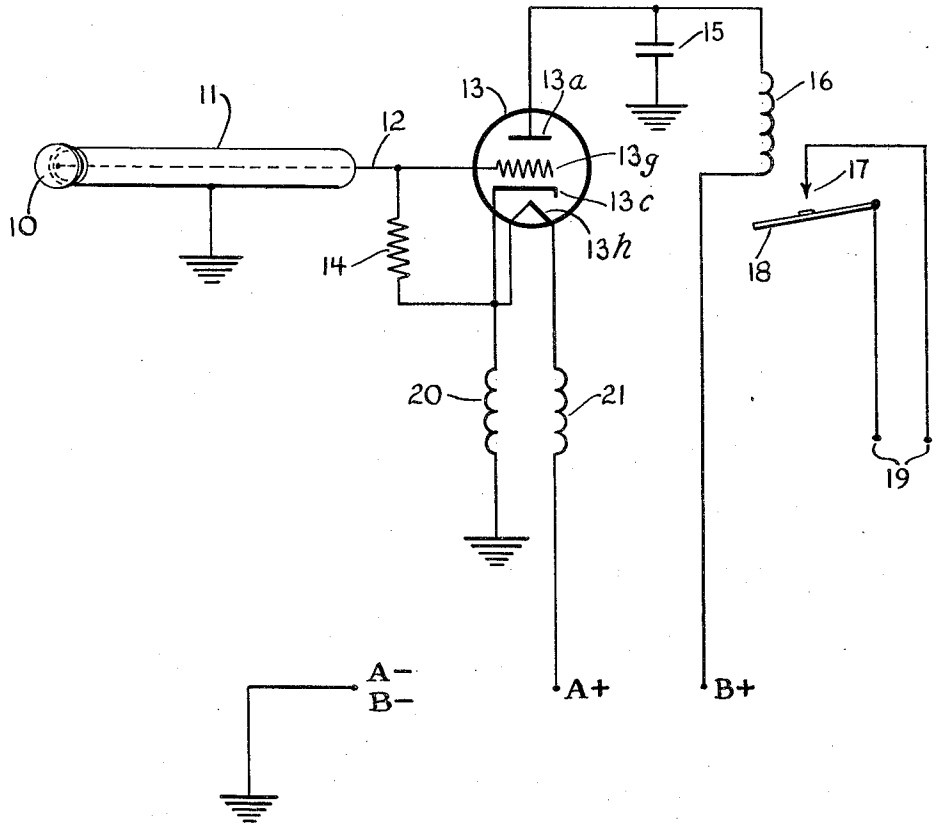
Feb. 19, 1957 J. P. RUG 2,782,308

CAPACITY OPERATED CONTROL SYSTEM

Filed May 13, 1953




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United States Patent Office 2,782,308 Patented Feb. 19, 1957



2,782,308

# CAPACITY OPERATED CONTROL SYSTEM

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Continuation of application Serial No. 646,046, February 7, 1946. This application May 13, 1953, Serial No. 354,755

5 Claims. (Cl. 250—36)

This invention relates to a capacity operated control system, and more particularly to control systems employing a metal conductive plate simulating a push button, in which the control is exercised not by pushing on the plate, but by bringing a finger or other part of the body close to or upon the plate. Such systems have been called "pushless push button" control systems.

The present application is a continuation of application Serial No. 646,046, filed February 7, 1946, assigned to the same assignee as the present application, and now abandoned.

In general, the increase of capacity caused by bringing the finger close to the button causes some action within the circuit, the result of which is to open or close a pair of contacts, which in turn control the circuit desired to be controlled. Such control systems may be used for a variety of purposes, including turning on and off radio receivers, starting the tuning variation in a signal-seeking receiver, and for other purposes.

In the past, as far as I know, such systems have been rather complex, involving at least two vacuum tube amplifiers, and have usually been rather critical to install; that is to say, a rather critical adjustment of various component parts is usually necessary.

It is an object of this invention to provide a control system of the class described which is extremely simple and economical to construct and install.

It is a further object of this invention to provide such a control system operating with only one vacuum tube amplifier.

It is a further object of this invention to provide a system of the class described, in which there are no critical adjustments required.

Still other objects and advantages of my invention will be apparent from the specification.

The features of novelty which I believe to be characteristic of my invention are set forth with particularity in the appended claims. My invention itself, however, both as to its fundamental principles and as to its particular embodiments, will best be understood by reference to the specification and accompanying drawing, in which the single figure is a circuit diagram of a control system according to my invention.

Referring now more particularly to the drawing, **10** designates the "pushless push button," which may be a small round metal button similar in size and appearance to a push button, but which may be rigidly mounted at any point desired where the control is to be exerted.

In the case of an automobile radio, this button **10** might be mounted on the dash or on a bracket projecting from the steering post, or, if desired, it might be mounted on the steering wheel. Conductor **12** is connected at one end to button **10** and at its other end to the control electrode or grid of tube **13**, which is connected as an oscillator of the Colpitts type.

Tube **13** may comprise heater **13***h*, cathode **13***c*, control electrode **13***g*, and anode or plate **13***a*. The plate may be connected to ground through suitable condenser **15**



and through relay winding **16** to B+. Relay armature **18** closes against fixed contact **17** when a sufficient amount of plate current flows, thereby closing the circuit between contacts **19**, which may be connected to the circuit to be controlled.

One end of heater **13***h* may be connected to cathode **13***c* and this common point connected to ground through radio frequency choke **20**. The other end of heater **13***h* is connected through radio frequency choke **21** to A+. A— and B— are preferably connected together and grounded, and resistance **14** is provided, connected between cathode **13***c* and control electrode **13***g*.

Lead **12** is preferably enclosed in a shielding and grounded sheath **11**, which extends from button **10** to or nearly to the grid connection of tube **13**. Conductor **12**, plate **10**, and shielding conductor **11** form a tuned circuit. Since the tuned circuit is electrically one-half wave length long, a point of high impedance and hence maximum radio frequency voltage appears at the grid end and the push button end of conductors **11** and **12**.

As a conductive object or part of the body approaches button **10**, radiation resistance and capacity are added to the concentric line termination until sufficient resistance and/or capacitance have been added to cause a rise of plate current in tube **13**, resulting from the variation in frequency, the decreased amplitude of oscillations generated, and even in some cases the stoppage of oscillations in tube **13**.

This increase in plate current is sufficient to operate relay **16**, which may be of the so-called "sensitive" type. Upon removal of the conductive object or the finger from the vicinity of button **10**, initial conditions are restored and tube **13** will begin to oscillate again if it has stopped, or if it has not stopped, the frequency will rise to its normal value, the plate current of tube **13** will drop, and armature **18** will open.

Whereas in some previous systems of this general type, the length of conductor **12** is critical, in the system herein described it is not, and almost any length of conductor **12** within reason may be employed.

In the specification I have explained the principles of my invention and the best mode in which I have contemplated applying those principles, so as to distinguish my invention from other inventions; and I have particularly pointed out and distinctly claimed the part, improvement, or combination which I claim as my invention or discovery.

While I have shown and described certain preferred embodiments of my invention, it will be understood that modifications and changes may be made without departing from the spirit and scope thereof, as will be clear to those skilled in the art.

I claim:

1. A control system comprising, a radio frequency oscillator including a resonant transmission line open circuited electrically at its remote end, a loading element coupled to said remote end of said line and responsive to a predetermined change of a control condition for producing through said line a substantial increase of the load on said oscillator thereby substantially reducing its amplitude of oscillation, and means effective on said change of oscillation amplitude for providing a desired control effect.

2. A control system comprising, a radio frequency oscillator including a resonant transmission line open circuited electrically at its remote end, a loading element coupled to said remote end of said line and responsive to a predetermined change of control condition for providing through said line a substantial increase of load on said oscillator thereby substantially increasing the energizing current supplied to said oscillator, and a

current relay responsive to said increase of current for providing a desired control effect.

3. A control system comprising, a radio frequency oscillator including a resonant transmission line of the concentric-line type open circuited electrically at its remote end, a loading element coupled to said remote end of said line and responsive to a predetermined change of a control condition for producing through said line a substantial increase of load on said oscillator thereby increasing the energizing current supplied to said oscillator, and means responsive to said change of energizing current for providing a desired control effect.

4. A control system comprising, a radio frequency oscillator including a resonant transmission line having an effective electrical length equal to a multiple of one-half wave length at the operating frequency and open circuited at its remote end alone to constitute the frequency-determining element of said oscillator, a loading element coupled to said remote end of said line and responsive to a predetermined change of a control condition for producing through said line a substantial increase of the load on said oscillator thereby substantially reducing its amplitude of oscillation, and means effective on said change of oscillation amplitude to provide a desired control effect.



5. A control system comprising, a radio frequency oscillator including a resonant transmission line of the concentric-line type open circuited electrically at its remote end, a metallic button element electrically connected to the end of the center conductor only of said line for effecting in accordance with a predetermined change of a control condition a substantial increase of the load on said oscillator thereby substantially reducing its amplitude of oscillation, and means effective on said change of oscillation amplitude for providing a desired control effect.

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