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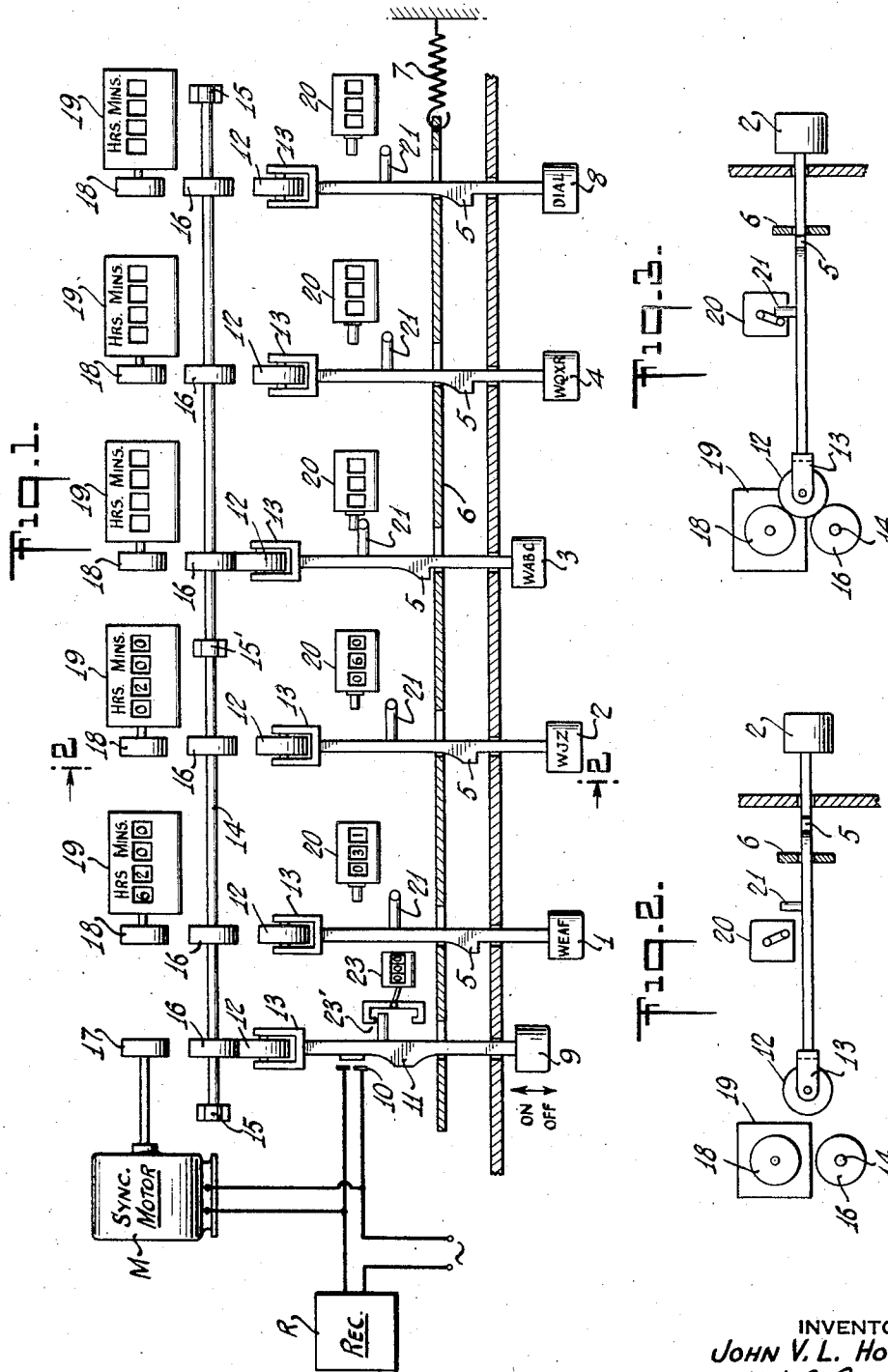
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2,368,761

MEANS FOR REGISTERING RADIO LISTENING HABITS

Filed July 30, 1942

2 Sheets-Sheet 1



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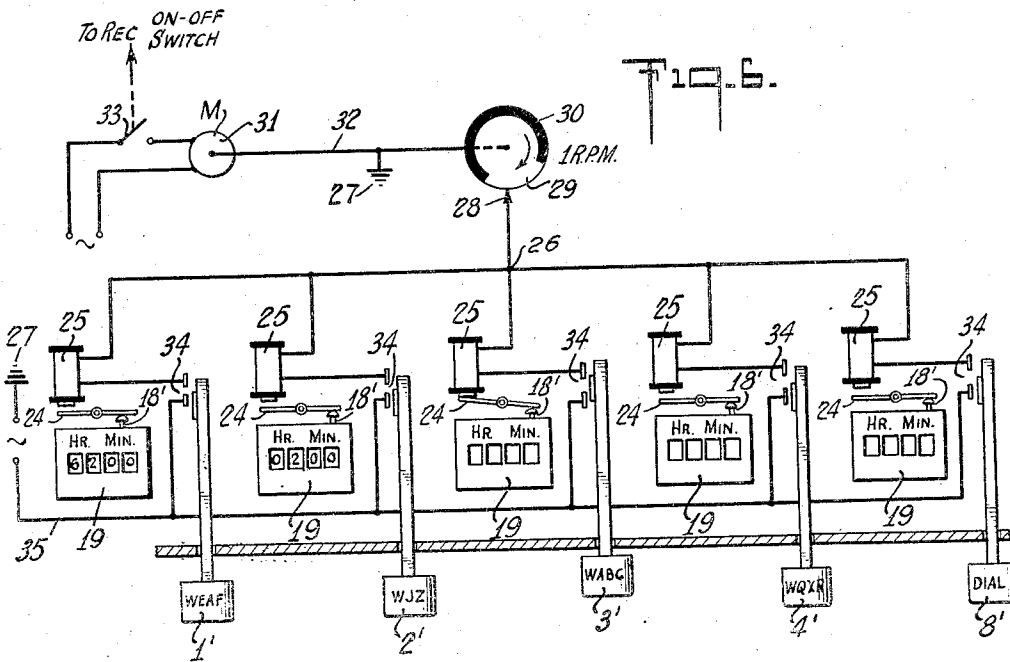
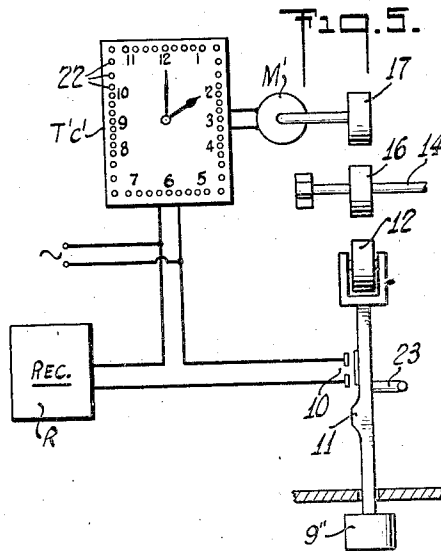
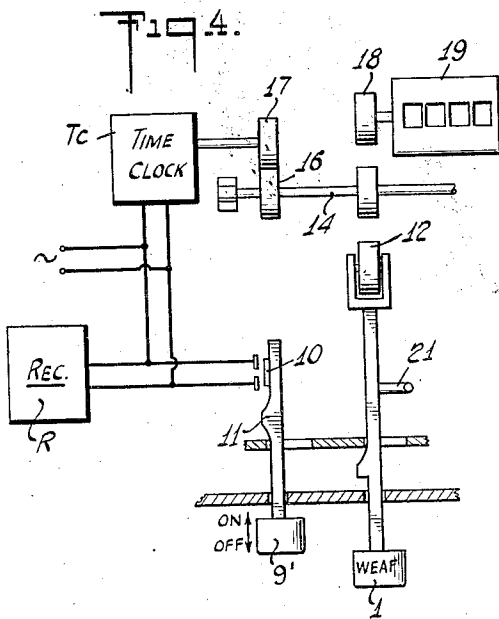
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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE

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## MEANS FOR REGISTERING RADIO LISTENING HABITS

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4 Claims. (Cl. 161-15)

The invention relates to simple automatic means for registering and evaluating the listening habits of users of broadcast receivers.

One of the principal objects of the invention is to provide simple means whereby it becomes possible to obtain, on a practical and economical basis, information as to the listening habits of radio users that cannot now be obtained except at great inconvenience and expense.

The modern system of radio broadcasting depends fundamentally upon technical research, which demonstrates the coverage and potential audience of individual broadcasting stations, and listener research, which determines station and program popularity. Several organizations have developed methods of surveying radio listening habits by telephone and personal interviews, and the results of such interviews are largely used in the production and selling of radio programs. All of the survey methods in use, however, have specific and well recognized limitations. For example, the coincidental telephone survey is probably the most accurate but gives information as to what each listener is doing for only a brief time. The telephone recall method attempts to obtain information as to the program and station preferences of each listener interviewed over a period of several hours, but depends for its accuracy upon the memory of the listener. The personal interview method probably is somewhat more accurate, but is very costly.

It has been attempted to overcome the shortcomings of these several methods by the use of machine recorders to be attached to individual radio sets. The typical recording machine so far considered comprises a clock-driven tape which is marked by days and hours along its length. This tape is continuously passed under a recording stylus which is connected to the tuning condenser of the radio set so that the stylus point will occupy a different position, across the width of the recording tape, for each tuning point on the dial. Thus the position of the marked line on the paper tape, or the trace produced by the stylus, shows what station was tuned in at the particular time indicated by the markings along the margin of the tape. The recorder also shows whether the radio set was turned on at any particular time. From the analysis of such a tape it is possible to determine exactly what stations were tuned in on a particular radio receiver, and when and for how long each station was tuned in. Such a machine apparently provides the ideal basis for listening habit study, but although it has been available

for some years it has never come into substantial use, for the reasons that the most important information required can be obtained more cheaply by interview surveys; the cost of the machines and of their installation and servicing is too great; and the cost of analyzing the records produced by the machine is too great.

The present invention is directed toward providing means for obtaining information as to listening habits which cannot be obtained accurately by the interview method, and is based upon the use of a machine which is low in cost and so simple in design and operation as to minimize the expense of installation and servicing. Moreover, the new machine automatically presents its information in immediately usable form, so that no analysis of a record is necessary.

By using the tuning push-buttons of a radio set it becomes unnecessary to provide mechanical or electrical connection between the tuning condenser of the radio receiver and the survey machine. By the use of simple mechanical revolution counters, the required information as to each station to which a push-button is assigned, is obtained directly and the need for a moving record tape and a movable marking stylus is obviated.

The new machine fundamentally comprises a synchronous motor or clock mechanism, preferably electrically driven, which may operate continuously or intermittently, a series of revolution counters, and an individual electrical or mechanical connection from each push-button on the radio receiver, which connection is arranged to engage or disengage a coupling between the clock-driven shaft and the revolution counter associated with each push-button. The motor or clock-driven shaft may rotate once per minute, as does the second hand of a clock, so that if for example the push button tuning to WEAF is depressed, the revolution counter assigned to WEAF will at once commence counting the revolutions of the clock-driven shaft and thus show on its scale the number of minutes measuring the interval throughout which the set has been tuned to WEAF. Similarly another push-button and revolution counter will add up the number of minutes that the set is tuned to WJZ, WABC, etc. An additional counter is preferably assigned to the "dial" push-button, and will record the number of minutes that the set is tuned to stations other than those to which push-buttons are assigned.

An interlock between the "on-off" switch of the set and all of the revolution counters is pro-

vided, so that even though the clock shaft continues in rotation and the receiver is left tuned to the station last listened to, the minute counting operation will automatically stop when the set is turned off. Thus the sum of the dial readings at the several revolution counters will indicate correctly the total time that the set has been in use, and the individual counter dials will register the total number of minutes during that time that it has been tuned to each of the several stations. By directly reading the revolution counter dials, and knowing when they were last previously read, it becomes possible in a simple manner to compute the percentage of total listening time and the distribution of that time over the various stations.

As so far described, the registering mechanism would be in operation twenty-four hours a day and consequently would give an overall picture of the listeners' radio habits.

It is frequently desired to study the popularity of stations or of programs during limited periods of time. To supply this information an automatic timer may be employed or the clock mechanism may be provided with an adjustable on-and-off coupling to the driven shaft whose revolutions are counted, so that the device may be set up to count only during morning hours, afternoon hours, evening hours, etc., or may in fact be limited to operation during a single hour or program period of the day. Where it is desired to limit registering to specific days of the week, a similar disconnecting mechanism may be provided by the use of a one-to-seven reduction gear from the hour hand of a twenty-four hour driving clock or a one-to-fourteen reduction if a twelve hour clock is used.

Where desired, additional information as to the number of times the set is tuned to a given station can be had by providing a second counter which is operated directly by the push button. This counter will simply add up the number of times its particular push button is depressed. So equipped, the machine will give directly not only the number of minutes spent in listening to a given station, but also the number of times that station was tuned in during the period since the last reading was taken. Thus, if the machines are read monthly, it might be found that one listener had tuned thirty-one times to WEA F and had listened for a total of sixty-two hours, or an average of two hours for WEA F each time it was tuned in. The same listener might be found to have tuned to WJZ sixty times during the month but to have listened for only a total of two hours in the entire month, which would indicate that he had habitually listened to that station for some particular short program item and would show that he had not listened continuously to it for the two hours on any one day, etc.

The machine can give still a further item of information by the addition of a counter associated with the on-off switch of the set, which counter would go into operation when the receiver was turned off and would be automatically set to zero whenever the radio receiver was turned on. This counter would measure the length of time that the set had been out of use.

In the accompanying drawings I have shown certain preferred embodiments of the invention, wherein Figs. 1, 2 and 3 illustrate diagrammatically a mechanical form of survey mechanism, Fig. 2 being a view in side elevation taken along the line 2-2 in Fig. 1 and Fig. 3 being a simi-

lar view when the push-button is in depressed or operated position; Figs. 4 and 5 are modifications of certain portions of the apparatus shown in Fig. 1; and Fig. 6 illustrates diagrammatically an electrical form of survey mechanism.

Referring first to Fig. 1 of the drawings, 1, 2, 3 and 4 are the station push-buttons of a radio receiver shown by the block R. The receiver to be employed may be of any conventional type, superheterodyne or tuned radio frequency, and for simplicity the receiver is shown to be provided with only four station push-buttons, although it will be understood that any desired number may be used. The push-buttons are of usual construction, each being adapted by spring means (not shown) to assume an inoperative position as shown by the buttons 1, 2 and 4. Each push-button carries a cam 5 which cooperates with a locking bar 6 in a well-known manner, when a selected push-button is depressed to first move the bar to the left, as shown in the figure, against the action of the spring 7 to release another button which may have been previously operated to a depressed position, and then to cause the last selected button to be locked in position as shown for the button 3.

A "dial" push-button 8 similar in construction to the station push-buttons is provided to accomplish "dial" tuning and to make ineffective tuning of the receiver by means of the push-buttons. An "on-off" push-button 9 is provided with switch contacts 10 for turning the receiver R "on" and "off" and also for energizing the driving motor M. This button however is not spring-pressed, it being necessary in order to turn the receiver "off" to cause said button to be pulled out. The "on-off" button 9 is provided with a projection 11 which cooperates with the locking bar in such manner that in either direction of operation, for turning the receiver "on" or for turning it "off," any station-button or the dial-button that may have previously been operated will be spring-operated to its inoperative position.

The ends opposite to the finger pieces of the several push-buttons 1 to 4, 8 and 9 are each provided with a friction wheel or gear 12 which is retained in a suitable bracket 13. A master timing shaft 14 which makes one revolution per minute is supported in end brackets 15, 15 and a center bracket 15' and carries in spaced relation the several friction wheels or gears 16. Disposed in alignment with the end friction wheel 16 on the master shaft 14 and the friction wheel 12 carried by the "on-off" button is the master drive wheel 17 which may be driven by a synchronous or "Telechron" timing motor M, or by electrically-operated time clocks as in Figs. 4 and 5. Disposed in alignment with each of the other friction wheels 16 on the shaft 14 and the friction wheels 12 are the friction wheels 18 which operate the respective revolution counters 19. For simplicity of illustration the gears or friction wheels 12, 16 and 17 and each set of gears or friction wheels 12, 16 and 18 are shown one above the other, but actually they are arranged in the manner shown in Figs. 2 and 3.

The revolution counters are of the mechanical type being graduated to indicate either hours and minutes or minutes only. The wheels 16 and 18 have a 1 to 1 gear ratio so that for each revolution of wheel 18, the counter will register one minute. Normally, in the inoperative position of a push-button, the friction wheel 12 carried by the push-button will be in spaced relation

with respect to its associated friction wheels 16 and 18 as shown in Fig. 2. In the depressed position of the button, however, its friction wheel will engage to couple the wheels 16 and 18 so that the latter will be driven from the former, as shown in Fig. 3.

With the arrangement thus far described, operation is as follows: The button 9 is pushed in to turn the receiver "on" and simultaneously to energize the motor M. Concurrently therewith the wheel 12 engages the wheels 16 and 17 so that the master shaft 14 and the several driving wheels 16 carried thereby are rotated at the rate of 1 R. P. M. Next, one of the station push-buttons is selectively operated according to the desire of the listener, and as a result the wheel 12 associated with the depressed station-button will cooperate with the wheels 16 and 18, the latter actuating the mechanical revolution counter which will indicate or register the length of time the listener has been tuned to the desired station. At the end of the program, should it be desired to turn "off" the receiver, the button 9 is pulled out whereupon the switch contacts 10 are broken to de-energize both the receiver and the driving motor. As the "on-off" button is being pulled out its projection or cam member 11 urges the locking bar 6 to move to the left against the action of the spring 7 to permit the previously operated station button to assume its inoperative position. In this way, by having all the station buttons, including the dial button, in their normal inoperative positions prior to a reception period, it is possible to obtain, by the means hereinafter to be described, the exact number of times each predetermined station has been tuned in, as well as the number of times dial tuning has been resorted to. Otherwise, with a previously operated button still in the depressed position at the beginning of the reception period, the "number of times" counters 20 would not register the initial program.

Instead of operating the station buttons the dial button 8 may be operated in which case the revolution counter 19 associated therewith will commence to register the time in minutes or hours and minutes during which stations other than the preselected stations assigned to the several push-buttons are being tuned in.

In order to obtain an indication of the number of times a particular station is tuned in between meter readings, a plurality of counters 20 are provided, one associated with each of the station buttons. These counters are actuated by means of projecting lugs 21 or other suitable means affixed to the several push-buttons when the latter are actuated to depressed position. A similar counter 20 may be operated by the dial button in order to give an indication of the number of times the receiver has been employed to obtain reception by means of the usual dial tuning member. The dial reading at each such counter 20 will advance by one unit each time the button with which it is associated has been depressed.

While the above described embodiment of the survey mechanism has been shown to include both "minute" counters 19 and "number of times" counters 20, it will be understood of course that in some instances it may be desirable to utilize only one type of counter to the exclusion of the other type. In other words, if it is sought to determine only the numbers of times certain predetermined stations have been tuned in by the listener during a given period, only the

counters 20 need be incorporated in the survey mechanism, whereas, on the other hand, if it is sought to determine only the actual time periods the predetermined stations have tuned in, then only the counters 19 need be incorporated.

As previously explained it may be desirable to have an indication of how long the receiver has been inactive. For this purpose the counter 23 is provided and is operatively associated with the on-off button 9 through suitable means such as 23'. This counter operates to indicate the time during which the button 9 is in the "off" position, but when the button is actuated to its "on" position, the counter is returned to its zero reading.

Instead of providing a synchronous or "Telechron" motor for driving the master drive shaft 14 as in Fig. 1, an electric time clock TC may be employed. Two such modifications are disclosed in Figs. 4 and 5. In Fig. 4 the time clock is permanently connected to the power supply so that it is continuously energized therefrom, the "on-off" button 9 serving only to turn the receiver "on" and "off." By having the master drive wheel 17 associated with the time clock TC in meshed relation with the driven wheel 16, the shaft 14 will also be driven continuously so that the coupling wheel 12 associated with the on-off button, as in Fig. 1, may be dispensed with. If desired, however, the coupling wheel 12 may be supplied also in this modification, in which case the wheels 16 and 17 will not be in meshed relation but arranged as in Fig. 1.

In Fig. 5 a time clock T'C' of the type known as an "interval timer" is employed. This timer is provided with a plurality of manually set members 22, there being one such member for each 15 minute interval. The timer is so connected with the power supply and a motor M' which may be separate from or form an integral part of the timer T'C' that in the absence of any member 22 being set to an operating position, the motor M' will be inoperative. However, with the setting of one or more members 22 to their operating positions, the motor will be energized to drive the master drive wheel 17 during the one or more 15 minute intervals corresponding to the one or more set members, the motor M' being deenergized at the end of such interval if only one member 22 had been set, or at the end of the last 15 minute interval if a number of consecutive members 22 had been set. Should it be desired to register the stations to be tuned to by the operator of the receiver during a selected period of the day, say between 2 and 3 p. m., for any number of days, or weeks, etc., the one making the survey would set to operative position the members 22 corresponding to 2, 2:15, 2:30 and 2:45 p. m. Then each day at 2 p. m. the motor and master drive wheel will begin to operate and will continue to operate until 3 p. m. During this interval actuation of any of the station push-buttons will be registered in the same manner as previously described in connection with Fig. 1, for example. Thus the user could listen to any station he chose at any hour of the day, but his habits would only be registered with the pre-set period, when the registering mechanism would be rendered operative by the interval timer.

In Fig. 6 there is disclosed an electrically operated survey mechanism. The several station push-buttons are indicated at 1', 2', 3' and 4' and the dial button at 8'. The revolution counters 19 are of similar construction as those shown

in Fig. 1 except that plungers 18' serve to actuate the counters instead of the wheels 18. Each revolution counter has associated with the operating plunger thereof a pivoted armature 24 which is adapted to be actuated by an electromagnetic relay 25. The several relays are included in as many circuits which are connected in parallel between the junction 26 and ground 27. A brush contact 28 is connected to the junction point and is adapted to contact the periphery of a commutator 29 which is adapted to rotate at the rate of one revolution per minute. The commutator may take the form of a conducting disc, the greater portion 30 of which is provided with an insulating rim. The commutator is driven from the motor 31 by means of a conducting shaft 32 which is grounded. The motor is energized from a suitable source of potential, the motor circuit closing switch 33 being ganged with the receiver on-off switch, so that upon actuation of the receiver switch to "on," the motor circuit will be closed, and vice versa.

In operation, turning on the receiver will close switch 33 to energize the motor which will cause the rotation of the commutator 29. Once during each revolution of said commutator a circuit will be closed which can be traced from ground 27, commutator shaft 32, the conducting portion of the commutator 29, brush contact 28, the relay 25 associated with the station or dial push-button which happens to have been depressed by the listener, the switch contacts 34 which have been closed by the operated push-button, bus line 35, a suitable power source, and back to ground 27. Each time an electromagnetic relay is energized, the armature associated therewith will be actuated to operate the plunger 18' of the revolution counter, each such operation indicating the lapse of one minute during which reception of a selected station has been in progress.

It will be understood of course that the push-buttons of this modification may be similar to those employed in the system of Fig. 1 in the respects that they have associated therewith the locking bar mechanism, "number of times" counters 20, and a push-button equivalent to the on-off button 9, as well as a period-control clock or timer which may be set to make the counters operable only during certain time periods.

The survey mechanisms above described may be made either as accessories to be built into al-

ready existing radio sets, or they may be built into new push-button sets as initial equipment.

The arrangements of coils and condensers whereby the various push-buttons tune the radio receiver to different carrier frequencies have not been shown, since my invention may be used with any types of push-button tuning that are well-known in the art.

While I have shown and described certain preferred embodiments of the invention, it will be understood that modifications and changes may be made without departing from the spirit and scope of the invention, as will be understood by those skilled in the art.

What I claim is:

1. A system for determining the listening habits of a broadcast receiver operator over a period of time, comprising a receiver equipped with a plurality of push buttons which are adapted each to tune the receiver to a predetermined station and with a tuning dial push button, a timing device cooperatively related with each station push button and operated upon actuation thereof to register the time interval during which said receiver is tuned to said predetermined station, and a timing device also cooperatively related with the tuning dial button for registering the total time during which dial tuning has been employed.

2. A system in accordance with claim 1 wherein the receiver is provided with a switch member for turning the receiver on and off, and means cooperatively related with said switch member for registering each period during which the receiver is inactive.

3. A system as defined in claim 1, having clock-controlled means whereby the timing devices may be rendered inoperative for predetermined intervals of time.

4. A system for registering the response of a broadcast receiver listener, comprising a receiver having push-button means for instantaneously tuning the receiver to a selected one of a number of preset channels, additional means operable to effect reception of other desired channels as well as the preset channels, means operable in response to actuation of said push-button means for registering the total time during which each of the preset channels was received, and means operable in response to actuation of said additional means for registering the total time that the receiver was in operation due to said additional means.

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