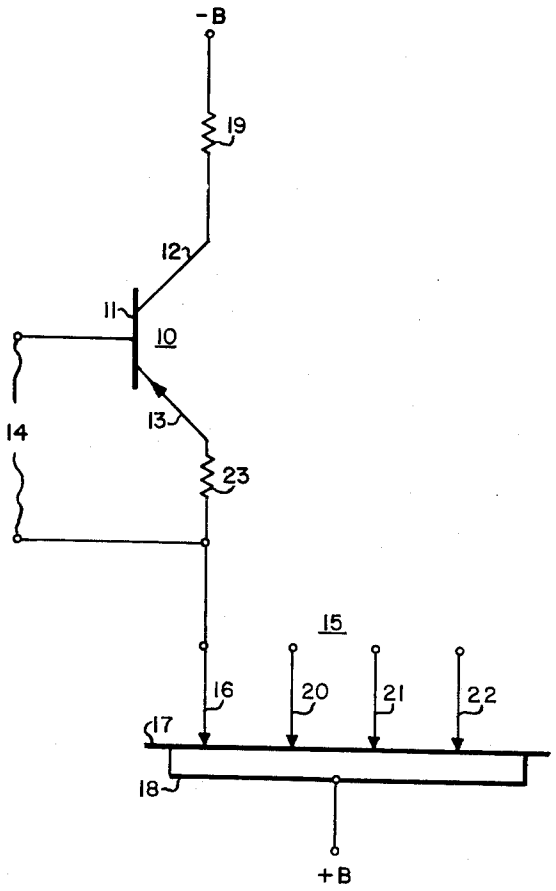
June 6, 1961 R. J. FARBER 2,987,367

DRIVING CIRCUIT FOR ELECTROLYTIC RECORDERS

Filed Oct. 3, 1958



United States Patent Office 2,987,367 Patented June 6, 1961

2,987,367

DRIVING CIRCUIT FOR ELECTROLYTIC RECORDERS

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Filed Oct. 3, 1958, Ser. No. 765,176
3 Claims. (Cl. 346—74)

General

This invention relates to electrolytic recorders and, more particularly, to the circuits that drive the marking apparatus.

The art of electrolytic recording is not new. Since it is a well-known art, the theory behind this type of recording will only be briefly described.

There are three essential elements that comprise the marking apparatus of an electrolytic recorder. They are a cathode, an anode, and a recording medium. The recording medium, usually paper, is chemically treated with an electrolyte and is normally positioned between the anode and the cathode. When a voltage is impressed across the anode and the cathode, ions leave the anode and chemically react with the electrolyte in the recording medium. This chemical reaction causes the recording medium to be marked at the particular spot that lies between the anode and the cathode. The intensity of the mark is dependent upon the intensity of the current density through the recording medium. Because the ions leave the anode, the anode slowly erodes. Therefore the anode must eventually be replaced.

The variations in intensity of the markings on the recording medium indicate the variations in the current of the signal that is being recorded. Usually one electrode, either the anode or the cathode, is held at a fixed potential, and the other electrode is connected to the source of the signal which is to be recorded.

In multichannel recording, the electrodes which are connected to the sources of fixed potential may be connected together and replaced by a common bar. The other electrodes serving as styli are connected to the individual signal sources. The styli may be individually mounted or they may be constructed as a unit. In the event that one or any number must be replaced, difficuties arise in the removal and replacement of an individual stylus or a number of individual styli. As mentioned previously, the anodes must be replaced after they erode. Therefore it is desirable to have the common bar as the anode and the styli as the cathode since it is easier to replace the common bar than the individual stylus or a number of individual styli.

In the past, electrolytic recorders have made use of electron tubes and NPN transistors in the circuits which drive the marking apparatus. The advantages of using transistors in place of electron tubes are well known to those skilled in the art. Two of the comparative disadvantages of electron tubes are size and power consumption. However, NPN transistors are not available in high power sizes necessary for high speed recording.

The present invention makes use of a PNP transistor in the circuit which drives the marking apparatus and, therefore, has all the advantages of transistors over electron tubes, while at the same time it has additional advantages over NPN transistors.

It is an object of the present invention, therefore, to provide a new and improved driving circuit for the marking apparatus of an electrolytic recorder which avoids one or more of the above-mentioned disadvantages of prior driving circuits.

In accordance with one particular form of the present invention, the electrolytic recorder apparatus comprises

a pair of input terminals for supplying a signal which is to be recorded. Also included are means for amplifying this signal. These means include a PNP transistor having base, collector, and emitter electrodes; the base electrode being connected to one of the input terminals, the emitter electrode being connected to the other input terminal, and the collector electrode being connected to a source of fixed potential. The electrolytic recorder apparatus further includes marking apparatus means responsive to the amplified signal including a first electrode connected to the emitter electrode, a second electrode connected to a source of fixed potential, and a recording medium.

For a better understanding of the present invention, together with other and further objects thereof, reference is had to the following description, taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims.

Referring to the drawing, there is shown a circuit diagram of the electrolytic recorder apparatus in accordance with the particular form of the present invention.

Description and operation of electrolytic recorder apparatus of the drawing

In the drawing there is shown the electrolytic recorder apparatus of a particular form of the present invention. The transistor **10** comprises the base **11**, the collector **12**, and the emitter **13**. The input terminals **14** for supplying a signal which is to be recorded are directly connected to the base **11** and through an optional resistor **23** to the emitter **13**. The collector **12** is connected to the negative end of a source of fixed potential through a second optional resistor **19**. The marking apparatus **15** comprises the stylus **16**, the recording medium **17**, and the common bar **18**. The stylus **16** is connected to the emitter **13** through optional resistor **23**. The common bar **18** is connected to the positive end of the source of fixed potential.

The signal to be recorded by the marking apparatus is translated from the input terminals **14** to the base and emitter of transistor **10**. The transistor circuit amplifies the signal and then couples this amplified signal to the stylus **16**. Because the common bar **18** is connected to a source of fixed potential, the variations in current through the stylus **16** cause variations in the intensity of the marking on the recording medium **17**. In this manner, the signal appearing at terminals **14** is recorded.

The variations in the input signal at terminals **14** also appear across resistor **19**. The resistor **19** has been included in the invention in the event that it is desirable to have two sources from which to sample the variations in the input signal.

Resistor **23** is an emitter degeneration resistor. While this resistor is commonly employed in circuits to provide improved stability for transistor amplifiers its use is optional and does not necessarily bear on the operation of the present invention.

Also included in the drawing are styli **20**, **21**, and **22**, making up additional channels of this multichannel recorder. Each of these additional styli has its own driving circuit similar to the transistor **10** and its associated circuitry.

While there has been described what is at present considered to be the preferred embodiment of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention and it is, therefore, aimed to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. Electrolytic recorder apparatus comprising: a pair of input terminals for supplying a signal which is to be

recorded; means for amplifying said signal, said means including a PNP transistor having base, collector, and emitter electrodes, said base electrode being connected to one of said input terminals, said emitter electrode being connected to the other of said input terminals, and said collector electrode being connected to a source of fixed potential; and marking apparatus means responsive to said amplified signal including a first electrode connected to said emitter electrode, a second electrode connected to a source of fixed potential, and a recording medium.

2. Electrolytic recorder apparatus comprising: a pair of input terminals for translating a signal which is to be recorded; means for amplifying said signal, said means including a PNP transistor having base, collector, and emitter electrodes, said base electrode being connected to one of said input terminals, said emitter electrode being connected to the other of said input terminals, and said collector electrode being connected to a source of fixed potential; and marking apparatus means responsive to said amplified signal including a cathode electrode connected to said emitter electrode, an anode electrode connected to a source of fixed potential, and a recording medium.

3. Electrolytic recorder apparatus comprising: a pair of input terminals for translating a signal which is to be recorded; means for amplifying said signal, said means

including a PNP transistor having base, collector, and emitter electrodes, said base electrode being connected to one of said input terminals, said emitter electrode being connected to the other of said input terminals, and said collector electrode being connected to a source of fixed potential; and marking apparatus means responsive to said amplified signal including a cathode electrode connected to said emitter electrode, an anode electrode connected to a source of fixed potential, and a recording medium positioned between said cathode and anode electrodes.

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