SPORTS SCORING DEVICE INCLUDING A FLEXIBLE PREZOELECTRIC LAYER RESILIENT LAYER

DESCRIPTION

TECHNICAL FIELD

This invention relates generally to the field of evaluating performance in physical contests involving body maneuvering, and more specifically to scoring in matches between practitioners of the martial arts.

BACKGROUND ART

Martial arts such as karate, kung-fu, tae-kwon do, kick-boxing, boxing, and others, enjoy increasing popularity as physical sports and mental disciplines. Many of these martial arts are the present day successors to ancient forms of hand to hand combat practiced in various regions of the Orient.

Today, the competitive aspects of these martial arts are generally practiced by fighters in a ring (with or without ropes on the perimeter) similar to the type used in boxing.

These martial arts employ, in both their training regime and competition matches, full-contact contest formats, or non-contact or light contact (controlled) sparring sessions, with opponents of approximately equal experience and weight. This training must be done on a regular basis to be effective in developing the requisite skills to defend oneself in a self-defense situation or to perform optimally in an organized competition.

In the non-contact or light contact modes of sparring practice, martial arts such as karate, kung-fu, etc., differ from professional boxing. In practice of these martial arts, offensive "techniques", i.e. attack moves, are executed, or "delivered" toward an opponent's body with full power and speed. They are, however, ideally controlled, "pulled" or stopped just short of actual physical contact, or upon only light contact, depending on applicable rules of the competition. This restraint is not only employed because of the great potential for serious injury that can result from a skillfully delivered unrestrained martial arts technique, but also because this precise control demonstrates mental discipline and physical prowess on the part of the combatant.

A point may be awarded to a fighter when he or she delivers an unblocked attack or technique to the neighborhood of a designated legal target or "vital" area of the opponent's body, with sufficient speed, power and form to be adjudged to potentially cause damage to the opponent's body if not controlled. Vital areas include the kidneys, solar plexus, face, groin, etc. An added requirement is that a point will be awarded only when a technique threatens a designated vital or target area with impact by a predetermined "designated hitting surface" of the attacking fighter's body. Designated hitting surface areas include for example the first two knuckles of a closed fist, the side of the hand, and the ball of the foot.

Excessive contact in delivering a technique in non-contact or light contact matches can cause a fighter to be disqualified, or be denied points, for that technique.

A problem created by non-contact or light contact sports, such as these controlled martial arts sparring exercises, is that accurate scoring is predicated on the subjective evaluation of an exchange of techniques between the fighters, either by the fighters themselves, or

by as many as five experienced judges, strategically positioned in tournament matches at corners of the ring and within the ring itself. Dependence on this subjective judgment sometimes results in improperly awarded points, missed points, excessive contact (by a participant attempting to forcefully "record" his point unmistakably for the judges) and in second punching by the defending fighter because he ignored, by design or accident, his opponent's scoring technique.

Martial arts fighters can maneuver their bodies and deliver attacks or techniques toward their opponents with extreme speed in flurries of action. The degree of this speed amplifies the difficulty in determining when points 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 inequality of perspective enjoyed by the various officials. Moreover, visual acuity may vary among officials, and even, over time, in the same official.

Participants in the sports of Professional Boxing, Professional Karate and Kickboxing, etc. deliver their techniques with full power and speed in competitive matches with the goal of rendering their opponent temporarily incapacitated. A scoring system based on the visible accumulation of damaging blows represents one mode of measuring the effectiveness of a fighter's technique. The rigorous nature of such contests limits participation and offers potential for injury to the combatants. Full contact matches that end without a knockout or TKO are subject to subjective scoring as are the non-contact and light contact matches.

Martial arts practitioners in increasing numbers wear protective garments including padding that covers the fighters' designated hitting areas, such as the hands and feet. Such protective garb is very popular as a means of preventing injuries due to accidental contact. Their use is mandated in the great majority of tournaments in the United States and Canada.

An interesting, but crude, proposal has been made in the hope of improving scoring accuracy in martial arts matches. According to this proposal, each fighter wears a vest-like garment having numerous pockets, each pocket being positioned over a vital area of the fighter's body. Inflatable components, resembling balloons, are placed in the pockets. When the opposing fighter delivers a technique to the neighborhood of a vital area, the corresponding balloon is struck and is said to burst, indicating that the technique was in fact delivered to the neighborhood of the associated vital area.

A significant problem with this proposal is that, once a balloon bursts, it can indicate no further results of action. With this proposal, the fight must be stopped after each point and a new balloon inserted into the appropriate pocket. Such a limitation renders impractical the proposed system.

Another disadvantage of the proposed system is that, while it can indicate when a vital area is contacted, it cannot distinguish between hits utilizing designated hitting areas and hits made with non-scoring other parts of the attacking fighter's body.

Further disadvantages in the proposed system are that the actual force of each blow is not quantitatively measured and no provision is made for participants who prefer sparring without the requirement of receiving or delivering contacting blows.