

March 17, 1942.

H. W. YOUNG

2,276,445

RADIO TIMING DEVICE

Filed Oct. 13, 1940

2 Sheets-Sheet 1

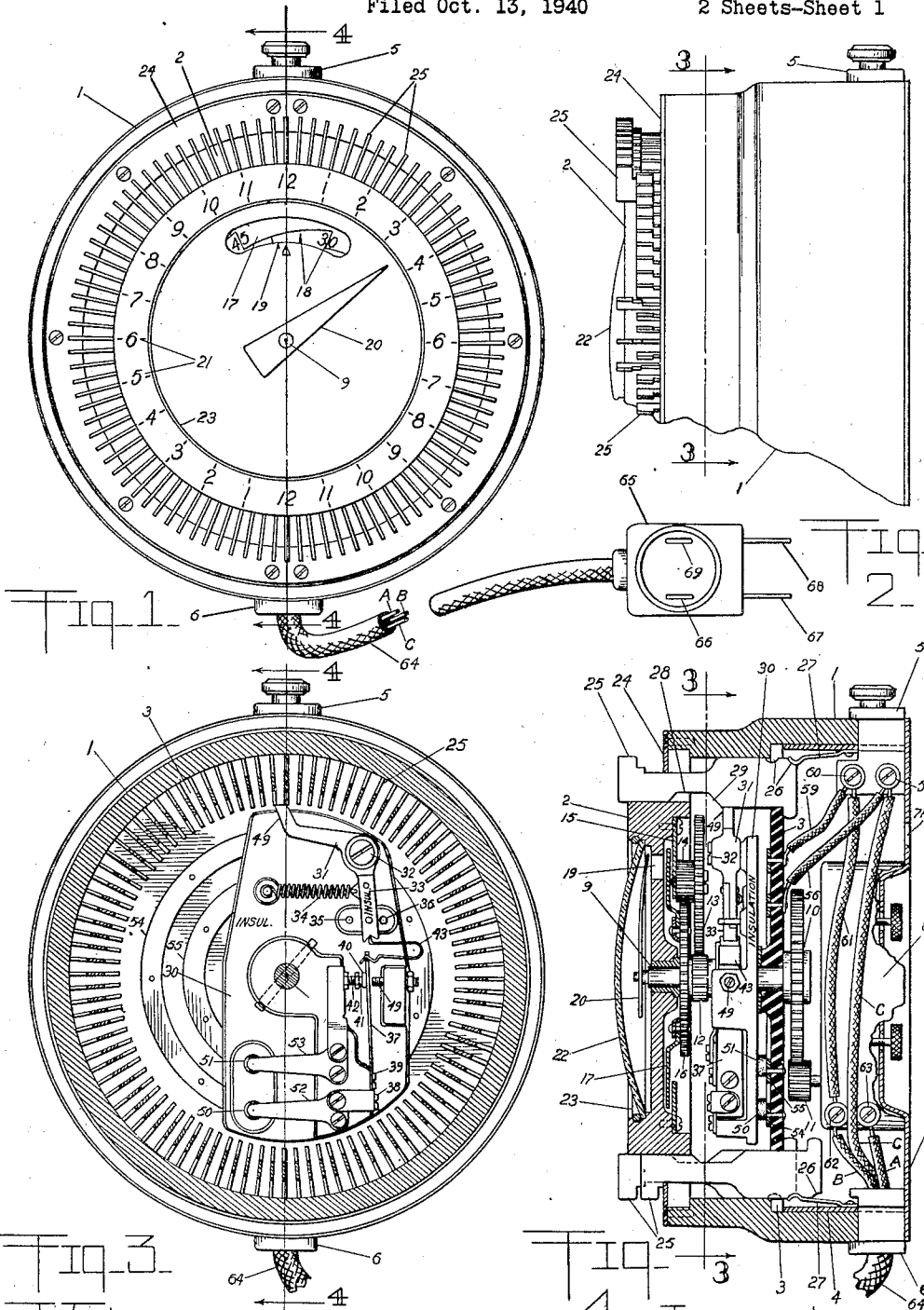


Fig. 3
Witness

Glen Ball

Fig. 4
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2 Sheets-Sheet 2

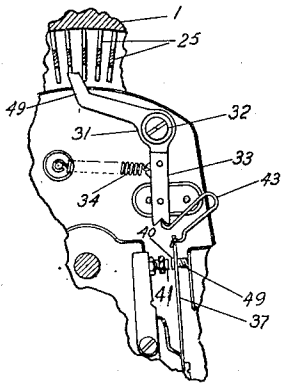


Fig-5-

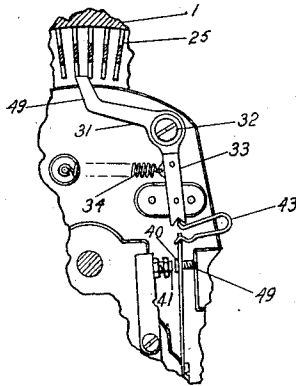


Fig-6-

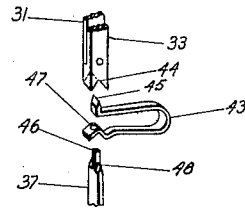
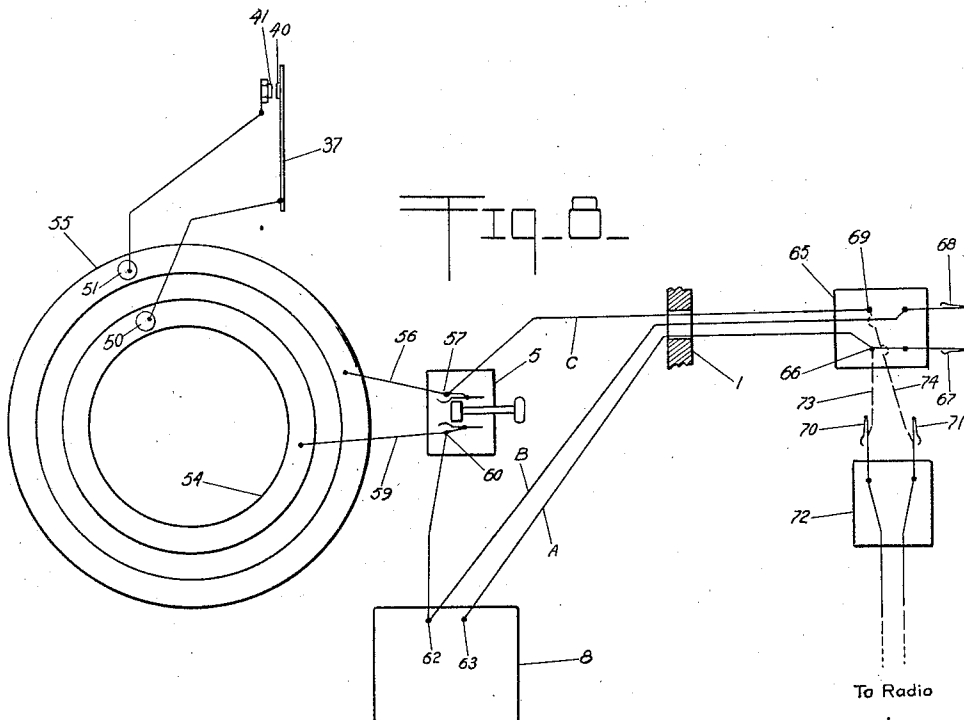


Fig-7-



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UNITED STATES PATENT OFFICE

2,276,445

RADIO TIMING DEVICE

Homer W. Young, Springfield, Mo.

Application October 3, 1940, Serial No. 359,485

6 Claims. (Cl. 200—39)

My invention relates to a radio timing device and particularly to a device for turning a radio on and off in accordance with selected program periods.

The primary object of my device is to provide a timing mechanism which is operative to turn a radio on and off in accordance with any predetermined setting whereby any quarter hour period or multiples thereof may be selected in advance.

Another object of my device is to provide a mechanism of this character which has a single time-controlled make and break switch.

A further object is to provide a timing device having an electrical circuit which is continuous except for the single make and break switch and which does not include separate manual or automatic switches for each program period.

Another object is to provide a device of this character which may be adjusted to complete the circuit a predetermined length of time prior to the exact program time whereby the radio may be "warmed up" before the desired program begins.

Another object is to provide a device of this character which will break the circuit a predetermined length of time after a selected program is finished.

A further object is to provide a device of this character which is simple in construction and economical in cost, and which due to its simplicity may be built compactly into a small unit.

Another object of my device is to provide a timing mechanism in which no part of the circuit closing and opening mechanism operates except when actuated to open or close the circuit, thereby eliminating noise during inoperative periods.

Other objects and advantages will be apparent from the following description, the accompanying drawings and the appended claims.

In the drawings:

Fig. 1 is a front elevation of my device.

Fig. 2 is a fragmentary side elevation of the device.

Fig. 3 is a cross sectional view taken on 3—3, Fig. 2 or 3—3, Fig. 4.

Fig. 4 is a cross sectional view taken on 4—4, Fig. 1 or 4—4 Fig. 3.

Fig. 5 is a fragmentary view showing the make and break mechanism just after breaking the electrical circuit.

Fig. 6 is a fragmentary view showing the make and break mechanism in a position near the circuit making stage of its operation.

Fig. 7 is a fragmentary perspective view showing parts of the snap-switch mechanism in disassembled relationship.

Fig. 8 is a diagrammatical view showing the electrical circuit of my device.

Similar characters are used throughout the several views to indicate similar parts.

In further detail 1 is a cylindrical casing to which is fitted the front member 2. 3 is a central disc of insulating material which is held against shoulders on the casing 1 by a cylindrical band 4. Notches in the band 4 and casing 1 accommodate the switch 5 and collar 6. A plate 7 is secured to the casing 1 by a row of peripherally disposed screws (not shown). The plate 7 holds the band 4 in place against the disc 3. An electrical clock mechanism 8 is secured to the plate 7 which has an opening 1A by which the device may be suspended.

A rotatable shaft 9 is supported centrally in disc 3 and front member 2 and to which is secured the gear 10 which is driven one revolution each 24 hours by the clock driven pinion 11. Also secured to the shaft 9 is a pinion 12 which drives the gear 13 to which is attached the pinion 14. Gear 13 and pinion 14 revolve on a stud attached to the plate 15 which is secured to the front member. 16 is a gear meshed with pinion 14 and which is free to turn on the central shaft. Attached to the gear 16 is a disc 17 which carries on its front side indicia 18 which is calibrated in quarter-hour divisions and five-minute subdivisions, there being eight such quarter-hour divisions and the disc 17 being geared to revolve twelve times for each revolution of the shaft 9, whereby the eight quarter-hour divisions corresponding to two hours will traverse the elongated window 19 in the front member while the hour-hand 20 mounted on the shaft 9 is traversing two hours as indicated by the indicia 21 on the front member. A crystal 22 is held by the retainer ring 23 which fits into a suitable groove in the front member. An annular member 24 holds the front member in place, the member 24 being secured to the case 1 by screws. A series of radial slots in the front member and a similar series of slots in the central disc 3 accommodate the movable slides or stops 25, of which there are ninety-six, corresponding to the like number of quarter-hours in twenty-four hours. These slides are provided with suitable projections on either end which limit their movement and each slide is provided with depressions 26 which engage suitable projections on the springs 27 and which

hold the slides in either extreme position. Each slide is provided with a depressed portion 28 and a sloping portion 29.

A commutator block 30 of insulating material is secured to and revolves with the shaft 9 and carries the make and break mechanism which will now be described.

31 is a rocker arm which is pivoted on the stud 32 and which carries the block 33 of insulating material. A spring 34 urges the rocker arm against the slides 25, and pins 35 and 36 limit the oscillatory movement of the arm. A thin, flexible flat spring 37 is attached to the boss on the block 30 by screws 38, 39 and carries an electrical contact point 40 which is designed to engage a similar contact point 41 carried by the adjustable screw 42. An intermediate spring 43 bears against the free end of the spring 37 and against the end of the block 33, the latter having a V notch (see Fig. 7) 44 which engages the knife edged end 45 of the spring 43 while the tongue 46 on the flat spring 37 engages an opening 47 in the spring 43. Knife edged shoulders 48 on the spring 37 support the spring 43 on either side of the opening 47. An adjustable screw 49 serves to limit the oscillatory movement of the spring 37.

The spring 37 and the arm 31 are positioned in a manner which permits the V grooved end of the latter to swing slightly farther in either direction than the free end of the spring 37 whereby when the arm 31 is moved to either extreme the intermediate spring 43 will force the spring 37 to the opposite extreme, such movement of the spring 37 occurring instantaneously at such times as the rocker arm approaches either of its extreme positions and overcomes the "dead center" position set up between the spring 37 and the spring 43.

The rocker arm 31 carries a pawl 49 which as it rotates with the commutator block 30 is designed to engage the movable slides 25 when any of the latter are positioned outwardly to bring the raised portion thereof in the path of the pawl 49. When the slides are positioned inwardly the pawl 49 passes within the depressed portion 28 of the slides and is not engaged by the latter. Should any of the slides be moved outwardly while the pawl is in operative position therewith the sloping portion 29 of the slide will cause the pawl to move inwardly and operate to close the points.

The pawl 49 is designed to slightly overlap adjacent slides 25 so that should two or more adjacent slides be located in operative position the pawl 49 will be held inwardly while it traverses such series of slides. When the pawl 49 is not engaged by any of the slides the spring 34 holds the pawl in its outward position (as shown in Fig. 5) whereby the points are held open. The spring 34 is of sufficient strength to overcome the resistance of the relatively weak intermediate spring 43 and the negligible resistance of the spring 37, the latter being balanced midway between its extreme positions.

The electrical circuit includes the carbon brushes 50 and 51 connected respectively to the contact points 40 and 41 through the spring clips 52 and 53. Brush 50 is in sliding engagement with ring 54 while brush 51 is similarly engaged with ring 55. Each of these rings are secured to the stationary central disc 3 by rivets. Connecting wire 56 leads from the ring 55 to terminal 57 of the switch 5. Similarly connecting wire 59 leads from the ring 54 to the terminal 60 of the

switch. Wire 61 leads from terminal 60 to terminal 62 of the electric clock 8. From the terminal 63 of the clock, from the terminal 62 of the clock and from the terminal 57 of the switch 5 leads A, B and C respectively form a triple wire lead 64 to which is attached the combination plug and receptacle 65. Lead A is connected to the socket 66 and the prong 67. Lead B is connected to the prong 68. Lead C is connected with receptacle socket 69. (See Fig. 3.) Receptacle sockets 66 and 69 are adapted to receive prongs 70 and 71 of the radio plug 72 as indicated by the broken lines in Fig. 8 (73 and 74), while the prongs 67 and 68 are adapted to be plugged into the usual power receptacle.

The switch 5 forms a shunt across leads B and C when it is desired to cut the automatic timing mechanism out of the circuit and which has the effect of connecting terminal 60 with prong 68 and thus forms a live socket of the terminals 66 and 69 which connect with the radio plug prongs. When the switch 5 is open the circuit is traced from the power prong 68 to the clock terminal 62, switch terminal 60, ring 54, brush 50, spring 37, breaker points 40-41, brush 51, ring 55, switch terminal 57, lead C to terminal 69 of the plug 65, radio plug prong 71, radio, radio plug prong 70, terminal 66 of plug 65 to power prong 67. The electric clock mechanism is in permanent connection with power prongs 67 and 68.

For the sake of clarity in Fig. 4 the slides 25 lying between the top and bottom positions of the case have been removed together with the corresponding retainer springs 27. It will also be noted in this view that the case 1, front 2, central disc 3 and some of the other parts are shown in median cross-section while the commutator block 30, the gears and pinions and the electric clock are shown in full for better understanding.

It will be noted that many parts of the structure as shown are adapted to be moulded of plastics, such as the case, front member, central disc and commutator block, the latter being formed with integral bosses as shown to accommodate the various fixtures. It will also be noted that due to its structure the device can be easily and quickly assembled.

In operation the plug 65 is inserted in the power socket and the radio plug is inserted in the sockets 66-69. The slides 25 corresponding to selected quarter-hour periods throughout the 24-hour day are pulled out, using the upper half of the dial for daytime (6 a. m. to 6 p. m.) programs and the lower half of the dial for night-time programs.

Particular attention is called to the fact that when the points 40-41 are separated by virtue of the pawl having disengaged one of the slides such break is made instantaneously inasmuch as the spring 34 shifts the pawl, together with the intermediate spring, into a position which causes the latter to kick the point 40 into open position. It is also noted that in closing the points the pawl is gradually pushed inwardly by the stop 25 (see Fig. 6) until the "dead center" position of the springs 43 and 37 is overcome and the intermediate spring 43 instantly closes the points (see Fig. 3). In this manner of instantaneously opening and closing the points arcing and flash are avoided as well as burned points and radio noise. It is also noted that no other switches are included in the automatic circuit and that no sliding contacts are made except between the carbon brushes and the collector rings.

It is also noted that in operation if adjacent

stops are selected the pawl merely glides over such series of adjacent stops and the circuit is held closed, while a series of non-operative stops are traversed by said pawl without affecting the pawl and therefore without noise or wear during such periods.

I claim:

1. A radio timing device comprising a case, a clock motor, a rotor driven by said clock motor, a pair of make-and-break contact points, one of said points being movable into and out of contact with the other of said points, a resilient means adapted to be moved either to a position urging said movable point away from said other point or to a position urging said movable point toward said other point, a movable shifting means for moving said movable resilient means from one of said positions to the other, a spring adapted to resiliently urge said shifting means in a direction to affect opening of the breaker points, said breaker points, said resilient means, said shifting means and said spring being carried by said rotor, a pair of brushes carried by said rotor one of said brushes being in connection with said movable point and the other of said brushes being connected with said other point, a pair of stationary collector rings, one of said brushes being in sliding engagement with one of said rings and the other of said brushes being in sliding engagement with the other of said rings, said rings forming terminals on opposite sides of said points, and a series of annularly disposed manually operable selective slides, said slides being radially spaced about a 24-hour clock face, there being one slide for each quarter-hour division of said clock face, said slides being adapted to be engaged by said movable shifting means when such slides are moved to a selected position, said movable shifting means being adapted to be moved by said selective slide to a position affecting closure of said points when said shifting means is rotated into engagement with said selected slide, said movable shifting means being adapted to be moved by said spring to a position affecting opening of said points when said shifting means disengages said slide.

2. A radio timing device comprising a first stationary collector ring forming a terminal of a power circuit, a second stationary collector ring forming a terminal of a radio connected circuit, a clock driven rotor adapted to revolve concentrically with said rings, a first brush carried by said rotor, said brush being in sliding engagement with said first collector ring, a second brush carried by said rotor, said second brush being in sliding engagement with said second ring, a pair of breaker points carried by said rotor, one of said points being connected with said first brush, the other of said points being connected with said second brush, one of said points being movable into and out of contact with said other point, resilient means for moving said movable point, said means being adapted to be shifted to urge said movable point either into engagement with said other point or out of engagement therewith, means for moving said resilient means from one position to the other, said last means including a pawl, and a series of selective manually operable pawl-operating stops, said stops being positioned radially and concentric with said rings, said pawl being in operative relation with said stops to affect closing and opening of said points in accordance with the selective positioning of said stops.

3. A radio timing device comprising a case, a

series of annularly disposed radially spaced selective stops carried by said case, a pair of breaker-points, operating mechanism cooperating with said stops for opening and closing said points, a rotor for carrying said breaker-points and said operating mechanism, one of said breaker points being movable into and out of contact with the other of said points, such movement being limited to a confined path, said operating mechanism including a movable spring member adapted to urge said movable point either toward or away from said other point, said spring member being adapted to assume a neutral position immediately of each point moving position, said operating mechanism including a positioning member for said spring member, said positioning member being adapted to change the position of said spring member from one point moving position through said neutral position to the other point moving position, said operating mechanism being adapted to transverse said series of selective stops, said stops being adapted to be selectively positioned to operate said positioning member to close said points when any of such selected stops are traversed by said positioning member, spring means for operating said positioning member to open said points when said positioning member is released by said stops, said rotor being adapted to be driven by a clock motor, said selective stops being positioned to affect breaker-point operation at predetermined time intervals.

4. A radio timing device comprising a supporting frame, a series of annularly disposed radially spaced movable selective stops carried by said frame, a pair of breaker-points adapted to open and close a radio or other circuit, one of said points being movable, operating mechanism cooperating with said stops to affect opening and closing of said points, a rotor for carrying said breaker-points and said operating mechanism, said operating mechanism including a spring adapted to be moved to urge said movable point either into or out of engagement with the other of said points, said operating mechanism including a shifting member adapted to move said spring into either a point closing or a point opening position, said shifting member being adapted to cooperatively traverse said stops, said stops being adapted to be positioned selectively to affect operation of said shifting member to close said points when said shifting member traverses said selected stops and a spring member adapted to cause opening of said points when said shifting member disengages said stop, said shifting member cooperating with said selected stop to hold said points closed throughout a predetermined length of time, such stops being adapted to hold said points in contact continuously while said shifting member traverses adjacent selected stops.

5. A radio timing device comprising a casing member, a clock driven rotor, a pair of breaker-points carried by said rotor, brush and collector ring means for establishing electrical communication with said points, a flat spring member for carrying one of said points, said spring having one end thereof secured to said rotor, its free end adapted to be moved to open or close said points, a second spring member adapted to urge substantially longitudinally against the free end of said flat spring, means carried by said rotor for shifting the direction of pressure of said second spring to affect movement of said flat spring to open or close said points, a series of movable stops carried by said casing, said stops

being radially positioned about said rotor, said stops being adapted to be selectively moved into the path of said shifting means to affect closing of said points when said shifting means is carried by said rotor into operative association with any of said selected stops, and spring means for moving said shifting means to affect opening of said points when said shifting means disengages said selected stop.

6. A time switch for electrical circuits comprising a series of annularly disposed radially spaced selective stops, a rotor, a pair of breaker points carried by said rotor, one of said points being movable into and out of contact with the other point, brush and collector ring means for establishing electrical communication with said points, a movable member carried by said rotor and adapted to traverse said stops, said movable member being adapted to engage said stops and to be actuated thereby when said stops are selectively located in operative position, breaker point

actuating means in cooperative association with said movable member and said movable point, said actuating means including a first spring adapted to urge said movable point either into or out of engagement with the other point, said alternative action being determined by the position of said movable member, said movable member being adapted to move said first spring into a point-closing position when said member engages a selectively positioned stop; said movable member being adapted to hold said first spring in a point-closing position while said member traverses said stop; said movable member being adapted to hold said first spring in a point closing position while said member traverses a series of adjacent selectively positioned stops; and a second spring adapted to actuate said movable member to move said first spring into a point-opening position when said member disengages said selectively positioned stops.

HOMER W. YOUNG.