June 18, 1957 J. D. DURKEE 2,796,485

AUTOMATIC ELECTRICALLY-CHARGED SWINGING GATE SWITCH

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FIG. 1

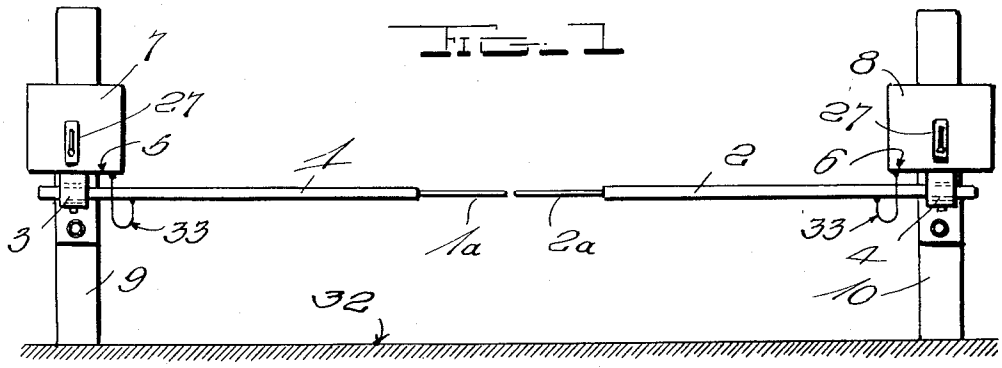


FIG. 2

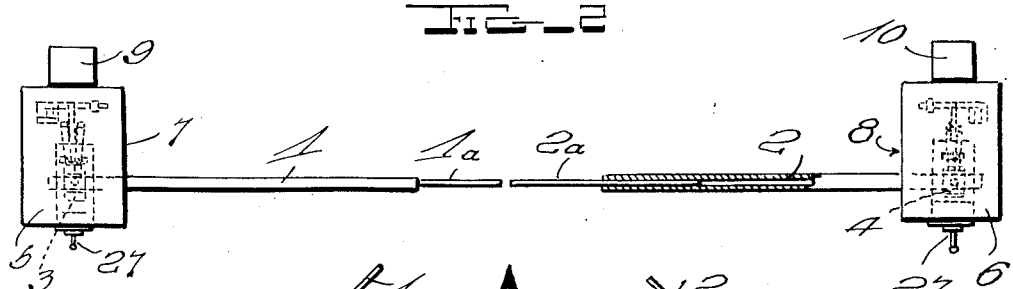


FIG. 3

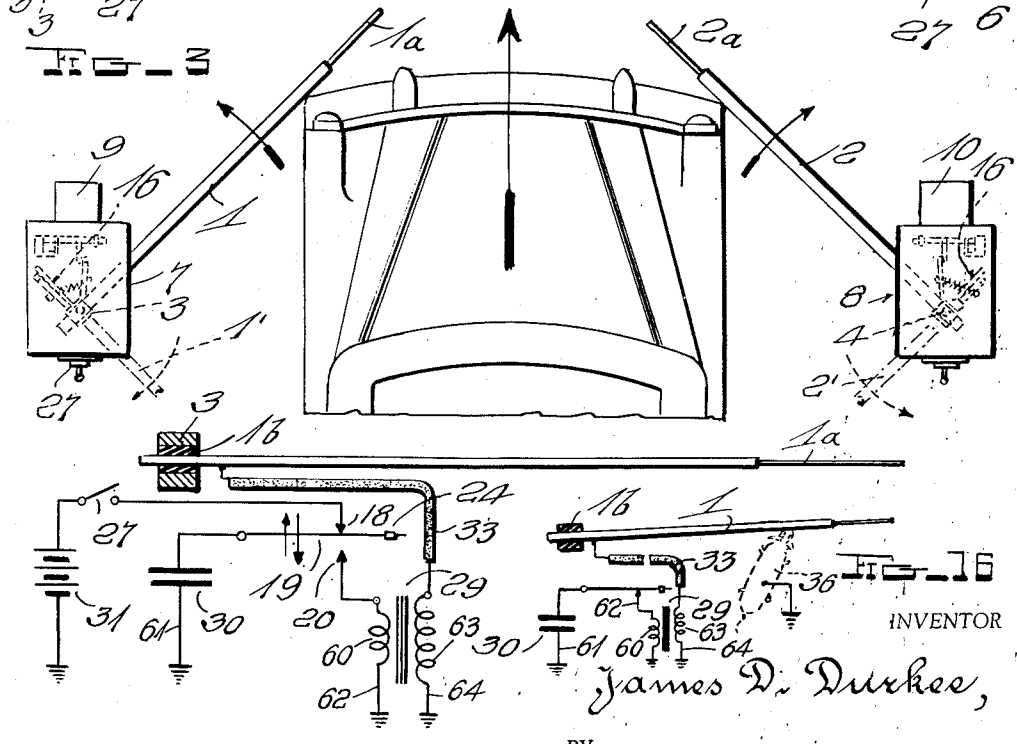


FIG. 16

FIG. 15

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FIG. 4

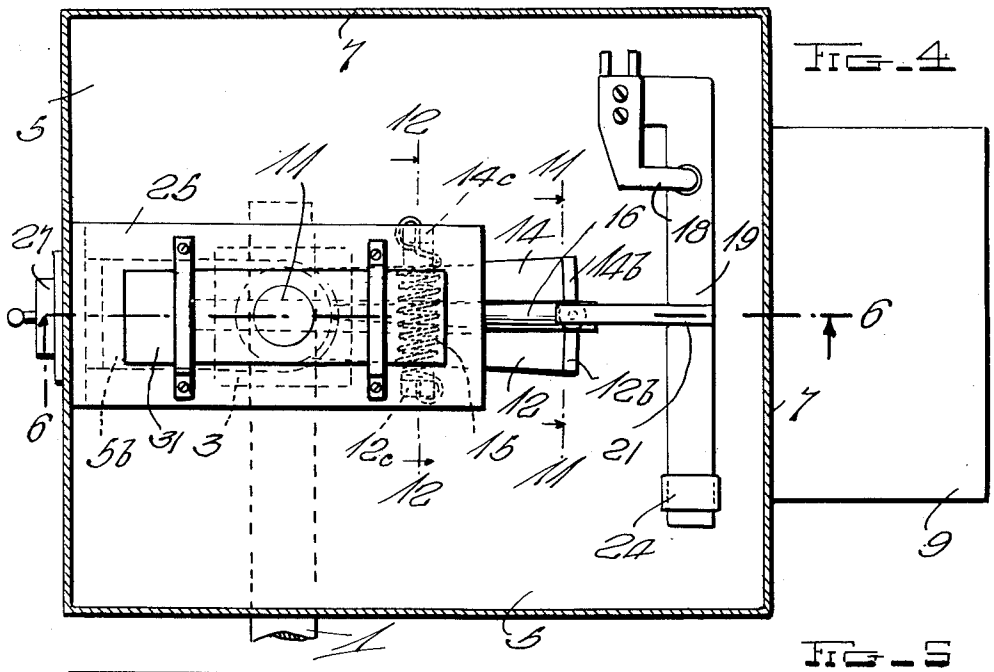


FIG. 5

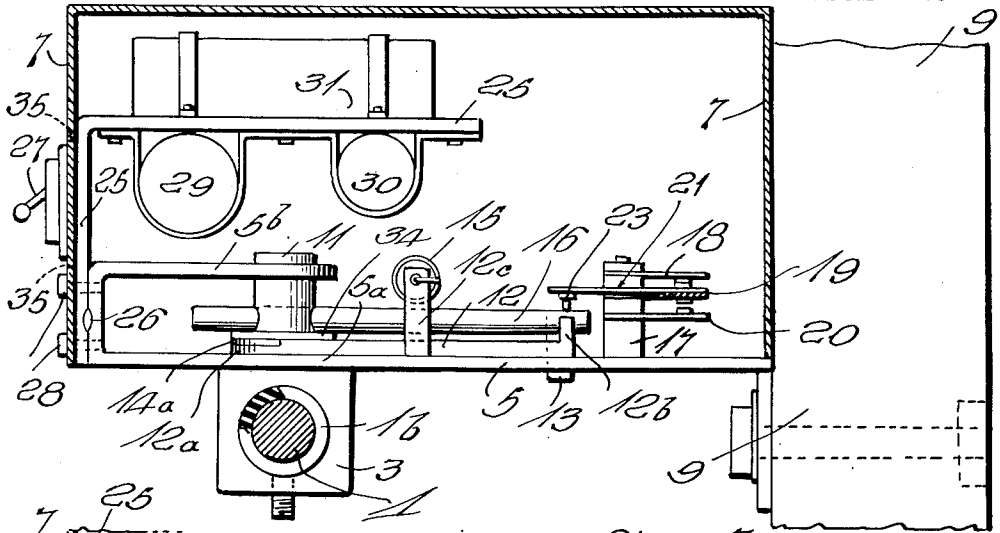
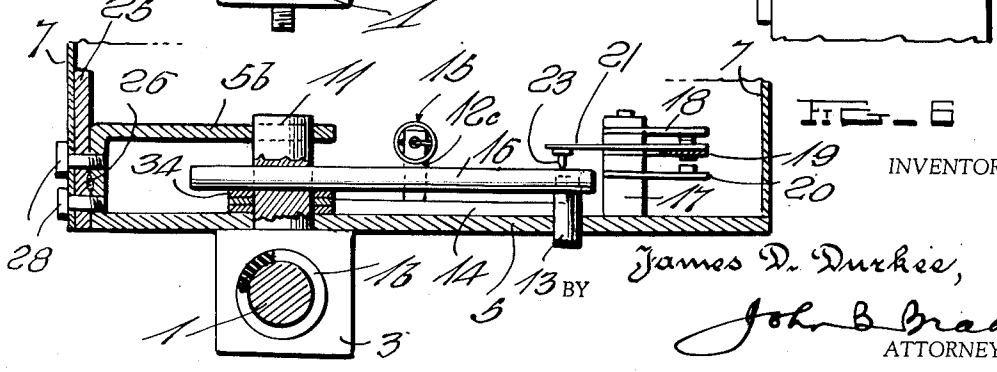


FIG. 6



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AUTOMATIC ELECTRICALLY-CHARGED SWINGING GATE SWITCH

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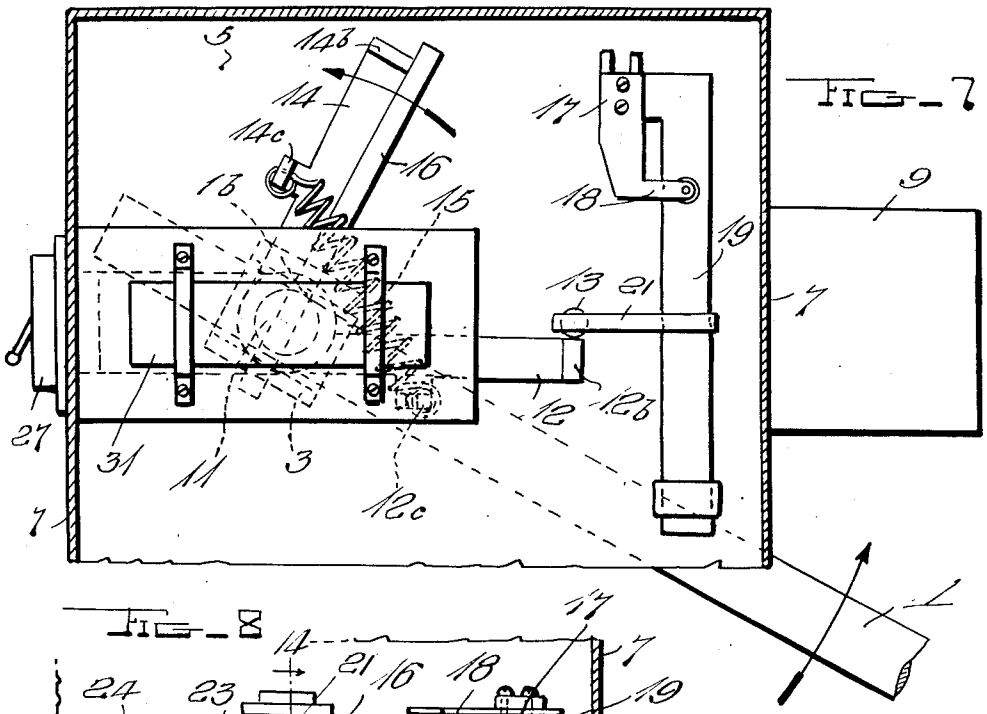


FIG. 7

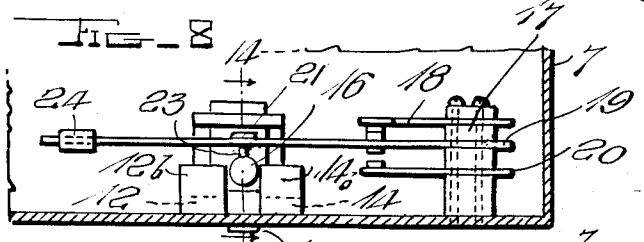


FIG. 8

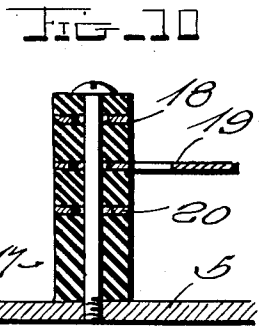


FIG. 10

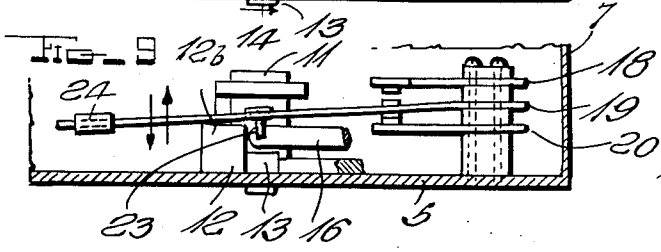


FIG. 9

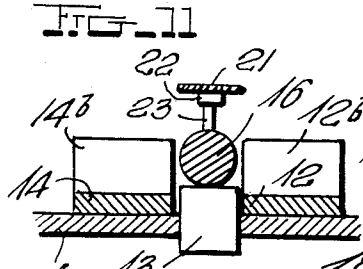


FIG. 11

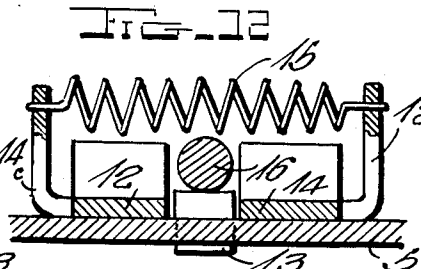


FIG. 12

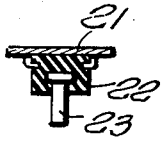


FIG. 14

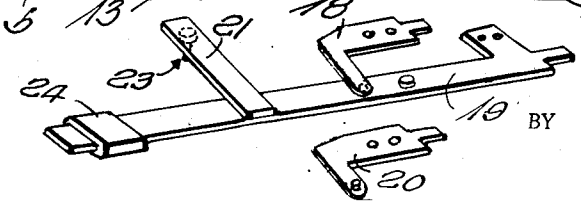


FIG. 13

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AUTOMATIC ELECTRICALLY-CHARGED SWINGING GATE SWITCH

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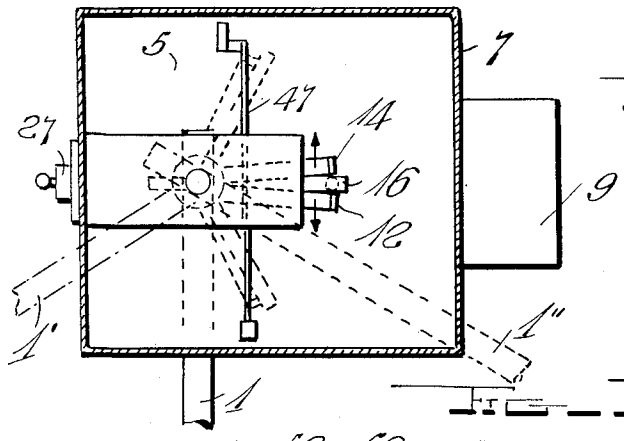


FIG. 17

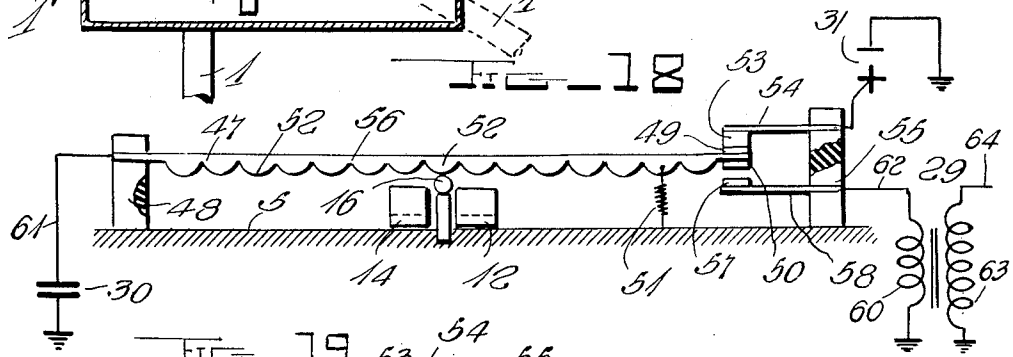


FIG. 18

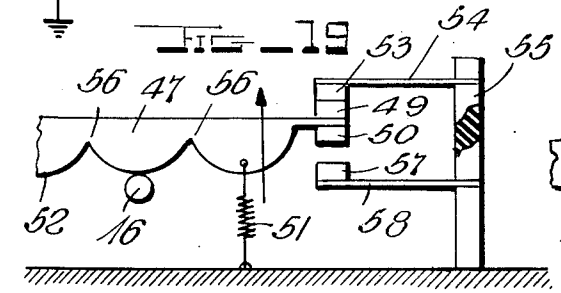


FIG. 19

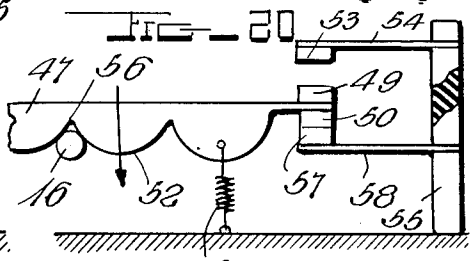


FIG. 20

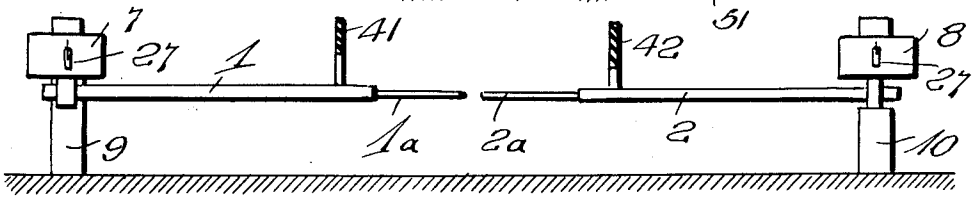


FIG. 21

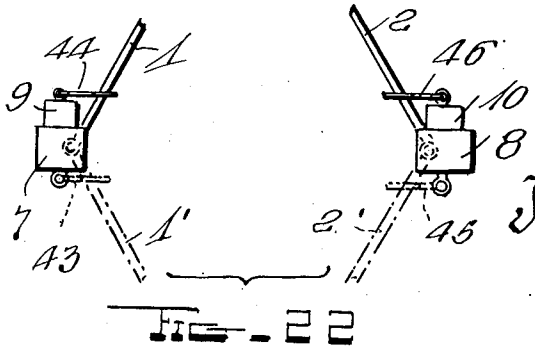


FIG. 22

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United States Patent Office 2,796,485 Patented June 18, 1957

2,796,485

AUTOMATIC ELECTRICALLY-CHARGED SWINGING GATE SWITCH

James D. Durkee, Gravette, Ark., assignor to Farm Devices, Inc., Gravette, Ark., a corporation of Arkansas

Application February 1, 1955, Serial No. 485,402

19 Claims. (Cl. 200—61.62)

My invention relates broadly to gates and more particularly to a drive-through gate intended for confining cattle and other live stock to restricted areas while enabling vehicles to pass freely through a gate guarding such restricted areas.

One of the objects of my invention is to provide a construction of drive-through gate for guarding confined areas where the gate includes a confining member which becomes electrically charged as soon as the gate is displaced in an effort to pass through the gate for repelling any tendency for cattle and other live stock to escape through the gate, while permitting vehicles to pass freely therethrough.

Another object of my invention is to provide a mechanism for a swingable gate whereby displacement of the gate sets the mechanism into operation for subjecting the gate to a succession of high voltage electric charges serving to prevent the passage of cattle and live stock through the gate, while permitting the free passage of vehicles therethrough.

Still another object of my invention is to provide a vibratory circuit control mechanism which is set into operation upon the displacement of a swingable gate for applying to the gate a succession of high voltage charges which apply electric shocks to live stock or cattle attempting to pass through the gate.

Still another object of my invention is to provide a mounting for a swingable gate which may be angularly displaced in either of two directions through a wide range approximating 180° for permitting the passage of vehicles in either direction, while obstructing the passage of live stock or cattle by applying thereto a succession of high voltage shocks operating to warn, and thus divert, cattle or live stock away from the area of the gate.

Still another object of my invention is to provide a construction of hinged mounting for a gate where the gate is so suspended that mere nudging of the gate by cattle or live stock initiates the mechanism into operation to convert potential energy to kinetic energy for producing high voltage discharges which shock and warn and otherwise divert the cattle or live stock from the area of the gate.

Other and further objects of my invention reside in the production of a novel gate suspension mechanism as set forth more fully in the specification hereinafter following by reference to the accompanying drawings, in which:

Fig. 1 is a front view showing the mounting for two coacting swinging gates according to my invention;

Fig. 2 is a plan view of the two swinging gates and their mountings as represented in Fig. 1;

Fig. 3 is a plan view illustrating the manner in which the swinging gates are free to move angularly in either of two opposite directions;

Fig. 4 is an enlarged top plan view of the circuit controlling mechanism operated by the swinging gate with the protective cover for the mechanism and the electrical

circuit components associated with the mechanism removed to show the dynamic parts of the mechanism;

Fig. 5 is a vertical side elevational view of the mechanism shown in Fig. 4 with the circuit components and cover shown in position;

Fig. 6 is a fragmentary vertical view taken substantially on line **6—6** of Fig. 4 and illustrating the mechanism in normal position with the high voltage control contact to the gate circuit maintained in open position with the gate at ground potential;

Fig. 7 is a fragmentary plan view of the gate operating mechanism showing the gate displaced to an open position resulting in the dynamic operation of the voltage controlling circuit for applying high voltage to the gate;

Fig. 8 is a fragmentary elevational view of the contact spring pile-up and the contact controlling mechanism maintained in closed position preparatory to displacement of the gate;

Fig. 9 is a view showing the dynamic condition of the switching mechanism, illustrated in Fig. 8, at the time that the gate is displaced from normal, enabling the reed-type leaf spring to operate through a series of vibrations for controlling the application of high voltage to the gate;

Fig. 10 is a vertical sectional view taken through the standard which supports the spring pile-up assembly and the reed-type contact spring employed in the mechanism of my invention;

Fig. 11 is an enlarged transverse sectional view taken substantially on line **11—11** of Fig. 4;

Fig. 12 is a transverse sectional view taken substantially on line **12—12** of Fig. 4;

Fig. 13 is a perspective view of the contact springs and the reed employed in the switch mechanism of my invention;

Fig. 14 is a transverse sectional view of the pintle associated with the spring reed in the switch mechanism of my invention, the view being taken substantially on line **14—14** of Fig. 8 with the cam arm omitted;

Fig. 15 is a schematic circuit diagram showing the manner in which high voltages are impressed upon the swinging gate;

Fig. 16 is a schematic view showing the manner in which a high voltage electric shock is imparted to cattle or live stock which may nudge or displace the swinging gate;

Fig. 17 is a transverse sectional view through a modified form of circuit control mechanism embodying my invention and illustrating in plan view a cam controlled switch for successively opening and closing the circuit to a condenser charging and discharging circuit;

Fig. 18 is an enlarged schematic view of the form of cam operated switch embodied in the arrangement of Fig. 17;

Fig. 19 is a fragmentary view schematically showing the switch moved to condenser charging position which is the condition when the gate is at rest in normal position;

Fig. 20 shows the cam operated switch of Figs. 17–19 moved to condenser discharging position for transferring a charging pulse to the swinging gate;

Fig. 21 illustrates a further modified arrangement of my invention wherein the swinging gates are provided with vertically insulated hand grips which enable a pedestrian to swing the electrically charged gate to open position without contact therewith; and

Fig. 22 illustrates the gate of my invention equipped with latching hooks which enable the gates to be latched in open position for the ingress and egress of cattle or pedestrians without danger of receiving a discharge from the gates.

My invention is directed to a construction of ranch

gate which may be readily installed across the gate openings of fenced areas, either as a single swinging member for single lane traffic along a roadway, or coacting swinging members for two-way traffic through a driveway. In conventional practice on farms and ranches a vehicle may pass through fenced closures, stopping at each fence enclosure to open the gate at one side and close the gate on the opposite side. Under conditions of rain, wind and snow this is an inconvenient annoyance and requires the driver on many occasions to walk in the mud and water around the fenced area with the accompanying soiling of garments and subsequent tracking of the mud into the vehicle. The automatic electrically charged swinging gate of my invention eliminates all of these inconveniences and yet forms an adequate barrier and serves to restrain the escape of cattle and live stock by reason of the potential energy provided in electric circuits associated with the gate and which is impressed upon cattle and live stock upon contacting with the gate. The mere nudging of the gate by cattle or live stock places the mechanism controlled by the gate in a dynamic state for converting potential energy into kinetic energy resulting in the application of successively high voltage shocks to cattle or live stock which may come into contact with the gate. Cattle and live stock become aware of the dangers incident to contact with the swinging gate and thus shun the area of the gate, reducing to almost nil, the danger of escape of the cattle or live stock through the gate. On the other hand, vehicles with their rubber-tired wheels are insulated from the ground and the shocks incident with the contact of the swinging gates are not imparted to the vehicle. Moreover, vehicles having authorized access to the property are equipped with insulated guards at the level of the swinging gates so that the swinging gates **1** and **2** and the flexible rod ends **1***a* and **2***a* merely brush along the surface of the insulated guards and do not contact any metallic portion of the vehicle body so that no electric charge can ever be imparted to the vehicle body. The gates may be opened and latched or locked in an open position to permit driving cattle therethrough when necessary. A pedestrian may push the gate open with a stick or other insulated material to permit through-passage without danger of receiving a discharge from the gates. Switches are provided at each control mechanism on the gate posts for deactivating the electric charging circuit where it is desired to make repairs and adjustments on the mechanism or when pedestrians wish to pass through the gate. However, for the purpose of confining cattle and live stock the switches are moved to activating position so that the control mechanism is continuously available for the protection of the property against undesired passage of cattle and live stock. Specifically the mechanism of my invention includes a vibrating switch which is initiated into vibratory movement upon displacement of the gate for successively opening and closing an electric circuit for applying the stored charge from an electric condenser to the primary circuit of a step-up high voltage transformer, the secondary winding of which is connected between the ground and the swinging gate. A battery is installed at each gate mechanism and under normal conditions serves to continuously charge the condenser. When, however, the control mechanism is placed in a dynamic state by displacement of the gate, such as by the nudging of an animal, the vibratory switch is initiated into operation, connecting the electric condenser to the primary winding of the step-up transformer so that the secondary winding delivers a voltage charge to the swinging gate. This vibratory motion continues alternately, effecting the re-charging of the condenser and the discharging thereof so that a series of high voltage charges emanate from the swinging gate.

The series of shocks are severe but not injurious. The shocks are of sufficient amplitude to warn the animals of the source of danger and the nature and instinct of the animals are such that in the course of time they learn to avoid the area of the gate and make no effort or attempt to escape therethrough. The drain upon the battery is inconsequential and small flashlight dry cells may be used, having a useful life that is approximately the shelf-life of the batteries.

Referring to the drawings in more detail, reference characters **1** and **2** denote swinging gate members in the form of rigid metallic tubes terminating in resilient metallic end rods **1***a* and **2***a* which are maintained in alignment by insulated mountings, such as **1***a*, in supports **3** and **4** which are rotatable in bracket plates **5** and **6** secured to the gate posts **9** and **10**, respectively. The insulated mountings are constituted by bushings such as **1***b* inserted in supports **3** and **4** for receiving the metallic tubes **1** and **2** and preventing the charges thereon applied through flexible leads **33** from dissipating direct to earth.

The gate posts **9** and **10** are each mounted in the surface of the earth, indicated at **32**, and are aligned as part of the fence forming the enclosure for confining cattle and live stock. The bracket plates **5** and **6** are mounted on these gate posts approximately 32" above the ground so that cattle and live stock strike the gate members **1** and **2** substantially in line with their bodies. Each bracket plate **5** and **6** is provided with a weather-tight cover **7** and **8** forming housings for the equipment and mechanism supported by the bracket plates **5** and **6**. The supports **3** and **4** revolve with respect to bracket plates **5** and **6**. The bracket plates **5** and **6** are apertured at **5***a* and **6***a* to permit the passage of the pintles on the ends of supports **3** and **4**, as represented for example at **11** in Figs. 4–6. In order to journal the pintles **11** I shape the bracket plates **5** and **6** as shown in Figs. 4–6 by extending these plates upwardly in a relatively narrow strip as represented at **5***b* in Figs. 4–6. These strips are bent into a spaced parallel position to the top surfaces of the bracket plates as represented for example at **5***b* and serve as the upper journal for pintles **11**.

The pintles **11** pass through a pair of actuator blades **12** and **14** which are cut to one-half their total thickness and form a compact half-joint at the superimposed ends thereof as represented at **12***a* and **14***a* through which the pintles **11** extend. These superimposed portions of one-half thickness serve as bearing faces which mutually revolve on each other as the actuator blades change their annular relation. The outwardly projecting ends of actuator blades **12** and **14** are bent upwardly as represented at **12***b* and **14***b* and the blades each carry a lug **12***c* and **14***c* on the extreme outer edges thereof. Coil spring **15** extends laterally between the lugs **12***c* nd **14***c* and serves to bias the actuator blades **12** and **14** inwardly toward each other around pintles **11** as a center, restricted only by contact with opposite sides of the fixed anvil **13**. The actuator blades **12** and **14** are free to swing outwardly against the restraint of spring **15** as represented for example in Fig. 7, which shows actuator blade **14** displaced angularly with respect to actuator blade **12**. Over the superimposed positions of the actuator blades **12** and **14** I arrange a washer **34** and just above this washer I pass a cam arm **16** through a diametrically extending aperture **11***a* in pintle **11**. This cam arm thus serves to maintain the assembled relationship of the support, such as **3**, the bracket plate, such as **5**, the two actuator blades, such as **12** and **14**, the washer **34**, and the pintle **11**, in the bearings provided by the plate, such as **5**, and the upper turned-over extension **5***b* thereof as shown more clearly in Fig. 6.

Each bracket plate, such as **5**, provides mounting means for a contact spring standard **17** which supports contact springs **18**, **19** and **20** in insulated spatial relation in a spring pile-up assembly, each of which carries contact members. The contact spring **19** consists of a vibratory resilient reed or switch arm which extends from the

standard 17 in a direction transversely to an axis passing through the pivotally mounted pintle 11 as shown. The reed or switch arm 19 carries a weight 24 on the end thereof which may be selectively fixed in a position for insuring the vibratory operation of the reed as will appear more fully hereinafter.

The reed or switch arm 19 carries a transverse spring 21 which projects in a direction normal to the axis of the reed 19 and toward the pivot of pintle 11. The transverse spring 21 carries an insulation member 22 in the underside of the end thereof in which there is supported a pintle 23 extending downwardly and adapted to engage and be supported on the upper surface of the end of the cam arm 16 in the position shown, for example, in Figs. 4, 5, 6, 8, 11 and 12. That is to say, while the cam arm 16 is in the central position shown and extending in a direction normal to the axis of reed or switch arm 19, cam arm serves to support the pintle 23 so that the contact members carried by reed or switch arm 19 and contact spring 18 are maintained closed. On the other hand, when cam arm 16 is displaced and there is no support for pintle 23, the circuit between reed 19 and contact spring 18 is broken and a circuit between reed 19 and contact spring 20 is established as shown in Figs. 7 and 9. Inasmuch as cam arm 16 is removed from a position supporting pintle 23 abruptly, the weight 24 is released subjecting reed or switch arm 19 to the release of kinetic energy and reed or switch arm 19 dynamically vibrates up and down successively breaking the circuit connection with contact spring 20 and making circuit connection with contact spring 18.

The upper portion 5*b* of the bracket 5 serves as a support against which bracket 25 is secured by a weld 26, for example. The bracket 25 extends upwardly and horizontally in spaced relation above the horizontally extending upper portion 5*b* of bracket 5. A protective cover 7 forming the housing for the equipment supported by bracket 5 extends over the bracket 25 and is secured thereto by fastening screw 28 as shown. A switch 27 is supported on bracket 25 and extends through a slot 35, provided for that purpose in cover 7.

The horizontally extending portion of bracket 25 serves to suspend the high voltage transformer 29 and the condenser 30 beneath the horizontal portion of the bracket, while supporting the battery 31 above the horizontally extending portion of the bracket.

Referring more particularly to Figs. 15 and 16 the circuit components heretofore described have been illustrated by electrical symbols where the high voltage transformer 29 has its primary winding 80 connected to the leaf spring carrying its contact at 20 and to which connection is made by the contact carried by reed or switch arm 19, as the reed or switch arm 19 swings downwardly under the effect of weight 24 which connects condenser 30, which is generally of the dry electrolytic type and of 50 mfd. or greater capacity, to the primary winding 60 of the transformer 29, as illustrated in Fig. 16. Condenser 30 has been previously charged from battery or power supply source 31 by virtue of the contact of reed or switch arm 19 with the contact of contact spring 18 so that the discharge of condenser 30 through the primary winding 60 of the high voltage transformer 29 results in the induction of a voltage in secondary winding 63 of transformer 29 and the application of a high voltage shock pulse to the gate member 1 through the high voltage insulated lead represented at 33. The path of movement of the contacts on the reed or switch arm 19 is in a vertical direction when the support from cam arm 16 is removed. The circuit indicated at 61 constitutes a charge accumulating circuit. The circuit 62 which extends through the primary winding 60 comprises an input system. The output system includes the circuit 64 connected with the secondary winding 63 and connected to the gate member 1. By virtue of the vibratile operation, the reed or switch arm 19 in its own period, and the contacts thereon, move in and out of contact with the fixed contacts 18 and 20 and the condenser 30 is thus alternately charged and discharged to produce the successive shock pulses on gate member 1.

The animal, shown schematically at 36, in Fig. 16, sets into operation the shock mechanism by nudging the gate member 1 as shown, whereupon cam arm 16 is displaced from its support of the pintle 23 resulting in the vibratory movement of reed or switch arm 19 and the successive making and breaking of the contacts between reed or switch arm 19 and contact springs 18 and 20, whereby condenser 30 is successively charged from battery 31 and discharged into gate member 1.

The gate members 1 and 2 are swingable in either of the directions indicated in Fig. 3 in full lines and dotted lines 1—1′ and 2—2′ and in doing so move either the actuator blades 12 or 14 by cam arm 16 against the action of coil spring 15. The gates may be opened by a pedestrian who may push against the rods of insulation material shown at 41 and 42 in Fig. 21 carried by the gates 1 and 2 or the pedestrian may push the gates to open position by use of a stick or other insulation material to permit access through the gate. I may also provide hooks 43, 44, 45 and 46 in appropriate locations for latching the gates in open position, as represented in Fig. 22 at 1, 1′, 2 and 2′, to enable the cattle to be driven through when necessary. Displacement of either blade 12 or 14 by cam arm 16 results in the release of pintle 23 and the vibratory motion of weighted reed 19 for producing the successive shocks as hereinbefore explained. The restoration of the cam arm beneath the pintle 23 opens the circuit between the high voltage transformer and the condenser 30 and restores the condenser 30 to a condition of charge by closing the contact between reed or switch arm 19 and spring contact 18 for closing the circuit to battery 1. As soon as the gate members are again nudged or displaced the stored potential energy is converted into kinetic energy and high voltage shock pulses are delivered to the gate members.

In the form of my invention shown in Figs. 17–20, the vibratory reed or switch arm 19 is wholly eliminated and in lieu thereof I provide a switch member 47 which is insulatingly mounted on bracket plate 5 on pedestal 48 and electrically connected to the condenser 30. The switch member 47 extends horizontally over bracket plate 5 and carries an upper and lower contact 49 and 50 on the extremity thereof.

The switch member 47 is biased by spring 51 so that cam arm 16 while supporting member 47 on the peaks of the several cams 52 moves contact 49 into electrical connection with fixed contact 53 mounted on a resilient strip 54 carried by insulated standard 55 mounted on bracket plate 5 as shown. When, however, cam arm 16 is angularly displaced and the cam arm 16 angularly slides from a position supporting the peaks of cams 52 to a position in the valleys 57 between the cam peaks at 52 the switch member 47 drops under control of spring 51 to a position in which contact 50 establishes connection with contact 57 carried by leaf spring 58 mounted on insulated standard 55. Thus a circuit connection is established from condenser 30 through the primary winding 60 in the input system 62 of high voltage transformer circuit 29 electrically connected as heretofore explained, through secondary winding 63 in output system 64 to gate member 1 for applying a succession of high voltage charges to the associated swinging gate members. Thus the periodicity of the charging and discharging of the circuit through condenser 30 in charge accumulating circuit 61 is controlled by the spacing of the peaks of the cams 52. The cams 52 may be shaped in curves as shown or in lineal peaks, or in other shapes as may be desired.

In Fig. 17 I have indicated the manner in which the gate member 1 is swingable to either positions 1′ or 1″ throughout which range of movement cam arm 16 operates over the cam surfaces of cams 52 of switch member

47 subject to restoration in position by resiliently biased blades 12 or 14 as hereinbefore explained.

While I have described my invention in certain of its preferred embodiments I realize that modifications may be made and I desire that it be understood that no limitations upon my invention are intended other than may be imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. A switch comprising a horizontally swingable member displaceable from a static condition to a dynamic condition, a vibratory switch initiated in movement upon displacement of said member from a static condition to a dynamic condition, a high voltage charging and discharge circuit and means controlled by said vibratory switch when said member is displaced to a dynamic condition for rendering said high voltage charging and discharge circuit successively effective upon said horizontally swingable member while said member is in the dynamic condition through alternate charging and discharging conditions.

2. A switch as set forth in claim 1 in which said vibratory switch includes a resilient reed having a weight on one end thereof and secured at the other end thereof in a position between two spring contacts, means for normally supporting said resilient reed for maintaining the resilient reed out of contact with one of said spring contacts, the displacement of said member operating to gravitate said reed out of connection with the aforesaid contact and into contact with the other of said spring contacts in a succession of cycles.

3. A switch as set forth in claim 1 wherein a cam arm is moved in correspondence with the displacement of the horizontally swingable member and in which said cam arm normally supports said switch in static condition and removes the support upon displacement of said member to dynamic condition for initiating vibrating movement of said switch.

4. A switch as set forth in claim 1 wherein a pair of angularly shiftable actuator blades are pivoted to move about the same center as the center about which said horizontally swingable member moves, a cam arm mounted to move simultaneously with said swingable member and operative to move in correspondence therewith, said cam arm extending between said actuator blades, and means for biasing each of said actuator blades against said cam arm, whereby displacement of said member operates to correspondingly displace a selected one of said actuator blades, the selected blade operating to continuously restore said swingable member to the initial position thereof.

5. A switch as set forth in claim 1 including means for biasing said horizontally swingable member for restoring said member to a normal position after each displacement thereof.

6. A switch as set forth in claim 1 which includes a cam arm connected with said horizontally swingable member and movable simultaneously therewith, a spring device extending from said vibratory switch and projecting over and normally supported by said cam arm, the displacement of said cam arm operating to remove the support beneath said vibratory switch for gravitating said switch and subjecting said switch to cyclic movement for successively controlling said high voltage discharge circuit at the frequency of movement of said vibratory switch.

7. A switch as set forth in claim 1 in which said horizontally swingable member is mounted in an axially movable support journaled for movement about a vertical axis, a pair of actuator blades arranged in V-formation and pivoted on the axis about which said support is revolvable, a cam arm carried by said support and extending between the V-shaped arrangement of said actuator blades, means resiliently restraining said blades with respect to each other, said cam arm operating to move one of said blades while the other of said blades remains fixed when swinging the gate in either of two directions.

8. A switch as set forth in claim 1 in which said vibratory switch is normally maintained in a state of stored potential energy and wherein displacement of said member from a static condition to a dynamic condition effects the conversion of said potential energy into kinetic energy, while said high voltage circuit discharges to said member.

9. In a switch, a supporting bracket, means journaled in said bracket and displaceable from a static to a dynamic condition, a cam arm carried by said means and subject to said displacement from a static to a dynamic condition, a pair of actuator blades pivotally mounted with respect to said cam arm and extending on opposite sides of said cam arm, an anvil carried by said bracket in alignment with the end of said cam arm and normally providing a support for the remote end of said cam arm when said cam arm is in static condition, spring means interconnecting said actuator blades and extensions formed on said actuator blades one of which is selectively engageable by said cam arm when said cam arm is moved in a dynamic condition in either of two angular directions while the other actuator blade abuts said anvil.

10. A switch comprising a horizontal swingable member, a switch member, a cam arm connected with said gate and operated in a horizontal path beneath said switch member for moving said switch member from a static to a dynamic condition, said switch member having a pair of contacts on one end thereof and a multiplicity of cam surfaces disposed along the lower edge of said switch member, said cam surfaces being engageable by said cam arm for successively moving said switch arm to either of two positions and fixed contacts aligned with the contacts carried by said switch arm and adapted to be successively made or broken in accordance with displacement of said switch arm.

11. A switch as set forth in claim 10 in which said cam surfaces on said switch arm are separated by valleys in which said cam arm may be successively received, and means for resiliently biasing said switch arm with respect to said cam arm whereby engagement of said cam arm with the peaks of said cam surfaces and the valleys therebetween determine the successive making and breaking of the contacts carried by said switch arm with respect to said coacting aligned fixed contacts.

12. A switch as set forth in claim 10 in which said switch member is fixed at one end and is movable in a lineal plane for establishing successive circuit connections between the contacts carried thereby and either of said fixed contacts and wherein said switch member is assisted by gravity and said resilient biasing means for moving said switch arm into connection with one of said fixed contacts when said cam arm occupies a position in the valleys between said cam surfaces and wherein said switch arm is moved into electrical circuit connection with the other of said fixed contacts against the action of said resilient biasing means when said cam arm is aligned with the peaks of said cam surfaces.

13. A vibratory switch comprising a horizontally swingable member, a switch arm fixed at one end and free at the other end and carrying contacts on the free end thereof, fixed contacts located at opposite limits in the path of movement of the contacts on said switch arm, said switch arm being vibratile in its own period for moving the contacts thereon into and out of connection with the fixed contacts, a charge accumulating circuit including a condenser connected at one end to said switch arm, a high voltage transformer circuit including an input system and an output system, said output system being connected with said swingable member for applying high voltage discharges thereto, said input system being connected to one of said fixed contacts, a power supply charging source connected to the other of said fixed contacts, means for normally maintaining one of the con-

tacts on said switch arm in connection with the fixed contact connected with said power supply charging source for charging said charge accumulating circuit, said switch arm in successive vibratile movements thereof transferring the connection of said charge accumulating circuit to said input system for discharge therethrough and into said output system for subjecting said member to high voltage discharges.

14. A vibratory switch as set forth in cliam 13 in which the frequency of the high voltage discharges applied to said member is determined by the periodicity of the vibration of said switch arm.

15. A vibratory switch as set forth in claim 13 in which said member is movable from a static condition to a dynamic condition and wherein said output system is de-energized so long as said member remains in a static condition and is subjected to high voltage discharges so long as said member is in a dynamic condition.

16. A vibratory switch as set forth in claim 13 in which said switch arm is vibratile in a vertical plane and includes a weight adjacent the free end thereof, said switch arm being vibratile in a vertical plane and in which the frequency of the high voltage discharges applied to said member depends upon the rate of decay of the movement of the contacts on said switch arm with respect to said fixed contacts under control of the weight of said switch arm.

17. A vibratory switch comprising a horizontally swingable member, a horizontally disposed switch arm fixed at one end and free at the other end and movable in a vertical plane and carrying contacts on the free end thereof, fixed contacts located at opposite limits of the path of movement of the contacts on said switch arm, said switch arm being provided with a multiplicity of lineally spaced cams on the lower surface thereof and wherein a cam arm is connected with said swingable member and operates in movable supporting relation to said switch arm below the spaced cams thereon for successively moving the contacts carried by said switch arm into and out of contact with said fixed contacts, a charge accumulating circuit including a condenser connected at one end to said switch arm, a high voltage transformer circuit including an input system and an output system, said output system being connected with said swingable member for applying high voltage discharges thereto, said input system being connected to one of said fixed contacts, a power supply charging source connected to the other of said fixed contacts, means for normally maintaining one of the contacts on said switch arm in connection with the fixed contact connected with said power supply charging source for charging said charge accumulating circuit, said switch arm being successively displaceable for transferring the connection of said charge accumulating circuit from said charging source to said input system for discharge therethrough and into said output system for subjecting said member to high voltage discharges, the frequency of said discharges being proportional to the rate at which said cam arm moves below said spaced cams.

18. A switch comprising a frame structure, a pintle journaled on a substantially vertical axis in said frame structure for angular movement in opposite directions, an actuating member connected with one end of said pintle in a position outside of said frame structure, a cam arm connected with said pintle inside said frame structure, and movable by said pintle in a plane substantially normal to the axis of said pintle, a pair of actuator blades pivoted about said pintle and disposed within said frame structure and movable in a plane substantially normal to the axis of said pintle between said frame structure and the axis of said cam arm, an anvil mounted on said frame structure in a position for supporting the free end of said cam arm in normal position, said actuator blades having extensions thereon projecting into the paths of movement of said cam arm and engageable by said cam arm, spring means interconnecting the outer ends of said actuator blades normally whereby said actuator blades are biased to positions abutting with the opposite sides of said anvil and being displaceable as said cam arm moves in either direction for restraining the movement of said cam arm and restoring said cam arm to normal position supported by said anvil, a vibratory reed fixed at one end and free at the other end and disposed adjacent the free end of said cam arm, contacts carried by said reed, fixed contacts spaced above and below the aforesaid contacts and disposed in alignment therewith and a weight mounted adjacent the free end of said reed, said reed being normally supported in a static condition by said cam arm and being initiated into vibration when said cam arm is displaced from a position beneath said reed by movement of said actuating member, whereby said reed oscillates between said fixed contacts for effecting a series of make and break connections between the contacts carried by said reed and said fixed contacts.

19. A switch as set forth in claim 18 in which said cam arm is displaceable in either direction in a plane normal to the axis of said pintle and wherein in one direction one of said actuator blades is restrained in abutment with one side of said anvil while the other of said actuator blades is in spring biased contact with one side of said cam arm for exerting a restoring force thereon, and wherein when said cam arm is displaced in the opposite direction the other actuator blade yieldingly engages the opposite side of said cam arm for urging said cam arm in a direction for restoration to normal position while the aforementioned actuator blade abuts with the opposite side of said anvil.

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