

One method of providing a benchmark signature indicating a standard for a good blow is to have a fighter of known high skill deliver several blows to a transducer under fighting conditions. The official studies the displayed waveforms and can quantify the attributes identified above. Subsequent blows delivered in actual matches are then compared with the standard for evaluation.

Such evaluation can be performed as well with the transducer apparatus used in the practice equipment and contact scoring embodiments.

The various audio and visual indicators described in FIG. 6A, and their power supplies, can optionally be mounted on the fighters' vests and provide a completely portable unit, with no need of remotely located blow indicator elements.

It is to be understood that this description is intended as illustrative, rather than exhaustive, of the invention. Persons of ordinary skill in the relevant art may make certain additions to, deletions from, or changes in the embodiments described in this disclosure without departing from the spirit or the scope of the invention, as set forth in the appended claims.

We claim:

1. A scoring apparatus for indicating at least one characteristic of an externally applied impact by a sports participant to a deformable object, wherein said characteristic is at least one of velocity, force or energy of said impact, said apparatus comprising flexible transducer means, responsive to said impact, for providing an analog output, said transducer means comprises a piezoelectric film layer comprises of a piezoelectric material, wherein said transducer means is attached to a first resilient layer of material, wherein said resilient layer is above or below said piezoelectric film layer such that said impact deforms only a portion of said film layer and only a portion of said first resilient layer; means, responsive to said analog output, for indicating said one, characteristic of said impact,

wherein said flexible transducer means of said apparatus comprises an active means for generating an electrical output in response to said impact.

- 2. An apparatus as defined in claim 1, wherein said deformable object is a garment.
- 3. The apparatus as defined in claim 1, wherein said deformable object is a glove.
- 4. The apparatus as defined in claim 1, wherein said deformable object is a vest.
- 5. The apparatus as defined in claim 1, wherein said deformable object is a hitting pad.
- 6. The apparatus as defined in claim 1, wherein said deformable object is a punching bag.
- 7. The apparatus as defined in claim 1, wherein said deformable object is a football blocking dummy.
- 8. The apparatus as defined in claim 1, wherein said piezoelectric film layer comprises a plurality of physically separated, electrically connected piezoelectric members.
- 9. The apparatus as defined in claim 1, wherein said deformable object further includes at least a second layer of resilient material with said piezoelectric material sandwiched between said first and said second resilient layers.
- 10. The apparatus as defined in claim 1, wherein said analog output has an initial rate of increase and said indicating means includes means, responsive to said initial rate of increase, for signifying velocity of said impact.
- 11. The apparatus as defined in claim 1, wherein said analog output comprises an initial rate of increase, a peak amplitude or a duration.
- 12. The apparatus as defined in claim 1, wherein said deformable object includes a curved surface, said first resilient layer is curved, and said second film layer is contoured to the curved shape of said first resilient layer.
- 13. The apparatus as defined in claim 1, wherein said indicating means indicates the force of said impact.

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