CROWD CONTROL STICK


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ABSTRACT

An electric shock weapon is disclosed for use by officers in maintaining order at public gatherings and for other crowd control applications. The invention is embodied in an electrified stick or in an electrified garment worn by the user. The device comprises at least one pair of exposed conductors which are connected across a high voltage power supply and adapted to be simultaneously engaged with the anatomy of awould-be assailant and thus to ward off or cause retreat of such person. In order to give warning of the character of the device, and to lend a menacing appearance, a sparking device is disposed on the weapon and connected across the high voltage power supply to provide a spark discharge. In the embodiment of the invention in an electrified stick a grip portion is provided at the rear end and a slidable insulating sleeve is disposed over a portion of the conductors and movable to the forward end of the stick to provide an auxiliary gripping portion for two-handed use of the stick.

The high voltage power supply preferably comprises a capacitor discharge system comprising a battery energized transistor inverter and a voltage doubler connected across a storage capacitor, with a self-switching discharge circuit connected with an induction coil which in turn is connected with the exposed conductors on the device. A timing circuit and a silicon controlled rectifier are employed in the self-switching discharge circuit.

19 Claims, 7 Drawing Figures
CROWD CONTROL STICK

This invention relates to crowd control devices and more particularly to devices adapted to be wielded or worn by officers charged with maintaining order at public gatherings.

Heretofore it has been proposed to equip billies or night sticks with means for impressing an electrical shock on persons who would grasp or otherwise engage such devices in opposing the officer wielding the same. The prior art devices have been wanting in several respects and hence the usage thereof has been quite limited. A particular problem has been that of providing the required high voltage for a sufficiently long period of time from a readily portable lightweight battery energized power supply. Another difficulty in the prior art is that of the inaccessibility of the device to deliver sustained repetitive shocking pulses without manual intervention when the high voltage conductors are held by the assailant. Another problem in the prior art is that of facilitating use of the electrified stick in a two-handed manner for pushing assailants as officers are trained to do, because of the need for a nonshocking auxiliary hand-grip portion near the outer end of the stick. Such a nonshocking grip portion has been undesirable because it makes it easier for an assailant to wrest the stick from the officer.

The subject invention provides for greatly prolonged battery life with an electrical circuit which sustains operation with the high voltage conductors in short-circuit, open circuit or a spark discharge mode of operation. Furthermore, the circuit is adapted to operate in a freerunning or self-switching mode so that repetitive high voltage impulses are delivered without manual intervention, even when the high voltage conductors are short circuited. Further, the subject invention provides for the application of a train of high voltage pulses which are substantially uniform in voltage value and energy per pulse. This is accomplished by use of a capacitor discharge system with an induction coil having its primary winding connected to the capacitor through a self-actuating switching means which is closed when the capacitor becomes charged. A charging circuit for recharging the capacitor includes a battery energized inverter which is coupled to the capacitor through a voltage doubler. Preferably the self-actuating switching means takes the form of a thyristor having its gate connected with a timing circuit and its output being self-actuated by the associated circuits. Such a high voltage power supply is preferably provided in a separate container and is connected with the high voltage conductors through a flexible cable. The power supply is admirably suited to high voltage conductors incorporated in a stick or incorporated in a garment or an item of apparel worn by the user.

The invention also provides as an optional feature a visible and noisy spark discharge to not only warn a would-be assailant of the character of the device but also to lend a menacing appearance to the device. This is accomplished by connecting a pair of spark gap electrodes across the high voltage supply and locating the same in a prominent position on the device. In a preferred embodiment of the invention in an electrified stick the electrodes are disposed at the outer end of the stick and one electrode is formed as a light reflector so that the spark is prominently visible. The psychological affect of the spark discharge is enhanced by the combined brightness and noise, which is achieved from the repetitive impulses produced by a capacitor discharge system.

The invention additionally provides an electrified stick which will apply an electric shock to an assailant who touches it anywhere near the outer end and yet which provides an auxiliary handgrip portion for the user at the outer end. This is accomplished by means of a slideable insulating sleeve fitted over the stick and electric conductors thereon and being movable from a position near the handgrip portion at the rear of the stick to the outer end thereof.

In the preferred embodiment of the invention in an electrified stick, the stick itself is of wooden structure and supports plural pairs of conductors extending from the handle portion to the outer end. A first set of alternate conductors are connected to a common electrical connector adjacent the handle portion with the common connector taking the form of a metallic ring in engagement with each of the first set of conductors. A second set of alternate conductors are connected together through a second common connector which preferably takes the form of a ring portion in engagement therewith at the outer end of the stick. A spark gap is formed at the outer end of the stick by a first electrode formed integrally with the second connector and a second electrode spaced from the first to form an annular spark gap and having a lead wire extending centrally of the stick and connected by a radial pin to one of the first set of conductors. Thus the plural sets of conductors and the spark gap are energized from high voltage power supply leads in a central bore of the stick by radially extending pins engaging respectively one of the first and second sets of conductors. In this construction the entire electrical circuit within the stick is achieved by mechanical engagement without the need for solder connections. Additionally, the slideable insulating sleeve is constrained between the first and second connector rings mounted on the stick.

A more complete understanding of the invention may be obtained from the detailed description that follows, taken with the accompanying drawings in which:

FIG. 1 is a pictorial view of the invention embodied in an electrified stick;

FIG. 2 is a pictorial view of the high voltage power supply;

FIG. 3 shows the reverse side of the high voltage power supply;

FIG. 4 shows the invention embodied in a garment;

FIG. 5 is a view partially in section of the electrified stick depicted in FIG. 1;

FIG. 6 is a view taken on lines 6-6 of FIG. 5; and,

FIG. 7 is a schematic diagram of the high voltage power supply.

Referring now to the drawings, there is shown an illustrative embodiment of the invention in an electric shock weapon which is especially adapted for use by an officer or other person for controlling a crowd or maintaining order at a public gathering.

FIGS. 1, 2 and 3 illustrate the invention in an electrified stick which, in general configuration, resembles the conventional billy used by policemen. The device comprises a stick 10 constructed of insulating material, preferably wood, which is formed with the handle 12 and a shank 14. The handle 12 or grip portion is provided with a wrist strap 16 secured in an annular slot.
and is also provided with flutes 18, if desired, to facilitate gripping of the handle. The shank 14 is provided with a plurality elongated conductors 22 and 24 which are arranged in pairs and extend longitudinally of the shank in spaced relation. It is noted that each of the conductors is suitably of circular cross-section and is inlaid by about one-half diameter into the surface of the shank. A first set of alternate conductors 24 are electrically connected together by a common connector in the form of a metallic ring 26 disposed over the stick and securing the conductors thereon. A second set of alternate conductors 22 are electrically connected together at the outer end of the stick by a common connector having a ring portion 28 disposed over the end of the stick in securing relation with the conductors 22. It is noted that the conductors 22 are axially spaced from the ring 26 and the conductors 24 are axially spaced from the ring portion 28.

In order to electrify or energize the pairs of conductors 22 and 24, a high voltage power supply is provided in a separate container or case 30. The output of the high voltage power supply is connected through a flexible cable 32 to the electrical connector 34 in the base or rear end of the stick. The power supply is provided with an on-off switch 36 readily accessible on the case 30. Additionally, the case is provided with a window 38 for display of a pilot lamp to indicate the on-off condition of the high voltage power supply. On the back side of the case 30 a hanger or bracket 40 is provided to support the case from a receptacle adapted to be carried on a belt worn by the user of the device. The bracket 40 is provided with a pair of electrical terminals 42 and 44 for connection with a battery charger receptacle when the device is not in use.

Referring now to FIGS. 5 and 6, further details of construction of the stick 10 will be described. The conductors 22 and 24, as previously noted, are suitably of circular cross-section and are preferably of relatively stiff metallic wire in order to withstand rough treatment. One terminal of the high voltage power supply is connected through the cable 32 and connector 34 to a pin 48 and thence through the body of a connector 50 in the base of the stick to a rigid conductor 52 extending through an axial bore in the stick. A radially extending conductive pin 54 is disposed in a radial passage in the stick between the conductor 52 and one of the conductors 24. All of the conductors 24 are electrically connected together through the ring 26. In a similar manner the other terminal of the high voltage power supply is connected through the cable 32, connector 34 to a pin 58 and thence through the connector 50 to a rigid conductor 60 in the bore of the stick. A radially extending conductor pin 62 is disposed between the inner end of the conductor 60 and one of the conductors 22. All of the conductors 22 are electrically connected together through the ring portion 28.

In order to provide a warning to a would-be assailant of the character of the electrified stick and to impart a menacing appearance, a sparking device 64 is provided on the exterior of the stick at a prominent position. As shown in FIG. 5, the sparking device 64 comprises a first electrode portion 66 which is formed integrally with the ring portion 28 and the two portions together constituting an end cap fitted over the end of the stick. The electrode portion 66 is of concave configuration and is preferably of a bright metal to provide a reflective surface. An electrode 68 of disc shape is disposed centrally of the electrode portion 66 and forms an annular spark gap therewith. The electrode 68 is spaced from the electrode portion 66 by an insulating washer 70 and is provided with a stem or lead-in conductor 72 which extends through an opening in the electrode portion 66 into an axial bore in the stick. The electrode 68 is connected through the lead-in conductor 72 and a pin 74 extending therefrom to one of the conductors 24 and thence to one terminal of the high voltage power supply. The electrode portion 66 is connected through the ring portion 28 to the conductors 22 and thence to the other terminal of the high voltage power supply.

It will now be appreciated that with the terminals of the power supply connected with the pins 48 and 58 on the stick 10, the sets of conductors 22 and 24 will have the high voltage of the power supply impressed therebetween. The conductors 22 and 24 are spaced sufficiently to prevent spark discharge therebetween through the air in use of the stick. However, the conductors are spaced close enough so that engagement of the shank of the stick with the anatomy of a person, will most likely cause simultaneous contact of a pair of conductors 22 and 24 so that a localized high voltage electric shock is applied to the person. The high voltage power supply connected across the electrodes 66 and 68 of the sparking device 64, and the length of the spark gap formed thereby are such to cause an intense spark discharge. It is noted that the spark discharge across the spark gap, which is in parallel with the pairs of conductors 22 and 24, serves to regulate and limit the voltage across the pairs of conductors 22 and 24.

In order to permit the user of the stick to grasp it in a two-handed manner a slidable sleeve 80 of insulating material is disposed over the shank of the stick. The sleeve 80 is an auxiliary handgrip and provides a gripping portion long enough to accommodate a person's hand and may be positioned along the shank of the stick over the conductors 22 and 24 as desired. In single-handed use of the stick the sleeve 80 would normally be parked at the rear portion adjacent connector ring 26 which serves as a stop for the sleeve. This leaves the conductors 22 and 24 exposed at the outer end of the stick for contacting persons opposing the stick. When the user desires to use the stick in a two-handed manner he merely grasps the sleeve with his other hand and slides it toward the outer end of the stick. The user is fully insulated from the high voltage of the conductors 22 and 24 by the sleeve in any position thereof on the shank of the stick. The connector ring portion 28 serves as a stop for the sleeve at the outer end of the stick.

The high voltage power supply circuit for the electrified stick is shown in schematic form in FIG. 7. This circuit is disclosed and claimed in my copending patent application Docket P-303 filed on even date herewith and assigned to the same assignee as the present invention and entitled "High Voltage Pulse Generating Circuit." The power supply circuit comprises, in general, a transistor inverter 110 which supplies alternating voltage to a voltage doubler 112, which in turn delivers charging current to a storage capacitor 114. The storage capacitor is connected with a voltage transforming means 116 through a thyristor 118. The thyristor is connected with control means 120 which turns on the thyristor at controlled intervals to discharge the capacitor 114 and thereby develop high voltage impulses.
across the output of the voltage transforming means 16.

Considering the circuit in greater detail, the inverter 110 suitably takes the form of a conventional pushpull transistor oscillator. As such, it comprises a pair of NPN power transistors 122 and 124, a direct voltage source such as a battery 126 and an output transformer 128. The transistor 122 has its output circuit from collector to emitter connected across the battery 126 through an on-off switch 130 and a primary winding 132 of the transformer 128. Similarly, the transistor 124 has its output extending from collector to emitter connected across the battery 126 through the switch 130 and a primary winding 134, which has one terminal in common with one terminal of the primary winding 132 and constituting a center tap on the combined windings 132 and 134. The transistor 122 has an input circuit from base to emitter, including a resistor 136 and a feedback winding 138. A forward bias for the transistor 122 is provided by a voltage divider comprising a resistor 140 and the resistor 136. Similarly, the transistor 124 has an input circuit extending from base to emitter through a resistor 142 and a feedback winding 144. A forward bias is provided for this transistor by a voltage divider comprising a resistor 146 and the resistor 142. The output transformer 128 is also provided with a secondary winding 148 which, in operation of the oscillator, produces an output alternating voltage.

The operation of a transistor inverter of the type described is well known and need not be described in detail. Suffice it to say that upon closure of the switch 130, both of the transistors 122 and 124 are forwardly biased and both become conductive. However, because of inherent circuit unbalance one becomes more conductive than the other through its associated primary winding and consequently positive feedback to that transistor through the associated feedback winding drives that transistor quickly into saturation and the induced voltage in feedback winding of the other transistor drives it to cut-off. When current saturation is reached in the first transistor, the feedback voltage is reduced to zero and the decreasing current in the primary winding of the conductive transistor results in collapse of the magnetic flux and a reversal of polarity of the induced voltages in the feedback windings. Accordingly, the first transistor is cut-off and the other transistor becomes conductive and is driven to current saturation. This cycle of operation is repetitive at a frequency determined by the parameters of the oscillator circuit and consequently an alternating voltage is developed across the output terminals of the secondary winding 148. As is well known, the output voltage has a somewhat rectangular waveform due to the rapid switching characteristics of the transistors 122 and 124.

The voltage doubler 112 is adapted to charge the storage capacitor 114 toward a voltage value equal to twice the peak value of the alternating voltage of the secondary winding 148. For this purpose the voltage doubler comprises a first rectifying diode 152, connected in series with a holding capacitor 154 across the secondary winding 148. The circuit also includes a second rectifying diode 156 connected between the junction of capacitor 154 and diode 152 and one terminal of the storage capacitor 114. A blocking diode 158 is connected between the other terminal of the storage capacitor 114 and the other side of the diode 152. In the operation of the voltage doubler 112 the holding capacitor 154 will be charged through the rectifying diode 152 during one half-cycle of the alternating voltage toward the peak value of voltage across secondary winding 148. During this half-cycle the blocking diode 158 blocks current flow to the storage capacitor 114 and the rectifying diode 152 prevents discharge of the holding capacitor 154 through its charging circuit following the first half-cycle. During the succeeding half-cycle, with the polarity across the secondary winding reversed, the voltage thereof is additively combined with the voltage across the holding capacitor 154 in series with the rectifying diode 156, the storage capacitor 114 and the blocking diode 158. Accordingly, the storage capacitor 114 is charged toward a voltage equal to twice the peak value of voltage across the secondary winding. For the purpose of providing a visual indication of the operative condition of the inverter 110, a neon lamp 162 is connected across the secondary winding 148 with a series resistor 164 and hence is illuminated when the inverter is running.

The discharging circuit for the storage capacitor 114 extends through the primary winding 166 of the voltage transforming device 116 and thence through the output, i.e., anode to cathode of the thyristor 118 which preferably takes the form of a silicon controlled rectifier. As is well known, a thyristor is a rectifier of the solid state semiconductor type which becomes forwardly conductive from anode to cathode when the voltage impressed thereacross exceeds a threshold value and when the current from the gate to cathode exceeds a predetermined value. The anode to cathode remain conductive, even after the gate to cathode current is reduced to zero, so long as voltage applied thereacross exceeds the threshold value. Thus the thyristor or silicon controlled rectifier 118 is turned on only by the requisite gate current and can be turned off only by the requisite reduction of cathode to anode voltage to quench the output.

The control means 120 for controlling the turn-on of the thyristor 118 is adapted to correlate the switching point with the value of output voltage across the storage capacitor 114. For this purpose the control circuit comprises a voltage divider including a resistor 170 and a capacitor 172 in series across the storage capacitor 114. A voltage threshold device, such as a semiconductor diode 174, polled for forward conduction, is connected between the junction of resistor 170 and capacitor 172 and the gate of the thyristor 118. Thus the input of the thyristor 118 is connected across the voltage divider capacitor 172 and when the voltage across the capacitor reaches a predetermined value the diode 174 will conduct in the forward direction and the requisite turn-on current will flow from gate to cathode in the thyristor 118 and thereby trigger the turn-on of the thyristor. This allows the storage capacitor 114 to discharge through the thyristor and the primary winding 166 of the voltage transforming device 116 and thereby develop a high voltage pulse in secondary winding 176 which constitutes the high voltage output and the terminals thereof are connected through cable 32 to the pins 48 and 58 (FIG. 5). The voltage transforming means 116 preferably takes the form of a high voltage spark coil with the primary and secondary windings having a common connection with constitutes an intermediate tap on a single coil and serves as a common return or ground conductor. Thus the transforming
means has the configuration of an autotransformer, as is commonly used for ignition coils.

Operation of the inventive high-voltage pulse generating circuit is as follows: When the switch 130 is closed the inverter 110 is operative and produces an alternating output voltage across the secondary winding 148. On each full cycle of the oscillator 110 the storage capacitor 114 is charged toward a value equal to twice the peak of the alternating voltage across the secondary winding. During the first half-cycle the capacitor 154 is charged and during the second half-cycle the voltage across the capacitor 154 and the voltage across the secondary winding 148 are additively combined across the storage capacitor 114, whereby it is charged toward a value equal to twice the peak voltage across the transformer secondary. As the capacitor 114 is charged, the voltage thereacross is also applied across the voltage divider including the series resistor 170 and capacitor 172. During the initial part of this charging interval the thyristor 118 is turned off and accordingly no current flows through the primary winding 166 of the coil 116. As the voltage across the capacitor 114 rises toward its peak value the voltage across the capacitor 172 also increases until the output of the voltage divider 120 exceeds the threshold value for forward conduction of the diode 174. At this point the diode 174 becomes conductive and the current flow from gate to cathode of the thyristor 118 is sufficient to turn on the thyristor which thereupon connects the primary winding 166 directly across the storage capacitor 114. A discharging circuit is thus completed through the primary winding of the coil 116 and the resulting primary current imparts a high voltage output pulse across the secondary winding 176. The capacitor 114 is quickly discharged through the thyristor 118 and the thyristor is turned off in readiness for the next cycle of operation. The turn-off or quenching of the thyristor 118 is believed to be accomplished in either of two ways depending upon the operating conditions. When the high voltage across the secondary winding 176 is allowed to discharge, the energy in the capacitor is exhausted, thereby terminating current flow through the thyristor. When the high voltage across the secondary winding is not allowed to discharge, the reflected counter electromotive force in the primary winding 166 terminates the current flow through the thyristor. Thus the thyristor 118 is turned off at the end of the first cycle and the succeeding cycle commences. As previously described, the first half-cycle thereof is operative to charge the capacitor 154 and the second half-cycle is operative to apply the transformer secondary voltage and the voltage of capacitor 154 to the storage capacitor 114. When a predetermined voltage is reached, the control circuit 120 turns on the thyristor to discharge the capacitor 114 through the primary winding 166 to produce a high voltage pulse in the output winding 176, as previously described. This operation is repetitive at a rate depending upon the time constant of the resistor 170 and the capacitor 172 with a maximum corresponding to the frequency of the transistor oscillator 110. A train of high voltage output pulses is produced across the secondary winding of the transforming means 116.

The train of high voltage pulses are applied through the cable 32 to electrocute the stick 10. Accordingly, the high voltage will be impressed across the sets of conductors 22 and 24. The high voltage will also be impressed across the electrodes 66 and 68 of the sparking device 64. The voltage of each pulse is high enough to cause a spark discharge between the electrodes 66 and 68 but it is insufficient to cause discharge between the adjacent conductors 22 and 24 which are more widely spaced than the spark gap electrodes. The sparking device 64 produces spark discharges of considerable intensity across the annular gap and the reflective surface of the electrode 66 enhances the visual effect. Additionally, the spark tendency to travel or wander around the annular gap. The high voltage power supply is effective to fire the spark gap at the repetition rate of the high voltage pulses which is in the auditive frequency range and the repetitive discharges thus produce a noise in the nature of a hissing sound. Consequently the sparking device lends a menacing appearance to the electrified stick even though the sparking device itself is rather harmless.

The effectiveness of the electrified stick is provided by the high voltage conductors 22 and 24. Although the voltage is of the order of several thousand volts, the device is not lethal and does not inflict lasting injury upon the person who engages the conductors. Instead, by reason of the high voltage being applied across adjacent conductors a localized area of the person’s anatomy is directly affected. The high voltage power supply delivers a measured amount of electrical energy by each discharge of the storage capacitor and hence by each pulse of high voltage. When a person grasps the stick and his hand bridges the high voltage conductors high voltage shocking pulses will be administered at a repetition rate corresponding to the frequency of inverter. The power supply will function with the high voltage output in an open circuit, spark discharge or short circuit condition. Even in the short circuit mode the current drain on the battery remains substantially the same as in other modes because the capacitor discharge system of the power supply will deliver only a metered amount of energy per pulse. The high voltage output circuit is effectively isolated from the battery supply in the inverter. Thus the power supply may be operated a relatively long time without recharging the batteries.

A modification of the invention is illustrated in FIG. 4. In this modification the invention is embodied in a garment to be worn by the user of the device. In particular, a glove of leather or other insulating material is provided with a pair of conductors 202 and 204 which extend in spaced relation along the length of the glove. The conductors 202 and 204 are provided with electrical connectors 206 and 208 respectively, which suitably take the form of snap fastener elements adapted to be connected to the high voltage power supply through a flexible cable which terminates in mating snap fastener elements, not shown. It will now be appreciated that the glove 200 may be connected with a high voltage power supply of the same construction as shown in FIGS. 2, 3 and 7. When the power supply is energized during the use of the glove for crowd control purposes the simultaneous engagement of the conductors 202 and 204 with the anatomy of a would-be assailant produces an electric shock sufficient to ward off the assailant.

Although the description of this invention has been given with reference to a particular embodiment, it is not to be construed in a limiting sense. Many variations and modifications will now occur to those skilled in the
art. For a definition of the invention reference is made to the appended claims. The embodiments of the present invention in which an exclusive property or privilege is claimed are defined as follows:

1. An electric shock weapon comprising a support member of electrically insulating material, a power supply, at least one pair of spaced conductors mounted on said member and being adapted for simultaneous engagement with a subject, an induction coil with a primary winding and a secondary winding, said secondary winding being connected between said conductors, a capacitor and a charging circuit connected therewith for recharging the capacitor after discharge thereof, said charging circuit being connected with said power supply, and a self-actuating switching means connected in series circuit with said capacitor and the primary winding of said coil, said switching means being effective to close said series circuit in response to a predetermined voltage across said capacitor whereby the capacitor is discharged through said primary winding, said switching means being effective to open said series circuit when the capacitor is discharged whereupon the capacitor is recharged and the conductors are energized with repetitive high voltage impulses from said secondary winding, said impulses being of substantially uniform energy content.

2. The invention as defined in claim 1 wherein said support member is a stick, plural pairs of spaced conductors extending lengthwise of said stick, a first set of alternate conductors being connected together at one end and a second set of alternate conductors being connected together at the opposite end.

3. The invention as defined in claim 1 wherein said support member is a garment.

4. The invention as defined in claim 1 wherein said support member is portable by the user, a separate container enclosing said coil, capacitor, charging circuit and switching means and adapted to be carried on the person of the user, and a flexible electrical cable extending between the coil secondary winding in said container and said conductors on said member.

5. The invention as defined in claim 1 wherein said charging circuit comprises an inverter, including a battery, a voltage doubler connected between the inverter and said capacitor and wherein said self-actuating switching means comprises a timing circuit and a thyristor with its output connected in series with said capacitor and said secondary winding and with its gate connected to said timing circuit.

6. The invention as defined in claim 5 including a support bracket mounted on said container and adapted to be received in a holder carried on the person of the user, said support bracket being provided with a pair of electrical terminals connected across said battery and being adapted for connection with an external battery recharging device.

7. The invention as defined in claim 2 wherein said stick includes a handgrip portion at one end thereof, and an insulating sleeve slidably disposed upon said stick over said conductors and being movable between a position wherein said handgrip portion to a position adjacent the other end and constituting an auxiliary handgrip portion.

8. An electric shock weapon comprising a support member of electrically insulating material, at least one pair of spaced elongated conductors mounted on said member, and being adapted for simultaneous engagement with a subject, a pair of spaced electrodes mounted on said member and having a spark gap therebetween disposed exteriorly of said member so as to be readily visible to said subject, a high voltage pulse generator having output terminals connected across said electrodes to produce sparking therebetween and connected across said conductors to apply an electric shock to a subject in engagement therewith, said conductors being spaced far enough from each other so that no spark discharge occurs directly through the air therebetween, said pair of electrodes being spaced close enough to each other so that a spark discharge occurs directly through the air therebetween upon each pulse from said pulse generator, the pulse generator frequency being high enough so that the spark discharge appears to be continuous.

9. The invention as defined in claim 8 wherein said support member is a stick, a handgrip portion at one end of said stick, plural pairs of conductors disposed on said stick between said handgrip portion and the other end of said stick, said pair of spaced electrodes being disposed on said stick at said end of said stick.

10. The invention as defined in claim 9 wherein one of said electrodes includes a concave portion on said other end of the stick and forms a light reflective surface, said other electrode being disposed centrally of said one electrode, whereby light from a spark discharge between said electrodes is reflected by said one electrode.

11. The invention as defined in claim 9 wherein a first set of alternate conductors is connected to a first common connector at one end of the conductors, a second set of alternate conductors being connected to a second common connector at the opposite end of the conductors, one electrode and the first common conductor being connected to one of said output terminals, and the second common connector being integral with said other electrode and being connected to the other of said output terminals.

12. The invention as defined in claim 11 wherein said first common connector is a ring disposed around said stick and the second common connector having a ring-shaped portion integrally connected with said concave portion and being disposed over the end of said stick.

13. The invention as defined in claim 12 wherein said one electrode is a metallic disc defining an annular spark gap with said first electrode.

14. The invention as defined in claim 8 wherein said high voltage power supply comprises an induction coil with a secondary winding, a capacitor and a charging circuit connected therewith for recharging the capacitor after the discharge thereof and a self-actuating switching means for connected said capacitor across the primary winding of said coil when the capacitor is charged, whereby the conductors and said spaced electrodes are energized with repetitive high voltage impulses, and said spark gap produces a bright and noisy spark discharge.

15. An electric shock weapon comprising a stick of insulating material, a handgrip portion at one end thereof, at least one pair of conductors mounted on the surface of said stick in spaced relation and extending substantially throughout the portion of the stick from the handgrip portion to the other end of the stick, said pair of conductors being adapted for simultaneous en-
11. Engagement with a subject, a high voltage power supply having output terminals connected across the pair of conductors for applying an electric shock to a subject in engagement with said pair of conductors, and an insulating sleeve slidably disposed upon said stick over said conductors and being movable between a position adjacent said handgrip portion to a position adjacent said other end and constituting an auxiliary handgrip portion.

16. The invention as defined in claim 15 including plural pairs of conductors, a first set of alternate conductors being connected with a first common connector and a second set of alternate conductors being connected with a second common connector, said common connectors being connected respectively with the output terminals of the high voltage power supply.

17. The invention as defined in claim 16 wherein said first common connector is a ring disposed over said stick adjacent said handgrip portion and wherein said second common connector is a ring disposed over said stick and adjacent the other end thereof, and said sleeve is slidably disposed between said rings.

18. The invention as defined in claim 17 including a pair of spaced electrodes mounted on said other end of said stick and being connected respectively with the output terminals of said power supply.

19. The invention as defined in claim 18 wherein said high voltage power supply comprises an induction coil with a secondary winding, a capacitor and a charging circuit connected therewith for recharging the capacitor after discharge thereof, and a self-actuating switching means for connecting said capacitor across the primary winding of said coil when the capacitor is charged, whereby said conductors and said electrodes are energized with repetitive high voltage impulses.

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