Jan. 2, 1968 H. E. WYSONG 3,361,974

RADIO ALARM AND TIMING MECHANISM

Filed April 28, 1965

FIG. 1.

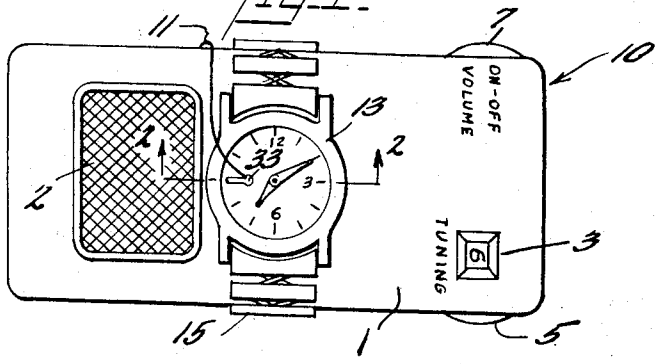


FIG. 2.

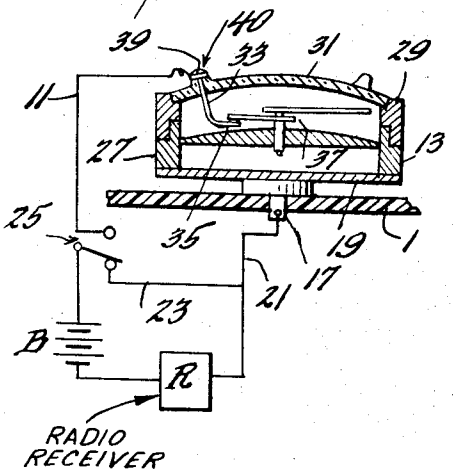


FIG. 3.

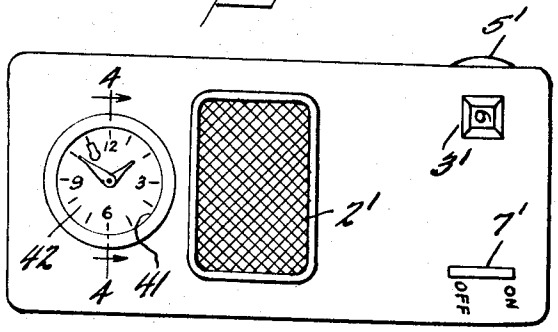


FIG. 4.

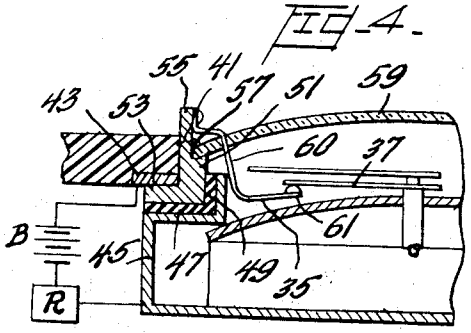


FIG. 5.

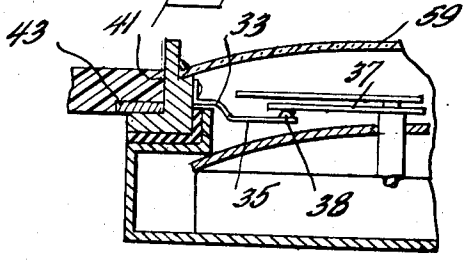


FIG. 6.

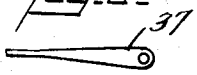


FIG. 6a.

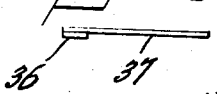


FIG. 7.

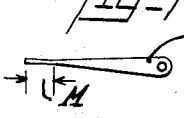
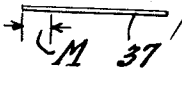


FIG. 7a.



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RADIO ALARM AND TIMING MECHANISM

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15 Claims. (Cl. 325—396)

ABSTRACT OF THE DISCLOSURE

The device deals with the use of conventional timepiece mechanisms with but minor modification, as timing devices for electrically operated appliances, particularly battery powered radios and the like, the current being carried through a bezel or crystal mounted, movable contact arm and the hour hand of the mechanism, means being provided to cause rapid make and break action between hand and contact means; the clock mechanism may be incorporated permanently, with little modification in a common casing with the appliance or may be a wristwatch mounted temporarily on the radio case.

This invention relates to clock-operated devices, in particular devices powered by a low voltage power source such as transistor radios and the like and in part to an improved device over that shown in my copending application Ser. No. 417,738, filed Dec. 11, 1964.

The use of modified watches and clocks as a means for cyclically operating various devices, particularly electrical devices is well known, being shown in various prior art patents such as 327,919, 1,261,411 and 3,146,324 among others. Also it is known to power a radio via a removable timing device such as shown in Patents 2,771,559 and 2,771,560. In all cases, however, expensive components are involved or alternatively modifications to the timing mechanism are so complex as to remove same from the realm of readily available inexpensive, foolproof commercial items which can be readily purchased at a reasonable price. Too, such devices are all subject, where a relatively straightforward structure is involved as in 1,261,411 for example, to erratic performance and short service life for such reasons, as will become readily apparent hereinafter.

Accordingly an object of this present invention is to produce a reliable timing mechanism.

A further object of the invention is to produce a timing mechanism utilizing the hands of a conventional watch as the make and break contact in a rapid, non-arcing positive manner.

An additional object of the invention is to provide a snap acting timing mechanism for radios which is simple and may be used as a conventional watch.

Still another object of the invention is to provide a conventional watch with means whereby same may be used as a timing device or as is conventional in daily living.

An additional object of the invention is to produce an alarm radio of simple inexpensive components.

These and other objects of the invention are accomplished by providing a conventional watch or clock with a switch contact mechanism utilizing a hand of the watch as the timing medium and wherein said hand comprises at least one member of a make and break switch mechanism and including means wherein the switch is positively operated both in making and breaking an electrical circuit.

The switch may be comprised of a hand of the watch and a contact arm carried by a watch case and comprising a rotatable bezel member insulated by a suitable insulator from the case, the bezel providing the means for rotating the crystal and in turn being in abutment with a conductive ring carried by the case of the timed article, such as a radio, with the contact arm extending beneath the crystal at one end and in a plane in close proximity

to the plane of rotation of the watch or clock hour hand and having its opposite end disposed in contact with the bezel whereby an electric circuit can be completed through the watch mechanism, hour hand, contact, bezel, conductive ring and the power source, etc.

Where convenient the watch may be of the electrically powered type and the same power source may power both watch and the timed device, particularly a transistor radio.

Turning now to a detailed description of the invention and to the drawings appended hereto and forming a part of this disclosure,

FIG. 1 is a face view of a pocket-sized personal radio combined with a conventional wrist watch in accordance with the teachings of this invention,

FIG. 2 is a partial sectional view taken along the line 2—2 of FIG. 1 with certain parts removed for clarity,

FIG. 3 is a view of a small transistorized radio incorporated with a timing device in a common case according to this invention, while

FIG. 4 is a partial sectional view similar to that of FIG. 2 but taken along the line 4—4 of FIG. 3,

FIG. 5 is a view similar to FIG. 4 showing a further modification of the inventive concept, and

FIGS. 6, 6*a*, 7 and 7*a* are top and side views respectively, of watch or clock hour hands incorporating features of the invention.

Turning now to FIG. 1 it may be seen that a conventional pocket-sized radio **10**, preferably utilizing a readily available 1½- or 9-volt battery is shown in combination with a wrist watch. While the specific arrangement of the various operating elements, volume control, tuning selector, etc., may vary, the radio comprises a suitable casing **1**, housing the receiving circuit and the power source, access being had to the latter via a removable back panel. The face or front of the casing includes a speaker panel **2**, a station selection aperture and tuning wheel or knob **3** and **5**, respectively, and an on-off volume control knob **7**. Examples of such radios are sold in volume under various names such as "Sony," "Raleigh," and are manufactured by many well recognized U.S. producers such as Westinghouse, General Electric, among others, including various foreign manufacturers.

The radio per se is modified only to the extent, as in this case, that the power source is connected to the receiving circuit via an external conductor **11** as and for the purposes to be set forth hereinafter. The specific circuit used, is clearly illustrated in my copending application Ser. No. 417,738 and need not be belabored in detail herein, though such a circuit is illustrated schematically in FIG. 2, as will be described hereafter.

As further shown in FIG. 1 and it should be understood, merely by way of illustration, not limitation, a conventional wrist watch **13** is positioned adjacent the center of and on the face of casing **1** with any suitable wrist encircling band, for example, an expansion band encircling the casing to retain the watch in place.

The watch mechanism itself is substantially conventional though, as will be described, the crystal and/or bezel carrying the crystal may be modified or changed in accordance with this invention.

FIG. 2 illustrates a version of the invention wherein the radio case **1** is provided with a conductive button **17**. This button **17** projects slightly above the surface of the face of casing **1** so that when the watch **13** is positioned thereon the back **19** will be in firm contact therewith.

It is quite conceivable that the button may comprise the name plate or medallion of the manufacturer.

The button is preferably fastened through to the interior of the casing where a conductor **21** is soldered or otherwise fixed thereto. Thus an electrical circuit may be es-

tablished from battery B, conductor 11, the watch mechanism 13, button 17 and conductor 21 to the radio receiving circuit R shown schematically. For the purpose of operating the radio receiver in the event the clock or watch mechanism is removed, the circuit may include a double pole manually operated two-position switch 25 and a further conductor 23 whereby the circuit may be bypassed from the battery through the switch 25 and conductor 21 to the receiving circuit R. Obviously, the switch 25 would have an operator extending outside of casing 1 for convenient manual manipulation.

Further considering FIG. 2 it will be seen that the watch mechanism is conventionally housed in the usual case 27 provided with a bezel 29 carrying crystal 31 which crystal is rotatably fixed within the bezel for 360° rotation therein in either a clockwise or counterclockwise direction. The crystal 31 is pierced by a very thin, fine conductor or contact arm 33, one end 35 of which is curved beneath and disposed in close proximity to the plane in which the hour hand 37 of the watch rotates during normal operation. The opposite end 37 of the contact arm 33 is terminated outwardly of the crystal in a generally bulbous projection 40 which in turn is apertured laterally at 39, that is generally in the same plane or curved surface as that generated by the outer face of crystal 31. As shown the end of arm 11 may be provided with a thin flat terminal which is insertable into aperture 39. Thus, crystal 31 may be rotated to any position with respect to the face of the watch dial to position the contact arm 33 with respect thereto such that when the hour hand reaches that point where it contacts the end 35 of contact arm 33 the circuit from source B is completed through arm 33, hand 37, the watch mechanism, button 17, etc., to the radio receiving circuit with the result that the radio is turned on.

While various arrangements have been proposed prior hereto for utilizing a conventional timepiece as a timing mechanism for electrically powered devices several failings which have plagued such devices have been erratic performance, and lack of service life. In most instances this is attributed to the failure of the contact arm 33 to establish positive contact with the watch hand or vice versa. Too, the delicacy of the contact end 35 and the close tolerances required to assure contact between it and hand 35, but without creating a frictional drag problem have generally contributed to the overall problem because any jarring, shaking, etc., of the watch, as in conventional use can and does disturb the contact-hand relation. Too, electrical arcing caused by improper positioning of the contact contributes to short service life.

Thus, as shown in FIGS. 4, 5, 6 and 7, the present invention includes the use of a magnetic force acting between the contact arm 33 and hand 37 to assure abrupt and firm contact and release between these two elements. As shown in FIG. 5, the contact arm 33 has applied to its extreme tip 35 as by adhesion or any suitable means, a small strip of ferromagnetic material 38 which is quite readily magnetized. This particular embodiment of the invention is useful particularly where the contact 31 may be formed of a non-magnetic but conductive material such as aluminum or conductive plastic or the like. In FIG. 6 and FIG. 6*a*, the situation is reversed, i.e. the magnetic strip or slug 36 is applied to the extreme tip of hour hand 37. The latter arrangement may be preferable in that watch hands are usually somewhat flexibly resilient, thus inherently contributing to the rapid make and break between the end 35 of contact arm 31 and hand 37 as the magnet force overcomes this resiliency when the hand approaches contact arm 33, and in turn is overcome as the hand moves away from said contact arm.

In FIG. 7 and FIG. 7*a*, a further modification is shown. In this case only the extreme tip of a ferromagnetic hand 37 is subject to a magnetic field. In this connection it has been found that the extreme tip of a watch hand may be magnetized and will retain its residual magnetism where the remainder of the hand is shielded from the source during magnetization by a suitable shield. In contrast, magnetizing the whole hand, while partially successful is not as satisfactory because the field tends to dissipate in a relatively short period of time. The reasons for this phenomenon are not clearly understood, but the fact of it has been observed.

Thus, because there is positive attraction generated between the contact arm 33 and the hand 37, the present invention presents a solution to the various difficulties previously hampering use of ordinary and conventional timepieces as a timing device for electrically powered items. It should be noted that magnetism has been avoided in the past since the effects thereof on the accuracy of timepieces is known. However, in this invention the strength of the field is so slight, because of the delicacy of the parts involved, as to have no effect on the accuracy of the timepiece in most situations. Where, however, the invention is applied to a timepiece having relative massive hands or contact arm, it has been found practicable to form the face of the timepiece of a magnetically shielding material.

Turning now to FIGS. 3, 4 and 5, a further variation in structure is disclosed whereby the circuit may be completed from the movable magnetized contact. This particular arrangement is particularly useful in an arrangement as shown in FIG. 3 wherein the timepiece may be incorporated in more or less integral association within a radio casing 40. In this arrangement, casing 40 is provided with an aperture 41 through which the face of the timepiece 42 may be readily viewed. The inner rim of the aperture 41 is provided with a conductive ring 43 of metal or other suitable material which may be embedded in the case during the molding operation. This ring 43 is in turn connected into the radio power circuit as illustrated schematically in FIG. 4.

The watch mechanism 42 per se, is unmodified except that in some instances, i.e., where the hand is used as the magnetized make-or-break contact, the hour hand 47 is magnetized or is provided with a slug as in the form of FIG. 6, FIG. 6*a*.

Mounted on the body or case of the watch, which is provided with the usual peripheral step 47 is an insulating ring 49 generally L-shaped in cross section. This insulating ring may be maintained in place by any suitable arrangement as is customary in the art; friction fit, for example, and is exceedingly thin since its dielectric properties need insulate against low voltage conductance.

The insulating ring in turn, is engaged by a bezel 51 which it receives and in turn, by any suitable means, retains on the watch case. In any case, the bezel-insulator contact is such as to retain the bezel in place yet permit of its rotary movement on the insulating ring 49 and hence with respect to watch case 45.

The bezel 51 includes an outwardly extending peripheral flange 53 and an upwardly disposed annular extension 55 which projects through the aperture 41 in casing 40, when the timepiece is inserted therein. As shown, the peripheral flange is adapted to engage conductive ring 43. The bezel further includes an annular groove 57 into which is press fit the edge of crystal 59 as is customary in the art. Thus, the bezel 51 can be rotated, carrying crystal 59 with it, while at the same time it is in conductive contact with ring 43 at all times.

The extension 55 also serves as a convenient means whereby manual manipulation of the bezel can be readily accomplished. Thus, in any position of bezel 51, it is in electrically conductive contact with ring 43, thence to the power source B, the radio receiving circuit R and which in turn is connected by any convenient means to the watch case 45, all as schematically illustrated in FIG. 4.

As also shown in FIG. 4, contact arm 60 extends through crystal 59 and contacts bezel 51 adjacent the inner periphery of extension 53 and has its inner terminal

end 61 magnetized and disposed in close proximity to the plane in which hour hand 37 rotates, whereby as the hand approaches the position at which the contact arm is located, it will be pulled magnetically into engagement with this end of the contact arm.

Thus at a selected time for which the contact arm 60 is set, the hour hand will be drawn quickly into conductive engagement with the contact end 61, or vice versa and the power circuit will be completed via the watch case 45, the hand 37, contact arm 60, bezel 51 and ring 43 to energize the radio receiving circuit R.

FIG. 5 represents a slight variation on the FIG. 4 structure in that, all parts remaining the same, the contact arm 60' is connected to the bezel 51 below the crystal 59 rather than being connected through the crystal as in FIG. 4. In some applications this arrangement may be preferable, being simpler to construct, though in the FIG. 4 arrangement will enable crystal 59' to be readily interchangeable in any of the structures disclosed herein or in my aforesaid copending application Serial No. 417,738.

Having thus described my invention in detail it will be apparent that various combinations and permutations and modifications will occur to those skilled in the art, all of which fall within the spirit and scope thereof as defined and limited only as set forth in the claims, wherein:

What is claimed is:

1. A clock radio comprising a radio receiving circuit and a power source, switch means for periodically energizing said circuit from said power source, said switch means comprising a timepiece having at least one rotating hand, a movable contact arm carried by but insulated from the timepiece and having one end disposed in close proximity to the plane of rotation of said hand, said hand and said contact arm defining switch elements at least one of which includes a permanent magnet attracting the other of said elements whereby when the hand and said contact arm are in immediate juxtaposition relative to one another the power source is connected to said receiving circuit.

2. A clock radio as defined in claim 1 wherein the timepiece is a wrist watch.

3. A clock radio as defined in claim 2 wherein said watch is completely independent of said radio and including means for conductively connecting said watch between said power source and said receiving circuit.

4. A clock radio combination as defined in claim 1 wherein the timepiece hand includes permanent magnet.

5. A clock radio combination as defined in claim 4 wherein the tip only of the hand is magnetized.

6. A clock radio as defined in claim 1 wherein the contact arm defines the permanent magnet.

7. For use in a clock radio combination a timepiece having rotating hands, contact means having one end disposed adjacent the plane of rotation of one of said hands, said contact arm being insulated from the timepiece and rotatable with respect thereto whereby electric current can flow only when said hand and the end of said contact arm are in abutting engagement, magnetic means attracting said contact arm and said hand one to the other, at least one of said elements being resilient whereby the magnetic means causes abrupt engagement and release of the contact means with said hand or vice versa.

8. A clock radio combination comprising a power source and a radio receiving circuit, a switch means between said power source and said circuit, a casing for said power source, said receiving circuit and said switch means, said casing being provided with an aperture; a conductive ring surrounding said aperture, a timepiece mounted in said casing for viewing through said aperture, means connecting said timepiece to said circuit and said power source, said timepiece comprising a case, a conductive bezel assembly rotatably mounted on said case, insulation means between said bezel and said case, said bezel assembly including an outwardly extending flange in contact with said ring, a switch element carried by said bezel assembly, one end of said element being disposed in close proximity to the face of the timepiece, said timepiece including a rotatable hand adapted to contact said element, and define therewith circuit closing means, said bezel assembly including further, means whereby said assembly may be manually rotated relative to said watch case and said radio casing.

9. A clock radio combination as defined in claim 8 wherein said bezel assembly includes a rotating ring and said switch element is carried by said ring.

10. A clock radio combination as defined in claim 9 wherein said rotating ring is insulated from the watch case.

11. A clock radio combination as defined in claim 8 wherein said bezel assembly includes a crystal and said crystal carries said switch element.

12. A clock radio combination as defined in claim 8 wherein one of said switch closing means comprises a permanent magnet.

13. In combination, a radio comprised of a casing, a radio receiving circuit and a power source; means between the power source and said receiving circuit to periodically energize the circuit from said source, said means comprising a self contained watch mechanism including a pair of rotating hands, means insulated from but carried by the watch mechanism and movable relative thereto, said means comprising a contact arm having one end in conductive association with the power source and its opposite end disposed adjacent the path of rotation of only one of said pair of rotating hands, and means for biasing said one of said hands and said contact arm into firm, conductive quick acting contact when said hand moves to the position of said contact arm.

14. In a radio receiving circuit including a power source to energize said circuit; a switch mechanism, said switch mechanism including a pair of movable contact elements one of said elements comprising the hand of a conventional timepiece and wherein at least one of said contact elements is permanently magnetized to attract the other of said elements when said elements are in juxtaposed relation with respect to one another.

15. The combination defined in claim 3 wherein said timepiece includes a crystal and wherein one of said elements is carried by the crystal.

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