

Nov. 15, 1938.

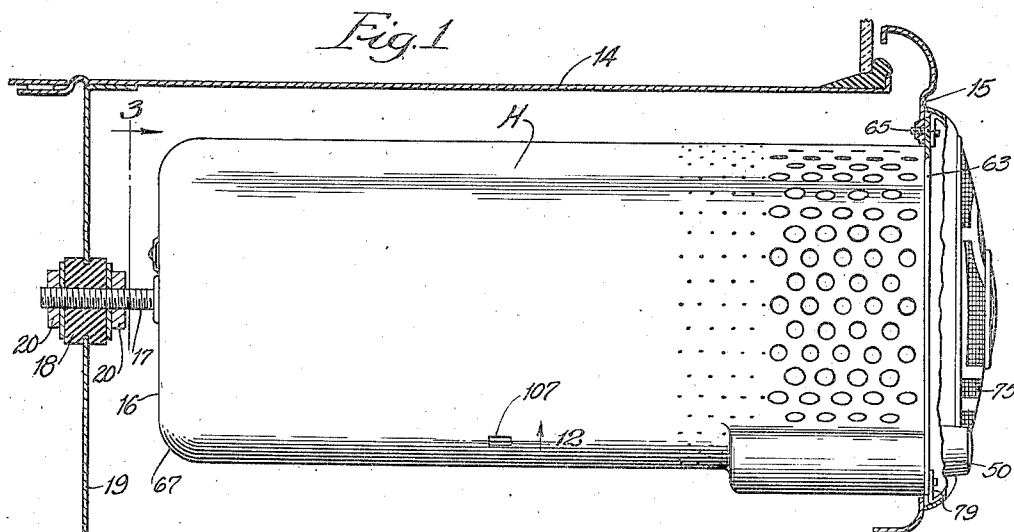
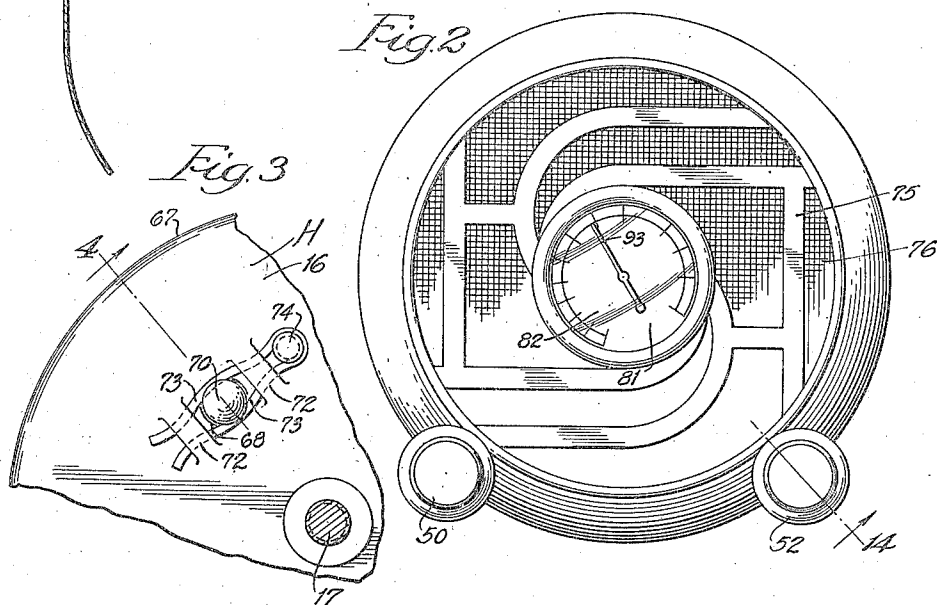
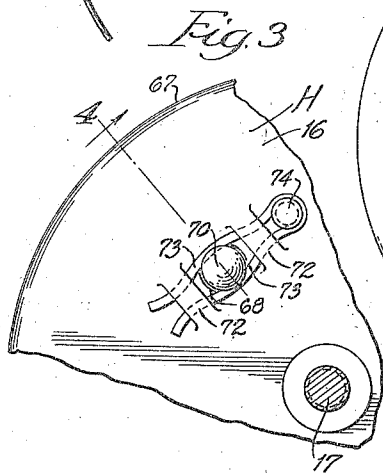
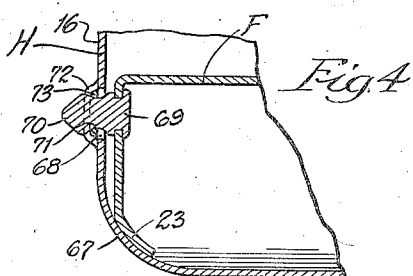
J. L. SWALLOW

2,137,035

RADIO RECEIVING SET

Filed July 15, 1936

5 Sheets-Sheet 1



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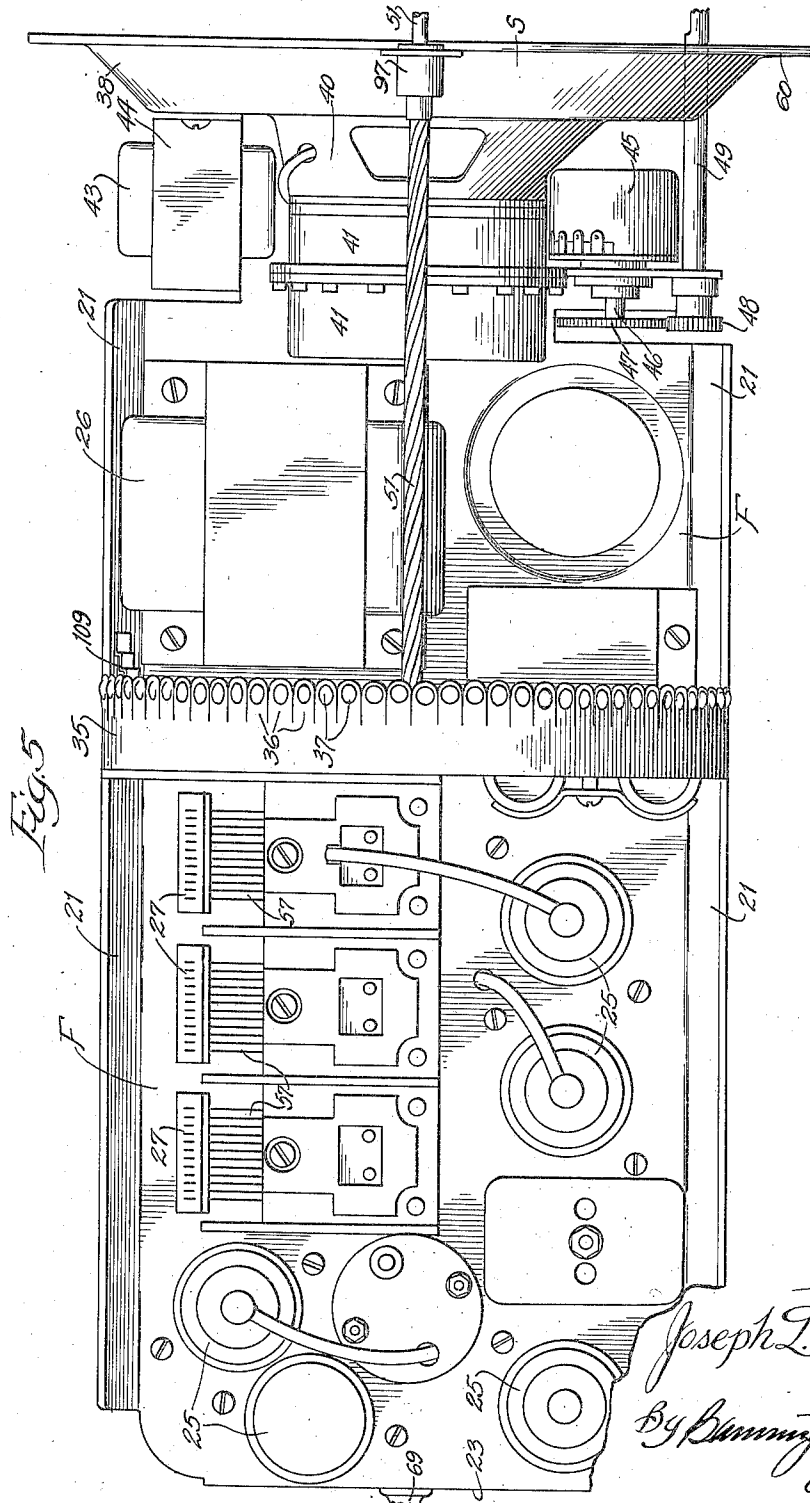
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RADIO RECEIVING SET

2,137,035

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5 Sheets-Sheet 2



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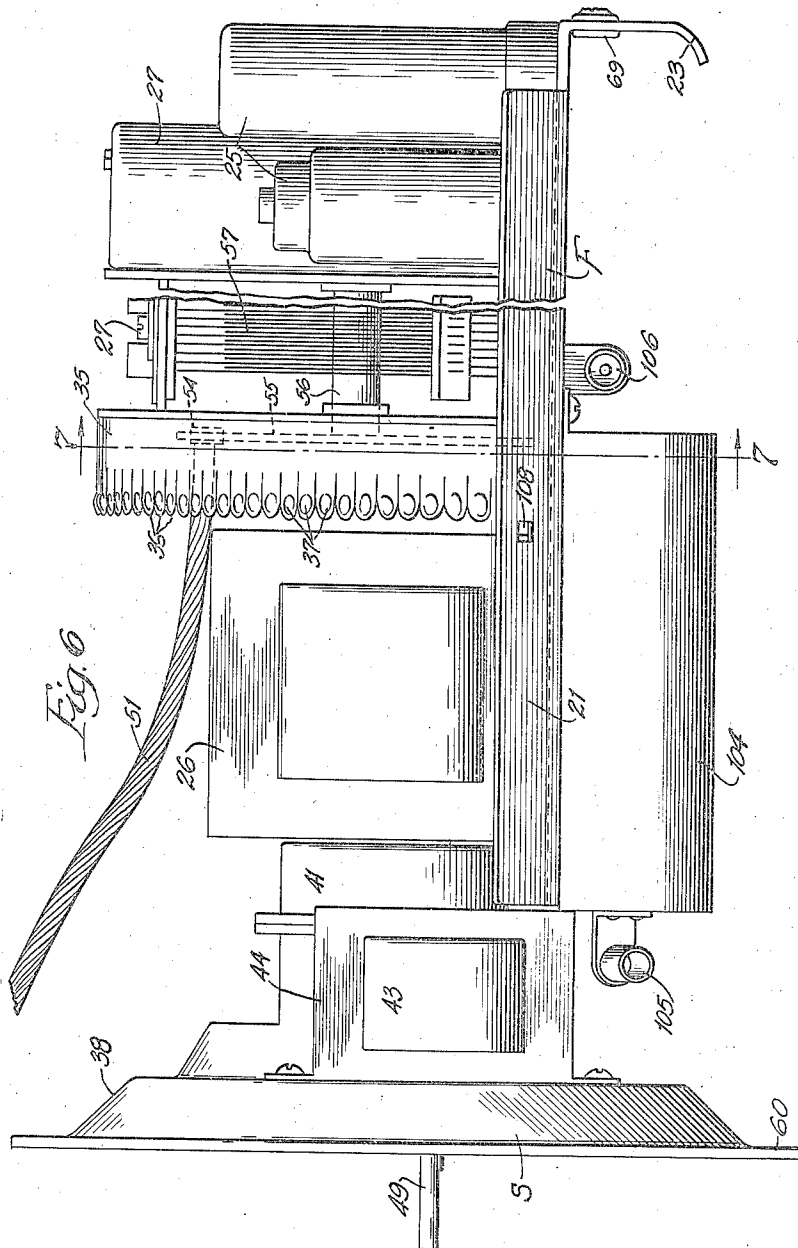
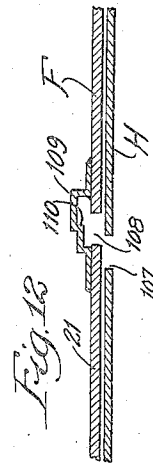
J. L. SWALLOW

2,137,035

RADIO RECEIVING SET

Filed July 15, 1936

5 Sheets-Sheet 3



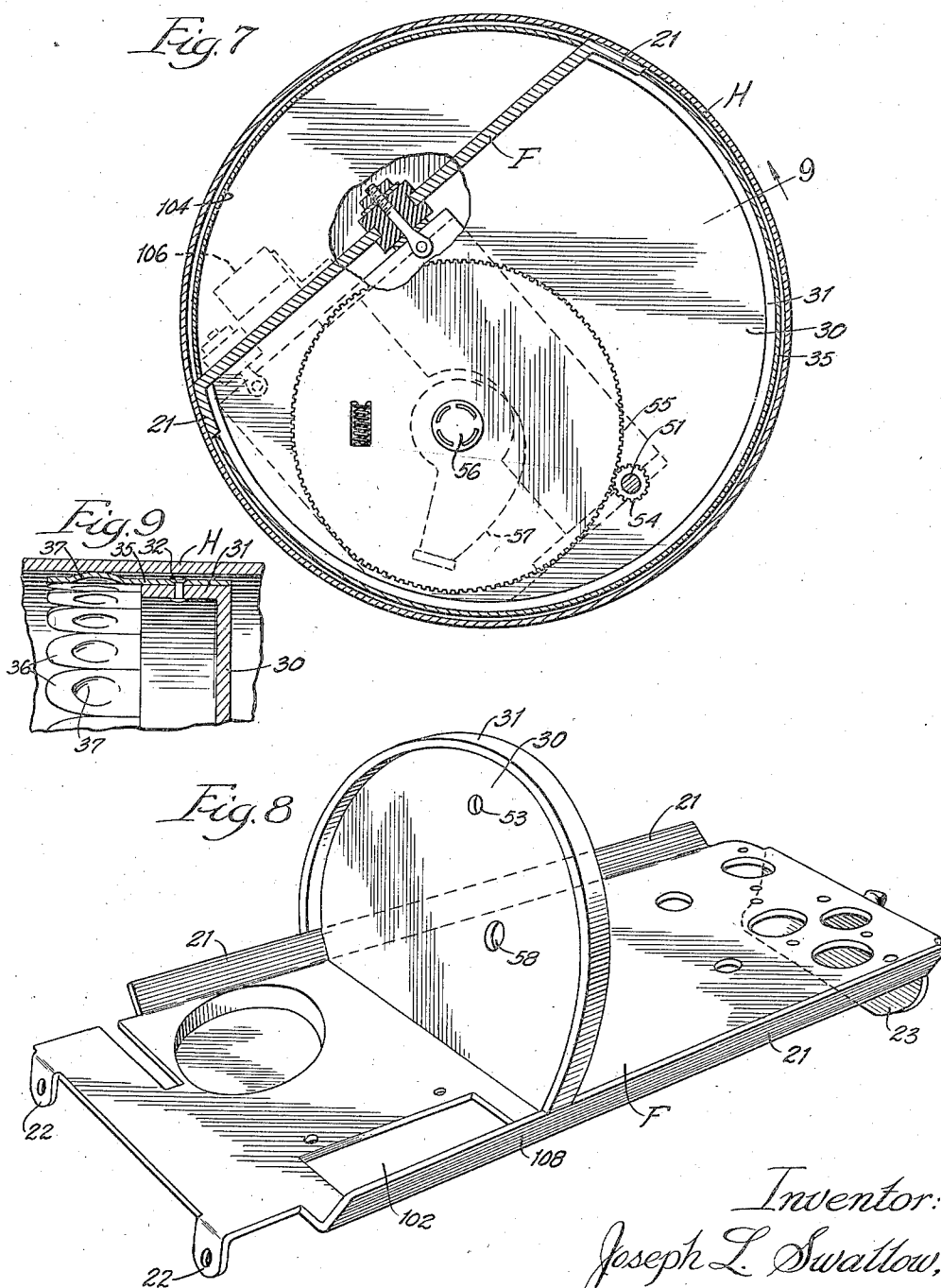
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J. L. SWALLOW
RADIO RECEIVING SET

2,137,035

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5 Sheets-Sheet 4



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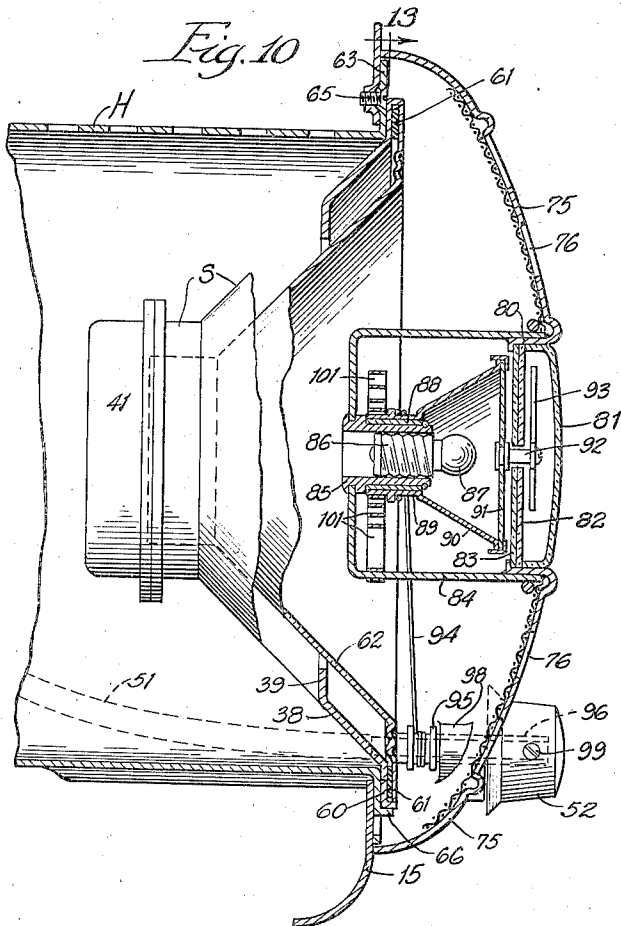
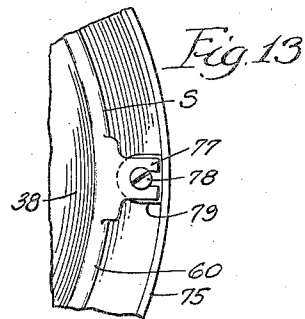
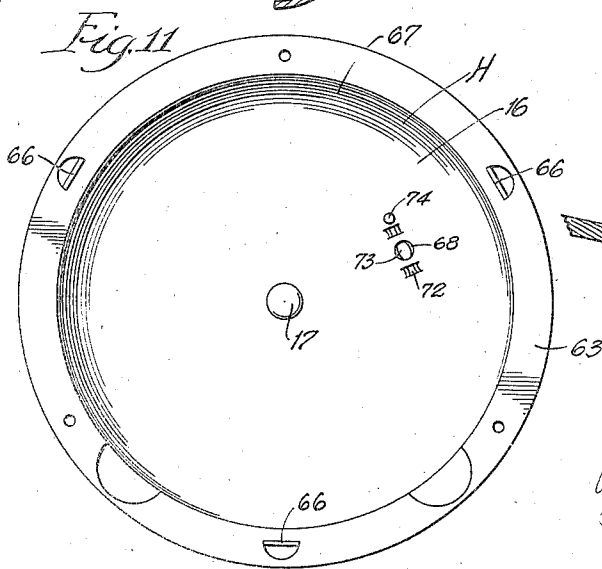
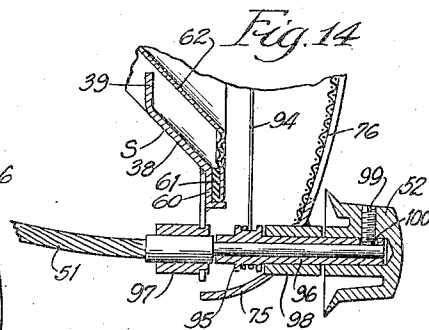
Nov. 15, 1938.

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RADIO RECEIVING SET

2,137,035

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,137,035

RADIO RECEIVING SET

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Application July 15, 1936, Serial No. 90,709

15 Claims. (Cl. 250-14)

This invention relates to a radio receiving set, and more particularly to certain features of construction which render such a set particularly suitable for installation and use in automobiles.

5 The present improvements are directed to an assembly and combination of units which will occupy a minimum of space, be readily accessible for inspection, repair, or replacement, and be easily and quickly installed in or demounted from an automobile. With these purposes in view, the present set comprises an open-ended housing which is preferably of cylindrical form, together with a chassis which may be moved endwise into the housing or be withdrawn therefrom. As a further feature of improvement the chassis comprises in its assembly a speaker and dial mechanism, the latter at the end of the chassis so as to serve as a closure for the housing when the chassis is fitted in place. In this arrangement of parts the speaker is positioned just behind the dial mechanism, but the arrangement is such that the sound waves may pass freely around the dial which is located at a point convenient to the automobile occupants. Such a radio receiving set is preferably mounted with its dial mechanism substantially flush with the instrument board, the housing being supported rearwardly of the board and below the cowl of the automobile.

It is with a general assembly and arrangement of units of this kind, together with other features of value and importance, particularly those relating to the dial mechanism, that my invention is concerned. Certain suggestive embodiments of my invention are set forth in the accompanying drawings in the manner following:

Figure 1 is a vertical section through the cowl, bulk head and instrument board of an automobile, showing the mounting for the present radio receiving set which is illustrated in elevation;

Fig. 2 is a front elevation of the radio receiving set;

Fig. 3 which is an enlarged detail in section taken on line 3 of Fig. 1, shows in elevation the chassis lock at the rear end of the housing;

Fig. 4 is a detail in section taken on line 4 of Fig. 3;

Fig. 5 is a view in plan of the receiving set chassis removed from its surrounding housing;

Fig. 6 is a side elevation of the chassis;

Fig. 7 is a view in transverse section taken on line 7-7 of Fig. 6, showing the chassis positioned within the housing;

Fig. 8 is a view in perspective of the chassis frame;

Fig. 9 is a detail in section on an enlarged scale, taken on line 9 of Fig. 7;

Fig. 10 is a vertical section through the front end of the receiving set and adjacent part of the instrument board which furnishes a mounting therefor;

Fig. 11 is a view in elevation of the front end of the housing;

Fig. 12 is an enlarged detail in section, taken on line 12 of Fig. 1;

Fig. 13 is a fragmentary view in elevation, taken as indicated by line 13 of Fig. 10; and

Fig. 14 is a sectional view taken on line 14 of Fig. 2.

The present radio receiving set has been designed with particular reference to installation and use in an automobile. It comprises a chassis within a cylindrical housing H, desirably of copper, and formed in the region of one open end with numerous openings by which to enhance the resiliency of its walls. As shown best in Fig. 1, this housing may be accommodated below an automobile cowl 14 and behind the instrument board 15 which is provided with a suitable opening for its insertion. From the rear end 16 of the housing is extended a stud 17 adapted for reception through a resilient bushing 18 which is fitted into an opening in the automobile bulk head 19 to which it is fixedly secured as with the aid of lock nuts 20 which are screw-threaded upon the stud.

The parts forming the present chassis are carried upon a frame F in the form of a plate, as best shown in Fig. 8. The plate which is receivable within the housing at a point to one side of its axis (see Fig. 7) is provided along its opposite sides with diverging flanges 21. From its front end at a point adjacent its opposite sides are depended lugs 22 (as viewed in Fig. 8); and at its rear end the plate is provided with a depending flange 23. The plate is provided further with certain openings in or over which are placed the various units comprised in the chassis, as best indicated in Fig. 5. These may comprise tubes 25, transformers 26, and also condensers 27 arranged in gangs, as shown. In addition, I provide at a point in the middle region of the plate a transverse partition 30 having a circular contour with a forwardly extending flange 31 adjacent its periphery. This partition is of a size to fit closely within the cylindrical walls of the housing with only a slight intervening space.

Fitted over the flange of the partition and secured thereto as by rivets 32 is a circular band 35 which extends forwardly of the flange where it

is slitted to provide a plurality of fingers 36 each having an outward bulge 37 in the form of a button. This band which may be made of phosphor bronze is adapted to present the fingers for frictional engagement against the inner surface of the housing walls upon which they exert a tensional force. This band of phosphor bronze thus provides a friction lock which steadies the frame within the housing and also serves as a shield therefor.

At the forward end of the frame (see Fig. 5) is mounted a speaker S comprising an annular frame 38 with a rear intumed flange 39, arms 40 being extended convergingly to the rear for the support of containers 41 in which are suitable vibrating units. Adjacent these containers is a transformer (or transformers) 43 having a mounting 44 to the rear of the annular speaker frame; and opposite thereto is a rheostat switch 45 provided with a rearwardly extending shaft 46 on which is mounted a gear 47 in mesh with a pinion 48 carried on a volume control shaft 49 to which is fitted an operating knob 50 (see Fig. 2).

A second shaft 51 for tuning control is equipped with an operating knob 52 and is arranged symmetrically at a point upon the opposite side of the chassis. This shaft which is flexible extends rearwardly through an opening 53 in the partition to carry at its rear end a pinion 54 in mesh with a gear 55 which is carried fast on a shaft 56 whereon are mounted movable plates 57 forming part of the condensers 27 (see Figs. 6 and 7). The condenser shaft has a mounting in an opening 58 in the partition whereby it is adequately supported.

Referring now to Fig. 10, the front end of the annular speaker frame is provided with an out-turned flange 60 against which is placed a resilient gasket 61 furnishing a cushioned mounting for a conical diaphragm 62 which is fitted thereto. The front end of the chassis housing is also provided with an outturned flange 63 adapted to be fitted over the adjacent edge of the instrument board to which it is secured as by screws 65, three being the number indicated. In addition, the housing flange is provided with a plurality of forwardly extending lugs 66, three being the number indicated, adapted to center between them the speaker which is carried on the chassis. By the means described, the front end of the housing is fixedly secured to the instrument board and the chassis within the housing is centered and securely maintained in its correct position there-within.

When the chassis is fitted into the housing, it may be releasably locked in place by some such detent as is shown in Figs. 3 and 4. As indicated, the rear wall 16 of the housing is rounded as at 67 as is also the depending flange 23 of the frame, the one co-acting with the other to maintain a slight space between them. Carried by the flange and extending rearwardly thereof through an opening 68 in the rear wall of the housing is a post 69 with a pointed nose 70 and an annular groove 71 adjacent thereto, the longitudinal position of the groove being just outside the housing rear wall. A pair of straps 72 are outset from the wall, one upon each side of the post, forming support for two bowed arms of a spring wire clip 73 which is looped around a pin 74 carried by the same wall. The clip arms lie within the groove of the post where they are held under tension, thus locking the chassis within the housing; only by first deflecting the clip is the chassis freed for

removal from the housing. This deflection may desirably be accomplished by force applied to the chassis in the manner to be hereinafter explained.

Directly in front of the speaker is positioned a dial mechanism (see Fig. 10) which may comprise a spider in the form of a crowned plate 75 with appropriate apertures 76 for the passage of sound waves therethrough. As by a plurality of slotted lugs 77 each extending from the annular speaker frame and screws 78 passing there-through for threaded engagement with lugs 79 adjacent the periphery of the crowned plate, the latter may be secured in a fixed position at the front of the speaker (see Fig. 13). In its center region the crowned plate is intumed to provide an annular flange 80 defining a central opening across which is fitted a transparent disk or crystal 81. Behind this disk in spaced relation thereto is a dial plate 82 with which may be associated, if desired, a colored screen 83. Connected to the annular flange 80 is a strap bracket 84 which mounts a bushing 85 in which is fitted a socket 86 for a light bulb 87 furnishing an illuminant rearwardly of the dial. Upon the bushing is mounted a sleeve 88 over which is rotatably fitted the neck 89 of a conical reflector 90 surrounding the illuminant and extending forwardly thereof to a point adjacent the dial where it carries a transparent plate 91. Supported at an axial point upon this plate, just forwardly of the illuminant, is a post 92 extending through the dial (and screen, if used) to support on its forward end a pointer 93 lying adjacent the dial and serving as an indicator therefor. Coiled around the reflector neck is a flexible wire or cord 94 which extends down and around a winding drum 95 having an elongated hub 96 which is fitted upon the shaft 51. As shown in Fig. 14, this shaft is rotatably supported upon bearings 97 and 98, one carried by the annular speaker frame and the other by the crowned plate, the latter surrounding the hub of the winding drum. As by a set screw 99 extending radially through the operating knob 52 and through a registering opening 100 in the hub of the winding drum, the latter may be rotatively adjusted upon the shaft to co-ordinate movements of the tuning mechanism with the dial pointer. When the tuning shaft is rotated in one direction the cord will be wound on the drum and unwind concurrently from the reflector neck which is rotated in opposition to the tension of a coiled leaf spring 101 having one end joined to the supporting bracket 84 and the other to the neck of the reflector. The tension of this spring, in conjunction with the friction of the associated parts, is such that the reflector will remain in any adjusted rotative position, all its movements being accomplished without any lost motion whatsoever. The pointer 93 will be moved with each actuation of the reflector to a new position relative to the dial, all such movements being coordinated with movements of the tuning control shaft 51, so as to produce indications on the dial which will correspond exactly with the various tuning adjustments.

At one side of the frame F, near its forward end is a rectangular opening 102 opposite which is secured the power transformer 26. A shield 104 is secured to the frame below this transformer, the shield being of convex form with end walls and designed to fit the curvature of the cylindrical housing. Carried by a bracket at one end wall of the shield is a socket 105 to which electrical connection is made from the source of power. A second socket 106 (see Fig. 6) is also

located rearwardly of the shield for electrical connection with an antenna.

In the installation of the present set, the cylindrical housing is first secured in place. This requires merely that it be inserted through an appropriate opening in the instrument board, that its front end (i. e. the end facing the car occupants) be connected thereto by screws, and that the stud at its rear end be fastened to the bulk head, all as hereinbefore explained. The chassis is then fitted into the housing and locked thereto by the post-clip connection at the rear end. As part of the chassis I include the dial mechanism whose mounting is co-axial with that of the speaker diaphragm and directly forwardly thereof. In consequence of this relationship of units, the single post-clip connection at the rear will suffice, inasmuch as adequate provision for supporting the front end of the chassis, dial included, is provided by the centering lugs 66. To remove the chassis for inspection or repair will require only an unlocking of the post-clip connection, whereupon the chassis is free to be withdrawn from its housing.

Initial movement of the chassis out from its housing may be accomplished with the aid of a small prying tool whose acting end is insertible through an opening 107 in the housing wall (see Fig. 12) and into a second nearly offset opening 108 in the frame flange 21 to the inner face of which is secured a cap 109 having a further offset shoulder 110. The edges of these two openings and shoulder form, in effect, a series of steps with the two last of which the prying tool may successively engage while utilizing the first step as a fulcrum by which to force the chassis lengthwise of the housing and release the post-clip lock at the rear. After being started in some such way as this, the crowned plate at the front will stand out from the instrument board a sufficient distance to be available for grasping whereupon the chassis may be removed easily by hand.

An important feature, which contributes to simplicity in mounting and installation, and clear reception in service, is the placing of the speaker directly at the front of the chassis with all the operating units (except only the dial and controls) in the rear. The speaker diameter is substantially the same as that of the housing which may conveniently be made cylindrical in form. Even though the speaker be given a front position in the chassis, it is possible to provide an equally foremost position for the dial which may be combined with the speaker in the manner already set forth. A part only of the space ahead of the speaker is utilized for the dial, and with symmetrical considerations in mind I have shown the dial and speaker as occupying co-axial positions. It is important, however, that the dial be relatively small in diameter so that the surrounding space will be ample for the passage therethrough of sound waves emanating from the speaker just to the rear thereof. By so relating the units, and mounting the set in its entirety on the automobile instrument board, the sound is projected toward the car occupants from a point that is best for clear reception. And one further feature of advantage in a set of this character is the provision for adjustment exteriorly of the housing of the dial pointer so that it may be correctly correlated to the tuning mechanism for operation in coordination therewith.

In practice it may be desirable to have a rotative relationship between the chassis and hous-

ing much as is indicated in Fig. 7. By so doing, it may be found easier to extend the operative connections from the tuning control knob at the front to the movable condenser plates at the rear. For convenience in description I have referred to the frame plate F as presumably lying in a horizontal plane, whereas it may be otherwise disposed, if desired.

I claim:

1. In a radio receiving set, the combination of a tubular housing open at one end, a chassis snugly receivable into the housing through the open end thereof, interlocking means on the chassis and housing for releasably locking the chassis in a selected position when the chassis is inserted within the housing, and releasing means on the chassis and housing comprising an element on one offset with respect to an adjacent element on the other and laterally spaced to receive therebetween engagement from a lever whereby force may be applied from one element to the other to move the chassis longitudinally of the housing a distance sufficient to release the interlocking means.

2. In a radio receiving set, the combination of a tubular housing open at one end, a chassis receivable into the housing through the open end thereof, a speaker member having a fixed mounting at one end of the chassis and adapted to extend across the open end of the housing, co-acting means on the speaker member and housing open end for centering the chassis relative to the housing, and interlocking means for locking the chassis within the housing when centered by said coacting means.

3. In a radio receiving set, a dial mechanism comprising a dial plate, a pointer mounted to move across the dial plate, an illuminant, a reflector associated with the illuminant, a connection between the reflector and pointer whereby to support the latter, and a mounting for the reflector such that it may move whereby to transmit motion to the pointer.

4. In a radio receiving set, a dial mechanism comprising a dial plate, a pointer mounted to move across the dial plate, an illuminant, a reflector associated with the illuminant and rotatable relative thereto, a connection between the reflector and pointer whereby to support the latter, and means for rotating the reflector whereby to transmit motion to the pointer.

5. In a radio receiving set, a dial mechanism comprising a dial plate, a pointer mounted to move across the dial plate, an illuminant, a reflector for the illuminant, a mounting wherein the reflector may move, and an operative connection between the reflector and pointer such as to produce movements thereof in unison.

6. In a radio receiving set, a dial mechanism comprising a dial plate, a pointer associated with the dial plate, means for producing relative movement between the dial plate and pointer comprising a winding drum connected to one of these parts, a tension device connecting the drum with a fixed support, and a flexible cord coiled around the drum adapted to impart thereto a one-way rotation counter to the tension device whereby to produce relative movement between the dial plate and pointer.

7. In a radio receiving set, a dial mechanism comprising a dial plate and a pointer in relatively movable relation, a tune control including an operating knob, and an adjustable connection from the tune control to the dial mechanism for transmitting movements thereto, said connection

being carried by said knob for operation of said tune control and dial mechanism together or said dial mechanism alone by said knob.

8. In a radio receiving set, a dial mechanism comprising a dial plate and a pointer in relatively movable relation, a tune control including an operating knob, an operative connection from the tune control to the dial mechanism for transmitting movements thereto, and means associated with the knob for operating the tune control and dial mechanism together or the dial mechanism alone by the knob.

9. In a radio receiving set, the combination of a housing open at one end, a chassis receivable within the housing comprising a speaker and a dial mechanism wholly supported upon the chassis, the dial mechanism including a spider adapted to occupy a position across the open end of the housing and positioning the chassis with respect to the housing, and interlocking means for locking the chassis in the housing when positioned by said spider.

10. For mounting within an opening through an automobile instrument board, a radio receiving set comprising a housing open at one end, means for securing the housing to the instrument board with the open end of the housing substantially flush with the board, and a chassis receivable within the open end of the housing for accommodation therewithin, the chassis including at its end adjacent the board a dial mechanism with an adjacent speaker therebehind.

11. For mounting in an automobile having a bulk head and an instrument board formed with an opening therethrough, a radio receiving set comprising a housing secured at its rear end to the bulk head and at its forward end to the board, the forward end of the housing being open, and a chassis including a self-contained speaker and dial mechanism receivable within the open end of the housing for operation therewithin.

12. For mounting in an automobile having an instrument board with a round opening there-through, a radio receiving set comprising a cylindrical housing flanged and open at one end adapted to be fitted through the board opening and secured thereto, and a chassis receivable within the housing including a speaker with an adjacent dial mechanism at the chassis end proximate to the board, the dial mechanism fur-

nishing a closure for the housing when the chassis is positioned therewithin.

13. For mounting in an automobile having an instrument board with a round opening there-through, a radio receiving set comprising a cylindrical housing adapted to be fitted through the board opening and secured thereto, the housing end adjacent the board being open, and a chassis receivable within the housing including a dial mechanism at the chassis end adjacent the board adapted to furnish a closure for the housing when the chassis is positioned therewithin, a tuning control with an operating knob disposed exteriorly of the dial mechanism, an operating connection between the tuning control and dial mechanism, and means associated with the knob operable from a point exteriorly of the dial mechanism for adjusting the connection whereby to produce coordination between the tuning control and dial mechanism.

14. In a radio receiving set, the combination of an open-ended housing, and a chassis receivable therewithin comprising a frame plate extending lengthwise of the housing, a dial mechanism at one end of the plate furnishing a closure for the housing, a partition carried by the frame plate disposed transversely of the housing at a point intermediately of its ends, a speaker mounted on the frame plate adjacent the dial mechanism on one side of the partition, tuning mechanism mounted on the frame plate on the opposite side of the partition, and tension means carried by the partition engaging the housing walls serving also as a shield between opposite ends of the chassis.

15. In a radio receiving set, a dial mechanism comprising a dial plate, a pointer associated with the dial plate, a tune control including a knob, means for producing relative movement between the dial plate and pointer comprising a winding drum, means connecting one of these two latter parts to said knob, a tension device connecting the drum with a fixed support, a flexible cord wound by the drum to impart thereto a one-way rotation counter to the tension device whereby to produce relative movement between the dial plate and pointer, and means associated with the knob and drum for operating the tune control and dial mechanism together or the dial mechanism alone by the knob.

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