

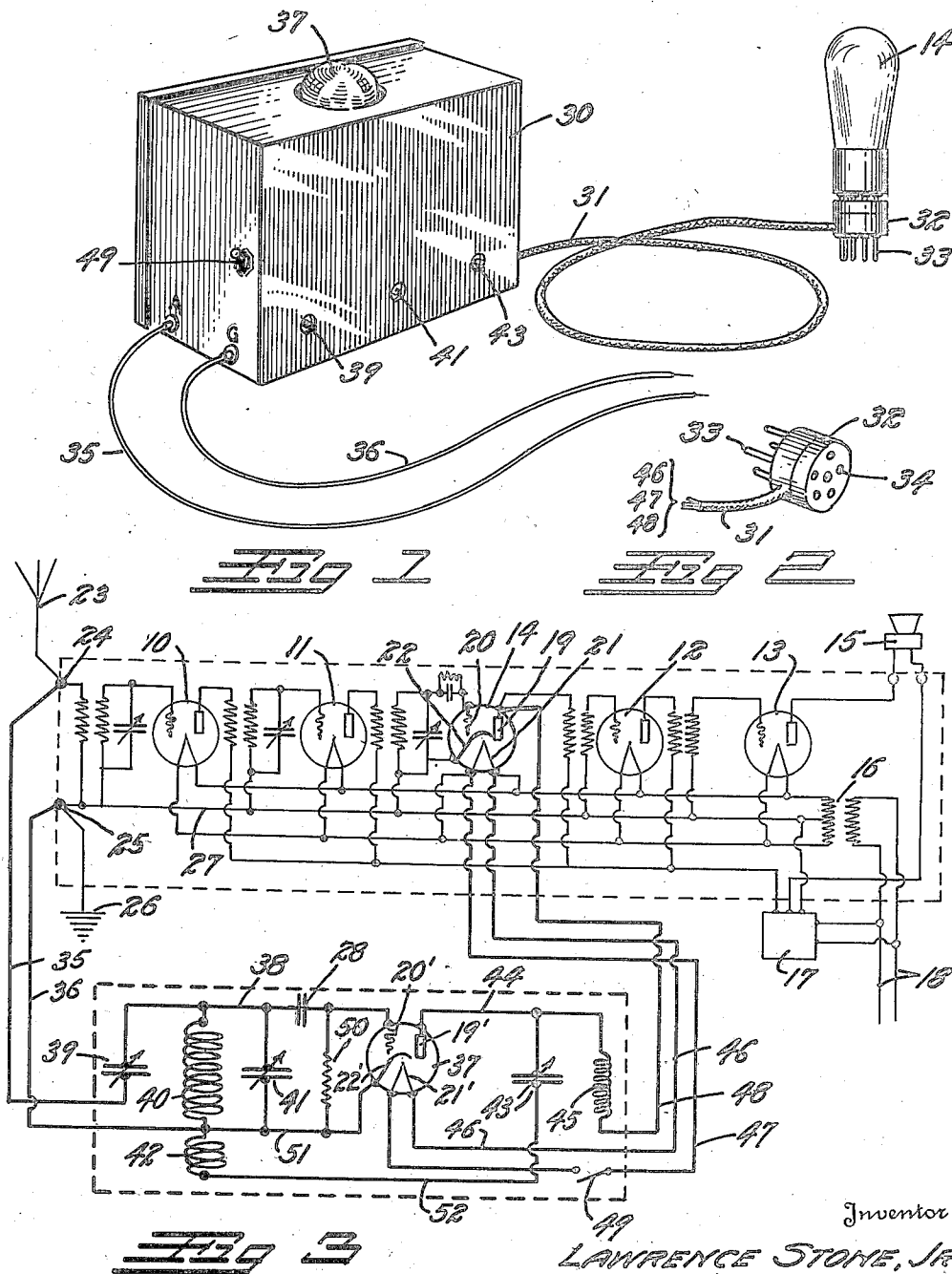
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AUTOMATIC SHORT WAVE CONVERTER

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AUTOMATIC SHORT WAVE CONVERTER

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This invention relates to an attachment for long wave broadcast radio receiving sets to adapt them for receiving short wave signals. Many adaptors have been designed for attachment to long wave receiving sets to convert them for receiving short wave signals. The disadvantage of all of these adaptors or converters is that the long wave signals can not be received while the adaptor is connected with the set. Radio listeners often desire to hear police news and other short wave signals, but they do not desire to eliminate their long wave reception and silence the set while awaiting the short wave signals.

The principal object of this invention is to provide an attachment which will automatically bring in any predetermined short wave signals which may be transmitted simultaneously with the long wave reception. With this attachment, a listener may have his attachment tuned to receive local police news for instance, and may then listen to his favorite long wave broadcasting programs. If any short wave police signals are put upon the air, they will be immediately heard super-imposed upon the long wave reception, without requiring any manual manipulation of the sets or controls.

Another object of this invention is to provide an attachment which will be neat and compact; which will readily fit into the ordinary radio cabinet, and which can be quickly and easily connected to any long wave set by an inexperienced person without disturbing the long wave set.

A further object of this invention is to construct the set so that it can be preset to a given short wave band such as the police band, and trimmed or balanced to cooperate perfectly with the given long wave set, and so that after adjusting it, it can not be tampered with by the user.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a perspective view illustrating one form of the complete attachment ready for installation in the long wave set.

Fig. 2 is a detail view of the combined detector plug and tube receptacle which may be employed with the attachment.

Fig. 3 is a circuit diagram illustrating the circuit of the attachment combined with the circuit of a typical broadcast receiving set.

The upper circuit in Fig. 3 is simply illustrative of a typical long wave receiver. The particular circuit shown forms no part of the present invention, as the latter might be embodied in any desired long wave circuit. For the sake of explanation, however, the long wave circuit illustrated will be briefly described.

In a conventional type long wave set, there are usually two radio frequency amplifying stages such as indicated at 10 and 11, and two audio frequency amplifying stages such as indicated at 12 and 13. Various hook-ups employ more or less of the radio frequency stages and more or less of the amplifying or audio frequency stages. Between the radio and audio stages, a detector tube 14 is employed for rectifying the radio impulses and feeding them to the audio stages. The radio impulses are received from an antenna 23 connected to an antenna post 24. A ground post 25 grounds the set as indicated at 26. The last stage, of course, is connected with and operates any suitable loud speaker such as indicated at 15.

Current is usually supplied to the filaments and grids of the various tubes from a suitable transformer 16. The plates of the various tubes are usually supplied with high tension direct current from a suitable transforming rectifier 17. The latter two sources are fed with primary current from the 110 volt lighting mains through suitable feeds 18.

The above circuit may be wound to operate satisfactorily on any predetermined wave band and is usually designed for the so called broadcast band of between 200 and 550 meters. When so wound, it will not receive signals transmitted on the so called short wave band of 10 to 50 meters without some sort of an adaptor or converter. Heretofore, all adaptors have required the elimination of the first detector tube 14 which of course immediately renders the long wave set useless.

The present invention does not require the removal of the detector tube 14 so that the long wave signals to which the long wave set is tuned will still operate to the loud speaker 15, regardless of whether the short wave attachment is in or out of service.

In the present attachment, we are only interested in the detector tube 14 which forms a part of the circuit of the attachment and which will be hereinafter designated as the first detector

tube. The various elements of the first detector tube are designated by numeral as follows: plate 19, grid 20, filament 21, and cathode 22. The cathode 22 is connected through a conductor 27 with the ground post 25.

The present attachment comprises: a box or housing 30 preferably formed of sheet metal so as to have a shielding effect upon the contained elements. Short wave circuits are supersensitive and the shielding therefor is highly important, especially in view of the fact that the attachment is employed closely adjacent to the long wave circuit. Protruding from the housing 30 is a three conductor cord 31 terminating in a combined plug and receptacle fitting 32. The fitting 32 is illustrated in detail in Fig. 2 and is provided with projecting prongs 33 to fit into the detector tube receptacle of the long wave set. It is also provided with prong openings 34 for receiving the base prongs of the first detector tube 14.

The short wave attachment is also provided with an antenna lead 35 and a ground lead 36. The circuit employed in the attachment contains a second detector tube 37, similar to the first detector tube 14. The elements of the second detector tube are designated on the drawing by numerals as follows: plate 19', grid 20', filament 21', and cathode 22'. The grid of the second tube 37 is connected through a buss 38 and a variable condenser 39 to the antenna lead 35. The cathode 22' of the second tube is connected through a ground buss 51 with the ground lead 36. A fixed or tuning coil 40 is included between the grid buss 38 and the ground buss 51 together with a bridged tuning condenser 41. A fixed feed-back winding 42 is placed in inductive relation to the tuning coil 40, and is connected through a feed back buss 52 with a variable condenser 43 to control regeneration and volume of signal in the output circuit.

An output buss 44 leads from the plate 19' of the second tube through a choke coil 45 to a plate conductor 48 in the cord 31. Two filament conductors 46 and 47 lead from the filament connections of the second tube 37 through the cord 31. A grid leak 50 is bridged across between the grid buss 38 and cathode ground buss 51. A cut out switch 49 is placed in circuit with the filament lead 47. The fixture 32 is so constructed that the filament, plate, grid and cathode prong receptacles 34 lead straight through to their respective prongs 33. In connecting the cord 31 to the fixture the filament conductors 46 and 47 are soldered to the filament contacts and the plate conductor 48 is soldered directly to the plate contact.

To connect the attachment to the long wave set, the first detector tube 14 is removed from its receptacle in the set and is installed in the prong receptacle 34 of the fitting 32, as shown in Fig. 1. The prongs 33 of the fitting 32 are then inserted in the detector tube receptacle of the long wave set in place of the tube 14. The ground lead 36 of the attachment is connected to the ground post 25 and the antenna lead 35 is connected to the antenna post 24 of the set and the entire circuit is then ready for use.

It is desired to call particular attention to the fact that the filaments 21 and 21' are connected in parallel by the conductors 46 and 47 and are heated simultaneously from the step down transformer 16. The two plates 19 and 19' are connected in parallel by the conductor 48 and the cathodes 22 and 22' are connected in parallel by the ground buss 51, ground lead 36 and conductor

27 of the long wave set. Therefore the ion emission from both tubes flows independently and simultaneously to the audio stage of the long wave set. The grid of the second tube however oscillates only to the reactance 40, condensers 39 and 41 which are attuned to a short wave. The grid of the first tube oscillates independently to its long wave reactance. Therefore, both the short and long wave signals are impressed upon the loud speaker unit 15. By controlling the relative volumes of the two signals the short wave signals may be made to dominate the long wave so as to be clearly heard thereover.

Many occupations require the members to be constantly on the alert for short wave calls, such as police officers, life station guards, aircraft employees, etc. For such uses the above hook-up becomes extremely valuable. The user can leave his set tuned to an enjoyable long wave broadcast and listen with perfect confidence that any important short wave information will come through and be heard over the continuous broadcast. When the short wave reception is not desired, it is only necessary to open the switch 49 which immediately stops the flow of current to the filament 21' and silences the attachment without affecting the long wave circuit in any way. The long wave set may be tuned out without affecting the short wave set if the latter only is desired.

The inductances 40 and 42 can be wound to suit the particular short wave important to the particular user, and the trimmers or condensers 39, 41 and 43 can be of the key set type, as illustrated in Fig. 1 which after setting cannot be tampered with, without the proper key and the entire set can be sealed within the housing 30. This insures the listener that the set is always in tune to the proper station. It is preferred to have the top of the tube 37 project through the top of the housing so that it may be removed for testing and renewal without disturbing the setting.

One of the most important features of the attachment is the fact that two independent detector tubes are employed simultaneously, each oscillating to a different wave length. The first tube is allowed to remain in the long wave set simply as a matter of convenience in installation. If desired, a second tube socket could be installed in the attachment to receive the first tube and the latter could be transferred to the attachment from the set. In such a case the fitting 32 would be replaced by a simple prong plug and sufficient conductors would be incorporated in the cord 31 to carry the required tube contacts.

If desired, the attachment could be incorporated into a standard long wave set at the factory in which case the contacts could be attached directly without the use of plugs or attachments.

It is noted that in using the attachment, the static usually heard on long distance reception and with high amplification is entirely eliminated from the long wave reception. It is also noted that in using the attachment properly tuned, the selectivity of tuning of the long wave set is greatly increased. The attachment therefor, in addition to the objects and advantages above pointed out, also serves as an efficient static eliminator and selectively increaser.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims,

without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:—

1. A radio receiver comprising: a first detector tube; a long wave tunable input circuit including said first detector tube; an audio amplifying circuit including said first detector tube; an antenna input connection for said input circuit; a ground connection for said input circuit; a current supply for both said circuits; a second detector tube; a short wave input circuit including said second detector tube; a combined plug and receptacle for said first detector tube; current supply leads for said short wave input circuit; a plate lead from said second detector tube, said current supply leads and said plate lead terminating in said combined plug and receptacle; an antenna lead for said short wave input circuit; connected to the antenna input connection of said long wave tunable input circuit; a ground lead for said short wave input circuit connected to the ground connection of said long wave input circuit; and a variable condenser in series with the antenna input lead of said short wave circuit between said latter stage and the antenna input connection of said first tuning stage.

2. A short wave attachment for a long wave radio receiving set, of the type having a detector tube circuit, an antenna circuit and a ground-cathode circuit comprising: a receptacle for the said detector tube, said receptacle having filament and plate connections; a short wave tunable input circuit; a second detector tube having grid, filament and plate electrodes and in-

cluding said short wave tunable input circuit in its grid circuit, the filament and plate of said second detector tube being connected to the filament and plate connections respectively of said receptacle so as to place the plate and filament electrodes of said two tubes in parallel relation; means for connecting said receptacle in the detector tube circuit of said long wave set; an antenna lead from the grid of said second tube connected to the antenna circuit of said long wave set; a ground lead from the cathode of said second tube and connected to the ground-cathode circuit of said long wave set.

3. A short wave attachment for a long wave radio receiving set of the type having an antenna circuit, a ground circuit, a detector tube, and a receptacle for said tube, comprising: a short wave tunable input circuit; means for connecting said input circuit to the antenna and ground circuits of said long wave set; a short wave detector tube having grid, filament and plate electrodes and including said short wave tunable input circuit in its grid circuit; a pair of filament conductors extending from the filament electrode of said short wave tube; a plate conductor extending from the plate electrode of said short wave tube; a combined plug and receptacle having grid, filament and plate contacts, said filament and plate conductors terminating at their respective contacts in said combined plug and receptacle, said contacts being formed to receive the detector tube of said long wave set and also to plug into the receptacle of said latter tube in said long wave set.

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