Aug. 29, 1939. F. J. HOOVEN 2,170,820

CONTROL MECHANISM FOR RADIO RECEIVERS

Filed July 17, 1936 2 Sheets-Sheet 1

FIG. 1

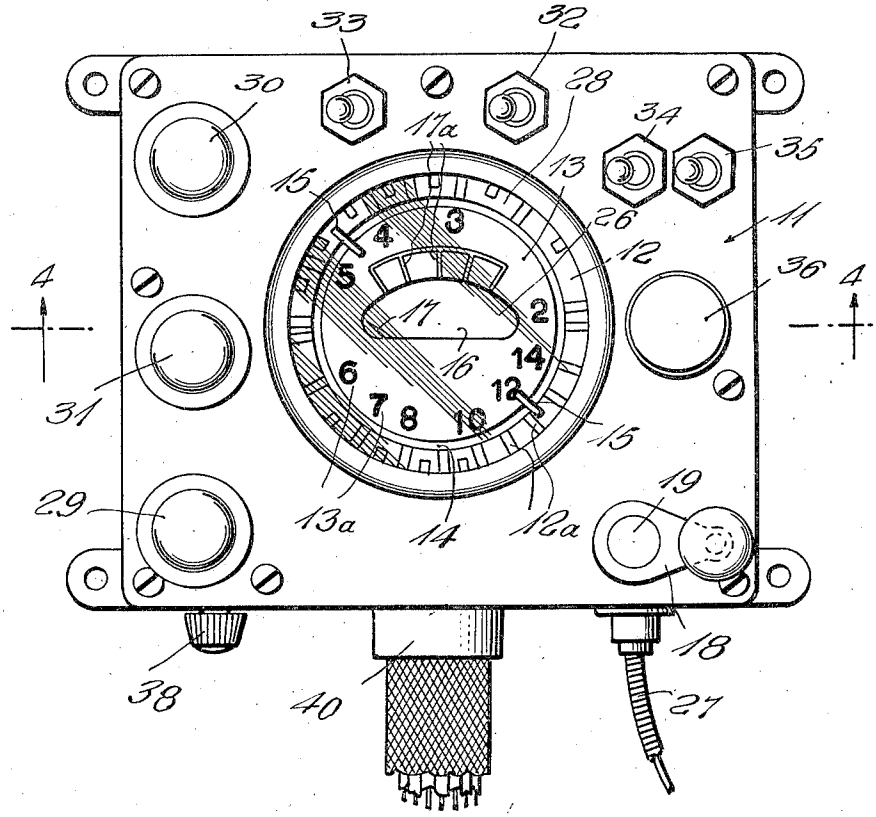
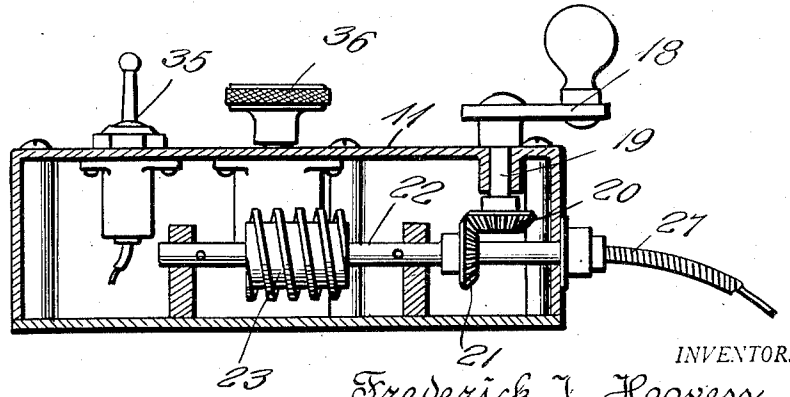


FIG. 2



INVENTOR.
Frederick J. Hooven,
BY
John O. Brady
ATTORNEY.

Aug. 29, 1939. F. J. HOOVEN 2,170,820

CONTROL MECHANISM FOR RADIO RECEIVERS

Filed July 17, 1936 2 Sheets-Sheet 2

FIG. 3

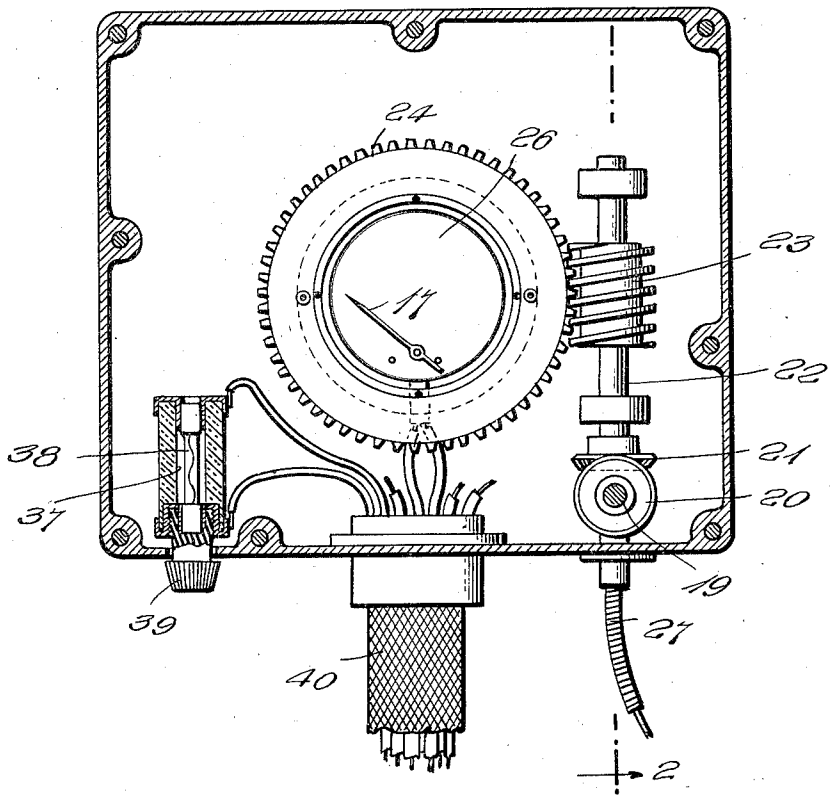
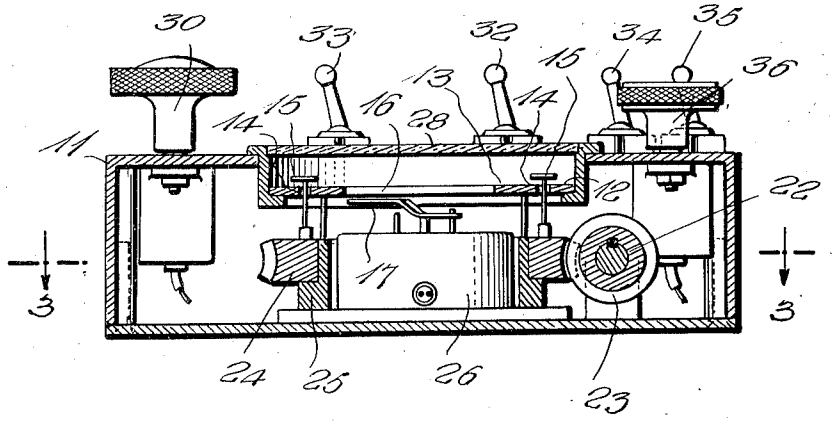


FIG. 4



INVENTOR.

Frederick J. Hooven,

BY

John B. Brady

ATTORNEY.

Patented Aug. 29, 1939

2,170,820

UNITED STATES PATENT OFFICE

2,170,820

CONTROL MECHANISM FOR RADIO RECEIVERS

Frederick J. Hooven, Dayton, Ohio

Application July 17, 1936, Serial No. 91,190

8 Claims. (Cl. 250—40)

My invention relates broadly to radio receiving systems and more particularly to a control mechanism for such systems.

One of the objects of my invention is to provide a compact construction of control mechanism for radio receiving systems for aircraft which may be mounted adjacent the pilot's position on the aircraft for controlling the radio receiving apparatus located remote from the pilot's position.

Another object of my invention is to provide a construction of control mechanism for radio systems on aircraft in which a multiplicity of functions may be controlled by the pilot from the pilot's position in the aircraft to produce predetermined operations in the radio receiver located in the aircraft in a position remote from the pilot.

Still another object of my invention is to provide a control mechanism for radio receiving apparatus on aircraft which may be compactly assembled adjacent the pilot's position and connected both electrically and through a flexible control shaft with radio receiving apparatus in the aircraft remote from the pilot's position for controlling a multiplicity of functions in the radio receiver from the pilot's position.

A further object of my invention is to provide a control mechanism for a radio receiver including a tuning meter and a mechanical indicator mounted concentrically with respect to the tuning meter and operated simultaneously with the adjustment of the tuning circuits of the radio receiver remotely positioned on the aircraft with respect to the position of the control mechanism.

A still further object of my invention is to provide a simplified and compact arrangement of control mechanism for a radio receiving system on aircraft in which the mechanical displacement of the tuning device in the radio receiver is mechanically indicated on the control apparatus simultaneously with the electrical indication of the tuned condition of the radio receiver.

Still another object of my invention is to provide a construction of control mechanism capable of conveniently coordinating the functioning of the marker beacon receiver and the main radio receiver on board an aircraft.

Other and further objects of my invention reside in the construction of a compact arrangement of control mechanism for radio receivers including switching devices, volume control, and tuning control mechanism, as set forth more fully in the specification hereinafter following by reference to the accompanying drawings, in which:

Fig. 1 is a front elevational view showing the control mechanism of my invention with the electrical connections and the flexible shaft which extend from the panel of the control mechanism broken away; Fig. 2 is a sectional view with parts shown in elevation and illustrating the adjusting means for the tuning mechanism of the radio receiver, the view being taken on line 4—4 of Fig. 3 looking in the direction of the arrows; Fig. 3 is a vertical cross-sectional view through the control mechanism showing the coordination of the tuning control mechanism with the displaceable ring gear which surrounds the tuning meter in the control mechanism, the view being taken on line 5—5 of Fig. 4 looking in the direction of the arrows; and Fig. 4 is a horizontal sectional view on line 6—6 of Fig. 1 looking in the direction of the arrows.

My invention is directed to a compact assembly and construction of control mechanism for radio receivers for use on aircraft by which a multiplicity of functions of the radio receiver may be controlled from the pilot's position while the radio receiver is located in a remote position in the aircraft and protected against the influence of variable temperature pressure and humidity conditions in addition to concentrating the controls for the radio receiver in a position convenient to the pilot. The control mechanism of my invention also includes the controls for the marker beacon receiver which is remotely located in the aircraft and which is employed for operating the flash indicator adjacent the pilot for use in advising the pilot with respect to effecting a blind landing. The control mechanism of my invention includes a rotary adjusting device connected through a flexible shaft with the tuning control of the remotely located radio receiver. A tuning meter is assembled adjacent the control mechanism with the calibrated scale thereof visible from the front panel of the control mechanism. A calibrated scale extends concentrically about the tuning meter and a pair of indicator members are arranged to be adjusted over the concentrically arranged calibrated scale simultaneously with the movement of the rotary adjusting device. The selective positioning of the indicator members with respect to the concentrically arranged calibrated scale is accompanied by a corresponding change in position of the tuning meter electrically connected in the input circuit of the final detector of the radio receiver for insuring a constant check on the operating condition of the radio receiver from the pilot's position. The control mechanism also includes in compact assembly a volume control adjusting

device; non-directional receiver sensitivity control device; receiver sensitivity control device; switch for changing from receiver observations to telephone communication; main on and off switch for the receiver; main on and off switch for the marker beacon receiver; switch for changing from high and low frequency bands to which the radio receiver is designed to respond; and control device for instrument lights. The control mechanism also includes a convenient mounting for a main fuse in the power supply circuit of the radio receiver and marker beacon receiver.

The control mechanism in housing 1 is located adjacent a front panel structure 11 in which there is mounted the circular calibrated scale 12 concentrically positioned about the circular dial plate 13 of the tuning meter. The concentric position of the circular dial plate 13 and the annular calibrated scale 12 is such that an annular gap or path is provided intermediate the annular calibrated scale 12 and the circular dial plate 13 as indicated at 14. A pair of indicator members 15 projects through the annular slot or path 14 and extend radially over both the annular calibrated scale 12 and the circular dial plate 13. The indicator members 15 coact with the calibrations which I have indicated at 13a on circular dial plate 13 and calibrations which I have indicated at 12a on annular calibrated scale 12.

The circular dial plate 13 has a sight aperture 16 therein for observing the movement of the tuning meter pointer 17 with respect to a coacting scale 17a carried by the circular dial plate 13.

I provide means for rotatably journaling the knob or crank 18 in housing 11 for operating the tuning mechanism. The knob or crank 18 drives a shaft 19 imparting movement to bevel gear 20 which meshes with bevel gear 21 carried on rotatably mounted shaft 22. The shaft 22 carries a worm gear 23 adapted to mesh with the ring gear 24 as shown. The ring gear 24 is journaled upon the ring gear bearing 25 which is concentrically disposed about the tuning meter 26. Movement of the knob or crank 18 therefore imparts rotary movement to ring gear 24 and at the same time imparts rotary movement of the flexible shaft 27 which leads to the tuning control on the radio receiver, not shown. The ring gear 24 carries the indicator members 15 so that the indicator members are shifted in an annular path with respect to the circular dial plate 13 and the annular calibrated scale 12 simultaneously with the corresponding movement imparted through flexible shaft 27 to the tuning control of the radio compass receiver. The faces of the dial plate and annular scale are protected by means of a sight glass indicated at 28.

The housing 11 also provides mounting means for the volume control device 29, the receiver sensitivity control 30, the marker beacon receiver sensitivity control 31, the main on and off switch indicated at 32 for the system, the transfer switch 33 for changing from radio receiver observations to radio telephone communication, a high and low frequency band switch 34, the on and off switch for the marker beacon receiver indicated at 35, and the instrument lights switch indicated at 36. A removable fuse plug casing 37 is mounted in the housing 11 in which a cartridge type fuse 38 may be removably inserted through the readily detachable plug member 39.

In order to carry all of the electrical circuit conductors from the control head to the radio receiver, the power supply, and the marker beacon receiver, I provide a conduit housing 40 through which all of the leads extend.

The fact that the calibrated scale 12 is concentrically disposed about the circular dial plate 13 provides a very compact method of checking the mechanical displacement of the tuning device in the radio receiver against the electrical readings afforded by the tuning meter 26. The pilot is provided with all of the essential readings within an extremely small area of vision and is able to change quickly and accurately the operating condition of the marker beacon receiver and the main radio receiver. Moreover, the control mechanism is of such small size that it may be readily mounted adjacent the other controls in the aircraft and also adjacent the on and off course indicators and the flash indicator. It is obvious that other modifications and changes may be made and, although I have described my invention in one of its preferred embodiments, I desire that it be understood that modifications may be made and that no limitations upon my invention are intended other than may be imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. Apparatus for remotely controlling the operation of a receiver comprising a housing, a tuning meter mounted in said housing and having a movable indicator, a calibrated scale adjacent said movable indicator, said calibrated scale having a substantially circular periphery with calibration marks thereon, a substantially annular scale spaced by a substantially annular gap from the substantially circular periphery of the aforesaid scale, an angularly adjustable ring member surrounding said tuning meter, indicator members carried by said ring member and passing through said substantially annular gap and coacting with each of the aforesaid scales, and means for imparting angular movement to said ring member for shifting said indicator members for comparing the readings on said scales with respect to the reading of the meter on said tuning meter.

2. Remote control mechanism for radio receiving apparatus having a tuning mechanism therein comprising a housing, a tuning meter located in said housing and electrically connected with the radio receiver, a movable indicator controlled by said tuning meter, a dial member having a calibration adjacent said movable indicator and a calibrated scale on the periphery thereof, a supplemental scale mounted adjacent the aforesaid calibrated scale, a rotary actuator journaled in said housing and connected through a flexible shaft with the tuning mechanism of said radio receiver, an indicator cooperating with both of said scales, means for driving said indicator from said rotary actuator simultaneously with the tuning adjustment of the tuning mechanism in said radio receiver for comparing the displacement of the tuning mechanism with the readings on said tuning meter.

3. Remote control mechanism for receivers comprising a housing, a tuning meter mounted in said housing, a calibrated scale for said tuning meter, a supplemental scale extending about the periphery of the aforesaid scale, a sleeve member located behind said scales and surrounding said tuning meter, an angularly displaceable member mounted on said sleeve member, indicator members displaceable with respect to said scales and carried by said angularly displaceable member, and a rotary actuator journaled in said

housing and connected with said displaceable member for imparting angular movement thereto for adjusting said indicator members with respect to said calibrated scales.

4. Remote control apparatus for receivers comprising a housing, a tuning actuator journaled in said housing, a sleeve bearing disposed centrally in said housing, a rotary gear journaled on said sleeve bearing and operatively connected with said tuning actuator, a pair of calibrated dial members located adjacent said gear, and indicator members supported by said gear and extending over each of said calibrated dial members, and a tuning meter located within said sleeve bearing, said tuning meter having a movable indicator operative with relation to one of said dial members.

5. Remote control apparatus for receivers comprising a housing, a rotary actuator journaled in said housing, a sleeve bearing supported centrally within said housing, an angularly displaceable gear member mounted on said sleeve bearing and operatively connected with said rotary actuator for angular displacement under control thereof, a pair of concentrically arranged calibrated dials disposed in the same plane adjacent said angularly displaceable gear member, said dials having an annular gap therebetween, an indicator member carried by said angularly displaceable gear and movable in the path provided by the annular gap between said dials with respect to the calibrations on said dials, and a tuning meter concentrically arranged within said sleeve bearing, said tuning meter having a movable indicator movable with respect to a scale carried by one of the aforesaid calibrated dials.

6. A tuning dial and meter assembly comprising an annular member bearing a frequency calibration, a disc member disposed coaxial and concentric with respect to said annular member with an annular gap therebetween, a tuning meter having an indicator and mounted behind said disc member, said disc member being apertured and provided with a scale for observing the relative position of said indicator, an indicator operative in the said annular gap relative to the said frequency calibration on said annular member, a rotatable ring member enclosing said tuning meter and carrying the last mentioned indicator, and actuating means for angularly displacing said ring member and correspondingly moving the last said indicator in accordance with a tuning operation.

7. In a remote control head for radio apparatus, a housing, concentric dial members supported within said housing and having an annular intervening gap between said members, a tuning control in driving relation with said radio apparatus, a rotatable ring gear supported in said housing and driven by said tuning control, indicator means attached to said gear and extending through said annular gap, a tuning meter housed within said ring gear, and indicator means on said meter cooperating with the inner of said concentric dial members.

8. In a remote control head for radio apparatus, a housing, concentric dial members supported within said housing and having an annular intervening gap between said members, a tuning control in driving relation with said radio apparatus, a sleeve bearing supported within said housing, a ring gear rotatably mounted on said bearing and driven by said tuning control, a plurality of indicators secured to said gear and extending through said annular gap, a tuning meter housed within said sleeve bearing and ring gear, and indicator means on said meter cooperating with the inner of said concentric dial members.

FREDERICK J. HOOVEN.