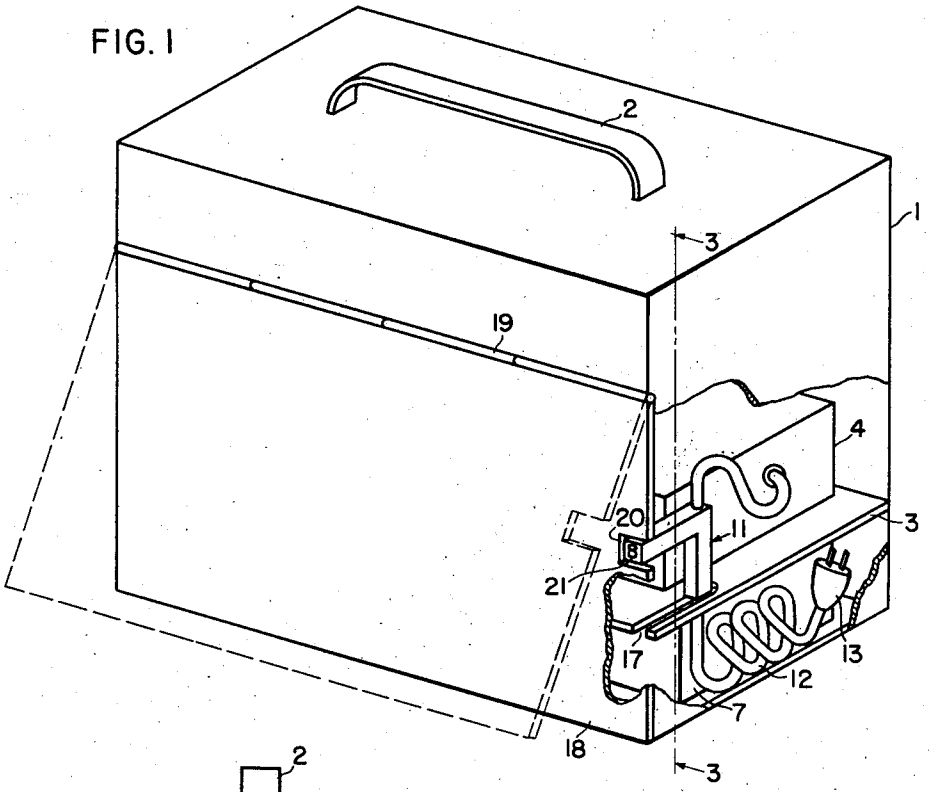
June 14, 1949. CHING-IH CHOU 2,473,194

POWER SUPPLY SWITCHING SYSTEM

Filed March 4, 1948

FIG. 1



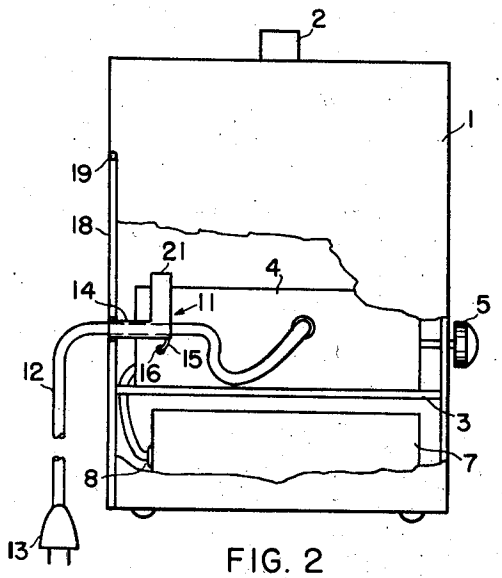


FIG. 2

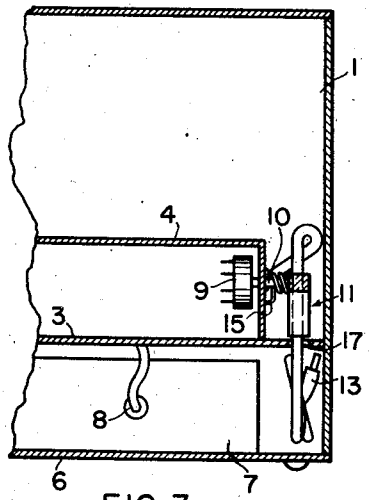


FIG. 3

INVENTOR.

CHING-IH CHOU

BY Albert R. Hodges

ATTORNEY

Patented June 14, 1949

2,473,194

UNITED STATES PATENT OFFICE

2,473,194

POWER SUPPLY SWITCHING SYSTEM

Ching-ih Chou, West Webster, N. Y., assignor to Stromberg-Carlson Company, a corporation of New York

Application March 4, 1948, Serial No. 13,039

8 Claims. (Cl. 171—97)

1

This invention relates to a power supply switching system, and more particularly to such a system for use in a radio receiver of the so-called "three-way" type, which is adapted to operate either from an alternating- or direct-current power line, or from batteries, usually self-contained.

A three-way radio receiver requires some kind of changeover switch having two positions, the first position providing for operation from the power line, and the second position for operation from batteries. As modern radio receivers are usually constructed, a single position of such a switch permits operation from either alternating- or direct-current power lines.

If an ordinary two-position switch is provided for this purpose and it is arranged to be manually operated by the user of the radio receiver, it is very likely that it will be improperly used due to ignorance or carelessness on the part of the operator. For example, if the line cord of the radio receiver is connected to a power outlet and the switch is in the battery position, serious damage to the tubes or batteries may result. Even if the switch is of the two-pole type, so that, when in the battery position, the power line is completely disconnected from the radio receiver, the receiver is very apt to be operated from the batteries with a needless waste of them, although the user is under the impression that power for operation of the radio receiver is being secured from the power line because the line cord has been plugged into a power outlet.

Various arrangements have been proposed in the past to overcome these difficulties. In some of these arrangements, a receptacle is provided on the back of the radio receiver into which the line-cord plug must be inserted during battery operation. In some cases, the insertion of the plug into this receptacle mechanically throws the power supply changeover switch of the radio receiver. A difficulty with this arrangement is that the insertion of the plug may be rather difficult, because of the force needed actually to throw the multiple switch required. In other prior-art arrangements, the insertion of the line-cord plug into the receptacle on the rear of the radio receiver so alters the electrical connections of the receiver as to render it adapted for operation from its self-contained batteries. With such an arrangement, the plug must be inserted with the correct plurality and, therefore, it is necessary to employ a plug of non-standard design to insure its correct positioning with respect to the receptacle. This is obviously disadvantageous both

2

from the standpoint of cost of manufacture and in the event that the plug has to be replaced during the life of the radio receiver.

It is the principal object of the present invention, therefore, to provide an improved power supply changeover switch for a three-way radio receiver which is simple in construction, inexpensive to manufacture and foolproof in operation.

Another object of this invention is to provide a changeover switch which is actuated by the position of the line cord of the radio receiver, and which, accordingly, requires no special effort or attention on the part of the operator when changing over from battery to power-line operation or vice versa.

In accordance with the present invention, there is provided, in a radio receiver of the three-way type, a changeover switch which is normally in the position for power-line operation when the line cord extends from the rear of the radio receiver in a normal manner for this type of operation. When the line cord is stored within the radio receiver during battery operation, however, the changeover switch is so arranged that it must be thrown to the position for battery operation.

The above and other objects and features of the present invention will be better understood by referring to the accompanying drawing, in which like reference numerals designate like components and in which:

Fig. 1 is a perspective view, partly in section, of a three-way radio receiver embodying a power supply changeover switch in accordance with the present invention;

Fig. 2 is an end elevation, partly in section, of the radio receiver of Fig. 1; and

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1.

Referring now more in detail to the drawing, there is shown a radio receiver having a cabinet or housing 1 which may have a carrying handle 2. Housing 1 is equipped with a shelf 3 adapted to receive and support the chassis 4 of the radio receiver, the controls 5 of which may be accessible through the front of housing 1, as indicated in Fig. 2.

A portion of the space between the shelf 3 and the bottom member 6 of housing 1 may be utilized for the storage of a battery unit 7, connection to which may be made with a conventional plug and cord arrangement as indicated at 8.

Chassis 4 is provided with a power supply changeover switch 9, which is preferably of the rotary two-pole type with detent means, and which may be arranged as shown with the axis

of its actuating shaft 10 arranged parallel to the longitudinal axis of chassis 4. Switch 9 is of the two-position type, a change from one position to the other requiring an approximately 90° rotation of shaft 10. Attached to shaft 10 of switch 9 is an L-shaped handle 11, preferably constructed of suitable insulating material, as for example a molded phenolic resin. Extending from the chassis 4 is a line cord 12 equipped with a conventional two-prong plug 13 adapted to be inserted into a standard power-line receptacle or outlet.

Line cord 12 passes through a hollow arm portion 14 of switch handle 11, handle 11 being so positioned with respect to shaft 10 that hollow arm portion 14 is substantially horizontal when switch 9 is in a position corresponding to power-line operation of the radio receiver. If desired, a helical spring 15 may be provided for maintaining switch handle 11 normally in the position shown in Fig. 2, one end of spring 15 being suitably anchored to chassis 4, as for example by being inserted into a hole 16 therein. Alternatively, means may be provided not only for biasing the switch, but also for retaining it in the position for battery operation until the back cover 18 is closed, but which thereupon releases the switch handle so that it shifts to the power-line operation position when the rear cover is again opened. While the cover is closed, the engagement of arm portion 21 with notch 20 keeps the switch in the battery operation position.

Directly below switch handle 11, there is provided in shelf 3 a slot 17, this slot being adapted to receive line cord 12 when switch handle 11 is in the position indicated in Figs. 1 and 3, that is, the position for battery operation. In this condition of operation, line cord 12 and plug 13 are stored in the space between shelf 3 and bottom 6 of housing 1 adjacent battery unit 7.

Housing 1 is provided with a suitable back closure or cover 18, which is provided along its upper edge with suitable hinge means 19, so that it may be opened as indicated by the dashed line to permit access to be had to the components located within the housing 1. If desired, spring means may be provided for holding back cover 18 in a normally closed position. Back cover 18 is provided with a suitable notch or opening 20, the area of which is such as comfortably to receive either end of switch handle 11, but not large enough to receive line cord 12 at the same time.

In operation, let it first be assumed that power for the radio receiver is to be obtained from battery unit 7. This condition of operation is illustrated in Figs. 1 and 3. In this case, the switch handle 11 is positioned with its hollow arm portion 14 vertically disposed and line cord 12 with its plug 13 are stored in the bottom portion of housing 1. Rear cover 18 of housing 1 is closed and the end portion 21 of switch handle 11 protrudes into and substantially fills notch 20. If desired, end portion 21 may bear a designation, as for example the letter "B" as shown in Fig. 1, to indicate that the radio receiver is adjusted for battery operation.

Now let it be assumed that the operator desires to energize the radio receiver from the power line. To accomplish this, rear cover 18 of housing 1 is opened, and line cord 12 with its plug 13 is withdrawn from its storage space. Due to the action of spring 15, switch handle 11 is rotated in a clockwise direction as viewed in Fig. 1 until its hollow portion 14 is substantially horizontal as indicated in Fig. 2. Since the line cord 12 passes through this hollow portion, the line cord now extends from the rear of the radio receiver and the plug 13 at its end may be conveniently inserted in a power-line outlet. Rear cover 18 may now be closed. Notch 20 prevents interference due to either the line cord or the switch handle 11 when the rear cover assumes its closed position. It will be apparent that the radio receiver is now in condition for operation from the power line, and there is no possibility that power may inadvertently be drawn from the battery unit 7.

To return to battery operation, rear closure 18 is again opened, switch handle 11 is rotated counterclockwise (as seen in Fig. 2) through approximately 90°, line cord 12 and plug 13 are stored adjacent battery unit 7, and cover 18 is closed, with end portion 21 of switch handle 11 protruding into and substantially filling notch 20. The receiver is now ready for battery operation.

While the provision of a biasing spring 15 on switch 9 is considered desirable, it is by no means essential. If this spring is omitted, the operator merely actuates switch arm 11 to the obvious and logical position for the type of operation desired. Since notch 20 in rear cover 18 is not large enough to receive both the end of switch handle 11 and line cord 12, there is no possibility that cord 12 will be brought out of the rear of the radio receiver when the end portion 21 is occupying this notch. Similarly, there is no likelihood that line cord 12 will be folded back on itself through notch 20 and stored when the hollow arm portion 14 of switch handle 11 is occupying the notch. Thus the arrangement in accordance with the present invention is simple and foolproof in operation, and free from the likelihood of misuse.

While there has been described what is at present considered the preferred embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. In a radio receiver of the type adapted to operate from a plurality of power sources and having a line cord adapted to be connected to a first of said power sources external to said receiver, a space within said receiver for storing said line cord during operation from a second of said power sources, and a closure for said space, a changeover switch having first and second positions for adapting said receiver to operation respectively from said first and second power sources, and actuating means associated with said switch and said line cord, said actuating means engaging said closure in such a manner that said line cord extends from said receiver only if said switch is in said first position and said line cord occupies said storage space only if said switch is in said second position.

2. In a radio receiver of the type adapted to operate from a plurality of power sources and having a line cord adapted to be connected to a first of said power sources external to said receiver, a space within said receiver for storing said line cord during operation from a second of said power sources, and a closure for said space, a changeover switch having first and second po-

sitions for adapting said receiver to operation respectively from said first and second power sources, and actuating means comprising an L-shaped member associated with said switch and said line cord, said actuating means engaging a notch in said closure in such a manner that said line cord extends from said receiver only if said switch is in said first position and said line cord occupies said storage space only if said switch is in said second position.

3. In a radio receiver of the type adapted to operate from a plurality of power sources and having a line cord adapted to be connected to a first of said power sources external to said receiver, a space within said receiver for storing said line cord during operation from a second of said power sources, and a closure for said space, a changeover switch having first and second positions for adapting said receiver to operation respectively from said first and second power sources, and actuating means comprising an L-shaped member having a hollow arm portion associated with said switch, said line cord passing through said hollow arm portion and said actuating means engaging said closure in such a manner that said line cord extends from said receiver only if said switch is in said first position and said line cord occupies said storage space only if said switch is in said second position.

4. In a radio receiver of the type adapted to operate from a plurality of power sources and having a line cord adapted to be connected to a first of said power sources external to said receiver, a space within said receiver for storing said line cord during operation from a second of said power sources, and a closure for said space, a rotary changeover switch having first and second positions displaced approximately 90° for adapting said receiver to operation respectively from said first and second power sources, and an L-shaped handle for rotating said switch, said handle having a hollow arm portion through which said line cord passes and the arm portions of said handle selectively engaging a notch in said closure in such a manner that said line cord extends from said receiver only if said switch is in said first position and said line cord occupies said storage space only if said switch is in said second position.

5. In a radio receiver of the type adapted to operate selectively from first and second power sources, a changeover switch having first and second positions for adapting said receiver to operation respectively from said first and second power sources, a housing for said receiver having a rear opening and a removable closure therefor, an opening in said closure, and actuating means for said switch comprising a member having first and second arms adapted selectively to protrude into and to substantially fill said closure opening, said switch being in said first position when said first arm protrudes and in said second position when said second arm protrudes, whereby said closure must be displaced before said switch can be actuated.

6. In a radio receiver of the type adapted to operate selectively from first and second power sources, a rotary changeover switch having first and second positions displaced approximately 90° for adapting said receiver to operation respectively from said first and second power sources, a housing for said receiver having a rear opening and a removable closure therefor, an opening in said closure, and actuating means for said switch comprising a member having first and second arms disposed in quadrature and adapted selectively to protrude into and to substantially fill said closure opening, said switch being in said first position when said first arm protrudes and in said second position when said second arm protrudes, whereby said closure must be displaced before said switch can be actuated.

7. In a radio receiver of the type adapted to operate selectively from first and second power sources, a line cord adapted to be connected to said first power source external to said receiver, a changeover switch having first and second positions for adapting said receiver to operation respectively from said first and second power sources, a housing for said receiver having a rear opening and a removable closure therefor, an opening in said closure, and actuating means for said switch comprising a member having a first hollow arm portion and a second arm portion adapted selectively to protrude into and substantially fill said closure opening, said switch being in said first position when said first arm protrudes and in said second position when said second arm protrudes and said line cord passing through said hollow arm portion, whereby said closure must be displaced before said switch can be actuated and said hollow arm portion must occupy said opening to permit said line cord to extend outside of said closure.

8. In a radio receiver of the type to be adapted to operate selectively from first and second power sources, a line cord adapted to be connected to said first power source external to said receiver, a rotary changeover switch having first and second positions displaced approximately 90° for adapting said receiver to operation respectively from said first and second power sources, a housing for said receiver having a rear opening and a removable closure therefor, an opening in said closure, and actuating means for said switch comprising a member having a first hollow arm portion and a second arm portion disposed in quadrature and adapted selectively to protrude into and to substantially fill said closure opening, said switch being in said first position when said first arm protrudes and in said second position when said second arm protrudes and said line cord passing through said hollow arm portion, whereby said closure must be displaced before said switch can be actuated and said hollow arm portion must occupy said opening to permit said line cord to extend outside of said closure.

CHING-IH CHOU.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,121,421	Burt	June 21, 1938
2,229,729	Emde	Jan. 28, 1941