

June 28, 1938.

R. F. VOLZ ET AL.

2,122,306

RADIO CONTROL DEVICE

Filed Aug. 5, 1936

2 Sheets-Sheet 1

Fig. 1

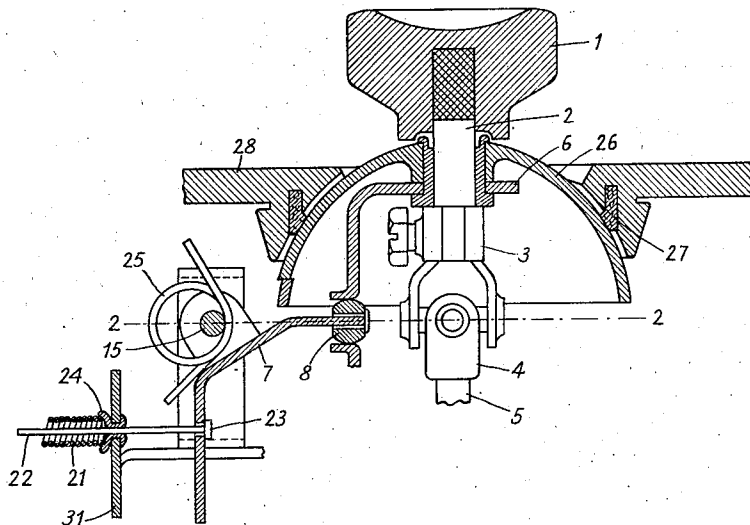
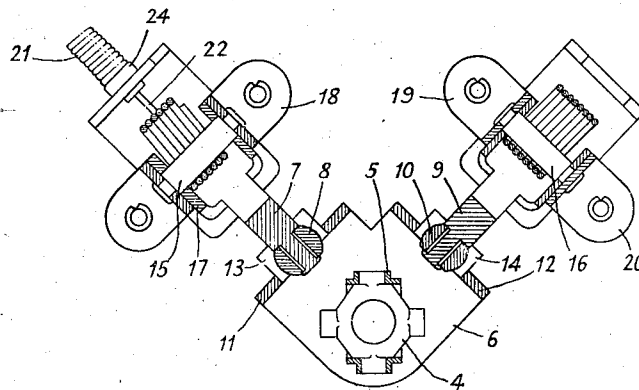


Fig. 2



INVENTORS
R. F. VOLZ, A. HOROWITZ &
A. J. W. DE GROOT
BY *H. S. Snow*
ATTORNEY

June 28, 1938.

R. F. VOLZ ET AL
RADIO CONTROL DEVICE
Filed Aug. 5, 1936

2,122,306

2 Sheets-Sheet 2

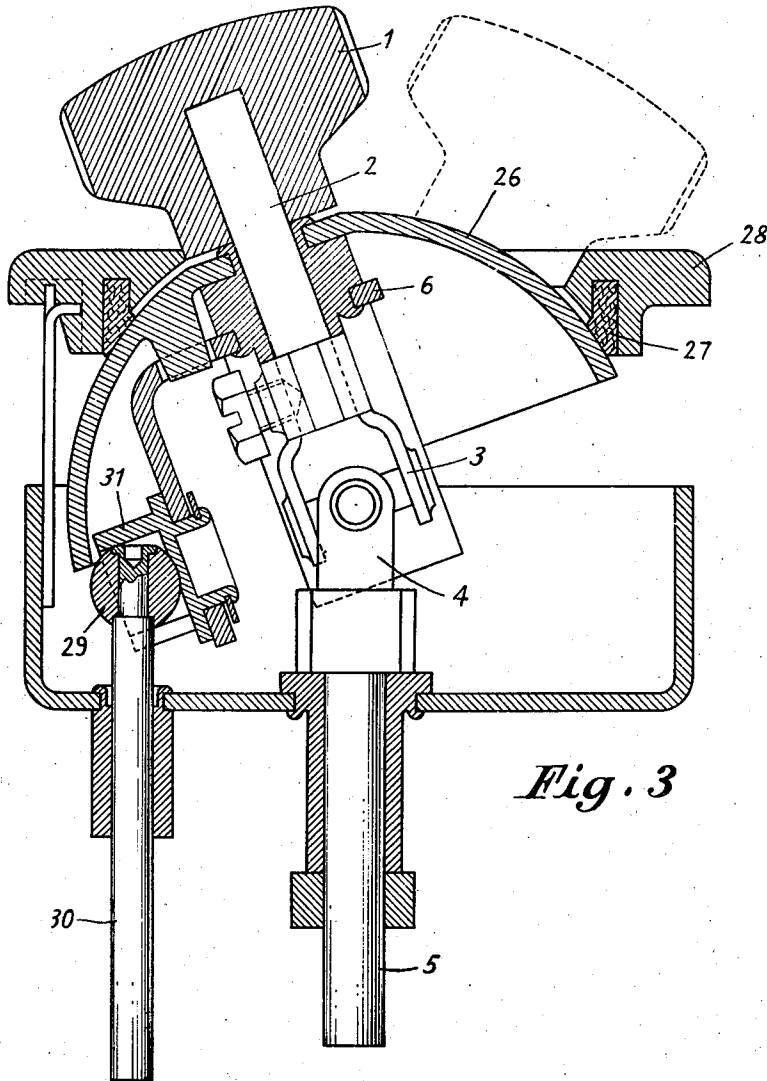


Fig. 3

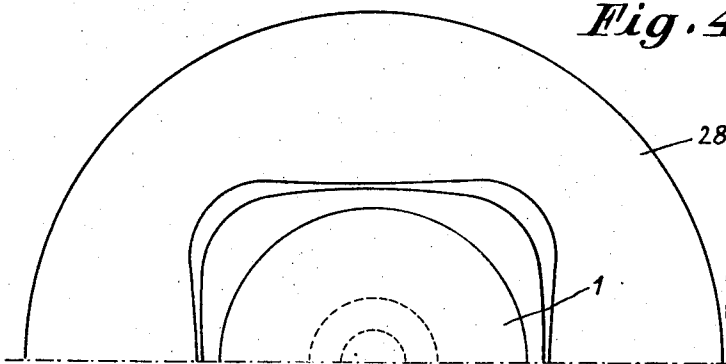


Fig. 4

INVENTORS
R. F. VOLZ, A. HOROWITZ &
A. J. W. DE GROOT
BY
H. S. Brown
ATTORNEY

UNITED STATES PATENT OFFICE

2,122,306

RADIO CONTROL DEVICE

Rudolf Friedrich Volz, Alexandre Horowitz, and
Abraham Jan Werner De Groot, Eindhoven,
Netherlands, assignors to N. V. Philips' Gloeilampenfabrieken, Eindhoven, Netherlands, a
corporation of the Netherlands

Application August 5, 1936, Serial No. 94,390
In Germany August 19, 1935

6 Claims. (Cl. 74-10)

This invention relates to a device for manipulating wireless receiving sets in which a single operating knob permits of adjusting various values, such as tuning, amplification, etc. Thus, for example, it has been proposed to construct the operating knob in such manner that it is capable of being rotated and in addition of being displaced longitudinally or laterally and that each of these movements has the effect of adjusting a given part of the radio device. Thus a single knob permits of adjusting two functions of the device. In addition, constructions have been suggested in which the knob is adapted to rotate and to be displaced both laterally and longitudinally so that it has three degrees of freedom. These constructions are, however, comparatively complicated and unsurveyable in manipulation and have therefore hitherto not resulted in practical use.

The invention relates to a device of simple construction capable of being readily operated even by a layman. According to the invention, the knob is fast on a shaft which is adapted to be moved laterally in such a way as to be capable of occupying any position within a cone having a point of the shaft as its apex and which is coupled to the adjusting elements of the device in such manner that during the said movement at least two values of the device can be adjusted independently of each other. Preferably, the device is constructed in such manner that the shaft passes through a stationary point and can occupy any positions within a cone having this point as its apex and in addition it is adapted to rotate and drives through a Cardan joint or the like a second shaft occupying a stationary position in space. In this case the latter is preferably coupled to tuning members, for example the rotors of the tuning condensers. The movement of the shaft in a lateral direction has, for example, the effect of controlling the amplification and the movement in a direction preferably normal thereto for example of controlling the quality of sound. In comparison with the well known devices, the device offers the advantage that all of the functions of a wireless receiving set can be adjusted in a natural manner by means of a single knob.

In order that the invention may be clearly understood and readily carried into effect, it will now be described more fully with reference to the accompanying drawings, in which,

Figure 1 is a sectional view of one embodiment.

Figure 2 is a section on the line 2-2 of Figure 1.

Figure 3 is a sectional view of a second embodiment.

Figure 4 is a plan view.

The operating knob 1 is fast on a shaft 2 which drives a shaft 5 through a Cardan joint constituted by parts 3 and 4. The shaft 5 which occupies a stationary position in space may have fast on it, for example, the rotors of the tuning condensers. Tuning is thus controlled by rotation of the knob 1. The knob 1 can also be moved in a lateral direction in such manner that it is possible for the axis of rotation to occupy any position within a cone having the centre point of a coupling between the two said shafts as the apex. The shaft has consequently two degrees of freedom and the device is constructed in such manner that a lateral movement of the shaft in a single direction permits of controlling one value of the device and the movement in another direction normal to the first one, or forming an angle therewith, permits of controlling a second value. For this purpose, the shaft has loosely arranged on it a member 6, for example, of sheet material, having two extensions 11 and 12 preferably normal to each other and parallel to the shaft and in whose slits 13 and 14 are arranged the ends of two parts 7 and 9 constructed as levers and capable of rotating on the shafts 15, 16. The shafts 15 and 16 are arranged in stationary parts 17, 18, 19 and 20 which are stamped from sheet material and may be secured, for example, to a casing or a front plate 31.

The part 6 is loosely arranged on the shaft 2 so that a rotation of the shaft does not exercise any effect on the position of the parts 7 and 9. If the shaft is, however, displaced laterally a rotation of one of the two parts 7 and 9 on its attendant shaft ensues. When the shaft is moved in the direction towards part 7, substantially this part 7 is driven, whereas a displacement of the shaft in the direction towards part 9 substantially results in a rotation of the latter on its shaft.

The rotary movement could be transmitted directly to an adjusting element, for example, a variable resistance or potentiometer but this would entail the necessity of a particular arrangement of these elements in the set. In the embodiment shown in Figures 1 and 2 the movement is therefore transmitted by means of flexible cables the core of which is capable of being displaced, such as Bowden cables. The use of such cables has already been proposed per se for the remote control of wireless receiving sets. In the present case the use thereof permits of materially simplifying the arrangement of the

set. The cable is formed by a helical metal envelope 21 which by means of a cylindrical member 24 is kept centered with respect to an aperture of a stationary plate 31. The core of the cable extends across this aperture and the end is connected by means of a knob 23 to the movable lower end of the lever 7. When the knob 1 is moved to the right, the cable is also pulled to the right. The other end of the cable core is mechanically connected to the adjusting element, for example, the arm of a potentiometer which, by means of a spring, may be secured in such manner as to exercise a tension on the cable core. Springs 25 may be provided for balancing the spring action of the cable so as to ensure that in any position the knob is substantially in balance. For ensuring satisfactory cooperation between the parts 6 and the ends of the parts 7 and 9 the latter carry balls 8 and 10 mounted on extensions of the parts 7 and 9.

According to the invention, the operating element may be provided with a body 26 having the shape of a hollow spherical segment the centre point of which corresponds to the stationary point of the shaft 2. This body is preferably arranged loosely on the shaft so that it does not follow the rotary movement of the shaft. It has its spherical side extending across an aperture of the front plate 28 so that it closes this aperture at each position of the shaft. In order to prevent the knob from occupying, for example, a certain position by reason of resiliency and gravity, the device may comprise a felt ring 27 which engages with slight friction the spherical surface of the body 26.

The condenser shaft is preferably driven by the shaft 5 through a fine adjustment device. In the present case this offers the advantage that, when the knob may be slightly rotated involuntarily during a lateral adjustment, this exercises nevertheless but a small influence on the tuning of the device.

Figure 3 is a sectional view of a different embodiment of the device. In this case the parts transmitting the movement to the adjusting elements of the device are capable of being displaced longitudinally and carry at their end a spherical part 29 which bears in a sleeve 31. The sleeve forms part of the member 6 loosely arranged on the shaft. The knob as shown occupies the extreme left hand position. The other extreme position is indicated in dotted lines.

Figure 4 is a plan showing the shape of the aperture of the front plate. This aperture is preferably rectangular so that the shaft can occupy any positions within a cone having this rectangle as the basis and one of the parts 7 and 9 always occupies one of the extreme positions when the knob 1 is moved along the rectangular periphery.

Having described our invention, what we claim as novel and desire to secure by Letters Patent is:

1. In a radio receiver having a tuning means and a plurality of control devices, a rotatable shaft connected to said tuning means, a pivotally mounted spherical shaped member, a control knob

mounted for rotation in said member and connected to said shaft, means connecting said member and one of said control devices and arranged to actuate said control device upon oscillation of said control knob in one plane and means connecting said member and the other of said control devices and arranged to actuate said control device upon oscillation of said control knob in a different plane.

2. In a radio receiver having a tuning means and a plurality of control devices, a rotatable shaft connected to said tuning means, a pivotally mounted spherical shaped member, a control knob mounted for rotation in said member and connected to said shaft, a member having two arms spaced apart by substantially 90 degrees connected to said spherical member and levers connected to said arms and said control devices respectively.

3. In a radio device having a tuning means and a plurality of control devices, a rotatable shaft connected to said tuning means, a hollow spherical shaped member, means frictionally engaging said member and arranged to retain it in any desired position, a panel having an aperture therein through which said spherical member projects, a knob mounted for rotation in said spherical member and connected to said shaft, and members spaced substantially 90 degrees apart connected to said spherical member and to said control devices respectively.

4. In a radio receiver, the combination of a panel having an aperture therein, a shaft extending through said aperture and adapted for oscillation therein, a control knob secured to the outer end of said shaft, radio control devices mounted at the rear of said panel, operating connections between said shaft and said control devices, a member loosely mounted on said shaft and arranged to form a closure for said panel aperture and means engaging said member and cooperating therewith to retain said shaft in a desired position.

5. In a radio device having a tuning means and a plurality of control means, a rotatable shaft connected to said tuning means, a spherical shaped member loosely mounted on said shaft, means frictionally engaging the surface of said member and adapted to retain it in a desired position, a control knob connected to the end of said shaft, two arms spaced apart by substantially 90 degrees and connected to said spherical shaped member, and means mechanically connecting said arms and said control means respectively.

6. In combination in a radio receiver having at least two control means, two levers having their pivotal axes in planes which are substantially normal to each other, Bowden wires connecting one end of said levers to said respective control means, and a single control member connected to the other ends of said levers and arranged for oscillation in the planes of both of said levers.

RUDOLF FRIEDRICH VOLZ.
ALEXANDRE HOROWITZ.
ABRAHAM JAN WERNER DE GROOT.