March 22, 1949. R. F. KNEISLEY 2,465,234

ELECTRIC FENCE CHARGER

Filed May 16, 1945

FIG-1-

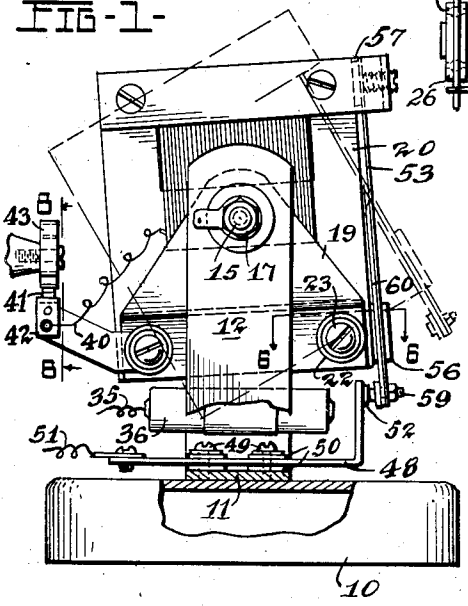


FIG-10-

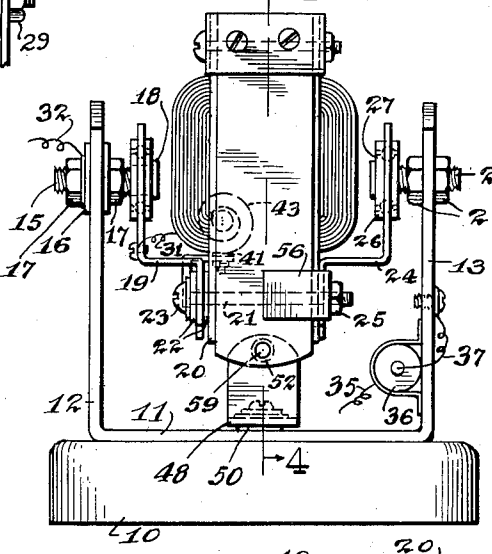


FIG-2-

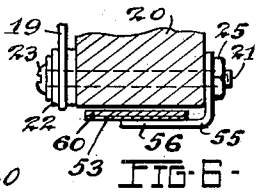


FIG-6-

FIG-3-

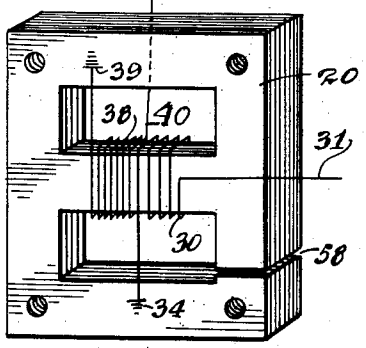


FIG-4-

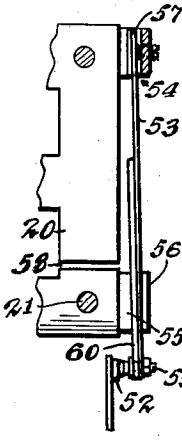


FIG-5-

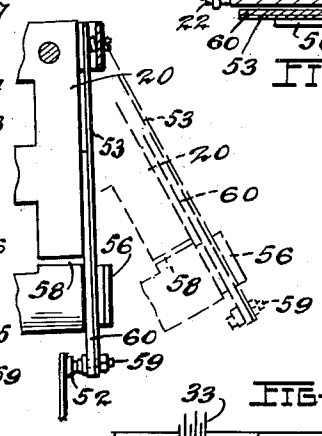


FIG-7-

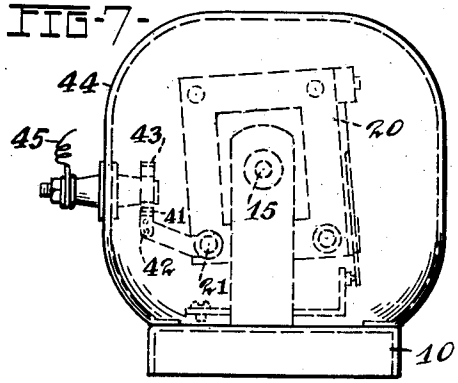
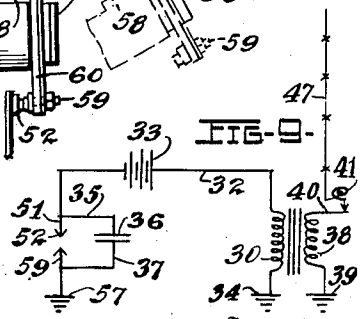


FIG-8-



FIG-9-



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ELECTRIC FENCE CHARGER

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4 Claims. (Cl. 175—357)

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This application relates to an electric fence charger and similar uses where a current, preferably a high tension current, may be sent through a wire intermittently, the time when the circuit is closed being preferably short compared to the time in which it is open.

A control for charging an electric fence is old wherein the normally insulated wire of the fence is connected at one end to a high tension coil, the other end of which is grounded, and a primary relatively low tension coil is employed for inducing high tension in the first said coil at spaced intervals. This invention relates primarily to a device for timing the intermittent current through such a primary coil, although the arrangement disclosed might be utilized to some extent for other purposes.

An object of the invention is to provide a timer which will close a circuit and immediately open the circuit and keep it open for a controllable length of time and then again close the circuit very briefly. A further object of the invention is to provide apparatus of the character described which is very simple and cheap in construction, not liable to getting out of order during use and operating with reliability during use. Further details and minor objects of the invention will appear as the description proceeds. In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of one embodiment of the invention. Figure 2 is an elevation of the same apparatus as viewed from the right of Figure 1. Figure 3 is an isometric view of a transformer core employed in the apparatus with the windings indicated diagrammatically. Figure 4 is a detail vertical section on the line 4—4 of Figure 2. Figure 5 is a view similar to Figure 4 but showing the positions of the parts after the coils are energized. Figure 6 is a detail sectional view on the line 6—6 of Figure 1. Figure 7 is a view of the apparatus enclosed in a casing. Figure 8 is a detail of contact arrangement. Figure 9 is a wiring diagram. Figure 10 shows a spring for swinging the transformer coils.

The apparatus disclosed in Figure 1 comprises a base 10 on which there is mounted a yoke 11 having two upright arms 12 and 13 upon which the operating mechanism is mounted. In arm 12 there is mounted a pivot pin 15 which is insulated from arm 12 by insulation 16. The pivot pin is held in fixed position by nuts 17. The bearing portion 18 of the pin projects inwardly from the arm 12 and has mounted thereon a triangular bracket 19. A laminated iron core 20

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for a transformer has bolts 21 there through adjacent its bottom. The bolts 21 are passed through but are insulated from bracket 19 by insulation 22, the heads 23 of the bolts holding the bracket and insulation in place against the core. On the other side of the core a similar triangular bracket 24 is held against the core by nuts 25. The upper end of bracket 24 is provided with a ball race 26 which forms a bearing with ball race 27 on a bolt 28, which is fixed in position on arm 13 by means of nuts 29.

The primary winding 30 of the transformer coil, as indicated diagrammatically in Figure 3, has one end 31 connected to bracket 19 which is in electrical contact with bearing pin 15. A wire 32 connects the bearing pin with a battery 33, as indicated in Figure 9, the battery not being shown in the other figures. The other end of the primary coil is grounded to the core, as indicated diagrammatically at 34. The other side of the battery, as indicated in Figure 9, is connected to a wire 35 which leads to a condenser 36, the other end of the condenser being grounded to the yoke through lead wire 37.

The secondary winding 38 has one end grounded to the core at 39 and the other end 40 is connected to a contact 41, as shown in detail Figure 8. Contact 41 is carried by a bracket 42 held in position by one of the bolts 21. When in the position shown in Figure 1, contact 41 engages a conductive spiral spring 43 carried by, but insulated from, casing 44, and connected by a lead wire 45 to a fence wire or other object which is to be intermittently charged with high tension.

Mounted on the lower member of yoke 11 there is a plate 48 held in place by screws 49, but insulated by insulation 50 from the yoke and base. Lead wire 51 leads from the battery in parallel with lead 35 to plate 48. One end of plate 48 is turned up and carries a contact member 52.

A spring plate 53, which may be of phosphor bronze, is attached at its upper end 54 to one side of the core. A stop member 55 is attached to the core, as shown in Figure 6 by one of the bolts 21 and nuts 25. The stop member is preferably made of soft metal which may be bent to adjust the relation of its end 56 to the core 20. The upper end of plate 53 is grounded to, or in electric contact with, core 20 at 57.

The core 20 is provided with an air gap at 58. The lower end of plate 53 carries a contact screw 59 which may be adjustable if desired. Armature 60 is attached to spring plate 53.

The operation of the apparatus will be fairly evident from the foregoing description. How-

ever, a brief summary of the operation is as follows:

With the apparatus connected up as indicated in Figure 9 and in the position in which it is shown in Figure 1, connections are made through contacts **52** and **59** so that the primary coil is energized and in turn induces a charge in the secondary coil. Due to air gap **58**, armature **60** is attracted to the core **20**. This pulls the core against the armature plate since the lower contact **59** rests against rigid contact **52** and the armature can not move while the core is pivoted. This moves the core to the position in which it is shown in full lines in Figure 5. Since the magnetic action attracting armature **60** is quite powerful, the movement of the core against the armature is rapid and the momentum thus acquired by the core swings it on to the position in which it is shown in dotted lines in Figure 5. As the momentum is expended the swing of the core will cease and it will return under the influence of gravity to the position in which it is shown in Figures 1 and 4, and the operation will be repeated.

For this operation it will be readily understood that the center of gravity of the transformer and its carrier and the parts attached thereto will be slightly below the pivot upon which the carrier swings. The weight of the carrier and parts mounted thereon above the pivotal line slows up the movement of the carrier so that, by mounting the carrier with the center of gravity not far below the pivotal point, the swinging action of the carrier may be slowed up to give a relatively brief energizing contact and a relatively long interval between contacts. The operation, of course, can be modified also by the adjustment of the stop **56** so as to adjust the travel of the core to reach the armature before contact is broken. The apparatus is preferably adjusted so that the contact as shown in Figure 1 will occur before the center of gravity of the carrier and parts mounted thereon is directly beneath the axis of the pivot upon which the carrier is mounted. This is to insure that, when the circuits are otherwise closed as shown in Figure 9, contacts **59** and **52** will be together except when separated by timed swinging action of the carrier and parts mounted thereon.

The degree to which the center of gravity will be to the right of the axis of oscillation when contact is made between **59** and **52** can be adjusted by adjustment of contact **59**.

Instead of relying upon gravity to bias the carrier in the direction to close the contacts, a spring might be employed, and in that case the apparatus might be made to operate in any position. In Figure 10, a coil spring **46** is indicated for this purpose.

While the apparatus is particularly designed for an electric fence, where very brief energizing with high tension current is desired, the principle of operation may be employed for other purposes where there is a similar desire for intermittent closing of a circuit with the circuit open the major part of the time. Also, while a transformer is employed in the apparatus as shown to constitute an electric magnet for operating the apparatus, it will be readily understood that where a change in voltage of the initial current is not needed or desired, a simple electromagnet of any desired and suitable construction could be substituted for the transformer. Also, details of the construction of the various parts and of the connections therebetween may obviously be varied

within the scope of the appended claims while obtaining the advantages of the invention disclosed herein.

What I claim is:

1. A transformer comprising a primary coil and a secondary coil and mounted to turn about a pivotal axis transverse the axes of the coils, a switch closed and opened by movement of the transformer about said pivotal axis and controlling the energizing of the transformer, means continuously urging the transformer in switch closing direction, and means utilizing the magnetic force of an energized coil of the transformer to swing the transformer in switch-opening direction, whereby the switch is a long interval periodic switch the interval of which is timed by the relation of the weight of the transformer to said constantly urging means.

2. In combination, a transformer comprising a primary coil and a secondary coil and mounted to turn about a pivotal axis transverse of the plane of the axes of said coils, an armature mounted on the transformer and movable a limited distance to and from the end of one of said coils, means normally holding the armature to the limit of its movement away from coil, the coil, when energized, exerting magnetic force to urge armature and coil together, a contact carried with the armature, means continuously urging the transformer to turn about its pivot in the direction in which the armature follows the coil, a stationary contact in the path of the first said contact as it moves under said continuous urging, and means energizing the transformer when the said contacts are brought together, whereby the momentum of the transformer when moved by the magnetic force accompanying its energizing opens the energizing switch, and said continuous urge recloses the switch after a predetermined interval.

3. In combination, a transformer comprising a primary coil and a secondary coil and mounted to turn about a substantially horizontal pivotal axis transverse the plane of the axes of the coils, an armature carried by a strip transverse the axes of the coils and fixed to the transformer at one end, resilient means urging the strip to carry the armature a limited distance from the coil, a contact on the other end of the strip, the center of gravity of the transformer and parts mounted therewith being eccentric of said pivotal axis, a fixed contact in the path of the strip-carried contact when the armature is turned under the influence of gravity in a direction to move the armature after the coil, and means energizing said transformer when said contacts are together, whereby the pivoted transformer acts as a timing pendulum for its own energizing switch.

4. In combination, a transformer comprising a primary coil, a secondary coil, a core magnetized by the coils, a carrier for coils and core mounted for swinging movement about an axis, an armature mounted on the carrier adjacent a magnetic face of the core, the core and armature being mounted on the carrier for limited relative movement to vary the distance between the armature and said magnetic face in a direction substantially tangential to a circle about said axis, means constantly urging the carrier to turn about said axis in a direction to make the armature follow said face, means constantly urging the armature and magnetic face apart to the extent of said limit, a contact in fixed relation to the armature, a fixed contact in the path of the first said contact as the carrier turns on its axis, and means energiz-

ing the primary coil of the transformer when the said contacts are together and deenergizing it when the contacts separate, the sum of said constantly urging means being sufficiently less than the magnetic attraction exerted on the armature when the contacts are together so that the parts carrying the magnetic face move towards the armature, when the contacts are together, to the extent of said limit, and then, by momentum, carry the armature with them to separate said contacts.

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