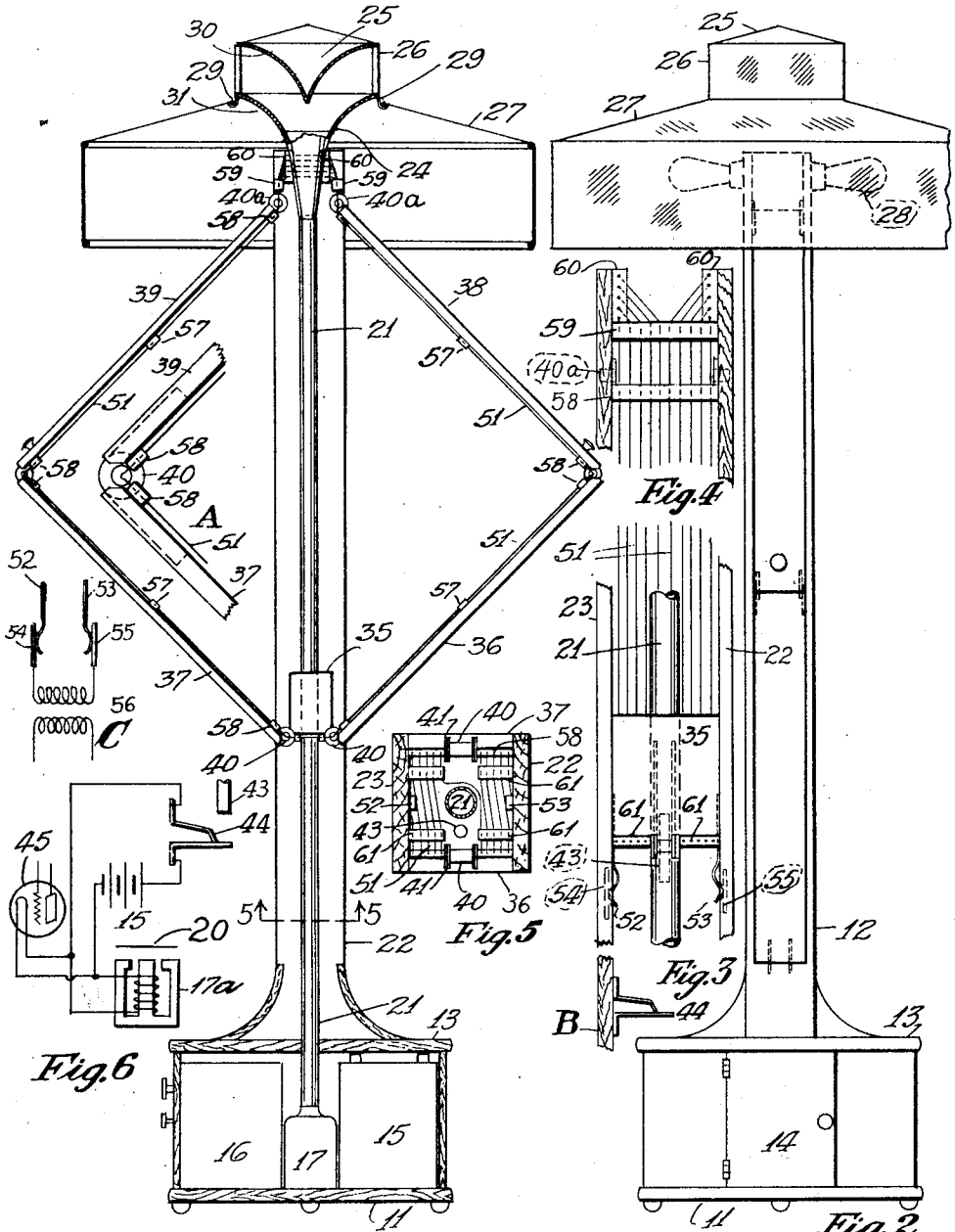
March 27, 1928. 1,663,635

M. H. LOUGHRIDGE ET AL

RADIO APPARATUS

Filed Dec. 30, 1921 2 Sheets-Sheet 1



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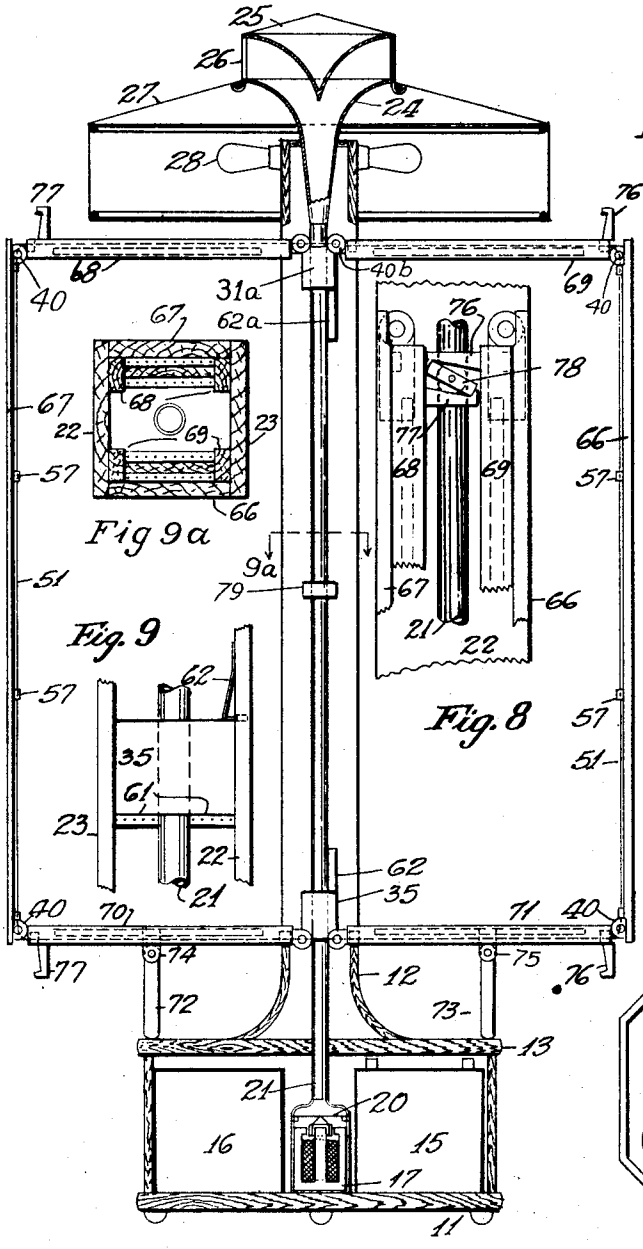


Fig 9a

Fig. 9

Fig. 8

Fig. 7

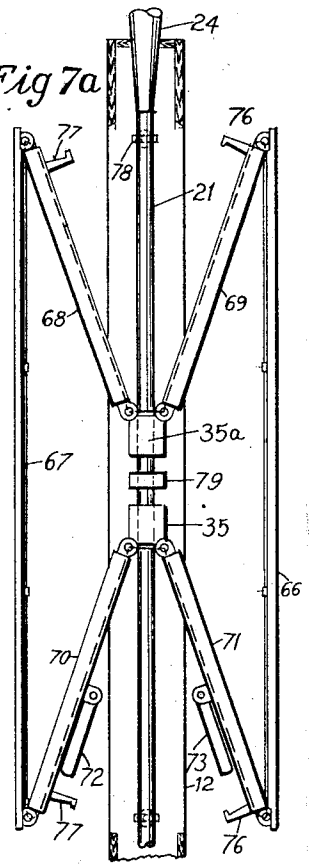


Fig 7a

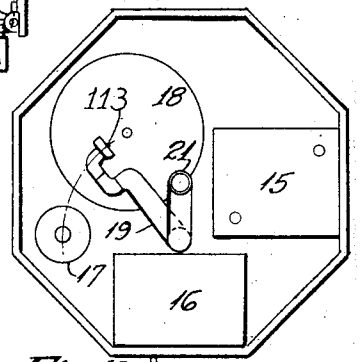


Fig. 10

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UNITED STATES PATENT OFFICE.

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RADIO APPARATUS.

Application filed December 30, 1921. Serial No. 525,917.

This invention relates to radio apparatus and more particularly to sound producing devices mainly operated by radio and includes an article of furniture in combination with the sound producing elements. This invention has for an object to provide a sound producing element with vertical horn and means for deflecting the sound from this horn through an annular opening in a horizontal plane, also a sound producing device incorporated in a lamp stand with the horn of the sound producing device at the top of the stand, also a sound producing device having folding arms supporting antenna wires receptive to radio signals, also a combination of electrically and mechanically operated sound producing devices and means for taking the sound from either of these devices. In addition this invention resides in the construction and combination of parts more fully described and explained in the following specification and shown in the accompanying drawings in which Fig. 1 illustrates a vertical stand showing one type of our invention partly in section, Fig. 2 is an elevation of the same device at right angles to Fig. 1, Figs. 3, 4 and 5 show details of the construction used in this device and Fig. 6 is a typical circuit that may be used in connection with the radio part of the invention; Figs. 7 and 7ª are modified arrangements of the device shown in Fig. 1, Figs. 8, 9 and 9ª are details of this device, and Fig. 10 is a plan view of a base that may be used with either Figs. 1 or 7. Certain of the features shown in each of these various illustrations may be used in the others depending upon the conditions of application to which the invention is applied.

This invention as illustrated in Figs. 1, 2 and 7 consists in embodying in a floor stand such as may be used for a floor lamp or a costumer certain elements including a sound producing device, which may be operated from the base of the stand with arrangements to emit the sound at the top of the stand above the lamp shade, also it includes a means for supporting a collapsible antenna suitable to receive radio signals, and radio apparatus housed in the base of the stand, thus making a unit complete for receiving sound from radio stations. The collapsible antenna enables the device to be folded in such a way that it has an appearance and shape substantially equivalent to an ordinary floor lamp and occupies about the same amount of space.

The horn for emitting the sound from the sound producing apparatus is arranged so that it may be connected with an ordinary phonograph in the base of the stand or may be changed over to an electrical sound producing device. The electrical sound producing device enables a number of similar stands to be operated in multiple circuit in perfect synchronism as might be desirable in large rooms. The use of the electrical sound producing device enables this invention to be applied to a chandelier or ceiling fixture which would not be accessible for ordinary phonographic purposes.

A further feature of the invention is to incorporate a lamp shade and vertical horn in such a way that the one is quite independent of the other, the horn offering practically no obstruction to the diffusion of light to the lamp shade while the shade itself forms a horizontal base upon which the sound waves are emitted from the vertical annular opening of the horn. All of these features of the invention may be incorporated in one device or each of them may be applied separately according to conditions without departing from the intent and spirit of the invention.

Referring to the drawings, shown in Figs. 1, 2 and 7, the stand comprises the base 11 and the pedestal 12. The base, as indicated, is octagon shaped, having a top-board 13 and suitable doors as indicated at 14. This base houses the apparatus including the battery 15, the radio amplifier 16, the electrical sound producing device 17 and in the case of Fig. 10, the phonograph mechanism and turntable 18, also the tone arm 19. The term base and pedestal are used throughout in a general sense to designate the supporting means of the device.

Arising from this base is the vertical pedestal 12 composed, as shown in the illustration, of two parallel boards 22 and 23 enclosing the tube 21 which connects with the sound producing device 17 and at the upper end is connected to the bell shaped horn 24.

Over the orifice of this horn and in the axial line therewith is placed the inverted cone 25, spaced from the horn by suitable wires or other means and having a covering preferably of silk 26, which encloses the opening and prevents dust from entering the vertical tube 21. Hooks are provided at intervals around the mouth of the horn 24 supporting the wire ring 29 forming an integral part of the lamp shade 27 which, as usually constructed, consists of a wire frame work upon which a colored silk shade is stretched. The construction is such that the silk shade may be sprung out of the hooks and removed from the stand by raising vertically. Below the silk shade 27 the lamps indicated at 28, Fig. 2 may be used for illuminating the shade.

The bell mouth of the horn 24 may be made of metal or this part may be made of a colored glass and the cone surface of 25 as indicated at 30 may be polished to act as a reflector so that light penetrating through the horn as at 31 will be reflected at 30 and projected through the shade 26, thus providing an annular glow in color around the outside top of the shade.

The pedestal itself is provided with collapsible arms which are also arranged to enclose the sides when folded. These arms in turn support and position the wires of an antenna preferably of the loop type, which acts as a receiver for radio signals from broadcasting stations.

The type shown in Figs. 1 and 2 provides for a diamond shaped antenna as shown, consisting of arms 36, 37, 38 and 39. These arms are hinged at 40 with a ruler type of hinge, also the lower ends of arms 36 and 37 are hinged at 40 to the sliding block 35 by a ruler type of hinge and the upper ends of arms 38 and 39 are hinged at 40^a to the top of the stand. It will be apparent that when the block 35 is lowered the arms collapse and fold to form the sides of the pedestal as indicated in Fig. 2 and when this block is raised, the arms spread out, diamond shape, as indicated in Fig. 1. When in the raised position, these arms may be latched or they may be held in position by the spring contact fingers 52 and 53, hereafter to be described.

On the inside of the diamond shaped loop the coils of the antenna wire 51 are placed, supported and spaced by suitable cleats 57. These wires are preferably stranded and flexible and are held taut by the cleats 58 at each end of the arms. The cleats 58 are placed as closely as possible to the hinge joint so that the bend of the wires may align as closely as possible with the axis of the hinge pivot. This arrangement always maintains the wires properly spaced so that they cannot readily make contact with each other.

It will be noted that the wires cross between arms 36 and 37 over the base of the sliding block 35 as indicated in Fig. 5. The wires in this case must, however, clear the tube 21 and for this purpose they are spread out to pass on either side of the tube as shown, being guided by cleats 61 for this purpose. It will also be noted that at the top of the stand where the horn flares from tube 21, there is not sufficient space for the wires to pass across between the arms 38 and 39 in a horizontal plane. We have, therefore, arranged for the wires to pass in a vertical plane at this point. Wires are fanned out as shown in Fig. 4 from the horizontal cleats 59 to the vertical cleats 60, thus providing a space around the horn without in any way obstructing the latter.

The collapsible antenna here shown is, of course, only usable when expanded as shown in Fig. 1. When folded and closed it is not in working position and it is desirable that the apparatus in this position be cut out of circuit. We have, therefore, arranged our invention so that the antenna when opened automatically establishes a circuit to the amplifier and when closed, opens this circuit and also disconnects the operating battery of the sound producing device. This will be understood by the details shown in Fig. 3, showing one end of the antenna connected to spring finger 52 which makes contact with plate 54. The opposite end of the antenna by spring finger 53 connects with plate 55. Plates 54 and 55 as shown in detail C may connect with a transformer 56 which is in turn connected with the amplifier. The stationary plates 54 and 55 it will be noted, are permanently connected with the transformer preferably by concealed wires and, therefore there are no flexible connections to the antenna itself. When the arms of the antenna are folded the fingers 52 and 53 are removed from the plates 54 and 55, thus disconnecting the antenna. Also, it will be noted from detail B that the plunger 43 on the sliding block 35 engages the spring contact 44, causing it to open the circuit of battery 15, Fig. 6, used to operate the sound producing device 17^a and to heat the filament of amplifier 45. When the antenna is opened again, the contact 44 is closed and this circuit is restored.

The highest efficiency is obtained from the antenna when there are no metal parts in its vicinity to cause inductive losses. With this end in view the entire stand including the arms is made from wood or other non-metallic material and the tube 21 is preferably made from vulcanized fibre, also the plates 41 of the ruler hinge 40 are preferably made from vulcanized fibre.

The arrangement shown in Fig. 7 differs from the arrangement shown in Fig. 1 by reason of the fact that the antenna is rectangular in shape and is adapted to con-

tain more wire per turn and thus be more effective in responding to radio signals. The main difference between this arrangement and Fig. 1 resides in the construction of the folding arms which are arranged to fold both at the top and the bottom as indicated in Fig. 7ª. The frame supporting the antenna consists of the boards 66 and 67 which when folded form the sides of the pedestal and parallel arms 68, 69, 70 and 71. The outer ends of these arms are hinged at 40 to the boards 66 and 67 and are hinged at 40ᵇ to the sliding blocks 35 and 35ª. When block 35 is raised and block 35ª is lowered, the ends of the horizontal arms are brought together, thus moving the side boards 66 and 67 into the centre where they close up and complete the pedestal. When closed the latch pieces 76 and 77 stand in the relation shown in Fig. 8 and a latching piece 78 may be provided and operated by a handle from the outside of the pedestal to engage the ends of these latches, thereby holding the pedestal closed. When the sliding block 35 is lowered the spring latch 62 holds it in the lowered position and when the sliding block 35ª is raised the spring latch 62ª holds it in the raised position thus maintaining the frame expanded. Arms 72, secured at 74 to the horizontal arm 70 and arms 73, secured at 75 to the horizontal arm 71 support the weight of the frame upon the top plate of the base 13. These arms fold inwardly on the pivot when the frame is collapsed.

The arrangement in Fig. 10 includes a phonograph mechanism operating a turntable 18 as well as the electrical sound producing device 17. The tone arm 19 swings as shown and the sound box head 113 may be removed and the end of the tone arm turned to register with the opening on the top of the sound producing device 17, thus making available both the electrical and mechanical sound producing devices in the one piece of apparatus.

Having thus described our invention we claim:

1. In combination, a base having a pedestal, arms pivotally secured to fold adjacent said pedestal and an antenna supported by said arms, said arms arranged to maintain said antenna taut and to entirely enclose said antenna when folded.

2. In combination, a base having a pedestal, arms secured to fold and form the sides of said pedestal and an antenna supported throughout its length by said arms.

3. In combination, a base having a pedestal, a slide supported by said pedestal; folding arms forming a rectangle pivotally supported by said slide and an antenna supported by said arms.

4. In combination, a pedestal, arms arranged to fold adjacent said pedestal and antenna wires coextensive with and supported by said arms, said arms maintaining a uniform tension on said antenna wires when the arms are folded and when they are unfolded.

5. In combination, a pedestal, arms arranged to fold adjacent said pedestal and to expand to form a rectangle and antenna wires supported on the inner side of said rectangle and so arranged as to conceal said wires when said arms are folded.

6. In combination, a pedestal, arms arranged to fold on pivoted joints to form a rectangle supported by said pedestal and antenna wires supported throughout their length on the inner side of said rectangle.

7. In combination, a plurality of arms with pivoted joints said arms capable of expanding into a rectangular form and of folding together into a straight form and an antenna supported adjacent said arms throughout their length.

8. In combination, a plurality of jointed arms capable of expanding into a rectangle and capable of folding together, antenna wires supported by said arms, said wires being entirely enclosed by said arms when said arms are folded.

9. In combination, a pedestal, arms arranged to fold on pivoted joints supported by said pedestal, antenna wires supported by said arms and means operated by said arms whereby the circuit of said antenna is established, when said arms are unfolded.

10. In combination, a pedestal, jointed arms associated with said pedestal to form a rectangle, antenna wires supported by said arms and means whereby said arms may be folded parallel with said pedestal to enclose the sides thereof.

11. In combination, a stand, jointed arms associated with said stand, antenna wires associated with said arms, electrical devices including a circuit controller associated with said antenna and means for operating said circuit controller by said arms.

12. In combination, a pedestal, jointed arms associated with said pedestal, and capable of folding adjacent said stand, antenna wires associated with said arms, electrical apparatus including a source of energy associated with said antenna and means operated by said arms for disconnecting said source of energy when said arms are folded.

13. In combination, a wooden stand for a radio antenna having detachable non-metallic sides, said sides jointed and pivotally connected to said stand so that they can open and close, said sides supporting antenna wires and non-metallic fittings for said joints whereby inductive losses in said antenna are avoided.

14. In combination, a stand for a radio antenna having detachable, non-metallic sides, said sides hinged to open and close,

antenna wires supported by said sides and latching means to hold said sides in position.

15. A collapsible aerial comprising a multiple sided frame having a coil of wire thereon, said frame being collapsible, upon one of its sides and means for retaining the wire on the frame when collapsed.

16. A collapsible aerial comprising a frame provided with side portions hinged together at its corners and intermediate two opposite sides, whereby the frame may be collapsed upon one of its sides, and means on the frame to hold a coil of wire thereon.

17. A collapsible aerial comprising a frame provided with side portions hinged together at its corners and intermediate two opposite sides, means adjacent the hinge points to engage a coil of wire and retain it on the frame in expanded or collapsed position.

18. In apparatus of the class described, and in combination, a rectangular frame having side portions hinged together at the corners and intermediate two opposite sides, whereby said frame may be collapsed, two of the sides folding inwardly, means for retaining said frame in expanded position under tension, a coil of wire having its convolutions secured to the frame adjacent the hinge points, all so constructed and combined that the frame when expanded will maintain said convolutions taut.

19. An aerial system comprising a foldable frame, a plurality of turns of wire attached thereto, and means for maintaining said turns substantially taut through the operations of folding and unfolding.

20. An aerial system comprising a collapsible or foldable frame, including parallel frame members, jointed frame members connecting said first frame members and adapted to hold said first frame members in spaced, extended position and to permit them to be moved towards each other, and an aerial wire wound on said frame in such manner as to be extended when said frame is extended and to be folded, but remain substantially taut, when said frame is folded.

21. In an electrical coil, a closed frame of more than three members pivoted at each corner, supporting members mounted at each corner, at right angles to the plane of the frame, and an electrical conductor mounted on said supporting members to form a shape substantially that of the frame.

Signed at New York city, in the county of New York and State of New York, this 23d day of December, A. D. 1921.

MATTHEW H. LOUGHRIDGE.
JOHN S. HOLLIDAY.