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CONTROLLING APPARATUS

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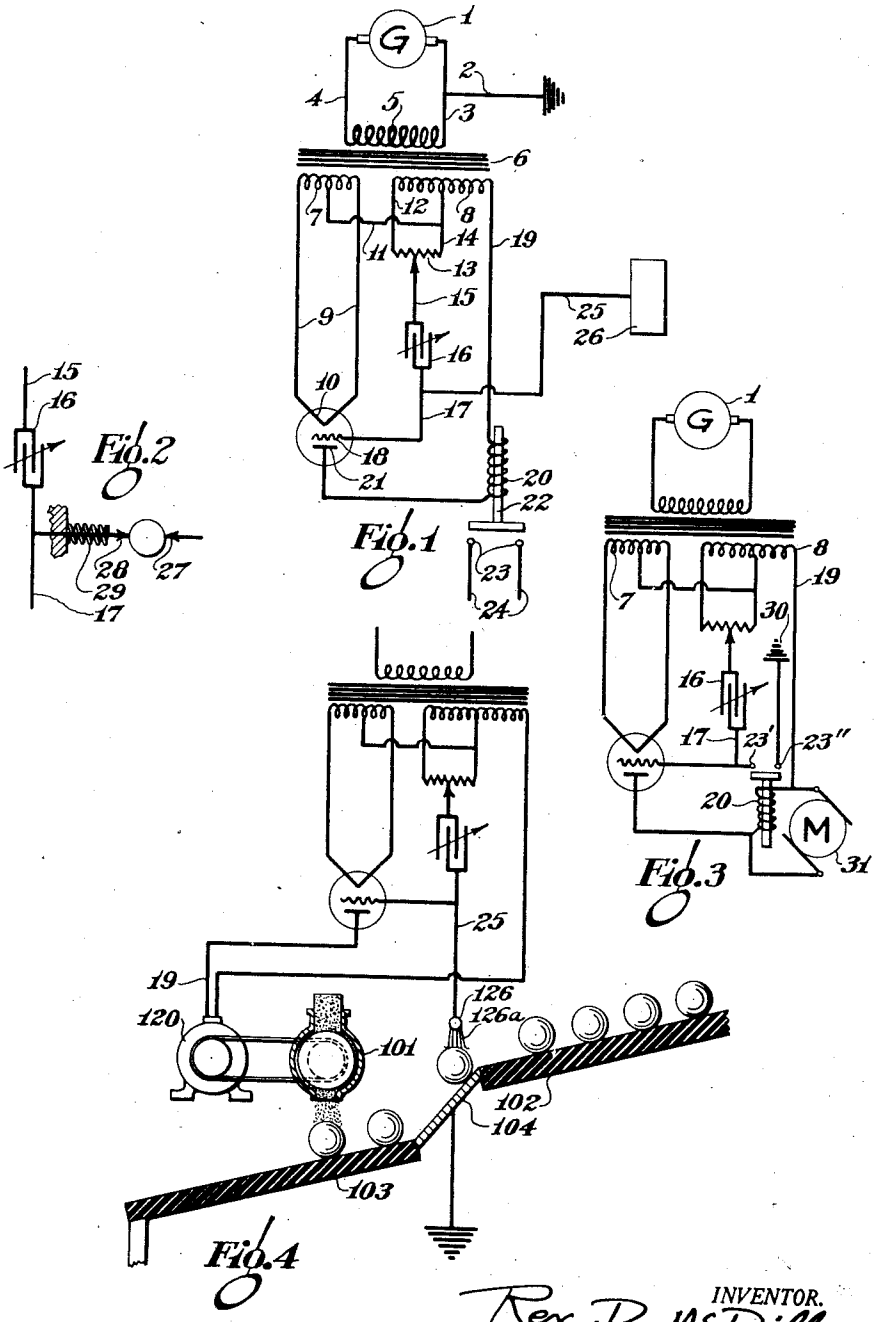

Fig. 1

Fig. 2

Fig. 3

Fig. 4

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CONTROLLING APPARATUS

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8 Claims. (Cl. 175—320)

This invention relates to electrical controlling apparatus.

An object of the invention is to provide improved electrical apparatus which may be used for controlling various devices and which will be extremely sensitive.

Another object is to provide an improved controlling apparatus which will be simple in construction.

Another object is to provide an improved controlling apparatus which will be efficient in its operation.

Other objects will hereinafter appear.

The invention will be better understood from the description of several practical embodiments thereof illustrated in the accompanying drawing, in which;

Figure 1 is a diagrammatic representation of one form of the apparatus arranged to operate a relay upon the presence or absence of a body in a particular location;

Figure 2 is a fragmentary diagrammatic illustration of the apparatus of Figure 1 arranged for use in measuring objects;

Figure 3 is another modification of the apparatus of Figure 1 showing the manner in which the apparatus may be used to operate a device designed for a current of a different frequency than that available; and

Figure 4 is another modification of the apparatus showing a manner of its application to the coating or similar treatment of objects being passed continuously by it.

Referring first to the arrangement of Figure 1, a source of current is illustrated at 1, this being conveniently an alternating current generator such as supplies 110 volt, 60 cycle, A. C. for the illumination of buildings and the like, and may be considered as a central power plant, remote from the apparatus, and may be grounded, as indicated at 2.

Current passes through conductors 3 and 4 to a coil 5 at the apparatus. This coil constitutes in effect the primary of a transformer having a core 6. The transformer has two secondary coils 7 and 8, the former of which is connected by conductors 9 to the terminals of a filament 10 of a thermionic valve or tube, such for instance as the mercury vapor rectifier now known as the thyratron, and to supply the current for heating this filament.

From a central tap on coil 7 to a similar tap on coil 8 extends a conductor 11. Connected to one end of coil 8 is a conductor 12 which extends to one end of a potentiometer or similar resistance element 13, the other end of which is connected by a conductor 14 to the central tap of coil 8. From the adjustable contact of the potentiometer a conductor 15 extends to a variable condenser 16, and a conductor 17 connects the condenser to the grid 18 of the tube.

Connected to the other end of coil 8 is a conductor 19 which includes a coil 20 and is connected to the plate 21 of the tube. The coil 20 is shown as provided with an armature 22 arranged to complete a circuit by being moved against contacts 23 from which conductors 24 pass to some electrical device (not shown) which it is desired shall be controlled.

A conductor 25 extends from conductor 17 and is provided at its end with a conducting plate 26 or the like.

If, with the apparatus just described, current is supplied to primary coil 5 by generator 1, it will induce currents in the secondary coils 7 and 8, the current in the former heating the filament 10. By proper adjustment of the potentiometer 13 and condenser 16, any desired bias may be impressed upon the grid of the tube, and by this means current may be prevented from passing through coil 20.

If, now, the charge which accumulates upon the plate of the condenser connected to conductor 17 be allowed to discharge, as by the approach of some object to plate 26, the grid bias will disappear, current will flow through conductor 19, causing coil 20 to function, and raise armature 22, breaking the circuit between conductors 24, and thus operating whatever device is in the circuit of these conductors.

In the apparatus of Figure 2, two mechanical contacts 27 and 28 have been provided, the former of which is in fixed position, and the latter of which is urged toward the former by a spring 29. The movable contact 28 is mechanically connected to one of the plates of condenser 16. If an object is placed between the two mechanical contacts, it will move this condenser plate relative the other plate, varying the grid bias in proportion to the width of the object, and thus control the operation of armature 22. By adjusting the apparatus to operate the relay when the mechanical contacts are at a known distance apart, objects may be accurately and rapidly measured by being passed between the two mechanical contacts.

In Figure 3, the circuit is substantially the same as that shown in Figure 1, excepting that one of the contacts 23' has been connected to conductor 17, and the other 23'' has been con-

nected to a ground 30. In addition, a motor or other device which it is desired to operate has been connected in parallel with coil 20.

This arrangement is particularly advantageous where the device 31 is designed to operate upon a current of different frequency from that supplied by generator 1. For instance, if the generator produces 60 cycle current and the motor or other device 31 is designed to operate at 15 cycles, the potentiometer and condenser are adjusted so that current will pass through coils 20 and 8 until the grid bias has been built up by four pulsations of the 60 cycle current. Therefore, for every period of four cycles of generator 1, one electrical impulse passes through conductor 19 to device 31 and coil 20; thus the armature will be raised and will ground conductor 17, permitting the grid bias to leak off and so starting the flow of current through coils 8 and 20, and then allowing the armature to assume its normal position. In this manner, current is permitted to flow to the motor 31 in pulsations ¼th as frequent as that which is supplied by generator 1, and the apparatus performs the function of an ordinary rotary converter while being far simpler in its construction.

In Figure 4, the apparatus is shown as arranged for sprinkling comminuted material upon a series of objects rolling along an inclined path. The material is dropped upon the objects from a grater or grinder 101 driven by a motor 120 which has been placed in the conductor 19, replacing coil 20 above described.

The inclined path down which the objects pass consists of two parts 102 and 103 of insulating material, separated by a grounded metallic plate or the like 104.

The plate 26 has been replaced by a brush-like conducting element 126 having depending extremely flexible filaments 126*a*, and is connected to the conductor 25. As the objects pass between filaments 126*a* and plate 104, they act as the dialectric of a condenser of which plate 104 and filaments 126*a* are the plates, so that the grid bias is maintained at a point where it permits current to flow to operate the motor 120, and as long as a continuous stream of objects pass between the plate and filaments, the motor continues to operate. When the objects cease to pass, the grid bias builds up to a point where it prevents further operation of the motor, and so prevents wasting of the material supplied by device 101.

While I have described the illustrated embodiments of my invention in some particularity, obviously many other embodiments will readily occur to those skilled in this art, and I do not therefore limit myself to the precise details shown and described herein, but claim as my invention all embodiments, variations and modifications coming within the scope of the subjoined claims.

I claim:

1. Electrical apparatus comprising a source of alternating current, a thermionic valve, transforming means supplying current to the grid and plate of said valve, regulating means controlling the current supplied to said grid, capacitative means controlling the potential of the current supplied to said grid, capacitative means controlling the potential of the current supplied to said grid and arranged to have its capacity varied by an extraneous object.

2. Electrical apparatus comprising a source of alternating current, a thermionic valve, transforming means supplying current to the filament of said valve, transforming means supplying current to the grid and plate of said valve, regulating means controlling the current supplied to said grid, capacitative means controlling the potential of the current supplied to said grid, and arranged to have its capacity varied by an extraneous object, and an electrical device in circuit with said plate.

3. Electrical apparatus comprising a source of alternating electric current, a transformer the primary of which is connected to said source and having two secondaries, a thermionic valve the filament of which is connected across one of said secondaries, connections from the other secondary to the grid and plate of said valve, a condenser in the connection between the second secondary and the grid of said valve, and means varying the capacity of said condenser and arranged to be actuated by an extraneous object.

4. Electrical apparatus comprising a source of alternating electric current, a transformer the primary of which is connected to said source and having two secondaries, a thermionic valve the filament of which is connected across one of said secondaries, connections from the other secondary to the grid and plate of said valve, a condenser in the connection between the second secondary and the grid of said valve, and means moving one of the plates of said condenser to vary the capacity of said condenser, said movement being controlled by an extraneous object.

5. Electrical apparatus comprising a source of alternating electric current, a transformer the primary of which is connected to said source and having two secondaries, a thermionic valve the filament of which is connected across one of said secondaries, connections from the other secondary to the grid and plate of said valve, a condenser in the connection between the second secondary and the grid of said valve, a stationary mechanical contact, a movable mechanical contact connected to one of the plates of said condenser to move therewith, and resilient means urging said contacts toward each other.

6. A circuit comprising a source of alternating electrical energy, a transformer having a primary connected to said source, and two secondaries, a thermionic valve having its filament connected to one of said secondaries, a resistance element connected in parallel with a portion of the second secondary, an adjustable connection from said resistance element including a variable condenser and connected to the grid of said valve, and a connection from one end of the second secondary to the plate of said valve including a device to be actuated by current passing through said connection.

7. A circuit comprising a source of alternating electrical energy, a transformer having a primary connected to said source and two secondaries, a thermionic valve having its filament connected to one of said secondaries, a resistance element connected in parallel with a portion of the second secondary, an adjustable connection from said resistance element including a variable condenser and connected to the grid of said valve, a connection from one end of the second secondary to the plate of said valve including a device to be actuated by current passing through said connection, and means for conducting current from the grid of said valve.

8. A circuit comprising a source of alternating electrical energy, a transformer having a primary connected to said source and two secondaries, a thermionic valve having its filament con-

nected to one of said secondaries, a resistance element connected in parallel with a portion of the second secondary, an adjustable connection from said resistance element including a variable condenser and connected to the grid of said valve, a connection from one end of the second secondary to the plate of said valve including a device to be actuated by current passing through said connection, means for conducting current from the grid of said valve, and a second electrical device connected in parallel with the first mentioned electrical device.

REX D. McDILL.

DISCLAIMER

1,980,816.—*Rex D. McDill*, East Cleveland, Ohio. CONTROLLING APPARATUS. Patent dated November 13, 1934. Disclaimer filed January 19, 1937, by the patentee.

Hereby enters this disclaimer to claims 2, 3, 4, and 6 of said patent.

[*Official Gazette February 23, 1937.*]