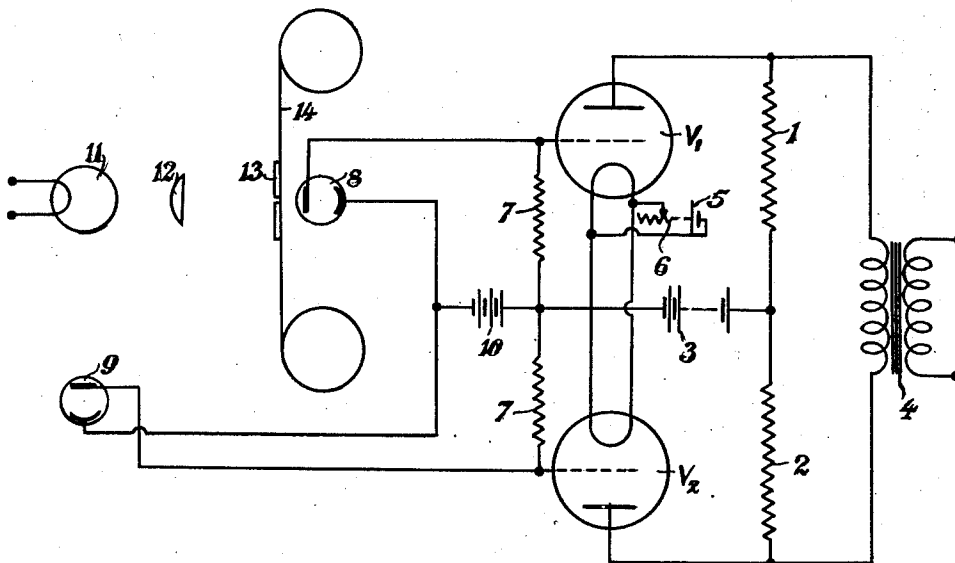


June 2, 1931.

A. S. RADFORD ET AL
SOUND REPRODUCING SYSTEM

1,807,602

Filed Aug. 29, 1929



Inventors
Arthur Stanley Radford &
Michael Bowman Manifold
By Cameron, Harlan & Sutton
Attorneys.

UNITED STATES PATENT OFFICE

ARTHUR STANLEY RADFORD, OF SOUTHALL, AND MICHAEL BOWMAN-MANIFOLD, OF HAYES, ENGLAND, ASSIGNORS TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY

SOUND REPRODUCING SYSTEM

Application filed August 29, 1929, Serial No. 389,280, and in Great Britain September 27, 1928.

The present invention is concerned with improvements in amplifiers for use with light sensitive devices such for example, as photo-electric cells. One of the objects of the invention is to eliminate or reduce noises caused by the variation in the intensity of the light source with which the photo-electric cell is used, for example, due to the heating of the filament of the light source with alternating current, or by variation in the voltage of the anode supply battery.

According to the present invention apparatus for the reproduction of recorded sound comprises two light sensitive devices and an amplifier adapted to amplify electrical oscillations derived from said devices and corresponding to the difference between their respective illumination.

According to the present invention in the preferred form, each of said light sensitive devices is associated with the grid circuit of a thermionic valve, one of said devices being illuminated from a light source by light modulated by a sound record and the other of said devices being illuminated from said source by light which is not modulated by said sound record.

The invention is illustrated, by way of example, in the accompanying drawing.

Referring to the drawing, the anodes of two thermionic valves V_1 and V_2 are connected through separate high resistances 1, 2 to the positive terminal of a battery 3 the negative terminal of which is connected to the filaments of the valves. The primary winding of a transformer 4 is connected between the two anodes and the secondary winding of this transformer constitutes the output of the amplifier. The filaments are heated in parallel from a low tension battery 5, a variable resistance 6 being included in the filament heating circuit.

Each of the grids of the valves V_1 and V_2 is connected to the filament circuit through a grid leak 7 and in shunt with each of the grid leaks is a photo-electric cell 8, 9 in series with a battery 10. The two photo-electric cells are arranged with their anodes connected to the grids of the valves.

The cell 8 receives the light from the source

11 after the light has passed through an optical system 12, a slit device 13 and a sound record film 14. The cell 9 receives the light direct from the source 11. The source 11 may be in the form of a filament lamp heated by alternating current. The film 14 is caused to travel past the slit device 13 producing variations in the illumination of the cell corresponding to the sound markings on the film. Since the other photo-electric cell is illuminated directly by the light source the sound record does not affect it. When the adjustment is correct it will be found that hum due to the alternating current in filaments of the light source is not transmitted to the output circuit but differences in illumination of the two cells 8, 9 is transmitted in the form of electrical oscillations to the output circuit.

In a modification of a circuit above described, high tension is supplied to the anodes of the two valves V_1 and V_2 through the primary winding of the output transformer 4 the centre point of this winding being connected to the positive terminal of the battery and the resistances 1 and 2 can then be omitted.

We claim:

1. In apparatus for the reproduction of recorded sound, the combination of two thermionic valve amplifiers arranged in opposition and having a common output, two light sensitive devices one connected across the input of each amplifier, a common light source for said devices, and means for modulating the light passing from said source to one of said devices only.

2. In apparatus for the reproduction of recorded sound, the combination of two thermionic valve amplifiers having input and output circuits and arranged in opposition, a resistance in each of said output circuits, a resistance in each of said input circuits, a translating device connected to both output circuits, two light sensitive devices one connected in each input circuit, a common light source for said light sensitive devices, and means for modulating the light passing from said source to one only of said light sensitive devices.

3. In apparatus for the reproduction of recorded sound, the combination of two thermionic valve amplifiers, a common source of

anode potential for said amplifiers, a resistance connected between said source and each of said amplifiers, a translating device connected across said resistances, a resistance
5 connected across the input of each of said amplifiers, a light sensitive device in parallel with each input resistance, a common light source for said light sensitive devices, and means for modulating the light passing from
10 said source to one only of said devices.

In testimony whereof we have signed our names to this specification.

ARTHUR STANLEY RADFORD.
MICHAEL BOWMAN-MANIFOLD.

15

20

25

30

35

40

45

50

55

60

65