

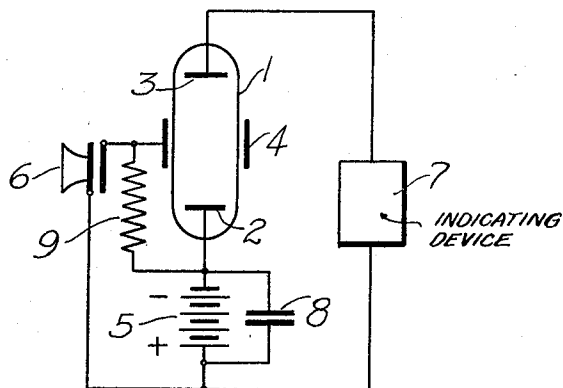
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PICK-UP AMPLIFIER

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PICK-UP AMPLIFIER

Application filed July 12, 1930. Serial No. 467,489.

My invention pertains in general to systems for transforming acoustical energy into electrical energy, and particularly relates to a microphone controlled amplifier known as a pick-up system.

One of the objects of my invention consists in producing a pick-up amplifier employing a microphone of the electrostatic condenser type in conjunction with a novel photoelectric cell amplifier.

Another object consists in providing a condenser microphone pick-up amplifier employing a photoelectric cell which produces an elongated electronic stream under control of an electrostatic grid.

Another object comprises producing a pick-up system utilizing a photoelectric cell amplifier and in which means are provided for varying the amplification characteristic of the photoelectric cell.

A further object consists in providing a detector amplifier employing a photoelectric cell having an exterior grid.

Another object consists in producing a condenser microphone pick-up amplifier in which extraneous capacitance is reduced to a minimum.

A still further object comprises providing a pick-up amplifier in which a single source of current is used for amplification energization and static polarization of the condenser microphone.

I accomplish the above desirable objects in a novel pick-up amplifier utilizing a photoelectric cell of the type disclosed in my co-pending application Serial Number 460,590 filed June 12, 1930.

In the drawing which accompanies and forms a part of the specification, I have diagrammatically represented this type of photoelectric cell, together with the electrical organization comprising one embodiment of the novel pick-up amplifier system of my invention.

Referring to the drawing in detail, I provide a photoelectric cell 1 which has a photoelectric cathode 2, and anode 3, and an annular exterior electrostatic grid 4. The cathode 2 and the anode 3 are positioned at opposite ends of the containing envelope of the photo-

electric cell in a manner adapted to produce an elongated electronic stream when the proper potentials are supplied to the grid and anode and irradiations are directed upon the photoelectric cathode.

The grid 4 produces an electrostatic field which traverses the electronic stream and influences the same in accordance with the value of the charges on the grid 4. The grid 4 is movable with reference to the cathode 2 so that the amplification characteristic of the photoelectric cell can be altered. When the grid 4 is at a point near the cathode 2, the amplification factor will be greatest, and will decrease as the grid is moved towards the anode 3 away from the cathode 2. Such an arrangement comprises the photoelectric cell disclosed in my co-pending application before referred to.

A source of current comprising a battery 5 is connected on its negative side to the cathode 2. The positive side of this battery 5 is connected to a condenser microphone 6 and thence to the anode 3. The condenser microphone 6 is of a construction well known in the art and includes a vibratile diaphragm which alters the effective capacitance of the condenser in accordance with sound waves incident thereon. The positive side of the battery 5 is further connected through an indicating device 7 to the anode 3 of the photoelectric cell 1 as shown. The indicating device 7 can be any means for indicating flow of current, such as a telephone or meter, or may be a work circuit.

The battery 5 serves to produce static polarization of the condenser microphone 6 and also provides the operating current for the photoelectric cell 1. A fixed capacitance 8 is provided in parallel with the battery 5 and serves as a by-pass condenser. Resistance 9, which may be of any desired value, is connected as shown to provide a definite potential drop across cathode and grid.

A short connection is provided directly from the microphone 6 to the grid 4, the use of a grid condenser being avoided. Extraneous capacitance effects of undetermined value are therefore reduced to a minimum.

Variations in the effective capacitance of

the condenser microphone 6, under control of sound waves, will produce variations in the electrostatic field set up by the grid 4 and which traverses the electronic stream emitted from cathode 2 to anode 3. The electronic stream will be varied in accordance therewith and the current passed by the photoelectric cell through the indicating device 7 will be an amplified electrical equivalent of the acoustical energy impinged upon the diaphragm of the microphone 6.

It will now be obvious that I have provided a pick-up amplifier system which is simple and efficient and that many advantages will be derived from its use. Although I have shown a preferred embodiment of the electrical organization, it is of course to be understood that many changes can be made without departing from the intended scope of my invention. I do not, therefore, desire to limit myself to the foregoing, except in so far as may be pointed out in the appended claims.

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

1. A pick-up amplifier comprising, an envelope, a photosensitive cathode and anode positioned within said envelope in a manner adapted to produce an elongated electronic stream, an electrostatic control electrode exteriorly positioned on said envelope, said control electrode and said cathode being relatively movable; an output circuit connected between said anode and said cathode and including an indicating device, an input circuit connected between said control electrode and said cathode and including an electrostatic condenser microphone, and a single source of voltage common to said input circuit and said output circuit for supplying a potential to said anode and to said condenser microphone.

2. A pick-up amplifier comprising, an envelope, a photoelectric cathode and an anode positioned within said envelope in a manner adapted to produce a substantially elongated electronic stream, a control electrode positioned exteriorly of said envelope to produce an electrostatic field for controlling said electronic stream, an output circuit connected between said anode and said cathode, an input circuit connected between said control electrode and said cathode, an electrostatic condenser microphone connected in said input circuit for controlling said electrostatic field, said control electrode being adapted to be moved along said envelope whereby the position of said control electrode can be adjusted with respect to said electronic stream for best conditions of amplification.

AUGUST HUND.