A fencing weapon includes an integrated indicator portion in the guard. The indicator portion can be a light or array of lights to signal valid and invalid touches. The sport of fencing benefits in particular from weapons with this indicator configuration.
FENCING WEAPON INCLUDING INDICATOR INTEGRATED IN GUARD

BACKGROUND AND SUMMARY

[0001] The modern sport of fencing is hundreds of years old. Historically, referees and bout directors awarded points (or touches—where one opponent’s weapon blade or tip makes contact with the target area of the other opponent) by visually observing two opponents and determining whether a touch occurred and whether the fencer scoring the touch should be awarded a point based on existing rules. The object of saber fencing, based on cavalry fencing on horseback, is to score touches by contacting a blade or tip of a fencer’s weapon with an opponent’s target area (above that opponent’s waist including his arms and head). The object of foil fencing is to score touches by contacting the tip of a fencer’s weapon with an opponent’s target area (the opponent’s torso). The object of epee fencing, based on first-blood duels, is to score touches by contacting the tip of a fencer’s weapon with an opponent’s target area (any part of the opponent’s body). Each form of modern sport of fencing is very rapid. Often actions, contacts, and target areas are difficult to visually see. Modern fencing weapons are so light that skilled fencers can manipulate them with extreme speed in flurries of action. This speed renders it difficult to determine when touches are scored. Even where several officials are employed to judge a match, visual identification of scoring maneuvers is difficult. Disagreement between officials often occurs, due to the inconsistency in the quality of perspective enjoyed by the various officials. Moreover, judgment by visual observation is a subjective criterion, and the acuity of vision may vary among officials, and even in the same official.

[0002] In the 1970s electronic circuits were used to aid in awarding touches. FIG. 1 depicts the current state of the art fencing scoring system. Each fencer X, Y holds a weapon 12, 14 which includes a blade 20 connected to a wire running down each fencer’s sleeve (not shown) and connected behind each fencer to a reel wire 24, 26 affixed to a retractable reel 28, 30. Each fencer X, Y wears a jacket 21, 22 which can be made of a conductive material, a mask 30 which can be made of conductive material, and a wire 31 connecting the mask to the jacket 21. The terminal of the reel wire 24, 26 is also connected electrically to the fencer’s jacket 21, 22. Each reel 28, 30 is connected to an electrical scoring apparatus 10 that has indicators Wx, Cx, Wy, Cy which alternatively illuminate to indicate a touch. If the weapon being fenced is saber, then when fencer Y in FIG. 1 contacts fencer X with any portion of the blade 20 of weapon 14 on a conductive area of either jacket 22 or mask 33, a circuit connects and indicator light Wy indicates fencer A scored a touch. A referee or director D will use this information and his or her visualization of the action to decide whether fencer Y’s touch should be awarded a point. When fencer X in FIG. 1 contacts fencer Y with the blade 16 of saber 12 on fencer Y’s conductive area of either jacket 22 or mask 33, a circuit connects and indicator light Wx illuminates. Often both lights Wx and Wx will illuminate and a director or referee will need to determine to which fencer, if any, a touch should be awarded according to the rules of saber fencing.

[0003] Foil fencing includes a similar configuration to the saber configuration of FIG. 1, except each fencer X, Y hold a foil and jackets 21, 22 have a conductive target area comprising the fencer’s torso. A valid touch signal in foil includes the breaking of a first circuit and completing a second. A foil has a movable contact on its tip, which is depressed whenever the tip touches an object, breaking the first electrical circuit. Each contestant wears a vest-like garment which covers the valid target portion of his body. The vest has a conductive surface, and is connected in a second circuit between the electrical scoring apparatus 10 and the opponent’s foil. The movable contact on each foil is itself conductive. When the movable contact of one fencer’s foil touches the opponent’s conductive vest, the second electrical circuit is completed, and the first circuit is broken, producing a valid touch signal (thus illuminating respective indicator Wx or Wy). An invalid touch in foil is indicated merely by the breaking of the first circuit (thus illuminating respective indicator Cx, Cy), since in an invalid touch, the foil fails to contact the opponent’s vest.

[0004] Epee fencing includes a similar configuration to the saber configuration of FIG. 1, except each fencer X, Y hold an epee and wear a jacket 21, 22 that need not include a conductive area. A touch signal in epee constitutes simply the making of one circuit. The movable contact in the epee touch sensor assembly completes the circuit on depression in the course of a touch. Errant touches on the piste 35 or on the opponent’s weapon body are not scored. Accordingly, if a fencer’s epee tip touches the piste 35, or his opponent’s weapon, the electrical scoring apparatus 10 disables the scoring indicators, preventing the registration of a touch in response to such errant touches. The movable contact on the epee tip is conductive as in the case of the foil. It is connected to a portion of the electrical scoring apparatus 10 which, if grounded, prevents actuation of the valid touch indicators. The piste 35 is grounded, as is the body of each weapon 12, 14, so that errant touches on the weapon body or the piste 35 are not counted as scores.

[0005] A problem associated with the state of the art fencing system is that electrical scoring apparatuses are often difficult to see for fencers and referees who must rapidly turn their attention from the fencing action to observe indicator lights on the apparatus. They can be confusing to spectators who have to associate one color light with each fencer and often are unsure which light represents which fencer. One way to combat this to include indicator lights in a fencer’s mask. When a touch is scored, lights or LED arrays situated in a fencers mask illuminate based on control signals from electrical scoring apparatus 10. Control signals can be sent wirelessly or via a wired connection. Illuminating masks are helpful in that they allow easy viewing when touches are scored by fencers, referees, and observers. However, they are often costly and may require after market electronics and batteries in order to function properly. Also, each fencer is only able to see the mask of the other which indicates a touch scored. They are unable to see the indicator contained in their own mask or may not have a mask that contains indicators. Thus they may have to look to an external scoring apparatus 10 to determine whether they also scored a touch which requires altering a field of view away from the fencing action.

[0006] Alternatively an external device situated either on the fencers’ garb this or connected to the fencer’s weapon may emit a signal indicator such as a light or sound. These devices are often less costly, however, they are of limited use in that they can easily be misheard and do not offer a convenient vantage for fencers, referees, and observers.

[0007] The invention overcomes the problems of the prior art by providing at least one indicator light or an array of lights within the guard of a fencer’s weapon. Such a light or array of
lights visibly makes clear indication of which fencer made contact and can easily be observed in the course of action during a fencing match.

[0008] The invention achieves this in a first aspect by a fencing weapon which includes a blade portion; a handle; and a guard portion having an integrated indicator device.

[0009] In one embodiment the integrated indicator device further can be an indicator light and in another embodiment it can be an array of indicator lights.

[0010] In one embodiment, the indicator light receives a signal from an electrical scoring apparatus and in other embodiments the electrical scoring apparatus is contained within the fencing weapon itself or is located remotely from the fencing weapon.

[0011] Indicator lights can be light emitting diodes and can be recessed below an outer surface of said guard portion to prevent that contacting it with an opponent’s weapon or weapon tip will register a valid touch.

[0012] In one embodiment, the fencing weapon includes a power source for providing power to the integrated indicator device. In another embodiment, the fencing weapon comprises a counter for outputting a count of indicator signals and a memory for storing the count. The integrated indicator device can include a display for displaying the count. The fencing weapon can also include a wireless communication device for receiving at least one indicator signal from at least one other device.

FIGURES

[0013] FIG. 1 depicts a prior art fencing system;
[0014] FIG. 2 depicts a first device according to the invention;
[0015] FIG. 3 depicts a second device according to the invention;

DETAILED DESCRIPTION

[0016] FIG. 2 depicts a fencing weapon. In the present example, FIG. 2 depicts a saber 12. Saber 12 includes a blade 16, a handle 45, and a guard 46. Blade 16 extends through a hollow portion of handle 45 where it terminates at a pommel 49. Blade 16 is conductive, frequently made of steel or some other metal alloy. FIG. 2 affords a view of saber 12 where the underside of guard 46 is visible. Processor 40, power supply 41, and signal device 43 are situated on the inside surface of guard 46 facing handle 45. Saber 12 also includes an integrated indicator device in the form of an array 44 which can be composed of a series of lights. The array 44 is integrated into the guard of 46 such that any light output from at least a portion of the indicator array 44 is visible to a viewer observing the outer surface of guard 46. Thus when any portion of indicator array 44 illuminates it will be visible, for example, to a fencer’s opponent, a referee, or any other observer capable of viewing the outer surface of guard 46. This allows convenient observation of indicator signals without having to remove viewing away from the fencing action. The array 44 can be a series of different colored lights. The lights can be light emitting diodes (LEDs), organo-luminescent light emitting diodes (OLEDs), bio-luminescent lights, incandescent lights or any other kind of light known to one of skill in the art.

[0017] By way of one non-limiting example, when the bearer of saber 12 completes a valid touch, processor 40 and signal device 43 direct power from power supply 42 to illuminate light 50. Light 50 can be any color of light, for example green. When the opponent of the fencer bearing saber 12 completes a valid touch processor 40 instructs signal device 43 to direct power from power supply 42 to illuminate light 51. Light 51 can be any color of light that is distinguishable from the color of light 50. For example, light 51 can be red. When the bearer of saber 12 contacts a ground state (indicating a meeting of blades or a failed electrical connection) processor 41 instructs signal device 43 to direct power from power supply 42 to illuminate light 52. Light 52 can be any color of light that is distinguishable from the colors of lights 50 and 51. For example, light 52 can be yellow.

[0018] Since two fencers compete simultaneously to score touches, signal device 43 can also emit a signal or signals via wireline or wirelessly to an opponent’s saber 12 or an electrical scoring apparatus not contained in either fencers’ saber. If, for example, both fencers hold a saber 12, they will be able to detect valid and invalid touches within their field of view during competition without having to alter their viewpoint to seek an external scoring indicator.

[0019] Generally, guard 46 is electrically grounded. Indicator array 44 can, for example, have a relatively small area such that it would not represent a large enough surface area to allow scoring of invalid touches when an opponent’s weapon or weapon tip contacts a grounded guard (i.e., what should not be scored as a valid touch). Indicator array 44 can be recessed within guard 46 so that it protects lights 50, 51, 52 from being struck during fencing and prevents them from being damaged.

[0020] Additionally, processor 40 can signal wireless device 43 to transmit a signal indicating a valid touch to an electrical scoring device which will then cause a respective appropriate indicator light to illuminate. Wireless device 43 can be any wireless device known to one of skill in the art, such as an IEEE 802.11 compliant device, or a Bluetooth device. Further processor 40 can signal wireless device 43 to transmit a signal intended for receipt by an opponent’s saber. This information can be used to signal an indicator on the opponent’s weapon. It can also be transmitted with the output of a motion sensor 42 and a timing device 39 such that electric scoring equipment and/or an opponent’s saber can collect adequate information to determine not only which weapon sensed contact with a target area, but also which fencer should be awarded a touch based on the rules of the sport (i.e., under the current rules of saber fencing, if both fencers initiate an attack and neither fencer’s blade contacts the other’s blade, if one fencer initiated the action by advancing their saber forward first he or she is awarded a touch. If however both fencers advance their weapons relatively simultaneously, no touch is awarded.

[0021] Transmitting the information that a touch is scored and information on timing and motion of the saber 12 can be very useful in aiding a director in awarding a touch or to render an automated touch award). Motion sensor 42 can be an accelerometer, a gyroscopic sensor, or any other motion sensor presently known to one of skill in the motion sensing art. Timing device 39 can be any timing device known to one of skill in the art. This information when received can be used to determine whether to illuminate a light 50, 51, 52 and when to illuminate it.

[0022] Power supply 41 supplies power for operation of processor 40, indicators 44, motion sensor 42, timing device 39, sensor blade 16 and wireless device 43. Saber 12 may also include a display 60 for displaying information from a counter 61, an electrical scoring system, or an opponent’s
weapon. For example, display 60 can display the number of touches scored by the bearer of saber 12 during a bout and can be reset anew for each new bout. In FIG. 2, display on saber 12 outputs the number 2 from counter 61 indicating that the bearer of saber 12 scored 2 touches in a present bout.

[0023] FIG. 3 depicts a weapon 12' similar to the saber 12 of FIG. 2. Weapon 12' contains all the components of saber 12 with a difference that tip-portion 500 acts as a sensor as opposed to the entire length of blade 16. Array 44 of lights 50, 51, 52 is situated in guard 46 in a similar configuration to the saber 12 of FIG. 2. Array 44 and display 60 are shown in FIG. 3 as situated on a substantially planar surface of guard 12 facing an opponent during play, however they can also be situated nearer an outside edge of guard 46.

[0024] While the invention has been shown and described with reference to certain exemplary embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims and their equivalents.

1. A fencing weapon comprising:
   a blade portion;
   a handle; and
   a guard portion, wherein said guard portion further comprises an integrated indicator device.

2. The device of claim 1, wherein integrated indicator device further comprises at least one indicator light.

3. The device of claim 1, wherein the integrated indicator device further comprises an array of indicator lights.

4. The device of claim 2, wherein the at least one indicator light further comprises an input which receives a signal from an electrical scoring apparatus.

5. The device of claim 3, wherein said electrical scoring apparatus is contained within said fencing weapon.

6. The device of claim 3, wherein said electrical scoring apparatus is located remotely from the fencing weapon.

7. The device of claim 2, wherein said at least one indicator light further comprises at least one light emitting diode.

8. The device of claim 2, wherein said at least one indicator device is recessed below an outer surface of said guard portion.

9. The device of claim 2, wherein a grounding substance covers said at least one indicator device such that contacting it with an opponent’s weapon or weapon tip will not register a valid touch.

10. The device of claim 1, wherein the fencing weapon further comprises a power source for providing power to said integrated indicator device.

11. The device of claim 1, wherein the fencing weapon further comprises a counter for outputting a count of indicator signals and a memory for storing said count.

12. The device of claim 17, wherein the integrated indicator device further comprises a display for displaying said count.

13. The device of claim 1, wherein said fencing weapon further comprises a wireless communication device for receiving at least one indicator signal from at least one other device.

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