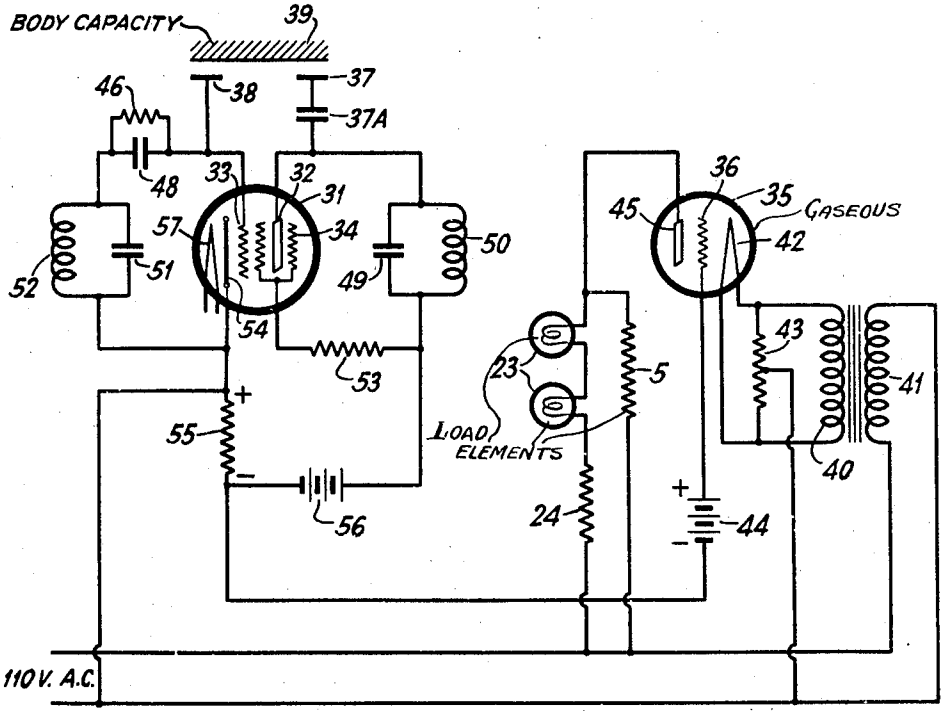
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AUTOMATIC LIGHTER AND DISPLAY DEVICE

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AUTOMATIC LIGHTER AND DISPLAY DEVICE

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Original application June 6, 1939, Serial No. 277,593, which is a division of application Serial No. 107,374, October 24, 1936. Divided and this application June 25, 1941, Serial No. 399,754

13 Claims. (Cl. 250—27)

This invention relates to a new and novel automatic lighter and display device.

The invention is a division of my copending application Serial No. 277,593, filed June 6, 1939, which is a divisional application of the parent application Serial No. 107,374, filed Oct. 24, 1936, Patent #2,182,336, and is particularly directed to the art of using electric discharge tubes as a relay device and deals especially with applying this principle to a novel lighter.

The claims in this divisional application are specificaly directed to a circuit for controlling electrical apparatus.

An object of this invention is to simplify and improve automatic lighters such as those employed for lighting cigars and cigarettes.

Another object of this invention is to provide an automatic lighter which is capable of continuous intermittent use and requires a minimum amount of servicing.

Still another object of this invention is to provide a simple improved lighter having no contact elements which are broken, the heater circuit being controlled by body capacity.

Another feature of this invention is the arrangement whereby at the same time the heating element is caused to heat, there is also flashed a display or advertising sign.

Still another feature of this invention is that the device as arranged fulfills both the purposes of a lighter and an advertising device and is arranged to attract the customer's attention and arouse his curiosity as to the control member, itself. The electrical circuit of the device is arranged so that when the heating arrangement heats, the sign will be illuminated, the tube giving off its characteristic glow which is a noteworthy advertising feature.

Although automatic lighters are old in the art, such devices generally required the breaking of the total heater current when the object to be lit was heated. As the heater current which was broken was relatively large, a substantially heavy contact pressure was necessary. Also, such devices required frequent servicing due to the burning out of the contacts.

It is the purpose of this invention to permit the body capacity of a person approaching the lighter to actuate the circuit of the heater element.

The contacts are arranged in the circuit so that a display sign flashes on and off when the heating element is on.

This invention will be more completely understood by referring to the accompanying drawing, which is a circuit diagram of the automatic lighter wherein the heating circuit is controlled by body capacity.

Referring now to the drawing the display device of this application is generally similar to my other applications mentioned above, with the exception of the omission of the electrical contacts and in place thereof are two capacitive electrodes **37** and **38**. The capacitive electrodes **37** and **38** may form part of the casing, itself, by being insulated from other parts of the housing. It is necessary that the capacity between plates be small relative to the housing, so that the movable body will make as large a percent change in capacity as possible. The heating current supplying the heater **5** is controlled by body capacity when a person approaches to light his cigar or cigarette, the extra capacity causing the tube to trip, thus heating the element and illuminating the advertising device. An electron discharge device **31** provides a high frequency amplifier of a tuned plate and grid circuit, the plate **32** and grid **33** being shielded from each other. A screen grid **34** prevents feedback through the tube. The "thyratron" tube **35** has a grid **36** which is held at a negative potential when tube **31** is not oscillating. In the grid and plate circuit of tube **31**, there is connected the capacitive elements or electrodes **37** and **38** which are suitably arranged so that when the body capacity **39** of a person who approaches the lighter intercepts electrodes **37** and **38**, feedback occurs between plate **32** and grid **33**, thus causing tube **31** to oscillate. This lowers the plate current of tube **31** which in turn lowers the negative bias on the "thyratron" tube **35** enough so that the positive bias applied to the secondary **40** of the transformer will cause the tube to conduct. When the extra capacity is removed, tube **31** will cease oscillating and tube **35** will then be non-conducting. A small blocking condenser **37***a* is employed to insulate the plate voltage from the exposed plate. It may be desirable also to work the plate at ground potential for the supply voltage and work the cathode at a negative voltage, so that the plate **37** has only a very low voltage radio frequency impressed on it.

There is also the possibility of using an audio frequency capacity bridge circuit; the unbalance due to body capacity causes a change in the audio voltage, this is amplified, rectified and caused to control the relay tube. Other elements of this circuit are transformer primary **41**, cathode **42**, cathode resistance **43**, a grid bias battery **44**, plate **45**, heating element **5**, and lamps **23** which are connected in series with the plate **45** and the series resistance **24**. The oscillator tube contains

grid leak 46 and grid condenser 48, plate 32 having connected in the tuned circuit condenser 49 an inductance 50. The circuit of grid 32 has also a tuned circuit comprising condenser 51 and inductance 52. Screen grid 34 is provided with a resistance 53, the cathode 54 of tube 31 being maintained at a desired positive potential by resistance 55 and a battery supply source 56. The filmament 57 of heater 31 is heated by any suitable means, such as a tap on the transformer secondary.

By a slight change in the circuit, batteries 44 and 56 may be eliminated and the bias potential obtained from the alternating current supply source.

Another circuit arrangement may accomplish the same effect by having the body capacity of the person approaching the lighter vary the neutralizing capacity of an amplifier, thus causing the tube to go in and out of oscillation.

Still another method of control would be to have the cigar or cigarette make or break a light beam which is inserted within the lighter, a photoelectric cell being connected in the circuit so as to cause the relay tube to trip and the heating element would thus be heated and the advertising device flashed.

Another modification would be that of a mechanical relay arranged to be actuated by the plate current of the relay tube if it is desired that a larger amount of power be required than the tube can control.

While only a few modifications of this invention are disclosed, it is to be distinctly understood that it is not to be limited thereto except by such limitations as are imposed in the appended claims.

What is claimed is:

1. In an electrical capacitive control circuit comprising a first and a second electron discharge device, said second electron discharge device being of the gaseous type, grid and plate circuits for both said first and second electron discharge devices, tuned circuits for the grid and plate of said first electron discharge device, a first and a second capacitive element, said first capacitive element connected to the tuned grid circut of said first electron discharge device, said second capacitive element connected to the tuned plate circuit of said first electron discharge device, means for keeping said second electron discharge device at a normally high negative operating potential when said first electron discharge device is not oscillating, means whereby feedback occurs between the grid and plate of said first electron discharge device, when a moving body changes the capacity between said first and second capacitive elements which lowers its plate current and also lowers the negative potential of said second electron discharge device causing the second electron discharge device to conduct and energize said controlled electrical circuit.

2. In an electrical capacitive control heater circuit comprising a first and a second electron discharge device, said second electron discharge device being of the gaseous type, grid and plate circuits for both said first and second electron discharge devices, tuned circuits for the grid and plate of said first electron discharge device, a first and a second capacitive element, said first capacitive element connected to the tuned grid circuit of said first electron discharge device, said second capacitive element connected to the tuned plate circuit of said first electron discharge device, a heater element connected to the plate circuit of said second electron discharge device, means for keeping said second electron discharge device at a normally high negative operating potential when said first electron discharge device is not oscillating, means whereby feedback occurs between the grid and plate of said first electron discharge device, when a moving body changes the capacity between said first and second capacitive elements which lowers its plate current and also changing the negative potential on the grid of second electron discharge device causing the second electron discharge device to conduct and energize said heater.

3. In an electrical capacitive control circuit comprising a first and a second electron discharge device, said second electron discharge device being of the gaseous type, grid and plate circuits for both said first and second electron discharge devices, tuned circuits for the grid and plate of said first electron discharge device, shielding means within said first electron discharge device to prevent feedback therethrough, a first and a second capacitive element, said first capacitive element connected to the tuned grid circuit of said first electron discharge device, said second capacitive element connected to the tuned plate circuit of said first electron discharge device, means for keeping said second electron discharge device at a normally high negative operating potential when said first electron discharge device is not oscillating, means feedback occurs between the grid and plate of said first electron discharge device when a moving body changes the capacity between said first and second capacitive elements which lowers its plate current and changing the negative potential on the grid of said second electron discharge device causing the second electron discharge device to conduct and energize said controlled electrical circuit.

4. A circuit for the control of electrical apparatus comprising a controlled device in circuit connection which will have its circuit completed by the body capacity upon the approach of a person, a pair of capacitive elements, a first and a second electron discharge device, each device having at least anode, grid and cathode circuits, one capacitive element connected to the grid circuit of said first electron discharge device, the other capacitive element connected to the anode circuit of said first electron discharge device, said anode circuit being normally tuned, said second electron discharge device being of the gaseous type and having its grid normally maintained at a high negative potential with respect to its cathode by a circuit connection with the tuned anode circuit of said first electron discharge device, said controlled device connected in series with the anode circuit of said second electron discharge device and a source of voltage supply, the grid circuit of said second electron discharge device being connected in series with a voltage source and said anode circuit of the first electron discharge device so that the change in the capacitive element increases the feedback of the anode circuit of the first electron discharge device, to a point of oscillation and lowers the current flow therein, which changes the negative bias on the grid of second electron discharge device to a lower value and causes it to conduct and completes the anode circuit of said second electron discharge device, including said controlled device.

5. A circuit for the control of electrical apparatus comprising a controlled device in circuit connection which will have its circuit completed by the body capacity upon the approach of a per-

son, a pair of capacitive elements, a first electron discharge device having at least anode, grid, screen grid and cathode circuits, a second electron discharge device being of the gaseous type and having at least anode, grid and cathode circuits, one capacitive element connected to the grid circuit of said first electron discharge device, the other capacitive element connected to the anode circuit of said first electron discharge device, said anode circuit being normally tuned and feedback prevented by means of said screen grid circuit, said second electron discharge device having its grid normally maintained at a high negative potential with respect to the cathode by a circuit connection with the tuned anode circuit of said first electron discharge device, said controlled device connected in series with the anode circuit of said second electron discharge device and a source of voltage supply, the grid circuit of said second electron discharge device being connected in series with a voltage source and said anode circuit of the first electron discharge device so that a change in the capacitive element causes said first electron discharge device to oscillate by feedback in the anode circuit of the first electron discharge device and lowers the current flow therein, which changes the negative bias on the grid of said second electron discharge device to a lower value and causes it to conduct and completes the anode circuit of said electron discharge device, including said controlled device.

6. A circuit for the control of electrical apparatus comprising a controlled device in circuit connection which will have its circuit completed by the body capacity upon the approach of a moving object, a pair of capacitive elements, a first and a second electron discharge device, said second electron discharge device being of the gaseous type, each device having at least anode, grid and cathode circuits, one capacitive element connected to the grid circuit of said first electron discharge device, the other capacitive element connected to the anode circuit of said first electron discharge device, shielding means within said first electron discharge device to prevent feedback therethrough, said anode circuit being normally tuned, said second electron discharge device having its grid normally maintained at a high negative potential with respect to its cathode by a circuit connection with the tuned anode circuit of said first electron discharge device, said controlled device connected in series with the anode circuit of said second electron discharge device and a source of voltage supply, the grid circuit of said second electron discharge device being connected in series with a voltage source and said anode circuit of the first electron discharge device so that the change in the capacitive element detunes the anode circuit of the first electron discharge device and lowers the current flow therein, which changes the negative bias on the grid of said second electron discharge device to a lower value and causes it to conduct and complete the anode circuit of said second electron discharge device, including said controlled device.

7. A circuit for the control of electrical apparatus comprising a controlled device in circuit connection which will have its circuit completed by the body capacity upon the approach of a moving body, a pair of capacitive elements, a first electron discharge device having at least anode, grid, and screen grid and cathode circuits, a second electron discharge device being of the gaseous type and having at least anode, grid and cathode circuits, one capacitive element connected to the grid circuit of said first electron discharge device, the other capacitive element connected to the anode circuit of said first electron discharge device, shielding means within said first electron discharge device to prevent feedback therethrough, said anode circuit being normally tuned and feedback prevented by means of said screen grid circuit, said second electron discharge device having its grid normally maintained at a high negative potential with respect to its cathode by a circuit connection with the tuned anode circuit of said first electron discharge device, said controlled device connected in series with the anode circuit of said second electron discharge device and a source of voltage supply, the grid circuit of said second electron discharge device being connected in series with a voltage source and said anode circuit of the first electron discharge device so that a change in the capacitive element causes said first electron discharge device to oscillate by feedback in the anode circuit of the first electron discharge device and lowers the current flow therein, which changes the negative bias on the grid of said second electron discharge device to a lower value and causes it to conduct and completes the anode circuit of said second electron discharge device, including said controlled device.

8. In combination, a vacuum tube generator of relatively high frequency oscillations, a gaseous discharge tube having an anode, cathode and grid, means for coupling a grid circuit of said gaseous discharge tube to the cathode return circuit of said oscillation generator so that when said generator is not oscillating, said grid of said gaseous tube is subjected to a high negative potential, and when said oscillation generator is generating high frequency oscillations the grid of said said gaseous tube is subjected to such a potential as to permit current flow therethrough, means for controlling the production of oscillations by said high frequency generator, a source of relatively low frequency alternating current and means for energizing the cathode and the anode-to-cathode circuit of said gaseous discharge tube from said source of alternating current.

9. Apparatus as claimed in claim 8, characterized by the fact that the means for controlling the generation of high frequency oscillations comprises capacitive elements.

10. Apparatus as claimed in claim 8, characterized by the fact that the means for controlling the generation of high frequency oscillations includes a screen grid for preventing the generation of oscillations, and a plurality of capacity elements connected to the control grid and plate of said vacuum tube oscillator, the capacity between which may be so adjusted as to cause the production of oscillations.

11. In combination, a vacuum tube oscillation generator, said generator including a vacuum tube having a plate, cathode, control grid and screen grid, high frequency circuits connected between said plate and cathode and said control grid and cathode, capacitive elements whereby feedback may be established so as to cause the generation of oscillations, a cathode return resistor connected between said plate and cathode, a gaseous discharge tube having an anode, cathode and a grid, a source of relatively low frequency alternating current for energizing the cathode of said gaseous tube and for supplying a variable voltage across said cathode and anode of said gaseous tube, a load circuit connected between the plate and cathode of said gaseous tube, and a direct current connection between

the grid of said gaseous tube and the cathode return resistor connected between the plate and cathode of said high frequency oscillation generator whereby when said high frequency generator is oscillating, the grid of said gaseous tube is subjected to such a voltage as to permit said gaseous tube to become conducting, and whereby when said high frequency oscillation generator is not oscillating, the grid of said gaseous tube is subjected to such a voltage as to permit said gaseous tube to become non-conducting by applying a negative potential to its grid of such value as to control the flow of current through said gaseous tube.

12. Apparatus as claimed in claim 11, characterized by the fact that said load circuit comprises an incandescent lamp, and further characterized by the fact that said high frequency oscillation generator is set into oscillation generation by virtue of body capacity.

13. Apparatus as claimed in claim 11, characterized by the fact that a condenser is provided to prevent the application of high plate potential of said high frequency oscillator to the body employed to cause the generation of high frequency oscillations.

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