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ELECTRIC FENCE

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Fig. 1

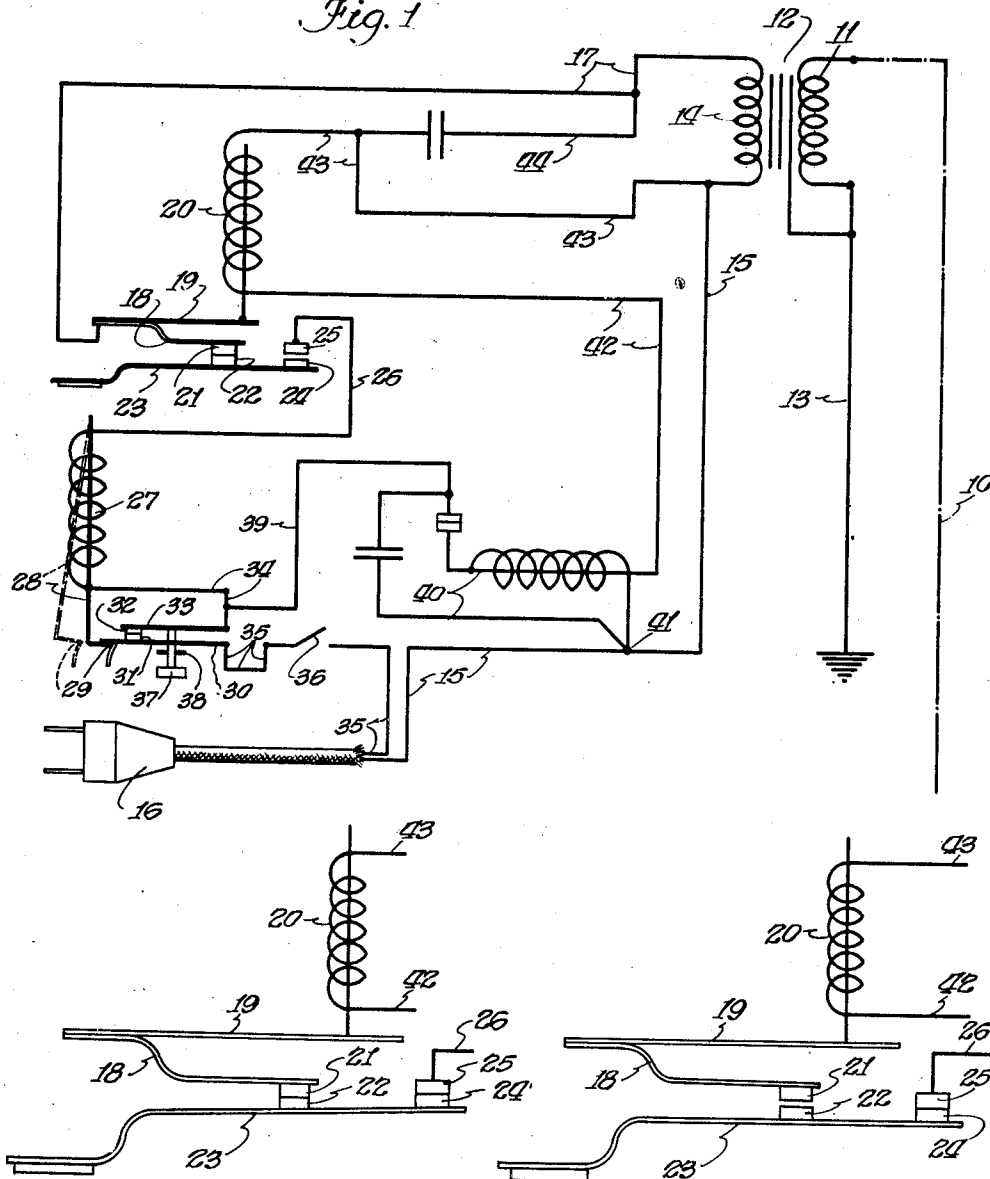


Fig. 2

Fig. 3

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ELECTRIC FENCE

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5 Claims. (Cl. 256—10)

The invention relates to improvements in electric fences and has for its primary object the provision of an improved fence of the character indicated, adapted and arranged to safely keep stock in an enclosure and which is highly efficient and safe in use.

Other objects will appear hereinafter.

The invention consists of the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawing forming a part of this specification and in which—

Figure 1 is a diagrammatic view illustrating an electric fence and circuits for operating the same embodying the invention;

Fig. 2, an enlarged detailed view of a relay switch for controlling the operation of the fence-energizing circuit and showing the parts in their intermediate and operative positions; and

Fig. 3 is a view similar to Fig. 2 but showing the parts in another position with the energizing circuit open.

The embodiment of the invention illustrated in the drawing comprises a conductor 19 which may be the usual conductor surrounding the enclosure for retaining farm animals, such conductor being connected as indicated with one end of one coil 11 or a high reactance transformer 12, the other end of said coil 11 being grounded by the wire 13, as is usual in arrangements of this character. The other coil 14 of the transformer 12 has one end connected by the wire 15 with a source of current in the form of a plug 16. The other end of the coil 14 is connected by wire 17 with one end of a spring switch bar 18 carried by an armature 19 of a relay 20. The switch bar 18 carries a contact 21 cooperating with a contact 22 on another spring switch bar 23, which in turn carries a second contact 24 cooperating with a stationary contact 25 connected by a wire 26 with one end of the wire 27 of a thermolatch. In this arrangement the tension of the spring bars 19 and 23 is such as to hold the parts normally in the positions indicated in Fig. 1, with the contacts 21 and 22 closed and contacts 24 and 25 open or separated. Upon movement of the switch bar 19, away from the switch bar 23, the contacts 21 and 22 will remain closed or in touch with each other until the contacts 24 and 25 touch, at which time the energizing circuit will be momentarily closed. Immediately thereafter, however, as the switch bar 19 continues its movement, the contact 21 is withdrawn from the contact 22, thereby breaking the

energizing circuit. Upon reverse movement of the switch bar 19, when contact 21 touches contact 22, the energizing circuit is again momentarily closed, to be almost immediately again broken by the withdrawal of contact 24 from contact 25, as will be readily understood. The flexible bar 28 of the thermolatch is provided with a detent shoulder 29 cooperating with the end of a switch bar 30, as shown, to releasably hold said switch bar in its circuit-closing position. The switch bar 30 carries a contact 31 cooperating with a contact 32 on another switch bar 33, which is connected by wire 34 with the other end of the coil of the thermolatch 27. The switch bar 30 is connected by wire 35 through a manual switch 36 with the plug 16 and whereby current will be furnished to the energizing circuit thus formed whenever all switches are closed. A reset plunger 37 is connected as indicated with the switch bar 33 and operates freely through the switch bar 30, being provided with a stop pin 38 as indicated. The parts thus indicated constitute an energizing circuit which will energize the open shock circuit 10—13 whenever closed, as will be readily understood. The switch 36—33 can only be closed by manipulation of the reset plunger 37. The first movement of this plunger 37 in an upward direction as indicated in Fig. 1, will serve to swing the switch bar 33 upwardly and hold the switch bar 30 until the stop pin 38 engages the switch bar 30, whereupon the latter will be raised to effect engagement with the detent 29, which will accordingly hold said switch bar 30 in its elevated position. Then when the plunger 37 is released the switch bar 33 will drop into the position shown in Fig. 1, thereby making contact with the switch bar 30 and maintaining such contact as long as the detent 29 is in engagement with the switch bar 30.

A branch wire 39 leads from the wire 34 to a thermoflasher control circuit 40, which in turn is connected at 41 with the wire 15. The thermoflasher circuit 40 is also connected by the wire 42 with one end of the coil of the relay 20, the other end of said coil being connected by wire 43 with one end of the coil 14 of the transformer. As indicated, the thermoflasher comprises the usual bi-metal bar enclosed in the heating coil which is included in the flasher-controlled circuit and which operates in the usual way to break said control circuit as soon as the heating coil heats the bi-metal switch bar, and closing said circuit as soon as the heat is discontinued by the breaking of the circuit. Upon each such closure of the circuit 40—41 the

magnet coil of the relay 20 will be excited to cause operation of the switch bars 19 and 23, as described above. This is an old and well known device for the purpose and requires no further description here. A branch wire 44 also connects wire 43 with the other end of the coil 14.

In operation, the switches 36 and 30-33 are first manually closed. This permits flow of current through the thermoflasher control circuit 40 from the plug 16 and also at the same time the flow of current through the relay 20. The flow of current through the relay 20 will cause movement of the switch bars 23 and 18 into the position indicated in Fig. 2, thereby momentarily closing the circuit 17-14-15 through the coil 14 of the transformer 12, thereby energizing the open shock circuit 10-13 as long as the contacts 21, 22, 24 and 25 remain in contact with each other, as indicated in Fig. 2. However, immediately thereafter the contact 21 moves from engagement with the contact 22, thus breaking said energizing circuit and consequently discontinuing the energizing of the shock circuit 10-13. Obviously therefore an animal or person coming in contact with the conductor 10 and the ground could only receive current from said conductor during the brief time in which the contacts 21, 22, 24 and 25 thus hold the energizing circuit closed. The tensions of the spring switch bars 18 and 23 are so adjusted that this momentary closing of the energizing circuit is a small fraction of the time the control or flasher circuit remains closed, so that it is impossible under any circumstances for an animal or person to receive any prolonged and dangerous shock from the conductor 10. The continued flow of current through the flasher circuit 40 automatically opens said circuit in the usual way and thus de-energizes the relay 20, permitting armature 19 to return to initial position as indicated in Fig. 1. However, in so returning to initial position, the parts must first pass through the positions indicated in Fig. 2, thus again closing momentarily the energizing circuit, so that on automatic opening and closing of the flasher circuit 40 the energizing circuit will be closed for a fraction of the time during which said flasher circuit remains either open or closed. The flow of current through the coil 27, if continued for any length of time, will heat the element 28 sufficiently to release the detent 29 from the switch bar 30, thus breaking the energizing circuit and preventing injury to any animal or person in contact with fence 10, even if the circuit-breaking switch 18-23 should fail to operate for any reason. In this way an electric fence is provided which will deliver the necessary momentary shock to animals coming into grounding contact therewith, but prolongation of said shocks will be absolutely prevented through all possible conditions of use. The specific form and arrangement of parts disclosed is a simple and effective one for the purpose.

While I have illustrated and described the

preferred form of construction for carrying the invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I therefore do not wish to be limited to the precise details disclosed, but desire to avail myself of such variations and modifications that fall within the scope of the appended claims.

I claim:

1. The combination with an enclosure conductor, of an open shock circuit including said conductor and the secondary coil of a circuit energizer; an energizing circuit including a primary coil cooperating with said secondary coil for energizing said shock circuit; a switch in said energizing circuit; a control circuit including means automatically operable by the current thereof for periodically opening and closing it; means for supplying current to said control circuit for automatically and periodically opening and closing it and means in said control circuit for momentarily closing and then opening said energizing circuit switch upon each opening and closing of said control circuit.
2. The combination specified in claim 1 in which a reset switch normally held closed by a thermolatch is included in the energizing circuit, said latch being arranged to release said switch upon continued flow of current in said energizing circuit.
3. The combination specified in claim 1 in which the energizing circuit switch comprises a spring switch bar carrying two switch contacts, one of which cooperates with a stationary contact in said circuit, and a second spring switch bar carrying a contact cooperating with said other contact on the first mentioned switch bar; and a relay in the control circuit operating said second switch bar.
4. The combination specified in claim 1 in which the control circuit is operated by a thermoflasher.
5. The combination with an enclosure conductor, of an open shock circuit including said conductor and one coil of a high reactance transformer; an energizing circuit including the other coil of said transformer; a switch in said energizing circuit comprising a spring switch bar carrying two switch contacts, one of which cooperates with a stationary contact in said circuit and a second spring switch bar carrying a contact cooperating with said other contact on the first mentioned switch bar; a control circuit including a relay for operating said second switch bar and means automatically operable by the current thereof for periodically opening and closing it; means for supplying current to said control circuit; a reset switch in said energizing circuit; a thermolatch in said energizing circuit and arranged to hold said reset switch normally closed, but release it upon the continued flow of current in said energizing circuit; and a thermoflasher in said control circuit for automatically opening and closing the same.

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