill., a corporation of Illinois

Filed Aug. 16, 1965, Ser. No. 480,066
6 Claims. (Cl. 325—352)

This invention relates to control apparatus, and more particularly to radio control apparatus which is adapted to be mounted in a variety of different supporting structures, such as the dashboards of automobiles, trucks, airplanes or the like.

Most auto radios are positioned behind the dashboard of a car with a pair of shafts for manual volume and tuning adjustment extending through apertures formed in the dashboard. Such radios generally incorporate a tuning dial which either projects through an opening in the dashboard between the shaft apertures, or is visible through such opening. Since many automobiles are sold with radio receivers already installed, substantially all cars manufactured are provided with a set of shaft apertures and a tuning dial opening in the dashboard. The relative positions of these apertures, however, varies somewhat between different makes and models of automobiles. For this reason, one who buys an auto without a radio and desires to have one installed subsequently must purchase a model in which the relative positions of the control shafts and dial thereon correspond to the apertures provided in the dashboard of his car. Manufacturers of auto radios must make different models to fit the various dashboard configurations and the provision of a substantial number of different models necessarily adds to overall manufacturing cost.

In order to avoid this problem and provide the possibility of manufacturing a single model radio which will fit all different dashboard aperture spacings, the universal mount automobile radio receiver has been developed. Such radios have a volume control shaft and a tuning control shaft which are adjustable in position relative to the radio receiver and the tuning dial. Such a radio receiver can easily be installed in a variety of different makes of automobiles or similar vehicles. Such universal mount radio receivers are shown and described in the patent to the present inventor, No. 2,953,927, patented Sept. 27, 1960, and in the patent to Winkler No. 3,073,171, patented Jan. 15, 1963. Both of the foregoing patents have been assigned to the assignee of the present invention. It has been found that solutions such as those proposed by the two foregoing patents, although satisfactory in many instances, do not afford the extremely wide variety of possible adjustments which may be necessary.

It is an object of this invention to provide control apparatus for a universal mount radio receiver which provides for a wide variety of control shaft position adjustment.

Another object of the invention is to provide control apparatus for a universal mount radio receiver wherein the provision for vertical displacement of a pair of control shafts with respect to the tuning dial is improved.

A feature of the invention is the provision, in control apparatus, of a front panel having a pair of apertures with portions permitting vertical displacement of a pair of control shafts with respect to a dial while maintaining a given horizontal spacing of the control shafts with respect to each other and the dial.

Another feature of the invention is the provision, in control apparatus, of a front panel with a pair of apertures therein each comprised of a plurality of elongated contiguous slots, at least one of which slots extends substantially vertically with respect to a dial.

Still another feature of the invention is the provision, in control apparatus, of a front panel having a pair of apertures therein of a size accommodating a variety of possible positions of a pair of control shafts, and of a pair of plates secured to the front panel covering the respective apertures and each having a smaller mounting aperture therein in a predetermined position.

In the drawings:

FIG. 1 is a view illustrating the mounting of a radio receiver behind the dashboard of a typical automobile;

FIG. 2 is a plan view of a radio receiver control apparatus in accordance with the present invention;

FIGS. 3*a*, 3*b* and 3*c* are front views of various mounting positions of a control shaft of FIG. 2;

FIG. 4 is a view illustrating the mounting of a radio receiver having control apparatus in accordance with another embodiment of the invention;

FIG. 5 is a plan view of the radio receiver control apparatus illustrated in FIG. 4; and

FIG. 6 is an exploded view of a portion of the control apparatus of FIGS. 4 and 5.

To summarize the invention as shown, control apparatus for a universal mount automobile radio receiver includes a pair of control shafts having substantially parallel axes. A front panel, having a dial fixed thereon, has a pair of apertures therein, one on each side of the dial. The apertures are of a shape to accommodate displacement of the control shafts relative to the dial. The apertures have a portion permitting vertical displacement of the control shafts with respect to the dial while maintaining a given spacing of the control shafts with respect to each other and the dial. Means are connected to the front panel for supporting each of the control shafts in a respective one of the apertures at a given position with respect to each other and the dial. In one form of the invention the apertures are comprised of a plurality of elongated contiguous slots at least one of which extends substantially vertically with respect to the dial of the tuning device. In another form of the invention the apertures are of a size sufficient to accommodate a variety of possible positions of the control shafts and a pair of plates are secured to the front panel covering respective ones of the apertures. Each plate has a smaller mounting aperture therein in a predetermined position for mounting one of the control shafts.

FIG. 1 shows a typical automobile dashboard **10** with spaced openings **11** and **12** formed therein to accommodate manual control shafts for radio receiver **13**. The front panel **14** of the receiver **13** is provided with a pair of apertures **16** and **17**, one of which is illustrated in detail in FIG. 3. Apertures **16**, **17** are of a configuration comprising a pair of contiguous elongated slots, one horizontally oriented, and one vertically oriented. The result is a shape resembling an inverted T. The receiver **13** also includes a tuning dial **18**, which protrudes through an opening **19** in the dashboard **10**. The spacing between openings **11** and **12** and the positioning of openings **11** and **12** with respect to opening **19** will vary among the different makes of cars.

As shown in FIG. 2, the tuning device includes a plurality of adjustable tuning cores **20** operatively connected to a carriage **21** which may be reciprocated in order to position the cores **20** for tuning purposes. The carriage **21** may be properly positioned for selected channels by operation of sliding push-button rods. Since suitable mechanism for this operation is known, this portion of the apparatus is not illustrated. An indicator arm **26** is driven by the carriage **21** in order to indicate, on dial **18**, the frequency to which the tuner is adjusted.

The carriage **21** may also be driven for tuning purposes through linking mechanism **25** by rotation of the shaft **23**, which is journaled in the tuner frame **24**. Shaft **23**

is driven through a clutch **27** by a drive train comprised of gears **30, 36, 38, 39,** discs **66** and **68,** and pinch washer assembly **67.** The details of this mechanism for driving the tuner are set forth more fully in the Winkler patent previously cited and will not, therefore, be detailed here. The clutch **27** is disengaged upon depression of one of pushbutton rods **22** to prevent the drive train inertia from resisting depression of the pushbutton. This is accomplished by a declutching mechanism comprised of lever **31** and lever actuator **35.** Such declutching mechanism is also described more fully in the Winkler patent.

It will be understood that the present invention has equal application to tuners in which only rotational manual tuning is provided and that the pushbutton structure is shown merely as an example of one form of receiver in which the invention may be utilized.

It will be noted that shaft **40,** which carries gear **39** and disc **68,** extends perpendicularly to the front plate **14** and could thus be extended to project outwardly of the receiver so that it could be manually rotated by means of a suitable knob mounted thereon. A problem would be encountered, however, when the receiver is mounted to a dashboard **10** in which the aperture through which the shaft **40** would extend is not properly spaced from the aperture **11** in the dashboard **10** through which the shaft of volume control **43** would extend. The volume control **43** includes a control shaft **44** which extends outwardly of the dashboard **10** and to which a control knob may be affixed. The control **43** is mounted in opening **16** in front plate **14** by means of a nut **45** which is threaded on the bushing **47** of the control. The precise mounting arrangement will be explained in detail subsequently. A threaded portion of the bushing **47** extends through the aperture **11** of the dashboard **10** and a suitable nut **53** is threaded thereon to form one mounting point for the entire receiver **13.**

Since it is generally desirable from the standpoint of good appearance to have the pushbutton rods **22** and the dial **18** centered between the control shafts **44** and **55,** it is necessary to permit adjustable positioning of the mechanical control mechanism for the tuner of the receiver. A control shaft **55** is mounted in a bushing **61** which includes an arm **57** and a threaded portion projecting through the opening **17.** The bushing **61** includes a shoulder which bears against the inner surface of the dashboard **10** and a fastening nut **65** may be threaded upon the bushing **61** to mount the entire assembly with respect to the dashboard **10.** It can be seen that the mounting of the receiver **13** to the dashboard **10** is effected through fastening both the volume control bushing **47** and the tuning control bushing **61.**

Drive disc **66** is fixed to the inward end of the shaft **55** and a portion of the periphery of this disc is captured on one side of the pinchwasher assembly **67.** The assembly **67** is rotatably mounted on a stud **57***a* of the bushing arm **57.** A second portion of the pinch washer assembly is in driving engagement with the disc **68** which is fixed to one end of the shaft **40.** A link **69** is joined between the shaft **40** and the stud **57***a* in order to maintain proper spacing between these members and to maintain the disc **68** captured by the pinch washer assembly **67.** Accordingly, it may be seen that manual rotation of shaft **55** will turn disc **66** causing rotation of the pinch washer assembly and driving of the disc **68.** Disc **68** will, of course, drive the shaft **40** and the drive train for shaft **23** to tune the receiver. Because link **69** permits the pinch washer assembly **67** to move about the axis of shaft **40,** and because arm **57** will allow the bushing **61** to be moved about the axis of shaft **40** when nut **65** is loosened, the tuner control shaft **55** may be moved to various positions while a driving connection is still afforded to the tuner shaft **23.**

The adjustments of the tuner control shaft **55** and the volume control shaft **44** to precise positions on the front plate are made in basically the same way and so only the shaft **55** is shown in FIG. 3. The front panel **14** of

the tuner mechanism of the receiver is, as has been stated before, provided with a pair of apertures **16** and **17,** one on each side of the opening for dial **18.** The apertures are comprised of a pair of elongated contiguous slots in roughly perpendicular relationship. The formation shown is that of an inverted T. The vertical portions of the T apertures are aligned on the most common center distance in the various auto models and permit adjustment of the control shafts **44** and **55** vertically with respect to the orientation of dial **18.** This is in addition to the horizontal adjustment provided by the horizontal slot. This vertical adjustment may be made without varying the spacing between the shafts and their horizontal spacing from the dial **18.**

The control shafts are mounted to the front panel **14** of the tuner by means of a mounting plate large enough to cover the aperture and having a smaller opening therein. Control shaft **55** and bushing **61** extend through a hole in plate or washer **71.** Plate **71** has an extension **71***a* thereon which is provided with a small tab **71***b* projecting at a right angle from plate **71.** A further tab **71***c* is also provided on the main portion of plate **71.** A plurality of openings **72***b* are provided for tabs **71***b* and a plurality of openings **72***c* are provided for tabs **71***c.* These openings, when the corresponding tabs are inserted therein, orient the plate **71** in a given position. As a result, the tuning shaft **55** is also oriented in a desired position by proper placement of the positions of openings **72***b,* **72***c* according to the various makes of automobiles. FIGS. 3*a,* 3*b* and 3*c* illustrate three possible positions in which the plate **71** may be oriented. Thus, by mounting plate **71** to the front panel **14** of the tuning device, the tuning shaft **55** may be properly positioned for a particular spacing of openings **11** and **12.** Bushing nut **61***a* clamps the plate **71** against the front panel **14.** Volume control shaft **44** is positioned in a similar manner with plate **73** being similar to plate **71.**

Referring now to FIGS. 4, 5 and 6, a further embodiment of the invention is shown. Identical parts have been given identical numbers. In the embodiment of FIG. 4, the front plate or panel **14** of the tuning device is provided with apertures, at either side of the dial **18,** which are of a size accommodating all the possible variations of control shaft position. These apertures **81** and **82** have a portion permitting vertical displacement of the control shafts with respect to the dial **18** while maintaining a given spacing of the control shafts with respect to each other and the dial. The precise location of the control shaft in each aperture is determined by the positioning of an opening in a plate which is secured to the front panel over the aperture.

Referring particularly to FIG. 6, the positioning of the volume control shaft **44** in the aperture **81** is determined by the positioning of the opening **83** in the cover plate **84.** Plate **84** is secured to the front panel **14** of the tuning device over the aperture **81** by threaded fasteners. The shaft **44** is then secured in opening **83** by means of the conventional bushing and lock nut arrangement comprised of bushing **47** and nut **45** and a knob **85** is placed on the end of shaft **44.** A similar plate **94** is secured over aperture **82** on the side of shaft **55** (see FIG. 5). Such a construction enables a radio dealer to keep a number of different ones of the plates, such as plate **84,** with openings **83** provided in different positions according to various makes of automobiles. A given radio is then provided with the proper plates and the desired spacing is achieved. Such an arrangement permits the control shafts to be positioned with an infinite variety of spacings.

It may, therefore, be seen that the invention provides improved control apparatus in a universal mount automobile radio receiver. The apparatus is simple of construction and permits considerable flexibility in vertical displacement of the control shafts.

I claim:

1. Control apparatus for a universal mount radio receiver, including in combination, a pair of control shafts

having substantially parallel axes, a front panel having a dial fixed thereon and further having a pair of apertures therein, said apertures being on opposite sides of said dial, said apertures being shaped to accommodate displacement of respective ones of said control shafts relative to said dial and having portions permitting vertical displacement of said control shafts with respect to said dial while maintaining a given horizontal spacing of said control shafts with respect to each other and said dial, and means connected to said front panel for supporting each of said control shafts in a respective one of said apertures at a given position with respect to the other and said dial.

2. Control apparatus for a universal mount radio receiver, including in combination, a pair of control shafts having substantially parallel axes, a front panel having a dial fixed thereon and further having a pair of apertures therein, said apertures being on opposite sides of said dial, said apertures being shaped to accommodate displacement of respective ones of said control shafts relative to said dial and having portions permitting vertical displacement of said control shafts with respect to said dial while maintaining a given horizontal spacing of said control shafts with respect to each other and said dial, a pair of plates, each being engageable with said front panel and disposed over a respective one of said apertures, each of said plates having an opening therethrough, and means supporting each of said control shafts in a respective one of said openings at a given position with respect to the other and said dial.

3. Control apparatus for a universal mounting radio receiver, including in combination, a pair of control shafts having substantially parallel axes, a front panel having a dial fixed thereon and further having a pair of apertures therein, said apertures being on opposite sides of said dial, said apertures being shaped to accommodate displacement of respective ones of said control shafts relative to said dial and having portions permitting vertical displacement of said control shafts with respect to said dial while maintaining a given horizontal spacing of said control shafts with respect to each other and said dial, a pair of plates, each having means thereon engaging said front panel and positioning said plate in a given position over a respective one of said apertures, each of said plates having an opening therethrough, and means supporting each of said control shafts in a respective one of said openings at a given position with respect to the other and said dial.

4. Control apparatus for a universal mount radio receiver, including in combination, a pair of control shafts having substantially parallel axes, a front panel having a dial fixed thereon and further having a pair of apertures therein, said apertures being on opposite sides of said dial and each being comprised of a plurality of elongated contiguous slots at least one of which extends substantially vertically with respect to the dial of the tuning device, said apertures accommodating displacement of

said control shafts relative to said dial with said vertical slots permitting vertical displacement of said control shafts with respect to said dial while maintaining a given horizontal spacing of said control shafts with respect to each other and said dial, and means connected to said front panel for supporting each of said control shafts in a respective one of said apertures at a given position with respect to the other and said dial.

5. Control apparatus for a universial mount radio receiver, including in combination, a pair of control shafts having substantially parallel axes, a front panel having a dial fixed thereon and further having a pair of apertures therein, said apertures being on opposite sides of said dial, each of said apertures being comprised of a plurality of elongated contiguous slots, at least one of which extends substantially vertically with respect to the orientation of said dial, said slots accommodating displacement of said control shaft relative to said dial with said vertically extending slots permitting vertical displacement of said control shafts with respect to said dial while maintaining a given horizontal spacing of said control shafts with respect to each other and said dial, a pair of plates, each having means thereon engaging said front panel and positioning said plate in a given position over a respective one of said apertures, each of said plates having an opening therethrough, and means supporting each of said control shafts in a respective one of said openings at a given position with respect to the other and said dial.

6. Control apparatus for a universal mount automobile radio receiver, including in combination, a pair of control shafts having substantially parallel axes, a front panel having a dial fixed thereon and further having a pair of apertures therein, said apertures being on opposite sides of said dial, each of said apertures being of a size accommodating a variety of possible vertical and horizontal positions of a respective one of said control shafts relative to said dial, said apertures having portions permitting vertical displacement of said control shafts with respect to said dial while maintaining a given spacing of said control shafts with respect to each other and said dial, a pair of plates, each being secured to said front panel over a respective one of said apertures in a predetermined orientation and having a mounting opening therein in a given position, and means supporting each of said control shafts in a respective one of said openings at a given position with respect to the other and said dial.

References Cited

UNITED STATES PATENTS

2,750,494 6/1956 Marholz ---------- 325—312

KATHLEEN H. CLAFFY, *Primary Examiner.*

R. S. BELL, *Assistant Examiner.*