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Plevy et al.

[11] **3,717,802**

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[54] **SOLID STATE ELECTRONIC BIRD REPELLENT SYSTEM**

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[73] Assignee: **Serex, Inc.**, Garwood, N.J.

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[21] Appl. No.: **246,686**

[52] **U.S. Cl.** ....**317/262 S,** 174/117 FF, 256/10, 317/31, 321/4

[51] **Int. Cl.** **H05c 1/02**

[58] **Field of Search** ...174/706, 72 C, 117 F, 117 FF, 174/117 A; 339/28; 317/262 S, 31; 321/18, 19, 4; 256/10

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Assistant Examiner—Harry E. Moose, Jr.
Attorney—Arthur L. Plevy

[57] **ABSTRACT**

An electronic bird repellent system utilizes a "sandwich like" transmission line assembly for conducting high voltage about an area to be protected. The transmission line comprises a top and bottom conductive foil separated by a suitable insulating member, for providing support and separation. The system includes high voltage protection circuitry to prevent prolonged shock hazard and voltage monitoring circuitry to provide an indication determinative of an open circuit in said transmission line.

10 Claims, 10 Drawing Figures

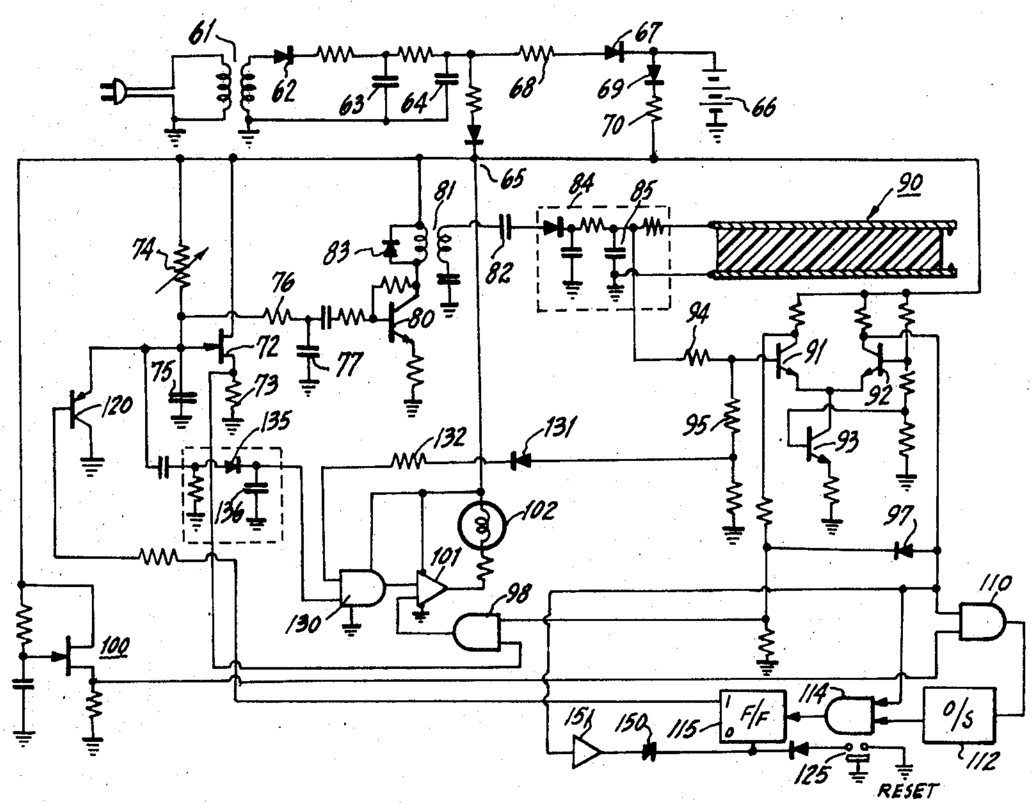
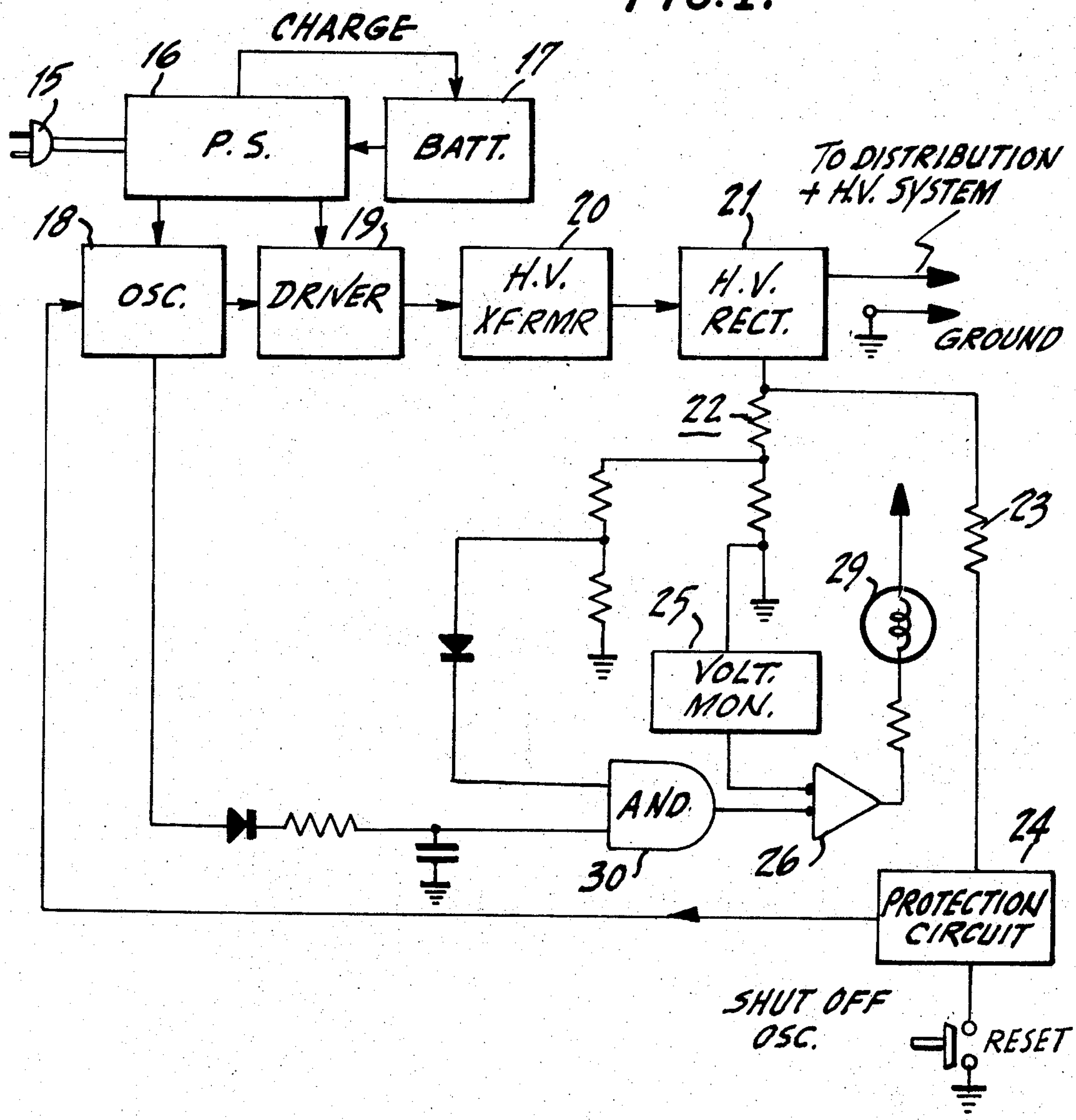


FIG. 1.


CHARGE
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16
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P. S.
BATT.
18
19
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21
TO DISTRIBUTION
+ H.V. SYSTEM
OSC.
DRIVER
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XFRMR
H.V.
RECT.
GROUND
22
23
29
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VOLT.
MON.
AND
30
26
24
PROTECTION
CIRCUIT
SHUT OFF
OSC.
RESET

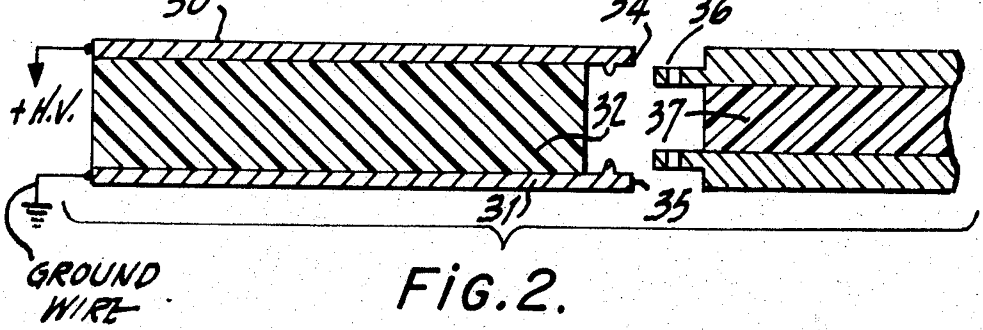

30
34
36
+H.V.
32
37
31
35
GROUND
WIRE

FIG. 2.

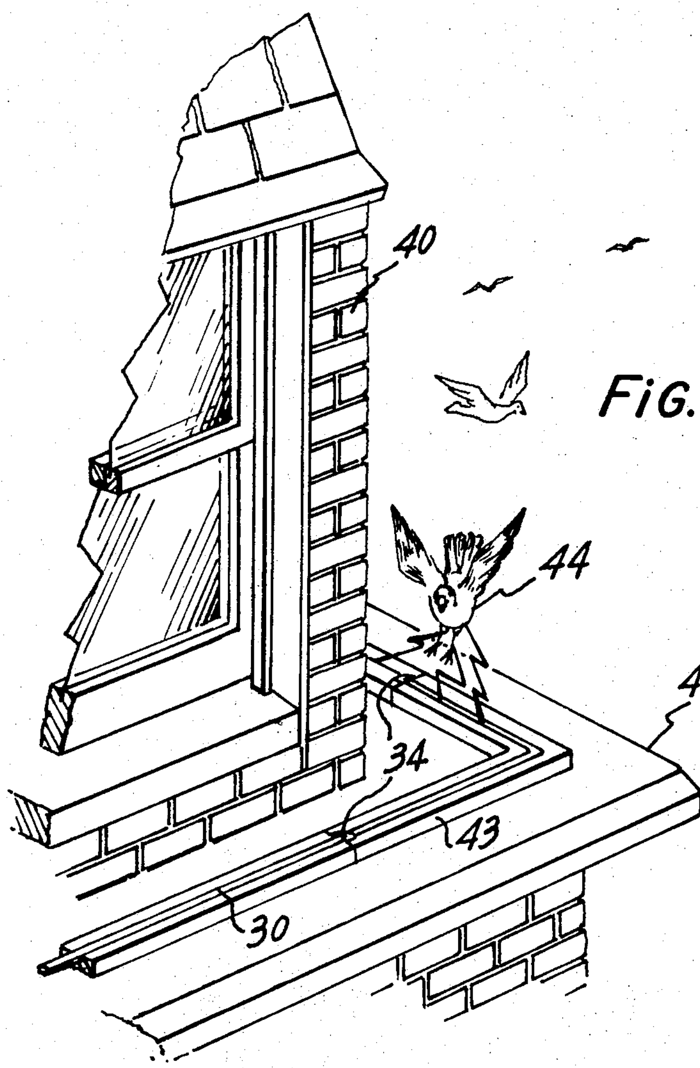


FIG. 3.

FIG. 4a.

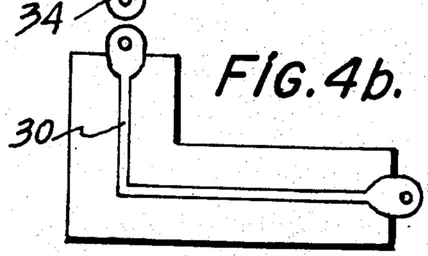


FIG. 4b.

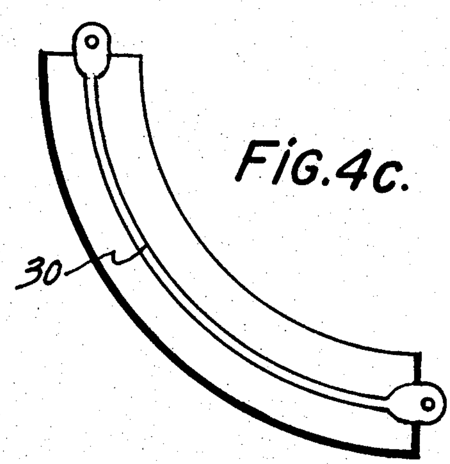


FIG. 4c.

FIG. 5.

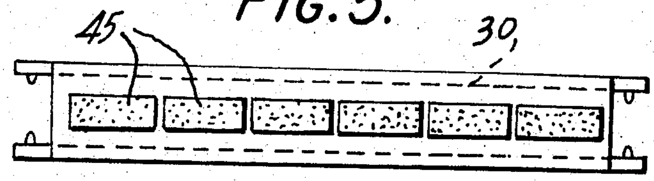


FIG. 6a.

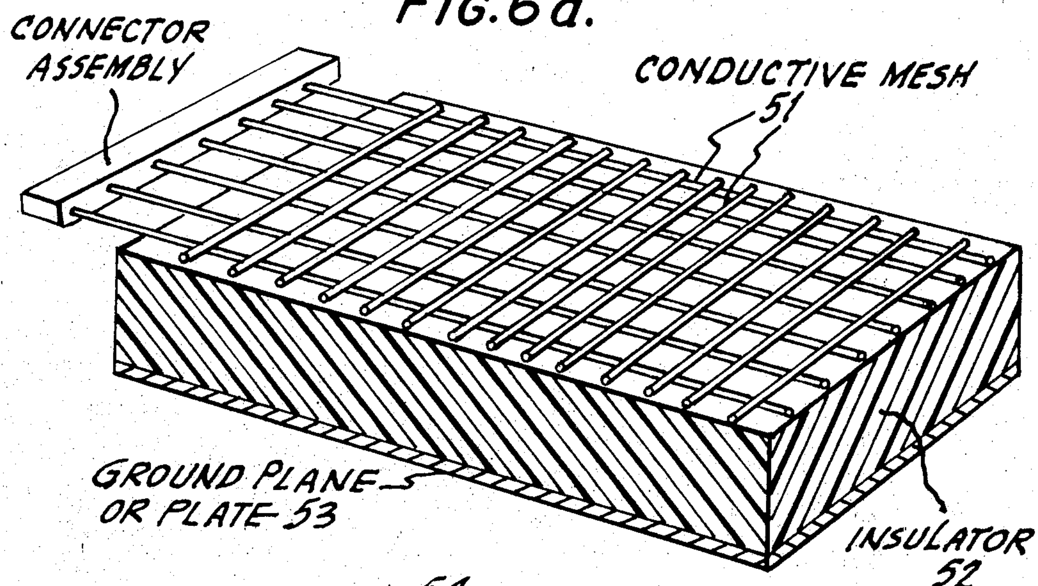
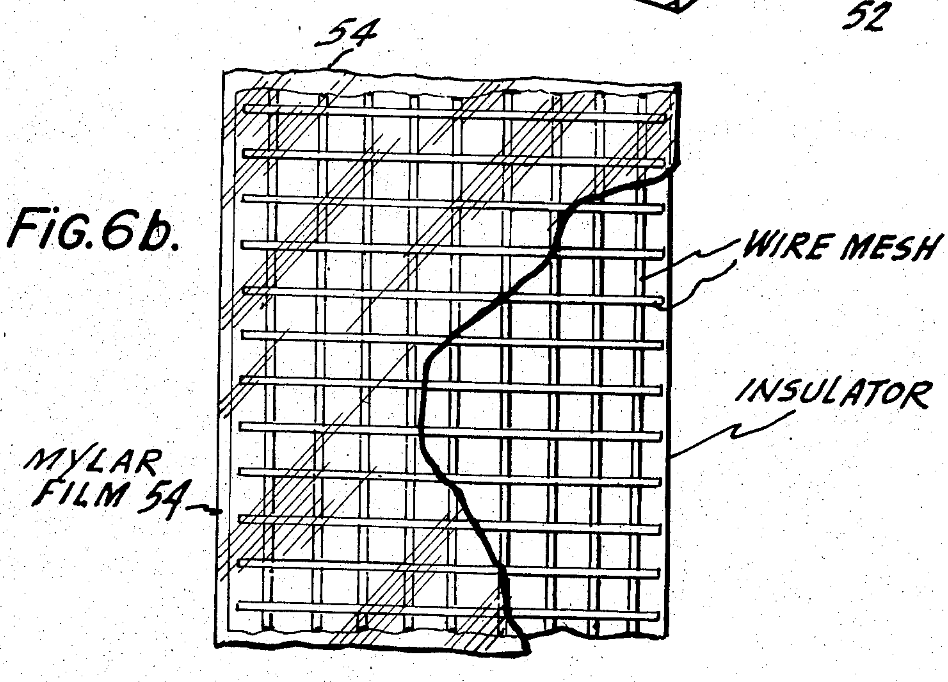
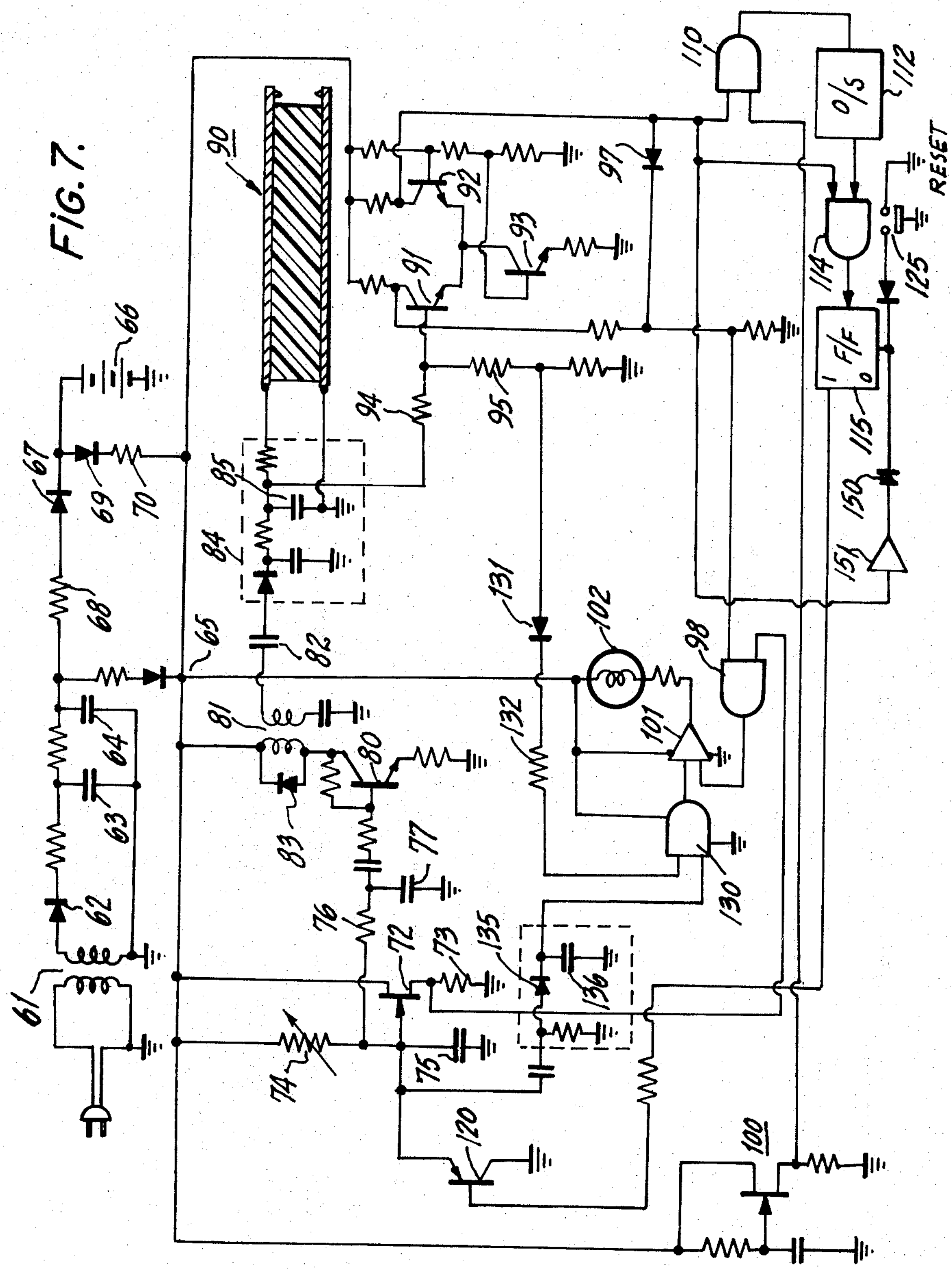


FIG. 6b.




O/S
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RESET
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FIG. 7.

SOLID STATE ELECTRONIC BIRD REPELLENT SYSTEM

BACKGROUND OF INVENTION

This invention relates to an electronic repellent system and more particularly to a system adapted for keeping birds from roosting on building structures.

The prior art is replete with a number of patents which relate in general to electrified repellent systems; and which systems operate to shock birds and other animals when they approach an area which is to be protected. In regard to buildings it is well known that birds will nest upon ledges and other structures, and due to their droppings will eventually deface the building. Repellent systems have been used to keep the exterior of these buildings clean and disease free. Birds are a significant factor to pollution in densely populated areas as they can pass on various viruses and fungus diseases to man. Besides this, their droppings accumulate and ruin the total overall appearance of the structure that they have selected for nesting.

The present systems used, operate to provide a high voltage between a pair of wires. This high voltage sets up a shock field within a suitable distance from one of the wires. If a bird or other small animal attempted to approach the wire they would receive a shock. Due to the fact that the systems use a high voltage and a relatively low current the shock is not sufficient to injure the animal in any manner but serves to prevent the animal from gaining access to the particular structure being protected.

The present systems utilized provide a series of wires which are strung along the building or about the building and are separated approximately by 2 or more inches by means of high voltage insulator standoffs. Thus to protect such a building the workmen have to drill into the concrete in order to mount the standoffs and proceed to string the wire about the areas to be protected. This of course is a cumbersome and time consuming task.

In any event, after wires have been properly routed, care has to be taken by other people who maintain various other parts of the building. Since it is desirable to maintain the aesthetic properties of the building these wires are relatively thin and are capable of being easily broken by window washers and other maintenance people. Therefore, the systems require monitoring in order to ascertain that they are still operational. In regard to appearance the wires are often relatively unattractive and in many instances do not blend into the architectural harmony of the structure to be protected.

Still further considerations must be taken into account in regard to the operation of such systems. Namely, one has to be sure that people such as the above noted maintenance people are not injured by the voltages produced by such systems and hence care has to be taken in order to regulate the current and voltage to assure that the system is safe to humans as well as to the animals. Furthermore, such systems must be capable of easy maintenance in case of a failure in the high voltage generating apparatus. Certain other conditions dictate that the system should still be operational during a power failure. The prior art systems receive their energy from the AC lines and in case of a power failure, which may be prolonged, these systems fail to operate. It would therefore be desirable to utilize a battery standby technique with such a system to keep the same operational during a lapse of power.

It is therefore an object of the present invention to provide a new and improved electronic bird repellent system which is easy to install, simple to maintain and economical to manufacture. Coupled with these advantages the present invention includes a plurality of unique high voltage conductor or transmission assemblies which are easy to assemble, while providing an overall attractive appearance thus maintaining the aesthetic qualities of the structure to be protected.

BRIEF DESCRIPTION OF PREFERRED EMBODIMENTS

A bird repellent system of the type including a high voltage source for shocking birds comprises a transmission assembly having a central insulator member, having a top surface coated with a conductive foil and a bottom surface coated with a conductive foil, the source of high voltage being connected between said foils, said configuration forming a sandwich like structure which can be easily installed and maintained on a building or other structure.

Still other embodiments include protection circuitry responsive to a predetermined decrease in the high voltage for a given period to disable the system from operating.

A further embodiment includes high voltage monitoring equipment to determine whether a break or open circuit in the transmission assembly occurred and to provide an indication of the same.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a block diagram of an electronic bird repellent system according to this invention.

FIG. **2** is a side view of a composite high voltage transmission assembly according to this invention.

FIG. **3** is a perspective fragmentary view of a building structure provided with the apparatus of this invention.

FIG. **4A** to **4C** are top views of alternate configurations of transmission assemblies according to FIG. **2**.

FIG. **5** is a side plan view of a laminated transmission assembly.

FIG. **6A** and **6B** shown alternative are embodiments of transmission assemblies.

FIG. **7** is a detailed circuit of a bird repellent system according to this invention.

DETAILED DESCRIPTION OF DRAWINGS

Referring to FIG. **1** there is shown an AC line cord **15** which is capable of being inserted into a conventional power outlet unit for supplying 60 cycle, 117 volt power to the power supply unit encompassed in module **16**. The power supply unit **16** may be a conventional full wave or half wave rectifier configuration. Shown coupled to power supply **16** is a battery **17** which is utilized strictly for standby purposes, and in case of a power failure the battery **16** is switched in circuit to provide the functions of the power supply **16**. During normal operation the battery is being charged from the power supply as will be explained in greater detail subsequently. The high voltage generating circuitry generally comprises an oscillator **18** which operates at a relatively stable frequency for example 50 to 5,000 HZ.

The frequency of the oscillator as indicated may be from 50 to 5,000 HZ. This frequency is relatively low as one may drive the transmission assembly directly with the AC signal. The high frequencies can be used for relatively short runs where capacitance is not a problem. For example, one may utilize a frequency of 5,000 HZ or greater for lengths from about 5 to 200 feet. However, if one desired to operate this with greater lengths one would use a lower frequency as for example 50 cycles to assure greater driving ability and therefore to achieve greater distance. In this manner the oscillator **18** may include a variable resistor to change its frequency depending on the length of the transmission line to be driven. The frequency output signal from oscillator **18** is applied to a driver amplifier circuit **19** which may be a conventional high power amplifier. The amplifier output is applied to a high voltage transformer **20**. The transformer has a large turns ratio between the secondary and primary windings to enable the amplified oscillator signal to be stepped up in voltage. The secondary winding of the high voltage transformer **20** is coupled to a high voltage rectifier circuit **21** to develop a large DC potential at a relatively low current. For example, the magnitude of such a potential may be between 15,000 to 20,000 volts at a current range of a few microamperes. Alternatively, the high voltage stepped up AC signal can be used directly if desired.

The high voltage rectifier **21** further includes a voltage divider **22**. A tap on the voltage divider **22** is coupled via a resistor **23** to a protective circuit **24**. The function of the protection circuit **24** is to monitor the high voltage supply **21** in order to ascertain that the voltage is within predetermined desired limits.

If the voltage falls below a predetermined value for a specified period the protection circuit **24** will disable the oscillator **18** thus preventing the generation of high voltage. The protection circuit therefore serves to prevent a hazardous, long duration shock which may result from a malfunction of equipment and if not prevented could possibly cause injury to an animal or a person.

Also shown coupled to the divider **22** is a voltage monitor module **25**. The function of module **25** as will be described in detail subsequently is to monitor the high voltage supply and to provide an indication if the high voltage exceeds a predetermined value. This condition would occur if the high voltage distribution system associated with the building develops an open circuit due to a break in continuity of the transmission assembly. The output of the voltage monitor **25** is coupled to an inverter amplifier **26** which has its output coupled to an indicator lamp assembly **29**. As will be explained the indicator **29** will pulsate or blink on and off if the high voltage condition is present. An AND gate **30** is shown having its output coupled to one input of inverter **26**. The function of the AND gate **30** is to activate the indicator during normal operation by monitoring the high voltage divider **22** and the high frequency oscillator **18**. The AND gate **30** functions to keep the indicator illuminated if the oscillator is operating and if high voltage is being provided at the output of divider **22**. These conditions are necessary to assure proper system operations as will be explained.

Referring to FIG. **2** there is shown a high voltage distribution system which is used to distribute the high voltage about the desired areas of a building or similar structure. Basically, the distribution system consists of a top conductive wire foil or strip **30** and a bottom conductive ground plane or sheet **31**. The strip and plane are held separate and apart and at a suitable distance by means of an interposing insulator **32**. The insulator **32** functions to provide the adequate spacing between the high voltage conductor **30** and the ground plane **31**, while further serving as a means for providing the separation. The composite sandwich like structure has two conductive tab-like connector assemblies at one or both ends, designated respectively as **34** and **35**. The connector **34** is associated and coupled to the high voltage conductor **30** while connector **35** is associated with the ground conductor **31**. These connectors are utilized to allow easy interconnection between modules when installing the transmission units on the surface of the building. Shown adjacent to the composite configuration is a portion of another such assembly with interfacing conductors **36** and **37** which are respectively female or male snap connectors and are adapted to be snapped into and to therefore coact with the counterpart fasteners **34** and **35**. This arrangement thus allowing one to use of a plurality of such composite members to cover a desired area of a building.

In the operation of such high voltage distribution systems there are two factors which one has to take into consideration. First there is capacitance. As one can readily see the transmission assembly is basically a conductive foil, an insulator and a conductive strip on top of the insulator. This configuration takes the form of a capacitor. Care has to be taken to minimize the capacity in order to adequately energize the effective length of the transmission line. In this manner, the conductive strip **30** is much thinner than the ground plane **31** and in essence can assume the diameter of a typical wire. The conductive strip **30** in fact may comprise a high voltage wire or a conductive foil. Since the strip **30** is relatively thin compared to the ground plane **31** there is little capacity between them and hence one is capable of operating the configuration at high voltage without fear of excess capacitance and losses. The exact nature of the conductor **30** is made clearer in reference to FIG. **4** where there is shown top views of various embodiments of the high voltage assembly.

Referring to FIG. **3** there is shown a building **40** with a ledge **42**. On the ledge there is located a transmission assembly such as that shown in FIG. **2**. As indicated the output of the high voltage generator is applied respectively to the top conductor and the bottom conductor thereby creating a high voltage along the entire length of the composite structure **43**. Also shown in the figure is a bird **44** which is about to nest or roost upon the ledge **42**. Depending upon the voltage of the generator if the bird attempts to land on the ledge an arc will be drawn via the high voltage conductor **30** which will shock the bird and thereby cause it to fly off. The composite distribution structure can be glued by means of a suitable outdoor epoxy or other means to the ledge in any desired location. The installer merely has to snap these pieces together to cover such a ledge or any other structure associated with the building.

Referring to FIG. **4** there is shown top views of alternate configurations of such composite structures. For example the unit shown in FIG. **4B** can be used to accommodate right angle turns on ledges while the unit in FIG. 4C can be used to accommodate various other angles or curvatures which may be associated with modern or other building structures. The conductive strip **30** is shown herein as a relatively thin member while the ground plane as indicated is of a greater width.

FIG. **5** shows a side view of the composite structure with a front surface thereof laminated with a thin sheet of plastic as mylar to take on the appearance of a particular material which might be used in the facade of a building. As one can readily ascertain from the previous figures, the structures depicted for the high voltage transmissions are virtually rectangular solids. Therefore it is a relatively simple job to cover the surface of the composite structure with a plastic lamination having the appearance of for example brick, concrete and so on. Such materials for providing such lamination are well known and are commercially available. This particular feature afforded by the construction of the transmission assembly therefore enables protection of the building from bird nuisance, while virtually maintaining the same architectural characteristics in that the unsightly wires of the prior art are eliminated. FIG. **5** is merely one example of a particular representation and shows a brick-like lamination **45** on this surface. It is of course understood that any other type of facade can be utilized as well.

Referring to FIG. **6** there is shown an alternate high voltage transmission assembly arrangement which may be useful for protecting large areas such as domes of buildings and so on. In the case of a dome structure one can not really protect the entire structure from bird nuisance because of the fact that such domes are relatively large and a great plurality of wires or composite structure strips would have to be utilized.

FIG. **6A** shows a perspective view of an alternative embodiment of a high voltage transmission assembly which can be utilized in covering large, irregularly shaped surfaces. The high voltage conductor is a conductive mesh **51** which is similar to a conventional screen made of a conductive metal. The screen or conductive mesh **51** is secured by an epoxy or other suitable means to the top surface of the insulator member **52**. The bottom surface of the insulator member **52** is covered with a conductive ground plane or wire mesh **53**. The conductive ground plane may also be a conductive metallic foil. Therefore it can be readily ascertained that the composite structure depicted is pliable and flexible and therefore can be placed or mounted upon an irregularly shaped surface such as a dome.

FIG. **6B** shows a top view of a member similar to that shown in **6A** with a thin mylar sheet or film **54** covering the mesh. The mylar sheet may be colored and serves to again provide good aesthetic qualities to keep the protected structure architecturally in tact.

FIG. **7** shows a detailed schematic diagram of the electronic repellent system as shown in block form in FIG. **1**. Referring to FIG. **6** there is shown a 60 HZ isolation transformer **61**. This transformer **61** is used to provide isolation to prevent shock hazard. The secondary winding of transformer **61** is coupled to a half wave rectifier circuit including diode **62** and filter capacitors **63** and **64**. The output of the half wave rectifier provides a suitable DC potential which is used to supply operating potential to the circuitry to be described. The output DC generated by the power supply is available at output terminal **65**. As previously indicated the unit is capable of operating in a battery standby condition in the case of power failure. A battery **66** is shown having a positive output terminal coupled to a terminal of filter capacitor **64** via a diode **67** in series with a resistor **68**. This output terminal is also coupled to the power supply output terminal **65** via another diode **69** in series with a resistor **70**. The battery standby circuit operates as follows: As long as AC power is supplied the battery **66** selected to be of a slightly lower potential than the potential on filter capacitor **64** is being charged via resistor **68** in series with diode **67**. If a power failure occurs there is no output DC available across the filter capacitor **64**. This therefore reverse biases diode **67** and forward biases diode **69**; to provide coupling of the positive terminal of the battery to output terminal **65**. Power is therefore supplied via the battery **66** to the circuitry.

A relatively stable frequency oscillator circuit includes a unijunction transistor **72** which may operate at a relatively high frequency between the range for example of 50 to 5,000 HZ. The unijunction transistor **72** is arranged in a typical sawtooth oscillator configuration and has one electrode thereof connected to the power supply terminal **65** and the other base electrode connected via a resistor **73** to a point of reference terminal. The emitter electrode of the unijunction **72** is coupled to the source of operating potential via a timing resistor **74** and is returned to ground via a timing capacitor **75**. The combination of the resistor **74** and the capacitor **75** serve to determine the operating frequency of the oscillator configuration. The resistor **74** may be variable in order to change the frequency of the oscillator if desired. The sawtooth output signal of the oscillator is coupled via a low pass filter, including resistor **76** and capacitor **77**, to the base electrode of a driver transistor **80**. The collector electrode of transistor **80** is coupled through the primary winding of a high voltage transformer **81** to terminal **65**. A diode is coupled across the primary winding for transient protection of transistor **80**. The transformer **81** is a typical high voltage transformer and has a large turns ratio between the primary and secondary windings to produce a large voltage signal at the secondary winding. This large voltage signal may be in excess of 25,000 volts peak to peak. The secondary winding is coupled via a capacitor **82** to a high voltage rectifier assembly shown enclosed within the dash line **84** used to provide a large voltage DC component across the output capacitor **85**. It is of course also understood that the assembly shown enclosed within the dashed line **84** may be eliminated and the high voltage AC signal may be used directly for activation of the composite transmission line structure **90** (similar to the format as described in conjunction with FIGS. **2, 3, 4, 5** and **6**). In any event the DC rectifier is still included to provide protection and monitoring functions.

There is shown a differential amplifier configuration comprising transistors **91** and **92** with the conventional constant current source transistor **93**. It is of course understood that the differential amplifier can be easily implemented by means of a conventional integrated circuit module. The differential amplifier configuration provides the function of the voltage monitor assembly 25 shown in FIG. 1.

The operation of the circuit is as follows: The base electrode of transistor **91** is coupled to the high voltage DC output of the rectifier assembly **84** via the voltage divider including resistors **94** and **95**. The base electrode of transistor **92** is coupled to power supply output terminal **65** which provides a reference potential for the base electrode of transistor **92** and for the constant current source transistor **93**. During normal operation transistor **91** is conducting as is transistor **92**. However, due to the current flow in the respective base to emitter and paths of the transistors, the collector voltage of transistor **92** is at a lower positive potential than is the collector voltage of transistor **91**. A diode **97** is coupled between the collector electrodes of transistors **91** and **92**. Now assume that the output load on the high voltage rectifier (the output load being transmission line **90**) is somehow open circuited. This condition unloads the high voltage supply and causes the voltage on filter capacitor **85** to rise. This rise in voltage which may be 25 percent or greater causes transistor **91** to conduct harder therefore causing its collector potential to fall. Due to the operation of the differential amplifier the collector potential of transistor **92** increases thus forward biasing diode **97** causing it to conduct. The cathode electrode of diode **97** is coupled to an input of an AND gate **98**. The AND gate **98** is shown in typical logical form as it is well known how to implement the same. Another input of AND gate **98** is coupled to the base electrode of a low frequency unijunction oscillator configuration **100**. Basically, the unijunction oscillator circuit **100** provides a sawtooth wave form at a relatively low frequency which may, for example, be 20 HZ or lower. Therefore, during a high voltage condition the AND gate **98** is enabled providing at its output the low frequency sawtooth wave form. This is applied to one input of an inverter **101** having an output coupled to an indicator lamp assembly **102**. Therefore, during a high voltage condition the lamp assembly **102** will blink on and off according to the repetition rate of the sawtooth to thereby provide a visual indication to an operator that a high voltage condition has occurred. This might be due to a break in the conductor assembly used on the building facade or for some other reason.

The unit described herein also includes a protection circuit shown in block form as **24**, FIG. **1**. The function of the protection circuit is to prevent an animal or a human receiving a prolonged shock which might serve to injure under proper conditions. Basically, the protection circuit operates as follows: An AND gate **110** is shown having one input coupled to the collector electrode of transistor **92**. During normal operating conditions the voltage at the output of the system is relatively constant as indicated above. However, if a bird or person receives a shock the voltage at the output of the rectifier will decrease. This decrease in voltage causes the following ot occur: Transistor **91** becomes less conductive due to the decrease in the voltage, therefore causing the voltage at the collector electrode of transistor **92** to decrease towards ground potential. This enables an input of AND gate **110**. The other input of the AND gate **110** is coupled to resistor **73** in the base electrode of the unijunction transistor **72**. Due to the operation of the unijunction circuit, sharp current spikes are provided across resistor **73**. Due to the fact that AND gate **110** is enabled the pulses are permitted to pass through the AND gate and serve to trigger the monostable multivibrator or one shot **112**. This circuit **112** provides a pulse of a predetermined width at the output. This pulse is applied to an input of another AND gate **115**. Another input of AND gate **114** is coupled to the collector electrode of transistor **92**. Thus if the high voltage decrease lasts for a duration longer than the pulse width provided by the one shot **112**, the AND gate **114** will pass the trailing edge transition of the pulse and trigger the flip-flop or bistable multivibrator **115**. This is due to the fact that the voltage decrease lasted and hence the reset lead via diode **150** and inverter **151** is no longer enabled. Thus the trigger caused by the end of the one shot cycle permits the flip-flop **115** to change state. The flip-flop will stay in this other state until the high voltage goes back up. This will occur automatically as the inverter **151** will force the flip-flop **115** back into the reset mode for a positive voltage at the collector of transistor **92**. Triggering the flip-flop **115** causes the output to go from a positive level towards ground. This condition forward biases the PNP transistor **120** causing it to saturate. The transistor **120** is coupled across the timing capacitor **72** of the high frequency unijunction oscillator system. The shorting out of this capacitor **72** disables the unijunction oscillator thereby turning off the high voltage. When this condition occurs the unit is disabled until the flip-flop **115** is reset either automatically or manually by means of the switch **125**. This action prevents a prolonged shock from occurring. Alternatively if the drop in voltage is less than the time duration of the one shot **112** the collector voltage of transistor **92** will immediately rise again and therefore the transition of the one shot will not pass through the AND gate **114** and will not trigger flip-flop **115**. This thereby permits the system to continue to operate normally.

As was mentioned above an indicator lamp **102** is used during the high voltage mode to apprise a maintenance man or operator of this condition. Also shown coupled to the indicator-driver circuit **101** is an AND gate **100**. The AND gate **130** has one input coupled to the voltage divider monitoring the output of the high voltage amplifier assembly **84**. This coupling is afforded via diode **131** in series with resistor **132**. As long as high voltage is being generated within acceptable limitations the input of the AND gate is enabled. Another input to AND gate **130** is derived from the unijunction oscillator circuit **72** by means of a half wave rectifier module generally designated as **135**. As long as the oscillator **72** is operating a DC voltage is provided at the output of filter capacitor **136**. This output voltage is sufficient to enable the respective input of AND gate **130**. Therefore during normal operation AND gate **130** is enabled and serves to directly operate the indicator lamp **102** to therefore illunimate the same. If for example the unijunction oscillator **72** fails to operate and no high voltage is provided AND gate **130** is disabled thereby turning off the indicator. During this condition AND gate **98** is inhibited and therefore the lamp **102** will go off. The lamp **102** will also be extinguished if the high voltage fails because of the malfunctioning of transistor **80** or the high voltage rectifier assembly 84. This also causes the lamp to be extinguished thereby informing the operator that the trouble is either in the oscillator circuit, the power supply or the various other mentioned components.

We claim:

1. In a system for controlling bird nuisance of the type including a source of high voltage for shocking a bird attempting to enter an area to be protected, the combination therewith of apparatus for providing a transmission path for said high voltage enabling protection of said area comprising:

a. a central solid insulator member having a top and bottom surface and side surfaces;

b. a conductive foil ground plane member secured to said bottom surface of said insulator member;

c. a conductive high voltage member secured to said top surface of said insulator member to thereby form a composite "sandwich like" configuration;

d. connecting means coupled to at least one of said conductive members adapted to coact with said source of high voltage.

2. The combination according to claim 1 wherein said conductive high voltage member comprises a conductive mesh.

3. The combination according to claim 1 wherein said conductive high voltage member comprises a conductive foil of a thin strip configuration.

4. The combination according to claim 1 further comprising:

a. a plastic veneer covering at least one side surface of said composite member to provide an overall aesthetic appearance to an observer viewing said area to be protected.

5. The apparatus according to claim 1 wherein said connecting means comprises a conductive tab including a female fastener for coacting with a male counterpart.

6. A system for controlling bird nuisance of the type using a high voltage shock in combination with said system apparatus for preventing prolonged shocks, comprising:

a. an oscillator operative to provide a relatively stable frequency signal at an output terminal thereof;

b. first means including a high voltage step-up transformer having a primary and secondary winding, said primary winding coupled to said output of said oscillator to develop a high voltage, high frequency signal at said secondary winding;

c. rectifying means coupled to said secondary winding for providing a predetermined high DC voltage therefrom;

d. protector circuit means coupled to said rectifying means for monitoring said high voltage to provide at an output an indication when said voltage falls below said predetermined value for a given duration;

e. means coupling said protector means to said oscillator and responsive to said indication to prevent said oscillator from operating to thereby prevent the generation said high DC voltage.

7. The apparatus according to claim 6 wherein said protector circuit means comprises:

a. a first AND gate having first and second inputs, said first input coupled to said rectifying means and said second input coupled to said oscillator to provide at an output a first signal indication when said high voltage falls below said predetermined valve;

b. a monostable multivibrator having an input terminal coupled to said output terminal of said AND gate and an output terminal and operative to provide a predetermined length pulse when said AND gate provides said first signal.

8. The apparatus according to claim 7 wherein said means coupling said protector circuit means to said oscillator comprises:

a. a bistable multivibrator having an input and output electrode, said output electrode capable of being in one of two states defined by first and second voltage levels, said input electrode coupled to said output terminal of said monostable multivibrator and responsive to the termination of said pulse to cause said output terminal to revert to said other state;

b. means coupling said output terminal of said bistable multivibrator to said oscillator for inhibiting the operation of said oscillator when said bistable multivibrator is in said other state, to thereby prevent the generation of said high DC voltage.

9. In a system for controlling bird nuisance of the type including a high voltage source coupled to a field producing transmission line assembly for protecting a given area from said nuisance by generating an electrical shock field, said high voltage source operating at a first voltage when said source is connected to said transmission line and at a second higher voltage when said source is not connected to said transmission line, in combination therewith apparatus for providing an indication when said source is undesirably not connected to said line comprising:

a. first means coupled to said high voltage source for providing a first signal at an output thereof when said high voltage source is at said second voltage;

b. a source of low frequency signals;

c. coincidence means having first and second input terminals and an output terminal, said first input terminal coupled to said output of first means, and said second input terminal coupled to said output of said oscillator, to provide at said output terminal of said coincidence means said low frequency signal only during the presence of said first signal; and

d. indicating means coupled to said output terminal of said coincidence means to provide an indication at said low frequency signal rate indicative of said second higher voltage state, to thereby provide a warning that said high voltage source is not connected to said transmission line.

10. The apparatus according to claim 9, wherein said first means comprises:

a. a differential amplifier including first and second transistors each having a collector, emitter and base electrode, said emitter electrodes coupled together and said collector electrodes adapted to be coupled to a source of operation potential;

b. first means coupling the base electrode of said first transistor to said high voltage source;

c. second means for biasing the base electrode of said second transistor at a predetermined reference potential, to cause the collector potential of said second transistor to change when said high voltage source is at said second state due to said differential amplifier operation; and

d. means coupled to said collector electrode of said second transistor and responsive to said change to provide said first signal.

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