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Europäisches Patentamt

European Patent Office

Office européen des brevets

11 Publication number:

**0 096 672
B1**

12

EUROPEAN PATENT SPECIFICATION

45 Date of publication of patent specification: **16.09.87** . 51 Int. Cl.⁴: **A 63 B 5/00, A 63 B 71/06**

21 Application number: **83850152.6**

22 Date of filing: **02.06.83**

54 **Overstep recording device.**

30 Priority: **04.06.82 SE 8203474**

43 Date of publication of application:
21.12.83 Bulletin 83/51

45 Publication of the grant of the patent:
16.09.87 Bulletin 87/38

84 Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL

56 References cited:
**DE-A-1 578 536
DE-A-2 852 337
FR-A-2 299 047**

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Courier Press, Leamington Spa, England.

EP 0 096 672 B1

Description

This invention relates to a device for recording overstep of a predetermined reference line by a sportsman which device comprises a step cushion having one side extending parallel to said reference line when positioned for use and including an airfilled and airtight cavity of a definite volume and an upper layer of elastic material enclosing said cavity, which layer, upon being loaded on its upper surface, is flexible to instantaneously reduce the volume of the cavity thereby causing a pressure increase, said cavity being connected to a pressure sensor which, in response to such a pressure increase, causes a signal member to emit an optical and/or acoustic signal.

A device of the type described above for recording oversteps in connection with different sports is known from the FR—A—2 299 047. Said device includes a step cushion in the form of a tube of rubber located on the bottom of a recess. Said tube is covered by a step board also located in said recess to act on the tube. Upon being loaded on its upper surface the step board acts on the tube to reduce the volume thereof thereby causing a pressure increase being used to cause a signal member to emit a signal.

Said known device for recording oversteps is not safe in function due to difficulties of avoiding entrance of sand particles and other undesired particles into the recess containing the tube. If such particles are allowed to enter into the recess and between the surfaces of thereof and the step board, they will reduce the movability of the step board within the recess, making said overstep recording device very insensitive and unusable in practice.

To record oversteps in connection with exercise of sports such as long jump, hop-step-and jump and so on, an overstep bank is used, said bank consisting of a marking board located in direct connection to a take-off board and provided with a flat, smooth strand of plasteline, model clay or similar easily pliable material. The plasteline strand can be laid on a hard, not removable support or on a removable plasteline board.

When a jumper steps over, the overstep is recorded in the form of a mark in the smoothly formed plasteline surface. When the overstep is substantial, there is no problem for the officials to decide that overstep has occurred. When, however, the overstep is minute, it can in many cases be very difficult for the officials to decide whether or not overstep has occurred. It is, therefore, necessary at competitions to have several officials for making the decision whether overstep has occurred or not.

When an overstep has occurred, the plasteline strand must be restored to its smooth original state. This requires time and, therefore, competitions in long jump and hop-step-and jump require relatively long time to perform, which implies for the spectators many and long uninteresting breaks. When several loose plasteline

boards are available, they can be shifted, and a plasteline strand deformed by overstep can be restored during the next jump and then be exchanged against the next plasteline strand deformed by overstep.

This known technique of marking and recording oversteps also involves the disadvantage, that the spectators at the same time as the jump is carried out cannot decide whether the jump is okay or not, but must wait for the judgment by the officials. This disadvantage also contributes to the fact that, for example, long jump and hop-step-and jump competitions are not so attractive and engaging for the spectators.

The present invention, therefore, has the object to provide a device for overstep recording, which does not show the aforesaid disadvantages, but renders it possible, even for the spectators, to safely and directly record whether overstep has occurred or not, and which does not require any restoring work after an overstep, but rather permits a stream of jumps.

This object is achieved in that the device according to the present invention has been given the characterizing features defined in the attached claim 1. Preferred embodiments are defined in claims 2 to 7.

The invention is described in greater detail in the following with reference to the accompanying drawings, in which Fig. 1 is a schematic horizontal view of a long jump grounds equipped with the device according to the invention, and Fig. 2 is on an enlarged scale a section substantially along the line II—II in Fig. 1.

In Fig. 1, the numeral 1 designates a run path for long jump, and 2 designates a jumping pit. In the run path 1, at the intended distance from the jump pit 2, a take-off board 3 is located. An overstep ramp 4 according to the present invention is provided in the jumping direction directly after the take-off board 3.

The overstep ramp 4 comprises a carrier 6 of rigid, i.e. non-resilient or inflexible material, for example wood, which is detachably attached on a rigid support 5 (Fig. 2), and a step cushion 7, which is rigidly connected to the angularly designed upper surface of the carrier. According to the present international regulations said angle α is 150° , i.e. the portion of the step cushion as well as of the carrier located closest to the takeoff board 3 extends upward from the take-off board 3 at an angle of 30° in relation to the horizontal plane and then is in parallel with said plane.

The step cushion 7 comprises an upper elastic tight layer 8 of rubber or similar elastic material with high airtightness, i.e. a material which is not air-permeable, and a bottom layer 9 of the same material as in the upper layer 8 or of stiff airtight rubber or other comparable material which is not air-permeable. These layers or parts 8, 9, by overall wall portions 10, 10a of the same material as in the tight layer or bottom layer, are designed in one single piece or connected to each other and form between themselves a cavity 11 filled with air. The step cushion 7 is provided on its upper

surface with a wear surface 12 of rubber coated with friction agent, which can form a separate layer rigidly connected to the layer 8 or constitute an integrated part of the layer 8, in order, especially at rainy weather, to prevent the jumper from slipping or sliding in some other way against the overstep ramp 4, even at substantial overstep.

The step cushion 7 preferably should be located so on its carrier 6, that it rests with its edge 13 remote from the take-off board 3 against a shoulder 14 formed on the carrier 6. The upper surface of said shoulder should be on the same level as the wear surface 12 of the step cushion or on a slightly lower level than the same.

In one short side of the step cushion a stop valve 15, shown only schematically in the drawing, it located and connected to the cavity 11. Said valve is connected through an airtight line 16 (Fig. 1) to a pressure indicator 17, to which a signal member 18 is coupled which is connected to the mains or a battery. Upon sensing a pressure increase in the step cushion 7, said signal member 18 emits an optic and/or acoustic signal. In the drawings the signal member 18 is shown in the form of a signal lamp emitting an optic signal in the form of red light. The signal member, of course, can have any other suitable form, provided that the signal emitted thereby for marking overstep can be recorded and be seen and/or heard by the spectators. It is also possible to provide as an extra signal member a manometer or the like, which records the pressure at overstep, and which has a pointer remaining in the position of deflection, and which, thus, at least approximately can indicate the degree of overstep, i.e. whether the overstep is minute or substantial.

The pressure increase required for the pressure indicator 17 to cause the signal member 18 to emit a signal, arises as soon as a jumper contacts with the shoe the step cushion 7. The upper surface of said cushion thereby is subjected to a load, which presses together the cavity 11 in the step cushion 7, and thereby the air pressure in the cavity 11 increases. The increased air pressure in the cavity 11 of the step cushion is sensed by the pressure indicator 17, which, in its turn, causes the signal lamp 18 to light. The lamp by its red light shows directly to the jumper, the officials and the spectators that the jump carried out last is not okay due to overstep.

The cavity 11 of the step cushion 7 includes air of a predetermined pressure. In order to be able to control that this pressure does not change during a competition, a pressure gauge (not shown) is located in a suitable place between the cushion 7 and pressure indicator 17. Preferably said indicator can be equipped with such a pressure gauge, and if the air pressure should change during a competition, it can be corrected either by supplying additional air, for example by means of a pump, or by tapping air via the stop valve 15 or by calibrating the pressure indicator.

The overstep ramp 4 included in the device

according to the invention, is removable and is recessed into the take-off board 3 a distance which substantially corresponds to the thickness of the wall portion 10a (Fig. 2) of the step cushion. The edge side 20 of the take-off ramp which faces toward the jumping pit 2 is marked by a dashed line in Fig. 2. Said edge side also is the reference line, from which the length of the jump is measured.

The term "overstep" is to be understood as false start at competitions with flying start or standing start, where the runners must not pass a reference line, i.e. a start line, before a start signal is given. The overstep ramp according to the invention has been shown to be straight in the drawings, but it may also be arched so as to fit a shot putter and hammer throwing ring.

Claims

1. A device for recording overstep of a predetermined reference line (20) by a sportsman which device comprises a step cushion (7) having one side extending parallel to said line when positioned for use and including an airfilled and airtight cavity (11) of a definite volume and an upper layer (8) of elastic material enclosing said cavity (11), which layer (8), upon being loaded on its upper surface, is flexible to instantaneously reduce the volume of the cavity (11) thereby causing a pressure increase, said cavity (11) being connected to a pressure sensor (17) which, in response to such a pressure increase, causes a signal member (18) to emit an optical and/or acoustic signal, characterized in that the cavity (11) contains air of a predetermined pressure and has an end portion disposed under the location of the reference line (20) and in that the cushion (7) is shaped such that the sportsman may directly contact it, thereby deforming the upper layer (8) when overstep occurs.

2. A device as defined in claim 1, characterized in that the cushion (7) is located on a carrier (6) of rigid material.

3. A device as defined in claim 1 or 2, characterized in that one end of the cushion (7), when positioned for use, is located under one end of a take-off board (3) so that the end portion of the airtight cavity (11) is under the one end of the take-off board (3) with the reference line (20) being disposed over said portion of the airtight cavity (11).

4. A device as defined in any of the preceding claims, characterized in that the cushion (7) is provided on its upper surface with a friction increasing agent.

5. A device as defined in any one of the preceding claims, characterized in that the air cavity (11) of the cushion (7) is located between said upper elastic layer (8) of airtight rubber and a bottom layer (9) of airtight rubber, which layers are connected to each other by overall wall portions (10) of the same material as in the upper or bottom layer.

6. A device as defined in any one of the

preceding claims, characterized in that the signal member is a sound or light transmitter (18) connected to the mains or a battery.

7. A device as defined in any one of the preceding claims, characterized in that the pressure indicator (17) is connected to the step cushion (7) via a stop valve (15).

Patentansprüche

1. Einrichtung zur Aufzeichnung vom Uebertreten eines Sportlers von einer vorbestimmten Bezugslinie (20), welche Einrichtung ein Trittkissen (7) mit einer sich in der Anwendungslage zur erwähnten Linie parallel erstreckenden Seite hat und einen luftgefüllten und luftdichten Hohlraum (11) eines bestimmten Volumens und ein den erwähnten Hohlraum (11) umschliessendes oberes Lager (8) aus elastischem Material umfasst, welches Lager (8) bei Belastung seiner oberen Fläche flexibel ist, das Volumen des Hohlraums (11) augenblicklich zu reduzieren und dabei eine Druckerhöhung verursacht, wobei der erwähnte Hohlraum (11) an einen Druckmesswertgeber (17) angeschlossen ist, der als Antwort auf eine solche Druckerhöhung ein Signalmittel (18) dazu bringt, ein optisches und/oder akustisches Signal auszusenden, dadurch gekennzeichnet, dass der Hohlraum (11) Luft von einem vorbestimmten Druck enthält und ein Endteil hat, das unter der Bezugslinie (20) angeordnet ist, und dass das Kissen (7) derart ausgebildet ist, dass der Sportler in direkten Kontakt damit kommen kann und dabei das obere Lager (8) deformiert, wenn Uebertreten vorhanden ist.

2. Einrichtung nach Anspruch 1, dadurch gekennzeichnet, dass das Kissen (7) auf einem Träger (6) aus stummem Material placiert ist.

3. Einrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass das eine Ende des Kissens (7) in der Anwendungslage unter einem Ende eines Absprungbalkens (3) placiert ist, so dass das Endteil des luftdichten Hohlraums (11) unter dem einen Ende des Absprungbalkens (3) ist, wobei die Bezugslinie (20) über dem erwähnten Teile des luftdichten Hohlraums (11) placiert ist.

4. Einrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass das Kissen (7) auf seiner oberen Fläche mit einem reibungserhöhenden Mittel versehen ist.

5. Einrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass der Hohlraum (11) des Kissens (7) zwischen dem erwähnten oberen elastischen Lager (8) aus luftdichtem Gummi und einem Bodenlager (9) aus luftdichtem Gummi placiert ist, welche Lager mittels ringsum gehender Wandteile (10) aus demselben Material wie im oberen und unteren Lager miteinander verbunden sind.

6. Einrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass das Signalmittel ein Schall- oder Lichtgeber (18) ist, der an das Netz oder an eine Batterie angeschlossen ist.

7. Einrichtung nach einem der vorhergehenden

Ansprüche, dadurch gekennzeichnet, dass der Druckanzeiger (17) an das Trittkissen (7) via ein Abschlussventil (15) angeschlossen ist.

Revendications

1. Dispositif pour indiquer un dépassement, par un athlète, d'une ligne de référence prédéterminée (20), dispositif comprenant un coussin (7) de piétinement dont un côté s'étend, en position d'utilisation, parallèlement à ladite ligne et qui renferme une cavité (11) d'un volume déterminé, remplie d'air et étanche à l'air, surmontée d'une couche supérieure (8) d'une matière élastique, ladite couche (8), dès que chargée sur sa face supérieure, cédant à la charge en réduisant instantanément le volume de la cavité (11), entraînant ainsi une montée de pression, ladite cavité (11) étant reliée à un capteur de pression (17) dont la réaction à une telle montée en pression consiste à agir sur un organe (18) qui émet alors un signal visuel et/ou sonore, caractérisé en ce que la cavité (11) contient de l'air sous une pression prédéterminée et comporte une partie extrême disposée sous l'emplacement de la ligne de référence (20) et en ce que le coussin (7) revêt une forme permettant à l'athlète de venir directement en contact avec lui, déformant ainsi sa couche supérieure (8) en cas de dépassement.

2. Dispositif selon la revendication 1, caractérisé en ce que le coussin (7) est disposé sur un support (6) réalisé en une matière rigide.

3. Dispositif selon l'une des revendications 1 et 2, caractérisé en ce que l'une des extrémités du coussin (7), en position d'utilisation, est disposée sous l'une des extrémités d'une planche d'appel (3) en telle sorte que la partie extrême de la cavité (11) étanche à l'air se situe sous ladite extrémité de la planche d'appel (3), la ligne de référence (20) étant disposée au-dessus de ladite partie de la cavité (11) étanche à l'air.

4. Dispositif selon une quelconque des revendications précédentes, caractérisé en ce que le coussin (7) est revêtu, sur sa face supérieure, d'un agent augmentant le frottement.

5. Dispositif selon une quelconque des revendications précédentes, caractérisé en ce que la cavité d'air (11) du coussin (7) est disposée entre ladite couche supérieure élastique (8) en caoutchouc étanche à l'air et une couche inférieure (9) de caoutchouc étanche à l'air, les deux couches étant reliées l'une à l'autre par des parois (10) assurant l'étanchéité et réalisées dans la même matière que celle des couches supérieure et inférieure.

6. Dispositif selon une quelconque des revendications précédentes, caractérisé en ce que l'organe émettant le signal est constitué par un transmetteur (18) de son ou de lumière branché sur le réseau ou alimenté par des piles.

7. Dispositif selon une quelconque des revendications précédentes, caractérisé en ce que l'indicateur de pression (17) est relié au coussin (7) de piétinement par l'intermédiaire d'une soupape d'arrêt (15).

FIG. 1



