Oct. 17, 1939. D. J. CROWLEY 2,176,667

RADIO RECEIVING SET

Filed Dec. 4, 1936 7 Sheets-Sheet 1

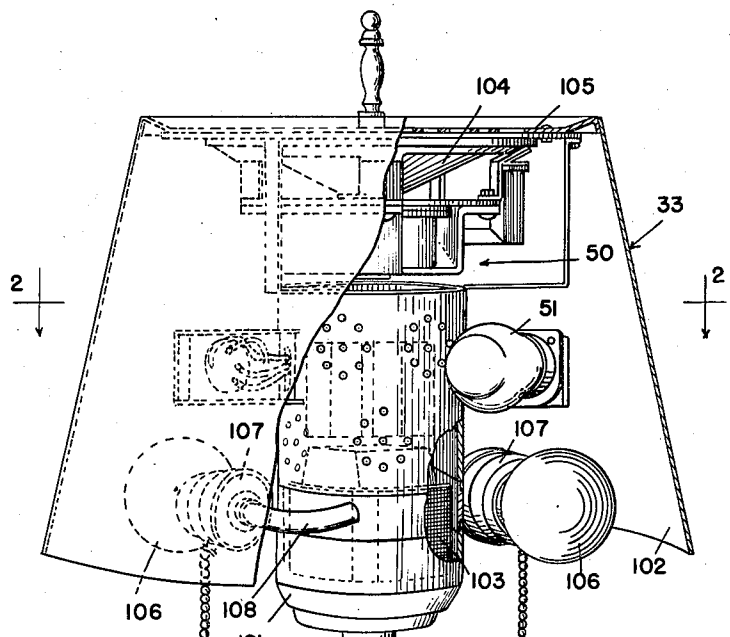


FIG.1.

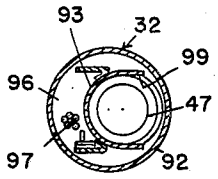


FIG.3.

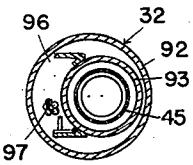
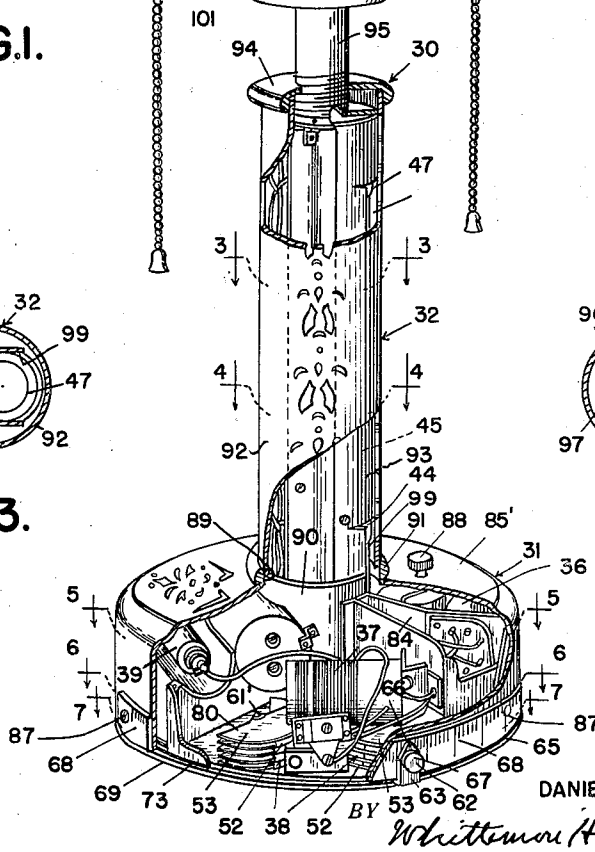


FIG.4.



INVENTOR
DANIEL J. CROWLEY

Whittemore, Hulbert & Belknap
ATTORNEYS

Oct. 17, 1939. D. J. CROWLEY 2,176,667

RADIO RECEIVING SET

Filed Dec. 4, 1936 7 Sheets-Sheet 2

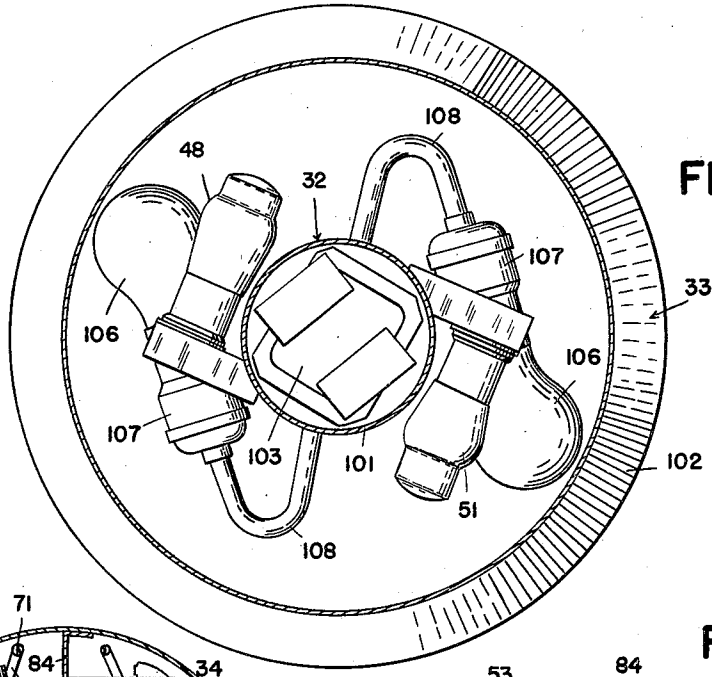


FIG.2.

FIG.5.

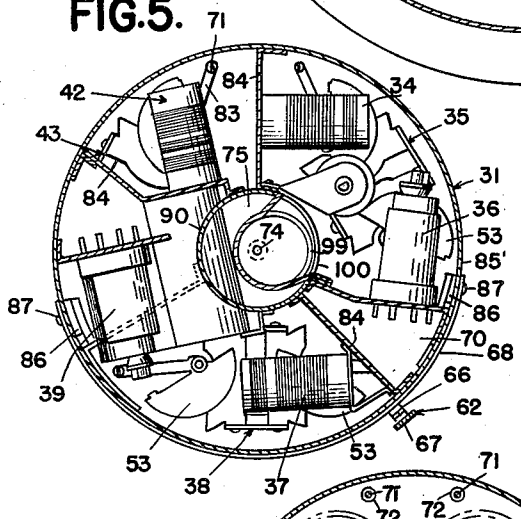
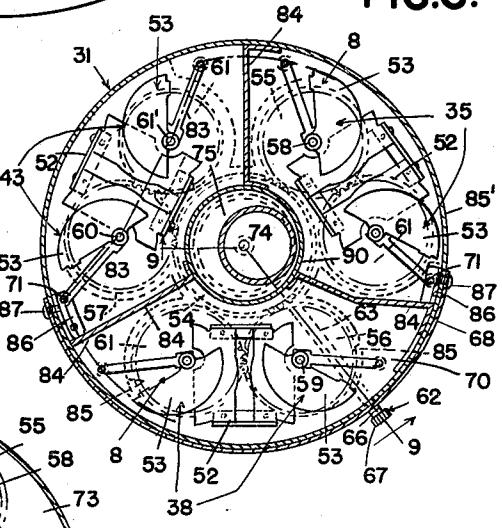


FIG.6.



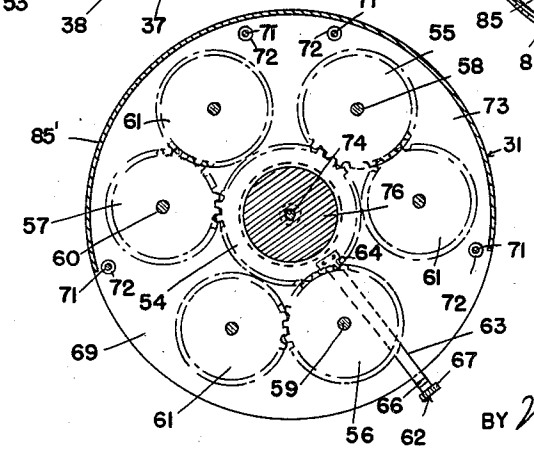


FIG.7.

INVENTOR

DANIEL J. CROWLEY

BY Whittemore, Hulbert & Belknap

ATTORNEYS

Oct. 17, 1939. D. J. CROWLEY 2,176,667

RADIO RECEIVING SET

Filed Dec. 4, 1936 7 Sheets-Sheet 3

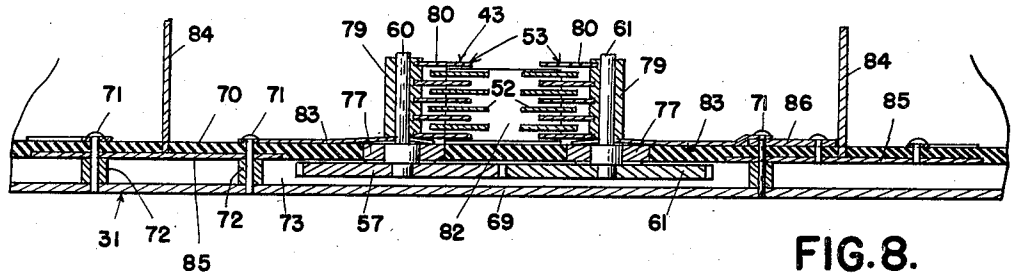


FIG.8.

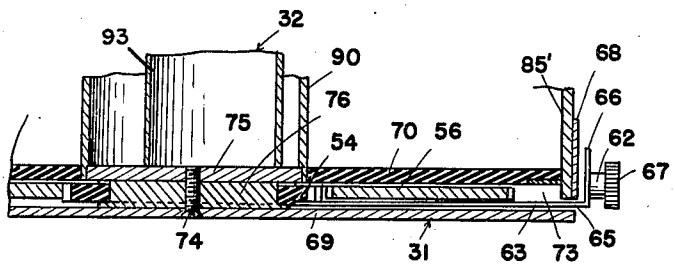


FIG.9.

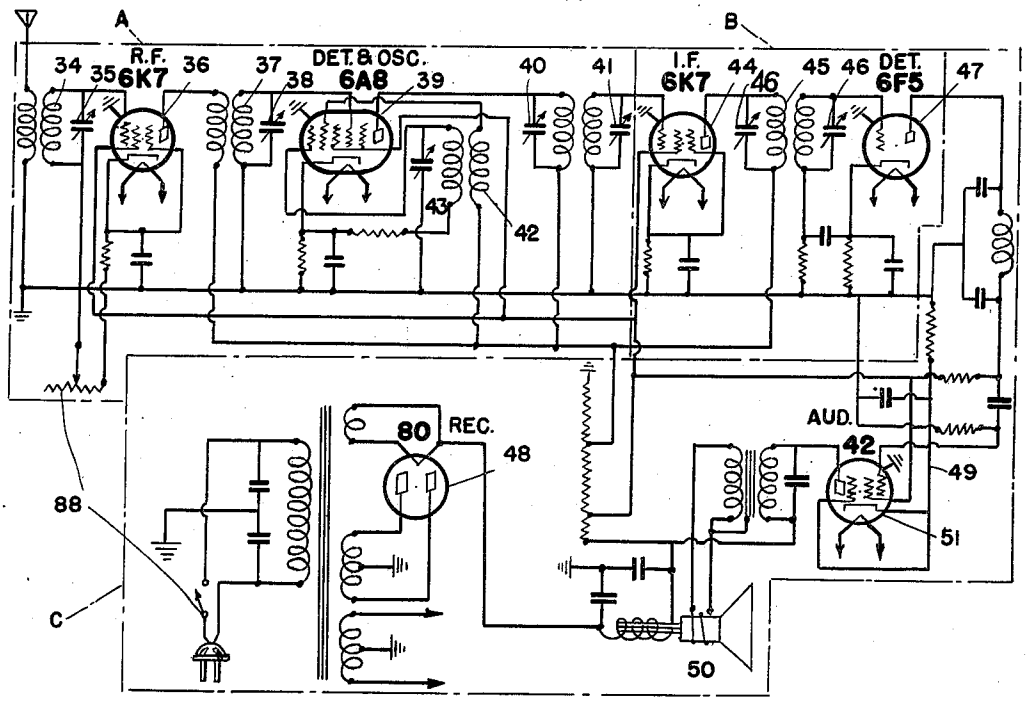


FIG.10.

INVENTOR

DANIEL J. CROWLEY

BY Whittemore Hulbert & Belknap

ATTORNEYS

Oct. 17, 1939. D. J. CROWLEY 2,176,667

RADIO RECEIVING SET

Filed Dec. 4, 1936 7 Sheets-Sheet 4

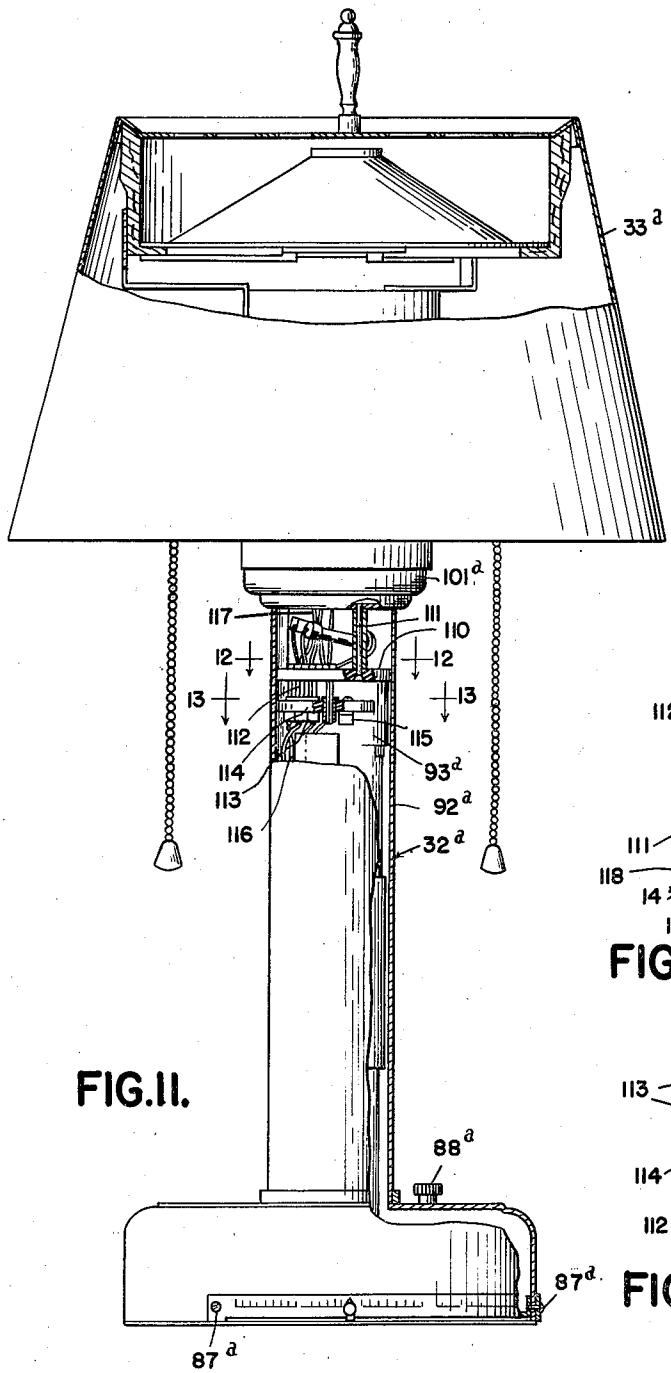


FIG.11.

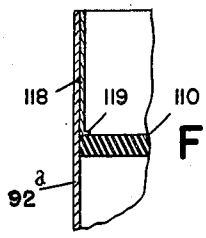


FIG.14.

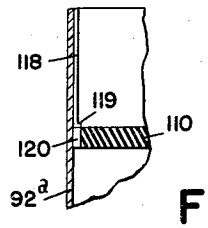


FIG.15.

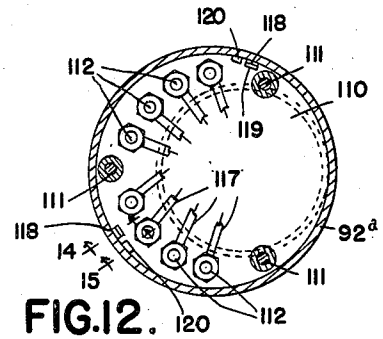


FIG.12.

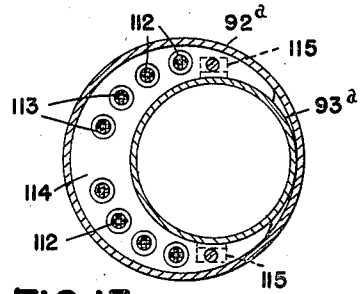


FIG.13.

INVENTOR
DANIEL J. CROWLEY
BY Whittemore Hulbert & Belknap
ATTORNEYS

Oct. 17, 1939. D. J. CROWLEY 2,176,667

RADIO RECEIVING SET

Filed Dec. 4, 1936 7 Sheets-Sheet 5

FIG.22.

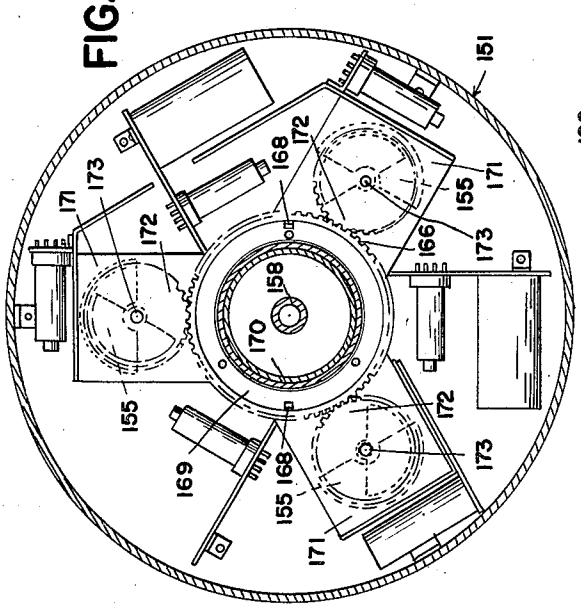


FIG.19.

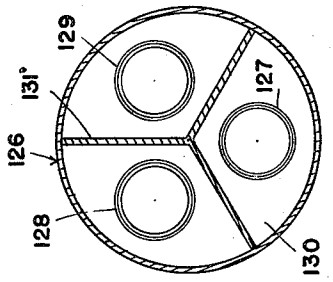


FIG.18.

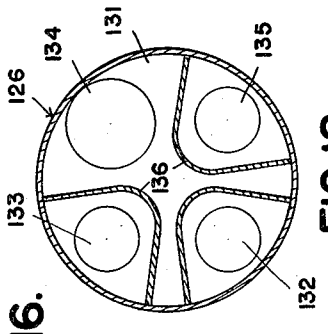


FIG.16.

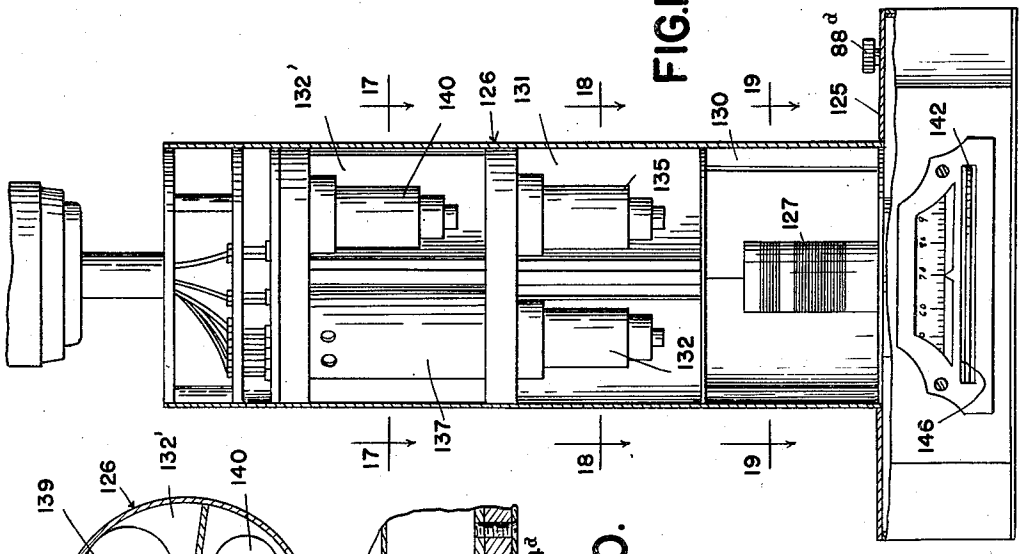


FIG.20.

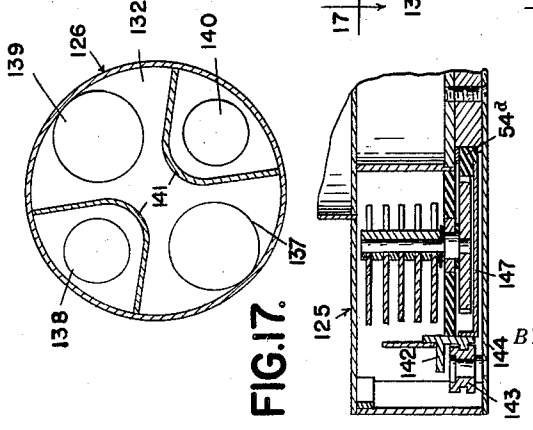


FIG.17.

INVENTOR

DANIEL J. CROWLEY

BY Whittemore Hulbert & Belknap

ATTORNEYS

Oct. 17, 1939. D. J. CROWLEY 2,176,667

RADIO RECEIVING SET

Filed Dec. 4, 1936 7 Sheets-Sheet 6

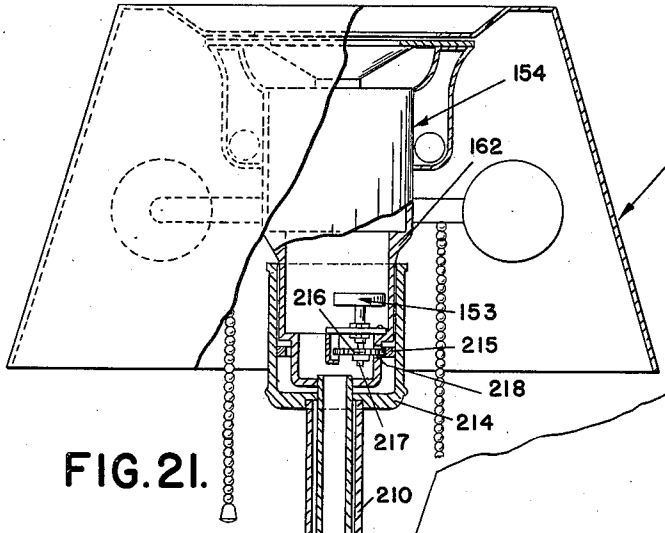


FIG. 21.

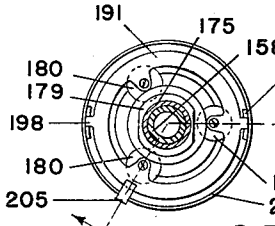


FIG. 23.

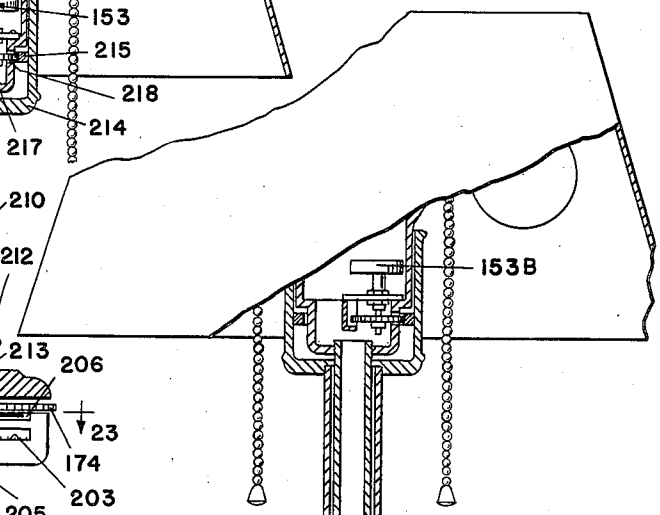
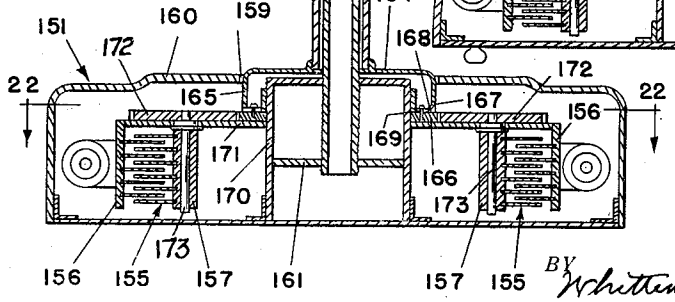


FIG. 26.



INVENTOR
DANIEL J. CROWLEY
BY Whittemore Hulbert & Belknap
ATTORNEYS

Oct. 17, 1939. D. J. CROWLEY 2,176,667

RADIO RECEIVING SET

Filed Dec. 4, 1936 7 Sheets-Sheet 7

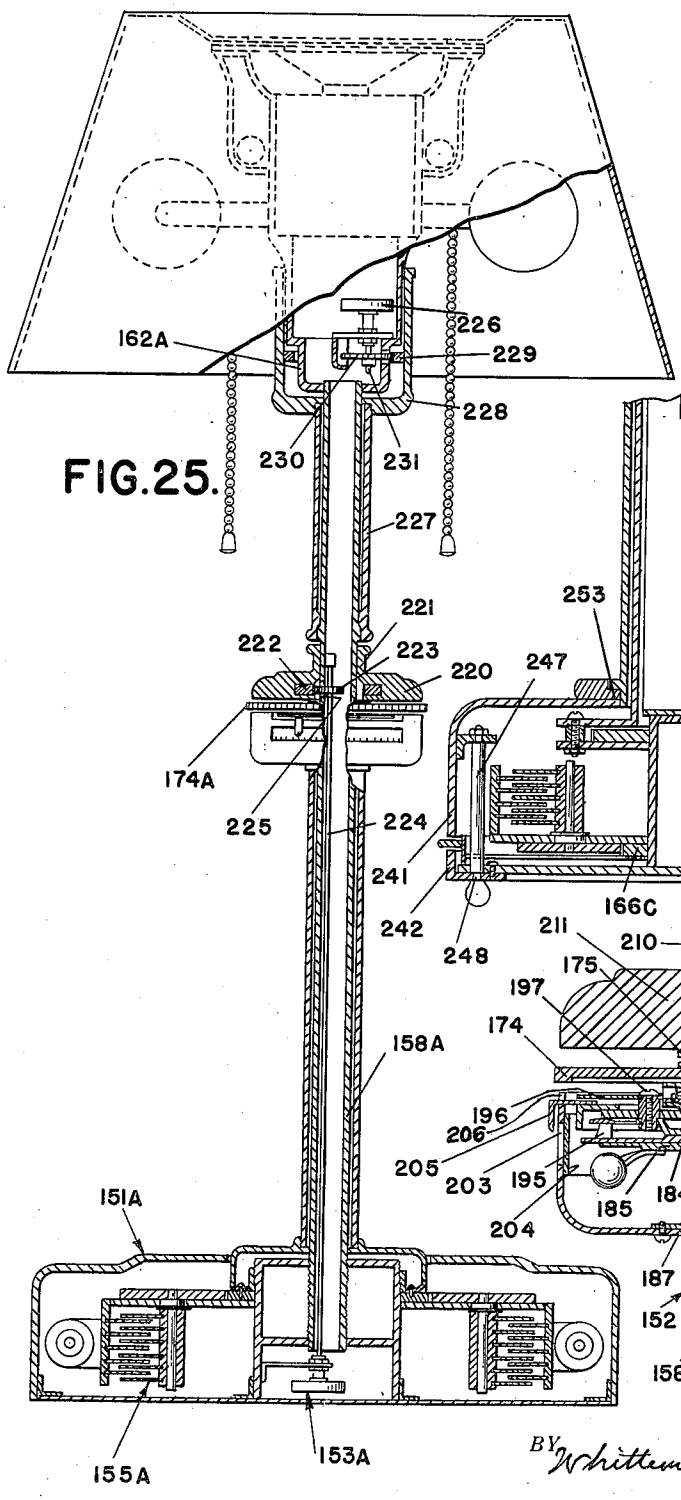


FIG.25.

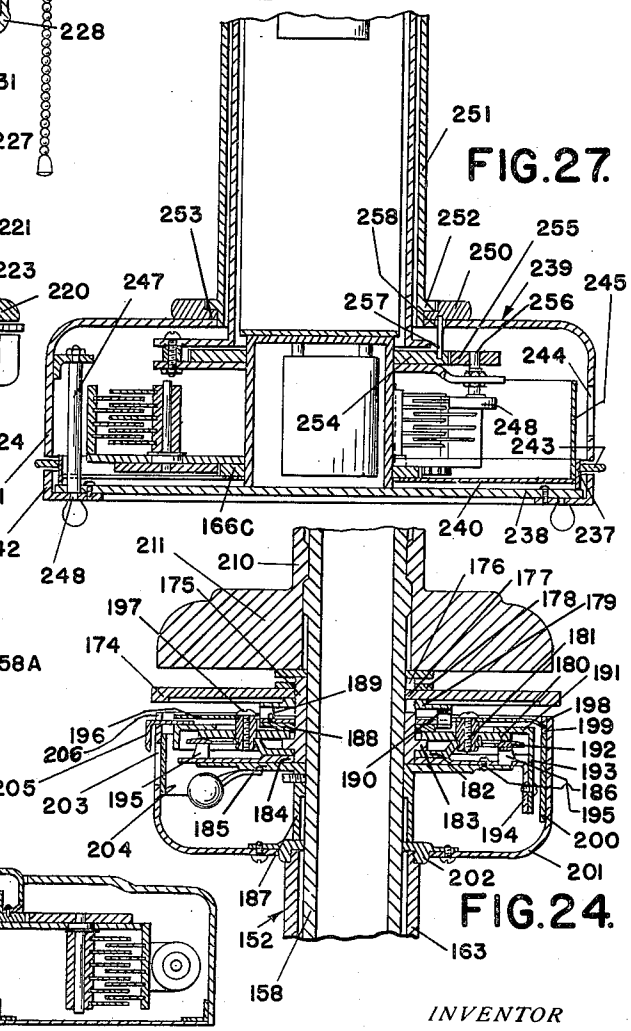


FIG.27.

FIG.24.

INVENTOR
DANIEL J. CROWLEY
BY Whittemore Hulbert & Belknap
ATTORNEYS

Patented Oct. 17, 1939

2,176,667

UNITED STATES PATENT OFFICE

2,176,667

RADIO RECEIVING SET

Daniel J. Crowley, Grosse Pointe, Mich.

Application December 4, 1936, Serial No. 114,268

8 Claims. (Cl. 250—14)

This invention relates generally to radio receiving apparatus and refers more particularly to a lamp constructed to embody the several instrumentalities of the receiving apparatus.

One of the principal objects of this invention resides in the provision of a radio receiver comprising a standard circuit of proven efficiency having the several instrumentalities ingeniously arranged in compact groups capable of being housed in different portions of a relatively small lamp, without interfering with the efficiency of operation of the receiver or impairing the illuminating qualities of the lamp, and without unduly restricting the artistic design of the lamp. In accordance with this invention, the lamp may be any one of a number of numerous designs and the receiving apparatus may be incorporated in the lamp structure in such a manner as to be entirely concealed from view.

Another advantageous feature of this invention resides in the provision of radio receiving apparatus of the character set forth embodying relatively improved means for actuating the several controllable instrumentalities of the circuit, such as the variable condensers and the combined volume and switch control.

A further object of the present invention which contributes materially to the practicability of my improved apparatus consists in the provision of a combined lamp and radio unit, wherein the tubes of the receiving circuit having the greatest heat transfer are supported at a point remote from the remaining instrumentalities of the circuit in a region where this heat may be readily dissipated without damaging the insulation or parts of the receiving circuit. In accordance with this invention, the rectifier and amplifier tubes are arranged in the lamp shade, whereas the remaining tubes and associated parts are disposed in the lamp base or in both the latter and shade supporting stanchion. The radio frequency and detector tubes operate cooler than the tubes in the shade and for this reason may be compactly arranged without the danger of the heat melting or otherwise damaging the parts associated in relatively close proximity thereto. This feature renders it possible to install an efficient radio receiving circuit of commercial capacity in a lamp of pleasing proportions and contributes materially to the general appearance of the unit.

In addition to the foregoing, this invention contemplates a combined lamp and radio receiving apparatus, wherein the unit in the shade section of the lamp may be readily detached from the remaining units and this feature, as well as the foregoing and other objects, will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:

Figure 1 is a perspective view of a lamp embodying radio receiving apparatus in accordance with the present invention and having certain parts broken away for the sake of clearness;

Figure 2 is a cross sectional view taken substantially on the plane indicated by the line 2—2 of Figure 1;

Figure 3 is a cross sectional view taken substantially on the plane indicated by the line 3—3 of Figure 1;

Figure 4 is a cross sectional view taken substantially on the plane indicated by the line 4—4 of Figure 1;

Figure 5 is a cross sectional view taken substantially on the plane indicated by the line 5—5 of Figure 1;

Figure 6 is a cross sectional view taken substantially on the plane indicated by the line 6—6 of Figure 1;

Figure 7 is a cross sectional view taken substantially on the plane indicated by the line 7—7 of Figure 1;

Figure 8 is a fragmentary cross sectional view taken substantially on the plane indicated by the line 8—8 of Figure 6;

Figure 9 is a cross sectional view taken substantially on the plane indicated by the line 9—9 of Figure 6;

Figure 10 illustrates a diagram of one type of radio receiving circuit that may be employed in the lamp construction featured in the above figures;

Figure 11 is a side elevational view of a modified form of a combined lamp and radio receiving apparatus and having certain parts broken away for the sake of clearness;

Figure 12 is a cross sectional view taken substantially on the plane indicated by the line 12—12 of Figure 11;

Figure 13 is a cross sectional view taken substantially on the plane indicated by the line 13—13 of Figure 11;

Figure 14 is a sectional view taken substantially on the plane indicated by the line 14—14 of Figure 12;

Figure 15 is a sectional view taken substantially on the plane indicated by the line 15—15 of Figure 12;

Figure 16 is a side elevational view partly in section of another embodiment of a combined lamp and radio receiving apparatus;

Figure 17 is a cross sectional view taken substantially on the plane indicated by the line 17—17 of Figure 16;

Figure 18 is a cross sectional view taken substantially on the plane indicated by the line 18—18 of Figure 16;

Figure 19 is a cross sectional view taken substantially on the plane indicated by the line 19—19 of Figure 16;

Figure 20 is a fragmentary vertical sectional view through a portion of the base of the lamp featuring the means for operating the variable condensers;

Figure 21 is a side elevational view, partly in section, of a modified form of combined lamp and radio receiving apparatus;

Figure 22 is a cross sectional view taken substantially on the plane indicated by the line 22—22 of Figure 21;

Figure 23 is a cross sectional view taken substantially on the plane indicated by the line 23—23 of Figure 21;

Figure 24 is a vertical sectional view through the control mechanism shown in Figure 21;

Figure 25 is a side elevational view, partly in section, of still another embodiment of combined lamp and radio receiving apparatus;

Figure 26 is a side elevational view, partly in section, of a further modified form of construction;

Figure 27 is a fragmentary vertical sectional view through the base of an additional modified construction.

Referring first to the embodiment of the invention illustrated in Figures 1 to 10 inclusive, it will be noted that there is illustrated in Figure 1, a relatively small artistic table lamp **30** having a base **31** supporting a vertical stanchion **32** and having a shade **33** carried by the stanchion **32** at the upper end thereof. In the present instance, one portion of the radio receiving apparatus is housed within the base **31**, another portion is housed in the vertical stanchion **32** and still another portion is arranged within the lamp shade **33**.

Although it is to be understood that the specific parts of the radio receiving apparatus housed in the aforesaid sections of the lamp may vary to suit existing conditions, nevertheless, for the purpose of illustration, I have resorted to the following arrangement. Upon reference to Figure 10, it will be noted that the radio receiving circuit, selected herein for the purpose of illustrating the present invention, is of the super-heterodyne type and the parts thereof contained in the area defined by the character A are housed within the base **31** of the lamp, while the parts of the circuit contained in the area defined by the character B are located in the vertical stanchion **32** of the lamp, and the instrumentalities of the circuit contained in the area defined by the character C are located in the shade **33** of the lamp.

In order to illustrate the ingenious manner in which the various parts of the radio receiving circuit are compactly arranged in the several sections of the lamp, reference will be briefly made to the various units of the receiver included in the areas defined by the characters A, B and C. Referring again more particularly to Figure 10, it will be noted that the base **31** of the lamp houses one stage of radio frequency including an RF coil **34** and a tube **36** of the 6K7 type. The base **31** of the lamp also includes the first detector and oscillator stage including a detector coil **37**, a variable condenser **38** and a pentagrid converter **39**. Also in the base **31** of the lamp is the intermediate stage including a variable condenser **40** for tuning the primary winding of the intermediate coil, and a second variable condenser **41** for tuning the secondary winding of the intermediate coil. In addition, the base **31** of the lamp includes the oscillator coil **42** and a variable condenser **43** for tuning the primary winding of the same.

In the present instance, the vertical stanchion **32** of the lamp encloses the tube **44** for the intermediate stage, a second detector coil **45**, variable condensers **46** for respectively tuning the primary and secondary of the second detector coil, and the second detector tube **47**. The power pack defined by the character C is housed within the lamp shade **33** and includes a full wave rectifier tube **48** and an amplifier **48** comprising a speaker **50** and an audio tube **51**. The problem of compactly arranging the several parts of the radio receiving apparatus in the base and stanchion of the lamp without the danger of overheating the insulation associated with certain of said parts, is solved by locating the power pack in the shade of the lamp where the heat radiated by the rectifier and amplifier tubes may be readily dissipated.

One of the principal features of the present invention which contributes materially to compactly arranging in the base **31** of the lamp the instrumentalities of the receiving circuit contained in the area A, consists in the unique arrangement of the variable condensers and the manner in which the latter are operated. The particular arrangement of the variable condensers is shown and described in detail in my co-pending application Serial No. 58,597, filed January 10, 1936. Briefly, however, each of the variable condensers **35**, **38** and **43** are shown in Figure 6 as formed of two complementary sections arranged in parallel so that the two sections of each condenser cooperate to provide the specified capacity. The aforesaid condensers are preferably identical in construction and each comprises a pair of stators **52** and a pair of rotors **53** predeterminedly mounted for rotation relative to the stators in a manner to be more fully hereinafter set forth.

In order to simplify the control of the radio receiving apparatus, common means is provided for simultaneously rotatably adjusting the rotors **53** of each of the condensers **35**, **38** and **43**. The manner in which the foregoing is accomplished will be understood upon referring to Figures 6 to 9 inclusive, wherein the reference character **54** designates a fibre driving gear mounted for rotation substantially centrally of the base **31** of the lamp and arranged in mesh with the three gears designated in Figure 7 by the reference characters **55**, **56** and **57**. The gear **55** is secured to the shaft **58** of one of the rotors of the variable condenser units **35**, while the gear **56** is secured to the rotor shaft **59** of one of the rotors of the variable condenser unit **38**, and the gear **57** is secured to the rotor shaft **60** of one of the rotors of the condenser unit **43**. Thus, it will be observed that one rotor shaft of each pair is driven by the drive gear **54** and, in order to impart the same degree of rotation to the other rotor shaft of each pair, suitable gears **61** are secured to the latter shafts in mesh with the gears **55**, **56** and **57** respectively. The gears **61** are of the same size as the gears **55** to **57** inclusive so as to insure simultaneous movement of the rotors at the same rate of speed, and the axes of the gears **61** are so lo-

cated that the latter gears do not mesh with the drive gear **54**. Adjustment of the rotors of the several variable condensers is effected through the gears by means of a control **62** having an arm **63** secured as at **64** to the drive gear **54** and extending laterally outwardly from the latter gear through an arcuate slot **65** formed in the side wall of the base adjacent the bottom of the latter. The other extremity of the arm **63** is provided with an upwardly extending pointer **66** and a knob **67** is secured to the pointer in a position to be conveniently grasped by the operator. The pointer **66** is for the purpose of indicating the usual indicia applied to a band **68** which, in turn, is secured to the side wall of the base above the slot **65**.

Referring now more in detail to the particular construction of the lamp selected herein for the purpose of illustration, it will be noted that the same comprises a base plate **69** secured to an auxiliary non-metallic base **70** through the medium of the fastener elements **71**. The auxiliary base **70** is positioned in spaced relation to the base **69** through the medium of the spacers **72** surrounding the fastener elements **71** and of sufficient length to provide the space **73** between the two plates required to house the gearing previously referred to as operating the rotors of the variable condensers **35**, **38** and **43**. Upon reference to Figure 9, it will be noted that a fastener element **74** serves to secure the central portion of the base plate **69** to a disc **75** held in spaced relation to the plate **69** by means of a spacer **76** located within the space **73** and having a length approximating that of the spacers **72** so as to support the disc **75** in the plane of the auxiliary base plate **70**. In the present instance, the spacer **76** is provided with a cylindrical exterior surface forming a journal for the drive gear **54** of the variable condenser gear train.

The manner in which the remaining gears of the aforesaid train are mounted is illustrated in Figure 8. In this connection, it is to be noted that Figure 8 shows only the pair of gears, **57** and **61** directly associated with the variable condenser **43**, and it is to be understood that the remaining pairs of gears are mounted in an identical manner. In detail, the gears **57** and **61** are secured to the lower ends of the variable condenser rotor shafts **60** and **61'** respectively. These shafts are suitably journalled in metallic inserts **77** secured in the auxiliary base plate **70** and the portions of the shafts extending above the auxiliary base form supports for the complementary variable condenser rotors **53**. The rotors **53** are provided with bushings **79** secured to the rotor shafts and carrying the rotor plates **80**. The rotors **53** are grounded by spring metal fasteners **83** having the outer ends fixedly secured to the auxiliary base **70** and having the inner ends disposed between the latter base and the lower ends of the bushings **79**. As shown in Figure 8, the inner ends of the fingers **83** are shaped to constantly urge the rotor shafts in an upward direction and thereby maintain the required relationship between the rotor blades **80** and the cooperating stator blades of the variable condenser. Thus, it will be apparent that each of the variable condensers, employed in the construction, is formed of two complementary sections cooperating to afford substantially double the capacity of a single condenser unit of the same height. In other words, the above construction renders it possible to house condensers of the required capacity in a relatively small vertical space and this is of extreme importance in the present illustrative embodiment of the invention, due to the limited vertical space available in the base **31** of the lamp.

Upon reference to Figures 3, 5 and 6, it will be noted that provision is made to shield certain parts of the radio receiving circuit from other parts of this circuit. This is accomplished herein by arranging the vertical shields **84** in the base **31** having the lower ends extending through the auxiliary base plate **70** and secured to the underside of the latter by means of the horizontal plates **85**. The particular number of shields and the arrangement of the latter in the base **31** will, of course, depend upon the nature of the portions of the circuit housed in the base. With the specific arrangement shown in Figures 1 to 10 inclusive, the shields **84** are preferably located in the manner clearly illustrated in both of Figures 5 and 6 to shield from each other, the several parts of the radio receiving circuit shown in these figures.

Cooperating with the base plate **69** to form a housing for all of the parts of the radio receiving apparatus in the base **31** of the lamp is a casing **85'** secured at the lower end to suitable brackets **86** by fastener elements **87** having the additional function of securing the indicia band **68** to the side wall of the casing. The brackets **86** are secured to the auxiliary base plate **70** in the manner shown in Figure 8 and the fastener elements **87** are preferably the only means securing the casing **85'** in place, with the result that the same may be readily removed when access to the radio receiving parts in the base is desired. The contour of the casing **85'** is shown in Figure 1 and as will be observed from this figure, the top wall of the casing is apertured to provide for extending the combined volume and on and off switch control **88** therethrough. It will, of course, be understood that the knob of this control is readily detachable in order to permit the casing **85'** to be removed when desired. The top wall of the casing **85'** is also centrally apertured as at **89** to receive a bushing **90** having the lower end sleeved over the disc **75** and permanently secured to the latter. The upper end of the bushing **90** projects above the top wall of the casing **85'** and is normally concealed by a collar **91** fixedly secured to the casing **85'**.

Referring now to the peculiar construction of the stanchion **32** of the lamp, it will be noted that the same comprises two eccentrically arranged tubular sections **92** and **93**. The outer tube **92** is formed of two complementary sections for convenience in assembly and the lower end of this tube is sleeved within the collar **91** to seat upon the upper end of the bushing **90**, in the manner clearly shown in Figure 1. The complementary sections of the tube **92** are secured in assembled relation at the lower end by the collar **91** and at the upper end by the closure **94**, threadedly secured to the stem **95** projecting into the tube **92** through the closure **94**.

The tube **93** is supported within the tube **92** eccentrically with respect to the latter so as to provide the maximum space **96** for the electrical conductors **97** required to connect the instrumentalities of the radio receiving apparatus in the base to the parts of the same in the stanchion and in the shade. In detail, the lower end of the tube **93** has a pressed fit with the disc **75** in the manner shown in Figure 9, and the upper end of the tube **93** is suitably secured to the lower end of the stem **95**. It has been previously

stated that the intermediate tube 44 and the second detector tube 47 are located in the stanchion 32 and in the present instance, are housed in the tubular member 93. In order to permit these tubes to be readily assembled with, or removed from, the tubular member 93, the latter is cut away opposite the tubes in the manner designated by the reference character 99. In this connection, it will be noted from Figure 5 that the bushing 90 is also cut away as at 100 in alignment with the cut-away portion 99 in the lower end of the tubular member 93 so as to completely expose the intermediate tube 44 through the tubular member 93.

Referring now to the construction of the lamp shade 33, it will be noted that a housing 101 is secured to the upper end of the stem 95 within the shade 102 and this housing contains the power transformer 103, together with the associated choke coils forming parts of the power pack or speaker unit assembly. The speaker 50 is supported upon the upper end of the housing within the shade 102 and the cone 104 of the speaker is supported, in the manner shown in Figure 1, directly below the perforated disc 105 forming the top of the shade 102. The above construction is such that the shade 102 also acts as a baffle to prevent the upwardly directed column of air from co-mingling with the downwardly directed column of air, and thereby prevents the cancellation of the bass notes.

Upon reference to Figure 1, it will also be noted that the housing 101 supports the illuminating bulbs 106, and these bulbs are so positioned with respect to the other instrumentalities housed in the shade as to prevent the same from casting a shadow on the shade. The illuminating bulbs 106 are arranged in switch sockets 107 and the latter are connected to the housing through the medium of tubes 108 of sufficient diameter to permit the electrical conductors to be extended therethrough.

The embodiment of the invention illustrated in Figures 11 to 15 inclusive is similar to the one previously described, with the exception that provision is made for detachably securing the shade unit 33a of the lamp upon the stanchion 32a. In detail, a non-metallic disc 110 is sleeved within the upper end of the outer tube 92a and is secured to the lower wall of the housing 101a in spaced relation to the latter wall by means of the fastener elements 111. The disc 110 has secured thereto, a plurality of plugs 112 predeterminedly located to be received within suitable sockets 113 carried by a crescent-shaped non-metallic member 114. The crescent-shaped member 114 is secured to the inner tube 93a by means of the brackets 115 and each of the sockets is connected to an electrical conductor 116 extending from the instrumentalities of the radio receiving circuit it is desired to electrically connect to the several parts of the power pack unit housed by the lamp shade 33a. The latter parts of the power pack unit are electrically connected to the plugs 112 by means of the conductors 117, so that when the plugs 112 are engaged in the sockets, a complete circuit is effected. Accidental separation of the plugs 112 from the sockets 113 is prevented by means of a relatively simple latch shown in Figures 12, 14 and 15. In detail, a latch member 118 is secured to the inner wall of the outer tube 92a and this latch is provided with an inwardly extending detent 119 normally engageable with the upper surface of the disc 110, in the manner clearly shown in Figure 14, to prevent relative vertical displacement between the stanchion and housing 101a. Upon reference to Figure 12, it will be noted that two of the latch members 118 are provided and also that the disc 110 is slotted at its periphery in the manner shown by the reference character 120. The slots 120 are of sufficient dimension to provide for the passage therethrough of the detents 119 and require a slight relative rotative movement between the disc 110 and the stanchion 32a in order to align the detents 119 with the slots 120. It will, of course, be understood that the plugs 112 must be disengaged from the sockets 113 before the necessary relative movement aforesaid may be effected to align the detents 119 with the slots 120, and this may be accomplished by removing the fastener elements 87a and the knob of the volume control 88a so as to permit the inner tube section 93a to be lowered relative to the outer tube 92a the distance required to disengage the sockets 113 from the plugs 112. With the foregoing exceptions and with the exception that the outer tube 92a need not be formed of two sections as in the first embodiment of the invention, the construction may be the same as described in detail in connection with the first modification.

In the embodiment of the invention illustrated in Figures 16 to 20 inclusive, I have shown a different arrangement of the several instrumentalities of the radio receiving circuit in the base and stanchion of the lamp. In general, the base 125 contains only the variable condensers of the receiving circuit and the means for actuating the several rotors of the condensers simultaneously. The remaining parts of the radio receiving circuit described in connection with the first form of the invention as being in the base of the lamp are compactly positioned within the stanchion 126, and the latter is divided into three compartments for accommodating these parts. Upon reference to Figure 19, it will be noted that the first detector coil 127, the oscillator coil 128 and the RF coil 129 are located in the compartment 130 and are shielded from one another by the shield 131'. Disposed directly above the compartment 130 is an intermediate compartment 131 and the latter is adapted to house the pentagrid converter 132, the first intermediate tube 133, intermediate coil 134 and the RF tube 135. As shown in Figure 18, the several tubes in the compartment 131 are shielded from one another and from the coil 134 by the shields 136. The upper compartment 132' is shown in Figure 17 as containing a second intermediate coil 137, a second detector tube 138, a second intermediate coil 139 and a second intermediate tube 140. The tubes 138 and 140 are shielded from each other, as well as from the two coils, by means of the shields 141 suitably secured within the compartment 132'. It will be noted from the above that the circuit in the present lamp construction differs from the circuit featured in Figure 10 in that it embodies an additional stage of intermediate frequency.

The variable condensers are exactly the same in construction as defined in connection with the first embodiment of this invention and the gearing for operating the rotors of these condensers is also arranged in the same manner previously described. However, the means for simultaneously operating the several rotors of the condensers is slightly different and this means is shown in Figures 16 and 20 as comprising a ring 142 supported for rotation about the axis of the drive gear 54a

by the rollers 143 secured to the base plate 144 in circumferential spaced relationship. The diameter of the ring is predetermined with respect to the dimension of the base 125 so that peripheral portions of the ring extend through slots 146 in the several sides of the base permitting the ring to be conveniently engaged by the operator from several sides of the base. Upon reference to Figure 20, it will be noted that the ring is secured to the drive gear 54a by means of a strap 147 so that the rotative movement imparted to the ring will be transferred to the drive gear 54a and from the latter to the several rotors of the condensers in the same manner described in connection with the first embodiment of this invention. With this construction, the condensers may be controlled from any one of a number of sides of the base and the volume may be regulated by a control 88a similar to the one shown in Figure 1 of the drawings.

The power pack and speaker assembly may be carried in the lamp shade in the manner shown in the first embodiment of the invention, and this unit may be readily detachably secured to the stanchion by incorporating the construction defined in the embodiment of the invention featured in Figures 11 to 15 inclusive.

The embodiment of the invention shown in Figures 21 to 24 inclusive, illustrates the radio receiving apparatus in association with a floor lamp. In this construction, provision is made at a convenient elevation on the stanchion of the lamp for operating the several variable condensers of the radio receiving apparatus and for actuating the combined switch and volume control.

In detail, the lamp shown in Figures 21 to 24, inclusive, comprises a shade 150, a base 151 and a vertical stanchion 152 supporting the shade from the base. The shade assembly 150 is similar in construction to the one described in connection with the first form of this invention, with the exception that it includes the combined volume control and switch 153, in addition to the power pack unit 154. All of the remaining instrumentalities of the radio receiving apparatus including the variable condensers 155 are compactly arranged in the base 151 of the lamp. In the present instance, the variable condensers 155 may be of conventional construction comprising a stator 156 and a rotor 157 cooperating with the stators to tune the set to the desired wave length.

The stanchion 152 comprises a vertical tube 158 having the lower end extending through an opening 159 in the top 160 of the base and secured to a plate 161 permanently fixed in the base. The upper end of the tube 158 is threadedly secured to the lower wall of the power pack housing 162 and the latter, in turn, supports the lamp shade 150. The stanchion 152 also includes a tube 163 telescopically engaging the lower end portion of the tube 158 and having a length predetermined to provide for locating the upper end of the tube 163 at a convenient elevation for engagement by the operator. The tube 163 is supported for rotation and the internal diameter thereof exceeds the external diameter of the tube 158 to avoid friction. Upon reference to Figure 21, it will be noted that the extreme lower end of the tube 163 is detachably secured to an inverted cup-shaped member 164 having the peripheral flange 165 extending through the opening 159 in the top 160 of the base 151 and having a driving engagement with a central gear 166. In the present instance, the free or lower edge of the flange 165 is notched at circumferentially spaced points in the manner designated by the reference character 167 for receiving projections 168 struck upwardly from the periphery of a ring 169 secured to the gear 166.

The above arrangement is such that rotation of the tube 163 effects a corresponding rotation of the gear 166. The gear 166 is rotatably mounted on a fixture 170 secured in the base of the lamp and rests upon the condenser supporting plate 171. The teeth in the periphery of the gear 166 mesh with pinions 172 secured to the shafts 173 of the condenser rotors for adjusting the latter relative to the stators. The arrangement is such that rotation of the tube 163 effects a simultaneous adjustment of the rotors of the several condensers relative to the stators thereof.

The tube 163 is rotated by means of a control disc 174 shown in Figure 24 as centrally apertured to receive the fixed tube 158 and to also receive a collar 175. The collar 175 is rotatably mounted on the tube 158 and is slotted, as at 176, to receive a projection 177 on the control 174. The construction is such as to provide a driving connection between the control disc 174 and the collar 175 so that rotation of the former effects a corresponding rotation of the latter. The control disc 174 is positioned axially with respect to the collar 175 by means of washers 178 and 179 threaded upon the collar at opposite sides of the control disc.

The collar 175 is operatively connected to the upper end of the tube 163 by speed reducing mechanism in order to provide a vernier adjustment of the variable condensers. In the present instance, the speed reducing mechanism is of the friction type having a plurality of freely rotatable discs 180 spaced from each other at equal distances around the collar 175 and journalled on vertically extending stub shafts 181. Upon reference to Figure 24, it will be apparent that the stub shafts 181 are supported on a carrier disc 182 freely rotatably mounted on the collar 175 between a radially outwardly extending flange 183 on the collar and a plate 184. The plate 184 is, of course, centrally apertured to receive the lower end of the collar 175 and this plate is supported on the collar by means of a disc 185 secured to the plate, as at 186, and having a hub 187 secured to the fixed tube 158.

It will be noted from Figure 24 that the sides of the revoluble discs 180 adjacent the axis of the tube 158 are frictionally urged into engagement with the upper side of the radially outwardly extending flange 183 on the collar 175 by means of a disc 188 supported on the collar 175 above the revoluble discs 180 and normally urged into engagement with the latter by means of the spring washer 189. Peripheral portions of the spring washer are fashioned to provide spring fingers 190 adapted to be compressed by engagement with the washer 179 supporting the control disc 174 on the collar. The arrangement is such that the inner sides of the revoluble discs are yieldably clamped between the radially outwardly extending flange 183 and the disc 188.

The outer sides of the revoluble discs 180 are yieldably clamped between the two rings 191 and 192. The top ring 191 is provided at spaced points with depending strips 193 secured to correspondingly spaced projections 194 extending downwardly from the plate 184. The opposed ring 192 is supported upon a plurality of spring fingers 195 struck out from the plate 184 at points spaced around the axis of the collar 175.

With the above arrangement, it will be noted

that rotation of the control disc 174 by the operator exerts a driving force upon the inner sides of the revoluble discs 180 tending to rotate the carrier 182 at a corresponding rate. In the event the carrier 182 is rotated as a unit with the control disc 174, the outer sides of the discs 180 must move through a greater arc than the inner sides, and this movement is resisted by the frictional engagement of the rings 191 and 192 with the outer sides of the discs. As a result, the discs 180 are rotated upon actuation of the control disc 174 and the carrier 182 is revolved at a much slower rate than the control disc 174. The differential, of course, depends upon the dimensions of the parts and, in the present instance, is such as to provide the desired vernier control of the variable condensers. In the present illustrative embodiment of the invention, the carrier disc 182 is connected to the upper end of the tube 163 for rotating the latter at the reduced rate by means of a driving disc 196 secured to the upper ends of the shafts 181 by means of the screws 197 and having tongues 198 extending into notches 199 formed in the upper edge of a ring 200 carried by a cup-shaped member 201. As shown in Figure 24, the ring 200 is fixed to the inner surface of the upstanding flange on the cup-shaped member 201 and the latter is secured to the upper end of the tube 163 by means of the collar 202. The cup-shaped member 201 is of sufficient dimension to house the reduction mechanism and to thoroughly conceal the latter from view.

One side of the cup-shaped member 201 is provided with a slot 203 therethrough for exposing the wave indicating band 204 secured to the inner side of the upstanding flange of the cup-shaped member opposite the slot. Thus, it will be seen that the wave indicating band rotates as a unit with the cup-shaped member 201 at the reduced rate effected by the reduction mechanism and the graduations on the wave indicating band are indicated by means of a fixed pointer 205 secured to the ring 191 in the cup-shaped member and projecting through a slot 206 in the cup-shaped member. The slot 206 is of sufficient length to cover the entire band without interfering with the rotation of the cup-shaped member.

In order to provide for varying the resistance controlling the volume and, at the same time, operate the "off" and "on" switch from a position adjacent the condenser control disc 174, the following construction may be resorted to. A tube 210 is telescopically engaged with the portion of the tube 158 extending above the condenser control disc 174, and the lower end of this tube is provided with an enlargement 211 shaped to combine with the cup-shaped member 201 in providing an attractive design. Actually, the enlargement serves as a control for revolving the tube 210 relative to the fixed tube 158.

As shown in Figure 21, the internal diameter of the tube 210 is greater than the outside diameter of the tube 158 and the former tube is axially positioned relative to the latter tube by means of an annular projection 212 extending inwardly from the tube 210 adjacent the lower end thereof and adapted to rest upon an annular projection 213 extending outwardly from the fixed tube 158. It will be observed from the above figure that the ends of the projections are flat in an axial direction so as to provide an efficient bearing engagement between the two tubes. The upper end of the tube 210 is secured to a cup-shaped member 214 of sufficient diameter to receive the lower end of the transformer housing 162 and a ring gear 215 is permanently secured to the inner side wall of the cup-shaped member for meshing engagement with a pinion 216 secured to a vertical shaft 217. The vertical shaft 217 and pinion 216 are located within the transformer housing and the latter is slotted, as at 218, to provide for extending the periphery of the pinion through the side wall of the transformer housing for engagement with the ring gear 215.

With the above construction, it will be noted that rotation of the ring gear 215 by the cup-shaped member 214 and tube 210 effects a rotation of the shaft 217. This shaft is connected to the combined volume control and "off" and "on" switch for controlling the circuit to the receiving apparatus and for regulating the rheostat to vary the volume. Thus, it will be noted that the radio receiving apparatus may be entirely controlled from a unit supported in a convenient position on the stanchion of the lamp.

In some installations, it may be desirable to provide the radio receiving apparatus with a tone control in association with the speaker unit. The embodiment of the invention illustrated in Figure 25 is provided with a tone control and the latter, as well as the variable condensers and the combined volume and "off" and "on" switch, are controlled from a convenient position on the stanchion of the lamp. The variable condensers 155A are controlled by a disc 174A in exactly the same manner as defined in connection with the embodiment of the invention illustrated in Figures 21 to 24, inclusive. In Figure 25, however, the combined volume control and "off" and "on" switch 153A is supported in the base 151A of the lamp below the lower end of the fixed tube 158A. The device 153A is controlled from a position directly above the condenser control disc 174A by means of a control 220 having a hub portion 221 sleeved upon the tube 158A for rotation relative thereto and embodying a ring gear 222 adapted to mesh with a pinion 223 secured to the upper end of a vertically extending shaft 224. The shaft is journalled within the tube 158A and the latter is slotted, as at 225, to permit the periphery of the pinion to extend through the tube into meshing engagement with the ring gear. The lower end of the shaft 224 is operatively connected to the device 153A so that rotation of the shaft by the control 220 operates the "off" and "on" switch and varies the resistance controlling the volume.

The tone control for the speaker is located in the transformer housing 162A and is controlled by means of the tube 227 telescopically engaging the portion of the tube 158A above the control 220. The lower end of the tube 227 is supported on the tube 158A in the same manner as the tube 210 in Figure 21 is supported on the tube 158, and the upper end of the tube 227 is provided with a cup-shaped member 228 identical in construction to the cup-shaped member 214 in that it is provided with a ring gear 229 for rotating the pinion 230 on the tone control shaft 231. Thus, it will be noted that the construction shown in Figure 25 embodies all of the advantages of the constructions shown in Figures 21 to 24, inclusive, with the additional feature that the tone control may be operated from a convenient position on the stanchion of the lamp.

In the embodiment of the invention shown in Figure 26, provision is made adjacent the base 151B of the lamp for controlling the variable condensers 155B and the combined volume control

and "off" and "on" switch 153B. In this construction, the lower tube 163, in both of the preceding embodiments, is eliminated and the central driving gear 166B is rotated directly by the driving disc 196B, through the medium of the control 174B. The reduction mechanism employed is the same as the one described in detail in connection with the embodiment of the invention shown in Figures 21 to 24, inclusive, and this mechanism is concealed by means of a closure 235 having the lower edge secured to the condenser supporting plate 171B and having an upper edge terminating adjacent the lower side of the control 174B. The combined volume control and "off" and "on" switch 153B is actuated by means of a tube 236 surrounding the fixed tube 158B and the method of operation is exactly the same as described in connection with the modification featured in Figures 21 to 24 inclusive.

The embodiment of the invention illustrated in Figure 27 shows a modified form of condenser adjusting mechanism that may be used with either the lamp shown in Figures 1, 11, 16, or 26. As will be observed in this figure, the central driving gear 166C for the condensers is actuated by means of a ring 237 rotatably supported on the bottom wall 238 of the base 239 of the lamp and connected to the driving gear by means of spokes 240. It will be observed from Figure 27 that the base 239 is formed of two sections 241 and 242 spaced from each other a sufficient distance to provide a slot for receiving the control ring 243. The control ring 243 is secured to the ring 237 and projects beyond the side walls of the base a sufficient distance to permit the same to be conveniently manipulated by the operator. One side of the section 241 of the base is slotted, as at 244, to expose the wave indicating band 245 which is secured to the ring 237 for rotation relative to the pointer (not shown).

The two sections of the base are held in spaced relation to each other by means of the spacers 247 and are secured together by means of fastener elements 248 extending axially through the spacers. It will, of course, be understood that the spacers 247 are predeterminedly arranged so as to be free from engagement with the spokes 240 during adjustment of the condensers throughout their range.

In Figure 27, the combined volume control and "off" and "on" switch 248 is supported in the base 239. This device is actuated by means of a ring 250 surrounding the lower end of the stanchion 251 and seated on the top wall of the section 241 of the base. The ring 250 is held against axial displacement relative to the stanchion 251 by means of an annular radially outwardly extending flange 252 at the lower end of the stanchion adapted to extend over an annular inwardly extending projection 253 on the ring. The ring 250 is operatively connected to a driving gear 254 rotatably supported in the base 239 and adapted to mesh with a pinion 255 secured on the volume control shaft 256. The operative connection between the ring and driving gear comprises a pin 257 extending through an arcuate slot 258 in the top wall of the base and having the opposite ends respectively secured to the ring 250 and driving gear 254 adjacent the periphery of the latter.

Although a number of different embodiments of this invention have been described somewhat in detail, nevertheless, it will be noted that each modification contemplates installing a complete radio receiving apparatus in a lamp in such a manner that the same does not appreciably restrict the design of the lamp or render the same cumbersome in appearance. In other words, in each of the several embodiments of this invention, the instrumentalities of the radio receiving apparatus are ingeniously arranged to permit the same to be housed in the minimum of space and this is of particular importance from the artistic point of view. It will also be noted that in each embodiment of the invention, the rectifier and amplifier tubes are located in the shade assembly of the lamp so that the heat generated by these tubes will not destroy any of the parts of the radio receiving apparatus sensitive to heat and will not interfere with the compact arrangement of these parts. In addition to the foregoing, it will be noted that I have provided novel control means for the several instrumentalities of the radio receiving apparatus and that this means is of such a nature as to permit the same to be cleverly worked into the design of the lamp.

What I claim as my invention is:

1. In a combined lamp and radio receiving apparatus, the combination of a lamp having a base and a shade unit connected to the base by a stanchion including a hollow upright member having portions of one side wall slotted, a complete radio receiving circuit housed within the several parts of the lamp, said circuit having parts located in the base, other parts including amplifier and rectifier tubes supported in the shade and still other parts insertable into the upright member through the slotted wall aforesaid and supported on the upright member, and a second upright member of hollow construction surrounding the upright member aforesaid to conceal the parts of the radio receiving circuit in the latter member.

2. In a combined lamp and radio receiving apparatus, the combination of a lamp having a base and a shade unit connected to the base by a stanchion including a hollow upright member having portions of one side wall slotted, a complete radio receiving circuit housed within the several parts of the lamp, said circuit having parts located in the base, other parts supported in the shade and still other parts insertable into the upright member through the slotted wall aforesaid and supported on the upright member, and a second upright member of hollow construction surrounding the upright member aforesaid in eccentric relation thereto and being sufficiently larger than the first upright member to provide ample space for accommodating additional instrumentalities of the radio receiving circuit.

3. In a combined lamp and radio receiving apparatus, the combination of a lamp having a base, a stanchion supported by the base and having an inner tubular upright member and having an outer tubular upright member eccentrically arranged with respect to the inner member and concealing the latter, and a radio receiving circuit having parts thereof located in the space provided by the eccentric arrangement of the members.

4. In a combined lamp and radio receiving apparatus, the combination of a lamp having a base, a stanchion supported by the base and having an inner tubular upright member and having an outer tubular upright member eccentrically arranged with respect to the inner member and concealing the latter, a radio receiving

circuit having parts thereof located in the space provided by the eccentric arrangement of the members, and having other parts located within the inner tubular member.

5. In a combined lamp and radio receiving apparatus, the combination of a lamp having a base, a shade spaced above the base and a vertical stanchion supporting the shade on the base, said stanchion having a tubular upright member provided with openings in one side wall, a radio receiving circuit having amplifier and rectifier tubes located in the shade and having certain of the parts thereof insertable into the tubular member through the openings aforesaid and supported on said tubular member, and a second tubular member detachably secured to the base and concealing the tubular member aforesaid.

6. In a combined lamp and radio receiving apparatus, the combination of a lamp having a base section, a shade unit supported from the base by a stanchion section, and a radio receiving circuit having tubes and having a loud speaker located in the shade, certain of the tubes radiating more heat than others and being supported in the shade unit and other tubes being compactly arranged in one of the sections aforesaid of the lamp.

7. In a combined lamp and radio receiving apparatus, the combination of a lamp having a base section, a shade unit supported from the base by a stanchion section, a loud speaker assembly mounted in the shade unit and a radio receiving circuit having radio frequency tubes supported in one of the sections aforesaid of the lamp and having a rectifier tube supported in the lamp shade unit.

8. In a combined lamp and radio receiving apparatus, the combination of a lamp having a base section, a shade unit supported from the base by a stanchion section, a loud speaker assembly mounted in the shade unit and a radio receiving circuit having parts of the receiving circuit including the radio frequency tubes supported in one of the sections aforesaid of the lamp and having rectifier and amplifier tubes supported in the shade of the lamp.

DANIEL J. CROWLEY.