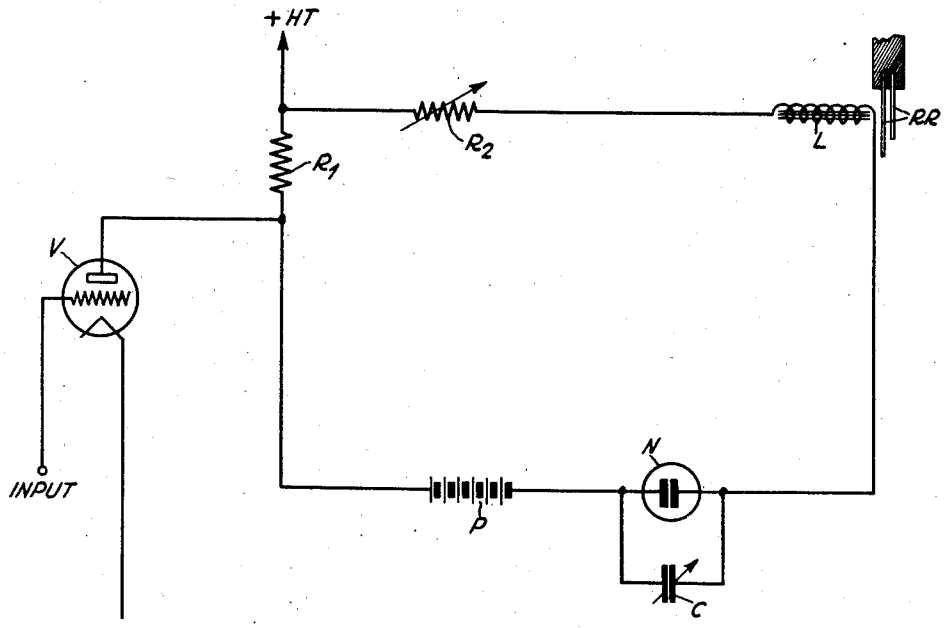
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ELECTRICAL DEVICE

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ELECTRICAL DEVICE

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6 Claims. (Cl. 177—311)

This invention relates to electrical overload, safety, alarm and like devices and has for its object to provide a sensitive arrangement whereby safety means such as switches, will be operated and/or alarm devices such as indicators or bells will be actuated if the current in a particular circuit increases a predetermined amount above or decreases a predetermined amount below a predetermined value. The invention is particularly adapted for use in connection with the actuation of safety or alarm devices for protecting against or giving warning of predetermined increases or decreases in current in the anode circuit of a thermionic valve employed for example in a thermionic valve radio transmitter. The invention is, however, not limited to this application.

It is customary in thermionic valve transmitters to provide overload devices, but such devices are for practical reasons usually set to operate only when substantial increases in current occur and it is advisable therefore to provide a more sensitive device which will give an indication for quite a small increase (or in some cases decrease) of anode current. The present invention may be with advantage employed for this purpose.

According to this invention a resistance which forms part of a so-called electric discharge tube "blink" circuit is associated also with the circuit to be protected and frequency responsive means are arranged to be actuated by the frequency of the said "blink" circuit, the whole arrangement being such that when the current in the circuit to be protected reaches a predetermined value, the frequency in the "blink" circuit will be such as to actuate the frequency sensitive means.

The invention is illustrated in the accompanying drawing which shows diagrammatically one arrangement in accordance therewith and adapted to give warning of an increase of current in the anode circuit of a thermionic valve transmitter.

Referring to the drawing V is the valve in question and, as will be seen, there is included in the anode circuit thereof and in series with the anode cathode path thereof a resistance R_1 which also forms part of a neon tube "blink" circuit, the said neon tube "blink" circuit including in a series loop the said resistance R_1 a second resistance R_2 which is preferably adjustable, an iron cored inductance member L, a neon lamp or other electric discharge lamp N and a source of potential P.

The neon lamp is shunted by a condenser C which is preferably adjustable. The circuit consisting of the neon lamp N the condenser C the source of potential P the iron cored inductance L and the two resistances R_1 and R_2 of course constitutes a so-called "blink" circuit and pulsations of current will flow therein at a frequency predetermined by the resistance, capacity, and E. M. F. in the said circuit. In the leakage field of the iron cored inductance is arranged a resonant reed RR and the said reed and the various components of the "blink" circuit are so adjusted that so long as the current in the anode circuit of the valve does not exceed a predetermined value, the voltage drop across the resistance in said anode circuit is such that the frequency of the "blink" circuit is too high to actuate the reed. If, however, a predetermined increase in anode current occurs, the voltage applied to the neon tube will decrease due to the increased voltage drop across the resistance which is common both to the "blink" circuit and the anode circuit, and in consequence, the frequency of the "blink" circuit will fall to a value bringing it into resonance with the natural frequency of the reed. Accordingly, the reed will vibrate and this vibration may be utilized in any convenient way (not illustrated); for example, it may serve to give a visible indication or it may actuate an audible or visible warning device, or it may actuate a safety device as may be deemed desirable. If desired, two reeds of different natural frequencies may be associated with the iron cored inductance one having a resonant frequency above, and the other a resonant frequency below the frequency obtained in the "blink" circuit when the anode current is at a correct value. Thus, an increase or a decrease in anode current will result in the actuation of one or the other reed.

As above stated, the invention is primarily designed and intended for the actuation of warning devices, the apparatus being intended to give an indication to the engineer in charge as soon as a fault is developing, in order that he may ascertain and clear the fault before the normally provided less sensitive overload device comes into operation.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. An electrical overload, safety alarm and like device adapted to be operated when the current in a circuit to be protected increases or decreases by a predetermined amount from a predetermined value, said device comprising a re-

sistance forming part of a so-called electrical discharge tube "blink" circuit and connected in series with the circuit to be protected, frequency sensitive means comprising a condenser connected in shunt with a discharge tube to actuate an alarm by a change in the frequency of said "blink" circuit, the whole arrangement being such that when the current in the circuit to be protected reaches a predetermined value the frequency in the "blink" circuit will actuate the frequency sensitive means.

2. An electrical overload, safety, alarm or like device adapted to be operated when the current in a circuit to be protected increases or decreases by a predetermined amount from a predetermined value, said device comprising a resistance in series in said circuit, a loop circuit including a source of potential, an inductance and a neon or similar electric discharge lamp in series with said resistance, a condenser in shunt with said discharge lamp, and frequency sensitive means connected with said condenser and discharge tube so as to actuate the alarm and to be actuated by energy derived from said series loop circuit, the component elements of said series loop circuit being of such magnitude that frequency of "blink" set up therein is substantially the same as that of the frequency sensitive means when the current through the resistance reaches a predetermined value at which the device is intended to operate.

3. An electrical overload safety alarm device to operate when the current in a circuit to be protected exceeds or decreases by a predetermined amount from a predetermined value, said device comprising a resistance in series with a circuit to be protected, a loop circuit including a source of potential, an inductance in the form of a choke coil connected in series with a second resistance, an electrical discharge lamp in series with said choke coil and resistances, a condenser in shunt with said discharge lamp, frequency sensitive means comprising a vibratory reed actuated by the leakage field of said choke coil and connected with said condenser and discharge tube so as to actuate an alarm by energy derived from said loop circuit when the frequency set up therein is substantially the same as the frequency sensitive means when the current through said resistance reaches a predetermined value at which said device is intended to operate.

4. An electrical overload safety alarm device to operate when the current in a circuit to be protected exceeds or decreases by a predetermined amount from a predetermined value, said device comprising a resistance in series with a circuit to be protected, a loop circuit including a variable resistance, an iron choke coil, a source of potential, an electrical discharge lamp, all in series with said variable resistance, a condenser in shunt with said discharge lamp, frequency sensitive means comprising a vibratory reed actuated by the leakage field of said iron choke coil and connected with said condenser and discharge tube so as to actuate an alarm by energy derived from said loop circuit when the frequency set up therein is substantially the same as the frequency sensitive means when the current through said resistance reaches a predetermined value at which said device is intended to operate.

5. An electrical overload safety alarm device to operate when the current in a circuit to be protected exceeds or decreases by a predetermined amount from a predetermined value, said device comprising a resistance in series with a circuit to be protected, a loop circuit including a source of potential, an inductance in the form of a coil capable of producing a leakage field, an electrical discharge lamp in series with said coil and resistance, a variable condenser in shunt with said discharge lamp, frequency sensitive means comprising a vibratory reed actuated by the leakage field of said choke coil and connected with said condenser and discharge tube so as to actuate an alarm by energy derived from said loop circuit when the frequency set up therein is substantially the same as the frequency sensitive means when the current through said resistance reaches a predetermined value at which said device is intended to operate.

6. An electrical overload safety alarm device to operate when the current in a circuit to be protected exceeds or decreases by a predetermined amount from a predetermined value, said device comprising a resistance in series with a circuit to be protected, a loop circuit including a source of potential, an inductance member capable of producing a leakage field, an electrical discharge lamp in series with said inductance and resistance, a condenser in shunt with said discharge lamp, frequency sensitive means comprising two vibratory reeds, one of said reeds being above, and the other being below the frequency set up in said circuit to be protected, said reeds actuated by the leakage field of said inductance member and connected with said condenser and discharge tube so as to actuate an alarm by energy derived from said loop circuit when the frequency set up in said loop circuit corresponds to the frequency of either one of said reeds.

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