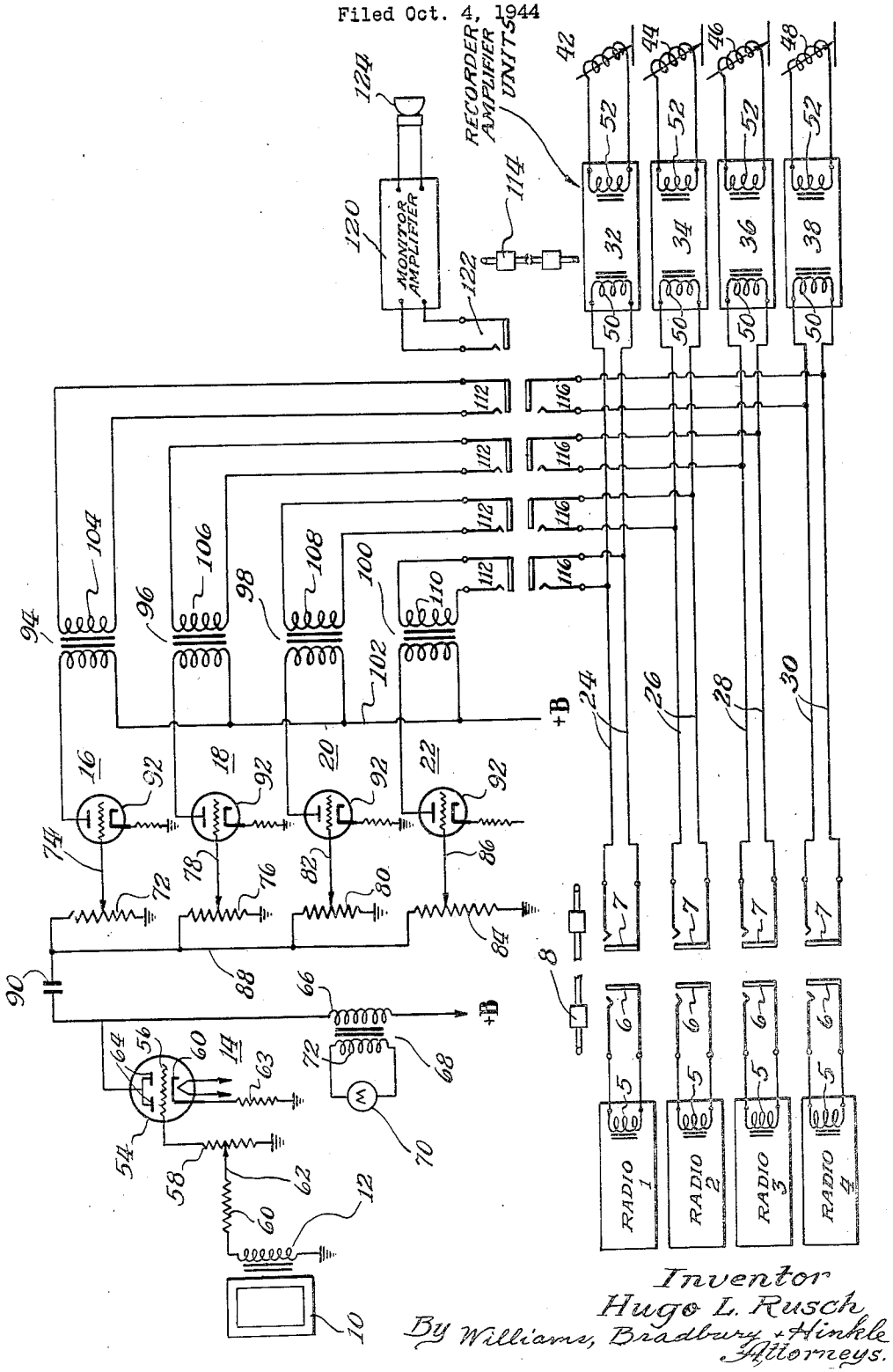
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SIMULTANEOUS RADIO PROGRAM AND TIME SIGNAL RECORDING SYSTEM

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SIMULTANEOUS RADIO PROGRAM AND TIME SIGNAL RECORDING SYSTEM

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The present invention relates to new and improved time record producing apparatus and more particularly to apparatus for producing a record of time signals upon one or more radio program recordings.

The primary object of the present invention is the provision of new and improved apparatus for superimposing a time signal record upon selected radio program recordings in such manner that the intensities of the superimposed time signals may be individually and independently adjusted whereby the time signals and radio programs may be satisfactorily recorded.

In analyzing radio listener response, it is extremely desirable to correlate the tuning or operation of the radio receivers under observation with the radio programs being analyzed to obtain information as to the reactions and actions of people listening to the program. To do this, it is desirable to record the various stations to which a radio receiver or receivers are tuned and then to decode or analyze the records to obtain the listener's response throughout the duration of the program. The station tuning record should be very accurate so that the station to which the receiver is tuned at any time may be accurately ascertained. It is also important that the radio program itself be correlated with the record of the stations to which the receivers are tuned. For instance, the radio receiver tuning records may show that a considerable change in the number of listeners occurs as a result of the change in the nature of the program or as a result of one star coming on or leaving a program. In order that the listener response not be misinterpreted to the harm of the star, the time at which this or that star comes on or leaves the program has to be known with certainty.

Some radio program scripts are carefully timed during rehearsal so that the time the various elements go on the air is worked out fairly accurately. Sometimes the time that a certain star comes on the air or the time that a certain line is begun is recorded on the margin of the script, within the nearest half minute. However, the timing of a live program on the air is never exactly the same as the timing of the rehearsal.

Accordingly, it is one of the primary objects of the present invention to provide a new and improved apparatus for simultaneously recording selected radio programs and time signals. A convenient method of recording the radio program is to make disc records of the programs and, according to the present invention, time signals are superimposed upon the radio program whereby

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the time signals and radio program are simultaneously recorded upon the disc.

Another object of the present invention is to provide new and improved apparatus for supplying a single time signal to a plurality of radio program recordings and which is so constructed and arranged that the time signal components supplied to the various program recordings can be individually and independently adjusted to insure satisfactory recording.

Other objects and advantages of the present invention will become apparent from the ensuing description, in the course of which reference is had to the accompanying drawing, the single figure of which is a diagrammatic representation of one embodiment of the invention.

According to the present invention, spoken time announcements are supplied to the radio program recording apparatus so that these announcements may be recorded simultaneously with the program. The announcements may consist of signals indicating definitely the particular time of the signal, e. g., a tone signal preceded by a statement of the time at which the tone signal occurs. The signals may be made locally or be supplied from a distance, as over a telephone line. In the embodiment of the invention illustrated in the drawing, the time signals are inductively picked up, from a suitable source, such as a telephone ringer box 10, to which the signals are supplied from a local or remote originating station, by a coil 12 wound about an iron core and attached or otherwise secured in close proximity to the box.

The time signals are amplified by a driver amplifier indicated generally by reference character 14, from which the amplified signals are supplied to a plurality of individual isolating amplifiers 16, 18, 20 and 22. The amplified signals are adapted selectively to be supplied to individual two-wire recording lines 24, 26, 28 and 30 coupled to recording amplifier units 32, 34, 36 and 38, respectively. The latter are coupled to individual recording heads 42, 44, 46 and 48, respectively.

The desired or selected radio programs may be supplied to the recording lines 24, 26, 28 and 30 for simultaneous recording with the time signals. Thus any one of four radio receivers 1, 2, 3 or 4 may be connected to any one of the four recording lines. The radio receivers may be of conventional construction and are preferably of a type having manual volume controls (not shown) and output transformers the secondary windings 5 of which are connected to telephone type output

jacks 6. The output jacks 6 may be connected to recording line jacks 7 connected to lines 24 to 30, inclusive, by suitable means such as by patch cords similar to the one indicated by reference character 8.

The recording amplifier units have input and output windings indicated by reference characters 50 and 52, respectively, the impedances of the input windings being preferably equal to the impedances of the output windings 5 to provide proper matching. Otherwise, the units may be of conventional construction although it is preferred they be supplied from a power source having little or no interference.

The time signals derived from source 10 are, as heretofore indicated, picked up by the coil 12 and supplied to the driver amplifier 14. This amplifier may include a driver tube 54 (as of the 6SC7 type), the grid 56 of which is connected to a potentiometer resistor 58 (which may have a value of about 500 ohms). The pickup coil 12 is connected to the potentiometer resistor through a series resistor 60 (of a value of about 400 ohms) and a movable contact 62 providing a means of adjustment of the intensity of the time signals. The tube 54 includes also a cathode 60 connected to ground through a bias resistor 63 and a pair of anodes 64 connected to a suitable source of anode voltage through a coil 66 serving the dual function of a coupling impedance and a primary winding of a transformer 68 coupling a volume indicator or meter 70 to the anode circuit. The meter is connected across the terminals of a secondary winding 72 inductively coupled to the winding 66.

The individual isolating amplifiers are individually coupled to the driver amplifier through individual potentiometer resistors and adjustable conductors 72—74, 76—78, 80—82 and 84—86. The resistors are all connected to a common conductor 88 connected to the anodes 64 of tube 54 through a coupling condenser 90. The resistors may have values of about 5,000 ohms each and the coupling condenser may have a value of about .02 microfarad.

The individual adjustable inputs to the isolating amplifiers provide means for adjusting the volume or intensity of the individual time signal components, the total intensity of which, it may be remembered, is regulatable by the adjustment of the input to the driver amplifier 14. The isolating amplifiers include identical amplifier tubes 92, the output circuits of which are connected to individual output transformers 94, 96, 98 and 100, respectively. One terminal of the primary winding of each transformer is connected to the anode of its corresponding amplifier tube and the other to a common conductor 102 leading to a suitable source of anode voltage. The secondary windings 104, 106, 108 and 110 of the output amplifiers are connected to individual output jacks 112 adapted selectively to be connected by patch cords 114, similar to patch cords 8, to jacks 116 connected to recording lines 24, 26, 28 and 30. The secondary windings 104 to 110, inclusive, have impedances matching those of the radio receiver output windings 5 and the recording amplifier input windings 50 in order properly to match the units.

To assist in adjusting the relative intensities of the original time signals and of the individual amplified time signal components, relative to the radio programs, there is provided a monitor amplifier 120, the input of which is connected to a jack 122 so that it may be selectively connected

to a desired recording line. Its output may be connected to a receiver 124, which may be either an earphone or a loud speaker.

In operation, the radio receivers may be rendered operative and tuned to a radio program or programs that are to be analyzed. One or more of the receivers may be used as a spare and it should be understood that more than four receivers may be utilized if desired. The selected receivers are connected to the desired recording lines 24, 26, 28 or 30, whereby the programs may be recorded upon placing the recording amplifier units 32 to 38 into operation and placing the recorder heads upon associated discs. However, before the recording apparatus is made operative, the time signals are supplied to the desired recording lines and the intensities of the radio programs and time signals are adjusted to insure satisfactory simultaneous recording of both. The driver and isolating amplifiers are rendered operative and the intensity of the time signal supplied to the driver amplifier is adjusted, if necessary, by the potentiometer 58—62 and then the selected time signal intensity is adjusted by the intensity or volume control of the amplifier 16, 18, 20 or 22, whichever is used. The monitor amplifier may be connected to the recording line to be used while the adjustment is being made so that the relative intensities of the radio program and time signals may be accurately adjusted. Ordinarily the intensities of both should be at approximately the same level for best results.

After the radio program and time signal intensities have been adjusted, the apparatus is ready for making records and this can be readily done by energizing the selected recorded amplifier units and placing the recording heads upon the record discs which are rotated in conventional manner by motors or the like (not shown).

Should more than one radio program be recorded at the same time, then a plurality of time record signals from the individual isolating amplifiers are utilized. The individual outputs from the latter are individually adjustable by means of the input potentiometers and the adjustment of one has no appreciable effect upon the others because of the independent relationship of the isolating amplifiers. Thus it is not necessary to make repeated adjustments when a plurality of programs are to be recorded.

Although the present invention has been described in connection with the details of one embodiment thereof, it should be understood that such details are not intended to be limitative of the invention except in so far as set forth in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is:

1. Time record producing apparatus, including in combination, means for producing a time signal, means including a plurality of individual amplifiers each supplied with said signal for producing a plurality of separate amplified time signals corresponding to said first mentioned time signal, means for selectively superimposing said separate time signals electrically upon a selected received radio program, and means for recording the superimposed time signal and radio program.

2. Time record producing apparatus, including in combination, means for producing a time signal, means including a plurality of individual amplifiers each supplied with said signal for producing a plurality of separate amplified time sig-

nals corresponding to said first mentioned time signal, and means for selectively superimposing said separate time signals electrically upon the output of a selected received radio program.

3. Time record producing apparatus, including in combination, means for producing a time signal, means including an amplifier having an adjustable input and a plurality of output means for amplifying said signal, a plurality of individual adjustable isolating amplifiers each connected to a different one of said output means for producing a plurality of separate amplified time signals, a plurality of individual lines, means including inductive coupling means for selectively superimposing said separate time signals electrically upon the individual lines, means inductively connecting selected radio programs to said individual lines, and means adapted to be inductively and selectively coupled to said individual lines for recording the time signal and radio program superimposed upon said lines.

4. Time record producing apparatus, including in combination, means for producing a time signal, means including an amplifier having an adjustable input and a plurality of output means for amplifying said signal, a plurality of individual adjustable isolating amplifiers each connected to a different one of said output means for producing a plurality of separate amplified time

signals, a plurality of individual lines, means including inductive coupling means for selectively superimposing said separate time signals electrically upon the individual lines, means inductively connecting selected radio programs to said individual lines, and means adapted to be inductively and selectively coupled to said individual lines for recording the time signal and radio program superimposed upon said lines, said inductive coupling means having matched impedances with respect to said lines.

5. Time record producing apparatus, including in combination, means for producing a time signal, means supplied with said signal for producing a plurality of separate time signals corresponding to said first mentioned time signal, and means for selectively superimposing said separate time signals electrically upon the output of a selected received radio program.

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