March 9, 1937. H. E. MARSCHALK, JR 2,072,897

TIME CONTROL APPARATUS

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Fig. 1.

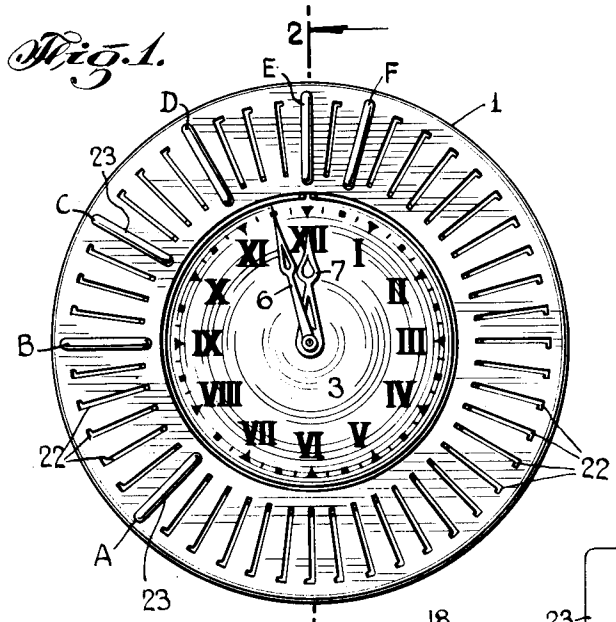


Fig. 4.

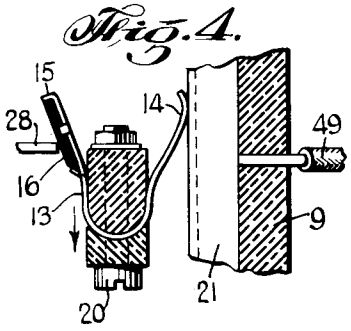


Fig. 2.

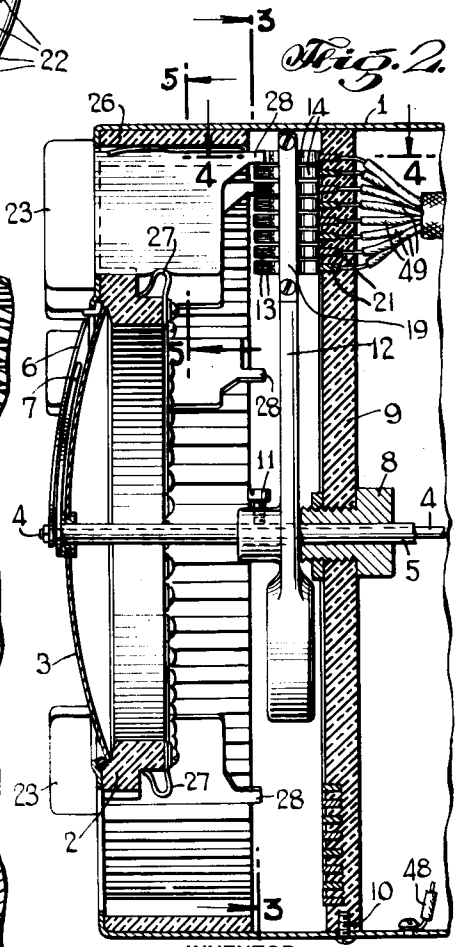
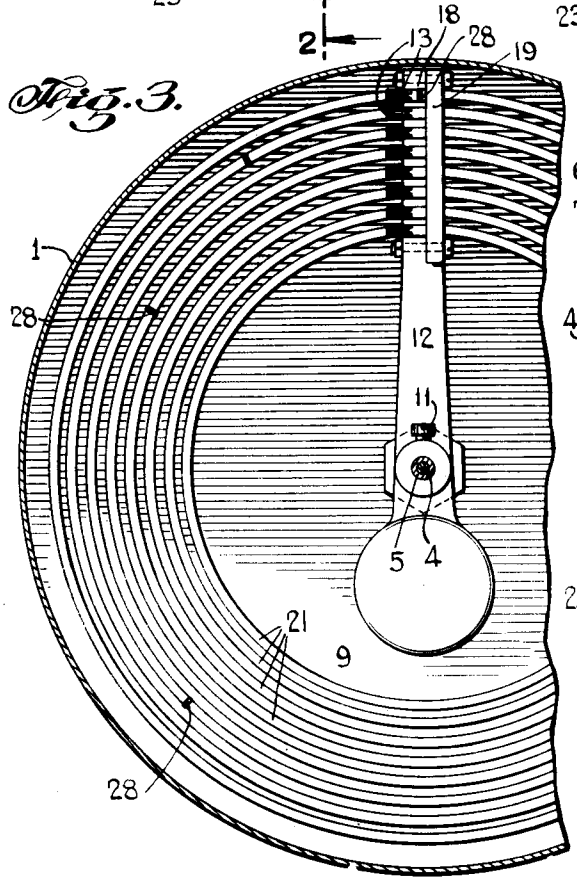


Fig. 3.



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Fig. 5.

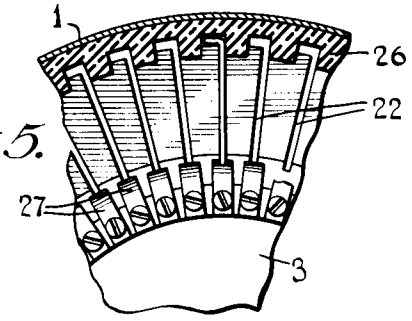


Fig. 5a.

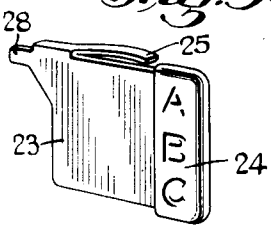


Fig. 8.

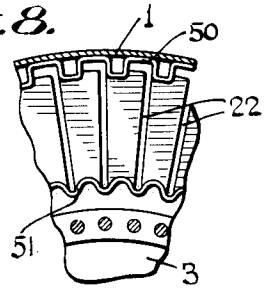


Fig. 6.

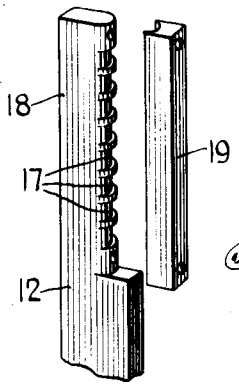


Fig. 7.

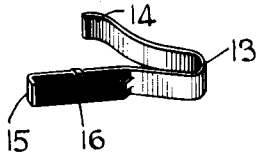


Fig. 11.

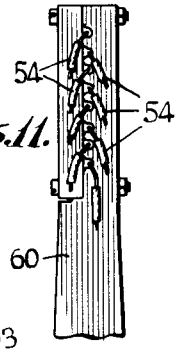


Fig. 9.

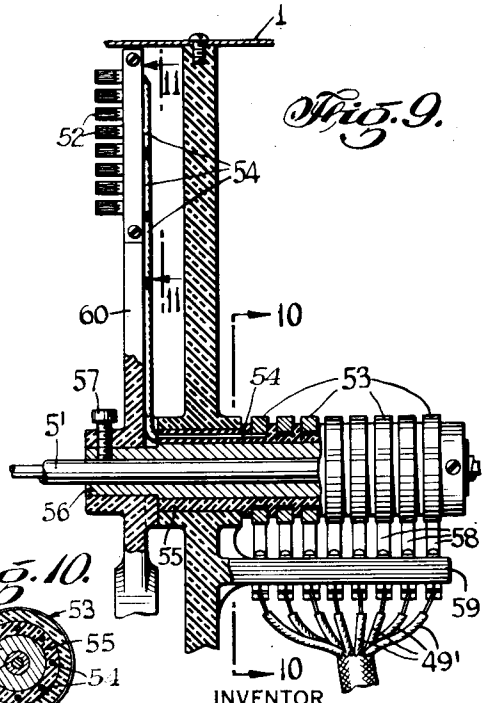


Fig. 12.

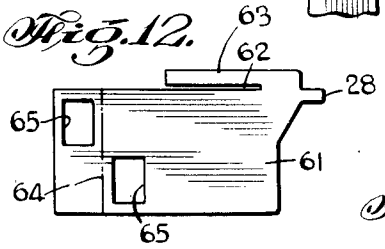


Fig. 10.

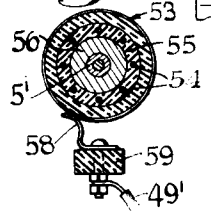
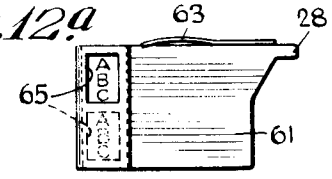


Fig. 12a.



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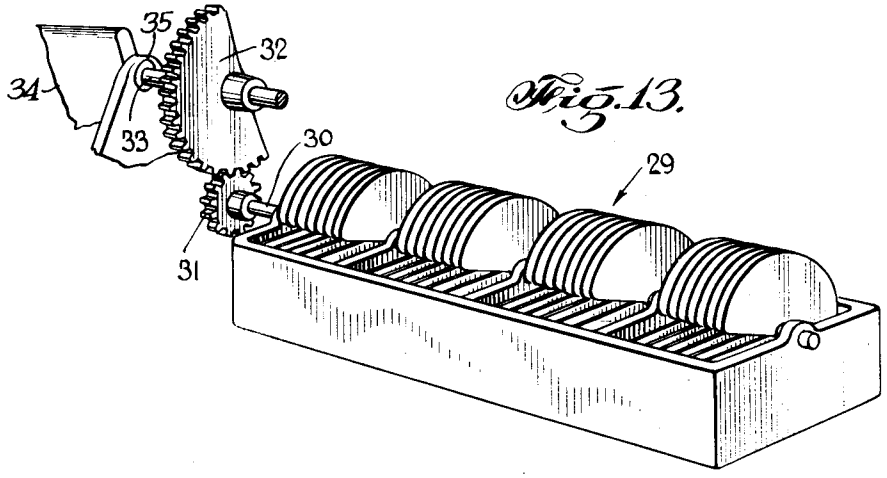


Fig. 13.

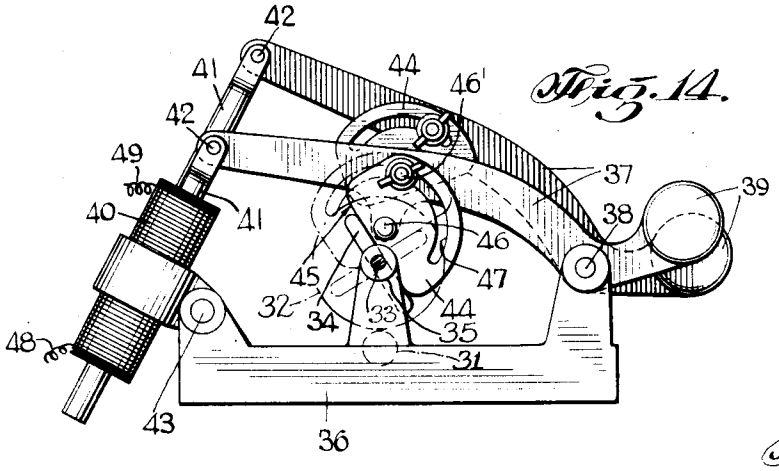


Fig. 14.

Fig. 15.

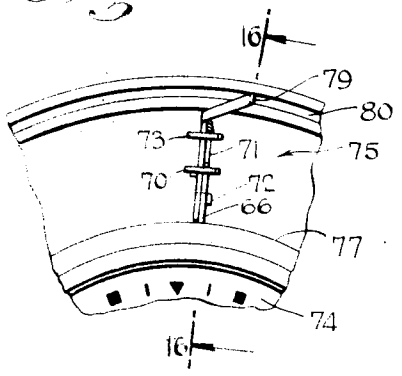
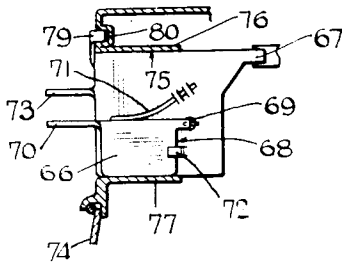


Fig. 16.



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UNITED STATES PATENT OFFICE

2,072,897

TIME CONTROL APPARATUS

Henry E. Marschalk, Jr., East Orange, N. J.

Application January 3, 1930, Serial No. 418,180

9 Claims. (Cl. 250—20)

My invention relates in general to time control apparatus and more particularly to means for automatically altering the setting of an apparatus, instrument or machine at predetermined time intervals.

One object of the invention is to provide means whereby the setting of an instrument such as a radio condenser may be automatically changed to alter its capacity at selected intervals of time so that it may be successively brought into tune with different broadcasting stations.

Another object is to provide electrically operated means in combination with clock mechanism and controlled by a series of adjustable circuit closing keys asociated with the dial of the clock adapted to indicate by their positions the time when the various keys will cause changes in the setting of the condenser corresponding to station designations on the series of keys. Accordingly a set of keys representing different broadcasting stations may be placed in selected time positions on the clock and will cause the condenser to be automatically tuned to the stations designated on the keys and at the time indicated by the clock.

Another object of the invention is to provide easy means of adjustment for the circuit closing keys.

Further objects and advantages will appear as the description proceeds, reference being made to the accompanying drawings forming a part of this specification and in which:

Fig. 1 is a face view of a clock dial showing a series of keys in position for controlling the operation of a condenser.

Fig. 2 is a view in section taken on the line 2—2 of Fig. 1.

Fig. 3 is a view in section taken on the line 3—3 of Fig. 2.

Fig. 4 is a detail view in section and on an enlarged scale, taken on the line 4—4 of Fig. 2.

Fig. 5 is a fragmental view in section taken on the line 5—5 of Fig. 2.

Fig. 5*a* is a view in perspective of a circuit closing key.

Figs. 6 and 7 are details in perspective of the contacting devices shown in Figs. 2 and 3.

Fig. 8 is a fragmentary view in section, similar to Fig. 5, but showing a modified means for holding the circuit closing keys.

Fig. 9 is a fragmental view in section of a modified form of the invention.

Fig. 10 is a view in cross-section taken on the line 10—10 of Fig. 9.

Fig. 11 is a fragmental view of a contact carrying member looking in the direction of the arrows 11—11 of Fig. 9.

Fig. 12 is a side view of a blank from which a modified form of circuit closing key is formed.

Fig. 12*a* is a side view of the key after it has been formed.

Fig. 13 represents a variable condenser and a portion of means employed for turning its shaft.

Fig. 14 shows another portion of the means for turning the condenser shaft.

Fig. 15 is a fragment of further modified means for holding circuit closing keys in the clock dial; and

Fig. 16 is a view in section taken on the line 16—16 of Fig. 15.

In the drawings the reference numeral 1 indicates a casing in which there is secured a frame 2 providing a mounting for a dial 3. Suitable clock mechanism (not shown) is arranged to drive a pair of shafts 4 and 5 of the minute and hour hands 6 and 7 respectively, the said shafts being supported in a bearing 8 carried by a wall 9 fastened within the casing 1 as by screws 10. On the shaft 5 of the hour hand 7 there is secured by a set screw 11, or otherwise, a member 12 so that it will rotate with the hour hand. The free end of the member 12 carries a plurality of contactors 13 insulated from each other and consisting of metallic spring material formed substantially in the shape of a U, whereby to provide a wiping contact 14 and an end contact 15. A block of insulation 16 is secured to each of the contactors 13 in advance of the end contact 15 for a purpose later described. The contactors 13 may be conveniently secured to the member 12 as illustrated in Figs. 4, 6, and 7 by providing notches 17 on a reduced portion 18 of the member 12 and into which the spring contactors 13 are held by a retaining strip 19 secured to the reduced portion 18 as by bolts 20.

The wiping contacts 14 are arranged to maintain electrical connection with a plurality of rings 21 preferably embedded in the wall 9, as shown in Fig. 2. Preferably the member 12, the strip 19, and the wall 9 are of insulating material such as bakelite. The casing 1 is provided around the dial 3, with a plurality of L-shaped slots 22 preferably disposed radially as disclosed in Fig. 1. The slots 22 are adapted to receive circuit closing key 23 of the type shown in Fig. 5*a*. Each key 23 bears a station designation as indicated at 24, and carries a spring 25 arranged to engage a metallic ring 26 in the casing 1 and

concentric with the dial 3, whereby to hold the key in place within the slot 22 and to form electrical connection with the ring 26. Springs 27 secured to the frame 2 also aid in holding the keys 23 in place, and it will be noted that the ring 26 forms an electrical connection common to all of the keys of a set such as that comprising keys A, B, C, D, E, and F in Fig. 1. The lateral offset at the outer end of each slot provides clearance for the spring 25 which, as shown in Fig. 5a, is laterally offset from the body of the key. The lateral offsets of the slot and key serve to prevent insertion of a key in inverted position.

In order that the various keys of the set may contact, one after another, with the contactors 13 as the member 12 moves around with the hour hand 7, each key is provided with a finger 28 adapted to engage the end contact 15 of the contactor in whose path the finger is located, it being understood that the fingers 28 must be so located on the different keys that they will each engage only one of the contactors 13 of the member 12. It is apparent that as the shaft 5 moves the member 12 around with the hour hand in the direction of the arrow in Fig. 4, a finger 28 of a key 23 will first engage the insulation block 16 of a contactor 13 and will consequently not form electrical connection with the contactor 13 until the same has progressed far enough to bring the end contact 15 in engagement with the finger 28, at which time an electrical connection of short duration is made from the common ring 26 to the one of the concentric rings 21 against which the wiping portion 14 of the contactor 13 is engaged.

The foregoing described mechanism is effective to control devices adapted to turn the shaft of the variable condenser of a radio receiving set, to alter its capacity at timed intervals, whereby the radio set may be automatically tuned to a succession of radio broadcasting stations, one after another, according to time indicated on the dial 3. Such a condenser is indicated at 29 in Fig. 13 and to operate the same the shaft 30 of the condenser is provided with a gear 31 which meshes with a larger gear 32 rotated by a shaft 33 which is rigidly secured to a tiltable member 34 (see Fig. 14) preferably mounted in bearings such as indicated at 35 on base 36. There is also provided a plurality of individually operable arms 37 pivoted at 38 and each having a counter balance 39 for normally holding the arms 37 in the elevated positions shown by the broken lines. For operating the arms each is provided with a separate solenoid 40 having a movable core 41 pivotally connected at its upper end to the free end of the arm 37 as at 42, the solenoid being fastened at 43 to the base 36. Each arm 37 is also provided with a plate 44 having a straight lower edge 45, the angularity of which may be adjusted with relation to the arm 37 by means of fastening devices such as bolts 46 and 46' projecting from the arm 37 and passing through the plate 44. The bolt 46 serves as a pivot pin and the bolt 46' which passes through an arcuate slot 47 in the plate 44, serves to hold the plate at desired angular adjustment on its pivot. The bolt 46' has a wing unit which may be tightened against the plate to hold it securely in set position. It will be seen that upon energizing any one of the solenoids 40, the edge of the plate 44 will be brought into engagement with the tiltable member 34 which will consequently be tilted to the same plane as the edge of the plate 44. Thus, by setting the series of plates 44 each to a different angle the row of solenoids 40 are operable individually to turn the shaft 30 and through gears 31 and 32 to alter the setting of the condenser 29 to any of a plurality of different capacities, whereby the radio receiver may be tuned to the radio stations corresponding to the various settings of the plates 44. The solenoids 40 have common electrical connection through a wire 48 with the ring 26 which also forms a common conductor for all of the keys 23. There are also individual connections 49 from each solenoid 40 to the concentric rings 21, as indicated in Fig. 2, so that when a contactor 13 makes electrical connection with the finger 28 of a key 23, it closes a circuit through the key 23, the ring 26, the casing 1, the wire 48, an individual wire 49 of the associated solenoid 40, the ring 21, and the wiping contact 14, a suitable source of electrical energy (not shown) being cut into the circuit as will be readily understood by those skilled in the art. There is thus provided an apparatus capable of setting the condenser 29 to any predetermined capacity, and governed by keys which may be adjusted to timed positions around the dial 3 so as automatically to bring the condenser into tuned relation with the different stations, one after another. It is obvious that two identical keys, that is, ones having the fingers 28 adapted for location in the path of the same contactor 13 would tune in the same station at different times depending upon the placement of the keys in the slots 22 around the dial 3. One of the keys, for instance key F, in Fig. 1, may be used to turn the condenser to zero position, means being provided for operating a switch to disconnect the radio set and control apparatus. Such means is not shown but consists of a main switch controlled by the position of the condenser shaft, as will be apparent to any one skilled in the art. Any arrangement and combination of the keys 23 may be made in the slots 22 so that the tuning in or out of the various broadcasting stations may be easily and quickly accomplished.

In Fig. 8 there is illustrated a modified form of holding means for the keys 23. According to this form of the invention, the keys 23 are held between a pair of corrugated rings comprising an outer ring 50 and an inner ring 51, both encircling the dial 3, as will be readily understood.

Fig. 9 discloses another form of timed contacting mechanism which may be substituted for the one described in connection with Fig. 2. In this latter form of the invention the wiping portion 14 of the contactors 13 such as shown in Fig. 4 is dispensed with, and instead, contactors designated 52 are directly connected to a series of rings 53 by conductors 54 which are mounted on an insulating spindle 55 having an internal sleeve 56 fastened as by a set-screw 57 to the shaft 5' of the hour hand of the clock mechanism, and a series of brushes 58 mounted upon a support 59 are held in contact with the rings 53. Individual wires 49' communicate with the condenser operating devices such as previously described in connection with Figs. 1 and 2. The contactors 52 may be mounted upon a member 60 in a manner similar to that shown in Fig. 3. The member 60 is secured to the shaft 5' by the set-screw 57.

Figs. 12 and 12a illustrate a circuit closing key which is formed from sheet metal 61, slit as at 62 and bent at right angle to form a spring 63, one margin of the sheet being bent upon itself along the line 64 and having openings 65 for holding and displaying a card having a station designation thereon.

To obtain fine variations in adjustment of the keys with respect to contactors 13 or 52 the keys may be constructed in accordance with the embodiment shown in Figs. 15 and 16, wherein a key 66 is equipped with a finger 67 corresponding in general to the finger 28 in Fig. 5a described. The key has a detent 68 pivoted at 69, and is provided with a handle portion 70. The detent is normally pressed by a spring 71 against a stop 72. The key 66 is also provided with a stationary handle 73 adjacent to the detent handle 70, whereby the two handles may be grasped in adjusting the key 66 to retract the lower edge of the detent. Instead of slots 22, the face of the clock is formed with a circular channel 75 surrounding the dial 74. The channel 75 is defined by an upper wall 76 and a lower wall 77 and the key 66 is inserted between the two walls 76 and 77 while the handles 70 and 73 are pressed together so that the key may be moved in the channel 75 around the dial 74 to any desired location and then released, whereupon the detent 68 will engage the lower wall 77 to retain the key in adjusted position. The key 66 is preferably provided with an angularly disposed portion 79 arranged for engagement in an annular groove 80 extending concentrically around the channel 75 to aid in holding the key 66 in operative position.

Obviously, the different types of circuit closing keys represented by Figs. 5a, 12a, and 16 may be inserted, with their holding means, into either of the clock driven devices shown in Figs. 2 and 9. The invention contemplates any arrangement of mechanism wherein a series of adjustable station identifying keys are adapted to control the setting of a radio instrument in a manner to tune it with the stations indicated by the keys, one after another, at timed intervals.

It is to be understood that various other changes may be made in the arrangement and construction of the various parts of the herein described invention without departing from the spirit thereof, and it is, therefore, intended to cover by the appended claims such changes as may be reasonably included within the scope of my invention.

I claim:

1. The combination with a variable condenser, of a clock including a shaft for turning the hour hand, a member mounted on said shaft to turn therewith, said member carrying a plurality of contactors, a series of station selectors in the form of circuit closing keys adjustably held around the dial of the clock adjacent to time graduations thereon, electrical means operable to alter the capacity setting of the condenser, an independent electrical connection from each of said contactors to the condenser altering means, each of said keys having a portion adapted to engage a different contactor to establish electrical contact therewith, and means associated with all of said keys adapted to form a common return circuit for said independent connections.

2. The combination with a variable condenser having a shaft rotatable to vary its capacity, of a member associated with said shaft and adapted to be tilted to turn said shaft, a plurality of pivotally mounted arms, adjustable means carried by said arms each adapted upon actuation of the associated arm to tilt said member to a different degree, means for actuating said arms to effect said tilting, a clock, and means controlled by the clock for timing the operation of said actuating means.

3. The combination with a variable condenser having a shaft rotatable to vary its capacity, of a member associated with the shaft and adapted to be tilted to turn said shaft to different degrees, movable arms associated with said member, each arm being provided with means adapted to tilt said member to a predetermined extent upon movement of the arm, an individual solenoid for actuating each arm, a clock, and means controlled by the clock for timing the actuation of the individual solenoids.

4. The combination with a variable condenser having a shaft rotatable to vary its capacity, of a member associated with the shaft and adapted to be tilted to turn the shaft through different angles, a series of individually movable arms, each arm carrying an adjustable element adapted to tilt said member through a predetermined angle upon actuation of the arm, electrical means operable to actuate said arms individually, a clock including a dial and driving mechanism, and circuit closing means associated with the clock mechanism adapted to cause operation of said electrical means at selected times indicated on the clock dial.

5. The combination with a variable condenser having a shaft rotatable to vary its capacity, of a member operatively connected to the shaft and arranged to be tilted to rotate the shaft to effect different capacity settings of the condenser, movably mounted arms each provided with adjustable means for tilting said member, means for normally holding said arms in positions free of said tiltable member, and an individual solenoid operatively connected to each arm, a clock including a dial and driving mechanism for the hands thereof, a plurality of contactors rotated by said mechanism with the hour hand, and a series of circuit closing keys adjustably located around the dial and adapted to successively close circuits for operating the solenoids at timed intervals indicated by said hour hand on said dial.

6. The combination with a variable condenser having a shaft rotatable to vary its capacity, of a member operatively connected to the shaft and adapted to be tilted to turn the shaft, movably mounted arms each provided with means for tilting said member to a different angle upon actuation of the arm, means for normally holding said arms in positions free of said tiltable member, each arm being provided with a solenoid for operating the same, a clock including a dial and a shaft for turning the hour hand, a member secured for rotation with the shaft of the hour hand and carrying a plurality of contactors, a series of concentrically arranged rings maintaining electrical connection with the moving contactors, an individual electrical connection between each ring and each solenoid, a series of contact closing keys held in adjustable positions around said clock dial opposite to time graduations thereon, each key being adapted to engage a different contactor as said contactor-carrying member moves around with the hour hand, and an electrical connection common to all of said keys and the solenoids, each key having a marking thereon indicating a radio broadcasting station, whereby said keys close circuits to said solenoids, one after another, according to the position of said keys with respect to the graduations on the dial.

7. The combination with a tuning device for a radio receiving apparatus, of a clock, a shaft

for turning the hour hand of the clock, a member mounted on said shaft to turn therewith, said member carrying a plurality of contactors, a series of station selectors in the form of circuit closing keys adjustably held around the dial of the clock adjacent to time graduations thereon, electrical means operable to alter the setting of the tuning device, an independent electrical connection from each of said contactors to said means, each of said keys having a portion adapted for selective engagement with the different contactors to establish electrical contact therewith, and means associated with all of said keys to form a common return line for said independent connections.

8. The combination with a tuning device for a radio receiving apparatus, of a clock, electrical means for operating the tuning device, said electrical means including normally open electrical circuits adapted to be individually closed to control the setting of the tuning device, switch contacts for the circuits respectively, a rotary carrier for said contacts adapted to be rotated by the clock, keys adjustably held around the dial of the clock for selective engagement with the contacts at different time intervals whereby the circuits will be closed individually in any desired sequence and at any desired time intervals.

9. A radio program selector comprising in combination with a tuning member, a time selector having a plurality of key receptacles corresponding with definite periods of time, a plurality of station selector circuits each having a contact in each of said key receptacles, a plurality of electrically actuated elements connected with the respective contacts and coacting with said tuning member when actuated to select the respective stations, a plurality of removable key members corresponding with the respective station selector circuit contacts and each insertable in any of the key receptacles of the time selector, and an additional set of keys and receptacle contacts for controlling the electric supply to the receiver.

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